

*Clerkship Directors in Emergency Medicine (CDEM)/
Society for Academic Emergency Medicine (SAEM)*

Medical Student Educators' Handbook

EDITED BY
Robert L. Rogers
Siamak Moayedi

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About Clerkship Directors in Emergency Medicine

Clerkship Directors in Emergency Medicine (CDEM), formed in 2008, is the first Academy within the membership of the Society for Academic Emergency Medicine (SAEM). CDEM members are medical student educators who are committed to enhancing medical student education within our specialty. CDEM provides the opportunity for emergency medicine clerkship directors and medical student educators to join forces, collaborate, and become a unified voice at the national level.

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Foreword

The first edition of this book, titled *Medical Student Educator's Handbook*, edited by Douglas Ander, Wendy Coates, and David E. Manthey, was developed by the Society for Academic Emergency Medicine (SAEM) Undergraduate Medical Education Committee and Medical Student Educator's Interest Group. In 2008, Clerkship Directors in Emergency Medicine (CDEM) was formed as an academy within SAEM. CDEM is now the national voice of emergency medicine clerkship directors and medical student educators. This book represents the collaborative efforts of CDEM members to update the previous edition.

The goal of this book is to assist emergency medicine faculty interested in medical student education in their efforts to develop a more successful emergency medicine clerkship based on highlighted best practices. This book is intended to offer the reader tools to deal with the challenges of running a successful emergency medicine clerkship, including addressing administrative and political considerations, promoting faculty, supporting faculty involvement, determining methods for evaluation, and developing novel teaching tools. We envision its use as a reference for up-to-date, practical information.

Although the target audience is primarily emergency medicine faculty interested in medical student education, many of the topics covered are translatable to other medical student clerkships in various fields of medicine. Thus, this book will benefit a broad spectrum of medical student educators.

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SECTION ONE

*Emergency Medicine Rotation—
Teaching, Evaluation, and Feedback*

Expectations of an Emergency Medicine Clerkship Director

Robert L. Rogers, David A. Wald, Michelle Lin, and David E. Manthey

Summary Points

- Clerkship directors need adequate protected time to perform scholarly activities and administer the emergency medicine rotation.
- Clerkship directors in emergency medicine play a vital role in the hierarchy of undergraduate medical education.

IN ALL MEDICAL SCHOOLS, the clinical clerkship is fundamental to the process of educating medical students. Regardless of the health care setting—inpatient, outpatient, or the emergency department—the clinical experience in medical school revolves primarily around direct patient care. The clerkship director serves as a faculty leader within the school of medicine and plays a vital role in the hierarchy of undergraduate medical education. Collectively, clerkship directors across specialties serve a multitude of roles and are responsible for clerkship administration; curriculum development; and teaching, mentoring, and advising students. To provide opportunities for successful academic careers and to promote job satisfaction, faculty members who view undergraduate medical education as a career and not merely a stepping stone

Clerkship directors and other medical student educators have the unique opportunity to impose a positive and long-lasting impact on students at a time in their careers when they are most impressionable. In many ways, students at an early stage in medical school are undifferentiated, similar to the patients that we encounter in the emergency department on a daily basis.

to something else should be fostered and supported at the departmental and medical school level.

This chapter is based on an article being prepared by a taskforce consisting of members of the Academy of Clerkship Directors in Emergency Medicine (CDEM) and the Association of Academic Chairs of Emergency Medicine (AACEM). Brief recommendations have been published regarding the role of the emergency medicine clerkship director; however, this chapter was developed with the goal of further describing the role, expectations, and resources required for the emergency medicine clerkship director to be a successful academician.

Importance of the Emergency Medicine Clerkship Director

In the current health care system, we struggle with emergency department overcrowding, escalating costs to provide premium health care, declining reimbursements, and increasing oversight from regulatory agencies. It is easy to forget that undergraduate medical education is the principal and unique mission of the medical school and is one of the most important charges of the academic medical center. Traditionally, the third-year core clerkships have been the mainstay of undergraduate medical education, with clerkship directors playing a pivotal role in developing and maintaining the quality of the educational experience for medical students. In recent years, with the combination of the growth of emergency medicine as a medical specialty and renewed emphasis on the senior year of medical school training, more medical schools have incorporated an emergency medicine clerkship as a mandatory clinical experience for medical students.

Clerkship directors and other medical student educators have the unique opportunity to impose a positive and long-lasting impact on students at a time in their careers when they are most impressionable. In many ways, students at an early stage in medical school are undifferentiated, similar to the patients that we encounter in the emergency department on a daily basis. Interactions with faculty members who serve as professional role models can have long-term affects. Emergency medicine clerkship directors are advocates not only for our specialty but also for our profession, because many of the medical students we encounter will choose alternative career paths. With that being said, most, if not, all students will enter career paths that will require that they interact with emergency medicine physicians at some point. By providing an educational experience and friendly environment conducive to learning, emergency medicine clerkship directors can play a role in shaping the perception of the specialty of emergency medicine

for future physicians, allowing them to better understand the role of the emergency department in the health care system.

Who Are the Clerkship Directors?

Given the significance of the clerkship director position within the medical school framework, the person best suited to oversee a clinical clerkship would seem to be a seasoned educator. However, in our specialty, a seasoned educator is more often the exception than the rule. Emergency medicine clerkship directors are younger and more likely to be junior faculty members at the clinical instructor or assistant professor rank than are their counterparts in the other core specialties. In a recent survey of emergency medicine clerkship directors, only 22% were at the rank of associate professor or higher, compared with 68% of internal medicine clerkship directors, 71% of surgery, 76% of pediatric, and 53% of obstetrics and gynecology clerkship directors.¹ Emergency medicine clerkship directors also received less protected time for clerkship administration and the pursuit of scholarly activities than did their counterparts in other specialties. In a study by Coates and colleagues, emergency medicine clerkship directors reported receiving on average only 2.7 h per week of reduced clinical work load, and more than half reported that they had no protected time set aside to perform clerkship administration.¹ Career longevity has also been an issue for emergency medicine clerkship directors. Forty five percent of emergency medicine clerkship directors have held their current position for only 1 to 2 years, and fewer than 25% have held their current position for longer than 5 years. This finding is in contrast to clerkship directors in other fields of medicine who have traditionally held their current position for 5 to 8 years.¹

It still remains unclear as to why there is such a turnover in the position of the emergency medicine clerkship director. It is possible that a lack of protected time for clerkship administration and the pursuit of scholarship or issues related to job satisfaction or career advancement may play a role. Whatever the reasons for turnover may be, it is important to realize that the clerkship director holds an important position within the medical school hierarchy, and this position can affect students on a multitude of levels and serve as a basis for an academic career and promotion. A continued challenge for leaders in our specialty will be to develop consensus on the value of the position of the emergency medicine clerkship director along with how much protected time should be provided for the faculty member to perform his or her job while being provided with the opportunity to be academically productive.

In a recent survey of emergency medicine clerkship directors, only 22% were at the rank of associate professor or higher, compared with 68% of internal medicine clerkship directors, 71% of surgery, 76% of pediatric, and 53% of obstetrics and gynecology clerkship directors.¹

The clerkship director holds an important position within the medical school hierarchy, and this position can affect students on a multitude of levels and serve as a basis for an academic career and promotion.

Leaders in medical student education have stated that the role of the clerkship director and program director are and should be viewed as comparably valuable positions. These positions arguably serve distinct but parallel roles in the framework of undergraduate and graduate medical education, respectively. With this in mind, clerkship directors of mandatory and high-volume emergency medicine rotations deserve protected time to allow for clerkship administration, teaching, and opportunities to participate in scholarly pursuits equal to peers in other specialties. In our specialty, this has not yet uniformly occurred. As reported in a recent published faculty salary survey, emergency medicine program directors work on average 17 clinical hours per week, whereas clerkship directors typically carry a much heavier clinical work load.² Clerkship directors should be embraced within our specialty similar to program directors, whose job qualification and description are delineated in the Accreditation Council for Graduate Medical Education (ACGME) program requirements for graduate medical education in emergency medicine.³

Emergency Medicine Clerkship Director— Defining the Role

Recommendations for educational training, mentorship, and protected time for the emergency medicine clerkship director have been published, but to date, no document exists to provide the emergency medicine clerkship director with a standardized job description and expectations for this role.⁴ In 2003, a multidisciplinary group of medical student educators published a statement titled “Expectations of and for Clerkship Directors.”⁴ This article represents a collaborative effort from constituent member organizations of the Alliance for Clinical Education (ACE). The authors represented 7 core clerkship director organizations and recommended a minimum of 25% release time for clerkship administration and a minimum of 50% full-time equivalent (FTE) when the expectation includes time for teaching and educational scholarship.⁴ Because this statement was developed before the Academy of CDEM joined ACE, an emergency medicine representative was not part of this effort. However, these recommendations still apply to an emergency medicine clerkship director of a mandatory or high-volume clinical rotation. Similar expectation statements outlining the job description of the clerkship director have been developed by medical student educators in other specialties; each has some degree of applicability to our specialty.

The Liaison Committee on Medical Education (LCME) is recognized by the U.S. Department of Education as the accrediting body for programs of medical education leading to the

MD degree in the United States and in collaboration with the Committee on Accreditation of Canadian Medical Schools for Canadian medical education programs. The LCME accreditation standards guide and govern the medical school and the clerkship director in performing his or her duties. By incorporating the expectations set forth by ACE and the educational objectives and requirements of the LCME, we can further establish guidelines for the roles and responsibilities of the emergency medicine clerkship director (see Box 1.1). Characteristics and essential skills of an emergency medicine clerkship director are presented in Box 1.2.

Box 1.1. Roles and Responsibilities of the Clerkship Director⁴

- Provide a high-quality educational experience that achieves both departmental and medical school expectations.
- Set expectations, roles, and responsibilities for student involvement in patient care activities.
- Identify students with academic difficulty and develop a strategy for remediation.
- Adhere to departmental and medical school expectations, guidelines, and timelines.
- Advise and mentor students in the residency application process, provide letters of recommendation, review personal statements, and the like.
- Generate reports on an as-needed basis regarding faculty and resident teaching evaluations.
- Periodically evaluate program effectiveness and implement changes as needed.
- Perform other duties necessary to maintain a high-quality educational experience and to comply with regulatory and accreditation bodies, such as the Liaison Committee on Medical Education.
- Develop, review, and update, as needed, a set of educational objectives for the clerkship ensuring that the clerkship objectives correspond with the institutional objectives (ED-1).
- Establish a system to specify the types of patients or clinical conditions that all students must encounter and monitor the experiences to verify compliance and remedy any identified gaps. This oversight can be at the clerkship or institutional level (ED-2).
- Make known the objectives of the educational program to all faculty members, residents, and others with direct responsibilities for medical student education (ED-3).
- Ensure comparable educational experiences and equivalent methods of evaluation across alternative instructional sites (ED-8).
- Ensure that residents who supervise or teach medical students are familiar with the educational objectives of the clerkship and are prepared for their roles in teaching and evaluation (ED-24).
- Ensure that the student learning experiences throughout a required emergency medicine clerkship are supervised by members of the medical school's faculty (ED-25).
- Set the standards of achievement for the emergency medicine clerkship (ED-29).
- Design and implement a system of formative and summative evaluation of student achievement (ED-30).
- Evaluate each student early enough during the clerkship to allow time for remediation (ED-31).
- Provide narrative descriptions of student performance and of noncognitive achievement as part of evaluations in required clerkships when teacher–student interaction permits this form of assessment (ED-32).

Note. ED = LCME Educational Objective.

Box 1.2. Characteristics and Essential Skills of an Emergency Medicine Clerkship Director⁴

Characteristics

- Is board certified in the specialty of emergency medicine
- Has experience and comfort with clinical supervision and classroom instruction
- Has skills and experience in formative and summative evaluation
- Is able to advise and supervise remediation for students with academic problems
- Is enthusiastic about medical student education and regard undergraduate medical education as a central focus of career development
- Is able to provide career guidance to medical students regardless of specialty choice

Essential Skills

- Interpersonal skills to effectively communicate with medical students, emergency medicine faculty and residents, community training sites, and the medical school administration
- Computer skills necessary to communicate via e-mail, develop and maintain student reports and other documents, prepare and analyze spreadsheets, and the like
- Problem solving, conflict resolution, and decision-making skills
- Time management and organizational skills

Protected Time for the Emergency Medicine Clerkship Director

To be an effective clerkship administrator, educator, and successful academician, the clerkship director should be afforded ample protected time to perform clerkship duties, as well as the opportunity to be engaged in academic scholarship. Time requirements for the clerkship directors have been recommended by consensus opinion from leading medical educators in their respective specialties. The Clerkship Directors in Internal Medicine recommended a 25% FTE be considered a minimum estimate of time to perform clerkship administration.⁵ If time for teaching and scholarly pursuits is included, a minimum of 50% FTE should be expected. The Council of the Association of Directors of Medical Student Education in Psychiatry recommend that the clerkship director be allocated 20% of an FTE for clerkship administration, 25% for direct teaching, and an additional 10% for educational research, for a total of 55% time release.⁶ (Table 1.1).

CDEM supports the recommendations from these national clerkship director organizations in recognizing the need for a reduction in the clinical load for clerkship directors to perform their jobs. For emergency physicians who are primarily shift workers, it is, however, difficult to best interpret how a 50% reduction in clinical time for clerkship administration, teaching, and scholarship translates into clinical hours worked per week.

As outlined in the ACGME Emergency Medicine program requirements, “core” faculty members should not average more than 28 clinical hours per week, or 1344 clinical hours per year. This requirement provides a baseline for the clinical expectation of a “generic” faculty member without additional academic, administrative, or clinical responsibilities. In the most recently reported emergency medicine academic faculty salary and benefit survey, work weeks average 22 clinical hours and 22 nonclinical hours per week.² These figures are averages for all faculty types and thus have somewhat limited applicability for the clinical and nonclinical expectations of the emergency medicine clerkship director. This recommendation must remain flexible, however, and account for variations in student volume and other workload factors such as whether the clerkship is mandatory, selective, or elective in structure. Some clerkship directors are responsible for a high-volume mandatory rotation providing oversight for 150 to 200 (or more) medical students annually, whereas others provide oversight of a low-volume experience in the role of a clinical affiliate training site director or in a stand-alone elective community-based experience. It is obvious that the requirements to perform clerkship administration, teach, and pursue other scholarly activities will vary on the basis of the type of clerkship supported and whether the program is located at an academic medical center or a community teaching hospital. These recommendations are most applicable to the faculty member who oversees a high-volume, mandatory clinical clerkship. Those who function in an assistant capacity, are affiliate site directors, or administer low-volume clinical rotations may have fewer academic expectations and therefore will carry a heavier clinical work load with less protected time. In these situations, in which the role is primarily clerkship administration, it is a reasonable expectation to provide faculty members with no more than a 25% reduction of their clinical commitment.

Table 1.1. Time Requirements for Clerkship Directors Recommended by Leading Medical Educators in Their Respective Specialties⁴

	Clerkship Administration	With Teaching and Scholarship
Alliance for Clinical Education	25% FTE	50% FTE
Clerkship Directors in Internal Medicine	25% FTE	50% FTE
Council of the Association of Directors of Medical Student Education in Psychiatry	25% FTE	55% FTE

Note. FTE = full-time equivalent.

Box 1.3. Recommended Support for Emergency Medicine Clerkship Directors⁴

- Adequate training in educational principles (e.g., curriculum development and administration, bedside and didactic teaching methods, evaluation and feedback approaches)
- Mentorship from qualified faculty members in career development
- Sufficient protected time to perform clerkship administration, teach medical students, and pursue scholarly activities (including opportunities to attend national academic meetings and faculty development courses)
- Support from faculty in teaching and evaluating students
- Adequate clerical and administrative support to run the clerkship
- Membership to Clerkship Directors in Emergency Medicine

The clerkship director requires support from his or her chair. This support involves assisting the clerkship director in engaging other faculty members and sets the tone within the department regarding the importance of undergraduate medical education.

What Support Does the Emergency Medicine Clerkship Director Need to Succeed?

To run the clerkship efficiently, the clerkship director needs both departmental and institutional support. From the department, the clerkship director requires support from his or her chair. This support involves assisting the clerkship director in engaging other faculty members and sets the tone within the department regarding the importance of undergraduate medical education. The chair must also support the clerkship director by providing opportunities and funds to attend national meetings or faculty development courses. Within the department, value must be placed on education and the role of teaching. Within the medical school, emphasis and recognition must extend beyond the department to the institution's promotion and tenure committee. It may also be necessary for the institution to provide information technology, in addition to faculty salary support or support for a clerkship administrator. On a national level, support for the emergency medicine clerkship director has now materialized with the formation of the Academy of CDEM (See Box 1.3 for recommended support for the emergency medicine clerkship director). Box 1.4 describes the role of the clerkship administrator.

Resources for the Emergency Medicine Clerkship Director

Many resources are available for emergency medicine clerkship directors; a simple Web-based search will reveal many of these. Various national organizations such as ACE, the Association of American Medical Colleges, CDEM, and the LCME can serve as resources for medical student educators (Box 1.5 provides for a brief list of educational resources for the emergency medicine clerkship director).

Box 1.4. Job Description for the Emergency Medicine Clerkship Administrator⁴

The primary responsibilities for the clerkship administrator include, but are not limited to—

- Serve as the first contact liaison to the medical students, emergency medicine faculty members, and residents; community training sites; and the medical school administration.
- Provide administrative support for the clerkship and clerkship director.
- Communicate directly with the clerkship director regarding all clerkship- and medical student-related matters.
- Manage the daily operations of the clerkship, prioritize tasks, and resolve issues as they arise.
- Prepare all clerkship-related materials for distribution.
- Collect and organize end-of-clerkship material (e.g., course and faculty evaluations, patient encounter logs).
- Reserve lecture space and obtain audiovisual or other supplies, as needed.
- Prepare faculty and resident teaching evaluations.
- Be familiar with the rotation manual and other clerkship paperwork and evaluation forms.
- Recruit faculty members or residents for medical student teaching, as needed.
- Maintain complete and accurate student files.
- Maintain a confidential file of medical student grades.
- Provide reports on a semiannual or as-needed basis.
- Prepare departmental letter of recommendations.
- Prepare documents required for Liaison Committee for Medical Education accreditation.
- Schedule and coordinate meetings and conference calls.

Conclusion

Clerkship directors play a vital role in medical student education. For those academic emergency physicians who foresee a career in medical student education, opportunities and resources must be made available to perform clerkship director-related duties and actively pursue other academic endeavors. Now is the time to place further value on our educators by providing them with the time and resources necessary to succeed. With emergency medicine becoming a more commonly accepted rotation for medical students, it is likely that additional emphasis will be placed on the educational role of the emergency medicine clerkship director. We hope that this chapter can serve as a template for the job description and expectations of the emergency medicine clerkship director.

References

1. Coates WC, Gill AM, Jordan R. Emergency medicine clerkship directors: defining the characteristics of the workforce. *Ann Emerg Med.* 2005;45:262–268.

Box I.5. Resources for the Emergency Medicine Clerkship Director

- Alliance for Clinical Education (www.allianceforclinicaleducation.org)
 - *Guidebook for Clerkship Directors*, 3rd ed.⁷
 - Expectations of and for clerkship directors
- Association of American Medical Colleges (www.aamc.org)
 - Careers in medicine
 - MededPORTAL
 - Medical school objectives project
 - Recommendations for clinical skills curricula for undergraduate medical education
- Clerkship Directors in Emergency Medicine (www.saem.org/cdem)
 - Clerkship Directors in Emergency Medicine forum
 - *Emergency Medicine Clerkship Primer*⁸
 - Self study modules/digital instruction in emergency medicine cases (in development)
 - *Medical Student Educator Handbook*⁹
- Liaison Committee on Medical Education (www.lcme.org)
 - Accreditation standards
- University of Medicine and Dentistry of New Jersey Center for Teaching Excellence (<http://cte.umdnj.edu/>)
 - Links to various educational resources

2. Kristal SL, Randall-Kristal KA, Thompson BM. The Society for Academic Emergency Medicine's 2004–2005 emergency medicine faculty salary and benefit survey. *Acad Emerg Med.* 2006;13:548–558.
3. ACGME Emergency Medicine Program Requirements. Available at: www.acgme.org/acWebsite/RRC_110/110_guidelines.asp. Accessed April 15, 2010.
4. Pangaro L, Bachicha J, Brodkey A, et al., and the Alliance for Clinical Education. Expectations of and for clerkship directors: a collaborative statement from the Alliance for Clinical Education. *Teach Learn Med.* 2003;15(3):217–222.
5. Pangaro LN. Expectations of and for the medicine clerkship director. *Am J Med.* 1998;105:363–365.
6. Association of Directors of Medical Student Education in Psychiatry Clerkship Director Position Paper. Available at: www.admsep.org/positionpaper.html. Accessed April 15, 2010.
7. Fincher, RE, ed. *Guidebook for Clerkship Directors*, 3rd ed. Omaha, Neb: Alliance for Clinical Education; 2005. Available at: <http://familymed.uthscsa.edu/ACE/guidebook.htm>. Accessed November 10, 2009.

8. Wald DA, Ander DS, Fisher J, et al., eds. Emergency Medicine Clerkship Primer: A Manual for Medical Students. Lansing, Mich: Society for Academic Emergency Medicine; 2008. Available at: www.saem.org/saemdnn/Portals/0/NTForums_Attach/ED%20Primer.pdf. Accessed November 4, 2009.
9. Ander D, Coates W, Manthey DE, eds. Medical Student Educators Handbook. Lansing, Mich: Society for Academic Emergency Medicine; n.d. Available at: www.saem.org/saemdnn/Home/Communities/MedicalStudents/MedicalStudentEducatorsHandbook/tabid/686/Default.aspx. Accessed November 10, 2009.

The Ideal Curriculum

David E. Manthey

Summary Points

- Be familiar with the rules and regulations governing a clerkship as directed by the Liaison Committee on Medical Education (LCME). Be aware of the legal regulations regarding portions of your clerkship.
- Use the updated documents from the LCME and Alliance for Clinical Education to guide the development and form of the clerkship.
- Learn what your students have already gained in knowledge and experience on previous and prerequisite courses in their clinical years to prevent unnecessary redundancy and promote advanced learning objectives.
- Play to the strengths of your institution, department, and faculty.
- Use a variety of teaching modalities to convey the didactic portion of the clerkship.
- Include observational and patient care opportunities in clinical responsibilities.
- Provide timely and objective feedback, which is crucial to student development. Training of the faculty in how to deliver feedback and the criterion for grading are imperative.

THERE IS NO SUCH thing as the ideal curriculum; however, there is evidence that a standardized clinical experience and didactic curriculum can improve a students' performance on a standardized examination.¹ Even with modifications in undergraduate curriculum, some educators believe that the training of medical students in the care of acutely ill patients is suboptimal² and that the cognitive and decision-making skills of students need to be improved before students independently intervene in life-threatening situations.³ Clerkships in emergency medicine are uniquely situated to address these issues. As a specialty, we have developed a national curriculum for the fourth-year mandatory rotation in emergency medicine.⁴ This curriculum will be revised many times as we progress in medical student education

All of emergency medicine cannot be taught in the span of a 4-week rotation.

When developing a curriculum, the clerkship director needs to work to the strengths of the faculty, department, and institution.

and our specialty develops a stronger position in the medical education arena.

The national curriculum seeks to set forth bare minimum standards of understanding and knowledge in emergency medicine for students completing a fourth-year curriculum. It does not seek to make clerkships identical, because each institution may have different faculty resources and strengths that may affect both the overall curriculum and how it is implemented. However, as with all other mandatory clerkships in the clinical years, there must be uniformity to a significant portion of the curriculum. In addition, each medical school will fulfill certain requirements of an emergency medicine curriculum in adjunct courses and other core rotations (suturing on surgery). Redundancy should occur because of planned reiteration or progression of a skill, not because of a lack of planning or knowledge of other core clerkship's curricula.

When developing a curriculum, the clerkship director needs to work to the strengths of the faculty, department, and institution. If the faculty members are adept at bedside teaching and willing to devote more time, make teaching shifts a stronger component of the curriculum. If you have faculty members with toxicology as an area of expertise, enlarge the toxicology portion of the curriculum. If you have the ability to develop a simulation or cadaver lab, then by all means, incorporate this into the curriculum. Does this mean every institution must do simulation cases? No, but each institution should use what is available to it and strive to develop or obtain those resources that have been shown to improve educational or clinical outcomes. If an institution has resources available outside of the emergency department to teach part of the curriculum, such as a pediatric sedation suite, then the clerkship director should reach out to these other services to improve the overall education of the student.

Because emergency medicine is a relatively new specialty, we continue to discover our strengths. Students should not only learn how to assess and address emergent issues while in the emergency department but also learn the abilities of an emergency medicine physician. Emergency medicine physicians interact with almost every other specialty in medicine and surgery, both in consultation to care for a patient and when patients of these specialists land in the emergency department. The students going into these specialties should learn the true capabilities of an emergency medicine physician. Most students are still amazed that emergency medicine physicians can wield an ultrasound machine, and recently there has been good data that we can train students to review static images during the clerkship⁵

Anatomy of a Curriculum

First we need to define what a curriculum for a clerkship should encompass. A curriculum is more than a list of lectures. It is the entire educational content that shapes the student's knowledge base, skills, experience, professional behavior, and medical decision-making ability. There must be both a didactic and clinical portion to the course, with specific goals and objectives in relation to these areas. The didactic portion will have learning objectives for the factual knowledge and theory. The clinical portion will have objectives for types of clinical encounters and procedures to pursue as well as the application of the clinical knowledge. A clerkship curriculum should address the qualities required of a medical student from the Accreditation Council for Graduate Medical Education standpoint of core competencies (Box 2.1). Beyond these, a curriculum should also address feedback, evaluation, and remediation. Without feedback, students will repeat clinical and medical decision-making errors because they do not see the eventual consequence of their actions. With these tools, we are able to mold the students' behavior and knowledge base by identifying areas of strengths and weaknesses.

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Didactic Curriculum

The didactic experience can be wide and expansive, but the clerkship director needs to remember that all of emergency medicine cannot be taught in the span of a 4-week rotation. In addition, many of the topics we want to talk about have been covered in other clerkships. Therefore, the clerkship should cover some basic topics that are germane to all emergency medicine clerkships and represent the bare minimum that the student should know before leaving the rotation. From that point, clerkship directors should add topics that fit within the areas of expertise of their departmental faculty and that are not covered in depth elsewhere in the undergraduate curriculum. With the change in hospital and clinic structure and function, the emergency department has become more of a diagnostic center. As such, we have a new ability to offer the medical school what most other rotations cannot: the evaluation of the undifferentiated patient.^{6,7}

Box 2.1. Accreditation Council for Graduate Medical Education Core Competencies

- Patient care
- Medical knowledge
- Practice-based learning
- Interpersonal and communication skills
- Professionalism
- Systems-based practice

The approach to an undifferentiated patient can cover the initial evaluation and stabilization of several broad categories of disease, such as chest pain or altered mental status, without addressing specific disease entities. This approach affords the student the opportunity to enter an emergent situation and provide initial care without a definitive diagnosis. The student should also learn about specific potentially life-threatening presentations seen in the emergency department, such as acute myocardial infarction, hypoglycemia, stroke, or asthma. Any clerkship director or medical student educator can come up with his or her own list of “must know” topics, and there will be significant overlap of these lists. The national curriculum has developed, by consensus, just such a list.⁴ An updated curriculum is in development and will be posted to the Clerkship Directors in Emergency Medicine (CDEM) Web site when completed (www.saem.org/cdem). Resources to implement the curriculum will be available on a separate CDEM curriculum site (www.cdemcurriculum.org).

Learning objectives should also be developed for each of the educational topics taught during the course of the clerkship. These objectives should be appropriate for the level of training of the student and for the actual expected final knowledge and skills base. Students should know what information they must commit to memory (e.g., causes of anion gap acidosis), as well as what concepts they should be able to apply (e.g., how lactic acid forms and is removed from the body). They must be able to synthesize this information and apply it in the clinical setting (e.g., looking for and treating acidosis in the altered mental status patient). Students must know the level to which they are expected to learn a procedural skill from familiarity with the steps (e.g., cricothyroidotomy) to the ability to perform the skill with dexterity on a patient (e.g., suturing). When developing the educational objectives for a curriculum, the clerkship director should decide how to assess completion of these objectives. For knowledge base, it may be an end-of-rotation examination. For skills, it may be clinical performance on either a patient or model and evaluation based on a competency form. For behavioral and professional skills, it may be observation and feedback during clinical shifts or during an observed clinical structured encounter with a standardized patient.

In teaching both the medical knowledge and clinical skills, the material can be presented to the students in a variety of ways. Examples from the medical literature include the use of a virtual emergency department,^{6,7} computer-assisted learning,⁸ computer simulation,⁹ and computer-based tutorials.¹⁰ We are quick to incorporate new techniques to deliver information or instruct on application and clinical skills such as simulation, but there are few

data to suggest that students learn better by these techniques.¹¹ The key may very well be that certain students learn better in certain learning environments. By adding variety to the way the core knowledge base is taught, the clerkship director ensures that most, if not all, the students are intrigued, challenged, and learn the material.

The ideal number of lectures for the students is unknown. On average, clerkships offer approximately 10 lectures during the rotation with a large interquartile range from 6 to 16.¹² The number of self-study modules or online teaching modules used in addition to the lectures is unknown, but we do know that an additional median of 3 h of education labs are usually provided for each rotation block.

Clinical Curriculum

The experiential curriculum must include enough clinical time for the students to hone their skills of history taking and physical examination, as well as practice the art of differential diagnoses, case presentation, and development of evaluation and treatment plans. Because most students are not entering our specialty, the students should also develop a sense of what the emergency medicine physicians can do for their future patients and how our services are best used. As for the best number of clinical shifts or how long they should be, that number varies by clinical site because of the volume, acuity, and ability of student to primarily see patients. The averages (at this writing last compiled in 2005) are 14 to 16 eight-hour shifts in a 28-day rotation.¹² There is no absolute number of patients the student should see or number of procedures they should perform. The clerkship director should develop a manner to track what the averages are in the department and then hold future students to a reasonable number based on these data. Developing actual goals for the student gives them purpose and direction.

One of the reasons many physicians enter the world of emergency medicine is that we never know what is going to come through the door next, and each day has a variety of both acuity and type of patient presentations. The emergency department offers a unique opportunity to see a myriad of cases involving many different specialties in one place, even without being directly involved in the patient's care. Students should be encouraged to see all index cases of relatively common emergencies such as electrocardiograms of acute myocardial infarction, appendicitis, erythema multiforme, abscesses, computed tomographies of lung abscesses, and the like. They should be encouraged to read about cases they encounter in the emergency department, even if they are not the sole trainee involved with the case. Reading

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Because most students are not entering our specialty, the students should develop a sense of what the emergency medicine physicians can do for their future patients and how our services are best used.

Box 2.2. Components of a Curriculum

- Education syllabi
 - Core competencies
 - Knowledge base
 - Clinical encounters
 - Procedures
- Feedback
- Student assessment
 - Formative
 - Summative
- Remediation
- Clerkship review
- Liaison Committee on Medical Education rules and regulations
- Hospital and medical school rules and regulations

Reading about an encounter, even if the students are peripherally involved, will allow them to better retain the information and apply it to future patient encounters.

about an encounter, even if the students are peripherally involved, will allow them to better retain the information and apply it to future patient encounters.

The ideal clinical curriculum should include an opportunity for students to develop their medical decision-making skills. This process occurs by expecting the students to evaluate and develop a treatment plan for a patient based on the patient's history and physical and differential diagnosis list. Asking students to defend that plan during the presentation or on paper during the write up forces them to think about why they order tests and treatments. However, this process requires several items to be built into the curriculum that clerkship directors often take for granted. The students must see and manage their own patients, because they will be encouraged not just to listen but also to think. The faculty or senior residents must take the time to allow the students to present the patients. They must also expect students to develop a differential, evaluation, and treatment plan. If faculty or senior residents take over the case, the student does not learn to think critically or make decisions. Faculty members and senior residents must allow students to make mistakes without being rebuked or chastised, but instead gently redirected. To develop their medical decision-making skills, students must be challenged and have some direct responsibility for their decisions and actions.

Feedback and Assessment

A curriculum is more than just an educational blueprint. The faculty must not only provide educational opportunities but also assess and guide the impact and lessons learned from those experiences through both formative and summative feedback. For the student to learn better skills in taking a history and performing a physical examination or in the ability to develop a list of differential diagnoses, the student must attempt it independently,

be objectively observed, and receive critical constructive feedback on the process. All of these steps are intrinsically important to the learning process and the development of independent thought and behavior. To facilitate the learning process, faculty and residents must be trained to evaluate. Explicit training is needed to prevent grade inflation.¹³ Both faculty and residents should understand the criteria for each component of the clinical grade. They should receive training on how to give effective feedback. They should also be tracked to determine who the hard graders and easy graders are so that the evaluators also receive feedback.

A process should be in place to allow time for early and timely evaluation of the students (shift cards). This process will allow the clerkship director to determine whether deficiencies exist, discuss the issues with the student during the mandatory midterm evaluation, and develop a remediation plan. The student would then be evaluated on his or her ability to address the issues during the later half of the rotation.

To further develop an established curriculum, the clerkship director should develop evaluation tools that allow students to give feedback on the course, the faculty and residents, the clerkship director, and the clerkship coordinator. By reviewing these data, clerkship directors will learn the weaknesses of their programs, have objective written data to support change, and may even encounter some novel ideas from the student perspective. Allowing the students a say in their own education gives them ownership in what and how they learn. The rewards are untold because only they can see the curriculum from the learner's point of view.

To develop their medical decision-making skills, students must be challenged and have some direct responsibility for their decisions and actions.

Rules and Regulations in the Curriculum

The Liaison Committee on Medical Education (LCME)¹⁴ outlined basic guidelines that each clerkship director must follow in its educational directives section. Course requirements, clinical responsibilities, and learning objectives must be known to the students and the residents and faculty members involved with teaching medical students. Students should also be instructed on the layout of the department, documentation requirements, how to pick up a patient, and the format of a case presentation, as well as nonclinical issues such as retrieving old medical records or reviewing digital radiographic images. Students can receive information before the start of the rotation. The *CDEM Emergency Medicine Clerkship Primer* is an excellent resource to help students understand their role in the emergency department (available for download on the CDEM Web site under Resources for Medical Students).¹⁵ The students should receive an orientation to the

program philosophy, educational requirements, clinical duties, evaluation methods, and professionalism standards.

To develop your curriculum, clerkship directors must also have a handle on the legal ramifications of having students involved in certain activities. National, local, and institutional guidelines are available through the medical school and in other sections of this text. Can students shadow in the emergency department at your institution when they are not part of the emergency department clerkship? Do they need to have special training and paperwork to clear the U.S. Occupational Safety and Health Administration and Health Insurance Portability and Accountability Act regulations? Can the students ride with emergency medical services or helicopter crews? Are they covered both medically and legally if something happens to them while they are performing clerkship duties outside of the institution? When outside students arrive for an extramural rotation, do they have the right liability coverage? How much of an electronic or handwritten chart can a student fill out without violating Medicare rules on documentation? The clerkship director must develop the ideal curriculum not only for the education of the students but also a curriculum that addresses and contains all the pertinent educational directives as outlined in the LCME accreditation standards. Clerkship directors must understand both the LCME's and the medical school's interpretation of the educational directives as well as what documentation is required.

Updating the Curriculum

As a relatively new specialty, especially within medical student education, we are going to see a lot of adventurous programs and teaching techniques. We should stay abreast of innovative ideas in teaching, evaluation, and integration of emergency medicine into the various years of school. In 2006, South Africa developed an educational module in emergency medicine for its medical students.¹⁶ It is an integrative and progressive educational program that spans forensic medicine, emergency medicine, trauma, and anesthesia. Other educators can learn from these new approaches because we are too young and too forward thinking in our specialty to say "that's how we have always done it."

CDEM is currently rewriting the syllabi for the core competencies, educational topics, and procedural lists based on evaluation and review of implementation of the 2006 curriculum. CDEM will strive to review the implementation and application of the curriculum every 3 to 5 years to keep updating it on the basis of new educational techniques, changes in LCME requirements, and changing medical knowledge. Every course director should evaluate his or her own programs for specific improve-

ments toward the end of every academic year. Overall course evaluations should guide changes to provide the students with the best educational encounter.

References

1. Lampe CJ, Coates WC, Gill AM. Emergency medicine subinternship: does a standard clinical experience improve performance outcomes? *Acad Emerg Med.* 2008;15:82–85.
2. Smith CM, Perkins GD, Bullock I, et al. Undergraduate training in the care of the acutely ill patient: a literature review. *Intensive Care Med.* 2007;33:901–907.
3. Young JS, Dubose JE, Hedrick TL, et al. The use of “war games” to evaluate performance of students and residents in basic clinical scenarios: a disturbing analysis. *J Trauma.* 2007;63:556–564.
4. Manthey DE, Coates WC, Ander DS, et al. Report of the Task Force on National Fourth Year Medical Student Emergency Medicine Curriculum Guide. *Ann Emerg Med.* 2006;47:e1–e7.
5. Fernández-Frackelton M, Peterson M, Lewis RJ, et al. A bedside ultrasound curriculum for medical students: prospective evaluation of skill acquisition. *Teach Learn Med.* 2007;19:14–19.
6. Celenza A. Evolution of emergency medicine teaching for medical students. *Emerg Med Australas.* 2006;18:219–220.
7. Youngblood P, Harter PM, Srivastava S, et al. Design, development, and evaluation of an online virtual emergency department for training trauma teams. *Simul Healthc.* 2008;3:146–153.
8. Ricks C, Ratnapalan S, Jain S, et al. Evaluating computer-assisted learning for common pediatric emergency procedures. *Pediatr Emerg Care.* 2008;24:284–286.
9. Smolle J, Prause G, Smolle-Jüttner FM. Emergency treatment of chest trauma—an e-learning simulation model for undergraduate medical students. *Eur J Cardiothorac Surg.* 2007;32:644–647.
10. Pusic MV, Pachev GS, MacDonald WA. Embedding medical student computer tutorials into a busy emergency department. *Acad Emerg Med.* 2007;14:138–148.
11. Schwartz LR, Fernandez R, Kouyoumjian SR, et al. A randomized comparison trial of case-based learning versus

- human patient simulation in medical student education. *Acad Emerg Med.* 2007;14:130–137.
12. Wald DA, Manthey DE, Kruus L, et al. The state of the clerkship: a survey of emergency medicine clerkship directors. *Acad Emerg Med.* 2007;14:629–634.
 13. Weaver CS, Humbert AJ, Besinger BR, et al. A more explicit grading scale decreases grade inflation in a clinical clerkship. *Acad Emerg Med.* 2007;14:283–286.
 14. Liaison Committee on Medical Education Forms and Functions. Available at: www.lcme.org/standard.htm. Accessed November 4, 2009.
 15. Wald DA, Ander DS, Fisher J, et al., eds. *Emergency Medicine Clerkship Primer: A Manual for Medical Students*. Lansing, Mich: Society for Academic Emergency Medicine; 2008. Available at: www.saem.org/saemdn/Portals/0/NTForums_Attach/ED%20Primer.pdf. Accessed November 4, 2009.
 16. MacFarlane C, Green-Thompson L. Medical student education in emergency medicine: new model from South Africa. *Emerg Med Australas.* 2006;18:276–281.

Educator's Guide to Planning and Administering the Emergency Medicine Subinternship

Wendy C. Coates

Summary Points

- The emergency medicine subinternship provides senior medical students with an opportunity to evaluate undifferentiated patients and to explore the specialty as a potential career choice.
- A well-planned, diverse curriculum that has the support of the department chair, deans, and emergency medicine faculty will lead to a successful educational experience.
- The clerkship director serves a crucial role in educating students and recruiting potential residents to the specialty and the individual program.
- Emergency medicine clerkship directors should be afforded the same rights and responsibilities as other faculty who assume managerial roles in their departments and institutions.

THE MOST COMMON EDUCATIONAL experience that medical students have in the emergency department occurs in the senior year. In different institutions, this may be an elective or required course and is often referred to by names such as clerkship, elective, course, rotation, or subinternship. In this chapter, the term subinternship will be used to denote the senior experience in emergency medicine. This chapter will highlight features of a typical course, provide the clerkship director with information on how to assume administrative responsibility for an existing course,

“The Emergency Medicine Sub-Internship—An Educator’s Guide to Planning and Administration,” by W. C. Coates, *Academic Emergency Medicine*. 2005;12:129e1–129e4. Copyright © 2005 by the Society for Academic Emergency Medicine. Adapted with permission from Wiley-Blackwell Scientific Publications.

In an elective subinternship, each student has made a conscious decision to learn about emergency medicine, whereas students in a mandatory subinternship may have varying levels of interest in the subject.

and outline educational and administrative factors important in designing a new course.^{1,2}

Description of the “Typical” Senior Subinternship

There is no national standard for a senior subinternship in emergency medicine, although there are recommendations by a multiorganizational task force in emergency medicine and by Clerkship Directors in Emergency Medicine (CDEM).^{3–5} The learning environment of each institution varies according to local opportunities and conventions, and the guidelines provided can be adapted to any setting. In an elective subinternship, each student has made a conscious decision to learn about emergency medicine, whereas students in a mandatory subinternship may have varying levels of interest in the subject. Although some institutions have set up 2 different rotations to address the needs of each population, most offer a single senior subinternship. For non-emergency medicine bound students, this subinternship may be the last opportunity to care for patients outside their chosen specialty. It also provides an opportunity to see the acute presentation of diseases that will be common to their practice. Hidden benefits of hosting non-emergency medicine bound students are to expose them to our specialty, educate them in the role of emergency medicine in the care of patients, and outline their responsibilities as future consultants and members of emergency on-call panels. There is also a benefit to exposing future doctors to the problems that affect emergency care in our country (e.g., crowding), because many of these problems have a “trickle-down” effect on more global medical practice. Such exposure can help foster advocacy by future health leaders.

For emergency medicine-bound students, the senior subinternship is an opportunity to confirm their belief that they have made the correct career choice, to gather career-planning advice, and to obtain letters of recommendation from faculty. For many emergency medicine-bound students, this will be their first official exposure to emergency medicine. All students must be capable of handling medical emergencies after graduation, as stipulated by the Liaison Committee on Medical Education.^{6,7} Components of a typical 4-week subinternship are listed in Box 3.1.

This subinternship provides time to learn and refine acute patient management skills on a variety of disease presentations. It also gives the student an opportunity to experience shift work and to attend several didactic sessions. Prerequisites usually include completion of the core clerkships but can be altered to suit the needs of a particular medical school. Students who are in the spring of their junior year of medical school may have

Box 3.1. Components of a Typical Emergency Medicine Subinternship

- Length of rotation: 4 weeks
- Prerequisites: Core clerkships from junior year
- Didactic program
 - Attendance at resident lectures
 - Conferences for students only (e.g., lectures, procedure labs, interactive learning, simulation)
 - Mandatory reading list or text
 - Completion of online study questions
- Clinical program
 - Policy on patient evaluation and procedures
 - Presentation to faculty and residents
 - Other clinical activities available (e.g., emergency medical services, helicopter)
- Evaluation of student performance
 - Exam (written or clinical)
 - Written assignment
 - Faculty and resident evaluation forms
 - Immediate or midterm feedback
- Evaluation of subinternship
 - Evaluation form by students on rotation
 - Evaluation of residents and faculty as teachers
- Administrative
 - Coordinator to schedule and maintain paperwork
 - Mechanism for problem solving
 - Support for subinternship by emergency medicine department chair, residency program director, and school of medicine dean's office

satisfied the requirements for the emergency medicine course and may be considered for enrollment.

The clerkship director is the manager of the educational program for students. Guidelines should be provided to resident and faculty physicians for supervising students according to the goals and objectives of the course.⁴ These may be developed in partnership with the residency program director to outline resident responsibilities or with the department chairman for faculty. A method of evaluation of both students and supervisors should be developed. An initial training is needed for new faculty members and residents, and ongoing reinforcement of guidelines and principles helps maintain effective habits of current faculty and residents.^{8,9}

Hidden benefits of hosting non-emergency medicine bound students are to expose them to our specialty, educate them in the role of emergency medicine in the care of patients, and outline their responsibilities as future consultants and members of emergency on-call panels.

Most subinternships treat senior medical students as interns and give them similar responsibilities.

Familiarity with medical school procedures, teaching methods, and curriculum design are important. Daily activities typically include the evaluation of patients in the emergency department under the supervision of resident or faculty physicians whose expertise far exceeds that of the student. Most subinternships treat senior medical students as interns and give them similar responsibilities. The experience and motivation of each student will dictate the level of responsibility that can be afforded. The supervising physician on duty in the emergency department should monitor and evaluate the student's history taking and physical exam skills, ability to develop a reasonable treatment plan, and medical knowledge base. The student's professionalism should also be observed.

Similarly, expectations for the students should be provided at an orientation session at the beginning of the rotation (Box 3.2). This session should include information on attendance requirements in the emergency department and at didactic sessions, evaluation methods, background reading requirements, clinical guidelines on how to see patients and to whom the students should present, and other institutional policies they must follow. Departmental activities, such as ongoing research projects, may be highlighted at this time.^{1,2} The clerkship director should be accessible to students and will often enjoy their appreciation for career advice and support of their education.

Taking Over an Existing Curriculum

The clerkship director should be accessible to students and will often enjoy their appreciation for career advice and support of their education.

In some cases, a subinternship is already in place, and the previous clerkship director has assumed a new role in the department or has relocated to a new institution. It is beneficial to spend some time discussing the subinternship and the methods for

Box 3.2. Sample Student Orientation Session

- Welcome statement—overview of program philosophy
- Attendance requirements
- Course requirements
 - Didactic program
 - Clinical responsibilities
 - » Presenting patients
 - » Charting
 - » Procedures
 - » Other (e.g., emergency medical services, other sites)
 - Reading requirements
- Evaluation methods and grading policies

administering it with this person. If the new director is already a member of the faculty and is familiar with the subinternship and institutional policies, it may be possible to modify the program immediately. In many cases, however, the person assuming responsibility for the subinternship is new to the department and may be new to the faculty role as well. For new faculty, the most desirable way to ensure a smooth takeover is to enlist the help of a mentor within the department who is familiar with the educational program and who has an interest in the career development of the new faculty member. It may be possible to allow the program to run as it had under the old leadership. The new director can observe how things work and slowly make changes to modify the educational program. During this period, the new director can focus on learning the necessary administrative requirements and can develop a master plan for the subinternship. If there are considerable problems with the subinternship, significant changes may be needed. In this case, the task can be approached in the same manner as designing a new curriculum.^{1,2}

For new faculty, the most desirable way to ensure a smooth takeover is to enlist the help of a mentor within the department who is familiar with the educational program and who has an interest in the career development of the new faculty member.

Designing a New Curriculum

A new curriculum may be needed for an emergency medicine subinternship because it is being offered for the first time or because the existing subinternship does not meet the expected standards for the department or institution. In addition, the change from an elective subinternship to a required one may very well require a more formal and detailed curriculum, including objectives and assessment.

To develop a new subinternship, the medical school curriculum committee must review and approve the learning objectives.

To develop a new subinternship, the medical school curriculum committee must review and approve the learning objectives. Most medical schools have guidelines that outline the method of proposing a new course. Considerable thought must precede the application so the contents of the course description are complete. Essential elements of a course description are provided in Box 3.3. In some schools, an emergency medicine subinternship may be a new experience, and discussion with the dean's office may be required. It is prudent to have the support of the medical school administration for any course that is being offered to the students. Frequently, the department of medical education in the dean's office can provide advice on curriculum design and instructional methods. The intended audience must be defined. For the senior elective or subinternship, the intended audience usually includes students who have completed the core clerkships of the junior year. Some rotations allow junior medical students to enroll in the spring after certain clerkships are completed.

Box 3.3 Components of a Course Description

- Contact information
- Prerequisites
- Course description (narrative)
- Learning objectives
- Typical daily/weekly schedule
 - Didactic
 - Clinical
 - Other (e.g., EMS)
- Dates of availability

After careful assessment of what is needed for baseline clinical experience, course prerequisites are set. These prerequisites might be somewhat flexible, depending on the nature of the course. An example of flexibility is to admit a student who has not yet completed the pediatric core clerkship if the emergency medicine rotation is limited to the adult population.

There is an unlimited potential for establishing the core curriculum. The successful clerkship director will assess the strengths of the home institution to decide how each goal of the curriculum will be met. One example is that the management of a severely injured trauma patient is a reasonable clinical goal for all students who are rotating in a busy trauma center. If the rotation is housed in a community emergency department, however, the topic of evaluation and management of the multiple trauma patient may be better accomplished through the use of a lecture or simulated learning experience. The learning objectives should cover the broad variety of patient complaints, procedures, and management skills that typify the specialty of emergency medicine.¹⁰ A useful framework was designed by the Education Committee for the Society for Academic Emergency Medicine.³ It includes suggested clinical topics and other adjuncts to the subinternship, such as exposure to the emergency medical services system. A more comprehensive resource is the Report of the National Task Force on Emergency Medicine curriculum.⁵ Please also refer to Chapter 2: The Ideal Curriculum.

Professionalism

Professionalism begins with the abstract concept of compassion and can be further explained more tangibly by putting its principles into action in the emergency department environment.¹¹

The close relationship between the medical student and supervising physician presents an excellent opportunity to teach and evaluate professionalism. Professionalism begins with the abstract concept of compassion and can be further explained more tangibly by putting its principles into action in the emergency department environment.¹¹ Examples include the conduct of an ethical practice and interactions of the medical student with patients, family members, and support staff. Role

modeling by the faculty physician at the bedside is one method that students can observe and learn about how to conduct themselves in a professional and compassionate manner. Students can be assessed by observing their personal interactions and providing immediate feedback is an effective strategy to develop professionalism skills.¹¹

Other components of professionalism relate to the practitioner's standards of ethical business practice, such as punctuality, accurate charting and billing, and work ethic. Patterns of behavior can be noted by the supervisor, and feedback can be provided as needed. The basic principles of this component of conducting one's practice in a professional manner can be taught by example of a faculty mentor and outlined in a didactic format for reference. Numerous methods to evaluate one's professionalism have been described elsewhere.¹¹

Administrative Support

To be a successful educational program, there must be local support. For an emergency medicine subinternship, this typically involves the support of the department of emergency medicine and the dean's office at the school of medicine. The clerkship director's role is an important one—he or she is responsible for cultivating a love of emergency medicine in the students and for designing and implementing an educational program that teaches the art of evaluating the undifferentiated patient, a critical skill required for all graduates of medical school. In addition, the clerkship experience and clerkship director play a pivotal role in resident recruitment. Many resident applicants select their top-ranked programs based on their experience as a student in that department (whether in their home school or as a visiting student). Therefore, the clerkship director should be afforded the opportunity to have significant time allotted to manage the rotation. Support can be garnered in the form of administrative assistance and release time to perform the duties effectively. The department chair in emergency medicine should support the clerkship director at the same level as the residency director. Frequently, the department chair and residency director can help set the tone to encourage participation of the faculty in the subinternship experience.^{12,13} If the medical school requires all students to take an emergency medicine rotation, the clerkship director of this rotation should be compensated at the same rate as the other core clerkship directors with funds from the dean's office to reimburse time spent performing required clerkship duties and ample administrative support to meet these needs. These negotiations may involve the department chair and curriculum committee at the school of medicine.

The clerkship director's role is an important one—he or she is responsible for cultivating a love of emergency medicine in the students and for designing and implementing an educational program that teaches the art of evaluating the undifferentiated patient, a critical skill required for all graduates of medical school.

If the medical school requires all students to take an emergency medicine rotation, the clerkship director of this rotation should be compensated at the same rate as the other core clerkship directors

Summary

Most emergency medicine subinternships are enjoyable for students—it is often their first opportunity to feel primarily responsible for patient care. They work with enthusiastic and energetic people who can be ambassadors for the specialty and their individual residency programs. For the clerkship director, managing the subinternship can be a rewarding introduction to managing a major educational program and a means for developing a career path in medical education and for selecting and influencing eager new members of the specialty.

References

1. Coates WC. An educator's guide to teaching emergency medicine to medical students. *Acad Emerg Med.* 2004;11:300–306.
2. Coates WC. The emergency medicine sub-internship—An educator's guide to planning and administration. *Acad Emerg Med.* 2005;12:129e1–129e4.
3. DeBehnke DJ, Restifo KM, Mahoney JF, Coates WC. Undergraduate curriculum. *Acad Emerg Med.* 1998;5:1110–1113.
4. Farrell SE, Pacella C, Egan D, et al. Resident as teacher: a suggested curriculum for emergency medicine. *Acad Emerg Med.* 2006;13:677–679.
5. Manthey DM, Coates WC, Ander DS, et al. Report of the task force on national fourth year emergency medicine curriculum guide. *Ann Emerg Med.* 2006;47:e1–e7.
6. Coates WC, Crooks K, Slavin SJ, et al. Medical school curricular reform: fourth year colleges improve access to career mentoring and overall satisfaction. *Acad Med.* 2008;83:754–760.
7. Liaison Committee on Medical Education. *Functions and Structure of a Medical School. Standards for Accreditation of Medical Education Programs Leading to the M.D. Degree.* Washington, DC: Liaison Committee on Medical Education; 2003.
8. Ende J. Feedback in clinical medical education. *JAMA.* 1983;250:777–781.
9. Wood BP. Feedback: a key feature in medical training. *Radiology.* 2000;215:17–19.
10. Mandin H, Dauphinee WD. Conceptual guidelines for developing and maintaining curriculum and examination objectives: the experience of the medical council of Canada. *Acad Med.* 2000;75:1031–1037.

11. Larkin GL, Binder L, Houry D, Adams J. Defining and evaluating professionalism: a core competency for graduate emergency medicine education. *Acad Emerg Med*. 2002;9:1249–1256.
13. Coates WC, Gill AM, Jordan R. Emergency medicine clerkship directors: defining the characteristics of the workforce. *Ann Emerg Med*. 2005;45:262–268.
13. Wald DA, Manthey DM, Kruus L, et al. The state of the clerkship: a survey of emergency medicine clerkship directors. *Acad Emerg Med*. 2007;14:629–634.

Teaching Medical Students in the Emergency Department

David A. Wald

Summary Points

- Numerous teaching opportunities exist in the emergency department.
- Teach to your students' strengths and weaknesses.
- Teach general concepts.
- Focus on the complaint-based approach of our specialty
- Bring teaching to the bedside.
- Emphasize case-based teaching.
- Provide feedback on performance.

THE EMERGENCY DEPARTMENT setting provides for a unique educational experience. The emergency department is distinct in its clinical environment and patient pathology from the inpatient and ambulatory care settings, and a rotation through it allows a student to interact with a high volume of patients presenting with chief complaints that vary from low acuity to life-threatening emergencies. Where else in a single clinical shift can a trainee participate in the care of such a wide variety of undifferentiated patients—those of different ages and levels of acuity? Throughout an emergency medicine clerkship, a medical student will put to use his or her clinical skills acquired in other core rotations, such as internal medicine, family medicine, surgery, obstetrics and gynecology, pediatrics, and psychiatry, often in the same day.¹ This

Simple approaches such as enforcing history and physical examination skills, developing a focused differential diagnosis, and reviewing basic mechanisms of disease can be applied to many of the patients encountered in the emergency department.

Throughout an emergency medicine clerkship, a medical student will put to use his or her clinical skills acquired in other core rotations, such as internal medicine, family medicine, surgery, obstetrics and gynecology, pediatrics, and psychiatry, often in the same day.¹

chapter reviews various methods to enhance the clinical teaching of medical students throughout a clinical emergency medicine rotation. Many of these same teaching techniques can be applied to further educate graduate medical trainees.

As a starting point, all faculty members and residents involved with teaching medical students should be familiar with the learning objectives, sometimes referred to as “competencies,” of the specific clerkship. Often, the majority of the rotation objectives for emergency medicine are met through direct patient care. In addition to being familiar with the learning objectives, the preceptor should understand the role of the student along with his or her level of responsibility and place as part of the health care team. The emergency medicine teaching attending physician or senior resident may benefit from reviewing the “National Fourth Year Medical Student Curriculum Guide” to become more familiar with proposed national guidelines.² Addressing the rotation competencies is a great starting point. Simple approaches such as enforcing history and physical examination skills, developing a focused differential diagnosis, and reviewing basic mechanisms of disease can be applied to many of the patients encountered in the emergency department. Although all students completing an emergency medicine clerkship should be held to a single standard, teaching can easily be tailored to the needs of the individual student who identifies specific goals beyond those expected to be achieved by all students. The needs of a particular student will vary on the basis of his or her prior clinical experiences, background, areas of strength or weakness, and, perhaps, career aspirations.

Much of the current medical literature focuses on teaching techniques and strategies to improve learning in the inpatient and ambulatory care settings.^{3–15} In the last 10 years, however, more scholarly writing has been dedicated to teaching and learning in the emergency department.^{16–23} For those physicians practicing our specialty, we are well aware that this is an exciting venue to educate medical students. Teaching in the emergency department is certainly not new, and many of the teaching techniques previously described in the literature have been adopted and modified to enhance clinical teaching in the emergency department.

Opportunities for Teaching in the Emergency Department

Many clinical teaching opportunities exist within the domain of the emergency department. Starting in the preclinical years, often with the emergency medicine interest group, opportunities for shadowing or observing shifts are used to introduce medical students to the specialty of emergency medicine while providing

bedside teaching and a venue to bridge a student's basic science knowledge to its application in clinical medicine. Most medical schools incorporate a clinical skills or "doctoring" type of course into the first biennium of undergraduate medical education in which students are exposed to the fundamentals of interviewing patients and performing a physical examination. Emergency physicians can expose preclinical medical students to these essential clinical skills in addition to modeling professional behavior.

The specialty of emergency medicine encompasses a unique patient population and presenting complaints. Many of these encounters can provide educational opportunities and represent the backbone of what makes emergency medicine a distinct clinical specialty. These situations may include managing the acutely poisoned or intoxicated patient, caring for patients with environmental emergencies, interacting with prehospital care providers, evaluating the acutely ill undifferentiated patient, performing emergency procedures, caring for trauma patients and providing wound management, and more. In the emergency department, medical students are likely to encounter clinical scenarios and chief complaints that they would otherwise have little, if any, direct contact with. In addition, few, if any, other health care settings allow the learner to provide the initial evaluation and workup all the way through hospitalization, as is the case in many emergency department encounters.

Clinical teaching in the emergency department setting also has been enhanced by the Internet and the quick access to a wealth of medical knowledge; essentially a virtual library is available 24 h a day, 7 days a week. Incorporating evidence-based medicine to answer real-time clinical questions (discussed in depth in Chapter 8), finding medical images, reviewing articles, and more can be performed rapidly and used to improve patient care.

Bedside Teaching

In the emergency department, bedside teaching rounds can be conducted in a fashion similar to inpatient teaching rounds. This type of teaching is best delivered and least disruptive to the patient if performed in small groups, generally up to 3 to 5 students. Bedside teaching rounds can be educational for the preclinical medical student with very limited patient care experience through the more seasoned senior medical student and beyond. In past years, bedside teaching has declined.^{3,4,6} When surveyed, medical students and residents reported that they have not had enough bedside teaching.²⁴ However, these same medi-

Emergency physicians can expose preclinical medical students to these essential clinical skills in addition to modeling professional behavior.

Bedside teaching rounds can be educational for the preclinical medical student with very limited patient care experience through the more seasoned senior medical student and beyond.

Bedside teaching can provide an excellent opportunity for the teacher to role model professional behavior, improve the doctor–patient relationship, foster communication skills, and further educate the patient.²²

cal students and residents all valued bedside teaching for developing professional skills. Because this concern has not been adequately studied, it is unclear whether a decline in bedside teaching in the emergency department has occurred during this same time period.

When initiating formal bedside teaching rounds, it can be helpful to identify patients who will provide the most educational value to the learners. With these select patients, the attending physician may demonstrate or briefly observe a medical student performing certain aspects of the history and physical examination. These cases are also excellent for teaching clinical vignettes and reviewing interesting physical examination findings such as rashes, heart murmurs, and the like. Bedside teaching can also provide an excellent opportunity for the teacher to role model professional behavior, improve the doctor–patient relationship, foster communication skills, and further educate the patient.²² Students can learn much just by watching how a seasoned clinician interacts with a patient. When teaching at the bedside, it is important to realize that methods of questioning students (e.g., the Socratic method) and other teaching techniques may need to be modified to maintain a supportive educational environment.

Properly performed bedside teaching rounds are generally viewed as having a positive effect on patient care.^{24,25} The majority of patients enjoy bedside teaching and often develop an increased understanding of their illnesses. However, some patients suggest that physicians use less confusing medical terminology and incorporate the patient more into the case discussion. In the inpatient setting, it has been suggested that teaching physicians ask permission to conduct educational rounds, even though most patients have positive perceptions about bedside teaching.^{24,25} Although patient perception of rounds has not been well studied in the emergency department setting, most emergency department patients have positive perceptions of medical students being involved with their care.²⁶ It is still reasonable to ask the patient's permission before conducting purely educational rounds.

Case-Based Teaching

In the clinical years, most teaching in the emergency department occurs during a formal rotation; much of this can be on an individual basis—the teaching physician supervises a medical student or resident. Case-based clinical teaching can focus on several elements, including chief complaint–based medical interviewing and physical examination skills, development of case-specific differential diagnosis, medical decision making, use and interpretation of diagnostic studies, basic procedural skills, understanding proper patient disposition, medical documentation, and implementation of patient management plans.

As an alternative approach to having a medical student evaluate an undifferentiated patient, the teacher can prescreen emergency department cases for their educational value or can select patients with specific chief complaints (e.g., abdominal pain, chest pain, headache). Before the student–patient encounter, a faculty member and student could briefly prepare for the case by discussing key differentials for the chief complaint, likely findings, and other methods of discovery. This approach may serve to focus the student’s attention on the pertinent findings and further reinforce the emergency medicine approach of focused history and physical examinations.

Teaching at the bedside also can be incorporated into each patient encounter either during or immediately after the case presentation. At the bedside, the teaching physician can use techniques of demonstration or observation.²⁷ Direct observation of clinical skills takes more time but allows for a more in-depth evaluation of the student’s performance. For example, a case of lower back pain can provide a valuable learning experience. Demonstrating or observing a student perform a musculoskeletal or neurologic examination, describing techniques of performing a straight leg raise test, and discussing the implications of positive findings can make a straightforward case teachable. A simple case involving a patient with an ankle sprain or sore throat can prove educational if a few minutes are spent to demonstrate or observe the student performing an examination or highlighting key aspects of the case. These and other similar cases are perfect to discuss the application of cost-effective medicine by incorporating various clinical decision rules such as the Ottawa foot and ankle rules, NEXUS criteria or Canadian C-spine rules into clinical practice.

Sign in–Sign Out Rounds

The sign in–sign out rounds, unique to the shift work scheduling of emergency medicine staff, can provide an educational opportunity. Sign out usually takes place in a central location, near the patient tracking board, to allow for a focused review of all patients in the department. An alternative to the classic “board rounds” in which the staff discusses the cases at a central location, are the “walk rounds.” These are best accomplished in the morning at the start of the day shift as the entire patient care team is transitioning care. Usually, attendance at morning rounds is the greatest because there is a complete turnover of the physician staff. In my experience, students and residents enjoy walk rounds because they are more interesting and educational than the standard sign-out rounds. Walk rounds should be case based and are typically presented by the overnight resident or student team. The daytime

In the emergency department, medical students are likely to encounter clinical scenarios and chief complaints that they would otherwise have little, if any, direct contact with.

By allowing the student to proceed without interruption, the teacher may be better able to assess the needs of the student while simultaneously developing a differential diagnosis and treatment plan for the patient.

attending serves as a facilitator or moderator and is better able to pick and choose certain aspects of each case that appear to be of educational benefit to the team. A review of interesting radiographs from the previous shift or other diagnostic test results also can occur at this time.

Student Case Presentations

As in other health care settings, medical students rotating through the emergency department are rarely directly observed performing a history and physical examination.^{9,10,28} The first opportunity for teaching usually occurs during the student case presentation. It is often at this time that the tone for teaching is set. Throughout the case presentation, the preceptor must patiently listen to the student. By allowing the student to proceed without interruption, the teacher may be better able to assess the needs of the student while simultaneously developing a differential diagnosis and treatment plan for the patient.

Improvement in case presentations as a communication skill will lead to better patient care and an enhanced educational experience for the student. All too often, the focus of select teaching points can be lost if the case is not presented in a coherent and organized fashion. In a busy emergency department, time required to clarify details of a poorly presented case can take away from valuable and often limited time available for teaching. McGee and Irby described guidelines for the outpatient case presentation.¹¹ The emergency department is distinct from the office setting in that it is frequented by patients with acute and often complex medical issues. However, generalizations about case presentation style can still be made. Medical student case presentations should be brief, to the point, and last approximately 2 min for most uncomplicated, straight forward cases. Because emergency medicine is primarily a complaint-driven specialty, focused case presentations are often possible. The traditional case presentation approach begins with a directed opening statement. I recommend that this initial statement include any pertinent past medical history along with the patient's chief complaint. An example is shown in Box 4.1. When the student links pertinent past medical history early in the case presentation, it allows the preceptor to follow the case better.

After the opening statement, the student should present a more detailed description of the history of present illness. This description is often the crux of the case presentation, with the history of present illness taking up approximately half of the total presentation time. After a description of the history of present illness, the student should report pertinent review of systems

Box 4.1. Example of an Initial Statement in a Traditional Case Presentation

Mr. Jackson is a 57-year-old man with a history of hypertension and peripheral vascular disease who presents with palpitations and exertional shortness of breath.

(positive and negative), major ongoing medical problems, relevant family and social history, medications, and allergies, followed by vital signs, pertinent physical examination findings, and laboratory or other available data, and conclude with an assessment and treatment plan.

A variation on this traditional format is described by Wolpaw et al.²⁹ In this learner-centered model for case presentations, the learner follows a six-step mnemonic referred to as SNAPPS. *Summarize* briefly the history and physical examination findings, *narrow* the differential to relevant possibilities, *analyze* the differential by comparing and contrasting the possibilities, *probe* the preceptor by asking questions (in effect, use the preceptor as an expert consultant), *plan* management for the patient, and finally have the learner *select* a case-related issue for self directed learning.

An alternative case presentation approach applicable in the emergency department setting was reported by Maddow et al.³⁰ They described the use of an assessment-oriented (AO) style of oral case presentations by emergency medicine residents. This style differs from the traditional model and can easily be adopted by medical students in straight forward cases with single system complaints. The AO format may, however, be difficult to use with complicated cases or with patients with multiple complaints. AO style case presentations can have a benefit in the emergency department setting when time is at a premium. This style has been shown to be an effective and efficient way of communicating while also being time saving. The AO case presentation style is the epitome of the “cut to the chase” approach to case presentations. When using this format, instead of initially describing the chief complaint followed by the history of present illness and so forth, the trainee starts the presentation with the assessment (diagnostic impression) of the case followed by the treatment plan. This presentation can then be followed by pertinent (positive or negative) history and physical examination data that support the clinical assessment. I believe it is also helpful to include information related to the chief complaint in the opening statement. An example of an opening statement using the AO format is shown in Box 4.2.

Medical student case presentations should be brief, to the point, and last approximately 2 min for most uncomplicated, straight forward cases.

Box 4.2. Example of an Opening Statement Using the AO Case Presentation Style

Mr. Laury is a 53-year-old man who presents with right leg pain and swelling. I am concerned that he could have a deep venous thrombosis. I would like to obtain a noninvasive vascular study to confirm the diagnosis.

Box 4.3. Three Types of Case Presentation

Traditional Case Presentation

- Directed opening statement
- Detailed description of the history of present illness (approximately half of the total presentation time)
- Pertinent review of positive and negative systems
- Major ongoing medical problems
- Relevant family and social history
- Medications and allergies
- Vital signs
- Pertinent physical examination findings
- Laboratory or other available data
- Concludes with an assessment and treatment plan

SNAPPS

- Learner-centered model for case presentations
- Summarize briefly the history and physical examination findings
- Narrow the differential to relevant possibilities
- Analyze the differential by comparing and contrasting the possibilities
- Probe the preceptor by asking questions (in effect, use the preceptor as an expert consultant)
- Plan management for the patient
- Select a case-related issue for self-directed learning.

Assessment-Oriented (AO) Oral Case Presentations

- "Cut to the chase"
- Presentation begins with the assessment (diagnostic impression) of the case followed by the treatment plan
- Pertinent (positive or negative) history and physical examination data that support the clinical assessment are added as needed

The AO case presentation model is also effective when discussing a case over the phone with a consultant or with the admitting physician. Box 4.3 shows a comparison of the 3 case presentation methods. I suggest that regardless of which case presentation format the preceptor prefers, he or she should relay those expectations to the student to avoid any confusion or misunderstanding. At times, the preceptor may need to facilitate the presentation; however, the goal is to examine the thought process of the student and move away from the expectation of just reporting the data.

After conclusion of the case presentation, typically the traditional format, students may pause. It is at this time that they are usually looking for some type of feedback, reassurance, or valida-

tion, or they are uncertain how to proceed with the case. At the conclusion of the presentation, some preceptors may attempt to summarize the case, lead the discussion, and direct patient management. For complex cases, or when working with a student encountering a clinical scenario that he or she is unfamiliar with, this style may be necessary for the preceptor. When applicable, the preceptor should attempt to probe the student's thought process with questions that promote critical thinking to better gauge his or her understanding of the case.³¹

Clinical teaching is as much of an art as it is a skill. Each patient encounter is unique, and each learner has his or her own strengths, areas requiring improvement, and educational needs.

Styles of Questioning

Clinical teaching is as much of an art as it is a skill. Each patient encounter is unique, and each learner has his or her own strengths, areas requiring improvement, and educational needs. A seasoned clinician should use different teaching techniques and methods of questioning to actively involve the student in the learning process. Tailoring the clinical teaching to the learner is paramount to providing an optimal educational experience. Setting aside patient care, questioning techniques used by teachers have varied educational purposes.^{32,33} Low-level questions can be used to assess a learner's medical knowledge base and knowledge application to a specific patient encounter, problem, or chief complaint. High-level questions can effectively assess clinical reasoning or problem-solving abilities by evaluating how a student analyzes and synthesizes clinical information gathered during the history and physical examination or through the interpretation of diagnostic studies. By using probing questions as a method of discovery, the teacher can better gauge the students' understanding of a particular case. Probing questions are used to promote critical thinking in the learner, that is, the Socratic method of teaching (how?, what?, and why?, see Box 4.4).

Box 4.4. Questions That Promote Critical Thinking

1. What do you think is wrong with this patient?
2. What are the important aspects of this case?
3. How did you come to that conclusion?
4. What else do you think could be the cause of the patient's complaint?
5. What do you think is the most likely cause of the patient's complaint?
6. What diagnostic tests are indicated in this case?
7. How should we proceed from here?
8. Do you think the patient will require hospital admission?
9. When should this patient return to the emergency department?

When asking a question, remember to allow enough time for the student to formulate an answer. If the question is answered incorrectly, the first question can be followed up with another question that guides the student toward the correct answer. It may also be helpful to avoid answering a student's question directly. Instead, it may be helpful to use counter questions. Many different teaching styles have been described in the medical literature.^{14,34,35} Although no one style is best, effective clinicians use different teaching styles depending on the clinical circumstance and the specific needs of the student. Regardless of the teaching style used, it is important to provide a learning environment that is nonconfrontational and supportive and that fosters critical thinking.

One method of questioning is the *assertive style*. The teacher poses direct questions and can provide answers or information for the student. The teacher can also educate by asking self-answering questions. This style uses a teacher-centered approach. An example of assertive questioning is as follows, "What is the antibiotic of choice for treating streptococcal pharyngitis?" Low-level questions like this can be used to gauge the learner's medical knowledge base. Another method of questioning is the *suggestive style*. When using this type of questioning, the preceptor offers suggestions or alternative methods of patient care with either questions or statements. The teacher can also share opinions and practical experience as a model for the student. An example of suggestive questioning is as follows, "Although Bactrim is an option for treating a urinary tract infection, in my experience ciprofloxacin is a more cost-effective choice." The *collaborative style* is more learner centered and can help explore the student's clinical reasoning and further promote problem-solving abilities. With this approach, the preceptor may elicit or explore the student's thought process. To many educators, questions that assess the ability of the student to analyze and synthesize data are much more important than questions that assess pure recall of factual knowledge. The teacher can accept the student's ideas and can relate personal experience as a means of empathizing with the student. An example of this style of questioning is, "Why do you think this patient could have a pulmonary embolism?" or "If the D-dimer is negative, would that change your approach to this patient?" Another method is the *facilitative style*. In this style, the teacher can elicit and accept the student's feelings to promote self-understanding. The teacher may also offer feelings and can encourage the student. An example of this style is as follows, "Ms. Jones discussed some very personal issues about her home environment; how did that make you feel?"

Teaching Models

The traditional ambulatory teaching model is thought to be the most commonly used teaching model in the outpatient setting.⁸ This patient-centered approach to teaching has three components. The first is the case presentation, which takes approximately 50% of the time. The second component is the questioning of the student by the preceptor to obtain additional patient data, clarification, and the like, which takes approximately 25% of the time. The remaining time is spent discussing the case and treatment plan; often little time is dedicated to teaching or providing feedback. The 1-min preceptor model differs from the traditional approach in that it is a learner-centered approach.^{8,9,31} This model consists of 5 microskills that appear to be effective for clinical teaching:

1. Get a commitment from the learner.
2. Probe the learner for his or her underlying reasoning (Socratic questioning).
3. Teach general rules.
4. Provide positive feedback.
5. Correct mistakes.

Regardless of the teaching model used, allow the student to play an active role in learning to enhance the educational process. By encouraging students to openly discuss their approach to a particular case, the teacher will be better able to identify their strengths or deficiencies in clinical reasoning skills. Providing general rules or guidelines is another useful approach to teach certain concepts, for example, “You should always consider hypoglycemia in the differential diagnosis of a patient with an altered mental status,” the reason behind and technique of applying a cervical collar to a patient with an altered mental status who has suffered head trauma is an important concept to understand. Teachable moments can be found in most if not all cases. Use the wide range of presenting complaints in the emergency department to make learning interesting.

Feedback

Feedback and reflection enhance medical education and are two simple teaching techniques that can be applied to many clinical encounters. Feedback is the process of providing students with information related to their performance in a particular activity that is intended to guide their future performance.³² In a nutshell, feedback can be thought of as a method of enacting performance improvement. Feedback can be presented in

Feedback is the process of providing students with information related to their performance in a particular activity that is intended to guide their future performance.³²

In medical education, *reflection* refers to the consideration of the larger context and the implications of a specific experience or action.¹⁵

multiple ways. Branch and Paranjape¹⁵ described 3 approaches to providing feedback. The first is the brief feedback session. This type of session is informal, often unscripted and unplanned. This feedback can occur at or away from the bedside while observing a medical student performing a specific component of the physical examination or when supervising basic procedures. Students may not even recognize that they are receiving feedback if it is provided in a nonjudgmental manner. Formal feedback may also be unscripted and unplanned, but it usually occurs away from the bedside. An opportunity for formal feedback may occur at the conclusion of a case presentation, after a complicated procedure, after a medical mistake, after a difficult patient encounter, or at the conclusion of a shift. The third category is considered major feedback. This is a formal, prearranged session that should be held in a private setting. This type of session can be held at the mid-point or conclusion of a rotation. Providing effective feedback is challenging, but it can be accomplished if a few simple guidelines are followed.^{15,32} Feedback should be nonjudgmental, descriptive, supportive, and nonevaluative, always keeping the student's best interests in mind. Feedback should also be well timed and is most effective if provided shortly after the clinical encounter. A suggested approach is to start a formal feedback session by asking the student to provide self-feedback. This process of self-evaluation can be both helpful and insightful. This technique is often an easy way to initiate feedback and may be a useful technique when discussing difficult topics such as a medical mistake. If possible, always start off by providing positive feedback. By doing so, a positive tone is set, and the student will be more likely to accept constructive criticism. Positive feedback will encourage the student to continue the same behavior in the future. Feedback should refer to specific behaviors or actions and can incorporate suggestions for improvement. If areas of improvement are recognized, feedback is not complete without providing the student with a plan, approach, or suggestions for remediation.

A clear distinction needs to be made regarding feedback and evaluation, because these are often linked together. *Feedback* can be used as a teaching tool if it is given in a formative approach, providing the student with an honest assessment of his or her performance. *Evaluation* is traditionally summative and is used to describe performance as it relates to the achievement of learning objectives and in determining clerkship grades. A more in-depth discussion on this topic is reviewed in Chapter 12 on providing feedback to students.

In medical education, *reflection* refers to the consideration of the larger context and the implications of a specific experience or action.¹⁵ In some ways, this reflection can be viewed as

a debriefing exercise. Reflection is not designed to teach factual knowledge and differs from feedback in its approach and emphasis. An opportunity for reflection may occur after a challenging clinical encounter. Reflection involves discussing the humanistic and moral aspects of patient care.¹⁵ Reflection can occur simultaneously with a group of learners as opposed to feedback, which is best individualized. Many educators will invariably use a combination of these techniques.

Effective clinical teachers have also been shown to actively involve students in the learning process, promote learner autonomy, teach with enthusiasm, and communicate expectations for performance.^{36,38}

Qualities of an Effective Clinical Teacher and Role Model

The qualities of effective clinical teachers and professional role models have been identified in the medical literature.^{23,32,36–39} Although most of these studies have been performed in the inpatient and ambulatory care settings, these findings can easily be applied to emergency medicine physician role models. Elnicki et al.³⁸ used a regression analysis model to identify factors associated with teaching effectiveness ratings by third-year medical students in ambulatory clerkships. He identified several teaching behaviors that were independently associated with perceived teaching effectiveness:

- Inspiring confidence in medical skills
- Explaining the decision-making process
- Treating students with respect
- Modeling professional behavior

In addition, three clerkship goals were independently associated with the student's perceptions of effective teaching:

- Learning and practicing clinical skills
- Practicing ethical medicine
- Encouraging evidence-based medicine

Effective clinical teachers have also been shown to actively involve students in the learning process, promote learner autonomy, teach with enthusiasm, and communicate expectations for performance.^{36,38} Clinical competence of the bedside teacher is crucial to establishing credibility with the learner.⁴⁰

A *role model* can simply be defined as a person who is in a position to set an example for others.³⁶ In addition to clinical competence, role models exhibit professional behaviors and attributes that are often difficult to adequately portray in the classroom setting. Professionalism encompasses the admirable characteristics of physicians. Often by observing faculty behavior, medical students are exposed to how seasoned clinicians display humanistic qualities and interact with patients, families, and colleagues. Role modeling is another method by which medical students learn. This learning

Clinical teachers are highly improvisational. This is a necessary skill, because faculty members are often called on to react to unknown patient presentations without an opportunity for advance preparation.

does not occur by teaching knowledge or concepts, but rather by demonstrating the qualities inherent to being a professional and ethical physician. Through personal experience, many of these same characteristics and attributes are present in effective emergency medicine teachers and role models. Among faculty members, effectiveness as a clinical teacher and role model does not appear to be associated with specialty, faculty rank, or gender.^{10,38,39}

Another key to effective clinical teaching is to identify what a particular student needs to know in addition to making the correct diagnosis and providing excellent patient care. As junior faculty members become more comfortable with clinical medicine, they are better able to decipher the pertinent facts of the case. When their comfort level improves, the task of teaching becomes easier. Being able to identify a learner's needs is one of the most critical skills in effective teaching.³² The responsibilities of the clinical teacher are to provide excellent patient care and to help a student achieve the learning objectives for a particular clinical experience. Irby investigated how attending physicians made instructional decisions on inpatient teaching rounds.⁷ Although the research was not conducted in the emergency department setting, it is likely that many of these same concepts are applicable to emergency medicine faculty. Clinical teachers are highly improvisational. This is a necessary skill, because faculty members are often called on to react to unknown patient presentations without an opportunity for advance preparation. In addition, educators rely on their past experiences to develop scripts or preplanned teaching points. An instructional script can be considered to be a teaching plan that includes predetermined goals, activities, and examples to be used in teaching about a particular clinical scenario.⁷ Many situations we encounter will have similarities to past cases and will allow for this type of teaching. Examples include the pregnant patient with abdominal pain, the poisoned patient, and the patient with an altered mental status. For cases like these, and many others, experienced faculty members have preconceived teaching points that they feel are important for the student to learn.

Evaluation of Clinical Teaching

The evaluation of clinical teaching is also an important part of the learning process. Faculty members and senior residents who are involved with teaching medical students should receive periodic feedback and evaluation regarding their clinical teaching skills. Medical students should have the opportunity to evaluate their clinical teachers. Often, this is done anonymously during an end-of-rotation evaluation. These evaluations serve several

purposes. First, they can serve to identify strong clinical teachers within your department. In addition, some academic emergency medicine departments incorporate teaching evaluations into salary incentive programs, and teaching evaluations may be included in promotion portfolios.

The teaching mantra in the emergency department can best be summed up as “teach when you can.”

Barriers to Effective Clinical Teaching

In the emergency department, many barriers exist that affect the ability to teach medical students. The emergency department is a hectic and, at times, unpredictable clinical environment for training medical students. The teaching mantra in the emergency department can best be summed up as “teach when you can.” Barriers to effective clinical teaching in the emergency department revolve around the patient, the student, the teacher, and the emergency department setting itself. Patient barriers include the high level of acuity, patients with an altered mental status, needs for privacy, and patient reluctance. Student barriers include different levels of training, variable funds of knowledge, different career interests, individual goals, and variable learning attitudes and expectations. Teacher barriers include lack of confidence, limited teaching experience, little or no formal training, limited time to teach, endless interruptions, and simultaneous patient care and administrative responsibilities. Barriers related to the emergency department setting include overcrowding, inadequate patient care space, unpredictable workload, and unanticipated emergencies. These and other barriers such as the shift work scheduling of emergency medicine attendings, residents, and students often lead to limited preceptor–learner continuity, which makes it difficult to assess learner progress throughout a clerkship. However, strategies exist to overcome these barriers (see Table 4.1).

In the academic emergency medicine environment, faculty time is at a premium. It is therefore important to have departmental support to optimize the medical student educational experience. This support may include altering staffing patterns to provide adequate teaching coverage or providing faculty members with protected time to devote to the teaching of medical students. Emergency medicine faculty must be committed to enhancing medical student education. Departmental support is important in developing clinical educators, because many faculty members have had no formal training in education and some base career aspirations on being a clinical educator.

Conclusion

Numerous opportunities for clinical teaching exist in the emergency department. Techniques for teaching described in this

Table 4.1. Barriers to Teaching and Strategies to Overcome Them in the Emergency Department

	Barriers	Strategies to Overcoming Barriers
Emergency department	<ul style="list-style-type: none"> • Overcrowding • Inadequate patient care space • Unpredictable workload • Unanticipated emergencies. • Shift work scheduling of emergency medicine attendings, residents, and students 	<ul style="list-style-type: none"> • Highlight unique content areas. • Use the varied emergency department patient population to your advantage. • Identify teachable moments. • Incorporate bedside teaching. • Teach multitasking and time management skills. • Role model professional behavior.
Patients	<ul style="list-style-type: none"> • High level of acuity • Patients with an altered mental status • Needs for privacy • Patient reluctance 	<ul style="list-style-type: none"> • Actively involve the patient in the teaching experience. • Incorporate teaching directly into patient care.
Students	<ul style="list-style-type: none"> • Different levels of training • Variable funds of knowledge • Different career interests • Individual goals • Variable learning attitudes and expectations 	<ul style="list-style-type: none"> • Identify knowledge gaps or misconceptions. • Directly observe skills. • Teach to the students' level. • Focus teaching toward high-yield topics. • Focus teaching to the needs of the individual.
Teachers	<ul style="list-style-type: none"> • Lack of confidence • Limited teaching experience • Little or no formal training • Limited time to teach • Endless interruptions • Simultaneous patient care and administrative responsibilities 	<ul style="list-style-type: none"> • Understand that most cases have a teaching point. • Identify interesting cases and procedural opportunities. • Use your clinical experience. • Be enthusiastic and create a supportive environment. • Challenge the learner.

chapter will help enhance the teaching experience of medical students. As educators, we must realize that no one method is optimal; the key is that teaching should be tailored to the learner. Be flexible in your teaching style, engage the student and allow him or her to actively participate in the process. Offer feedback that reinforces positive behaviors or actions while providing guidance on how the learner can improve or remediate their clinical performance. Most of all, enjoy the opportunity to teach.

References

1. Kuhn WF. Emergency medicine: a unique opportunity for medical students. *Acad Med.* 1999;74:755–756.
2. Manthey DE, Coates WC, Ander DS, et al. Report of the Task Force on National Fourth Year Medical Student Curriculum Guide. *Ann Emerg Med.* 2006;47:e1–e7.
3. Ramani S. Twelve tips to improve bedside teaching. *Med Teach.* 2003;25:112–115.
4. Ramani S. Whither bedside teaching? A focus group study of clinical teachers. *Acad Med.* 2003;78:384–390.
5. Ende J. What if Osler were one of us? *J Gen Intern Med.* 1997;12:s41–s48.
6. Thibault GE. Bedside rounds revisited. *N Engl J Med.* 1997;336:1174–1175.
7. Irby DM. How attending physicians make instructional decisions when conducting teaching rounds. *Acad Med.* 1992;67:630–638.
8. Aagaard E, Teherani A, Irby DM. Effectiveness of the one minute preceptor model for diagnosing the patient and the learner: proof of concept. *Acad Med.* 2004;79:42–49.
9. Irby DM, Aagaard E, Teherani A. Teaching points identified by preceptors observing one minute preceptor and traditional preceptor encounters. *Acad Med.* 2004;79:50–55.
10. Irby DM. Teaching and learning in ambulatory care settings: a thematic review of the literature. *Acad Med.* 1995;70:898–931.
11. McGee SR, Irby DM. Teaching tips in the outpatient clinic. *J Gen Intern Med.* 1997;12:s34–s39.
12. Regan-Smith M, Young WW, Keller AM. An efficient and effective teaching model for ambulatory education. *Acad Med.* 2002;77:593–599.
13. Janicik RW, Fletcher KE. Teaching at the bedside: a new model. *Med Teach.* 2003;25:127–130.
14. Langlois J, Thach S. Teaching and learning styles in the clinical setting. *Fam Med.* 2001;33:344–346.
15. Branch WT, Paranjape A. Feedback and reflection: teaching methods for the clinical settings. *Acad Med.* 2002;77:1185–1188.
16. Coates WC. An educator's guide to teaching emergency medicine to medical students. *Acad Emerg Med.* 2003;11:300–306.

17. Kaji A, Moorehead JC. Residents as teachers in the emergency department. *Ann Emerg Med.* 2002;39:316–318.
18. Penciner R. Clinical teaching in a busy emergency department: strategies for success. *CJEM.* 2002;4:286–288.
19. Totten VY. Ethics and teaching the art of emergency medicine. *Emerg Med Clin North Am.* 1999;17:429–441.
20. Maddow CL, Shah MN, Olsen J, et al. Efficient communication: assessment-oriented oral case presentation. *Acad Emerg Med.* 2003;10:842–847.
21. Wald DA. Teaching techniques in the clinical setting: the emergency medicine perspective. *Acad Emerg Med.* 2004;11:1028.e1–1028.e8.
22. Aldeen AZ, Gisondi MA. Bedside teaching in the emergency department. *Acad Emerg Med.* 2006;13:860–866.
23. Bandiera G, Lee S, Tiberius R. Creative effective learning in today's emergency departments: how accomplished teachers get it done. *Ann Emerg Med.* 2005;45:253–261.
24. Nair BR, Coughlan JL, Hensley MJ. Student and patient perspectives on bedside teaching. *Med Educ.* 1997; 31:341–346.
25. Lehmann LS, Brancati FL, Chen M, et al. The effect of bedside case presentations on patients' perceptions of their medical care. *N Engl J Med.* 1997; 336:1150–1155.
26. Wald DA, Yeh K, Ander DS, et al. The perception of emergency department patients regarding medical student participation in their health care [abstract]. *Acad Emerg Med.* 2007;14: S75–a.
27. Kroenke K, Omori DM, Landry FJ, et al. Bedside teaching. *South Med J.* 1997;90:1069–1074.
28. Wald DA, Barrett J, Lafferty K. Observation of medical students during a fourth year emergency medicine clerkship. *Ann Emerg Med.* 2003;42:s102.
29. Wolpaw TM, Wolpaw DR, Papp KK. SNAPPS: a learner-centered model for outpatient education. *Acad Med.* 2003;78:893–898.
30. Maddow CL, Shah MN, Olsen J, et al. Efficient communication: assessment oriented case presentations. *Acad Emerg Med.* 2003;10:842–847.
31. Gordon K, Meyer B. *Five microskills for clinical teaching.* Adapted by D Irby. Updated by T Greer. Available at: www.fammed.washington.edu/predoctoral/clerkship/forms/FiveMicroskillsforClinicalTeaching.pdf. Accessed March 22, 2010.

32. Kleffner JH, Hendrickson WD. *Effective Clinical Teaching*. Houston: Texas Southern University College of Pharmacy and Health Sciences; 2001.
33. Spencer J. Learning and teaching in the clinical environment. *BMJ*. 2003;326:591–594.
34. LaCombe MA. On bedside teaching. *Ann Intern Med*. 1997;126:217–220.
35. Whitman N. *Creative Medical Teaching*. Salt Lake City: Department of Family and Preventive Medicine, University of Utah School of Medicine; 1990.
36. Irby DM, Ramsey PG, Gillmore GM, et al. Characteristics of effective clinical teachers of ambulatory care medicine. *Acad Med*. 1991;66:54–55.
37. Wright SM, Kern DE, Kolodner K, et al. Attributes of excellent attending physician role models. *N Engl J Med*. 1998;339:1986–1993.
38. Elnicki DM, Kolarik R, Bardella I. Third year medical students' perceptions of effective teaching behaviors in a multidisciplinary ambulatory clerkship. *Acad Med*. 2003;78:815–819.
39. Wright SM, Carrese JA. Excellence in role modeling: insight and perspective from the pros. *Can Med Assoc J*. 2002;167:638–643.
40. Irby DM. *Effective Clinical Teaching and Learning: Clinical Teaching and the Clinical Teacher*. Available at: www.med.cmu.ac.th/secret/meded/ct2.htm. Accessed November 4, 2009.

Teaching Didactic Material in Emergency Medicine

Douglas S. Ander

Summary Points

- Course directors can choose from several modalities to deliver didactic material. These modalities need to be adapted to individual needs of the course.
- Lectures are an extremely efficient method of presenting cognitive information.
- Case-based small group learning typically requires a higher level of thinking, application, and evaluation of knowledge and a skilled educator.
- Implementation of the educational program requires matching available resources with the needs of the curriculum.
- Development of educator skills is a crucial component when developing a didactic program.

COURSE DIRECTORS NEED TO consider various options to deliver didactic materials to learners, including reading materials, lectures, small group discussions, and simulations. If a lecture is the best approach for a particular subject or setting, the medical educator needs to make sure it is well organized, meets the learning objectives, and is delivered skillfully.

Lectures are an extremely efficient method of presenting cognitive information.

Types of Teaching in the Classroom

Lectures

Lectures are an extremely efficient method of presenting cognitive information. Planning involves assessing the educational needs, level of learner education, and skill of the educator. Lec-

Lectures have the advantage of clearly defined objectives that will fit into an overall curriculum design.

tures have the advantage of clearly defined objectives that will fit into an overall curriculum design. The course director can pick the topics, define the objectives, and write the lectures or edit other faculty member's work. The final step in this process is evaluating the lecture, providing feedback to the educator, and revising the lecture on the basis of the feedback and curriculum requirements. Lectures are typically topic based, but cases can be inserted to add clinical relevance.

Small Group Sessions

Small group sessions require a strong leader who is able to direct discussion, energize the group, and answer questions on facts that were prepared in advance.

A small group session (with maximum of approximately 30 learners) is typically case based and can combine lecture material with interactive discussion. These small group sessions require a strong leader who is able to direct discussion, energize the group, and answer questions on facts that were prepared in advance. They typically require a higher level of thinking, application, and evaluation of knowledge. A case can be presented in its entirety at the start of the session or broken up into segments. After discussion of each segment, the educator reviews discussion, clarifies teaching points, and summarizes. Small group sessions offer a reasonable balance between the efficiency of communicating vital medical information to the learner and the benefits of an interactive session. In this model, the objectives can be met in an environment that promotes discussion and free thought. Particular emphasis should be placed on faculty and resident development to ensure proper implementation of this teaching modality.

Independent Study

Independent study can be used for core curriculum content. The course director may decide that learners should gain an understanding of a topic but, because of limited clinical exposure and the limited number of lecture hours, the medical school has decided not to teach this material in the classroom. In these cases, the curriculum can be supplemented with independent study. Further, when a learner develops a question to a clinical issue encountered during patient care, the learner should be encouraged to research the answer independently. Learners should be provided a framework to answer the clinical question using evidence-based medicine techniques. They need to have an understanding of the different levels of evidence and have an outlet for presenting the results of their research.

The following learning objective would be appropriate for independent study: *The medical student will be able to recognize the characteristics of a venomous snake.* For this objective, the learner may receive a handout with all the necessary cognitive informa-

tion, which may include appropriate pictures. The course director should provide a list of objectives that can be attached to a list of educational resources. These might include specific textbooks, handouts, journal articles, Web-based material, or CD-ROMs. This approach provides learners with a framework for education but the autonomy to assimilate the material at their own speed. Although reading is passive, workbooks or interactive Web-based computer program sessions help make this activity more interesting and interactive.

Faculty can infuse the didactic material with real-life examples based on their clinical experience while not ignoring evidence-based medicine.

Resources and Obstacles

Implementation of the educational program requires matching available resources with the needs of the curriculum. The course director needs to be flexible with curricular contents and delivery mechanisms based on the results of the resource analysis.

Faculty

Faculty members are the most important commodity to a course director. They are instrumental in the development of curricula, lectures, and other didactic material. Faculty can infuse the didactic material with real-life examples based on their clinical experience while not ignoring evidence-based medicine. The course director needs to be realistic and balance the desire to have faculty members teach all the classes with the realities of academic life. Faculty time, the requirements of clinical practice, and faculty comfort and experience with teaching medical students need to be taken into account before implementation of an educational program. Options for faculty involvement may be voluntary participation, use of only selected faculty, or required participation by all faculty. The course director needs to work with the faculty leadership and the faculty members themselves to find the appropriate balance and support.

Residents

In many programs, residents serve as medical educators. The residents, being closer in training to the learners, may have a better understanding of the learners' educational needs. The major disadvantage is that the residents' knowledge base may not allow them to adequately teach the objectives, and they have less experience with educational methods. Developing conference modules in advance is one solution to this problem. Aside from providing the residents with the required material, it decreases the need for residents and faculty members to rewrite lectures for every rotation.

Faculty and resident development are crucial.

Faculty and Resident Support

When faculty members or residents are expected to participate in the didactic curriculum, they must be provided with ample support and feedback. The course director should provide a program or individual mentoring aimed at developing appropriate teaching skills. Resources are available to assist in this responsibility. Although not meant to be comprehensive the course director can start with the *Guidebook for Clerkship Directors*.¹ The Institute for Medical Education at Mount Sinai School of Medicine has many useful on-line resources.² The educator can also use society meetings that typically host educator development sessions (e.g., Clerkship Directors of Emergency Medicine and the Council of Residency Directors). The residency director needs to be involved in developing residents' roles in medical student education.

Regardless of the teaching modality, faculty and resident development are crucial. The majority of medical educators are not taught how to lecture. Medical schools and residencies do not routinely include a curriculum on how to teach adult learners. The course director needs to be responsible for educating the faculty and residents on efficient lecture and small group session techniques. The course director should consider observing sessions with inexperienced faculty or residents to assess for problems and provide them with clear, constructive feedback.

Learners

The number of learners that will participate in the educational programs will affect the choice of educational modality. Small, interactive group sessions can take place if there are fewer enrolled learners. Larger groups can still be case based, but these groups are typically less interactive and lean toward a lecture format. During any rotation, learners may also be at different levels of training. Some may have already had an emergency medicine rotation, other electives, or more experience in other specialties. The lecture material and educator must be flexible to account for the various needs.

Space

The availability of space may affect the type of didactic session. A room with audiovisual equipment makes teaching a module with computer-generated material feasible. If no audiovisual equipment is available, all the learning material will have to be printed, and the module may be best taught in a case-based or small group discussion format. If the rotation involves several clinical sites, the course director will have to decide whether conferences will be held centrally, move among the sites, or incorporate

distance-learning techniques. Multiple sites may even require the same material be taught by several different educators, requiring the course director to ensure consistency. It may be necessary to make all the didactics independent study if the rotation uses multiple sites, some of which may not have the ability to deliver lectures or small-group sessions.

Before developing a lecture, the course director needs to ask whether the lecture is necessary at all.

Technology

A course director must assess the technology available to and the comfort level with the available technology. Does the educator have access to computers, LCD projectors, or the Web? For distance learning, the educator must assess whether learners will have access to video conferencing at different sites and whether the learners have easy Internet access if the distance learning is Web based. If the educator is developing the modules, he or she should ascertain whether there is expertise available to develop Web-based programs, CD-ROMs, or video conferencing. Although it is tempting to use PowerPoint for every lecture, some lectures will lend themselves to more interactive “chalk-talk” type of lectures. Interspersing these types of lectures may also keep the learners’ interest better if there are a number of lectures back to back, such as on a dedicated didactic day.

Lecture Development

Before developing a lecture, the course director needs to ask whether the lecture is necessary at all. Is a lecture the best format to relay the information to the learner? If the material is already in print and the lecture will not add to what already exists, learners may easily read the material on their own time. The course director could assign reading from a textbook, review article, or original research article instead of creating and implementing a lecture series. A lecture can be effective if it provides a means for discussion that synthesizes information and provides information that is not available in print, whether that is new research or clinical experience. If a lecture is the best approach for a particular subject or setting, the course director needs to make sure it is well organized, meets the learning objectives, and is delivered skillfully. Many people learn effectively through a lecture, and it should be considered a useful teaching modality.

Once it has been decided that a lecture is the best way to deliver the information, the course director needs to assess the learner and the environment in which they are learning. The educator needs to understand the learners who will be participating in the lecture, meet their expectations, and gauge their level of expertise. While planning the curriculum and lecture, the course

Content and good delivery are synergistic.

director needs to develop the learning objectives and decide how they will be integrated into the overall curricular goals of the course and, if necessary, the medical school curriculum.

An example of a learning objective might be as follows: *The medical student will be able to manage acute chest pain.* The course director would examine the years of medical student training, previous rotations, and current knowledge base. During the course of this analysis, the course director might discover that all the learners have taken care of chest pain patients during their third-year internal medicine clerkship and have a firm understanding of the pathophysiology, but they need to learn the fundamentals of risk stratification and disposition of patients with chest pain. The lecture and learning objectives can be adopted to meet these needs. The learners will still be expected to be able to perform an appropriate history and physical examination of patients with chest pain and relate a differential diagnosis, but the lecture can focus on more advanced aspects of management, including risk stratification and disposition. This process should be repeated for every aspect of the curriculum, with the course director making decisions about which aspects need to be highlighted in the didactic material.

Although some course directors may have no external forces directing their curriculum, most will need to integrate their curriculum into the larger medical school curriculum or attempt to comply with national recommendations. Course directors should meet with the appropriate deans in their institution, other course directors, or the curriculum committee. These interactions are important to guarantee good integration of the emergency medicine curriculum into the general medical school curriculum.

The second phase in development of the lecture objectives is an assessment of the learning environment. Take, for example, the following learning objective: *The medical student will be able to differentiate between venomous and nonvenomous snakes.* During analysis, the course director discovers that only a very small percentage of learners will actually see a snake bite during clinical practice. In this situation, the course director would need to add educational material to compensate for the gap in clinical experience. A lecture that reviews various clinical vignettes might be useful to fill in the clinical gap typically not present for more common clinical conditions.

Speaking Skills

To be effective, a lecture needs to contain appropriate content and delivery. Content and good delivery are synergistic. When delivering a lecture, the medical educator must have effective speaking skills that help the learners stay engaged and assimilate

the content of the material. The expressiveness of the educator has a significant effect on the learner ratings. This should be combined with good content to create an effective medical lecture (See Box 5.1 for tips on delivering an excellent lecture).

It is important to attract the attention of the learner early in the presentation. A variety of techniques can be used to engage the learner. The presentation could start with a relevant anecdote, one that illustrates one of the learning objectives, is enjoyable, personal, and funny (if possible). Another option is to pose a question or dilemma to the audience.

The average adult attention span is 20 min, so it is incumbent on the educator to use techniques that will keep and regain the attention of the learners. The learner must be an active participant in the activity. One technique is to introduce several open-ended questions into the lecture at regular intervals. The questions should require a learner to take and defend a position. Another technique is brainstorming. The educator can ask an open-ended question and get multiple responses from a range of learners. Using a whiteboard or flip chart to track responses will help gather the ideas where they can be evaluated as a group. The educator will need to summarize the responses. Inclusion of clinical applications at regular intervals in the presentation will add to relevancy, thus maintaining interest in the material. Depending on the lecture topic, demonstration may be useful, perhaps in the form of an actual demonstration of a skill or a video clip. Role playing is an active modality to demonstrate a particular skill typically related to communication skills. The educator will need

The learner must be an active participant in the activity.

Inclusion of clinical applications at regular intervals in the presentation will add to relevancy, thus maintaining interest in the material.

Box 5.1. Tips for Presenting an Excellent Lecture

- Approach your lecture like a conversation, not a speech. Deliver the lecture as if you were telling a story to the audience.
- Look at your listeners. By looking at your learners, you are better able to keep their attention and receive nonverbal feedback about your performance.
- Use a technique called eye sweep in which you scan the audience and occasionally make eye contact with an individual.
- Vary the pace of your talk; in addition vary tone, pitch, and force of your voice. Use natural hand and body movements to help energize your talk.
- Take your hands out of your pockets and off the podium. Walk away from the podium if you have a wireless microphone, but be aware of too much movement that may distract the learner. Sometimes holding on to items such as a pen or pointer will help you loosen up.
- Show enthusiasm for your topic. You should appear warm and have a high energy level. If you appear energized by your lecture, the audience will too. The expressiveness of the lecturer has a large effect on the learner ratings. This should be combined with good content to create an effective medical lecture.

Several general rules about slides are to keep them legible and simple with larger fonts and no more than 35 words per slide. In addition, red font should be avoided because it can be difficult to read, and distracting animations should not be used.

to have a plan for assigning roles, have specific information for each participant, describe the situation, and then allow time for the players and observers to comment and debrief. Audiovisual aids can be useful to maintain the attention of the learner, but typically they are overused.

Several general rules about slides are to keep them legible and simple with larger fonts and no more than 35 words per slide. In addition, red font should be avoided because it can be difficult to read, and distracting animations should not be used. The educator's words should complement what the learner reads on the slides and not mimic the slides. If the educator is using multimedia in the slides, he or she should arrive early to the lecture to check out the equipment and confirm that all embedded multimedia in particular movies work well.

The organization of the lecture should be clear to the audience. The educator should start with an introduction or preview of the material, present the material, and then conclude with a review of the material. The educator should stick to one or two major teaching points because too many points will be quickly forgotten. It is useful to establish some guidelines in advance of the lecture. The educator should tell the audience whether he or she allows for interruption for questions or prefers to save the discussion until the end. An alternative is to allow questions clarifying points but save disagreements with the points until the end. Practice the delivery and timing of the lecture.

The structure and routine of the lecture should be mastered before the presentation. If it is not routine, the educator will be more concerned with the delivery of the lecture than with keeping a perspective on the dynamic relationship between the lecturer and the audience. It is wise to practice the lecture in advance. This can be done with a colleague, watching yourself in a mirror, or videotaping. It is imperative that lectures be practiced aloud. Educators should learn to avoid nonverbal "space fillers" (e.g., "um" or "er").

The educator should seek evaluations of the performance. The course director should assist with this feedback by establishing a mechanism for learners to complete evaluations. During the lecture, informal feedback can help the educator alter the lecture while still presenting. The quality and types of questions may provide some insight on future modifications to the lecture content and delivery. Formal feedback might include evaluation forms or an examination. Many experienced educators will develop and bring their own evaluation forms that they will then collect after the lecture. These evaluations can be later summarized and added to a teaching portfolio.

Small Group Skills

Teaching in small group settings requires many of the same skills as a formal lecture but does have its own set of needs. To be effective, preparation needs to be aimed at making sure the learning objectives are met, the needs of each learner are addressed, and that the educator has the necessary skills. Small group learning sessions may include case discussions, problem-based learning, or lectures (either topic or case based with discussion intertwined), just to name a few. Regardless of the type being used, several key elements are required for a successful session.

The size of the group must allow for free discussion and interaction. The actual number of students may range from a couple of students to 25 to 30. The most important aspect is the context of the learning and how the faculty member facilitates the learning. If there is learner participation and time for feedback, reflection, and exploration, the group has achieved the objectives of a small group setting. Preparation may include developing a set of learning objectives, a series of questions that suit the objectives, and case scenarios. Medical knowledge material can be integrated with slides, handouts, or faculty supplementation. In any small group environment, there should be some ground rules, which might include being on time, being prepared, showing respect, and establishing a safe learning environment. If possible, the seating should be arranged in a manner to promote open discussion.

Medical educators have a tendency to talk too much. In the small group setting, this tendency will turn into a one-way dialogue, otherwise known as a lecture. The medical educator must avoid lecturing in the small group setting. In a small group setting, the emphasis should be on creating a dialogue. This requires a medical educator to be prepared with open-ended questions and to guide the discussion, enabling active discussion by the learners. In this setting, the medical educator must be an enthusiastic, organized, and strong leader who is alert to the group dynamics and empathetic to all the student needs within the group. The teaching skills should include questioning, listening, reinforcing, summarizing, and leading.

Small group learning sessions may include case discussions, problem-based learning, or lectures (either topic or case based with discussion intertwined). The medical educator must avoid lecturing in the small group setting.

Conclusion

Didactic material can be delivered through multiple modalities. Independent study, small group discussions, and lectures are all appropriate, but the course director must analyze the learner and environment to determine the best approach. Faculty and resident development will be important components of the preparation, because good delivery of the material is just as important as

the content. It is also very important for the course director to develop the learning objectives based on internal needs, institutional curricular needs, and national guidelines. Remember, when delivered well, a lecture can be an effective delivery vehicle, even in large group settings. If the content is well structured and delivered by a passionate speaker, a lecture is still a useful tool to convey curricular material.

References

1. Fincher, R-M, ed. *Guidebook for clerkship directors*. Washington, DC: AAMC Press; 2005.
2. The Mount Sinai Medical Center. *Faculty Development: The Resident Teaching Development Program*. Available at: www.mssm.edu/medschool/institute/resident_as_teacher.shtml. Accessed December 24, 2009.

Teaching Emergency Medicine Procedures to Medical Students

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Summary Points

- Teaching procedural skills to medical students is more effective than “on-the-job” training.
- Simulation leads to effective teaching by providing real-time feedback, allowing repetitive practice, providing varying levels of difficulty, and providing interesting scenarios in a controlled environment.
- Procedures can be taught by various methods, including cadavers, high-fidelity simulators, animal labs, computer simulation, and virtual simulation.
- Using a 5-step method to teach procedures can improve medical student efficacy and proficiency.
- After the procedure is taught, medical students need to be assessed for competence.

IN 2004, *THE ASSOCIATION of American Medical Colleges (AAMC) Project on the Clinical Education of Medical Students* was released to the medical community.¹ This report highlighted the need for medical schools to do a better job of teaching fundamental clinical skills during the medical school experience, calling the current state of procedural training “unstructured and unspecified.” The project was so influential that the AAMC formed a task force on clinical skills teaching. Although the AAMC report provides us with a background of what medical educators are doing to teach procedural skills to their students, more importantly, it highlights the deficiencies that we have as educators in getting our students competent at performing procedures.

For decades, interns and medical students have been encouraged to learn “on the job.”

Medical educators are involved in a constant search to improve the skills of their incoming residents and medical students. For decades, interns and medical students have been encouraged to learn “on the job.” Often this meant attempting a procedure or resuscitation under a stressful situation on a sick patient—not exactly a nurturing learning environment. In addition, the opportunity to obtain procedural experience was often left to chance and may or may not have occurred under the watchful eye of an experienced teacher. As most who work in the emergency department understand, the opportunity to perform rare life-saving procedures is infrequent and often left to chance.³ Therefore, medical students and interns are often left learning procedures on sick patients at times when supervision may or may not be present. As the medicolegal microscope continues to scrutinize our profession, medical educators are left to search for ways to effectively and safely teach a wide array of emergency procedures to their students. The age old adage of “see one, do one, teach one” is now being replaced with the more appropriate phrase, “see one, simulate many, do one competently, and teach everyone.”⁴

This chapter focuses on providing information for medical educators who teach procedures to students on emergency medicine clerkships. Many institutions have had good success instituting emergency procedures courses.⁵ Whether teaching procedures is added to an existing clerkship or instituted as a separate elective, the goal of this procedure curriculum is to provide educational resources, objectives, and guidelines to medical educators who are charged with giving our next generation of emergency physicians excellent clinical skill sets.

Background and Historical Significance

Corbett and Whitcomb commented in *The AAMC Project on the Clinical Education of Medical Students: Clinical Skills Education* that the clinical skills education of students may be the weakest link in our formative medical education process.¹ Indeed, this may have been the case for a great many years. In their report, the authors discussed 5 major reports focusing on the quality of undergraduate medical education that were released from the 1980s to the early 1990s. These reports from the AAMC, the American Medical Association, and the Macy Foundation all commented on the need to improve the clinical skills education of medical students.¹ Most physicians will confide that they attempted their first lumbar puncture, central line, or intubation on an actual live patient. Historically, medical students and physicians in training have been forced to practice procedures on live volunteers, models, cadavers, or the recently deceased.⁶ Although it is true that models and

cadavers have been a part of the medical school curriculum for years, only recently have there been other methods available to teach medical students about invasive emergency procedures. In 1999, the Institute of Medicine's report *To Err is Human* identified patient simulation as an opportunity for improving the safety of learning procedures.⁷ Indeed, an increasing emphasis on patient safety has led to reductions in resident work hours; this policy, combined with the patient dissatisfaction of being practiced on, has led to a dramatic increase in patient simulation among medical educators.⁸

When interns arrive for work in their first postgraduate year, they come from a broad, diverse background and often have varying skill levels. As in other specialties, emergency medicine residency directors have specific expectations of their prospective residents. Certain skills are expected on arrival, and others are expected to be learned during the course of the intern year. As Langdale et al. concluded in their paper, "medical schools should consider the expectations of their students' future residency directors when developing new curricula."^{9(p39)} Medical educators must assess these junior medical officers to determine what training they may need. Studies have shown that simply asking the interns to indicate their comfort level for a given procedural skill is unreliable.¹⁰ Furthermore, even at the same medical school, procedural skills may vary widely. Most studies show poor correlation between a junior house officers' own assessment of his or her skills and formally measured skills.^{10,11}

The *AAMC Project on the Clinical Education of Medical Students* showed that there is no curricular standard and much variability within the medical education community regarding the clinical skills education of medical students.¹ Very few schools approach clinical skills education with a formal, systematic process. Most medical schools appear to tend to assume that students acquire the necessary clinical skills training during clerkships, but it remains unclear how they determine if this is happening. This being said, even short courses in procedural skills at the beginning of the clerkship have been shown to be helpful. In a recent study, a 1-week course teaching procedural skills improved students' assessment of their proficiency, confidence, and anxiety levels.¹² Another study reported that just 7 weekly 3-h sessions on suturing, knot tying, laparoscopic skills, use of energy devices, and on-call management problems led to increased preparedness and effectiveness in surgical interns.¹³

Teaching Theory and Methodology

To become more effective educators, we must first understand how procedures are learned. The most widely recognized meth-

The opportunity to perform rare life-saving procedures is infrequent and often left to chance.³ Most physicians will confide that they attempted their first lumbar puncture, central line, or intubation on an actual live patient.

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odology for teaching and learning procedural skills appears in the Advanced Trauma Life Support (ATLS) course.¹⁴ It is based on the taxonomy of the psychomotor domain¹⁵ and consists of 7 phases:

1. *Conceptualize* the skill or the cognitive phase, including understanding the anatomy, indications, contraindications, and possible complications.
2. *Visualize* the procedure from start to finish.
3. *Verbalize* the procedural technique and sequential steps.
4. *Practice the skill*: After seeing the skill demonstrated and verbalizing the steps, each skill can be deconstructed into subcomponents, which can be individually taught; the subcomponents are then linked and practiced continuously to complete the entire procedure
5. *Correct and reinforce* the skill to provide feedback to the trainee. Feedback should occur at all levels of teaching.
6. Achieve *skill mastery* (the ability to routinely perform a procedure in a practice situation without error).
7. Achieve *autonomy* (the ability to perform the procedure in the clinical arena without error).

The first 3 phases may be taught in the classroom, using a textbook, or by demonstration.

In the final 2 phases, the trainee exhibits to the teacher that he or she is competent to perform the procedure. There is much debate about whether procedural competence on a simulator translates to clinical competence.

Using the ATLS theory, George and Doto described a 5-step method for teaching procedures (Box 6.1).¹⁶

1. Overview of the skill: Teaching and learning procedures require a proficient teacher to describe the skill and its importance in the clinical setting.
2. Silent demonstration: The preceptor should demonstrate the skill exactly as it should be done without talking through the procedure. This demonstration gives students a mental picture of what the skill looks like when it is being done correctly.
3. Verbal demonstration: The preceptor then repeats the procedure while describing each step in the process. This interactive demonstration allows students to see the sequence of actions. It also allows time for questions and clarification.
4. Student description: The prepared student describes the procedure step by step. The preceptor can then ensure that the student understands and remembers each step.
5. Skill performance: Under preceptor observation, the student performs the skill. The preceptor may give real-time feedback and reinforcement. Students should be encouraged to

Box 6.1. Five-Step Method for Teaching Procedures

- | | |
|--------------------------|------------------------|
| 1. Overview of the skill | 4. Student description |
| 2. Silent demonstration | 5. Skill performance |
| 3. Verbal demonstration | |

practice until they reach clinical competence. To reach clinical competence, students need exposure to a sufficient number of procedures on a diverse group of patients.¹ Educators should work to ensure that opportunities for clinical skills remediation and self-directed learning exist.

Unlike the cadavers used early in medical school to teach anatomy, unembalmed cadavers offer a more realistic procedural experience.

Teaching Methods

Procedures can be taught through a variety of methods: cadaver and animal labs, the Web, simulators, and virtual reality. Procedures that can be taught are shown in Table 6.1. Clearly it is impossible to teach all these procedures on a 1-month clerkship, let alone expose the student to all these procedures in such a short period of time. Ideally, a longitudinal procedural curriculum or an intense immersion course could help with the education of these important procedures. Regardless of the venue, educators will need to decide which, if any, of these procedures warrants exposure (observation or reading), performance, or competency assessment.

Cadaver Labs

The use of cadavers for educational purposes is a teaching method as old as the medical specialty. Recently, educators have been using unembalmed cadavers that have not been chemically preserved. Unlike the cadavers used early in medical school to teach anatomy, these unembalmed cadavers offer a more realistic procedural experience. Several studies have shown increased procedural competence with central venous access, chest tube placement, endotracheal intubation, and venous cutdown.⁶

A variation of performing procedures on cadavers is the practice of invasive procedures on the recently deceased. Although this method of training may present the most realistic arena for procedural teaching, it remains controversial. Recent surveys have shown that, although many residency programs teach procedures on the recently deceased, very few obtain consent from the family.²⁶ If this practice is to be used, consent from the family should be obtained.

Animal Labs

Like cadaver models, animal models have been used to teach invasive procedures to medical students for centuries. Animal

Table 6.1. Procedures That Can Be Taught^{2,21,22}

Airway techniques	Endotracheal intubation Mechanical ventilation and noninvasive ventilation Airway adjuncts Cricothyrotomy
Anesthesia	Local Regional nerve block Procedural sedation
Blood, fluid, and component therapy administration	Venipuncture and arterial puncture Intravenous catheter insertion and connection to intravenous tubing Subcutaneous and intramuscular injection
Diagnostic procedures	Anoscopy Arthrocentesis Bedside ultrasonography Lumbar puncture Nasogastric tube Paracentesis Pericardiocentesis Diagnostic peritoneal lavage Slit lamp examination Thoracentesis Tonometry
Genital/urinary	Bladder catheterization Foley catheter Suprapubic Testicular detorsion
Head and neck	Control of epistaxis Nasogastric tube placement Dental procedures
Hemodynamic techniques	Arterial catheter insertion Central venous access Intraosseous infusion Peripheral venous cutdown
Obstetrics	Delivery of newborn
Other techniques	Excision of thrombosed hemorrhoids Foreign body removal Incision and drainage Trephination of subungual hematoma Wound closure techniques and management
Resuscitation	Cardiopulmonary resuscitation Connecting a patient to a cardiac monitor Neonatal resuscitation
Skeletal procedures	Fracture or dislocation immobilization and reduction techniques Spine immobilization techniques
Thoracic	Cardiac pacing Cutaneous Transvenous Defibrillation and cardioversion Performing a 12-lead electrocardiogram Setting up a nebulizer Tube thoracostomy Thoracotomy

models have been shown to aid students in chest tube insertion, thoracotomy, venous access, and emergent airways.^{27,28}

Web-Based Education

Although the medicolegal landscape and work-hour restrictions have hindered the amount of participation medical students may have while on the wards, the tools available to train them have drastically improved. The World Wide Web, Wikis, blogs, personal digital assistants, and podcasts have made Internet access in the clinical patient care setting essential. In addition, the Web-savvy student can find digital photographs, movies, YouTube videos, audio files, and Web sites dedicated to digital images and video-based training for emergency physicians. It is no longer necessary for medical students to go through the arduous task of finding a textbook to look up the correct way to reduce a shoulder dislocation. Students can easily find a comprehensive procedural text such as Roberts and Hedges *Clinical Procedures in Emergency Medicine* on www.MDCConsult.com and review the procedure near the bedside.⁴ In addition, students can now review the performance of the procedure through sites such as www.ProceduresConsult.com.

Furthermore, students have access to multimedia presentations that demonstrate procedures and techniques. A recent article in *BMC Medical Education* provides an excellent explanation of the cutting edge technologies available to medical students.²⁹ The authors explain that *Wikis* are shared Web sites that can be edited by anyone who has access to them. Medical educators and students can collaborate on a Wiki to discuss any pertinent topic. Examples would be an emergency physician using a Wiki to discuss the best way to teach a lumbar puncture with other educators throughout the country. Other prime topics might include simulation, ethics, professionalism, or curricula development.

The word blog is a combination of Web and log. A *blog* is an online Web journal that can allow students or educators to write commentaries, post images or links, or even describe procedures. An excellent example of a medical blog would be *Clinical Cases and Images* at <http://clinicalcases.blogspot.com>.

M-learning, or mobile learning, is the concept that students can study and learn at any time in any place. Cheaper, better-supported mobile technology has made this concept a reality.²⁹ *Podcasts* are audio and video files that are cataloged and can be accessed by subscribers. We currently offer podcasted lectures to the students of our required fourth-year emergency medicine clerkship. Our students enjoy the fact that these audio and video lectures can be downloaded to portable media players to give them an opportunity to study at any moment. Indeed, at our

The World Wide Web, Wikis, blogs, personal digital assistants, and podcasts have made Internet access in the clinical patient care setting essential.

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Simulators offer a safe environment without the variable of a chance encounter.

institution, all medical students are provided with an Apple iPod Touch, making mobile technology an essential adaptation for students and educators alike. Truly, podcasts “can be taken anywhere, providing the potential for ‘anytime, anywhere’ learning experiences.”^{29(p41)}

Excellent examples of nationally available podcasts include *The New England Journal of Medicine* podcasts, McGraw Hill’s AccessMedicine podcasts, John Hopkins Medicine podcasts, and the Cleveland Clinic’s podcasts for health care professionals. Recently, Boulos and Wheeler identified numerous podcasts and the search engines for locating them.³⁰ A quick internet search reveals multiple sites where podcasts can be found. One such site is www.podcast.com. A newly developed emergency medicine education podcast, EMRAP—Educators’ Edition (www.emrap-ee.com), is also an excellent resource for medical student educators.

High-Fidelity Mannequin Simulation

High-fidelity patient simulators are full-body automated mannequins designed to provide realistic tactile, auditory, and visual stimuli.⁴ As previously stated, chance plays some role with the types of procedures a student is exposed to during the course of medical school or residency. Indeed, one student may have a vastly different experience than another student rotating at the very same hospital. Simulators offer a safe environment without the variable of a chance encounter. Simulators provide an optimal learning environment that is controlled and provides feedback during the procedure, repetitive practice, increasing levels of difficulty, and clearly defined outcomes.¹⁷

High-fidelity mannequin simulators also allow educators to design creative scenarios to frame the teaching session. For 1 group of students, the high-fidelity simulator may be a 54-year-old alcoholic with respiratory depression requiring endotracheal intubation. For the next group of students, the simulator may be a 16-year-old patient who presents unresponsive after a motor vehicle collision, requiring the students to recognize and treat a tension pneumothorax. Working with a group of students in a simulation or clinical skills lab allows the preceptor to teach procedures, resuscitation, communication, organization, leadership, professionalism, team building, and end-of-life discussions.¹⁰ Simulation offers a standardized, well-controlled method to remove the confounders that come with patient safety, instructor distraction, and time constraints.¹⁷ The positive effects of teaching with a high-fidelity simulator have led to an improvement from 29% to 85% in the number of emergency medicine residency programs using simulators over the past 5 years.⁹ Furthermore, a

recent review of the literature on this topic showed that 70% of all studies reported that simulator training significantly improved procedural skill performance.¹⁸ Factors that may increase the effectiveness of using a simulator for procedure training are shown in Box 6.2.^{17,19}

Partial or complex task trainers provide a focused model for the learner and are designed for a specific procedure.¹⁰ Examples of partial task trainers include mannequin pelvis for mock vaginal deliveries or transvaginal ultrasounds. These are typically used for teaching for a specific skill or procedure. With both partial task trainers and simulators, the goal is to allow students to perform their first attempts on a live patient with more competency.¹⁷

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Virtual Reality

A consensus statement by members of the 2004 Academic Emergency Medicine Consensus Conference for Informatics and Technology urged medical educators to research the extent to which virtual simulations can reduce dependence on animal or cadaver laboratories. Furthermore, they urged minimization of nonessential “practice” on live patients.⁴ Virtual reality may help in this endeavor.

Virtual reality is described as a concept of advanced human–computer interaction.⁴ Flight simulators have made a dramatic impact on the way we travel. In this same regard, military groups now use a desktop virtual reality program that aids in training of medics in casualty triage, resuscitation, and evacuation.²⁰ After witnessing the success that the military has had with virtual reality training, savvy medical educators can now teach laparoscopic surgeries, neurosurgery, endoscopic sinus surgery, arthroscopic surgery, and vascular surgery all with the

Box 6.2. Factors That Increase the Effectiveness of a Simulator in Procedure Training

- Quality and realism of the scenario
- Having a well-defined goal
- Level of learner experience
- Adequate time and space
- Number of repetitions performed and the quality of the practice
- Practice with increasing levels of difficulty or purposefully setting new goals
- Training schedule
- Instructor expertise
- Low instructor-to-trainee ratio
- Effective use of immediate feedback, motivation to improve, and postprocedure debriefing

Simulation leads to effective teaching by providing real-time feedback, allowing repetitive practice, providing varying levels of difficulty, and providing interesting scenarios in a controlled environment.¹⁰⁻¹²

aid of computer simulators.²⁰ Researchers at the University of Michigan have combined a high-fidelity mannequin simulator with virtual reality. The students wear stereoscopic glasses that allow them to see virtual scenarios around a mannequin simulator. These glasses allow students to care for the mannequin in any number of environments ranging from a rescue helicopter to an ambulance.²⁰

Evaluating and Assessing Competence

In the early 1980s, the Objective Structured Clinical Examination was developed to assess medical knowledge and competence in medical students. This was the first wide-spread use of simulation-based assessment.¹⁰ Many educators believe that high-fidelity mannequin-based simulation offers a way to assess the competence of medical graduates in any number of fields. A 2003 review of simulation in graduate medical education described how high-fidelity simulation can be used to satisfy all of the Accreditation Council for Graduate Medical Education core competencies.¹⁰ Simulation leads to effective teaching by providing real-time feedback, allowing repetitive practice, providing varying levels of difficulty, and providing interesting scenarios in a controlled environment.¹⁰⁻¹²

Some debate has occurred about the best ways to measure a student's procedural skill competence. No standardized method has been agreed on. In general, the goal of procedural training should be to bring all students to an equally acceptable level of performance. Competence in a given procedure is very important. Faculty competence can present a barrier to resident and student education because the less comfortable faculty members are with a given procedure, the less likely they will be to teach it.²² Furthermore, residents and students may be reluctant to attempt a procedure if they feel they are incompetent at that procedure. Several methods can be used to determine proficiency and competence.

Because most procedures can be taught in a stepwise approach, checklists may be the best way to assess and subsequently ensure competence. There is general consensus that educators need to standardize the evaluation of procedural competency. Excellent performance at a given task starts with the accumulation of standardized, reproducible endpoints.¹⁹ Checklists allow an educator to make a structured, sequential assessment of a student's ability to complete a procedure.¹⁷ Our institution has developed checklists for many common procedures that can be used as a frame of reference for the student for review or for the teacher to provide objective feedback on performance. An example of a checklist can be found in Appendix 6.1.

Although technical skills can easily be gauged through checklists, the cognitive aspects of the procedure are equally important. Assessment of these aspects includes testing the student's knowledge of indications, contraindications, confirmation of procedure success, and complications. Documentation of procedures, such as a procedure log, has also been shown to correlate with proficiency.²²

Future Directions

Virtual reality and simulation may represent the future of procedural teaching. There are 4 elements to any virtual reality system: software, hardware, input devices, and output devices.²⁰ Fortunately for medical educators, each of these elements has become more sophisticated and less expensive over the years.

Recent technological advances in computer processing and Internet connectivity have created opportunities for remote simulated virtual experiences. Second Life is an online, virtual, 3-dimensional world. This computer-based simulated environment has been used successfully as a tool for medical and public health education.^{23,24} This format is thought to offer many potential benefits, including promotion of active learning among students. However, educational research on 3-dimensional virtual worlds and their effect on educational outcomes is limited.²⁵ In Second Life, people are represented in a virtual world by their avatars—online, self-created representations of themselves. Once online in Second Life, avatars can act in any role (e.g., doctor, patient, nurse, or teacher) and perform any task that they are directed to do in the simulated environment. Research is ongoing with regard to testing and simulation in Second Life.

It is apparent that virtual reality and simulation have already reached the lay public. With the recent success of Nintendo Wii, people can bowl, work out, or play guitar in the comfort of their living room. It stands to reason that this technology will be harnessed soon for more educational purposes. When it arrives, students may be more familiar with it than their teachers.

Conclusions

The tools, resources, and aids available to medical student educators have come a long way since the days of practicing procedures on patients or cadavers. We now have the ability to teach our students and check for competence before the anxiety provoking experience of practicing on sick patients. By teaching students using a standardized method and grading their proficiency using a checklist, we no longer have to rely on other services to teach our students. Furthermore, as medical educators, we no longer

Once online in Second Life, avatars can act in any role (e.g., doctor, patient, nurse, or teacher) and perform any task that they are directed to do in the simulated environment.

The importance of procedural education needs to be stressed by means of development of a procedural curriculum extending throughout medical school, allowing repeated opportunities to practice in a safe environment.

have to hope that fate will bring our students the opportunity to practice a rare or complex procedure. The importance of procedural education needs to be stressed by means of development of a procedural curriculum extending throughout medical school, allowing repeated opportunities to practice in a safe environment. Cadaver labs, animal labs, high- and low-fidelity mannequins, task trainers, the World Wide Web, and virtual reality are all in the tool belt of medical educators. It is our responsibility to be creative and use the many different tools to help promote procedural competency in our medical students with the goal of improved patient outcomes.

References

1. Corbett EC, Whitcomb M. *The AAMC Project on the Clinical Education of Medical Students: Clinical Skills Education*. Washington, DC: Association of American Medical Colleges; 2004.
2. Wald DA, Manthey DE, Kruus L, et al. The state of the clerkship: a survey of emergency medicine clerkship directors. *Acad Emerg Med*. 2007;14:629–634.
3. Wang EE, Quinones J, Fitch MT, et al. Developing technical expertise in emergency medicine—the role of simulation in procedural skill acquisition. *Acad Emerg Med*. 2008;15:1046–1057.
4. Vozenilek J, Huff JS, Reznek M, et al. See one, do one, teach one: advanced technology in medical education. *Acad Emerg Med*. 2004;11:1149–1154.
5. van der Vlugt TM, Harter PM. Teaching procedural skills to medical students: one institution's experience with an emergency procedures course. *Annals of Emerg Med*. 2002;40:41–49.
6. Rosenson J, Tabas JA, Patterson P. Teaching invasive procedures to medical students. *JAMA*. 2004;291:119–120.
7. Kohn LT, Corrigan JM, Donaldson MS. *To Err Is Human: Building a Safer Health System*. Washington, DC: National Academy Press; 2000.
8. McLaughlin S, Fitch MT, Goyal DG, et al. Simulation in graduate medical education 2008: a review for emergency medicine. *Acad Emerg Med*. 2008;15:1117–1129.
9. Langdale LA, Schaad D, Wipf J, et al. Preparing graduates for the first year of residency: are medical schools meeting the need? *Acad Med*. 2003;78:39–44.

10. Remes V, Sinisaari I, Harjula A, et al. Emergency procedure skills of graduating medical doctors. *Med Teach*. 2003;25:149–154.
11. Barnsley L, Lyon PM, Ralston SJ, et al. Clinical skills in junior medical officers: a comparison of self-reported confidence and observed competence. *Med Educ*. 2004; 38:358–367.
12. Stewart RA, Hauge LS, Stewart RD, et al. A crash course in procedural skills improves medical students' self-assessment of proficiency, confidence, and anxiety. *Am J Surg*. 2007;193:771–773.
13. Brunt LM, Halpin VJ, Klingensmith ME. Accelerated skills preparation and assessment for senior medical students entering surgical internship. *J Am Coll Surg*. 2008;206:897–904.
14. Kovacs G. Procedural skills in medicine: linking theory to practice. *J Emerg Med*. 1997;15:387–391.
15. Simpson JS. *The Classification of Educational Objectives: Psychomotor Domain*. Project No. 5-85-104. Urbana: University of Illinois, Office of Education; 1966.
16. George JH, Doto FX. A simple five-step method for teaching clinical skills. *Fam Med*. 2001;33:577–578.
17. Lammers RL, Davenport M, Korley F, et al. Teaching and assessing procedural skills using simulation: metrics and methodology. *Acad Emerg Med*. 2008;15:1079–1087.
18. Lynagh M, Burton R, Sanson-Fisher R. A systematic review of medical skills laboratory training: where to from here? *Med Educ*. 2007;41:879–887.
19. Ericsson KA. Deliberate practice and acquisition of expert performance: a general overview. *Acad Emerg Med*. 2008;15:988–994.
20. Reznick M, Harter P, Krummel T. Virtual reality and simulation: training the future emergency physician. *Acad Emerg Med*. 2002;9:78–87.
21. 2007 Model of the Clinical Practice of Emergency Medicine. Available at: www.acgme.org/acWebsite/RRC_110/110_clinModel.pdf Accessed November 4, 2009.
22. Elnicki DM, Fagan MJ. Medical students and procedural skills. *Am J Med*. 2003;114:343–345.
23. Boulos MN, Hetherington L, Wheeler S. Second life: an overview of the potential of 3-D virtual worlds in medical and health education. *Health Info Libr J*. 2007;24 233–245.

24. Lewis DP. Parallel universe: entering an online 3-D world. *American Medical News*; 2008; 12–13. Available at: www.ama-assn.org/amednews/2008/09/08/bisa0908.htm. Accessed November 4, 2009.
25. Hansen, M. Versatile, immersive, creative and dynamic virtual 3-D healthcare learning environments: a review of the literature. *J Med Internet Res*. 2008;10(3):e26.
26. Fourre MW. The performance of procedures on the recently deceased. *Acad Emerg Med*. 2002;9:595–598.
27. Custalow CB, Kline JA, Marx JA, Baylor MR. Emergency department resuscitative procedures: animal laboratory training improves procedural competency and speed. *Acad Emerg Med*. 2002;9:575–586.
28. McCarthy MC, Ranzinger MR, Nolan DJ, Lambert CS, Castillo MH. Accuracy of cricothyroidotomy performed in canine and human cadaver models during surgical skills training. *J Am Coll Surg*. 2002;195:627–629.
29. Boulos MN, Maramba I, Wheeler S. Wikis, blogs and podcasts. A new generation of web-based tools for virtual collaborative clinical practice and education. *BMC Med Educ*. 2006;6:41.
30. Boulos MN, Wheeler S. The emerging Web 2.0 social software: an enabling suite of sociable technologies in health and health care education. *Health Info Libr J*. 2007;24:2–23.
31. Gordon JA and Vozenilek JA. *The science of simulation in healthcare: defining and developing clinical expertise*. Proceedings of the 2008 Academic Emergency Medicine (AEM) Consensus Conference. May 28, 2008. Washington, DC. *Acad Emerg Med*. 2008 15:978–1214

Appendix 6.1. Procedural Competency Checklist for Incision and Drainage

Data Supplement for Competence in Incision & Drainage												
Performance Scoring Checklist												
INDICATIONS												
Definitive treatment of a soft tissue abscess												
CONTRAINDICATIONS												
COMPLICATIONS												
Inadequate analgesia												
Premature incision before localization of pus may theoretically be deleterious because of extension of the infectious process and, rarely, bacteremia												
CAVEATS												
Bedside Ultrasound may be helpful in the management of soft-tissue infections												
Routine use of antibiotics for simple cutaneous abscesses in immunocompetent hosts is not recommended. Therapeutic antibiotics should be considered for immunocompromised patients and to the immunocompetent patient with "significant" cellulites. Manipulation of any abscess below the brow and above the lip may predispose to septic thrombophlebitis since these abscesses may drain into the cavernous sinus. Treat with antistaphylococcal antibiotic.												
Parenteral antibiotics are commonly given prior to procedure in patients with risk factors for endocarditis (preexisting cardiac disorders).												
Laboratory tests offer no specific guidelines for therapy of a cutaneous abscess and are not generally indicated												
Gram stain is not indicated in the care of uncomplicated simple abscesses												
Routine culture of pus is generally unnecessary in uncomplicated abscesses (obviously in the current environment of MRSA, routine culture is acceptable and recommended due to the high prevalence of MRSA positive abscesses)												
P/C	Item					Performed Correctly	Performed Incorrectly	Verbalized Only	Not Performed	Sequence Error		
	A Procedure Setting											
			Office									
			OR									
	B Equipment											
C			Standard suture tray									
			No.11 or 15 blade scalpel									
			Anesthetic (lidocaine with or without epinephrine)									
			Plain or iodiform thin (0.6 to 1.2 cm) packing strip gauze									
			Personal Protective Equipment									
	C Anesthesia											
			Consider procedural sedation and analgesia									
P	1		Place sufficient lidocaine in syringe and attach a 25 gauge (or smaller) needle			0	0	0	0	0		
			Inject the dome of the abscess subcutaneously by holding the syringe parallel to the skin			0	0	0	0	0		
	D Procedure											
P	3		Obtains informed consent from the patient or patient's decision maker			0	0	0	0	0		
			Think about skin creases or natural folds			0	0	0	0	0		
			Consider culture by needle aspiration if possible			0	0	0	0	0		
			Use the scalpel to nick the skin over the fluctuant area			0	0	0	0	0		
			Make a simple linear incision over the total length of the abscess cavity			0	0	0	0	0		
			Wrap hemostat with gauze			0	0	0	0	0		
			Probe depth of abscess			0	0	0	0	0		
			Break open loculations			0	0	0	0	0		
			Irrigate abscess cavity			0	0	0	0	0		
			Apply loose packing of gauze into abscess cavity			0	0	0	0	0		
			Place absorbent gauze dressing over packed abscess			0	0	0	0	0		
			Splint affected extremity if possible			0	0	0	0	0		
			E Follow up care									
			15		Recommend elevation			0	0	0	0	0
	Arrange follow up			0	0	0	0	0				
	Consider antibiotics for cellulitis			0	0	0	0	0				

Maximum Total Score

(17)

Total Score

0	0	0	0	0
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Examiner



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Simulation as a Teaching Tool in Medical Education

Traci Thoureen and Sara Scott

Summary Points

- Changing clinical environment, a focus on medical errors, and a focus on assessment of competence have brought simulation education into the forefront of teaching tools.
- Different types of simulation devices may be used, depending on the educational objectives.
- Technical, cognitive, and interpersonal skills, as well as professionalism, may all be assessed through simulation.

SIMULATION INCLUDES ANY approximation of a clinical scenario, ranging from a patient with a specific condition to a mass casualty incident. Devices used as simulators include mannequins with a spectrum of fidelity, task trainers, standardized patients, and computers that present complex scenarios. Today's students have had wide exposure to communication technology through high-speed computers, easy access to the Internet, and personal digital assistant technology that provides quick access to a wealth of information. Given this exposure, their expertise in its use, and their expectation to have access to and the ability to manage a high volume of information, learners today are amenable to educational experiences involving simulated situations. Simulation engages learners in a real-time and interactive format that

Simulation engages learners in a real-time and interactive format that provides opportunity for unlimited practice and allows mistakes to be made without causing harm to an actual patient.

Shorter hospital stays, increased focus on outpatient medicine, higher acuity of hospitalized patients, and a mandated reduction in work hours for resident physicians have decreased the frequency of contact with patients and, therefore, with a variety of diagnoses.

provides opportunity for unlimited practice and allows mistakes to be made without causing harm to an actual patient.

Evolution of Simulation as a Training Modality

Aviation provided the basis for the incorporation of simulation into training programs. In 1929, the first flight simulator, the “Link Trainer,” was introduced to teach pilots to fly using instruments. Simulation is also used in training military, business executives, and nuclear power plant personnel.^{1,2} Simulation became increasingly used in medical school curricula during the mid 1900s, when costs and ethical concerns rose around the traditional practice of providing live animals on which medical students learned medical procedures and applied physiology. In addition, three major drives in the 20th century led to the adoption of simulation: the resuscitation movement, anesthesia simulators, and medical education reform.

Interest in resuscitation led to the creation of the first medical mannequin simulator, Resusci Anne, by Laerdal, a Norwegian toy company, in 1960. The device was requested by 2 anesthesiologists to facilitate their instruction in the new concept of mouth-to-mouth ventilation.⁴ Computer technology was soon added to a mannequin model to create an anesthesia simulator, Sim One, which was developed by Abrahamson and Denson in 1966.⁵ This early mannequin did not become popular in the medical community because it was expensive and did not offer enough of a technological advance in medical education to convince educators to divert from the traditional apprentice model of teaching residents and students.⁶ In recent years, medical education reform has boosted simulation’s popularity in response to concerns about patient safety, the availability of new technologies, and the shift to outcomes-based assessment.⁷

Changing Clinical Environment

Changes in health care practices have led to changes in medical education. Shorter hospital stays, increased focus on outpatient medicine, higher acuity of hospitalized patients, and a mandated reduction in work hours for resident physicians have decreased the frequency of contact with patients and, therefore, with a variety of diagnoses. However, with the use of simulators, a standardized curriculum can be developed so that all students are exposed to a uniform set of clinical circumstances and can be instructed in their proper management. Also, simulators increase flexibility for instructors and enable them to construct specific clinical scenarios, as needed. Simulated exercises qualify as patient encounters in the procedure documentation required by the Liai-

son Committee on Medical Education and the Resident Review Committee.

The learner is assessed at 4 levels: knows, know how, shows how, and does.¹¹

Medical Errors

Medical errors were brought to mainstream attention with the publication of *To Err is Human* by the Institute of Medicine in 2000.⁹ This monograph stressed the need for institutional approaches to identifying and eliminating sources of medical error. Simulation provides one such approach by presenting the opportunity to practice responses to medical scenarios in a way that protects patient safety.

New Educational Requirements: Assessing Competence

The Accreditation Council for Graduate Medical Education (ACGME) delineated 6 domains of clinical medical competence: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice (Box 7.1). The learner is assessed at 4 levels: knows, knows how, shows how, and does.¹¹ Simulation can be used to assess the first 3 levels, because it can program and select learner-specific findings, conditions, and scenarios; provide standardized experiences for all examinees; and include outcome measures that yield reliable data.¹² Although medical schools do not use the exact same 6 core competencies the ACGME uses to assess residents, assessing competence is an extremely important concept in medical education (see Chapter 11).

Deliberate Practice

Research in instructional science has shown that the acquisition of expertise in a field requires deliberate practice.¹³ The repetitive performance of an intended skill coupled with assessment that provides specific feedback results in improved performance. Several studies have shown a consistent relationship between the amount and quality of solitary activities that meet the criteria of deliberate practice and individuals' performance in a wide range of areas of expertise.¹³ Studies have scrutinized

Box 7.1. Six Domains of Clinical Medical Competence

- Patient care
- Medical knowledge
- Practice-based learning and improvement
- Interpersonal and communication skills
- Professionalism
- Systems-based practice

Box 7.2. Types of Simulation

- Screen-based simulation
- Standardized patients
- Task trainers
- Mannequin simulators

expert medical performance, examining diagnostic skills as well as expert performance in surgery. From these it is clear that there is an opportunity to further explore how expertise is acquired in medicine, because the benefits would be tremendous.¹³ It is also clear that educators should create opportunities for deliberate practice, ensuring that specific aspects of performance are addressed and providing opportunities for feedback and correction.

Simulation literature has grown rapidly over the past 40 years. A review of the medical simulation literature identified the following successful characteristics of high fidelity mediated learning:¹⁴

- Provides feedback
- Allows repetitive practice
- Can be integrated into a curriculum
- Provides a range of difficulties
- Is adaptable; allows multiple learning strategies
- Provides a range of clinical scenarios
- Provides a controlled environment
- Offers active learning based on individualized needs
- Has defined outcomes
- Is valid as a realistic recreation of complex clinical situations

Types of Simulation Used in Medical Education

Screen-Based Simulation

Screen-based simulation was developed in the 1960s and became widely used in the 1980s when computer use began to increase.⁶ These programs allow the student to view a chosen program or scenario. Scenarios have been developed covering topics ranging from basic science to trauma and bioterrorism. Their cost is generally much lower than that of other simulation products, but screen-based programs cannot provide skills training. Some of the available computer-based simulation programs are listed at Penn State's Simulation Lab's Web site: www.pennstatehershey.org/web/simlab/home/available/cbs.

Standardized Patients

Standardized patients have been in use since the late 1960s and have been the most studied simulation-based education mo-

Standardized patients are trained individuals who can participate in developing students' skills in history taking, communication, and physical examination.

dality.⁶ Standardized patients are trained individuals who can participate in developing students' skills in history taking, communication, and physical examination. Many medical schools have programs through which people are recruited and trained to participate in scenarios for their students. The Association of Standardized Patient Educators holds an annual conference and promotes research and standards with standardized patients.

Standardized patients are paid for their time and according to the scenario and the amount of acting required. The typical cost is \$15 to \$25 per h and up to \$40 per h for more complex acting. Standardized patients may be used in conjunction with part task trainers or high-fidelity mannequins to increase the realism or complexity of the scenario.

Task Trainers

Task trainers are 3-dimensional devices that simulate a specific task. Many of these devices (e.g., venipuncture arms, suturing pads, and urinary catheterization devices), do not give specific feedback to the user, but others (e.g., laparoscopy or endoscopy simulators) have computer feedback integrated into them. These simulators combine a computer screen, the device, and haptic (touch and pressure) feedback for the user. The student can learn hand and eye coordination as well as the "feel" of the procedure.

Many models are available to teach a variety of tasks. One compilation of vendors and trainers is published at Penn State's Simulation Lab's Web site, www.pennstatehershey.org/web/simlab/home/available/tsm.

Mannequin Simulators

Mannequin simulators vary in their fidelity to real-world scenarios and therefore in cost. Features such as vocal responses, airways, and cardiac rhythms will be different among the models. Because the number and sophistication of features will determine the cost (up to \$200,000 for some high-fidelity models), the degree of realism needed to meet learning objectives should be factored into purchase decisions.

High-fidelity mannequins have features such as responsive pupils, voice, and heart and breath sounds. Cardiopulmonary responses based on physiology and pharmacology are programmed into the device. The Emergency Care Simulator (Medical Education Technology, Inc., Sarasota, Florida), for example, is a high-fidelity mannequin designed on physiologic pathways; incorrect student actions require computer input from the controller.

Mid-fidelity mannequins have many of the same functions as high-fidelity devices, but their actions are controlled by the instructor's input. For example, SimMan (Laerdal, Wappingers

Task trainers are 3-dimensional devices that simulate a specific task.

High-fidelity simulators can be programmed to demonstrate any number of physical abnormalities, including blown pupils, murmurs, wheezing, crackles, pneumothoraces, hypoactive bowel sounds, and intraoral cyanosis.

The expenses associated with caring for laboratory animals and with obtaining and storing human cadavers can be an obstacle for training programs. Simulation allows these high-risk technical skills to be taught and practiced without risk to patients and with multiple opportunities for success or failure.

Falls, New York) can be manipulated during a training session; the instructor can change cardiac rhythms or responses by entering commands on the keyboard.

Low-fidelity mannequins consist of an anatomic model that does not have the functions or features described for the higher fidelity models. These mannequins are used, for example to teach basic life support maneuvers such as chest compressions, mask ventilation, or intubation.⁶

Acquiring Skills

Technical Skills

Even the most basic skills, such as history taking and performing a physical exam, can be taught with the aid of human simulators.¹⁵ High-fidelity simulators can be programmed to demonstrate any number of physical abnormalities, including blown pupils, murmurs, wheezing, crackles, pneumothoraces, hypoactive bowel sounds, and intraoral cyanosis. In this way, simulators can be useful tools in teaching physical exam skills in introductory courses. A uniform exposure for every learner ensures that each individual will have an equal opportunity to practice the desired skill and receive structured feedback and instruction.

For the advanced learner, more complex skill sets are required. It may be difficult to find an ideal medium for teaching complex technical skills, because these procedures are often associated with a high amount of risk to patients. These high-risk procedures (e.g., tube thoracotomy, cricothyrotomy, and central line placement) are sometimes taught on animals or cadavers. The expenses associated with caring for laboratory animals and with obtaining and storing human cadavers can be an obstacle for training programs. Simulation allows these high-risk technical skills to be taught and practiced without risk to patients and with multiple opportunities for success or failure. Some medical schools now have required courses in the third year that use task trainers to demonstrate and teach procedural skills, such as intravenous access, lumbar puncture, and endotracheal intubation.¹⁵ Task trainers and high-fidelity simulators provide a safe and controlled environment for the acquisition of technical skills and promote student confidence.¹⁶ In fact, simulation workshops have been shown to improve self-rated competence scores in clinical procedures comparable to those reported after 6 months of clinical experience.¹⁷

In addition to providing the opportunity for technical practice, simulators can allow technical skill sets to be embedded into a clinical scenario and thus provide a clinical reference for procedures. For example, during instruction on how to perform needle decompression for a tension pneumothorax, the patient simulator

could be programmed to show signs of a tension pneumothorax such as diminished breath sounds on the affected side, hypoxia, tachypnea, and hypotension. Students learn not only the technical skills necessary for the procedures but also about the clinical settings in which the skill sets should be applied.

Cognitive Skills

Knowledge acquisition and comprehension are the main goals of the first and second years of medical school. During this time, students are learning about anatomy, physiology, pathology, and pharmacology. Traditionally, the preclinical years are taught in a lecture-based format with the occasional addition of problem-based learning sessions. Recently, medical schools have begun to integrate simulation into the preclinical curriculum. Like problem-based learning, simulation actively engages the student and can be used to augment traditional medical education. Human patient simulators have been used in pharmacology courses to demonstrate the clinical effects of various drugs as well as in physiology courses to illustrate the concepts of cardiac output, venous return, pressure, flow, resistance, and acid-base balance.¹⁵ The patient simulator has been shown to be effective and well received when used to teach physiology to medical students.^{18,19}

As medical students transition into the third and fourth years of medical school and beyond, they are expected to become proficient in higher-order cognitive skills, specifically analysis, application, synthesis, and evaluation. Simulation is an excellent way to aid in the acquisition of these skills. Steadman et al.²⁰ found that fourth-year medical students who learned about dyspnea using a human patient simulator performed 17% better on a final assessment scenario than those who learned about dyspnea in a problem-based format. Compared with problem-based learning, simulation was shown to be superior for the acquisition of critical assessment and management skills.²⁰ One medical school has developed an elective in which fourth-year medical students act as attending physicians in a clinical skills center. In this elective, the student supervises and teaches more junior students in the simulation center for 40 h a week. The students/attendings are expected to write a case for an objective standardized clinical exam and to train a standardized patient. This elective was designed to help senior students acquire higher-order cognitive skills as well as prepare them for teaching responsibilities.²¹

Interpersonal and Professional Skills

The ACGME considers professional and interpersonal skills to be core clinical competencies. Simulation is already widely used

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in assessing these skills, most notably in first- and second-year medical school courses in which standardized patients (actors) participate in patient-interviewing courses. Encounters with standardized patients are videotaped so that students can observe and evaluate their own communication skills.²²

Actors may be placed in alternate roles, such as family members. Students can be taught about or assessed on more complex personal interactions, such as discussing end-of-life decisions with family members or disclosing complications that could be associated with invasive procedures.²³ Standardized patients are also being used in combination with human simulators to create an environment in which students have to concentrate on interpersonal skills in concert with technical or cognitive skills.²⁴

Designing a Simulation Curriculum

Standardized patients are also being used in combination with human simulators to create an environment in which students have to concentrate on interpersonal skills in concert with technical or cognitive skills.²⁴

Simulation scenarios should be designed with a few specific educational objectives in mind. Once the educational goals are determined, the type of simulator best suited for teaching the material should be selected. For example, a task trainer might be most useful for teaching central line placement, whereas a standardized patient would be most useful for teaching interpersonal skills. The level of fidelity (the simulator and the environment, with props, if necessary) needed to achieve the educational goal should also be considered when designing the simulation. Access to resources (physical space, money, faculty) will also influence the type of simulator and level of fidelity selected. Examples of how simulation curricula could be designed to teach technical, cognitive, and interpersonal skills are presented in the following sections. These skills can be taught separately or combined into one scenario in which students practice multiple skills (technical, cognitive, and interpersonal) simultaneously.

Technical Skills

One way to begin a technical skills workshop is with a didactic session that imparts basic information about the procedure, provides clinical relevance, and explains indications and contraindications for the procedure. After the didactic session, students could then watch an expert perform the procedure. The expert should demonstrate localization of important landmarks as well as proper technique. Didactics and demonstrations can be presented in a traditional classroom format, or they could be developed into an online course with didactic information and videos posted on the Web. Several commercial sites offer technical skills curricula, including *The New England Journal of Medicine: Videos in Clinical Medicine* (<http://content.nejm.org/misc/videos>).

shtml) and Procedures Consult (www.proceduresconsult.com/medical-procedures).

After attending a didactic session and watching an expert demonstration, or after completing a Web-based course, students could then perform deliberate practice of the procedure on task trainers or mannequins. The final step may include a procedural practicum, during which students are observed and given feedback on their newly acquired technical skills. This type of technical skills training has been implemented by critical care nurse practitioners to teach invasive procedures such as tracheal intubation, central line placement, and needle decompression of pneumothorax¹⁶ and can be easily adapted to teach emergency medicine students.

Cognitive Skills

One way to teach cognitive skills is through the use of a clinical scenario. When developing a scenario, it is important to establish a specific timeframe in which the objectives should be accomplished. The case scenario needs to be designed with this timeline in mind so that all objectives can be covered in the amount of time available. In addition, the timeframe for the debriefing session should be considered and calculated into the overall time allotment. Although there may be a specific timeline, students will not always perform the scenario in the expected way or reach clinical decisions within the desired timeframe. For this reason, cues are placed throughout the simulation to ensure that students are progressing in the desired direction. Cues can come from the patient simulator, the actors in the scenario, or the preceptor.

In addition to learning objectives and a desired timeframe, the complexity of the case must be determined. The complexity can be manipulated by providing extraneous information, distracters, or multiple medical issues. For example, in a simple case, the simulated patient may present with a straightforward myocardial infarction, but in a more complex case, the simulated patient may present with a myocardial infarction and tachydysrhythmia. The complexity of the case should be congruous with the students' knowledge and experience level. Several online libraries offer prepared clinical cases, including the Simulation Case Library of the Society for Academic Emergency Medicine (www.emedu.org/simlibrary/) and MedEdPORTAL from the American Academy of Emergency Medicine (www.aamc.org/mededportal). These cases can be modified to fit students' needs.

At the conclusion of the scenario, there should be a structured debriefing session. Feedback is the single most important feature of simulation-based medical education and appears to slow the decay of acquired skills.¹⁴ The simulator itself provides

One way to teach cognitive skills is through the use of a clinical scenario. When developing a scenario, it is important to establish a specific timeframe in which the objectives should be accomplished.

Cues are placed throughout the simulation to ensure that students are progressing in the desired direction. Cues can come from the patient simulator, the actors in the scenario, or the preceptor.

Feedback is the single most important feature of simulation-based medical education and appears to slow the decay of acquired skills.¹⁴

feedback to students throughout the scenario, but a structured debriefing is the opportune time to close any performance gaps that were observed during the simulation. Debriefing can be accomplished in 4 steps:²⁴

- Identify deficiencies in performance.
- Provide descriptive feedback to the learner about the deficiencies.
- Investigate the reason for the deficiencies.
- Provide targeted discussions or interventions to eliminate the deficiencies.

Video-playback of the simulation can be a useful tool for student self-evaluation and as an adjunct to the debriefing process to facilitate self-reflection, discussion of behaviors, and timing of actions.²²

Interpersonal and Professional Skills

Scenarios can be used to simulate interactions between students and patients, patients' families, consultants, nurses, and other health care workers.

The development of a curriculum to teach interpersonal and professional skills could proceed much the same way as the development of a cognitive skills curriculum. After the learning objectives are determined, a case scenario is constructed, which includes a loose script for a standardized patient (actor). The actor is typically given a case outline or a loose script, which allows him or her to react to students' actions.

Clinical scenarios can be simple, requiring nothing more than interaction between the student and actor, or more complex, in which the student must perform technical skills while interacting with the patient. For example, a simple scenario may require the student to obtain informed consent for placement of a central line, and a more complex scenario may require the student to attend to a hysterical parent while trying to resuscitate an infant.

Scenarios can be used to simulate interactions between students and patients, patients' families, consultants, nurses, and other health care workers. The goal of a case may be to teach communication skills for dealing with a difficult consultant. A didactic session or video might be useful to introduce the topic and highlight the learning objectives. After the scenario, feedback may be provided by video playback, self-evaluation, or debriefing by preceptors as well as by the standardized patient.

Future Directions

Several factors, including advances in technology, increasing emphasis on patient safety, and decreasing resident work hours have created an environment that has fostered the growth of simula-

tion in medical education. Simulation is presented via a variety of mannequins, computer programs, and standardized patients and can be used to teach cognitive, technical, and interpersonal skills to medical students. In addition to serving as an educational aid, simulation is being used in licensing and credentialing exams, such as the United States Medical Licensing Exam Step 2 Clinical Skills and the Canadian Internal Medicine certification exam.²⁵ As the use of simulation for medical education and credentialing expands, so too does the need for more research examining the role of simulation in medical education and specific outcomes from curricula that have incorporated simulation into their teaching programs.

Several factors, including advances in technology, increasing emphasis on patient safety, and decreasing resident work hours have created an environment that has fostered the growth of simulation in medical education.

References

1. McGaghie WC. Simulation in professional competence assessment: basic considerations. In: Tekian A, McGuire CH, McGaghie WC, eds. *Innovative Simulation for Assessing Professional Competence*. Chicago, Ill: Department of Medical Education, University of Illinois at Chicago; 1999.
2. Issenberg SB, Gordon MS, Gordon DL, et al. Simulation and new learning technologies. *Med Teach*. 2001;23:16–23.
3. Bradley P. The history of simulation in medical education and possible future directions. *Med Educ*. 2006;40:254–262.
4. Tjomsland N. *From Stavanger With Care: Laerdal's First 50 Years*. Stavanger, Norway: Laerdal; 1990;82.
5. Abrahamson S, Denson JS, Wolf RM. Effectiveness of a simulator in training anaesthesiology residents. *J Med Educ*. 1969;44:515–519.
6. Ziv A, Small SD, Wolpe PR. Patient safety and simulation-based medical education. *Med Teach*. 2000;22:489–495.
7. Scalse RJ, Obeso VT, Issenberg SB. Simulation technology for skills training and competency assessment in medical education. *J Gen Intern Med*. 2007;23(suppl 1):46–49.
8. ACGME Project Outcomes. Accreditation Council for Graduate Medical Education, 2000. Available at www.acgme.org/outcome. Accessed January 26, 2009.
9. Kohn LT, Corrigan JM, Donaldson MS. *To Err Is Human: Building a Safer Health System*. Washington, DC: National Academy Press; 2000.
10. Gaba D. Anaesthesiology as a model for patient safety in health care. *BMJ*. 2002;320:785–850.

11. Miller GE. The assessment of clinical skills/competence/performance. *Acad Med.* 1990;65(suppl 9):S63–S67.
12. Issenberg SB, McGaghie WC, Gordon DL, et al. Effectiveness of a cardiology review course for internal medicine residents using simulation technology and deliberate practice. *Teach Learn Med.* 2002;14:223–228.
13. Ericsson KA. Deliberate practice and acquisition of expert performance: a general overview. *Acad Emerg Med.* 2008;15:988–994.
14. Issenberg BS, McGaghie WC, Petrusa ER, et al. Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. *Med Teach.* 2005;27:10–28.
15. Goodrow MS. Using cardiovascular and pulmonary simulation to teach undergraduate medical students: cases from two schools. *Semin Cardiothorac Vasc Anesth.* 2005;9:275–289.
16. Hravnak M, Tuite P, Baldisseri M. Expanding acute care nurse practitioner and clinical nurse specialist education: invasive procedure training and human simulation in critical care. *ACCN Clin Issues.* 2005;16:89–104.
17. Stolarek I. Procedural and examination skills of first-year house surgeons: a comparison of a simulation workshop versus 6 months of clinical ward experience alone. *N Z Med J.* 2007;120:U2516.
18. Tan GM, Ti LK, Suresh S, et al. Teaching first-year medical students physiology: does the human patient simulator allow for more effective teaching? *Singapore Med J.* 2002;43:228–242.
19. Ewy GA, Felner JM, Juul D, et al. Test of a cardiology patient simulator with students in fourth-year electives. *J Med Educ.* 1987;62:738–743.
20. Steadman RH, Coates WC, Huang YM, et al. Simulation-based training is superior to problem-based learning for the acquisition of critical assessment and management skills. *Crit Care Med.* 2006;34:151–157.
21. Moseley TH, Cantrell MJ, Deloney LA. Clinical skills center attending: an innovative senior medical school elective. *Acad Med.* 2002;77:1176.
22. Zick A, Granieri M, Makoul G. First-year medical students' assessment of their own communication skills: a video based open-ended approach. *Patient Educ Couns.* 2007;68:161–166.

23. Schmitz CC, Chipman JG, Luxenberg MG, Beilman GJ. Professionalism and communication in the intensive care unit: reliability and validity of a simulated family conference. *Simul Healthc*. 2008;3:224–238.
24. Kneebone R, Nestel D, Wetzel C, et al. The human face of simulation: patient-focused simulation training. *Acad Med*. 2006;81:919–924.
25. Rudolph JW, Simon R, Raemer DB, et al. Debriefing as formative assessment: closing performance gaps in medical education. *Acad Emerg Med*. 2008;15:1010–1016.
26. Hatala R, Kassen BO, Nishikawa J, et al. Incorporating simulation technology in a Canadian internal medicine specialty examination: a descriptive report. *Acad Med*. 2005;80:554–556.

Teaching Evidence-Based Emergency Medicine to Medical Students

Dan Mayer*

Summary Points

- The 4 elements of clinical practice are best available evidence, clinical situation, patient preferences, and clinical expertise.
- Evidence-based emergency medicine consists of 3 teachable skills: information mastery, critical appraisal, and knowledge transfer.
- Teaching information mastery should start during the preclinical years and continue during clinical rotations and residency.
- Teaching critical appraisal should be done primarily during the preclinical years and then be used on a regular basis during clinical rotations and in residency
- Teaching knowledge transfer should be begun during clinical rotations and be reinforced by training during residency.

THE MODERN EMPHASIS IN medicine for the best evidence to be used in daily medical practice was first expressed by David Eddy in his response to several studies that showed large variations in the way health care was delivered.¹ The term *evidence-based medicine* (EBM) was formally coined in 1992 by David Sackett and his group at Oxford University in the United Kingdom. Their definition was “the conscientious use of the best available evidence to improve care for the individual patient.”^{2(p71)} This definition of EBM has led to a great deal of debate about the meaning and practice of EBM, which has detracted from the intent of those who first used the term.

*Conflict of interest disclosure: Dr. Mayer is the author of *Essential Evidence-Based Medicine*,³ published by Cambridge University Press, for which he receives royalty payments on sales.

Ultimately, EBM is the critical evaluation of clinical studies to determine whether they are valid and will have a significant effect on important health care outcomes. It tries to determine whether the scientific basis of medicine is valid, reproducible, numerically important, and clinically significant.

EBM is simply the application of the scientific method to medical research and the practice of medicine. Ultimately, EBM is the critical evaluation of clinical studies to determine whether they are valid and will have a significant effect on important health care outcomes. It tries to determine whether the scientific basis of medicine is valid, reproducible, numerically important, and clinically significant.

The results of clinical research should follow the steps of scientific method (Box 8.1) and be reproducible. A final step of the scientific method applied to medicine is the applicability of the results of research studies, the translation of these studies to the care of an individual patient, and the assessment of the benefits and harms of medical science in society. A model of evidence-based practice is shown in Figure 8.1.⁴ Four elements of clinical practice act as interrelated components of EBM: the best available evidence, the clinical situation, the patient's preferences, and the clinical experience of the health care provider. These elements are accessed by 3 processes of EBM practice: information mastery, critical appraisal, and knowledge transfer. All of these elements come together to create the full palate of EBM. Teaching this model to our trainees is a significant challenge.

Teaching the Elements of EBM in Medical School

The difficult part of teaching the elements of EBM in medical school is deciding which elements of EBM should be taught at each phase in the curriculum. Teaching EBM integrates 3 specific and concrete skills—information mastery, critical appraisal, and knowledge transfer—over the continuum of the medical curriculum. The elements of information mastery and critical appraisal should be taught to medical students as basic sciences during the first 2 years of medical school. Excellent searching skills and information mastery should be an integral part of the skill set present at the start of house officer training. We should not be teaching these skills during the resident's clinical duties. Reviewing them during journal clubs is a helpful way of cementing the knowledge and skills of these areas.

Box 8.1. Basic Steps of Scientific Method

1. Formulate a hypothesis.
2. Design an experiment.
3. Carry it out and obtain results.
4. Draw conclusions based on valid statistical results.
5. Formulate a new hypothesis.

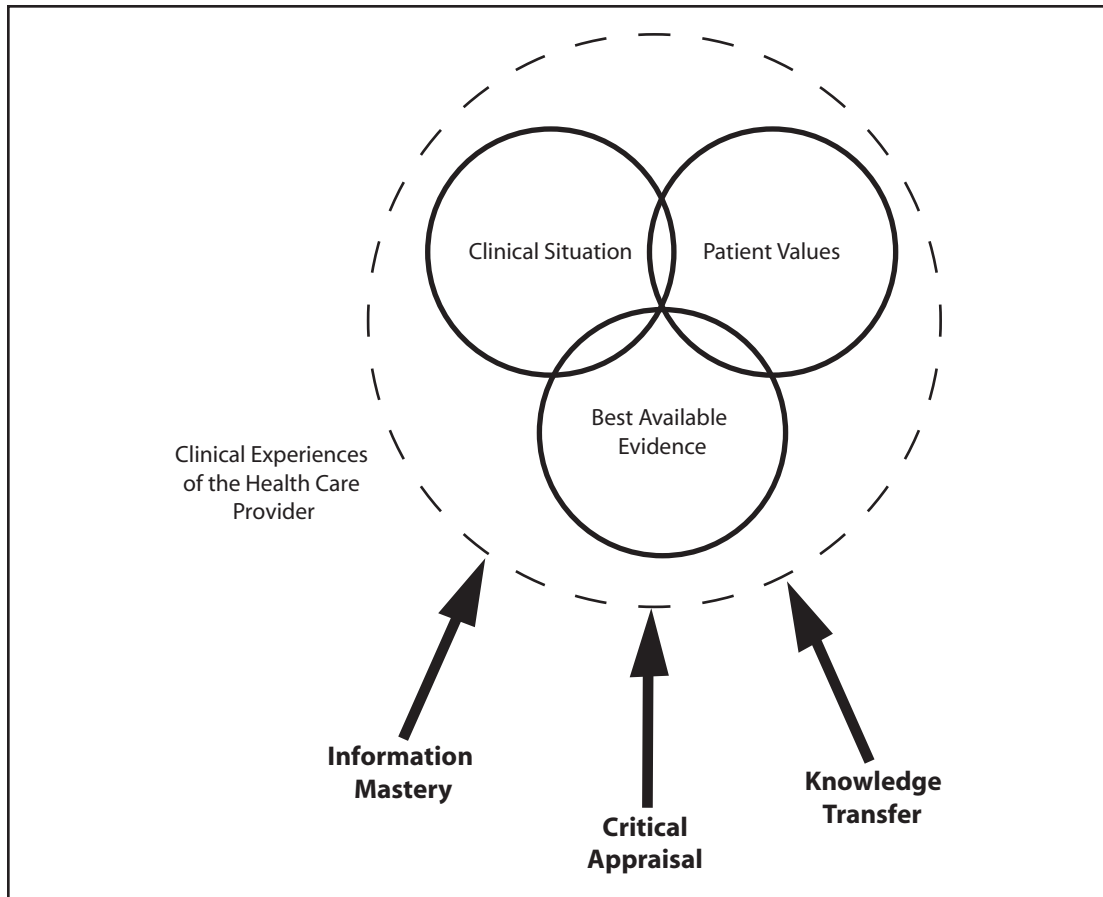


Figure 8.1. Schematic diagram of evidence-based medicine (Based on description by Haynes et al.⁴)

The elements of a sample EBM curriculum are listed in Box 8.2. Ideally, the curriculum should include the elements of causation as a special case of the scientific method, the various types of study designs used in clinical medicine and the strengths and weaknesses of each of them, common sources of bias in clinical research studies, a basic understanding of statistical processes, and clinical and epidemiological measures of risk and benefit. This part of the curriculum is ideal for the first-year medical student who is learning about basic processes in the body. The student should also be exposed to basic processes in clinical and basic science research. An elementary textbook that clearly explains the methodological and statistical concepts is very helpful.³

The second year is an ideal place to begin teaching the processes of diagnosis and medical decision making. The process of diagnosis can be taught along with the rational clinical examination and the process of clinical reasoning. During this part of the

Box 8.2. Suggested Progression of Teaching the Basic Elements of EBM During the First and Second Years of Medical School

First Year

- Basic statistical properties (measures of central tendency and dispersion, graphing, probability and odds, distributions)
- Causation and the scientific method (Koch's postulates and contributory cause)
- Study design (randomized clinical trials, cohorts, case control, descriptive)
- Sources of bias and critical appraisal of studies of therapy and harm
- Statistical methods (event rates, number needed to treat, Type I and Type II errors, confidence intervals)
- Assessment of risk (absolute risk, relative risk, odds ratio)
- Critical appraisal of studies of therapy, harm (risk), and etiology

Second Year

- Principles of diagnostic tests (likelihood ratios, sensitivity, specificity, predictive values, Bayes' theorem, receiver operating characteristics curves)
- Critical appraisal of studies of diagnosis, prognosis, decision analysis, cost analysis, clinical prediction rules, clinical practice guidelines, and meta-analyses

The second year is an ideal place to begin teaching the processes of diagnosis and medical decision making.

course, the students should learn the operating characteristics of diagnostic tests (e.g., likelihood ratios, sensitivity, specificity, receiver operating characteristics curves, Bayes' theorem). Additional elements of medical decision making, such as formal expected values decision making and cost-effectiveness analysis, can be taught during this time along with clinical prediction rules, clinical practice guidelines, studies of survival and prognosis, and meta-analyses. This approach prepares the student to go into the third year with a full spectrum of tools for incorporating the medical literature into daily practice.

These topics are the "must learn" elements of EBM for medical students. Students should have a firm grounding in basic statistical concepts, such as types of data, measures of central tendency and dispersion, basic probability, and interpretation of graphs. They should be able to calculate basic statistics such as number needed to treat to benefit or harm, likelihood ratios, sensitivity and specificity, relative risk, and odds ratio. Students should know the meaning of these terms and how to interpret them along with their confidence intervals. They should understand which common statistics ought to be looked for in a study and how to determine whether the results will be useful for sound clinical decision making. Medical students should also learn an appreciation of the need to be able to replicate these studies.

Teaching the application of the best available evidence should begin during the third year when students are able

to see how the use of the evidence that they find during the clinical encounter directly leads to a change or continuation of care for their patients. This subject introduces knowledge transfer, which becomes more intensely taught during residency training.

Formal EBM Process

The formal EBM process begins by defining an educational need. The learner can be a practicing physician, clinical teacher, resident, student, or any other member of the health care team. The first part of the process is determining whether there is an educational need for information.

Background or Foreground Question?

Clinical instructors should begin by explaining whether a particular clinical query is a background or foreground question. A *background question* is information that ought to be part of the learner's basic knowledge, and the learner should preferentially be sent to an online textbook such as UpToDate (www.uptodate.com/online/about/index.html)⁵ or any standard textbook of emergency medicine, of which *Rosen's Emergency Medicine: Concepts and Clinical Practice*, 7th ed., *Tintinalli's Emergency Medicine: A Comprehensive Study Guide*, 6th ed., are 2 examples.^{6,7} Background information can also be material found in narrative review articles, which are useful for the new learner who has very little clinical experience. These sources may not be completely accurate because they consist of information that is frequently out of date and contains the biases brought by the authors. The new learner may be unaware of these issues and should be guided by an experienced teacher to question those parts of background sources that are suspect.

If the question being asked relates to current or cutting-edge information, it would be called a *foreground question*, and the learner would apply the best searching skills, taught during the first 2 years of medical school, to rapidly access the highest level of the most currently available evidence from the medical literature. For medical students, it is up to the learner to read background information first and assess his or her own level of knowledge.

Background and Foreground Sources

A very popular source of background information is the online text book, *UpToDate*,⁵ which provides online links to the source journal articles referenced in the source material. This information is easy to access, but the learner should not be allowed to accept at face value the materials found in

Teaching the application of the best available evidence should begin during the third year when students are able to see how the use of the evidence that they find during the clinical encounter directly leads to a change or continuation of care for their patients.

any background sources until the teacher is satisfied that the learner has accessed and appraised the most currently available research evidence on that topic. One method is to ask the learner to find the referenced sources and verify or validate any statements that are controversial or questionable in the background source. Foreground sources are primary research articles, systematic reviews, or meta-analyses from the current medical literature.

The Educational Prescription

The teacher should present the learner with a written *educational prescription* to formalize the teaching encounter. The educational prescription is usually put in the form of a question designed to maximize the efficiency of searching for the best available evidence. The format of that question is called the PICO(T) format. This stands for patient or population (P), intervention (I), comparison or control or gold standard in diagnostic studies (C), and outcome (O), with time (T) being added only when it is helpful to separate studies done prospectively, retrospectively, or at a single point in time. The educational prescription should be given with a time within which the learner must fulfill the task.

Six Steps to EBM

The educational prescription leads the learner to the traditional 6-step process in EBM that transforms the educational need into a useful result to inform and modify clinical practice. (Box 8.3). The EBM process starts by asking a searchable clinical question and using good searching techniques to find the best resources. This process of accessing the best available evidence is called *information mastery* (Figure 8.1). The goal of this part of EBM education is to teach our learners to become excellent searchers. David Sackett and Sharon Straus found that junior physicians in the United Kingdom who were well trained in searching skills could find the best available evidence from PubMed in an average of 90 s. When available, they found evidence from preappraised sources, such as a critically appraised topic (CAT) bank of

Box 8.3. Six-Step EBM Process

1. Ask an answerable question to satisfy an educational need.
2. Access the best potential sources of evidence through the use of good searching techniques.
3. Acquire the best evidence to answer your question.
4. Appraise the studies found.
5. Apply the results to your patient.
6. Assess the efficacy of the application of the evidence to the clinical situation.

preappraised research studies, in as little as 20 s.⁸ My unpublished personal experience with fourth-year medical students has demonstrated that medical students can perform searches at speeds approaching these reported. Our medical students are trained to perform efficient searches during their first 3 years in medical school and when asked to find evidence in their emergency medicine rotation, are able to find the best available evidence within several minutes.

Teaching students how to access the best answer to a clinical question in the medical literature comes through the most efficient application of good searching techniques. Search engines such as the TRIP database (www.tripdatabase.com) help the learner to search the literature more efficiently, finding preappraised sources as well as primary studies that are most likely to answer questions in a clear and concise manner. Acquiring what appears to be the best available evidence is the key to minimizing your learner's time and paperwork burden. Good searching skills can be taught with the assistance of your medical librarians as part of a good medical informatics course. This is *information mastery*, which is complemented by the skill to actually review abstracts and determine the likely worth of the article being abstracted.

The *critical appraisal* of the quality of a study is what will ultimately determine whether the study or evidence found will be potentially useful. The quality of a study can be boiled down to 2 main questions that must be answered in this part of the EBM process: was the study valid, and what is the impact (numerical result) of the study? The question of validity asks the reader to find out if any of the conditions of the research methodology could lead to a systematic biasing of the results. Another way to ask this question is, what other explanation (other than the one offered by the authors) could account for the results found in this study? This question is something that can be answered by anyone knowing something about the subject and without the need to have to understand complex mathematics. Mathematical concepts appear to intimidate physicians, but some minimal math concepts are needed to understand the impact of a study. The question of impact asks the reader to assess the strength or clinical significance of the outcomes measured in the study. The mathematical elements of critical appraisal that all medical students should understand are listed in Box 8.4 and will be detailed in the following discussion.

Validity is determined by looking for sources of bias that might make the study results come out in the opposite way or might significantly affect the magnitude of the results of the study. This is known as *internal validity* and is distinct from *external*

Box 8.4. Mathematical Elements of Critical Appraisal of the Medical Literature

Statistical principles of research studies of therapy, harm, prognosis, and etiology

- Basic mathematic skills
- Basic statistical skills
 - Measures of central tendency and dispersion
 - Properties of the normal distribution
 - Basic probability
- Hypothesis testing and Type I and Type II errors
- Event rates, relative rate increase, absolute rate increase, and number needed to treat to benefit
- Confidence intervals
- Relative risks and odds ratio and number needed to treat to harm
- Kappa statistic and inter- and intra-observer variability

Probabilistic medical decision making and research studies of diagnosis

- Specificity and sensitivity and likelihood ratios
- Bayes' theorem
- Receiver operating characteristic curves
- Basic algebraic skills

The quality of a study can be boiled down to 2 main questions that must be answered in this part of the EBM process: was the study valid and what is the impact (numerical result) of the study?

validity, which determines whether the study results can be applied to particular patients. The impact or mathematical result or strength of the study is determined through an analysis of the numerical results and their statistical significance. Another way to define these elements of critical appraisal is to say that validity measures the likelihood that the association found in the “impact” was an unbiased way to come up with an accurate result. The impact determines the precision with which the measurement occurs and whether it is statistically important.

Knowledge transfer, the final element of EBM, is also known as *external validity*. It requires the clinician to determine whether the results of a study should be used for a particular patient. This determination requires that the clinician have some clinical knowledge about the problem and can put the results of the study into perspective of clinical practice and effectively communicate the results to the patient. The clinician must not only be able to discuss the findings of the research study with the patient but also determine what the patient's preferences are regarding the particular question and how those expectations will create a treatment plan. This would also include elements such as the clinical situation or setting in which the patient is being seen and that could be different in some ways between an urban tertiary care center and a rural community hospital.

The last steps in the EBM process are applying the evidence to the patient being seen at the moment and then assessing the results of that application on the patient's clinical outcome. These steps are probably best taught informally, although having the medical student follow-up on the care of the patient for whom evidence was sought and used is an excellent educational opportunity that should be used whenever possible.

Information Mastery

Creating an answerable clinical question is often difficult for new learners, yet this must be the first step of the information mastery process. The purpose of creating a question using the PICO(T) format is to create a question that is most easily searchable.

Although it is the terms used in the search that make the search useful, following the PICO(T) format ensures that all the essential elements are included in the student's search. Adding the time element can help to define the type of study done by examining whether this is a longitudinal or cross-sectional study.

The more elements of the PICO(T) question that are incorporated into the searching process, the more specific the resulting search will be and the fewer resources will be found. However, this type of search strategy is more likely to miss some important studies or sources of evidence than is a question that is more general and that will find many more sources. Using fewer elements in the search will lead to results that have many more resources, and this is a more-sensitive but less-specific search. Learners can often overcome the difficulty of creating a PICO(T) question if they are convinced that the question will make searching more efficient.

Most students are taught at the beginning of medical school to use PubMed. However, PubMed is often a difficult tool for beginning learners to master and usually results in searches that are either too complex, take too long to be useful in the clinical setting, or find mostly obscure studies. I recommend that the use of PubMed be a tool for first- and second-year students who can learn its strengths and weaknesses. After that, it should be considered a fall-back tool for the advanced learner in the later clinical years. The PubMed Clinical Queries (www.ncbi.nlm.nih.gov/corehtml/query/static/clinical.shtml) are much more efficient search filters than the main search engine, and these should be emphasized to all learners.

A useful searching philosophy for finding evidence at the point of care is the 5S construct. Using the 5S model of the hierarchy of the medical literature developed by R. Brian Haynes (Figure 8.2) helps students find the best available evidence that has been compiled and critically appraised by others.⁹ The 5S

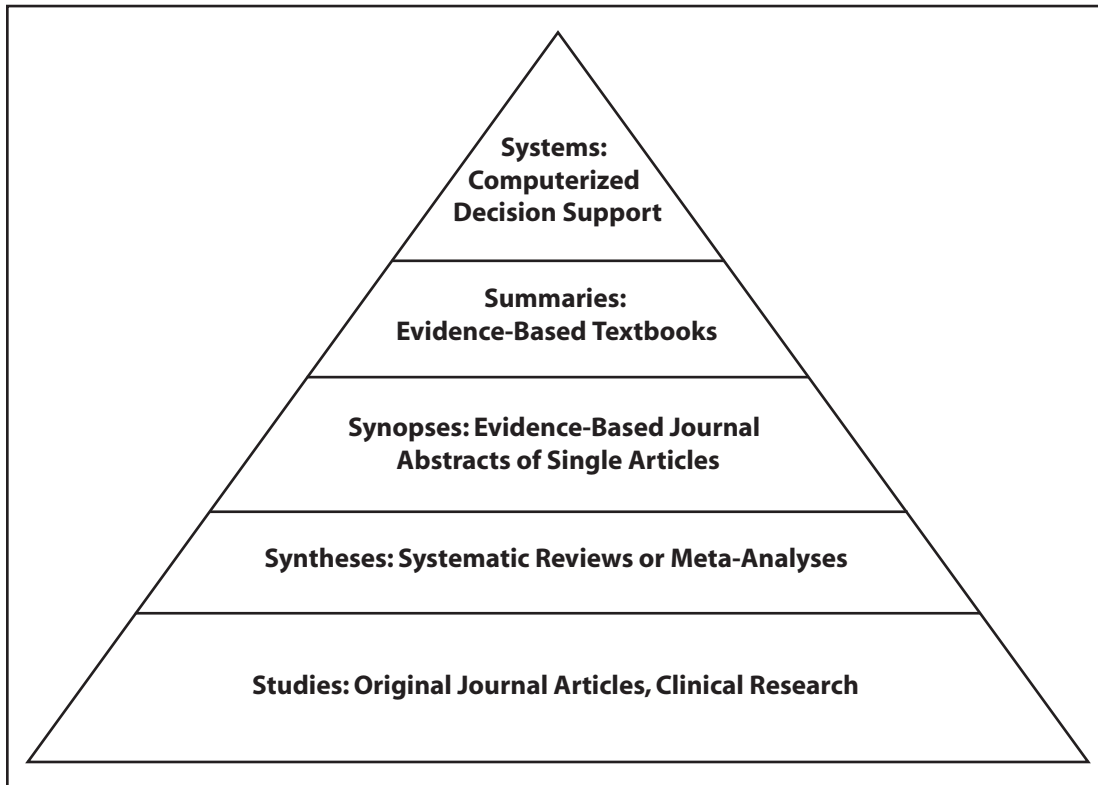


Figure 8.2. 5S schema for efficient searching.⁹

The more elements of the PICO(T) question that are incorporated into the searching process, the more specific the resulting search will be and the fewer resources will be found.

construct allows the user to begin searching with the highest level of evidence from the very beginning of the search. It uses a pyramid schema to characterize the level of evidence found and its hierarchy in the search for evidence at the bedside. It also encourages the learner to preferentially look for preappraised sources of evidence to save time and be more efficient. The TRIP Database (www.tripdatabase.com) and SUMsearch (<http://sumsearch.uthscsa.edu>) are good search engines for this process and will preferentially find these systems, synopses, and summaries of evidence.

Initially, the learner should look for systems of care that would be found in preappraised clinical practice guidelines or computerized algorithms. These should have been vetted as having been critically appraised by a responsible and reliable source. When teaching students how to use this process, it is always necessary to look critically at the source found and to assess potential conflicts of interest that might make the information and the source unreliable.

The second level of the 5S schema is summaries, which include evidence-based textbooks and online clinical reference

tools. Some examples are traditional print textbooks that focus on presenting the actual evidence for various aspects of clinical care. Emergency medicine sources include *Evidence-Based Diagnosis*,¹⁰ *Evidence-Based Emergency Care: Diagnostic Testing and Clinical Decision Rules*,¹¹ *Evidence-Based Acute Medicine*.¹² In addition, some on-line resources, such as *DynaMed*¹³ and the *BMJ Clinical Evidence*,¹⁴ give the level of evidence for medical facts using transparent and explicit criteria. Look for sources like these for which the levels of evidence are unambiguously stated and allow the learner to make the most explicit decisions on how to use that evidence at the bedside. The caveat concerning the quality of systems of care holds for these as well.

The third level of the 5S schema is synopses of individual studies, which include sources such as the following journals: *ACP Journal Club*, *Evidence Based Medicine*, and *Best Evidence Emergency Medicine* (from McMaster University). In these sources, individual studies are reviewed and critically appraised by an outside and interested third party who has nothing to do with the performance of the study. The outside party would presumably be more objective about the nature of the evidence, the quality of the evidence is quantified, and the results of the study are provided as easily understandable summaries that can be applied to the patient at the bedside.

CAT data banks provide online storage for preappraised topics for use by the learners. *Best Bets* (www.bestbets.org) is the most well developed of these data banks and has many completed and reviewed critically appraised topics. The commercial *Emergency Medicine Abstracts* (www.emaonline.org, The Center for Medical Education) is another source of reviewed articles specific to emergency medicine. It requires a subscription to access, but it is a free service for all members of the Emergency Medicine Residents Association, and it can be used as a resource by emergency medicine residents to teach at the bedside. Two other general medical sources, *Clinical Evidence* (<http://clinicalevidence.com/ceweb/conditions/index>) put out by the *British Medical Journal* and *PIER* (<http://pier.acponline.org>) from the American College of Physicians, are available by subscription only.

The fourth level of evidence in the 5S schema is the syntheses or systematic review and meta-analysis, including the Cochrane Collaboration, currently the best set of meta-analyses available for evaluating studies of therapy. Cochrane is a worldwide collaboration of researchers working with explicit, clear, and precise criteria for creating meta-analyses. Cochrane is working on creating these analyses for diagnostic tests. Some researchers would place these issues much higher on the list of evidence sources. However, even the best meta-analysis is only as good as the underlying evidence from individual studies. The Cochrane

When teaching students how to use this process, it is always necessary to look critically at the source found and to assess potential conflicts of interest that might make the information and the source unreliable.

PubMed is often a difficult tool for beginning learners to master and usually results in searches that are either too complex, take too long to be useful in the clinical setting, or find mostly obscure studies.

Even the best meta-analysis is only as good as the underlying evidence from individual studies.

Learning good searching skills requires that the learner be frequently asked to search for the best available evidence. Their searches must be evaluated and reviewed to give frequent feedback about the quality of their searches.

Collaboration has created a high standard for the performance of meta-analyses to create sources of evidence that are free of bias and universally acceptable.

The lowest level in the “searching for evidence” or 5S pyramid is that of individual studies and journal articles. These must be critically appraised before the evidence is used, and most learners will be able to find usable evidence before they get to this level. Search engines that are useful for accessing studies include PubMed and generic search engines such as Google or Google Scholar, which are available to all learners and preferred by our students.

Learning good searching skills requires that learners be frequently asked to search for the best available evidence. Their searches must be evaluated and reviewed to give frequent feedback about the quality of their searches. Medical librarians represent the experts in this area and are frequently more able to grade searches and give timely feedback to learners. This skill should be initially taught through searching exercises during the first and second year in which the learner is required to find specific evidence by being given a PICO-like clinical query and doing the searching themselves. In the clinical years, this skill can be reinforced in a more organic way during clinical rotations. When the faculty or resident teacher comes across an issue related to patient care that requires the answer to a clinical query, the student becomes the “go to” person on the medical team who will search for that evidence. The instructors give the educational prescription, and the learner finds the best available evidence. This is the essence of practice-based learning and improvement (PBLI), which must be intensively practiced during the clinical years of medical school. The student critical appraisals can be placed in their PBLI portfolios, which will be shared with their residents for Association of Academic Chairs of Emergency Medicine credits. After being critiqued and corrected by the faculty and residents, these critically appraised articles then become part of the CAT or journal club bank for other medical students and the residency to access.

Sackett and Straus estimated that there is a need for evidence at the point of care in 2 of every 3 patient encounters.⁶ The emergency department is a perfect place for evidence searching to be practiced, and this task will make the medical student a full-performing member of the team and help him or her integrate the knowledge into the team with the residents.

Critical Appraisal

Once the source of evidence has been accessed, the next step is to perform a critical appraisal of the evidence. If the learner

can trust the objectivity of the person doing an evidence-based review, then synopses, summaries, and other pre-reviewed sources of evidence would be completely appropriate to use at the point of care. After all, the idea is to promote the use of more evidence when it is most needed—at the bedside at the point of care. Perhaps the most intimidating part of EBM for both teachers and learners is the process of critical appraisal of an individual study. This is what all practicing physicians should be doing when they read their regular subscription medical journals so that they can become discriminating readers of the medical literature. This still should be taught to medical students and residents as outlined in the Sicily statement on evidence-based practice.¹⁵

The Sicily statement is a statement of purpose put out by the Teachers and Developers of Evidence Based Health Care, an international group of teachers and producers of evidence-based health care that meets every other year to discuss methods of improving both teaching and implementing evidence-based practice (EBP). The statement emphasizes the importance of EBP and the fact that medical decision making by the physician and patient should be based on the best evidence. All health care providers should understand and be able to recognize when evidence is used and when it is not to define “best practices.” Finally, EBP teaching should regularly occur in the clinical setting; the ultimate goal is for the students to incorporate these skills into their practice-based learning and improvement.¹⁵ The steps of critical appraisal as described in the Sicily statement are highlighted in Box 8.5.

The first step of the critical appraisal process is to read the abstract and determine whether the study is worth reading and analyzing. The acronym FOCC (Feasibility, patient oriented Outcome, Common condition, and an intervention that will Change practice) is a quick way to determine the value of the article on the basis of the abstract. The abstract should describe the study accurately and allow readers to determine whether the study is relevant and feasible to their practice.

If all those criteria are met, readers should then read the method section of the study. The method section will allow the

The emergency department is a perfect place for evidence searching to be practiced, and this task will make the medical student a full-performing member of the team and help him or her integrate the knowledge into the team with the residents.

The idea is to promote the use of more evidence when it is most needed—at the bedside at the point of care.

Box 8.5. Steps in Critical Appraisal

1. Read the abstract to determine whether the study is worth reading in its entirety.
2. Read the method section to determine the study's validity.
3. Determine whether the study is biased.
4. Determine the impact of the study by looking for Type I and Type II errors.
5. Ensure the study has an adequate reference standard.

reader to determine whether the study is valid. There are specific criteria to look for to determine the validity of the study. These criteria depend on the type of study. The University of Alberta (www.ebm.med.ualberta.ca)¹⁶ has developed an EBM toolbox that contains critical appraisal worksheets. These are helpful for formal critical appraisal and are very user friendly to ask the appropriate questions, which will vary depending on the type of study. The worksheet used for each type of study depends on the learner's having the skill to identify study design. A randomized clinical trial requires use of the worksheet for therapeutic interventions. A cohort or case control study requires the worksheet for etiology, harm, diagnosis, or prognosis depending on the nature of the study. A cross-sectional study requires the worksheet related to a diagnostic test, because that is the primary reason these studies are done. If a cross-sectional study is done, it may not be able to show which element is the cause and which is the effect. It can show only that the 2 are associated more likely than by chance alone, which is hypothesis generating but not proving the relationship between cause and effect.

After the type of study is identified and the worksheet completed, the reader can determine whether there is a likelihood of bias in the study. The reader should evaluate whether any bias could change the study results and whether there is a possibility that the opposite results could actually exist. Biases can be lumped into those caused by actions of the subject or the observer, bias in the way the subjects in each group are selected, and the effects of confounding variables, contamination or co-interventions.

The next step is to look at the results and determine the impact of the study. Begin by examining the primary outcome and determining whether there is a potential for Type I or Type II error. Type I error will be found in studies that are positive (statistical significance was found) and Type II errors in those that are negative (no statistical significance found). The common causes of Type I errors are multiple comparisons, composite outcomes and one-tailed tests. Multiple outcomes are more likely to lead to some chance outcomes being statistically significant and others not. Composite outcomes are those for which the important outcome for the patient has no statistical significance while some less important outcomes actually or nearly have statistical significance. When these outcomes are all put together, the entire "composite" outcome has statistical significance. One-tailed tests are appropriate to use if there is clear reason to accept a positive effect of the comparison group, and the opposite is not possible. When used inappropriately, this method effectively changes the p value from .05 to .1.

For a negative study, the reader should determine whether the study had adequate power to find a difference if one existed. A description of this process should be found in the statistical part of the methods section and should describe the power of the study. The reader can also determine the likelihood of a Type II error by looking at confidence interval. An interval skewed near the null point (0 for a difference, 1 for a ratio) could be a Type II error whereas those that are extremely symmetrical about the null point are less likely to contain a Type II error. This finding also depends on how rare or common the disease is and how likely it is that a larger study will be done in the future. A general rule of thumb is that if increasing the sample size by 1 order of magnitude changes the statistical significance of the results, the study may have inadequate power and the evaluator should wait for future studies to be done. Power tables and nomograms can also be used to determine the power of a study.¹⁷

For diagnostic tests, the ideal study must have a “gold standard” or reference standard that compares to the test being studied. There are a few good and useful reference standards, and how well they measure the ultimate patient outcome (correct diagnosis) determines the usefulness of the test. The results should be presented as likelihood ratios or sensitivity and specificity with 95% confidence intervals. Another useful presentation is the receiver operating characteristics (ROC) curve. The point with the largest likelihood ratios or the area under that curve should be given to allow the reader to determine whether the test is useful. The ROC curve is useful only in getting the overview of the test and not in determining whether it might be useful for an individual patient. That decision depends on the sensitivity and specificity of test.

Knowledge Transfer

The last step in the EBM process is applying the evidence to the patient at the point of care. Although on the surface, application appears to be a superficial activity, it is actually quite difficult and requires a great deal of experience. Application at the point of care is where clinical experience and judgment influence the use of the best available evidence alone. It is at this point that EBM really combines clinical experience, the clinical situation, patient's preferences, and the best available evidence.

After performing a well done critical appraisal and determining that a study has validity and a significant impact, readers can then determine how that study would affect their own practices. The outcome should be important to patients, and the intervention should be feasible in everyday practice. Deciding when to use a new therapy or diagnostic test is not an easy task, and most

One useful way to determine when knowledge transfer should be used is to discuss studies in groups in a journal club format.

physicians leave this decision up to their specialty societies with well-written clinical practice guidelines.

Knowledge transfer answers the question of external validity of a study. One useful way to determine when knowledge transfer should be used is to discuss studies in groups in a journal club format. This open discussion can be held informally during teaching rounds if the teacher has a recent article for the learners, and the discussion can focus on whether and when the results are likely to change physician practice. The strength of the study should be factored into this discussion. A large, well-done randomized trial would have much more weight than a smaller randomized trial or an observational study. A meta-analysis of many small trials might still not be as good as a single large randomized trial. There are multiple examples of this in the literature.

Finally, learners and educators should assess the outcome for the patient that is observed as a result of using the best evidence in treating their patient. This is the application of practice-based learning and improvement—also called quality improvement or evaluation—and it is what determines the effectiveness of an intervention.

Continuing Training in EBM During Residency

During residency, EBM education should be continued, and medical students should be involved in 3 areas: didactic sessions, journal clubs, and evidence shifts. Regular didactic sessions should review the elements of critical appraisal of literature and basic statistics. This review should be relatively minimal if residents come into the program having been well trained as undergraduates. A journal club, where these skills are formally practiced, should be a place where there can be open and frank discussion about both the critical appraisal of studies and their application or knowledge transfer. Journal club should be open to medical students as well as other health care providers in the emergency department.

Several models¹⁸⁻²⁴ for journal club can be applied to emergency medicine, and no evidence is currently available to suggest that any 1 model is superior. The goal is that residents formally perform frequent critical appraisals using published worksheets, such as those from the EBM Toolkit of the University of Alberta Web site.¹⁶ Ideally, residents should complete these worksheets with a medical student and then have them reviewed and critiqued by the faculty. One model of journal club assigns a single article each month to each year of residents in such a way that the first-year residents critically appraise simple articles such as those of therapy. The second-year residents evaluate more complex articles such as observational

or other advanced types of studies, and the third and final year residents review the most complex articles such as meta-analyses or systematic reviews. Resident reviews critically evaluated by the faculty can be put into a journal club bank, which serves as a repository for these critical appraisals and can be used to provide up-to-date evidence in the clinical settings at the point of care. These articles can also become part of the PBLI portfolios of the students and residents.

The third mode of teaching EBM during residency is the evidence shift (RA Seupaul and CD Chisholm, personal oral communication, August 2009). The evidence shift is a clinical shift in which 1 faculty member works with 1 or 2 residents and ideally some medical students who find the best available evidence for clinical queries that come up during patient care by their team and other providers in the emergency department. The challenge is to take a resident off rotation and add extra evidence shifts to the resident's current responsibilities. The trade-off becomes beneficial if the faculty members and residents place a premium on the efficient gathering of evidence at the point of care. Using the 5S methodology,⁹ I have used this strategy successfully in my practice with fourth-year medical students. Ideally, evidence shifts would begin during the third year of medical school when the students begin to create portfolios of PBLI exercises performed during their third-year rotations. These can then be carried over into residency where formal PBLI exercises can be done during evidence shifts, journal clubs, resident evaluations, and chart simulations.

The goal of EBM is for the student (undergraduate medical student or resident) to become a lifelong learner.

Conclusion

EBM is a paradigm for the scientific method as used in the practice of medicine. The goal of EBM is for the student (undergraduate medical student or resident) to become a lifelong learner. This goal requires an ability to have a healthy skepticism of what is found in the medical literature and to apply certain tools, usually associated with clinical epidemiology, to the studies reported. EBM practice can be started with emergency medicine learners during medical school and residency.

References

1. Eddy DM. Clinical policies and the quality of clinical practice. *N Engl J Med.* 1982;307:343–347.
2. Sackett DL, Rosenbreg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *BMJ.* 1996;312(7023):71–72.

3. Mayer D. *Essential Evidence-Based Medicine*. 2nd ed. Cambridge, UK: Cambridge University Press; 2010.
4. Haynes RB, Sackett DL, Gray JRM, et al. Transferring evidence from research into practice: I. The role of clinical care research evidence in clinical decisions. *ACP Journal Club*. 1996;125:A-14–A-16
5. UpToDate. Available at: www.uptodate.com/home/index.html. Accessed March 10, 2010.
6. Marx JA (ed.). *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 7th ed. Elsevier, Cambridge, MA, 2009
7. Tintinalli JE, Kelen GD, Stapczynski JS, Ma OJ, Cline DM (eds.). *Tintinalli's Emergency Medicine: A Comprehensive Study Guide*. 6th ed. The American College of Emergency Physicians, McGraw Hill, New York, 2004
8. Sackett DL, Straus SE. Finding and applying evidence during clinical rounds: the “evidence cart.” *JAMA*. 1998;280:1336–1338.
9. Haynes RB. Of studies, syntheses, synopses, summaries, and systems: the “5S” evolution of information services for evidence-based healthcare decisions. *Evid Based Med*. 2006;11:162–164.
10. Newman TB, Kohl MA. *Evidence-Based Diagnosis*. Cambridge, UK: Cambridge University Press; 2009.
11. Pines JM, Everett WW. *Evidence-Based Emergency Care: Diagnostic Testing and Clinical Decision Rules*. London, UK: BMJ Books; 2008.
12. Straus SE, Hsu SI, Ball CM. *Evidence-Based Acute Medicine*. London, UK: Churchill Livingstone; 2002.
13. DynaMed. Available at: www.ebscohost.com/dynamed. Accessed March 10, 2010.
14. BMJ Clinical Evidence. London, UK: BMJ Evidence. Available at <http://group.bmj.com/products/evidence-centre/clinical-evidence>. Accessed March 31, 2010.
15. Dawes M, Summerskill W, Glasziou P, et al. Sicily statement on evidence-based practice. *BMC Med Educ*. 2005;5:1–7.
16. Buckingham J, Fisher B, Saunders D. *Evidence-Based Medicine Toolkit*. Edmonton: University of Alberta; 2008. Available at: www.ebm.med.ualberta.ca. Accessed March 10, 2010.
17. Young MJ, Bresnitz EA, Strom BL. 1983. Sample size monograms for interpreting negative clinical studies. *Ann Intern Med*. 99:248–251.

18. Nicholson LJ, Warde CM, Boker JR. Faculty training in evidence-based medicine: improving evidence acquisition and critical appraisal. *J Contin Educ Health Prof.* 2007;27:28–33.
19. Rhodes M, Ashcroft R, Atun RA, Freeman GK, Jamrozik K. Teaching evidence-based medicine to undergraduate medical students: a course integrating ethics, audit, management and clinical epidemiology. *Med Teach.* 2006;28:313–317.
20. Kulier R, Hadley J, Weinbrenner S, et al. Harmonising evidence-based medicine teaching: a study of the outcomes of e-learning in five European countries. *BMC Med Educ.* 2008;8:27.
21. Akl EA, Maroun N, Neagoe G, Guyatt G, Schunemann HJ. EBM user and practitioner models for graduate medical education: what do residents prefer? *Med Teach.* 2006;28:192–194.
22. Yousefi-Nooraie R, Rachidian A, Keating JL, Schonstein E. Teaching evidence-based practice: the teachers consider the content. *J Eval Clin Pract.* 2007;13:569–575.
23. Slawson DC, Shaughnessy AF. Teaching evidence-based medicine: should we be teaching information management instead? *Acad Med.* 2005;80:685–689.
24. Glasziou P, Burls A, Gilbert R. Evidence based medicine and the medical curriculum. *BMJ.* 2008;337:704–770.

Overview of Student Evaluation and Grading

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Summary Points

- Assessment processes should be concordant with the stated goals and objectives of an educational experience.
- Assessment methods should be valid, reliable, and feasible to implement.
- Direct observation of trainees can produce valid and reliable information if evaluators are sufficiently trained in the assessment process.
- Multiple sources of assessment information are often required to accurately evaluate trainees' abilities.

OVER THE LAST DECADE, the Liaison Committee on Medical Education and Accreditation Council for Graduate Medical Education (ACGME) has revised its accreditation standards to include competency-based educational objectives and outcomes for medical schools and graduate programs, respectively.^{1,2} The focus on competency-based outcomes dictates that the assessment of medical students' clinical performance and professional behavior in the emergency department be aligned with the prescribed expectations for competency in the emergency medicine clerkship. Epstein and Hundert defined professional competence as the successful integration of the following skills:

- The skill to acquire and use knowledge to solve problems,

The challenge for the emergency medicine clerkship director is to compile several valid assessments of students' clinical performance, in an environment that is fraught with variability, so as to assign an evaluative grade.

- The skill to synthesize biomedical and psychosocial data in clinical reasoning,
- The skill of effective communication, and
- The emotional awareness necessary to apply all of these skills during patient care.³

They outline an assessment framework that incorporates Miller's progressive levels of competence: knows (factual recall), knows how (solves problems, describes procedures), shows how (demonstrates skills), and does (applies in real practice).⁴ Similarly, Pangaro outlined a descriptive evaluation of progressive clinical competence based on a learner's progression from novice "reporter" to "interpreter" of data, "manager" of problems, and, ultimately, "educator."⁵

Regardless of the taxonomy used to define progressive competence, the challenge for the emergency medicine clerkship director is to compile several valid assessments of students' clinical performance, in an environment that is fraught with variability, so as to assign an evaluative grade. The goal of this chapter is to outline the applicability to the emergency department of various assessment tools and strategies, some adapted from the ACGME Toolbox of Assessment Methods,⁶ others studied in the context of both emergency and non-emergency medicine specialties.

Principles of Assessment Instruments

The best assessment instruments should yield valid, accurate data that are consistent and, therefore, reliable in reproduction. The assessment methods should also be feasible within the bounds of time, training, and equipment costs and applicable to the specific clinical circumstances within which the measurements occur. Importantly, the assessment methods should provide useful information about a student's abilities relative to the competencies of interest.⁷

An assessment should be consistent with the clerkship's curriculum goals and objectives for competency, and the assessment data should be consistent with the predetermined evaluative criteria for grade assignments. No single assessment instrument can evaluate all competencies. Therefore, multiple assessment methods are often necessary to fully evaluate a student's clinical and professional performance.⁷

Observations of Medical Students in the Clinical Setting

Direct observation of a student's entire encounters with patients can be challenging in the emergency department given the variation in both available time and observational skills of faculty and residents and nonstandardized clinical patient presentations. In

addition, the specific components of a student's clinical skills that faculty and residents directly observe differ; as a result, some clinical assessment determinations may actually be inferred from a student's presentations rather than from direct observation of the patient interactions.⁸ Despite these potential impediments, it is possible to obtain and compile valid observational data from several observers over time if their observations are focused on those aspects of the student's performance that they are mostly likely to see and if they have been trained to be aware of the competencies to be assessed. For example, if a resident, briefly trained in observation, is more likely to be present during a student's interview of a patient, the resident may provide observational data related to the student's history-taking skills. By contrast, if a student is more likely to verbally present to a faculty member, the faculty member may be better able to assess the student's presentation skills and cognitive abilities.

The ACGME suggested that direct observation of an entire encounter, especially when compared with a predetermined checklist of performance-based criteria for competence, may be the most desirable method of evaluating interviewing skills and proficiency with medical procedures. A Council of Emergency Medicine Residency Directors task force developed a standardized direct observation assessment tool (SDOT) that has been studied in videotaped simulated resident-patient encounters. This SDOT has been shown to have relatively good interrater reliability in judgments of patient care and professional behaviors in the simulated setting.⁹ The SDOT has not been studied as an assessment tool of medical students' actual performance in the emergency department.

The mini-clinical evaluation exercise (mini-CEX), a modification of the "long case" used in the United Kingdom to evaluate clinical clerks, is an example of an observational assessment tool used in internal medicine clerkships.¹⁰ This evaluation exercise consists of an observation of a student's focused history taking and physical examination of an actual patient, rated on a standardized checklist. Although these observations can provide detailed information about competence in that 1 clinical encounter, the use of nonstandardized patient observations may require up to 10 encounters to make up a reliable assessment.¹¹ A related observational assessment instrument is the longitudinal evaluation of performance (LEP), which has been used to assess a trainee's improvement in clinical competence over time, relative to an expected, fixed competency to be achieved at the end of a training period.¹²

Both the mini-CEX and the LEP facilitate an in-time, focused feedback discussion based on observed clinical skills,

a necessary component of the assessment and feedback cycle. Given limited personnel, time constraints, and the somewhat cumbersome checklists required for accurate in-time observation and assessment in the emergency department, the administration of direct observation activities may best serve as formative assessments designed to enhance a student's plans for improvement rather than as summative assessments of clinical competency.

Assessment Forms

Global rating scales are judgments of general abilities and are considered by the ACGME to be potentially applicable methods to assess a student's ability to develop and implement patient care plans, perform medical procedures, and work in a team. Composite global rating scale assessments of a student's clinical performance are the most common means of evaluating skills and assigning a grade. This method is inexpensive and does not require intensive equipment or time resources. Because a composite of global rating scale relies on the distillation of multiple evaluators' judgments, it is subject to limited interobserver reliability; incomplete observations of a student's clinical performance; assessments based on inference; and judgments by untrained, busy observers. Validity and reliability may also be limited by a lack of discrimination between competence domains, the "halo effect" (or rather a subjective positive assessment of another person's qualities based on a positive assessment of other qualities), and rater bias.

Improving assessment forms by including specific, objective, performance-based criteria has met with mixed results in reducing rater variability and improving the validity of rating judgments.^{13,14} As the number of rating scales and domains of competence to be assessed increase, the assessment matrix can become complex, time-consuming to complete, and less discriminatory between subdomains.¹⁵

In summary, global assessment forms should outline specific but simple scales and competency matrices. Including explicit behavioral anchors and examples of various levels of competence may improve reliability across raters. Faculty, residents, and other care providers who complete assessment forms should be trained in their use and familiarized with any criterion-based levels of competency. Attaching digital photos of students to the assessment forms will help remind raters who they are assessing. Finally, as with the results of direct observations, assessment forms can be used to prompt the delivery of important formative information to students.

Assessment of Procedural Skills

The ACGME suggested that simulators and task trainers are one of the most desirable methods for assessing procedural profi-

ciency. Simulation-based training and assessment has become the accepted method of ensuring proficiency in the performance of invasive procedures such as tube thoracostomy and cricothyroidotomy and trauma team training.¹⁶ As with other assessment methods, before using simulators to assess procedural competence, it is important to define both the realistic learning needs of students and the benchmarks for proficiency on which the assessment will be based, whether they consist of component checklists or holistic generic assessments.¹⁷⁻¹⁹

The assessment of proper and safe procedural technique should also occur through the direct observation of a student's clinical work at the bedside. A component checklist of essential actions to be performed during a procedure should be as applicable in the clinical setting as in the simulator.

Case Checklists, Chart-Stimulated Recall Exercises, Written Exams, and Portfolios

Components of a student's clinical competence, either in the clinical setting or removed from the patient encounter, can be assessed in a variety of innovative ways. Case-based forms have been used in other specialties to assess students' clinical knowledge.²⁰ In a neurology clinic, students independently evaluate a patient and complete a brief, focused form that prompts them to commit to an assessment of a clinical problem, diagnostic tests, and management plan. A faculty member subsequently evaluates the same patient and completes the same checklist; a comparison of the students' and faculty members' lists contributes to both assessment of knowledge and a plan for future learning.

Chart-stimulated recall examinations have been used in conjunction with other standardized methods of assessing physicians' competence.²¹ These examinations are not expensive, and if the content and questions are standardized, when based on a student's own patients, these examinations may facilitate an assessment of a student's analytical thinking skills, clinical decision making, and ability to use scientific evidence to solve clinical problems. Chart reviews can also focus assessment on actual charting skills. Case write-ups and clinical case presentations by a student may further an assessment of their cognitive and communications skills.

Since 2005, the Society for Academic Emergency Medicine has sponsored the development of and hosted on its Web site a 500 multiple choice question bank for the assessment of medical students' clinical knowledge in emergency medicine.²² Questions are accessible to both students and clerkship directors and can be sorted by clinical topic and used for both teaching and assessment.

Competency-based assessment portfolios have been used in the United Kingdom, Canada, and at some medical schools

The assessment of proper and safe procedural technique should also occur through the direct observation of a student's clinical work at the bedside.

Competency-based assessment portfolios have been used in the United Kingdom, Canada, and at some medical schools in the United States as a way to engage students in self-assessment and continuous learning and improvement as they achieve their educational goals.²³

in the United States as a way to engage students in self-assessment and continuous learning and improvement as they achieve their educational goals.²³ Portfolio-based assessment allows for a guided collection of documentation of proficiency, integrated across competencies and sampled from a variety of sources over time. Assessment portfolios in emergency medicine might include a combination of case write-ups, literature reviews, procedural competency logs, faculty and resident feedback forms, documentation of professionalism and communications skills obtained from nurses and physician-extenders and staff, and reflective writing on the part of a student.

Assessment of Professionalism

The ACGME expectations for professional behavior are defined as a commitment to carrying out professional responsibilities and an adherence to ethical principles, through the demonstration of the following:

- Compassion, integrity, and respect for others;
- Responsiveness to patient needs that supersedes self-interest;
- Respect for patient privacy and autonomy;
- Accountability to patients, society, and the profession; and
- Sensitivity and responsiveness to a diverse patient population, including, but not limited to, diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.²⁴

It is no longer acceptable to expect that implicit role modeling of professional behavior will suffice in teaching these attributes to students. As a consequence, explicit teaching and discussions about professionalism and assessment of professional behavior are components of evaluation across the learning spectrum in medicine. Several methods have been developed to assess a student's professional behavior. The professionalism mini-evaluation exercise (P-MEX) is a 24-item scale designed to be used in multiple situations in which a student's behavior can be observed, including patient encounters, small group teaching sessions, and sign-out rounds.²⁵ The authors found that with as few as 8 observations, the P-MEX could provide valid information on a student's doctor-patient relationship skills, reflective skills, time management, and interprofessional relationship skills. Because professional behaviors should not be context and observer specific, the ACGME advocates the use of 360° evaluations to obtain feedback from multiple people with whom a trainee has contact. These evaluations can provide valuable feedback on teamwork, communications skills, and professionalism. Parent narratives have been used as components of students' professional assessment on pediatrics rotations.²⁶ In

the emergency department, similar assessment information can be collected from nurses, allied health personnel, patients, and families. Multiple focused observations of explicit behaviors are necessary to ensure a valid and reliable measurement, but this information can serve as another source of valuable feedback to a student, as well as a component of their clinical performance assessment.

Explicit teaching and discussions about professionalism and assessment of professional behavior are components of evaluation across the learning spectrum in medicine.

Summary

Valid and reliable assessment of a student's clinical performance in the emergency department setting can be challenging, but lessons learned and instruments used in other clinical environments can be adapted to the emergency department. Clinical and professional competence must be explicitly defined and expectations for behavior made clear to both students and assessors. Information obtained from multiple raters, observers, and assessment methods can provide the most reliable and holistic understanding of a student's abilities. Formative feedback should be explicitly integrated into assessment and learning cycles for the benefit of students.

References

1. *LCME Accreditation Standards*. Washington, DC: Liaison Committee on Medical Education; 2009. Available at: www.lcme.org/functionslist.htm#educational%20objectives. Accessed February 10, 2009.
2. The ACGME Outcome Project. Available at: www.acgme.org/Outcome/. Accessed November 4, 2009.
3. Epstein RM, Hundert EM. Defining and assessing professional competence. *JAMA*. 2002;287:226–235.
4. Miller GE. The assessment of clinical skills/competence/performance. *Acad Med*. 1990;65:S63–S67.
5. Pangaro L. A new vocabulary and other innovations for improving descriptive in-training evaluations. *Acad Med*. 1999;74:1203–1207.
6. Accreditation Council for Graduate Medical Education and American Board of Medical Specialties. *Toolbox of Assessment Methods*. Version 1.1. Chicago, Ill; 2000. Available at: www.acgme.org/outcome/assess/toolbox.pdf. Accessed November 4, 2009.

7. Lynch DC, Swing SR. *Key Considerations for Selecting Assessment Instruments and Implementing Assessment Systems*. The ACGME Outcomes Project. Chicago, Ill: ACGME. Available at: www.acgme.org/outcome/assess/keyconsids.pdf. Accessed November 4, 2009.
8. Pulito AR, Donnelly MB, Plymale M, Mentzer RM Jr. What do faculty observe of medical students' clinical performance? *Teach Learn Med*. 2006;18:99–104.
9. Shayne P, Gallahue F, Rinnert S, et al., on behalf of the CORD SDOT Study Group. Reliability of a core competency checklist assessment in the emergency department: the standardized direct observation assessment tool. *Acad Emerg Med*. 2006;13:727–13732.
10. Kogan JR, Hauer KE. Brief report: use of the mini-clinical evaluation exercise in internal medicine core clerkships. *J Gen Intern Med*. 2006;21:501–502.
11. Wass V, Jones R, Van der Vleuten C. Standardized or real patients to test clinical competence? The long case revisited. *Med Educ*. 2001;35:321–325.
12. Prescott-Clements L, Van der Vleuten CPM, Schuwirth LWT, Hurst Y, Rennie JS. Evidence for validity within workplace assessment: the longitudinal evaluation of performance (LEP). *Med Educ*. 2008;42:488–495.
13. Lamantia J, Rennie W, Risucci DA, et al. Interobserver variability among faculty in evaluations of residents' clinical skills. *Acad Emerg Med*. 1999;6:38–34.
14. Go S. A competency-based approach to clinical evaluation of students in the emergency department. *Acad Med*. 2001;76:538.
15. Bandiera GW, Morrison LJ, Regehr G. Predictive validity of the global assessment form used in a final-year undergraduate rotation in emergency medicine. *Acad Emerg Med*. 2002;9:889–895.
16. Berkenstadt H, Erez D, Munz Y, Simon D, Ziv A. Training and assessment of trauma management: the role of simulation-based medical education. *Anesthesiol Clin*. 2007;25:65–74.
17. Lammers RL, Davenport M, Korley F, et al. Teaching and assessing procedural skills using simulation: metrics and methodology. *Acad Emerg Med*. 2008;15:1079–1082.
18. Michelson JD, Manning L. Competency assessment in simulation-based procedural education. *Am J Surg*. 2008;196:609–615.

19. McKinley RK, Strand J, Gray T, Schuwirth L, Alun-Jones T, Miller H. Development of a tool to support holistic generic assessment of clinical procedural skills. *Med Educ.* 2008;42:619–627.
20. Davis LE, King MK. Assessment of medical student clinical competencies in the neurology clinic. *Neurology.* 2007;68:597–599.
21. Cunnington JPW, Hanna E, Turnbull J, Kaigas TB, Norman GR. Defensible assessment of the competency of the practicing physician. *Acad Med.* 1997;72:9–12.
22. Senecal EL, Thomas SH, Beeson MS. SAEM tests: revisions improved item validity [abstract]. Abstract presented at the SAEM Annual Meeting, May 2007. *Acad Emerg Med.* 2007;14:S77–S78.
23. Dannefer EF, Henson LC. The portfolio approach to competency-based assessment at the Cleveland Clinic Lerner College of Medicine. *Acad Med.* 2007;82:493–502.
24. The ACGME Outcome Project. *Common Program Requirements: General Competencies.* Available at: www.acgme.org/outcome/comp/GeneralCompetenciesStandards21307.pdf. Accessed November 4, 2009.
25. Cruess R, Herold McIlroy J, Cruess S, Ginsburg S, Steinert Y. The professionalism mini-evaluation exercise: a preliminary investigation. *Acad Med.* 2006;81(suppl 10):S74–S78.
26. Liu GC, Harris MA, Keyton SA, Frankel RM. Use of unstructured parent narratives to evaluate medical student competencies in communication and professionalism. *Ambul Pediatr.* 2007;7:207–213.

Evaluating Medical Student Clinical Performance and Clinical Competence

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Summary Points

- Clinical rotations are a formative time for medical students.
- Feedback is essential in helping students improve performance, modify their behavior, and prepare for residency.
- Many different methods can be used to evaluate students and provide feedback. The most appropriate method depends on the needs and resources of a given department and student population.
- Using multiple types of evaluation methods provides more useful information than a single method.

CLINICAL ROTATIONS are often the most formative time for medical students. The clinical skills developed on these rotations provide the basis for the future practitioner. Assessment of these skills is essential to provide the student with useful feedback, identify weakness in an educator's curriculum, and help potential residencies stratify applicants. However, assessing students can be difficult. Evaluation is frequently subjective and involves considerable time and resources. This chapter will provide the educator with several tools to consider when evaluating a student's clinical performance.

Clinical rotations are often the most formative time for medical students.

Performance Versus Competence

Although much of the literature focusing on resident assessment discusses competence, this term is less appropriate for medical

student evaluation. Competence is an often narrowly defined set of discrete skills or behaviors and focuses on an area of expertise. Residents are expected to become competent in several outcome measures defined for their specialty over the course of years. These competencies are observed and evaluated over this extended time period. A resident or practicing physician should be competent in various procedures and the evaluation and management of disease; however, the medical student's goal is to rise to the level of an advanced learner and to develop the building blocks from which competence will be formed. This advanced learner's performance should reflect familiarity and some understanding of the evaluation and treatment of common emergency complaints and procedures, but competence would not be expected.

Clinical Performance Measurement

The evaluation of medical student clinical performance has traditionally relied on observation of students by residents and faculty. Often this process involves informal meetings or presentations during rounds without formal evaluation tools and often with little actual patient–student interaction. In the last 10 years, there has been a shift to more comprehensive evaluation. For resident physicians, this shift is illustrated by the Accreditation Council for Graduate Medical Education (ACGME) Outcomes Project.¹ This project was created to identify resident competencies, implement more objective methods to measure performance, and use outcome data to improve education. Although there are certainly differences between the goals of resident and student education, many of the evaluation methods overlap.

The evaluation should focus on objectives defined not only for a particular rotation but also by the medical school. These objectives generally include patient care issues such as the ability to take a history and perform a physical, the ability to develop a treatment plan, familiarity with procedures, medical knowledge, practice-based learning, communications skills, professionalism, and system-based practice. A further discussion of the objectives for medical students can be found elsewhere in this text or in publications such as the “Task Force on National Fourth Year Medical Student Emergency Medicine Curriculum Guide.”² The following sections discuss several suggested evaluation tools.

Global Evaluation Form

The global evaluation form is one of the more commonly used assessments tools (See Box 10.1). It is simply the general assessment by faculty or residents based on their overall perception

Box 10.1. Sample Content Areas for Global Evaluation Form³

General considerations: Work ethic, professionalism, ethics

Communication skills: Includes patients, staff, consultants

Recordkeeping: General charting

Triage, acute assessment, and emergent intervention: Recognizes emergencies and understands key critical interventions

Diagnostic evaluation: Appropriate physical skills and understanding of appropriate application and interpretation of diagnostic tests

Therapeutic intervention: Understands appropriate therapy, can perform procedures at level of specific training

Development of differential diagnosis

Appropriate consultation and disposition

Educational participation

of student performance. Such a form provides an accessible and standard format that can easily be completed at any time. Frequently, an institution will use a standardized form for all clinical rotations. The form allows the evaluator to formulate a global opinion of the student and provide meaningful praise or criticism. Yet, the global form suffers from one of the greatest limitations of evaluation—bias. This bias is sometimes referred to as the “halo and millstone” phenomenon, in which the well-liked student can do no wrong and the disliked student can do no good.⁴ This phenomenon may leave the student with unconstructive praise or criticism. In addition, students frequently have short and intermittent contact with the evaluator, making global assessment difficult. Studies have shown several possible techniques for maximizing the use from such a form. A group from Minnesota found that a Web-based system was able to generate compliance between 81% and 92%.⁵ Forms should be explicit as well as standardized to prevent inherent grade inflation.⁶ Additional methods such as providing frequent reminders, preparing evaluations at the end of shifts, and attaching digital photos of students can increase the compliance of evaluators.

Chart-Simulated Recall

Chart-simulated recall is a commonly used education and assessment format, much like an oral board case. The oral exam typically involves a question-and-answer format in which the examiner presents a limited amount of information, and the examinee is given the opportunity to perform a history, perform a virtual physical, order tests, and initiate treatment. This format allows the educator to evaluate student cognition, thought

The Structured Direct Observation Assessment Tool (SDOT) is a clinical encounter in which a member of the medical education team, typically an faculty member with experience supervising students, observes the student in the clinical setting.

process, fund of knowledge, and decision making and provides a unique learning opportunity. Hayes et al. published an excellent standardized evaluation created by Michigan State's Emergency Residency.⁷

Structured Direct Observation Experience

The Structured Direct Observation Assessment Tool (SDOT) is a clinical encounter in which a member of the medical education team, typically an faculty member with experience supervising students, observes the student in the clinical setting. This evaluator looks for specific discrete behaviors such as the ability to take a thorough history and perform a thorough physical examination. Assessment of the student-patient interaction is also observed in this setting. This observation can be combined with the student's presenting a summary and plan, thus providing further evaluation of the student's thought process and decision-making skills. The SDOT has several unique advantages: In the clinical setting, it parallels actual clinical experience with all of the tools and distractions of a real clinical setting. In addition, this format can provide specific feedback on performance, suggest areas of improvement, and provide a unique setting for bedside teaching.

Although the SDOT can provide useful and relevant feedback, it is not without limitations. In the clinical setting, the types of available cases may be variable, and some patients may not be amenable to participating as a subject of an SDOT. There is also a significant time involvement by clinical educators, and some programs have actually instituted an "academic attending" type shift with protected time that incorporates SDOT as well as other educational activities.^{8,9}

The SDOT has been considered to be one of the strongest evaluations of residency competence by a consensus group within the Council of Emergency Medicine Residency Directors.¹⁰ The Council of Emergency Medicine Residency Directors developed and validated a standardized form for resident evaluation with high intraobserver reliability. This form is available at <http://www.cordtests.org/SDOT.htm> and can be easily modified for students.¹¹ A typical session can be enhanced through the use of checklist forms for various points of the history, exam, counseling, and interaction with the patient.

Standardized Patient Assessment

The use of the standardized patient was first introduced in the 1960s as a way to provide a controlled situation for the evaluation of students and residents.¹² Standardized patients are typically trained laypersons, although they may also be nurses, patients, other medical students, residents, or even attending physicians.

The training involves prepping the standardized patient to be able to give a consistent history and cohesive complaints, serve as an exam subject, and then evaluate the examinee. The cases should relate to complaints commonly seen in the emergency department such as dyspnea, chest pain, headache, abdominal pain, or trauma. The encounter is typically 10 to 15 min long. In this time, the student should obtain a focused history and inform the standardized patient of a basic plan. The student is then given several minutes to write a note, put it all together, and formulate a plan.

A well-trained standardized patient may serve as the evaluator by assessing which key parts of the history and physical examination the student obtained as well as the quality of interaction. An independent observer may also be present, evaluating through direct observation or by viewing video. The evaluation is not limited to the history, physical, and patient interaction but may also include charting and medical decision making. There are several different methods for assessing a student's performance on a standardized patient exam. The method may depend on whether the evaluator is a standardized patient or a faculty member.¹³

The standardized patient assessment can provide reliable data on performance if there is rigorous case construction, assessment instruments, and standardized patient training. However, using standardized patients for assessment is often expensive and involves many resources, including (1) finding, training, and financing the standardized patient; (2) the need for an appropriate location for such an exam; and (3) the amount of time needed to administrate and supervise the standardized patient. Some programs have managed these prohibitive costs by having standardized patients shared among different programs of the same medical center.

Objective Structured Clinical Examination

The objective structured clinical examination (OSCE) is an exam that may use multiple evaluation modules at several exam stations. These stations may include an SDOT type of experience with standardized or real patients; interpretation of labs, electrocardiograms, or radiographs; procedure skills with mannequins; or even simulation. The student spends 10 to 20 min at each station and then may spend further time writing a note reflecting on each station. The evaluator uses a standardized checklist and may be observing directly, reviewing a video, or interacting during the student performance. The key issues tend to focus on diagnosis, management, test interpretation, decision making, practice-based learning, and communication skills. This format is already in use as part of the US medical licensing exam and is used by 75% of

A well-trained standardized patient may serve as the evaluator by assessing which key parts of the history and physical examination the student obtained as well as the quality of interaction.

US medical schools.^{14,15} OSCEs specific to the student in emergency medicine have been developed and published.¹⁶ Similar to other types of evaluation, the OSCE may itself be a useful tool for teaching and giving feedback. Brazeau and colleagues used the format as a time to discuss the basic clinical skills on a family medicine rotation with a positive response by students.¹⁷

The main drawbacks of the OSCE are the time needed from students as well as evaluators, the preparation of multiple stations, and the use of standardized patients; it is overall resource intensive. The high cost of standardized patients could be somewhat limited by including the use of mannequins, simulation, and other media. The interrater reliability of such an exam is debated, and OSCE scores for some programs have been found to poorly correlate with licensing exam scores or evaluations by program directors.¹⁸ It is useful for overall assessment in a pass/fail format, but caution should be used in attempting to compile scores to compare students.

Simulation

Medical simulation is a growing field in which health care providers and students can learn, practice, and be assessed for medical skills and procedures. The encounters presented in simulation tend to be high-acuity situations, such as an unstable overdose, trauma, or unstable arrhythmias. Simulation is often similar to an extended oral exam with a directly observed experience and has the potential to incorporate more complex cases that expand the students' scope of practice. The student may be expected to ask questions as they would in a history, examine the "patient," and develop a plan while managing the case. Simulation can also be used for procedures such as central lines, lumbar punctures, intubations, and chest tubes. Although much of the literature focuses on high-fidelity models in which a mannequin may generate a pulse, breath, and respond to "medications," low-fidelity mannequins may be used for procedures and fairly sophisticated simulation software can be run on any computer.

High-fidelity simulators are quite versatile and may allow assessment of clinical skills related to history, exam, and procedural skills, as well as patient management. These simulators tend to be expensive and require not only a large amount of equipment but also a faculty member to lead the case and a separate individual familiar with running the equipment. Programs that have incorporated such simulation tend to have a simulation center associated with the medical center that can be shared with other departments and programs. Low-fidelity simulations such as computer simulation have been available for more than 20 years and have been part of the US Medical Li-

censing Examination Step 3 since 1999.¹⁹ In computer simulation, the history and physical may be presented, or students may choose which key parts to ask. They then must choose what test and interventions are needed and make an ultimate diagnosis and disposition. They may need to reassess vital signs and the patient's condition as the case progresses. Many of these computer programs can generate a scored report of the student's performance. Procedure-based simulation may involve the observation of a performance with a high-fidelity machine, animal lab, simple mannequin, or a simple prop.

Evaluation of students using simulation often uses a rubric in which different actions (critical actions) are weighed with more emphasis. Critical actions may include assessing the airway, requesting finger stick glucose on the unresponsive patient, or placing a cervical collar. Some authors have found interrater reliability of up to 0.92 for well-constructed rubrics and exams.²⁰ To improve validity, multiple evaluators can be used, often by grading a video recording.²¹ However there is a much higher variability of student performance among different scenarios, so it is best to evaluate individuals among multiple simulated encounters.²² The Society for Simulation in Healthcare has developed several publications to guide educators through the process of developing simulation cases.²³

360° Assessment

The 360° assessment is a composite evaluation of a student with input from the staff, including nurses, technicians, residents, and attending physicians, as well as the patients themselves. The strength of this method is that it captures many of the student's interactions when the typical evaluator is not present. Additional areas of performance such as interpersonal skills, teamwork, communication, and compassion are also subject to evaluation. The student is then provided multiple perspectives on performance and may receive insight that would otherwise not be available.

Although this method may be useful for residents who are evaluated over years, students are evaluated for a much shorter amount of time with many fewer interactions with patients, nurses, attendings, technicians, and families, who provide the insight for such an evaluation. Thus, a student may not be able to receive enough feedback from each group to provide a meaningful assessment. The reliability of such an assessment is also called to question, with a minimum of 5 to 10 nurses required for reliable assessment.²⁴ Students are unlikely to have enough interaction to generate this number of assessments. However, evaluation input can be obtained (on issues such as professionalism and communication skills) from those who come into contact with medical

students (e.g., emergency department staff, nurses). This type of information is often transmitted verbally to the clerkship director and may or may not be incorporated into the student's evaluation.

Conclusion

The clinical performance of students is an important part of the emergency clerkship. Although all of these methods offer the educator the ability to assess the clinical abilities and potential of students a few key points should be kept in mind:

- Using multiple types of evaluation (e.g., simulation, oral cases, SDOT) will provide the educator with more useful information than any single method alone.
- These methods all provide unique potential for useful feedback and teaching. A curriculum that incorporates teaching and detailed feedback into assessment will better serve the students.
- Standardized forms and checklists should be used whenever possible.
- Educators should frequently reassess their methods of evaluation and encourage student feedback.

References

1. Accreditation Council for Graduate Medical Education and American Board of Medical Specialties. Toolbox of Assessment Methods. Version 1.1. Chicago, Ill; 2000. Available at: www.acgme.org/outcome/assess/toolbox.pdf. Accessed November 4, 2009.
2. Manthey DE, Coates WC, Ander DS, et al.; Task Force on National Fourth Year Medical Student Emergency Medicine Curriculum Guide. Report of the Task Force on National Fourth Year Medical Student Emergency Medicine Curriculum Guide. *Ann Emerg Med.* 2006;47:e1–e7.
3. Reisdorff EJ, Hayes OW, Reynolds B, et al. General competencies are intrinsic to emergency medicine training: a multicenter study. *Acad Emerg Med.* 2003;10(10):1049–1053.
4. King RW, Schiavone F, Counselman FL, Panacek EA. Patient care competency in emergency medicine graduate medical education: results of a consensus group on patient care. *Acad Emerg Med.* 2002;9:1227–1235.
5. Rosenberg ME, Watson K, Paul J, Miller W, Harris I, Valdivia TD. Development and implementation of a web based evaluation system for an internal medicine residency program. *Acad Med.* 2001;76:92–95.

6. Weaver CS, Humbert AJ, Besinger BR, Graber JA, Brizendine EJ. A more explicit grading scale decreases grade inflation in a clinical clerkship. *Acad Emerg Med.* 2007;14:283–286.
7. Hayes OW, Reisdorff EJ, Walker GL, Carlson DJ, Reinoehl B. Using standardized oral examinations to evaluate general competencies. *Acad Emerg Med.* 2002;9:1334–1337.
8. Shayne P, Heilpern K, Ander D, et al.; Emory University Department of Emergency Medicine Education Committee. Protected clinical teaching time and a bedside clinical evaluation instrument in an emergency medicine training program. *Acad Emerg Med.* 2002;9:1342–1349.
9. Cydulka RK, Emerman CL, Jouriles NJ. Evaluation of resident performance and intensive bedside teaching during direct observation. *Acad Emerg Med.* 1996;3:345–351.
10. King RW, Schiavone F, Counselman FL, Panacek EA. Patient care competency in emergency medicine graduate medical education: results of a consensus group on patient care. *Acad Emerg Med.* 2002;9:1227–1235.
11. Shayne P, Gallahue F, Rinnert S, Anderson CL, Hern G, Katz E; CORD SDOT Study Group. Reliability of a core competency checklist assessment in the emergency department: the Standardized Direct Observation Assessment Tool. *Acad Emerg Med.* 2006;13:727–732.
12. Adamo G. Simulated and standardized patients in OSCEs: achievements and challenges 1992–2003. *Med Teach.* 2003;25:262–270.
13. Downing SM, Tekian A, Yudkowsky R. Procedures for establishing defensible absolute passing scores on performance examinations in health professions education. *Teach Learn Med.* 2006;18:50–57.
14. Baranksy, B; Etzel, SI. Educational programs in US medical schools, 2003–2004. *JAMA.* 2004;292:1025–1031.
15. Papadakis MA. The step 2 clinical-skills examination. *N Engl J Med.* 2004;350:1703–1705.
16. Johnson G, Reynard K. Assessment of an objective structured clinical examination (OSCE) for undergraduate students in accident and emergency medicine. *J Accid Emerg Med.* 1994;11:223–226.
17. Brazeau C, Boyd L, Crosson J. Changing an existing OSCE to a teaching tool: the making of a teaching OSCE. *Acad Med.* 2002;77:932.

18. Kahn MJ, Merrill WW, Anderson DS, Szerlip HM. Residency program director evaluations do not correlate with performance on a required 4th-year objective structured clinical examination. *Teach Learn Med.* 2001;13:9–12.
19. Dillon GF, Clyman SG, Clauser BE, Margolis MJ. The introduction of computer-based case simulations into the United States medical licensing examination. *Acad Med.* 2002; 77(suppl 10):S94–S96.
20. Murray D, Boulet J, Ziv A, Woodhouse J, Kras J, McAllister J. An acute care skills evaluation for graduating medical students: a pilot study using clinical simulation. *Med Educ.* 2002;36:833–841.
21. Murray D, Boulet J, Ziv A, Woodhouse J, Kras J, McAllister J. An acute care skills evaluation for graduating medical students: a pilot study using clinical simulation. *Med Educ.* 2002;36:833–841.
22. Gaba DM, Howard SK, Flanagan B, Smith BE, Fish KJ, Botney R. Assessment of clinical performance during simulated crises using both technical and behavioural ratings. *Anaesthesiology.* 1998;89:8–18.
23. Rosen MA, Salas E, Silvestri S, Wu TS, Lazzara EH. A measurement tool for simulation-based training in emergency medicine: the simulation module for assessment of resident targeted event responses (SMARTER) approach. *Simul Healthc.* 2008;3:170–179.
24. Rodgers KG, Manifold C. 360-degree feedback: possibilities for assessment of the ACGME core competencies for emergency medicine residents. *Acad Emerg Med.* 2002;9:1300–1304.

Competency-Based Assessment of Medical Students

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Summary Points

- Medical education has become competency based and outcomes driven. Curriculum and rotations need to be designed on the basis of educational objectives for the rotation.
- The Association of American Medical Colleges (AAMC) and Liaison Committee of Medical Education (LCME) do not subscribe to the Accreditation Council for Graduate Medical Education (ACGME) 6 core competencies, but they have identified 4 general learning objectives that should guide medical student education.
- The Society of Academic Emergency Medicine (SAEM) Undergraduate Education Committee and the Task Force on National Fourth Year Medical Student Emergency Medicine Curriculum Guide have developed a standardized curriculum with specific objectives that relate to the ACGME core competencies.
- Chief complaint and resuscitation competencies developed for residents can also be used to evaluate medical students' performance during the rotation.
- The core competencies can be used effectively to help determine measurable outcomes that can then guide a medical student's education experience.

BEFORE 1999, MEDICAL student and resident education was built on a structure- and process-based system¹ in which residents and students were exposed to specific content for a specific period of time. It was expected that a student or resident would learn enough about a particular discipline by being exposed to it for the set period of time. This type of system has inherent flaws in that the experience of any particular student varies, and it is difficult to compare 1 student's experience to that of another student. In 1999, this system was changed when the Accreditation Council for Graduate Medical Education (ACGME) and the American Board of Medical Specialties (ABMS) released the first version of what are now known as the core competencies (Box 11.1).²

Box 11.1. Accreditation Council for Graduate Medical Education and American Board of Medical Specialties Core Competencies

- **Patient care:** Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.
- **Medical knowledge:** Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care.
- **Practice-based learning and improvement:** Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning.
- **Interpersonal and communication skills:** Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.
- **Professionalism:** Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles.
- **Systems-based learning:** Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.

Most medical schools have now developed or are working on developing competencies or a list of skills that all medical students should know regardless of their eventual specialty training.

The 6 core competencies were the first step in changing resident medical education from the structure- and process-based system to an outcome-driven process. The 6 core competencies proposed by the ACGME were then further expanded on by each disciplines' residency review committee to make them specific to the goals and outcomes of the discipline.

The evolution of competency-based resident education is very clear, but does this history also exist for medical student education? Even before the ACGME and ABMS released the 6 core competencies in 1999, the Association of American Medical Colleges (AAMC) published its Medical School Objectives Project (MSOP) report titled *Learning Objectives for Medical Student Education—Guidelines for Medical Schools* in January 1998.³ The learning objectives were established to guide the design, content, and conduct of the educational programs at the nation's medical schools. As Michael E. Whitcomb pointed out in an editorial,⁴ it is difficult to develop specific competencies for a medical student who does not have a final declared discipline. Should a student going into internal medicine have the same competencies as someone going into surgery? Therefore, the AAMC and the Liaison Committee of Medical Education (LCME) have not developed "competencies" but rather have developed learning objectives that should guide a medical student's educational curriculum. The general categories of learning objectives³ are as follows:

- Physicians must be altruistic.
- Physicians must be knowledgeable.
- Physicians must be skillful.
- Physicians must be dutiful.

It is difficult to develop specific competencies for a medical student who does not have a final declared discipline.

These learning objectives were purposefully broad in scope and general in nature because they were intended to provide only a frame of reference for guiding medical schools in developing their own objectives.³ Most medical schools have now developed or are working on developing competencies or a list of skills that all medical students should know regardless of their eventual specialty training. Although some medical schools do not have specific competencies like the ACGME or ABMS, all medical student education is similar in that it is outcomes based. Medical schools typically follow how their students perform on objective structured clinical examinations (OSCEs), National Board of Medical Examiners shelf exams, US Medical Licensing Examination exams, and placement into residency programs, to name a few. It was also the intention of the MSOP to encourage medical schools to develop appropriate assessment methods that would provide objective outcomes data, although the AAMC acknowledges that outcomes related to attitude and values are difficult to measure.

An important point to make on both the MSOP and the ACGME core competencies is that emphasis is being placed on the nontechnical side of medicine.⁵ Professionalism, altruism, duty, and interpersonal skills are just some of the terms being used to emphasize that it is just as important to be able to communicate and relate to your patients, families, and other health care workers as it is to diagnosis pneumonia or know how to treat it. Being a good technician or having a large fund of knowledge does not necessarily translate into being a good physician.

AAMC acknowledges that outcomes related to attitude and values are difficult to measure.

In the end, the LCME and the AAMC did not provide any specific competencies for medical student education, but where they left off, the Society of Academic Emergency Medicine (SAEM) Undergraduate Education Committee⁶ and now the Task Force on National Fourth Year Medical Student Emergency Medicine Curriculum,⁷ took over. The Task Force, consisting of members of the 6 major emergency medicine organizations (American Academy of Emergency Medicine, American College of Emergency Physicians, Association of Academic Chairs in Emergency Medicine, Council of Residency Directors, Emergency Medicine Residents' Association and SAEM), developed a standardized curriculum based on the ACGME six core competencies that can be tailored to individual emergency medicine rotations.

Being a good technician or having a large fund of knowledge does not necessarily translate into being a good physician.

Definitions

What is the difference between a competency and an outcome or for that matter a goal? Depending on which article is consulted, *competency* can be defined in different terms, but a good general definition is, “Competencies are ‘knowledge, skills, attitudes and personal qualities essential to the practice of medicine.’”^{8(p250)} A *goal* can be defined as “very general and global statements which are supposed to serve as an overall frame of reference.”^{8(p250)} The difference between a goal and a competency is that a competency focuses on the end-product of the instructional process rather than on the instructional process itself. Competencies should be used to set performance standards based on a desired goal or outcome.

Implementation

Emergency medicine clerkship directors should start with the curriculum guide established by the Task Force on National Fourth Year Medical Student Emergency Medicine Curriculum Guide.⁷ Using this as a foundation, the clerkship director should consult with the school’s office of student affairs and the school’s curriculum committee to determine what educational goals and objectives should and could be met on the rotation. Other experts in the field, including Clerkship Directors of Emergency Medicine (CDEM; www.saem.org/CDEM), can be consulted for their expert opinions. For emergency medicine rotations, the goals and objectives might be entirely different, depending on whether it is a required rotation or an elective rotation, the number of students on the rotation, and the volume of patients seen in the emergency department. Once clear goals and outcomes have been determined, the next step will be to develop competencies and a curriculum. Carraccio et al. listed the four steps of curricular design¹:

1. Competency or objective identification;
2. Determination of competency components and performance levels;
3. Competency evaluation; and
4. Overall assessment of the process.

The first step in the process is to define the competencies or objectives. Box 11.2 provides a list of 12 criteria that should be used when defining a competency. The first 7 were proposed by Harden et al.,⁹ and the last 5 were proposed by Albanse et al.⁸

The AAMC’s MSOP³ and the “Emergency Medicine Curriculum Guide”⁷ mentioned the following skills that an emergency medicine rotation could address:

Box 11.2. Defining Competencies or Objectives

A competency or objective should—

- Reflect the vision and mission of the institution as perceived by the various stakeholders.
 - Be clear and unambiguous.
 - Be specific and address defined areas of competence.
 - Be manageable in terms of the number of outcomes.
 - Be defined at an appropriate level of generality.
 - Assist with development of “enabling” outcomes.
 - Indicate the relationship between different outcomes.
 - Focus on the performance of the end-product or goal-state of instruction.
 - Reflect expectations that are an application of what is learned in the immediate instructional program.
 - Be expressible in terms of measurable behavior.
 - Use a standard for judging competence that is not dependent on the performance of other learners.
 - Inform learners, as well as other stakeholders, about what is expected of them.
- The ability to perform routine technical procedures, including, at a minimum, venipuncture, inserting an intravenous (IV) catheter, placing a nasogastric tube, inserting a foley catheter, closing a wound, applying a splint, and interpreting cardiac monitoring and electrocardiography.
 - The ability to interpret the results of commonly used diagnostic procedures.
 - The ability to recognize patients with immediately life-threatening cardiac, pulmonary, or neurological conditions, regardless of etiology, and the ability to institute appropriate initial therapy.
 - The ability to recognize and outline an initial course of management for patients with serious conditions requiring critical care.
 - The ability to communicate effectively, both orally and in writing, with patients, patients’ families, colleagues, and others with whom physicians must exchange information while carrying out their responsibilities.

The “Emergency Medicine Curriculum Guide”⁷ also provided a list of course objectives that can be related to the ACGME 6 core competencies. Some of the examples the Task Force provides are shown in Table 11.1.

A curriculum might then have the student spend time with the emergency medicine nurses getting experience starting peripheral IVs or have didactic classes in which they are taught how to interrupt rhythm strips. Ideally, the objectives would be measurable so the students might be tested on their ability to interpret rhythm strips with standardized rhythms that all students

are asked to read or they might need to obtain 5 IV starts during the rotation. Once measurable objectives are in place, it will be easier to develop an appropriate curriculum and have a good barometer on which to grade students. Every site might have a different curriculum or competencies, depending on the type of patients seen, number of procedures available, or the ability to have simulation sessions or procedure labs.

Although the educational objectives of medical students will be different than emergency medicine residents, there is significant overlap. Therefore, the competency development that has occurred in residency programs could also be used in the evaluation and education of medical students. The emergency medicine residency review committee has required the development of chief complaint, resuscitation, and procedure competencies that can also be used with medical students (See examples in Appendix 11.1). The competencies could be tailored to meet specific educational goals that the program establishes for its students. At a minimum, the competencies could provide a standardized way to provide an objective assessment of the student.

Evaluation Methods

Numerous methods have been developed to evaluate medical students and residents, and most sites will use a combination of methods to fully assess the student.

Shift Cards

Shift cards are completed by residents and attendings who supervise medical students on their shifts. These cards provide immediate feedback on the student's performance and when averaged over the rotation can help the clerkship director identify continued problems, knowledge deficits, professionalism issues, and procedural skills. They also should show whether the student has improved during the rotation. The pitfalls of shift cards is that a lot of data can be generated on a student. A large time commitment is required to collate the data, and, depending on the faculty commitment, a portion of the cards may go uncompleted or be completed haphazardly. Computerized versions of the shift cards have been created that can track completion rates, compile the data, and provide comparisons to other students on the same rotation block, the current year, or with prior years. The computerized systems can also help track faculty evaluation trends to see who are the hard graders and easy graders.

Objective Structured Clinical Examination

The OSCE can be used to evaluate a student's performance in completing a procedure, taking a history, or completing a physi-

Table 11.1. Course Objectives That Can Be Related to the ACGME 6 Core Competencies

Core Competency	Course Objective
1. Patient care	<ul style="list-style-type: none"> Obtain an accurate focused history and physical exam.
2. Medical knowledge	<ul style="list-style-type: none"> Develop the skills to evaluate an undifferentiated patient.
3. Practice-based learning	<ul style="list-style-type: none"> Effectively use available information technology to solve patient care problems.
4. Interpersonal and communication skills	<ul style="list-style-type: none"> Effectively communicate with patients and families. Present cases in a complete, concise, and orderly pattern.
5. Professionalism	<ul style="list-style-type: none"> Be conscientious, on time, and responsible.
6. System-based practice	<ul style="list-style-type: none"> Make an appropriate referral from the emergency department.

cal exam. An OSCE can also be used to assess how a student deals with difficult patients or reporting bad news to family and patients. OSCEs can be very resource intensive in that they are typically done with simulated patients (actors) who require training. However, OSCEs do allow a more standardized way to evaluate a student and make comparisons to other students. An OSCE can also be performed to simulate complex procedures (e.g., central line), which limits harm to patients and provides a controlled situation to evaluate the student.

Written Tests

A written exam provides a standardized way to assess the student's medical knowledge. Other disciplines—neurology, family medicine, medicine, obstetrics and gynecology, psychiatry, pediatrics, and surgery—have the benefit of the National Board of Medical Examiners standardized “shelf” exams. These exams are not available for emergency medicine currently. Most emergency medicine rotations develop their own examinations. The problem with homegrown examinations is that the questions tend to not be changed often, so they can be passed on from student to student, compromising the validity of the exam. The Council of Residency Directors in Emergency Medicine has online testing resources and a question-and-answer bank, designed primarily for emergency medicine residents, (www.cordtests.org). These could be tailored for medical students.

Cadaver and Procedure Labs

Procedure labs can provide an excellent arena to educate the student on procedures (e.g., central line placement, intubation,

splinting techniques, suture techniques, ultrasound) and can be used to assess a student's knowledge of the risk, complications, and benefits of the select procedure. These labs, however, are resource intensive, typically requiring several instructors, supplies, and either cadavers or simulators. The cost or ability to acquire the resources can be prohibitive. Overall, procedure labs are well received by medical students and provide a safe environment to teach and test.

Simulation Lab

A simulation lab with or without a high-fidelity simulator is an excellent resource to assess a student's knowledge of the evaluation and management of patients and is often used to assess advanced cardiac life support knowledge. Simulation labs provide a safe environment for students to be tested on their ability to assess critically ill patients. These labs are limited because of their space requirements, the high cost of simulators, and the need to have personnel trained on the operation of the simulators. The simulation lab, however, is an area with a lot of interest, and there are resources on line at the CORD Sharepoint site (<http://cord.sharepointsite.net>; requires membership of CORD and a password to access this resource) and within the newly formed SAEM Simulation Academy.

Roadblocks and Hurdles

One of the biggest challenges with outcomes-based education is ensuring that all of the learners are able to meet the objectives and, ideally, are capable in the competencies established. Declaring that a student is competent in a procedure may be extremely difficult unless the procedures are relatively common and easy to learn, and there is ample opportunity for all students to get enough experience. Establishing a peripheral IV or placing a foley catheter are 2 tasks that most students could probably become competent in during a 4-week rotation, but it is extremely unlikely that this would occur with central line placement or lumbar punctures. Therefore, it is essential to establish competencies that are obtainable over the course of a rotation.

Additional hurdles that can be difficult to overcome are having adequate staff and resources to teach the selected skill. A cadaver or simulation lab can be an excellent place to learn how to place central lines, place chest tubes, or perform thoracotomies, but these labs can be expensive and resource intensive. It is also unlikely that students will become competent in these procedures, but they can develop a better understanding of the procedures, including their indications and potential complications.

Outcomes-based education can be very time intensive for the educators. A single chief complaint competency could take several minutes to complete, and this time would be drastically increased if the educator observed the entire patient encounter with the medical student. This situation is unlikely to occur in a fast-paced emergency department unless the program is able to commit to having a dedicated educator for medical students who could observe and provide feedback on patient encounters.

Educating faculty members on the core competencies, the expectations of the medical student rotation, and the evaluation process can be another significant hurdle to overcome. This hurdle can be addressed in the arena of faculty development where faculty can be educated on the art of providing feedback and how the rotation has been set up to evaluate the selected competencies. It can also be a challenge for faculty members to complete student evaluations in a timely manner. Finally, the subjective nature used to evaluate the areas of professionalism, motivation, and commitment to the rotation can vary. A certain student might be evaluated as enthusiastic by 1 attending, and another might find the student annoying. Personality conflicts and self-perceived expectations can shape the opinion of a faculty member. All of this will need to be considered when the clerkship director writes the final summative comments and grade.

Conclusion

Although medical student education is not governed by the same core competencies as resident education, all medical education should now be outcomes based. The days of having a student or resident spend a set amount of time on a particular rotation in an attempt to learn all that is important are over. The education of our learners needs to be based on measurable outcomes, and have a curriculum that is specifically designed to ensure success in reaching that outcome. The Task Force on National Fourth Year Medical Student Emergency Medicine Curriculum Guide helps bridge the gaps between the AAMC's MSOP and a competency-based curriculum for medical students rotating through the emergency department. Having clear goals and objectives has the additional benefit of identifying circumstances when there is a failure to reach predetermined outcomes, which makes establishing a remediation program easier.

References

1. Carraccio C, Wolfsthal SD, Englander R, Ferentz K, Martin C. Shifting paradigms: from Flexner to competencies. *Acad Med.* 2002;77:361–367.

The education of our learners needs to be based on measurable outcomes, and have a curriculum that is specifically designed to ensure success in reaching that outcome.

2. ACGME. Common program requirements: general competencies. February 13, 2007. Available at: www.acgme.org/outcome/comp/GeneralCompetenciesStandards21307.pdf. Accessed January 3, 2009.
3. Association of American Medical Colleges. *Learning Objectives for Medical Student Education—Guidelines for Medical Schools*. Washington, DC: Association of American Medical Colleges; 1998. Available at: https://services.aamc.org/publications/showfile.cfm?file=version87.pdf&prd_id=198&prv_id=239&pdf_id=87. Accessed January 3, 2009.
4. Whitcomb ME. More on competency-based education. *Acad Med*. 2004;79:493–494.
5. Larkin GL, McKay MP, Angelos P. Six core competencies and seven deadly sins: a virtues-based approach to the new guidelines for graduate medical education. *Surgery*. 2005;138:490–497.
6. DeBehnke DJ, Restifo KM, Mahoney JF, Coates WC. Undergraduate curriculum. SAEM Undergraduate Education Committee, Society for Academic Emergency Medicine. *Acad Emerg Med*. 1998;5:1110–1113.
7. Manthey DE, Coates WC, Ander DS, et al. Report of the Task Force on National Fourth Year Medical Student Emergency Medicine Curriculum Guide. *Ann Emerg Med*. 2006;47:e1–e7.
8. Albanese MA, Mejicano G, Mullan P, Kokotailo P, Gruppen L. Defining characteristics of educational competencies. *Med Educ*. 2008;42:248–255.
9. Harden RM, Crosby JR, Davis MH, Friedman M. AMEE Guide No. 14: Outcome-based education: part 5—from competency to meta-competency: a model for the specification of learning outcomes. *Med Teach*. 1999;21:546–552.

Appendix 11.1. Example Forms Used to Measure the Competency of Medical Students in Assessing Chief Complaint, Resuscitation, and Procedures

Emergency Medicine Direct Observational Assessment Tool—Wound Repair

This assessment tool is designed to obtain objective data through observation of student during actual patient procedures. Each item should be judged as follows:

Needs Improvement (**NI**), Meets Expectations (**ME**), Above Expected (**AE**), or Not Assessed (**NA**).

Student Name: _____ Date: _____
 Evaluated by: _____ Time spent (min): _____
 Patient complaint(s): _____
 Site: _____
 Type (circle): Simple Wound Closure Layered Wound Closure Complicated Wound Closure (Wound Margin Revision)

Before Procedure	NI	ME	AE	NA
1. Obtains informed consent (Formal written consent is not required. Verbal consent is permissible)				
2. Evaluates wound for presence of foreign body or fracture				
3. Evaluates wound for potential nerve, tendon, vessel, or joint involvement				
4. Evaluates tetanus status				
5. Assembles correct equipment				
During Procedure				
6. Observes universal precautions				
7. Ensures an appropriate, well-lit setting				
8. Anesthetizes wound appropriately				
9. Preps and drapes wound appropriately				
10. Irrigates wound as necessary				
11. Debrides tissue appropriately, if applicable				
12. Places sutures appropriately; understands indications for simple interrupted, vertical mattress, horizontal mattress, subreticular, and subcutaneous sutures				
13. Maintains aseptic environment throughout procedure				
After Procedure				
14. Appropriately discards sharp objects				
15. Dresses wound appropriately				
16. Prescribes appropriate antibiotics if indicated				
17. Gives patient appropriate discharge instructions				

Emergency Medicine Direct Observational Assessment Tool—Abdominal Pain

This assessment tool is designed to obtain objective data through observation of residents during actual ED patient encounters. Each item should be judged as follows:

Needs Improvement (NI), Meets Expectations (ME), Above Expected (AE), or Not Assessed (NA).

Student Name: _____ Date: _____
 Evaluated by: _____ Time spent (min): _____
 Patient complaint(s): _____

	NI	ME	AE	NA	Category
DATA GATHERING					
1. Respectful of patient's privacy and confidentiality, appears professional and communicates efficiently and respectfully					ICS, PC, PR
2. Initiates appropriate screening interventions based on chief complaint without delay (ECG, X-rays, computed tomography [CT] scan, ultrasound [US], IV, oxygen)					PC, MK
3. Performs complaint-oriented physical exam focusing on possible causes of abdominal pain					PC
4. Efficiently gathers essential and accurate information [i.e., patient, family, emergency medical services, private medical doctor (PMD)] with eye toward ruling out life threats					PC, SBP
5. Make use of technology when appropriate (old X-rays, old ultrasounds, old records)					SBP
SYNTHESIS/DDX					
6. Can explain pathophysiologic basis of "abdominal pain" etiology (cardiovascular [abdominal aortic aneurysm (AAA)], pulmonary [pneumonia], gastrointestinal, musculoskeletal)					MK
7. Presents the case in a structured manner taking into account the worst case scenario based on patient's complexity					MK, PC
8. Provides appropriate differential diagnosis, treatment plan, and disposition based on patient's likelihood of disease (risk stratification)					MK, PC
9. Understands benefits, risks, and indications for therapy (ultrasound, CT scan, narcotics, nonsteroidal anti-inflammatory drugs, paracentesis)					MK
MANAGEMENT					
10. Appropriately sequences critical actions in patient care (labs and X-rays, IV, oxygen, medications, surgery consult, operating room activation)					MK
11. Competently performs procedures, demonstrating knowledge of anatomy and observant of inherent risks (central line, paracentesis)					MK, PC
12. Communicates clearly, concisely, and professionally with colleagues and staff about the acuity of disease and the need for timely intervention.					ICS, PR
13. Anticipates, negotiates, and effectively resolves conflicts to expedite appropriate intervention or risk stratification (CT, magnetic resonance imaging [MRI], operating room)					ICS, SBP, PR
14. Discusses and updates care plan with the patient or family					PR, PC
15. Charting is timely, legible, and succinct, and reflects emergency department course and decision making as it pertains to abdominal pain					PC, PR
16. Prioritizes care and is cognizant of clinical protocols for managing potential AAA or aortic dissection					PBL, SBP
17. Considers and rules out life-threatening causes of abdominal pain early in the course of emergency department evaluation and treatment					PC, MK, PBL
18. Reevaluates and adjusts evaluation and treatment strategies for abdominal pain as clinical information becomes available					PC, PBL

19. Controls distractions and other priorities while maintaining focus on patient's care (multitasking, prioritizing intervention/treatment)						PC, SBP
20. Makes informed diagnostic and treatment decisions using an evidence-based approach when possible (scientific evidence)						PC, PBL
21. Considers nonclinical factors when determining timing of need additional testing.						PC, SBP
22. Documents reassessment and response of abdominal pain to therapeutic interventions						PC
DISPOSITION						
23. Selects appropriate disposition—emergency department observation unit, in-patient, or intensive care unit admission—based on sound clinical principles						SBP
24. Discharge or admission plan discussed with patient in a compassionate, professional manner so patient is well informed						PC, ICS, PR
25. Carries out discharge/admission/transfer plan, including notification of accepting doctor or PMD						PC, SBP
26. Arranges clinical follow-up with an understanding of outpatient resources and the patient's situation (US, MRI, primary care provider assignment)						SBP

Note. MK = Medical Knowledge, PC = Patient Care, PR = Professionalism, ICS = Interpersonal and Communication Skills, SBP = System Based Practice, PBL = Practice-Based Learning

How to Give Effective Feedback to Medical Students

Esther K. Choo

Summary Points

- Feedback must be given objectively and in an environment in which learners feel safe and respected.
- To be effective, feedback should
 - Immediately follow observed actions or behaviors;
 - Involve the learner and encourage self-reflection;
 - Provide specific, limited information on performance;
 - Include both positive and constructive remarks; and
 - Include a plan for improving performance.
- Content should be geared to the goals of the clerkship.
- Recommended techniques for incorporating feedback into a shift include the feedback sandwich, the Pendleton method, and the reflective feedback conversation.
- Faculty development activities should include training to develop and maintain feedback skills.
- Learners can assist in making sure that effective feedback occurs by actively seeking it from educators.

IN HIS SEMINAL ARTICLE ON feedback in medical education, Jack Ende described feedback as “an informed, nonevaluative objective appraisal of performance intended to improve performance.”^{1(p779)} Feedback is not the same as evaluation. The evaluation process is multifaceted, involving a summation of feedback over time from multiple sources, end-of-rotation grades, observation of longitudinal progress, and, in some cases, shelf exams.² *Evaluation* is a step back, a “big picture” view of the learner. *Feedback* is a part of the evaluation process, but it has a distinct role. It is a step forward, a close-up, detailed picture of a learner’s performance. It is meant to be given frequently and immediately so that it can have a day-to-day, immediate impact on learners.

Experts—including those in the medical professions—gain skill by performing observed tasks, receiving immediate and detailed feedback on them, and repeating the tasks, focused on applying the lessons imparted by the feedback.

Suppose you watch a learner perform an exam on a patient who you suspect has pneumonia. Afterward, you might tell her, “I noticed you listened to the lungs only anteriorly when you examined the patient. You should listen to all lung fields each time you examine a new patient, especially one with cardiopulmonary symptoms.” Because the exam just happened, it would not be difficult for the learner to recall that, indeed, she did not listen to all lung fields. The 2 of you could discuss why it was important to do so, which would lead naturally to more teaching. She could put this new practice into place immediately, and you could observe and ensure its accuracy before the end of the shift. This result would stem from a detailed observation you might not think to include in a written evaluation or might translate into a low score in the physical examination category of the learner’s evaluation that, without commentary, might mystify rather than enlighten her.

How important is this process? Psychologist K. Anders Ericsson, an eminent scholar on the acquisition of skill in everything from chess to health care, described feedback as the central step in learning.³ In Ericsson’s paradigm, experts—including those in the medical professions—gain skill by performing observed tasks, receiving immediate and detailed feedback on them, and repeating the tasks, focused on applying the lessons imparted by the feedback. Ericsson observed that, “In the absence of adequate feedback, efficient learning is impossible and improvement only minimal even for highly motivated subjects.”^{4(p367)} In other words, feedback is not only helpful but essential to learning. An unexpected benefit of feedback is that it often leads to more than just feedback. When given well and often, feedback reinforces attending supervision, attention, and instruction. Although there may be little time for didactic teaching during a busy shift, being attuned to the need for feedback means the attending physician has the opportunity to take any task, small or large, and turn it into a teaching moment.

Feedback has been described as “one of the most pervasive and difficult problems in clinical education.”^{5(p623)} The emergency department, with its high volume and acuity and unpredictability, may appear an unlikely place to champion feedback delivery. However, many perceived challenges to feedback have more to do with attitudes and knowledge about feedback than actual limitations. Educators may worry about the length of time it can take to give meaningful feedback, but learners report that effective feedback can happen in an extremely short period of time, even less than 1 min.⁶ Likewise, the intimidation factor associated with feedback comes in part from the mistaken concept that it needs to be a summation of the learner’s overall performance

over time rather than a rapid response to a single observed behavior. The fear of demoralizing or alienating learners with negative feedback, even after a learner demonstrates obvious deficiencies or makes blatant errors, can also prevent feedback delivery. However, learners generally expect feedback as part of their experience, notice when it is missing, and request both positive and constructive feedback.⁷

In fact, the emergency department environment is rich in opportunities to deliver feedback. During an emergency department clerkship, learners carry out key clinical tasks rapidly and frequently over the course of a single shift. The 12 to 16 shifts performed in a typical rotation add up to a great number of opportunities for educators to provide feedback on learners' performance within a broad range of skill sets: history taking; oral presentations; data gathering; building a differential diagnosis; and performing procedures such as suture repair, intravenous line placement, arterial blood gases, and lumbar punctures. There is no better place than the emergency department to learn how to prioritize tasks and patients, focus on life-threatening conditions, negotiate time- and resource-effective solutions, redirect expectations of the patient and families to the possible, anticipate complications, and arrive at management plans in a timely fashion.⁸ With appropriate feedback (Box 12.1), learners have an opportunity to consolidate information learned in other rotations, to identify strengths and weaknesses across a range of core clinical skills, and to advance their abilities noticeably.

The emergency department environment is rich in opportunities to deliver feedback.

General Feedback Principles

Feedback Must Occur in a Safe Learning Environment

Learners will not be receptive to feedback unless they feel comfortable with what they are doing and respected by the educator. Learners who are overwhelmed with the size or acuity of their clinical load will have a hard time concentrating on anything except for the tasks at hand. It is the educator's responsibility to ensure that learners are working within the bounds of their training and ability so that learning can occur. When feedback is given, the conversation must be predicated on mutual respect and the common goal of improving clinical performance. Feedback

Box 12.1. General Feedback Principles

- Feedback must occur in a safe learning environment.
- Feedback must be objective.
- There is a time and place for feedback.

of a sensitive nature should occur outside the main patient care area, perhaps stepping into a quieter hallway or waiting until the end of the shift to walk outside of the emergency department altogether.

Feedback Must Be Objective

Feedback should refer to observed, remediable actions and behaviors and should be phrased as such; for example, “I noted you had trouble with the ABG,” rather than “You are completely incompetent at blood gases!”⁸ Educators may need to articulate that constructive feedback is not to be perceived as judgment on overall ability or compatibility with the field of emergency medicine. Avoid addressing “off-limit” topics such as an individual’s personality, character, motivations, or any other qualities that are subjective, irrelevant to clinical learning, and not likely to change. Educators should also avoid having feedback colored by anger or frustration. It may be wise to take a 5- or 10-min break after a highly charged code or trauma resuscitation before giving feedback so emotions do not dictate the tone and content of the feedback.

There Is a Time and Place for Feedback

Occasionally, feedback must take a back seat to other concerns. For example, an educator may rarely encounter a problem learner who has an extremely serious deficiency in 1 area (e.g., is deliberately insulting to patients) or concerning global deficiencies incompatible with the stage of training (e.g., a fourth-year learner who does not know how to complete a basic history and physical examination or has broad knowledge gaps). In these cases, even the best feedback will not be enough to address the situation. This type of learner must be brought to the attention of a clerkship director or dean who can gather observations from multiple educators and decide on an appropriate plan for remediation. Conversely, there are times when feedback may be judiciously withheld in favor of encouragement. After an extremely tough shift, after an emotionally difficult case, or when a learner has clearly worked hard to address identified deficiencies, withholding further constructive feedback in favor of encouraging words and praise on progress may be the most appropriate, constructive, and compassionate course of action.

Elements and Techniques of Effective Feedback

Many descriptors are given to the process of effective feedback. Spickard noted that the medical education literature advises educators to give feedback that is “relevant, understandable,

Box 12.2. Elements of Effective Feedback

- Immediate
- Interactive
- Specific (and limited)
- Both positive and constructive
- Followed by a plan

descriptive, verifiable, comparative, specific, focused on behaviors, nonjudgmental, ongoing, timely, limited but sufficient, reciprocal, unfinalized, and impactful with an action plan for improvement.”^{9(p142)} It is helpful to focus on a few outstanding qualities of effective feedback.

The elements of effective feedback (Box 12.2) are described in the following paragraphs:

Immediate

Feedback is most valuable when linked to just-observed actions, behaviors, or decisions. Giving feedback immediately allows educators to take advantage of a teaching moment that they may not recall by the end of the shift. It also allows learners to link comments with actions, to ask questions while the details of the event are still fresh in their minds, and to feel teaching is as much of a priority as patient care and emergency department flow and not just something relegated to rushed conversations between shifts. Key times for giving feedback are right after stepping out of a room from a supervised history and physical or procedure or at the end of a patient presentation. However, when this is not possible, feedback can occur at the end of the shift or even at a scheduled time after the shift.

Interactive

Making learners participate actively in their own feedback accomplishes several goals. Learners are able to define the areas in which they are seeking feedback and help make the feedback maximally relevant for their stage of learning. At the beginning of the rotation or of the shift, medical students can be asked, “What skills are you least comfortable with?” or “what are your goals for this rotation?” and then, accordingly, “I’d like to see you do X procedure (e.g., laceration repair or ABG) and have a chance to give you feedback on it,” or “I’d like to watch you examine a patient with chest pain and give you feedback on it.” Asking learners to reflect on their own performance can empower them

to identify their own strengths and weaknesses and create their own plans for improvement—a process that can continue long after the end of the shift and the rotation.

Specific (and Limited)

Learners frequently receive generic and uniformly positive comments such as “Good job!,” “A pleasure to work with,” “Prompt,” “A team player,” or “Keep doing what you’re doing.” Even the constructive comments given are usually of a generic nature, such as “Should read more.” Comments such as these are easy to give and often well meant, but they do nothing to meet the shared goal of helping a learner improve clinical performance. A reflexive “Good job!” at the end of a shift can be followed up with a statement about what *exactly* the learner did well, so he or she knows to repeat that behavior. Being specific also allows the learner to focus on certain aspects of his or her performance. As Barbara Richardson put it, “Do not attempt to create the quintessential emergency medicine learner in 1 session.”⁸ Targeted, specific feedback will give learners an anchor for improving without overwhelming or confusing them.

Both Positive and Constructive

Giving constructive comments is the most challenging part of feedback for many educators. Often, educators fear that learners will respond badly to “negative” feedback or that it will ruin a good learner–educator relationship. However, although learners do appreciate positive feedback—and want to hear exactly what they do well—they also appreciate constructive feedback and request it when it is missing.⁷ More to the point, constructive feedback is critical to learning. Educators who give only praise may feel good, and may be extremely popular as well, but they are missing a teaching opportunity.

Followed by a Plan

Feedback should go hand in hand with a plan for improvement. Most medical students are well versed in methods of adult learning and do not need to be told how to learn more about a topic or skill. However, discussing the specific plan provides psychological momentum for addressing the deficiency and emphasizes the importance and immediacy of the feedback. In many cases, the plan will involve simply repeating an action. For example, if the learner receives feedback on execution of a procedural skill or a physical exam, the plan may be to attempt to repeat the procedure or exam as soon as possible, correcting the mistake. For knowledge-based deficiencies, the plan may include performing a literature search or reading a chapter before the learner’s next clinical shift.

Box 12.3. Pendleton Model

1. The learner states what was good about his or her performance.
2. The educator states areas of agreement and elaborates on good performance.
3. The learner states what could have been improved.
4. The educator states areas of agreement and elaborates further on what could have been improved.

Specific Feedback Techniques

Several popular techniques help educators initiate the feedback conversation and, to some extent, mitigate the sting of constructive feedback. One is the classic “feedback sandwich,”⁵ in which educators start with a positive comment (e.g., “I think you did a great job communicating with a very challenging psychiatric patient”), follow with a constructive comment aimed at an area needing improvement (e.g., “However, getting corroborating history from the family early is important for any psychiatric patient and would have helped us treat and disposition this patient more efficiently”), and end on a positive note (“Overall, I think your differential and management plan for an acutely psychotic patient was thorough and appropriate”). The Pendleton model is an adaptation of the feedback sandwich that integrates the learner’s own assessment¹⁰: The learner states what was good about his or her performance; the educator states areas of agreement and elaborates on good performance; the learner states what could have been improved; and the educator states areas of agreement and elaborates further on what could have been improved (Box 12.3).

The sandwich and Pendleton techniques have the advantages of being easy to use and thorough, but they may feel somewhat stilted. A “reflective feedback conversation” feels more natural, encourages self-reflection, and still allows the educator to provide input and guidance.¹⁰ The educator can simply initiate the conversation by asking the learner, “Let’s review the procedure you just performed. Can you think of things that might have gone better?” The learner and educator can discuss any difficulties that arose, and then the educator can follow up with “Is there any way you could improve the procedure next time you need to perform it?” Discussion can continue until there is a shared sense of areas needing improvement and the plan for doing so. This type of feedback works toward the ultimate goal of assisting learners to develop a habit of providing their own critical analysis.

Content for Feedback

Feedback may, and should, address a broad spectrum of clinical performance areas, including medical knowledge, patient care,

Feedback should be aligned with the goals and objectives of the clerkship

practice-based learning, interpersonal and communication skills, and professionalism. Ideally, feedback should be aligned with the goals and objectives of the clerkship, emphasizing core skills such as history taking, physical exam, case presentations, differential diagnoses, ability to formulate a management plan, laboratory interpretation, basic procedural skills, teamwork, and communication with patients and family (Box 12.4). Again, although the potential topics for feedback are endless, a given feedback conversation should not attempt to be exhaustive, but should address 1 or 2 specific teaching points.

For learners to receive effective feedback consistently, the entire faculty must be prepared to deliver it.

Faculty Development

For learners to receive effective feedback consistently, the entire faculty must be prepared to deliver it. Feedback is not an intuitive or easy process, so faculty members need focused training that emphasizes the importance of feedback to trainees, defines core components of effective feedback, teaches techniques for giving feedback, and ideally, includes the opportunity to practice feedback. The goal is not to achieve uniformity. Rather, presenting a variety of effective methods in an interactive format allows educators an opportunity to experiment outside their comfort zone and add proven feedback methods to their own style. Feedback workshops may occur independently or in conjunction with other faculty development activities. Methods of instruction may include in-house didactic activities, small group sessions, workshops with role playing, or even online modules that enable more faculty members to comply with requirements. Web-based programs (such as www.emresidency.ucsf.edu/Resource/FeedbackMovieFinal.html or www.hopkinsmedicine.org/fac_development/video/flash/feedback.html) can perceptibly improve feedback administration¹¹ and allow more faculty members to be included. Because most of the principles and practices of feedback are similar across medical specialties, emergency departments may consider coordinating with other departments in the hospital, which may allow pooling of resources and access to more costly teaching programs, such as bringing in national experts to conduct interdisciplinary training sessions.

Career educators may be interested in more formal faculty development courses that include feedback coaching as part of the curriculum. Such programs include the Stanford Faculty Development Program, the American College of Emergency Physicians teaching fellowship, the Harvard Macy teaching program, or even a master's degree program in education. Instruction in advancing clinical teaching, including feedback delivery in the emergency department is also available at the Council of Residency Directors annual meeting.

Box 12.4. Examples of Feedback in a Range of Content Areas

Teamwork and Communication†

I know it was a frustrating night. There were a lot of patients to see, and it got pretty stressful for a while. How do you think that interaction went with the nurse taking care of the patient with you? I saw that you were upset about the patient going up to the floor without your knowing about it. One thing that helps to avoid that is if you touch base with the nurse a little bit more frequently during the shift about the plan and the anticipated next step in patient care. Once you open the lines of communication, they will be more likely to acknowledge that you are a critical part of the care team and keep you in the loop. It might help if you take a minute to go thank her for her help today and patch things up a bit.

Procedural Skills‡

Nice job getting that lumbar puncture. Is there anything you had concerns about or felt could have gone better? I noticed that after the first attempt, you repositioned the patient, and that really helped you get the procedure on the next attempt. What would you do next time to make it go more smoothly? One thing I try to do is spend that extra minute before starting to make sure the patient is optimally positioned, with the spine straight and the knee-to-chest position as tight as possible. Try making a conscious effort to position the patient well on your next LP.

History Taking‡

With Mrs. Smith, I thought you took a very detailed family history, which is very important to the work up of chest pain. However, I noticed you didn't take much time asking about the quality and character of the pain. How might that change your index of suspicion for acute coronary syndrome in this patient? Can you improve this aspect of your history taking with the next patient with chest pain that you see?

Physical Exam‡

Can you walk me through the techniques you use to prepare a female patient for a pelvic exam? There are a few things you can do to make the patient more comfortable and less embarrassed during the exam. The next time I perform a pelvic exam, why don't you come with me so I can demonstrate how I do it?

Differential Diagnosis‡

Your case presentation leads me to believe that migraine is the most likely diagnosis. However, you didn't mention the other diagnoses you must consider so as not to miss a grave condition. What might be a good source to expand your knowledge in this area?

Writing Orders‡

It is important to order medications clearly to avoid medical errors. The nursing staff expects certain conventions. Let's review your orders for Mr. Jones. The nurses are looking for drug, dose, route, and frequency. For standing orders, they like to know exactly when and how the drug should be given. How do you think you did? How might you do this next time?

Patient Care‡

You have seen 2 patients today with possible fractures. How do you think we did in making them comfortable while they waited for a diagnosis? Do you need a diagnosis before administering pain meds? What would be appropriate?

Professionalism

I wanted to give you some feedback about on your interaction with that consult. How did you feel like things went? I agree that the resident was somewhat antagonistic at first, and I am sorry that you were made to feel uncomfortable. However, I saw that you ignored the personal comments and steered the conversation back to patient care. You made the interaction as positive and constructive as possible.

Note. Feedback examples provided by personal communication with Lalena Yarris,[†] Oregon Health & Science University, and from the work of Barbara Richardson,[‡] Mount Sinai School of Medicine.⁸

Clerkship directors should introduce learners to the purpose and content of effective feedback and instruct them to expect feedback during each shift and to take an active role in “pulling” feedback from their educators when it is not given spontaneously.⁴

Strong support from emergency department leadership is needed to support these opportunities for feedback training, as well as to create a culture in which feedback is perpetuated. Because feedback skills (like clinical skills) cannot be mastered in a single session, concepts will need to be reviewed periodically over the course of the year.¹² Reverse feedback from learners about the feedback they are receiving may be presented in administrative meetings to give faculty a sense of how well they are performing, provide motivation to improve effort, and keep faculty members from overestimating the amount and quality of feedback they are giving to trainees.^{13,14} Emergency chairs may facilitate feedback further by articulating the expectation for feedback delivery by the entire faculty. Annual reviews can include a discussion about performance in feedback, and individuals who excel at feedback can be recognized to the entire faculty. Finally, extending faculty feedback activities to include senior residents and nurse leaders will create momentum for feedback delivery by disseminating knowledge about, and responsibility for, feedback to others in the department.

Integrating Feedback Into Clerkship Design

The learner’s responsibility in seeking feedback can be established during orientation to the clerkship. Clerkship directors should introduce learners to the purpose and content of effective feedback and instruct them to expect feedback during each shift and to take an active role in “pulling” feedback from their educators when it is not given spontaneously.⁴ Learners may be taught to recognize key moments for seeking feedback (e.g., after presenting a history and physical examination) and to get the most out of feedback by asking preceptors to elaborate on general comments, requesting both positive and constructive comments, and obtaining specific, detailed suggestions for improvement.¹⁶ Learners may be advised to seek feedback from multiple sources, including nurses and residents. Both learners and faculty may require reminders that feedback is to be focused on the goals of the clerkship and what those goals are. Clerkship directors may facilitate the feedback interaction by addressing 1 problem particular to the emergency department: the lack of longitudinal experience with any 1 educator. Arranging learners’ shifts so they have multiple shifts with the same educator will allow more of an opportunity to address specific deficiencies over time under that educator’s supervision.

A physical prompt, such as a feedback card, can be an additional day-to-day reminder of expectations (Figure 12.1). A feedback card may be a helpful resource to prompt attendings to review learners immediately after the shift. The card may be filled

Figure 12.1 Sample Medical Student Feedback Card

EM Student Clerkship End-Of-Shift Evaluation Card		
Date		<i>See back of card for specific expectations for core competencies.</i> Card must be completed by student and faculty together and discussed.
Student		
Attending		
Student Self-Evaluation		
What went well today?		
What can I improve?		
Faculty Evaluation		
Please discuss with the student your impression of the strengths of their performance <i>in the ED today</i> and areas for improvement. Do you agree with their self-evaluation?		
One specific learning issue or suggestion for improvement:		
Other comments:		

Student Signature: _____

Faculty Signature: _____

Note. Feedback card provided by Lalena Yarris, MD, Oregon Health & Science University, April, 2009.

out and turned in, so there is a record of that day’s evaluation. However, more importantly, the card can be used as a launching pad for further discussion. The back of the card (Figure 12.2) can be used as a reminder to educators about the target areas for feedback during the rotation.

Face-to-face feedback has the advantage of providing immediacy, allowing the learner to be an active participant in the teaching moment, and preventing the teaching moment from being lost or forgotten. However, other resources can supplement in-shift feedback, provide supplemental information, and serve as a backup system in case verbal feedback does not occur or in case educators wish to give feedback retrospectively. For ex-

Figure 12.2 Sample Medical Student Feedback Card, Reverse Side

Expectations for Performance	
Clinical Performance	Expectation
History and Physical Exam	History is comprehensive, accurate and focused on key problems. Identifies relevant problem areas. Considers all available information.
Presentation Skills	Complete, concise, and orderly. Clear delineation of primary problems, with accurate characterization and chronology of key events.
Procedural Skills	Demonstrates familiarity with common emergency department procedures. Demonstrates ability to perform procedures competently.
Fund of Knowledge	Strong fund of knowledge, particularly with respect to common emergency department presentations. Ability to apply knowledge to clinical situations.
Diagnostic Reasoning	Differential diagnosis is thorough and precise. Well reasoned selection and use of diagnostic studies.
Professionalism	Integrates well into the clinical team, conscientious in patient care responsibilities. Punctual. Completes patient-related tasks prior to departure.
Interpersonal and Communication Skills	Communicates effectively to patients, families, and healthcare providers. Demonstrates empathy and compassion. Chart documentation is thorough and accurate.
Self-Directed Learning	Actively seeks feedback and appropriately modifies practice. Demonstrates independent learning during shift.

Note. Feedback card provided by Lalena Yarris, MD, Oregon Health & Science University, April, 2009.

ample, educators at Vanderbilt School of Medicine found that an electronic system that captured learner clinical notes in an online portfolio and prompted educators to review the notes improved both the frequency and detail of feedback on write-ups.¹⁷ Alternatively, educators may simply opt to follow up with learners through e-mail.

Finally, exit evaluation forms completed by medical student rotators should include questions on the quality and quantity of feedback received so that this information can be relayed to the clerkship director and others responsible for improving the quality of clinical teaching in the emergency department.

Conclusion

For many medical students, the emergency department clerkship is a high point of their medical training—an opportunity to consolidate their knowledge and to learn how to behave in the acute setting. Many medical students will complete their emergency department rotation just before their internship and view it as the opportunity to make the transition to independent thought and action. Educators in the emergency department have a great responsibility for providing the feedback essential to this transition. For most educators, providing effective feedback is a challenge and requires training in feedback delivery and consistent,

conscious efforts to identify moments in each shift amenable to feedback conversations. Individual commitment must be complemented and bolstered by departmental efforts. Faculty development, learner training, and involvement of every member of the care team will help create a culture in which feedback is a routine part of every day (and night) in the emergency department.

Faculty development, learner training, and involvement of every member of the care team will help create a culture in which feedback is a routine part of every day (and night) in the emergency department.

References

1. Ende J. Feedback in clinical medical education. *JAMA*. 1983;250:777–781.
2. Quattlebaum TG, Sperry JB. A computerized system for evaluation of residents and residency experiences. *Am J Dis Child*. 1988;142:758–762.
3. Ericsson KA. Deliberate practice and acquisition of expert performance: a general overview. *Acad Emerg Med*. 2008;15:988–994.
4. Ericsson K, Krampe R, Tesch-Romer C. The role of deliberate practice in the acquisition of expert performance. *Psych Review*. 1999;100:363–406.
5. Furney SL, Orsini AN, Orsetti KE, et al. Teaching the one-minute preceptor. A randomized controlled trial. *J Gen Intern Med*. 2001;16:620–624.
6. Yarris L, Hern G, Linden J, et al. Attending and residency satisfaction with feedback in the emergency department. *Acad Emerg Med*. 2008;S1:S6–S63.
7. Kernan WN, Lee MY, Stone SL, et al. Effective teaching for preceptors of ambulatory care: a survey of medical students. *Am J Med*. 2000;108:499–502.
8. Richardson B. Feedback. In: Ander D, Coates W, Manthey DE, eds. *SAEM Medical Student Educators Handbook*. Lansing, Mich: Society for Academic Emergency Medicine; n.d. Available at: www.saem.org/saemdn/Home/Communities/MedicalStudents/MedicalStudentEducatorsHandbook/tabid/686/Default.aspx. Accessed November 10, 2009.
9. Spickard A, 3rd. Words hard to say and hard to hear: “May I give you some feedback?” *J Gen Intern Med*. 1998;13(2):142–143.
10. Cantillon P, Sargeant J. Giving feedback in clinical settings. *BMJ*. 2008;337:a1961.
11. Janicik R, Kalet A, Zabar S. Faculty development online: an observation and feedback module. *Acad Med*. 2002;77:460–461.

12. Henderson P, Ferguson-Smith AC, Johnson MH. Developing essential professional skills: a framework for teaching and learning about feedback. *BMC Med Educ.* 2005;5:11.
13. Sender Liberman A, Liberman M, Steinert Y, et al. Surgery residents and attending surgeons have different perceptions of feedback. *Med Teach.* 2005;27:470–472.
14. Sostok MA, Coberly L, Rouan G. Feedback process between faculty and students. *Acad Med.* 2002;77:267.
15. Bing-You R. Coaching medical students in receiving effective feedback. *Teach Learn Med.* 1998;10:228–231.
16. Hewson MG, Little ML. Giving feedback in medical education: verification of recommended techniques. *J Gen Intern Med.* 1998;13:111–116.
17. Spickard A, 3rd, Gigante J, Stein G, et al. Automatic capture of student notes to augment mentor feedback and student performance on patient write-ups. *J Gen Intern Med.* 2008;23:979–984.

SECTION TWO

*Teaching Relationship Between
Students and Faculty/Residents*

Faculty Involvement in Medical Student Education

Michael D. Smith

Summary Points

- Emergency medicine has significant increasing opportunities for preclinical and clinical student education.
- Successful medical student education in the emergency department requires chair or director investment and probably reimbursement considerations for academic contribution.

AS RECENTLY AS THE MID 1990s, very few medical schools required clerkships or dedicated training in emergency medicine.¹ Since then, the presence of emergency medicine in undergraduate medical student education has become more palpable, and happily, for medical school administrators, more palatable. Not only are we experiencing a large increase in the number of required fourth-year clerkships in emergency medicine,² we are also now seeing emergency medicine used as a way to introduce brand new clinical students to the “undifferentiated patient” in their third year. Similarly, emergency medicine faculty members are facilitating courses at the end of medical school as a form of “crash course” training to prepare for internships.

Emergency medicine faculty members are facilitating courses at the end of medical school as a form of “crash course” training to prepare for internships.

Our time as medical student educators is at hand. We are no longer the new specialty struggling for independence and recognition.

Emergency departments have some unique conveniences that medical school administrators might find attractive. Emergency departments are open 24 h a day, never close, and are staffed at all times with attending-level emergency physicians. Few other specialties can tout this logistical uniqueness. Aside from being experts in acute care medicine (with a hefty dose of primary care), emergency medicine physicians are developing niches and expertise in subspecialized areas such as emergency ultrasound, emergency department infectious disease and epidemiology, emergency cardiac care, and emergency pediatrics (Internal survey of MetroHealth Emergency Medicine Faculty on Medical Student Education, performed in 2007 by the author). A learner may not just undertake “an emergency medicine rotation” but may also participate in a month-long rotation in emergency ultrasound, toxicology, or pediatrics under the auspices of the emergency department.

Our time as medical student educators is at hand. We are no longer the new specialty struggling for independence and recognition. Emergency physicians are now becoming deans of medical schools and serving on curriculum committees. We are also taking a more active role in preclinical education.

This chapter describes the importance of faculty involvement in medical student education and how emergency medical educators might go about achieving such involvement. This chapter is written not as an “expert opinion” but rather as the trials and tribulations of a young faculty member starting a new clerkship through the emergency department. Like you, I have also endured the pains of trying to “show the light” to faculty members and rally the troops toward being involved in medical student education. I have also enjoyed receiving the various quasi hate e-mails regarding my prodding. I’ve tried to elicit better learner feedback than “Good learner; seems nice.” I’ve tried to show faculty members that medical student education can be a rewarding, fairly painless, and, most importantly, crucial endeavor.

How to Emphasize Teaching Medical Students to Your Emergency Department Faculty

Medical student education requires a significant investment of time, money, and resources. Getting faculty members involved can be difficult, despite the obvious altruistic reasons for medical student teaching, such as developing better doctors, paying back for excellent education received, and encouraging some medical students to specialize in emergency medicine. In fact, faculty members usually feel that medical students slow them down and make their shifts more difficult. A 2007 survey of MetroHealth/

Case Western Reserve University emergency medicine faculty almost unanimously agreed that medical students slowed down their performance and decreased billing for patient care.³ This perception is a significant barrier to a successful program.

Involvement has to be encouraged and, to some degree, demanded by the chair or division director. The chair will be the most adept at making sure that the medical student program has been developed appropriately and is carried out. He or she can allocate resources and monies to running the medical student program effectively. The chair is also usually in the best position to negotiate with the medical school administrators so that the relationship between the emergency department and the medical school is advantageous for both. This negotiation should include a formal way to evaluate medical student educators and recognize both their educational commitment and skills for promotion in the medical school (for associate and full professor).

The chair can select a few designees to oversee the medical student program. At our institution, MetroHealth Medical Center, there is a director, assistant director, and a handful of core faculty members with a specific interest in medical student education. These medical student leaders will need an opportunity to give and receive feedback regarding their involvement in the program.

Medical student educators need to track every shred of time spent both in formal and informal medical student education, including short episodes of mentoring in passing. Our medical school is now using “teaching portfolios,” which are seemingly more common among other medical schools. These portfolios depict the individual educational activities faculty members have been involved in, the time spent, and the quality of the educational endeavor (Appendix 13.1). These portfolios should be part of the yearly or semiannual general faculty performance review and should be stressed by the chair for those faculty interested in promotion, particularly along a clinical or educational track.

Some level of involvement in medical student teaching needs to be expected from an academic emergency medicine faculty member. The core group of faculty members can be responsible for organization and most of the didactic curriculum, but there needs to be an understanding that all academic faculty members in the emergency department need to staff and participate clinically in the education of medical students. This situation is analogous to the expectation that physicians in an academic emergency department will work with residents. This needs to be a stringent expectation of the chair, or the educational program will likely fall apart. Involvement in medical student education has to be encouraged by the medical education director, and work must be

Emergency medicine faculty almost unanimously agreed that medical students slowed down their performance and decreased billing for patient care.³ This perception is a significant barrier to a successful program.

Involvement in medical student education has to be encouraged by the medical education director, and work must be delegated to faculty members with specific interests and abilities.

All learners seeing patients in the future will benefit from courses in directed histories and physicals, along with the approach to the undifferentiated patient.

delegated to faculty members with specific interests and abilities. The day-to-day education of medical students must be demanded on some level by the chair or medical director.

Ways for Faculty Members to Be Involved

It can sometimes be difficult to enlist the help of faculty members in both organizing and executing the medical student education program. Academic faculty members will have many interests and projects competing for their time. Primary clinical faculty members will sometimes see little incentive in taking on an educational role that is not reimbursed in the form of clinical time or that may decrease their clinical performance.

At an organizational level, medical student education can occur during all 4 years of training. Emergency medicine has progressed as a specialty, and we now have the opportunity to participate in curriculum design and to lend our talents to the preclinical curriculum. This education can come in the form of basic resuscitative training, history and physical examination taking, and clinical logic and decision making. The approach to the undifferentiated patient can be stressed. Emergency medicine faculty members are particularly poised to serve as adjuncts in the first 2 years of medical school because of their specific expertise in pediatric emergencies, toxicology, and ultrasound.

Emergency medicine faculty members need to be appreciated as educators valuable to all learners, regardless of the learners' final specialty choice. For example, a future anesthesiologist may benefit from ultrasound education by learning the skill of ultrasound-guided central line placement. All learners seeing patients in the future will benefit from courses in directed histories and physicals, along with the approach to the undifferentiated patient. Because emergency medicine physicians (at least initially) see and do everything, we must be careful not to sell ourselves short. Our approach can be very informative for the learner, along with traditional medical school didactics from basic scientists and instruction in extended management from various other specialists.

Other avenues for involvement include serving as a learner mentor, whether as a career advisor or research advisor. Research in emergency medicine has exploded^{4,5} and now offers ample opportunity for the interested learner to be involved. At our institution, 1 physician (a nearly retired gastroenterologist) was the source of career advising. This situation was sometimes acceptable for the future gastroenterologist or borderline acceptable for other specialties because this advisor could at least provide a networking opportunity. The situation proved more difficult for the future emergency medicine resident. Because the specialty was organized well after our career advisor trained, he could not

provide specific information and was potentially prone to viewing emergency medicine as it was practiced in the early 1960s: something people did in their spare time or when they had difficulty getting their first choice of residencies.

A specific form of mentoring is the emergency medicine interest group. Our medical school has an active emergency medicine interest group, which is facilitated by our faculty. This group gives us the opportunity to influence learners' career choices and allows them to contact our colleagues in various areas come residency interview time. In turn, we can refer these learners to our umbrella organizations, such as the American College of Emergency Physicians (ACEP), Society for Academic Emergency Medicine (SAEM), and, now, Clerkship Directors in Emergency Medicine (CDEM), for additional organized and ready information. Junior faculty members can be paired with more senior members, and the mentoring opportunity can be a learning experience (and less work) for all parties involved.

The symbiotic relationship culminates in beneficial results for both learners and faculty members. Learners have the opportunity to be exposed to emergency medicine faculty and to learn these faculty members' approach to medicine, which will benefit them in whatever field they chose. They also have the opportunity to decide whether emergency medicine might be something they may be interested in pursuing. There is also the opportunity for medical school awards for excellence through both ACEP and SAEM. Faculty members, similarly, have the opportunity not only for altruism in aiding a learner but also the ability to document their time spent aiding and teaching medical students. This documentation is helpful for academic promotion and clinical duty restriction within their department. Similar to learners, faculty members have the chance to win awards of excellence through ACEP, SAEM, and potentially their medical schools, for their scholarly contributions and teaching performance.

Similar to learners, faculty members have the chance to win awards of excellence through ACEP, SAEM, and potentially their medical schools, for their scholarly contributions and teaching performance.

Faculty Feedback

It is important to obtain feedback both from the faculty members regarding learners and from the learners about the faculty members. This feedback can sometimes be more challenging than at first glance. At our institution, there is the opportunity to give computer-assisted feedback to learners, along with direct feedback during clinical shifts. I also request feedback during the middle and end of the clerkship. It is human nature to believe that feedback, especially unsolicited, tends to be more negative. Therefore, interpreting the feedback can be somewhat nebulous, requiring value judgments in light of the individual faculty giving the feedback. Work could include a standardized learner evalu-

Formalized feedback to faculty members from learners is also important. Academic promotion on some level often requires it.

ation tool. As a profession, we already have an end-of-fourth-year-rotation evaluation in the form of the Standardized Letter of Recommendation (see Chapter 25), but the need exists for periodic evaluation, shift evaluation, third-year learner evaluation, and preclinical feedback. Formalized instruction in giving feedback would also be helpful. This instruction would help to avoid unhelpful comments, such as “Good learner, seems nice,” that we often get. It is beneficial to learners as well, because they can try to adjust their clinical performance and learning goals based on feedback received.

Formalized feedback to faculty members from learners is also important. Academic promotion on some level often requires it. Quality and quantity of academic teaching are important to document. Faculty members should also identify areas of educational weakness to be remedied. Positive feedback, aside from making us feel good, is useful for earning promotions, protected time, and faculty teaching awards. Learners also need to be instructed in giving appropriate feedback and prompted for when and how to give the feedback. Current medical students seem to be more in tune with this process and actually often give better, more focused, and more relevant feedback than many faculty members. Furthermore, faculty feedback should solicit the ideas of learners on future innovative teaching programs.

Conclusion

Feedback and evaluative methods are skills; they need to be taught and learned.

Medical student teaching is important. You can do it for the altruism and the potential for academic advancement and teaching recognition, but think of it this way: you are training a future doctor who could be very well be leaning over you as you gaze at the halogen lights. You want that physician to be as best prepared as humanly possible. Successful implementation of a medical student teaching program involves recognition and dedication on the part of the chair. It requires investment on the part of all faculty members. We are uniquely adept and prepared to serve as medical student educators and advisors at all levels members. This relationship is beneficial for both learners and faculty. Feedback and evaluative methods are skills; they need to be taught and learned. A rewarding experience for medical student education, earned through determination and hard work, along with some level of trial and error, then seasoned with the academic support of our colleagues nationwide (such as CDEM) can be done.

Acknowledgment

This chapter was based on the prior work of Adrienne Birnbaum, who wrote the 2003 version of this chapter in the *SAEM Medical*

Student Educator's Handbook.⁶ Birnbaum's chapter was used as an excellent outline for discussion, with changes made to include my low-brow sense of humor and subpar grasp of the English language.

References

1. Russi CS, Hamilton GC. A case for emergency medicine in the undergraduate medical school curriculum. *Acad Emerg Med*. 2005;12(10):994–998.
2. Wald DA, Manthey DE, Kruus L, Tripp M, Barrett J, Amoroso B. The state of the clerkship: a survey of emergency medicine clerkship directors. *Acad Emerg Med*. 2007;14(7):629–634.
3. American Board of Emergency Medicine. Subspecialties at a glance. Available at: www.abem.org/PUBLIC/_Rainbow/Documents/SubAtAGlanceForWebsite2-2010.pdf. Accessed April 12, 2010.
4. Birkhahn RH, Van Deusen SK, Okpara OI, Datillo PA, Briggs WM, Gaeta TJ. Funding and publishing trends of original research by emergency medicine investigators over the past decade. *Acad Emerg Med*. 2006;13(1):95–101.
5. Wilson MP, Itagaki MW. Characteristics and trends of published emergency medicine research. *Acad Emerg Med*. 2007;14(7):635–640.
6. Birnbaum A. Faculty Involvement in Medical Student Education. In: Ander D, Coates W, Manthey DE, eds. *SAEM Medical Student Educators Handbook*. Lansing, Mich: Society for Academic Emergency Medicine; n.d. Available at: www.saem.org/saemdnn/Home/Communities/MedicalStudents/MedicalStudentEducatorsHandbook/tabid/686/Default.aspx. Accessed November 10, 2009.

Appendix 13.1. Teaching Portfolio Outline for Non-Tenure Track Promotion Candidates Who Identify Teaching as Their Primary Strength

Promotion candidates are asked (but not required) to use the following outline for preparing materials for review.

Tenure track candidates and non-tenure track candidates with a primary strength in research or clinical service are encouraged, but not required, to submit these materials.

I. Philosophy of Teaching/Personal Development

Please submit a narrative essay of no more than 2 pages to answer the following questions:

- What are your goals as a teacher?
- What principles guide your teaching strategies?
- What teaching choices have you made on that basis?

The CAPT may read your essay to assess the extent to which your teaching is self-reflective, self-critical, and scholarly.

II. A Teaching Inventory

Please provide an inventory of all your contributions to education since appointment to the Case faculty, and optionally during prior years (especially CCLCM faculty), organized by level and learners in the manner listed below:

- Local
 - Medical students
 - Graduate students
 - Residents and fellows
 - Continuing medical education
 - Others
- Regional
- National/International

Please remember that our promotion standards define teaching very broadly.

The settings may include medical student teaching in lectures, subject committees, small group conferences, clinical science programs, elective programs, family clinic, core and optional clerkships, and ambulatory medicine, as well as undergraduate and graduate courses in the basic science departments and in other schools of the university, graduate medical and postgraduate medical teaching, serving as a student advisor or counselor, and continuing medical education and community teaching.

III. Important Teaching Contributions

Please describe your Most Important Teaching Contribution under as many of the following headings as are relevant. You may also submit any materials you have created or utilized that illustrate the contribution.

- Curriculum development
- Teaching materials development
- Teaching administrative leadership
- Participation in the community of educators (workshops, publications, demonstrations, etc.)

IV. Evaluations and Awards

Please present evidence, either quantitative or qualitative in nature, that would lead evaluators to conclude that your teaching has been effective. You may also include a description of any plans to make your teaching more effective in the future.

Resident Involvement in Medical Student Education

Gillian Schmitz and Matthew Tews

Summary Points

1. Emergency medicine residents are often interested in teaching, but have little, if any, formal training in medical student education.
2. Residents have many opportunities to work with students and develop their skills as educators.
3. When developing methods to train residents to be educators, a process should be in place to provide feedback and evaluate teaching skills.
4. Several opportunities exist at a national level for residents to participate in organized tracks for academic development and mentorship.

EMERGENCY MEDICINE RESIDENTS play a critical role in medical student education. They serve as educators, leaders, mentors, role models, supervisors, and representatives of our specialty. Previous studies have shown that effective residents influence medical students to pursue specific careers.¹ Within surgery programs in particular, residents were identified by medical students as exhibiting qualities that are essential to being an excellent mentor, which may play a role in influencing learners' career choices.² Similarly, emergency medicine residents may significantly affect medical students regarding their perception of and possible career choice in emergency medicine.

It is not uncommon for emergency medicine residents to be interested in education and teaching. This passion often starts

It is not uncommon for emergency medicine residents to be interested in education and teaching.

Residents are ambassadors of our department when they rotate on off-service rotations and often work with and evaluate medical students on their team.

during residency training where they transition from being the learner to becoming an educator. They are eager to share their knowledge and recent experiences as a learner, which helps them relate to the student learner. Despite their eagerness, knowing how to teach is not intuitive for residents at this stage in their careers. However, the opportunities for medical student education and teaching are abundant and give the residents the chance to explore the role of being the educator. These opportunities can include bedside teaching, as well as teaching outside of the emergency department in physical examination courses for medical students, advanced cardiac life support/basic life support courses, simulation labs, emergency medicine interest groups (EMIGs), and prospective applicant interviews during the residency application process. Residents are ambassadors of our department when they rotate on off-service rotations and often work with and evaluate medical students on their team. They serve as role models and informal advisors to medical students considering emergency medicine as a specialty.

The last few years have brought significant changes and opportunities for development of emergency medicine resident teaching and mentorship roles. Residents are now included and encouraged to attend a resident-specific track at the Council of Residency Director's Academic Assembly, and additional tracks in Medical Student Education have been developed and expanded. Residents may now also participate in a formal mentorship program to help counsel and advise medical students interested in emergency medicine. This chapter expands on these roles and gives resources to use when preparing residents for their roles as an educator and mentor.

Resident as Educator

Most residents have not had formal training in medical student education, and their residency education is not designed to prepare them for dealing with the novice learner.

Residents are in a unique position as an educator. They frequently are involved in the training and education of medical students on a day-to-day basis. They spend a significant amount of time supervising, teaching, and evaluating learners.³ They can affect the learner's perception of the rotation, ultimately influencing their choice of specialty.⁴ Residents work long and irregular hours with the goal of becoming a good clinician by the time they graduate. Although this is the ultimate goal of training, being a good clinician does not guarantee the ability to teach. Most residents have not had formal training in medical student education, and their residency education is not designed to prepare them for dealing with the novice learner. Despite their busy clinical schedules, most residents enjoy teaching and would like to be able to teach more.⁵ However, their role as educator needs to be balanced against their own needs as a learner during their

residency education and the time constraints with patient care responsibilities.⁶

The literature has demonstrated the benefits of formally training residents to be educators as part of their residency education.³ These programs improve resident's self-assessment of teaching behaviors and improve learner evaluations of the residents. In addition, The Liaison Committee on Medical Education has required that residents "be prepared for their roles in teaching and evaluation."⁷ Numerous examples of resident educator programs exist in the medical literature in multiple specialties, demonstrating the benefit of having such programs.⁵ These training modules are often referred to as "resident-as-educator" programs and have become significantly more prevalent in recent years across several traditional teaching specialties.⁸ The design of these courses can range anywhere from 1-h workshops to day-long courses to month-long rotations. One source provides specific tips for the organization, development, and implementation of a month-long elective in medical education designed to prepare residents as educators.⁹

The Society for Academic Emergency Medicine (SAEM) Undergraduate Education Committee addressed the need to train emergency medicine residents to be educators by developing modules for resident-educator training programs. These training modules are based on general teaching principles, adapted for emergency medicine practice, and can be used with learners, patients and other health care professionals.¹⁰ The topics covered include general principles of clinical teaching, bedside teaching, giving effective feedback, teaching procedures, teaching with high-fidelity patient simulation, and teaching effective discussion leading and lecturing.

When developing methods to train residents to be educators, a process should be in place to evaluate resident teaching effectiveness and skill. Residents want feedback when they feel uncomfortable with a specific skill. Examples in the literature show the development of standardized assessments of resident teaching skills. Because most of resident teaching is unobserved by experienced faculty, formal assessment of teaching skills can be accomplished in the form of simulated scenarios. One example is the objective structured teaching exams, which is structured after the objective structured clinical exams, but with the focus on evaluating teaching skills.¹¹ Similar assessments can be developed and adapted for scenarios and procedural skills common to emergency medicine.

Resident as Mentor and Role Model

Many medical schools do not require an emergency medicine rotation; hence, most learners do not have early exposure to the

Residents are in a unique position to answer questions about daily life, the benefits and challenges of an emergency medicine residency, and factors to consider when choosing emergency medicine as a specialty.

specialty before making a career choice. Learners can, however, shadow in the emergency department, participate in EMIG activities, and interact with emergency medicine residents who become a valuable resource for learners interested in emergency medicine. Residents are in a unique position to answer questions about daily life, the benefits and challenges of an emergency medicine residency, and factors to consider when choosing emergency medicine as a specialty. These residents can give medical students the chance to informally ask questions about selecting a specialty that is a good fit, and sometimes residents give the best advice about pursuing an emergency medicine residency. Learners may be more likely to seek out residents for advice, given their recent experience with the application process. A resident–medical student mentorship can be a mutually beneficial relationship. Previous studies have demonstrated that the most desirable attributes of a role model are excellent teaching, clinical skills, and compassion, which residents are able to provide, whereas the role model’s academic title and position in the department is less important.¹²

In 2006, the Emergency Medicine Resident’s Association (EMRA) created a Resident–Medical Student Mentorship program, which provides a networking opportunity for learners to get answers to questions from a resident perspective. As a follow-up to this program, a survey was distributed in January 2007 to determine demographics of learners, topics of interest, and the overall usefulness of the mentorship program. Seventy percent of learners who responded found the program helpful as an additional resource in selecting a specialty and a residency program. Topics that were frequently discussed included emergency medicine residencies, the application process, lifestyle issues, balancing residency and family, leadership opportunities, reasons the resident chose emergency medicine as a specialty, preparation for internship, and advice on planning the fourth year of medical school.¹³

The mentorship program also identified a specific subset of medical students, including foreign medical graduates, osteopathic students, and military students, who requested resident mentors with similar backgrounds. Residents who had recently completed the military match, the osteopathic match, or applied internationally were in a much better position to address the questions and concerns of this group as well as advise them through the unique challenges and application hurdles that occurred outside of the regular match. The learners indicated that preceptors without this background experience were less helpful in serving as an advisor.¹³

The SAEM Virtual Advisor Program, a Web-based program designed to pair learners interested in emergency medicine with

faculty advisors, found results similar to the EMRA mentor program. It was very successful in providing support for medical students in the United States. More foreign medical students applied to the program than expected, and faculty had less familiarity with this subset of learners to provide advice and mentorship.¹⁴ Subsequently, this program is currently only open to medical students in the United States. More information is available online at the SAEM Web site (www.saem.org).

The most common source of mentors for third- and fourth-year medical students is emergency medicine faculty on staff at their home institution. These individuals are local, committed to guiding learners to a successful career, and can use their contacts to help learners who need particular career advice. However, some learners may not have access to advisors trained in emergency medicine at their home institution. Fortunately, emergency medicine residents come from a variety of backgrounds and geographic locations. They offer unique experience and insight, having recently navigated through the match. With the addition of new residency training programs and the increased number of international applicants and learners considering military scholarships, it is important to have mentors available who are familiar with these changes and how they affect the application process. Residents who attended a foreign medical school, applied to both the allopathic and osteopathic match, or applied to the military match frequently encounter specific challenges in the application process. As the number and diversity of applicants increase as the specialty grows, residents may become a critical resource for learner mentorship. These broad experiences make residents uniquely qualified to counsel and mentor learners with similar backgrounds.

Opportunities for Residents in Medical Education

Previous studies have shown that most emergency medicine clerkship directors are junior faculty members with minimal protected time or training for their positions.¹⁵ Hence, there is a recognized need to train residents and junior faculty members in medical education.

Many opportunities are available to those interested in pursuing a career in medical student education. For instance, many emergency medicine residency programs now offer a specialized medical education fellowship or academic emergency medicine fellowship. An educational fellowship is typically 1 year and offers advanced training in teaching, curriculum design, simulation, and fundamentals of medical education research. It provides a foundation of knowledge and skills to prepare them for a career in academic emergency medicine.

Several national conferences and meetings are available to train residents to become “the educator.” The Council of Residency Directors holds an annual conference, Academic Assembly, which has specific tracks for residents and medical student educators. The American College of Emergency Physicians supports a teaching fellowship that meets for one week sessions in the fall and spring. The Emergency Medicine Foundation – American College of Emergency Physicians teaching fellowship is 12 days and focuses on teaching and evaluation, designing effective and efficient instruction, and developing a network of colleagues with similar interests. SAEM has committees for graduate and undergraduate medical education and recently added an academy for Clerkship Directors in Emergency Medicine (CDEM), which allows for resident members. The mission of CDEM is to serve as a unified voice for emergency medicine clerkship directors and medical educators and to provide a forum to communicate, generate solutions to common problems, and share ideas.

Additional resources are now available to residents who are interested in pursuing the medical education career pathway. SAEM’s Academic Career Guide, American Academy of Emergency Medicine’s Rules of the Road for Emergency Medicine Residents and Graduates, and Educator’s Guide to Teaching Emergency Medicine to Medical Students are just some of the references that may appeal to residents. Many articles have been published in the last 5 years, representing the growing interest in this important field.

Conclusion

The development of residents into educators and mentors is not a primary goal of the emergency medicine residency. However, it is a topic of growing interest, and programs and resources are available to help guide residents as they grow into their educator and mentorship roles. Emergency medicine residents provide an additional resource to learners and the literature demonstrates the benefits of formal resident training in medical student mentorship and education.

References

1. Musunuru S, Lewis B, Rikkers LF et al. Effective surgical residents strongly influence medical students to pursue surgical careers. *J Am Coll Surg*. 2007;204(1):164–167.
2. Nguyen SQ, Divino CM. Surgical residents as medical student mentors. *Am J Surg*. 2007;193(1):90–93.

3. Wamsley MA, Julian KA, Wipf JE. A literature review of “resident-as-teacher” curricula: do teaching courses make a difference? *J Gen Intern Med.* 2004;19:574–581.
4. Griffith CH, Georgensen JC, Wilson JF. Specialty choices of students who actually have choices: the influence of excellent clinical teachers. *Acad Med.* 2000;75:278–282.
5. Bensinger LD, Meah YS, Smith LG. Resident as teacher: the Mount Sinai experience and a review of the literature. *Mt Sinai J Med.* 2005;72(5):307–311.
6. Busari JO, Scherpbier AJJA, Van der Vleuten CPM et al. Residents’ perception of their role in teaching undergraduate students in the clinical setting. *Med Teach.* 2000;22(4):348–353.
7. Liaison Committee on Medical Education. Accreditation Standards. Revised 30 October 2009. Available at: www.lcme.org/standard.htm. Accessed January 6, 2009.
8. Morrison EH, Friedland JA, Boker J, et al. Residents-as-teachers training in U.S. residency programs and offices of graduate medical education. *Acad Med.* 2001;76(10 suppl):S1–S4.
9. Mann KV, Sutton E, Frank B, et al. Twelve tips for preparing residents as teachers. *Med Teach.* 2007;29:301–306.
10. Farrell SE, Pacella C, Egan D, et al. Resident-as-teacher: a suggested curriculum for emergency medicine. *Acad Emerg Med.* 2006;13:677–679.
11. Zabar S, Hanley K, Stevens DL, et al. Measuring the competence of residents as teachers. *J Gen Intern Med.* 2004;19:530–533.
12. Wright S, Carrese J. Examining what residents look for in their role models. *Acad Med.* 1996;71:290–292.
13. Schmitz, G. Can a resident–student mentorship be a useful supplemental tool to medical students interested in emergency medicine? [abstract] In: Council of Residency Directors Annual Academic Assembly; Orlando, FL; 2007.
14. Coates WC, Ankel F, Birnbaum A, et al. The virtual advisor program: linking students to mentors via the world wide web. *Acad Emerg Med.* 2004;11:253–256.
15. Coates WC, Gill AM. Emergency medicine clerkship directors: defining the characteristics of the workforce. *Ann Emerg Med.* 2005;45(3):262–268.

Career Development for Medical Student Educators

Corey Heitz and Glenn Hamilton

Summary Points

- Faculty and career development are ongoing, daily processes.
- Department leadership must support development efforts.
- Maintain a promotion file to help organize development efforts.
- Apply the principles of adult learning.
- Regular, formal feedback and evaluation sessions are essential.
- No academic endeavor should be undertaken alone.
- A self-sufficient curriculum allows the medical student educator more time to pursue personal development.
- Seek out local, regional, and national resources to assist in academic pursuits.

IT IS IMPOSSIBLE TO SEPARATE faculty development from career development; a commitment to 1 is integrally linked to the advancement of the other. This chapter uses these terms interchangeably while recognizing that *faculty development* represents a more tactical (short term) approach whereas *career development* exercises more strategic (long term) options.

Faculty development represents a more tactical (short term) approach whereas career development exercises more strategic (long term) options.

What Is Faculty Development?

Faculty development involves making promotion considerations, undertaking personal education, and engaging in skill advancement as a daily activity. It is independent of a specific faculty assignment as a medical student educator or any other role. It should be the active and continuous pursuit of any committed

Faculty members should make a conscious effort to further some element of their career on a continual basis.

academician; not something to achieve in 1 day or by means of a seminar held once or twice a year. Faculty members should make a conscious effort to further some element of their career on a continual basis. This daily activity is guided by personal goals and objectives developed annually but reassessed and reevaluated on an ongoing basis. Without continuous focus on planned changes and advancement, goals may remain out of reach without an understanding as to why.

These daily activities must be supported and encouraged by peers and leadership within the department. Although an individual faculty member may be highly motivated, the chair or department head is responsible for facilitating each faculty member in defining and achieving his or her development goals. Most individuals do not have the resources or the time to independently select from the wide range of available options for pursuing an academic career. These choices and resources are optimally chosen and made available in concert with the department leadership.

In short, faculty and career development are ongoing processes. They represent a sequence of planned, daily activities throughout your career that are defined by individual goals and objectives. These activities translate over the long term into a productive and satisfying career defined by your values and those of the institution. Career development cannot be done alone; it must be supported by the leadership of your department.^{1,2}

Promotional Considerations

Career development cannot be done alone; it must be supported by the leadership of your department.^{1,2}

Motivation to pursue faculty and career development can come from many sources, including the desire for promotion within the ranks of academia. Faculty development is linked to promotion and is linked to individual and institutional values. First, you must obtain and understand your university's promotion criteria and structure. Clearly comprehending the timeframe for promotion, the varying values placed on academic productivity, and the actual submission process are important at all stages of a faculty member's career and allow for active planning of each step necessary to reach the next level.

Faculty members should maintain promotion files; an example of materials that might be in this file is provided in Box 15.1. This is a physical file, regularly updated, containing all documents necessary for promotion. Ideally, the institution's promotion criteria and structure are used as the outline for this file. This approach ensures an organized and monitored approach while fulfilling the criteria necessary to complete the institutional requirements for promotion. This file should be reviewed annually with your department leadership and serve an important guide for your goals and objectives in planning for each year.

Box 15.1 Promotion File**Teaching and Education**

- Grants
- Leadership positions
- Curricula
- Program or educational aids developed
- Structured teaching
- Clinical teaching
- Awards
- Other and unstructured teaching

Service–Administrative and Community

- School and university committee membership or chairmanship
- Regional and national organization membership or committee membership
- Public health
- Other committee involvement

Research and Publication

- Research grant
 - Principal investigator (PI) or co-PI
 - Contributor
 - Reviewer
 - Consultant
 - Publications
 - » Books
 - » Book chapters
 - » Review articles
 - » Editor of journals or books
 - » Peer-reviewed publications
 - » Editorials
 - » Reviewer
- Presentations

Degrees and Certifications

- Degrees received
- Certifications
- Continuing medical education

This physical file allows you to track progress, gauge performance against established criteria, and maintain the documents necessary to provide institutional leadership with well organized proof of what you have accomplished.

You must be active in your learning process. Passive coursework without interaction is unsatisfactory.

Principles of Adult Learning

To achieve your own academic career growth, it is important to understand the principles of adult learning. You must be active in your learning process. Passive coursework without interaction is unsatisfactory. Simply attending conferences is inadequate; there must be an opportunity to practice the new knowledge or skills, preferably accompanied by immediate feedback about performance. New skills and abilities cannot be learned in a classroom situation alone without being applied to the real world. Making the skills operational and incorporating them into your own experience is necessary to fully understanding them. In addition, adults have widely varied styles of learning, and your own personal style must be recognized and addressed. Applying the principles of adult learning to your personal faculty development process will ensure sustained motivation, real accomplishment, and success.¹

Without feedback and evaluation, there is no means to identify areas of strength or areas for improvement.

The Evaluation Process

Consistent, regular evaluation is an important part of career development. Without feedback and evaluation, there is no means to identify areas of strength or areas for improvement. Integrating career development into the annual evaluation process establishes a clear expectation for both the faculty and the department with regard to academic productivity and scholarship. Semiannual retreats, in which each individual staff member's goals and objectives are developed and discussed, are a commonly used and validated approach. At the spring retreat, goals and objectives are developed, and the department leadership assists faculty members in developing a plan for achievement of their goals. This plan may be in the form of "assignments," specific resources, planned meetings, benchmarked activities, or contacts with other emergency medicine faculty members and individuals. All attendees participate in guiding the individual while discussing planned goals and objectives. At the second retreat, a status report is given, and progress (or lack thereof) toward the goals and objectives is discussed. If a faculty member is having serious or serial difficulty achieving specific career goals, the faculty should reevaluate the suitability to the stated goals. In addition, regular meetings with the department leadership are necessary to closely observe each faculty member's commitment, insight, and continued enthusiasm toward stated goals.¹

Faculty members must understand what is expected of them; in this way, they will have the motivation to reap the rewards of achieving their goals. Faculty retreats should be a regularly scheduled departmental undertaking, allowing all to participate, but targeted to each individual's strengths and needs.

Your Role in the Department

You Are Not Alone

As a faculty member in charge of medical student education, your role relates to interacting with the medical school curriculum as well as designing and implementing the allotted emergency medicine portion. You must view this responsibility in the context of the resources of the academic unit (department/division) and entire university that are available to you.

No single member of the department should be responsible for all of the medical student teaching. Implementing the medical student education program is best incorporated into the “baseline level of activity” for all faculty members. In this manner, it becomes an expectation for all faculty members that medical student education is not only part of their job but also rewarded in promotional considerations and in the evaluation process. A major role of an academic department is the education of future generations of physicians, and all faculty members should be involved in this endeavor. This approach allows more of the clerkship director’s energies to be devoted to interacting with and evaluating learners, monitoring course quality, and continually improving the emergency medicine course offering.

Create Investment by Other Faculty

To increase and understand the sense of importance of medical student education, each faculty member should have input into the curriculum design. This input can include lecture development, curriculum objectives, content critique, simulation activities, and other areas of expertise specific to an individual faculty skills set.

In addition to curriculum development within the clerkship, academic and clinical faculty members can enroll in other learner contact opportunities outside of the traditional emergency medicine rotation. The goal is to increase the department’s visibility in the medical school with activities throughout all years of medical student education. These activities may include shadowing, giving basic science lectures that have a clinical focus (thereby increasing learner interest and enjoyment), assisting with the activities of emergency medicine interest group, sponsoring research opportunities, and more. These responsibilities can be spread among the entire faculty, using their areas of interest or expertise to create new exposures. Frequent positive experiences not only motivate the learners to pursue emergency medicine but also expose the faculty members to the energy and excitement of the “new physician.” This exposure commonly increases job satisfaction and energizes faculty members throughout their career.^{1,3}

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Make the Curriculum Self-Sufficient

If the daily activities of the medical student curriculum are left to 1 person, this individual will not have the time or the energy to pursue career development opportunities, to increase his or her abilities as an educator, or to effectively pursue timely promotion to the next level. This is why it is important that the curriculum be well organized with a defined structure that can be repeated easily and that proceeds with the consistent and regular involvement of each faculty member.

A self-sufficient curriculum also includes a well-planned and collaborative evaluation process. This process allows for a more efficient standardized assessment for each medical student at the end of each rotation. Evaluative input must be required from a variety of sources to optimally reflect an accurate cross-sectional view of each learner’s performance. In this way, evaluation is integral to the curriculum and does not have to be re-created during each curricular iteration.

In summary, the medical student educator should not work in a vacuum. The responsibilities of medical student education should be shared among the faculty members, and these activities should be linked to each faculty member’s development activities as well as his or her evaluation. By making the curriculum as self-sufficient as possible and involving other department members’ energy and motivation, the clerkship director creates the resources and time to pursue his or her own academic career.

Expanding Your Role

Activities Inside the Institution

As a medical student educator, it is essential to reach outside of your department to find other individuals with similar assignments within the medical school. These relationships are a useful means for determining the information and assets each department brings to the medical school curriculum. In addition, you will be assigned to specific educational committees either for the medical student year in which your course occurs (most typically the fourth year in emergency medicine) or as part of a larger faculty curriculum committee. Active participation on these committees is an opportunity for your own education as well as a means to improve the emergency medicine and “whole school” curricular offering. There is an inherent problem in medical school curricula in that each department tends to develop its content in isolation from the others. In emergency medicine, there is the opportunity to connect with all departments and exercise a collaborative judgment in interacting with each depart-

ment's strengths while maintaining the unique integrity of the emergency medicine offering.⁴

It is also important to seek expertise outside of the departmental and committee structure, because many medical schools have learning centers or faculty development–trained individuals connected with the dean of academic or curricular affairs office. Useful information can be found in these settings, and regular contact and dialogue are essential. A working understanding of this office's responsibilities, hazards, and successes is important for both short- and long-term relationships.

The office of student affairs typically has the responsibilities of interviewing candidates, selecting learners, and acclimating new learners to the medical school once they arrive. Involvement with this office may gain the medical student educator access to serving as an interviewer for the medical student selection committee, serving on medical student advancement committees, or joining other committees that may operate in conjunction and collaboration with its role. This relationship offers insight into the institution's approach to the learners being recruited, the life and experiences of the medical student it seeks to promote, and potential problems that may be occurring with learners that need to be remedied. Emergency medicine must have a role during both of these stages of medical student recruitment and development. The office also represents a potential career path for the medical student educator.

An additional area to explore is the educational support structure operating within the university itself. Typically the equivalent of a “center for teaching and learning” within each university functions separately from the medical school. Once again, this center represents the opportunity to meet individuals with an interest in learner education. Involvement in their training sessions provides opportunities to expand your understanding of the educational process and apply it to the responsibilities of the medical student educator.

A “top-down” approach inside your department is the least valuable position you can take within the broad context of the medical school and the university. It is essential to seek a wide range of input and experience as you plan and implement a curriculum over the long term. Understanding the full environment that the institution offers to support the responsibilities of the medical student educator is an important part of establishing a broad base perspective of the career path you have selected.

Activities Outside the Institution

Typically like-minded, educationally oriented individuals outside the institution are discovered through the official organizations

Each department tends to develop its content in isolation from the others. In emergency medicine, there is the opportunity to connect with all departments and exercise a collaborative judgment in interacting with each department's strengths while maintaining the unique integrity of the emergency medicine offering.⁴

In academics, opportunities for publication, invited lectures, and educational research pursuits are both available and necessary for career development.

involved with the specialty. Clerkship Directors in Emergency Medicine (CDEM), an academy within the Society for Academic Emergency Medicine is the action arm behind this book. CDEM is a new and vibrant group that consists of more than 150 people who have similar responsibilities for medical student education. Many of them have performed this role for more than a decade. A parallel activity is found within the Council of Residency Directors in Emergency Medicine (CORD). Although more of CORD's programs are devoted toward the role of the residency program director, there are multiple overlaps in terms of curriculum design, evaluation, and remediation. Both of these organizations offer excellent opportunities to present your own approaches to medical student education, either as original research or as a skill session. Another venue offering some very interesting experiences is the international approach to medical student education. Medical education elsewhere in the world is set up quite differently than our own structure of 4 years of undergraduate training, 4 years of medical school, and 3 to 4 years of residency training. Therefore, it is worthwhile to explore approaches that exist outside this country. Organized and high-quality medical student-oriented educational programs on an international basis are hard to find, but the Mediterranean Emergency Medicine Congress sponsored in the United States by American Academy of Emergency Medicine is certainly 1 of the best and is uniquely oriented toward emergency medicine.

In academics, opportunities for publication, invited lectures, and educational research pursuits are both available and necessary for career development. In planning new curricula or curricular changes, it is important to determine whether learner acceptance, effectiveness in teaching, and efficiency in terms of use of resources can be evaluated during this transition time. This is the basis for educational research that will result in the papers, posters, and presentations that allow your academic career to proceed. A unique area to explore thoroughly is the Association of American Medical Colleges Medical Education Portal (<http://services.aamc.org/30/mededportal/servlet/segment/mededportal/information>). Within the portal, emergency medicine is well represented.

As your interest and experience in the area of medical student education develop and mature, it is important to find some realm of specialization. This specialization may be interacting with other courses in the medical school, developing specific curriculum design in emergency medicine, promoting medical student education, developing new technologies in teaching medical students, encouraging effectiveness and efficiency in medical student education, or promoting evaluation and satisfaction for learners as part of their curriculum experience in

emergency medicine. This list is certainly not exhaustive, but it gives you an organized way to approach your own choice of an area of emphasis as part of your career development. Once you have focused on an area of specialization, you can increase your skill set by focusing on coursework often available outside of emergency medicine that emphasizes the specific area of your interest. Information and new approaches on bedside teaching, evaluation, and remediation are regularly available from a variety of institutions over the course of the academic year; to continually enhance your career opportunities, choosing 1 or more of these areas is important and necessary.

Future Directions for Your Career

It is possible to be a medical student educator for the duration of your academic career. If you are diligent and effective in your contacts, academic requirement fulfillment and productivity movement through the academic rank via an educator's track is well accepted and satisfying. Still, there may be a point when you want to move beyond the medical student educator role and use the base of your experience to launch in new directions. Some new directions include fellowships or advanced degrees, work in the field of simulation, or administration.

Fellowships and Advanced Degrees

It is completely reasonable to seek specific formal recognition of your skill set and additional training when considering moving into a new career path. Fellowship training in advanced medical education exists in emergency medicine, and both master's and doctoral programs are available. Other directions may include master's of public health, master's of medical management through the American College of Physician Executives, and master's or doctoral training in education through a separate university pathway. Both fellowship training and advanced degrees are a valuable means of expanding your horizon and understanding of the whole range of career paths available for future career choice.

Simulation

Another specific direction that can be taken and expanded on is the new technology of simulation. As a medical student educator, you have seen that simulation is a very effective tool in energizing your medical students and training them in a variety of approaches and techniques pertinent to the specialty. Taken from the broader perspective, simulation is a field that is growing unto itself and is well worth exploration as a future career path within

the medical school and potentially beyond. There are formal simulation training courses, but graduate-level degree opportunities have yet to materialize in an extensive manner. At the same time, simulation is a training tool for the future, and, whatever your career plans, it should be incorporated in your experience and understanding as a medical student educator.⁵

Administration

There are numerous opportunities for education-oriented individuals in the administrative structure of the medical school. These opportunities had been alluded to earlier as being an assistant or associate dean for medical student affairs, curriculum, or faculty affairs. Each of these offices as structured within your own institution should be explored in some detail as a means of determining whether they would be a career path of interest. There is the opportunity of sharing your time in your own emergency medicine academic unit with an administrative role in the medical school. Therefore, you would not have to completely leave emergency medicine to serve in this broader capacity. Moving into the dean's office is an important and valuable opportunity for emergency medicine-trained academicians and one that should be actively pursued if it suits your personality and career goals.

Other academic opportunities separate from the dean's office include moving into the program director's role and thereby onto the potential of an academic chair's position. Even from those positions, the opportunity to become an academic dean of the medical school is an active opportunity for those of us in emergency medicine. Therefore, a successful experience as a medical student educator opens many doors inside the department, within the medical school, and certainly within the university, depending on your own preferences, desire for advanced training, productivity, and creative accomplishments.

Conclusion

The role of the medical student educator is essential to the success of our specialty and one that has many doors open to it should you choose to go beyond the immediate boundaries. At the same time, those boundaries are ever expanding and can be a wonderful source of satisfaction and accomplishment while significantly benefiting each and every medical student who trains under your care.

References

1. Hamilton G. What is faculty development? In: Martin M, Gallagher J, eds. *SAEM Faculty Development Handbook*. 1st ed. Des Plaines, IL: SAEM; nd. Available at: www.saem.org/saemdnn/Home/Communities/Faculty/FacultyDevelopmentHandbook/WhatisFacultyDevelopment/tabid/689/Default.aspx. Accessed March 3, 2010.
2. McLaughlin S. Faculty development. In: Manthey D, ed. *SAEM Medical Student Educators' Handbook*. Des Plaines, IL: SAEM; 2003:107–117.
3. Schmitz G, Hobgood C. Pursuing the medical student educator career pathway. In: Handel DA, McGee D, eds. *Emergency Medicine: An Academic Career Guide*. 3rd ed. Lansing, Mich: Society for Academic Emergency Medicine; 2007:23–28.
4. Russi CS, Hamilton GC. A case for emergency medicine in the undergraduate medical school curriculum. *Acad Emerg Med*. 2005;12:994–998.
5. Gordon JA, Vozenilek JA. 2008 Academic Emergency Medicine Consensus Conference. *Acad Emerg Med*. 2008; 15:971–977.

SECTION THREE

Administrative Issues

Political and Budget Issues

Louis Binder and Michael Smith

Summary Points

- The chair must provide his or her active support for a mandatory emergency medicine clerkship, a persuasive external presentation for a mandatory clerkship, and a credible argument within the department to ensure that the faculty members are committed to the priority of teaching all learners.
- Collecting multiple data points on the performance and outcomes of learners on the existing clerkship may be politically persuasive in supporting establishment of an emergency medicine clerkship.
- Success of a proposal may be enhanced by timing and crafting to correspond to the goals and objectives of overall curriculum reform and connections to the overall clinical outcome objectives of the school.
- The logistic and budgetary implications to the department will pertain to both the higher volume of learners (e.g., increased orientation, paperwork, evaluations, tighter scheduling) and to the demands placed on faculty time because of extra learner supervision.
- Several rationales can be presented for resource support for a mandatory emergency medicine clerkship from the school of medicine, state funding lines at state medical schools, a school's educational budget, the teaching hospital, outside funding resources, and state department leadership.

MEDICAL STUDENT CLERKSHIPS IN emergency medicine do not occur in isolation from the key institutional issues of organizational politics and resource support. This chapter discusses some of the political issues in proposing and obtaining support for a mandatory emergency medicine student clerkship, what is realistic to expect in terms of institutional resources support, and a proposed budget as well as potential sources of resource funding support.

The Big Picture

Political issues pertaining to establishing a mandatory emergency medicine clerkship for learners may be both intradepartmental and extradepartmental.¹ The decision makers in the politics of a

Therefore, the starting point for advocates of the clerkship may need to be within the department to ensure that the faculty members (and by extension, the chair) are committed to the priority of teaching all learners.

mandatory emergency medicine clerkship include the medical school dean, the vice dean for education/curriculum, and the chair of emergency medicine. A mandatory clerkship will not happen if any of these 3 individuals do not support it.

The emergency medicine chair is the most powerful advocate for the needs and desires of emergency medicine within administration and represents the interests of emergency medicine faculty within the school via the chain of command. The chair's active support is the key to both a persuasive external presentation for a mandatory clerkship and protected faculty time to allow for participation in the extra supervision and teaching load that comes with the clerkship. The emergency medicine chair may be concerned about supporting a mandatory clerkship versus other priorities politically, especially if other emergency medicine faculty members are hesitant about the teaching commitment. Therefore, the starting point for advocates of the clerkship may need to be within the department to ensure that the faculty members (and by extension, the chair) are committed to the priority of teaching all learners.

Rationales that may be used in working with the faculty include the Macy Report and Institute of Medicine Report commentaries^{2,3} regarding the importance of mandatory medical student education of emergency medicine content, the desirability of recruiting more emergency medicine residents from the class by educating all learners, educating non-emergency medicine bound learners in the skills and resources emergency medicine can provide to their future patients, and getting the best learners to stay at home for emergency medicine residency training.

Following alignment of departmental priorities, political issues outside of the department are addressed in the following steps:

- The cultivation of key supporters, led by the emergency medicine chair (dean, vice dean for education, curriculum committee chair, and M3/M4 subcommittee chair)
- A proposal for the mandatory clerkship to the curriculum committee (satisfies institutional procedural rules and final approval serves as educational peer validation of emergency medicine's proposal)
- Discussion and negotiation between the dean and emergency medicine chair for resources, time in curriculum, financial support, and protected time

Although these three steps are presented in a logical sequence, in reality, they can occur (and have occurred) in any sequence. For example, top down pressure from the dean may subsequently drive discussions with other key supporters, result-

ing in a curriculum proposal. Curriculum reform at the medical school may lead to a key role for emergency medicine in the revised curriculum, which in turn may lead to negotiations over resource support for a mandatory clerkship for all learners, and subsequent discussions with key figures in educational change.

From a political standpoint, the ideal timing of a proposal for a mandatory emergency medicine experience should coincide with a process of overall clinical curriculum reform at the medical school.

Logistics and Political Issues

Several data points^{4,5} collected by emergency medicine faculty are useful politically in supporting the process of establishing an emergency medicine clerkship. Tracking both the number of learners taking the clerkship across several years (optimistically, a sizable portion of the class) and learner evaluations of the clerkship (ideally favorable) support the utility and popularity of the course with tuition-paying learners who are the consumers of the school's educational product. The department can collect preclerkship and postclerkship data on the effectiveness of the emergency medicine clerkship "intervention" on an educational outcome desired by the school (e.g., procedural skills, knowledge base in a specific area, clinical problem solving with the undifferentiated patient, informatics abilities in retrieving data to solve problems, and so forth). Finally, pilot efforts that are encouraged and supported by the school, oriented toward a specifically desired process or outcome objective, with appropriate educational data, may be persuasive.

From a political standpoint, the ideal timing of a proposal for a mandatory emergency medicine experience should coincide with a process of overall clinical curriculum reform at the medical school. Such timing can provide a natural connection between the educational outcomes for learners established for the emergency medicine clerkship and the overall clinical outcome objectives for learners of the medical school. Currently, many schools are establishing generic clinical outcome objectives for skills needed by "every doctor, regardless of specialty," such as the ability to evaluate and stabilize acutely ill or injured patients, the ability to evaluate first contact or undifferentiated patients, or oversight and verification of learners' procedural capabilities. Emergency medicine clerkships, by virtue of their broad clinical patient base and first contact exposure, are in a position to provide these experiences for learners, and the benefit of the emergency medicine clerkship can be framed to coincide with what the school is seeking.

Approval of a mandatory emergency medicine clerkship has some political and logistical implications, which should be anticipated. A hypothetical "average sized" medical school of 160 learners per year, with learners rotating across 11 months,

An emergency medicine group pursuing a mandatory clerkship should anticipate the need to use additional teaching sites to accommodate all learners.

Depending on priorities, displacement of visiting learners may need to occur to accommodate mandatory learner rotations from the home school, learners may need to be shifted to other sites that can accommodate an increased capacity, or the department may need to decide that it will be unable to accommodate the increased learner burden of a mandatory rotation.

works out to 15 medical students assigned per month, which is 6 learners per shift on a 12-h shift or 4 learners per shift on an 8-h shift at 1 site. Clearly, the logistics of the rotation depend on how many shifts are available and how many shifts learners are asked to work. Because of this volume, an emergency medicine group pursuing a mandatory clerkship should anticipate the need to use additional teaching sites to accommodate all learners.

One complication of the logistics cited, which should be anticipated, are questions about the equivalence of case mix, grading, teaching, and other educational issues and rigor across all sites.⁴ This complication will require some effort by the emergency medicine clerkship directors to establish and demonstrate an effective clerkship organizational structure addressing these concerns. An alternative is to have learners spend 1 week at each of 3 or 4 sites, but issues of sufficient longitudinal contact with faculty members for grading purposes (and for mentoring purposes for learners interested in emergency medicine) become a problem with this approach. Multisite emergency department involvement creates a political dynamic that is favorable to emergency medicine: If all clerkship affiliates strongly support the emergency medicine clerkship, the dean saying “yes” makes all of the affiliates happy.

In evolving from an existing elective program to a mandatory emergency medicine clerkship, if all learners can be accommodated, the logistical and budgetary implications to the department will pertain to both the increased volume of learners (e.g., increased orientation, paperwork, evaluations, tighter learner scheduling) and to the demands placed on faculty time caused by extra learner supervision. If not all learners can be accommodated, the emergency medicine program and each hospital site used for learner education will need to consider its priorities. Is it more important to accommodate learners from its home medical school, to accommodate regular groups of visiting learners that come via arrangement from another medical school, or to leave slots open for visiting learners from outside schools (which aids in the recruiting of future emergency medicine residents for the program)? Depending on priorities, displacement of visiting learners may need to occur to accommodate mandatory learner rotations from the home school, learners may need to be shifted to other sites that can accommodate an increased capacity, or the department may need to decide that it will be unable to accommodate the increased learner burden of a mandatory rotation. The displacement of visiting learners creates a problem for the department in not accommodating learners from other institutions who may consider residency at the institution after an on-site rotation. The

inability to accommodate the increased learner burden potentially creates a missed opportunity to affect generations of local physicians and may create some political cost for the emergency medicine program at the medical school.

The rationale for resource and budget support should be developed for the dean. The school (and by extension, the dean) needs clinical rotations for its learners to achieve their educational objectives. However, learners are resource intensive; their presence increases the faculty burden in terms of both supervision and documentation and detracts from faculty members' clinical productivity. In most institutions, faculty members already have heavy clinical loads, and clinical productivity needs to be maintained to enhance departmental and institutional revenues. Therefore, if additional faculty time is engendered by learners, additional resource support to offset these costs is warranted. In addition, budgetary implications of a proposal to evolve from an elective to a mandatory emergency medicine rotation pertain to the increased volume of learners—additional staff support may be needed to process paperwork, and additional teaching materials and supplies may be necessary.

An Ideal Budget: What Is Included and Where Does the Money Come From?

Table 16.1 is a “wish list” budget to cover the anticipated expenses of a mandatory emergency medicine clerkship. Specific cost figures might be adjusted up or down (depending on class size or local start-up expenses), or additional line items may be added to adjust this budget for local circumstances. In almost all instances, the majority of the cost incurred for clerkship support are the line items for faculty and coordinator time.

Rationales can be developed to advocate for resource support from specific sources (see Table 16.2):

1. At state schools, a rationale for support from state accounts supporting medical education is that the mission of the school is to train doctors to serve the population of that state, often with particular qualifications (e.g., rural service, urban service, underserved populations). To serve the public, all medical graduates need skills with undifferentiated patients, acute patients, procedural supervision, and so forth, providing emergency medicine with a legitimate rationale for state support.
2. A rationale for support from the school's educational budget (if large monies are dedicated centrally, such as in mission-based budgeting) is the correlation of the clerkship's educational goals and outcomes with the overall educational goals

Table 16.1. Ideal Budget for a Mandatory Emergency Medicine Clerkship*

	Years 1 and 2	Year 3 and Beyond
1. 50% of Faculty FTE for 1–2 faculty for 1–2 years at implementation. Duties include design/revise curriculum; write learning objectives; develop faculty in teaching/evaluation at the learner level; develop orientation program, organize teaching modules and didactics; and develop syllabus/learning materials/computer-based instruction, grading parameters, and clerkship exams.	\$100,000/year Release time	
Can reduce to 10–25% FTE at maintenance.		\$40,000/year
2. 50% FTE support staff, particularly if this person coordinates multiple sites. Duties include tabulating and running down grades, coordinating site assignments, coordinating learner clinical and didactic schedules, communicating with learners, word processing, maintaining summary files, and providing timely grade reports to the school.	\$20,000/year	\$20,000/year
3. Educational or informatics expertise (to improve curriculum, evaluation process, web based teaching programs or computer-based instruction)	\$10,000/year	\$10,000/year
4. Teaching materials/supplies (photocopy and syllabi, handbooks, suture kits and sutures, pigs feet, instruments, plaster; software, dedicated computer; other)	\$5,000/year	\$5,000/year
Total Budget	\$135,000 Years 1 and 3	\$75,000/year Year 3 and beyond

*Approximately 150 students per year.

Note. FTE = full-time equivalent.

Table 16.2. Budget Rationales for Specific Sources

State accounts	Supports state population and special populations (e.g., urban, rural, underserved)
Medical school educational budgets	Meets educational goals and outcomes by providing experience with emergency medicine and undifferentiated patients
Teaching hospital budgets	Provides direct patient benefit via quick emergency department care, higher patient satisfaction, and retention of students as residents
Civil defense monies	Provides training of medical students as first responders

of the medical school and the need for experiences such as emergency medicine in the curriculum to achieve these experiences and goals.

3. A rationale for support from the teaching hospital can be made if a patient care benefit for the hospital can be demonstrated in having medical students in the emergency department (e.g., additional providers initiating patient care, quicker emergency department throughput, fewer errors, higher patient satisfaction, retention of good learners as fu-

- ture residents at the hospital).
4. Bioterrorism (or other topic specific or training grant) funding: Since the terrorist attacks of September 11, 2001, there has been lots of political support for, and subsequent availability of, civil defense monies. Emergency medicine educators can make a rationale to request monies to train all physicians at their school to respond to trauma and emergencies. Israeli schools have long had a similar outcome objective with related resource support for their graduates because all Israeli medical graduates subsequently give compulsory service in the armed forces. Given the high frequency of multitraumatic incidents in this country, all schools' outcome objectives include the ability to respond to traumatic and bioterrorism events. If several schools can commit to this mission as a statewide or regionwide effort, the proposal for funding is stronger.

Another approach is to follow the “evolutionary” means of support for a mandatory emergency medicine clerkship. One emergency medicine academic group evolved in the following way. At the time that the emergency medicine chair approached the dean and the curriculum committee to establish a mandatory emergency medicine clerkship, the chair requested support only for teaching materials and access to educational and informatics support through the school. This proposal was accepted. Over time, as the 2 faculty and support staff who developed and ran the clerkship in a very large school became increasingly engaged, the chair was able to justify additional full-time equivalent faculty and staff support for the clinical load (faculty) and increased work output of the faculty (staff). Through operational, rather than educational, salary lines (often far less resistance to expansion operationally rather than educationally), the result became a fully supported mandatory emergency medicine clerkship, as ultimately the protected time of the specific faculty and staff were dedicated to the medical student program. A similar strategy may be effective elsewhere.

References

1. Binder LS. The process of facilitating change in medical education at academic institutions. *Acad Emerg Med.* 1991;3:8–13.
2. Josiah Macy Foundation. The role of emergency medicine in the future of American medical care. *Ann Emerg Med.* 1995;25:230–233.
3. Institute of Medicine of the National Academies. *Hospital Based*

Care: At the Breaking Point. Washington, DC: Institute of Medicine; 2006

4. Binder LS. Evaluation of effectiveness of an educational curriculum. *Acad Emerg Med.* 1990;2:5–11.
5. American College of Emergency Physicians and the University of Texas Southwestern Medical Center Department of Biomedical Communications. *Instructor Manual for the American College of Emergency Physicians Teaching Fellowship.* The Residency Teacher Series—Emergency Medicine. Dallas, Texas: American College of Emergency Physicians and the University of Texas Southwestern Medical Center Department of Biomedical Communications; 2003.

SECTION FOUR

*Information Technology in Medical
Student Education*

The Internet as a Teaching Tool

Dan Lemkin

Summary Points

- Computers provide access to a multitude of free and subscription-based clinical resources. Keeping an active bookmark list of sites will save time and increase the likelihood of use.
- Explore clinical subscription offerings at your institution's library.
- Take advantage of free tools:
 - www.google.com
 - www.emedicine.com
 - www.wheelessonline.com
 - www.dermatlas.com
- Always scrutinize information found online for academic veracity.
- Do not print out tons of information that no one will read.
- Remember the axiom that "less is more" for retention of clinical pearls.
- Share clinical resource Web sites with your peers.

WHEN WAS THE LAST TIME A medical student asked you a question you could not answer? "Dr Smith, what is the effect of naloxone on QT-prolongation induced by methadone?" When was the last time you cracked open a physical textbook to find the answer? Computers have become an integral tool in our practice of medicine. They provide access to clinical data, administrative information and, of course, educational materials. We use these resources daily to augment our differential diagnoses, verify medication orders and prescriptions, and reinforce our knowledge and comfort levels before performing rare procedures.

Expanding the role computers play to that of student educator adjunct is natural and easy. In doing so, medical educators also expand their knowledge and access to great clinical tools that

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will serve them and their patients in daily clinical practice. Before discussing specific resources, it is prudent to review some basic guidelines and information. Most clinical institutions provide access to online resources for practicing physicians. For those medical student educators who work at academic institutions, the variety of clinical resources is often vast. Institution librarians tailor offerings to meet the needs of their local academic community. They are often fantastic resources who are receptive to clinician input.

Electronic resources offered through proxy Web sites and portals are generally commercial products that are vetted and peer reviewed. This fact should provide some degree of comfort regarding the validity and reliability of the information presented. Examples include UpToDate.com (UpToDate, Inc, Waltham, Mass; www.uptodate.com/) and MDConsult.com (MD Consult, St. Louis, Mo; www.mdconsult.com). In addition, many institutions provide full text access to Medline journals with products such as OVID (Wolters Kluwer Health, Norwood, Mass; www.ovid.com/).

These commercial medical databases cost institutions collectively hundreds of thousands of dollars in subscription fees (see Box 17.1). Pricing schemes vary by company, but they are generally formulated on the basis of institution size, number of clinicians, and annual patient volumes (admissions). This expense explains why libraries may not be able to add a particular resource unless enough demand exists. However, for this money, clinicians receive a wonderful resource that essentially makes paper texts obsolete. Because many of the textbooks on shelves are several versions old, this obsolescence is multifactorial.

Access to educational resources is a frequent frustration for clinicians and institution tech support. Most contracts specify whether resources can be used only *on-site* or via a remote *proxy server*. When you visit a Web site, the Internet protocol address (www.ip-address.com/) assigned to your computer is recognized

Box 17.1. What Do Medical Databases Cost Institutions?

The University of Maryland Health Sciences and Human Services Library offered rough estimates of its annual costs to help elucidate these issues:

UpToDate	\$90,000
MDConsult	\$35,000 for a 5-user license
OVID	\$140,000 with limited access to resources

These are all annual subscription services and represent an ongoing expense for the institution (R Klein, Digital Resources Librarian, Health Sciences and Human Services Library, University of Maryland Baltimore, personal communication, January 12, 2009.)

by the Web server. For on-site licenses, the Internet protocol address you have must match a range assigned to the institution. These addresses are fixed and unique, which makes it easy to restrict access to resources.

Proxy servers are computers or applications that are operated by your institution. They provide a portal to forward all information to the commercial Web site. If you have to login to a local hospital or university Web site or configure proxy settings on your browser, you are using a proxy server. This functionality allows the Web service to verify that only valid requests are being made by authorized users.

Although these resources are valuable and trusted, they are also more difficult to access and slow to respond. Anecdotal experience with proxy servers shows that they are fraught with glitches and bugs. Servers and browser software are very intolerant of configuration faults. Generally, they do not support all Web browsers, which causes additional inconvenience for the end users. Most are compatible with Microsoft Internet Explorer; however, this is the most insecure browser available and is not recommended.

For these reasons, many clinicians turn to rapidly accessible and free tools that meet their needs. Google.com is probably the most useful tool currently available. It has a robust search engine that finds relevant articles and, more importantly, relevant images. Free resources are numerous and very valuable adjuncts for clinical teaching and practice. The most important issue to consider is that many sources on the Internet are not peer reviewed. Anyone can post anything to the Web, and information you find may be completely incorrect and potentially dangerous to patients. Caution should be exercised before relying on online information, particularly with regard to medication prescribing and other therapeutic recommendations.

Keep in mind that most free resources collect personal information about you and sell this information to advertisers and other interested parties. Be sure to check privacy policies, which detail the types of data aggregated and which data are used to provide tailored advertising when you view the site. Google uses search tracking history to tailor advertising, and this practice, while less than ideal, is certainly not unique. A general rule of thumb is to assume that all your Web activity is being tracked, because it generally is.

Once you decide to search for information on the computer, what kinds of resources will you find? And more importantly, which should you use? The formatting and presentation of information as well as the number of steps required to access it, play an important role in determining the usability of a given source.

For those medical student educators who work at academic institutions, the variety of clinical resources is often vast. Institution librarians tailor offerings to meet the needs of their local academic community. They are often fantastic resources who are receptive to clinician input.

For teaching in the emergency department, information should be concise; clearly displayed; and make use of tables, figures, graphics, and outlines when appropriate. Long bodies of prose (like this chapter) are not suitable for a clinical environment.

The following are samples of commonly available resources. Qualitative scales have been assigned to provide some rapid guidance in selection for cost (\$ = low cost, to \$\$\$\$\$ = high cost) and usability (# = poor, to ##### = easy to use). The usability scale is based on the ability to rapidly find specific information, presented in an easily digestible form. Descriptions follow; these provide more in-depth information for each resource. Clearly this is a subjective review. Clinicians should explore all available resources to find those that suit their preferences and needs.

UpToDate

URL: www.uptodate.com
 Classification: Commercial subscription
 Cost: \$\$\$\$\$
 Usability: ###

UpToDate is probably the best peer-reviewed online medical resource available today. Documents are written by experts, and all are peer reviewed. The documents are, as the name implies, updated regularly. This procedure helps ensure information presented is timely and still represents the standard of care. The interface is relatively fast; however, accessing it requires using onsite or proxy servers and clicking through a few tedious login and disclaimer screens. The search engine is adequate, but it is not fantastic. The results can often be “information overload.” Poorly worded phrases will not always retrieve a relevant article, but because the search engine is so loose, it will retrieve numerous titles to wade through. The articles are formatted as research-based review articles. They usually include diagnostic and treatment information, which facilitates patient care in the emergency department. UpToDate makes good use of tables, images, and graphics to supplement the content. The service is very expensive to purchase as an individual and exponentially more expensive for institutions. For this reason, if it is available at an institution, it is often restricted to onsite use. The content is presented in prose fashion, which is difficult to scan. The use of hyperlinked bookmarks and a table of contents mitigate this annoyance. Overall, it is a good resource. If you wanted to provide a student with a summary of a condition in a case he or she saw, this would be one of the better resources.

MDConsult

URL: www.mdconsult.com
 Classification: Commercial subscription
 Cost: \$\$\$
 Usability: ##

MDConsult is a mediocre resource that I do not use regularly. It is a subscription service that offers both online textbooks in PDF format and Medline searching with some full-text articles. The interface is pretty, but it is slow to access and use. Page reloads take a long time. Like other commercial products, MDConsult requires either a personal account or proxy access to use. The search engine is more advanced, but the results are not necessarily more useful than UpToDate. This is not a good resource for most emergency department teaching. The only reason I would turn to this database is for access to online textbooks such as Roberts and Hedges, *Clinical Procedures in Emergency Medicine*.¹ OVID provides a much better Medline searching option, and UpToDate provides better review articles with a much faster user experience.

OVID

URL: www.ovid.com (varies by institution)
 Classification: Commercial subscription
 Cost: \$\$\$\$\$
 Usability: #

OVID is a commercial company that offers a robust search engine to Medline and numerous other databases. It lists access to 1,200 journals and 500 books. On OvidSP, the Web-based search engine, I was able to access 2 full-text books. This finding represents a site-license subscription choice and does not reflect its full library to date. The interface is similar to PubMed, making it familiar and easy to use. The highlight of this resource is the large number of included full-text journals. For many literature searches, this feature will allow the user to stay out of the library stacks. The ability to view and print native PDF articles and images is a bonus. Although OVID is a fantastic research tool and clearly plays a role in every academician's online arsenal, it is not a good clinical teaching tool. The vastness of the Medline database means that even well-designed queries will retrieve numerous entries that are only tangentially related to the information sought. This limitation all but negates it as an emergency department teaching resource.

PubMed

URL: www.pubmed.com
 Classification: Public Access Web Service for Medline
 Cost: Free
 Usability: #

Like OVID, PubMed is a Medline database interface. Unlike OVID, it does not provide access to nearly as many full text documents. PubMed has added an option to limit searches by “Links to free full text.” This limit makes searching more tolerable, but it greatly limits the number of documents matched, because numerous journals charge for access to their online publications. Because it is using the same database and functional interface as OVID, it suffers from the same limitations and is not recommended as a rapidly accessible clinical teaching tool.

Google

URL: www.google.com
 Classification: Public Access Web Service
 Cost: Free
 Usability: #####

There is a reason that Google is the most popular search engine: It is fast, scalable, and uses intelligent searching by means of page ranking.² This ranking provides greater importance and therefore a higher position in search results to Web pages referenced more often. Google is very effective at locating pages that closely approximate a searcher’s intention. An experienced searcher will scroll through search results and look for sources that are known or presumed to be credible. In general, Google should be the starting point for all free clinical searches. Many of the resources described here will show up as links in a simple Google search. By starting with Google, users can save several steps in accessing the information they desire. The search engine is intuitive but does not screen for the validity of information found. Users must scrutinize all sources found and should use caution when basing clinical decisions on such information.

Google Images

URL: images.google.com
 Classification: Public Access Web Service
 Cost: Free
 Usability: #####

Google Images is probably the most useful Internet tool for the bedside educator. Whether you are looking for diagrams or images to demonstrate dermatomes, Bartholin’s cysts, or Maison-

neuve fractures, Google images provides educators with great visual teaching tools. When it comes to the teaching cases, the items we most often use to supplement a discussion are visual props. Electrocardiograms, radiographs, diagrams, algorithms, and drawings are easily acquired and shared with students at the nurses' station or bedside computer. With an open browser, it takes less than 10 s to find images of many clinical conditions like torsades de pointes, tinea pedis, or QT prolongation.

Google Scholar

URL: scholar.google.com (beta version)
 Classification: Public Access Web Service
 Cost: Free
 Usability: ##

This Web site is Google's entry into academic search engines. It is similar to PubMed in function. The interface is classic Google, which is familiar to most people. This search engine does offer some nice features. It notes how often a source is cited, provides links to related articles, and imports references into automated citation software such as End Note (Thomson Reuters, Carlsbad, Calif; www.endnote.com) and RefWorks (RefWorks, Bethesda, Md; www.refworks.com). Users can also define several local libraries, and Google Scholar will link to local catalogs. Like PubMed and OVID, this is a research tool. It is difficult to find information and not suitable for a rapid teaching environment.

Emedicine.com

URL: emedicine.medscape.com
 Classification: Public Access Web Service
 Cost: Free Subscription
 Usability: #####

Medscape's eMedicine Web site is a clinician-oriented Web site from the same vendor that produces WebMD for lay people. The Web site is peer reviewed. According to the Web site, "New eMedicine articles undergo four levels of physician peer review plus an additional review by a PharmD prior to publication."³ This resource has decent and easy-to-digest articles about common conditions. It provides well-defined sections such as Clinical, Physical, Treatment, and Medication. This makes it very easy to extract desired information quickly. These articles are indexed by Google and can often be accessed directly from an initial Google search. Many times you are required to login to access articles. Registration is free, and demographics requested are limited. This is my favorite source for brief clinical documents. It is similar to UpToDate with articles that are occasionally less well written, but are free and rapidly accessible.

Duke Orthopaedics Presents Wheelless' Textbook of Orthopedics

URL: www.wheelessonline.com
 Classification: Public Access Web Service
 Cost: Free
 Usability: #####

Clifford R Wheelless III, MD, created this online textbook for practicing orthopedic surgeons. Over the years, the site has improved. The Web formatting is amateurish, and the content writing cryptic at times. Although the intended audience is an orthopedic surgeon, the emergency department physician and medical student will certainly benefit from this resource. It has many decent photographs detailing injury variants. It also provides useful information on patient disposition and management. This is especially useful for complex and graded injuries in which disposition differs on the basis of the severity of injury. A quick review before consultation can save time and embarrassment.

The New England Journal of Medicine—Videos in Clinical Medicine

URL: content.nejm.org/misc/videos.shtml
 Classification: Public Access Web Service
 Cost: Subscription \$99/year, Institutional Licensing
 Usability: #####

This repository of procedural videos is a fantastic resource for teaching. The only annoyance is the high subscription price. The videos are accessible to institutional and individual subscribers. Topics include most procedures and diagnostics that will be performed by students in an emergency department, including central venous catheterization, Foley catheter placement, splinting techniques, peripheral intravenous placement, paracentesis, intubation, laceration repair, and so forth.

Johns Hopkins University DermAtlas

URL: www.dermatlas.com
 Classification: Public Access Web Service
 Cost: Free
 Usability: #####

This is another great resource. Like Wheelless' online textbook, it offers great pictures and information in an amateurish Web format. Once you learn to navigate around, the site provides a lot of useful information and photographs. In addition, it has a Bool-

ean search feature, which facilitates the identification of difficult dermatologic conditions.

Conclusion

The Internet is ubiquitous in medicine and offers numerous benefits as a teaching adjunct. The Internet is generally easily accessible, provides up-to-date information, permits dissemination of information via print or electronic methods, and can provide access to numerous resources from 1 site. These benefits easily render conventional paper texts practically obsolete in the clinical environment.

The problem with using computers to locate clinical information is that searches often result in too much information, not too little. Learning to filter out low-yield Web sites and invalid content is essential when using the Internet as a resource. This chapter provides guidelines for scrutinizing content, as well as some resources that are generally thought to be bona fide. As always, it is the clinician's responsibility to review and verify all information found when applying it in the practice of medicine.

References

1. Roberts JR, Hedges J. *Clinical Procedures in Emergency Medicine*. 4th ed. New York, NY: Saunders; 2003.
2. Brin P. *The Anatomy of a Large-Scale Hypertextual Web Search Engine*. Stanford University, Calif: Computer Science Department; 1994. Available at: <http://infolab.stanford.edu/~backrub/google.html>. Accessed December 27, 2009.
3. WebMD. eMedicine: About eMedicine. Omaha, Neb: Medscape. Available at: <http://emedicine.medscape.com/public/about>. Accessed December 27, 2009.

Information Technology in Medical Student Education

Kevin P. Kilgore

Summary Points

- Students see e-learning as a complement to traditional instructor-led training and blended-learning strategies.
- Faculty commitment to development, evaluation and revision is fundamental to developing a successful e-learning course.
- E-learning applications give the learner the ability to interact with content material (adaptive learning) and interactions with others (collaborative learning).
- E-learning appears to be at least as effective as traditional instructor-led methods such as lectures.
- E-learning redefines the instructor as a facilitator of learning and assessors of competency.

SCIENTIFIC, SOCIAL, AND PEDAGOGICAL pressures have altered the complexion of medical education. Today's medical educators face increased clinical demands, reduced teaching time, and an increasing numbers of learners distributed over greater geographic areas—a situation that has driven a growing use of information technology.

Information technology is an essential part of the everyday practice of medicine and is rapidly becoming invaluable in medical education.¹ Instructional applications are constantly evolving and becoming widely available, offering the medical educators an opportunity to complement the traditional instructor-led instruction in the classroom and at distant sites. Computer-assisted and distance learning are inevitable,¹⁻³ and

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By using the power of the Internet, clerkship directors, with a little imagination and some careful planning, can transform program's effectiveness and efficiency.

medical educators are enthusiastic about using information technology to distribute educational information, foster independent learning, and maintain day-to-day recordkeeping. No single informational platform provides all the needed functionality to run a clerkship. By using the power of the Internet, clerkship directors, with a little imagination and some careful planning, can transform a program's effectiveness and efficiency.⁴ The following discussion addresses the basics of e-learning in medical education—its key terms, available resources for the creation and evaluation of an e-learning site, and the effectiveness of this modality in undergraduate medical education.

Electronic Learning: An Overview

E-learning (also known as electronic learning, computer-assisted instruction, and computer-based learning) encompasses learning activities based on any electronic format. It can be made up of a series of modules or instructional material presented by a computer. E-learning can also involve the use of Internet technologies to deliver an array of modular-learning exercises directed at enhancing knowledge and performance both in the classroom and distant from the central local.

Blended-learning is an approach to education that combines e-learning techniques, including online delivery of materials through Web pages, discussion boards, and e-mail, with traditional teaching methods, including lectures, in-person discussions, seminars, or tutorials. This combination of face-to-face and online learning methods cultivates an interactive learning experience and an enhanced learning environment.

The 2 basic modes of e-learning are *distance learning* and *computer-assisted instruction*. Distance learning tasks the Internet to deliver instruction modules to learners who are at remote locations. Computer-assisted instruction uses the computer to deliver standalone multimedia packages and instructional modules at a specific local.

E-learning applications give the learner control over content, content sequence, and pace of learning. Through this interactivity, the learner is an active participant in attaining his or her personal learning objectives.^{4,5} Authors now have a platform where content updates are easily prepared, distributed, and standardized. Direct electronic content updates are easier and more immediate than updating and reprinting the rotation's syllabus.⁵ E-learning technologies permit the widespread distribution of digital content to many users simultaneously at any time and any location. Modules and presentations accessed from a single central server act to standardize course content. Automated tracking and re-

Direct electronic content updates are easier and more immediate than updating and reprinting the rotation's syllabus.

porting of learners' activities further promote instructor involvement in the learners' achievement of competencies.¹

Content delivery is either synchronous or asynchronous. *Synchronous* delivery refers to real-time, instructor-led sessions, in which learners simultaneously receive information and communicate directly with the instructor, as well as other attendees. This shift from the teacher-centric model ensures that students are actively vested in managing their own learning through collaborative learning opportunities. Teleconferences (audio, video, or both), Internet chat forums, and instant messaging are a few examples of synchronous form of content delivery. Web conferencing programs (e.g., Dimdim <www.dimdim.com/>, Elluminate <www.illuminate.com/>) offer a browser-based interface for synchronous educational meetings. These sessions allow the clerkship director to share slide shows, collaborate on didactic presentations, chat, and broadcast via Web cam without requiring a download to host or attend meetings.

Asynchronous content delivery refers to transmission and receipt of information not occurring simultaneously. Using this format, learners are responsible for pacing their own self-instruction. The instructor and learners communicate by a variety of methods, including discussion board, e-mail, online bulletin boards, list servers, newsgroups, and blogs. Discussion boards, for example, in which tutors present students with questions, result in collaborative learning from the responses of their peers who contribute to the discussion.

E-learning will never replace a good educator. Computer-assisted instruction lacks the emotional factors of the classroom setting. In the traditional education setting, learners give visual clues to their day-to-day comprehension and acceptance of presented materials, which is not the case with the computer. In addition, e-learning cannot extend the lesson beyond the inherent limits of the programming.

Designing an E-Learning Course

The successful e-learning course starts with committed faculty members who have a unified global vision. The well-designed, interactive e-learning experience motivates the learner to engage in the course content.⁴ Interactivity serves to maintain the learner's interest and provide a means for diligent individuals to attain goals through practice and reinforcement. However, e-learning courses are likely to fail if they are presented as if they were traditional courses.⁵

A systematic approach to course development will ensure that specific learning goals are accomplished. As in the design

of any course, the instructional design process is essential and maintains focus on the learning rather than the technology (Figure 18.1). This iterative process affords (1) consistency between learning components, (2) effective structuring and presentation of content, (3) sustained quality, and (4) accelerated product development and project management requirements.

Typically, the first element in planning any course or lesson is a critical *analysis* of the curriculum requirements and the actual need for instruction. The goal of this phase is to acquire an approximate view of the learners, their numbers, locations, knowledge base, skills, and experience.

The *design* phase focuses on the instructional goals, scope, and sequence of the project. Learning objectives, exercises, and content formulated during this phase should consider the ease of navigating from module to module while maintaining a conducive, educational appearance and an effective use of multimedia elements. The design phase must also consider any special computer skills, hardware, or software requirements. The design matters more than the technology.

The actual creation of learning materials occurs in the *development* phase. Here, brainstorming sessions, storyboards, flow

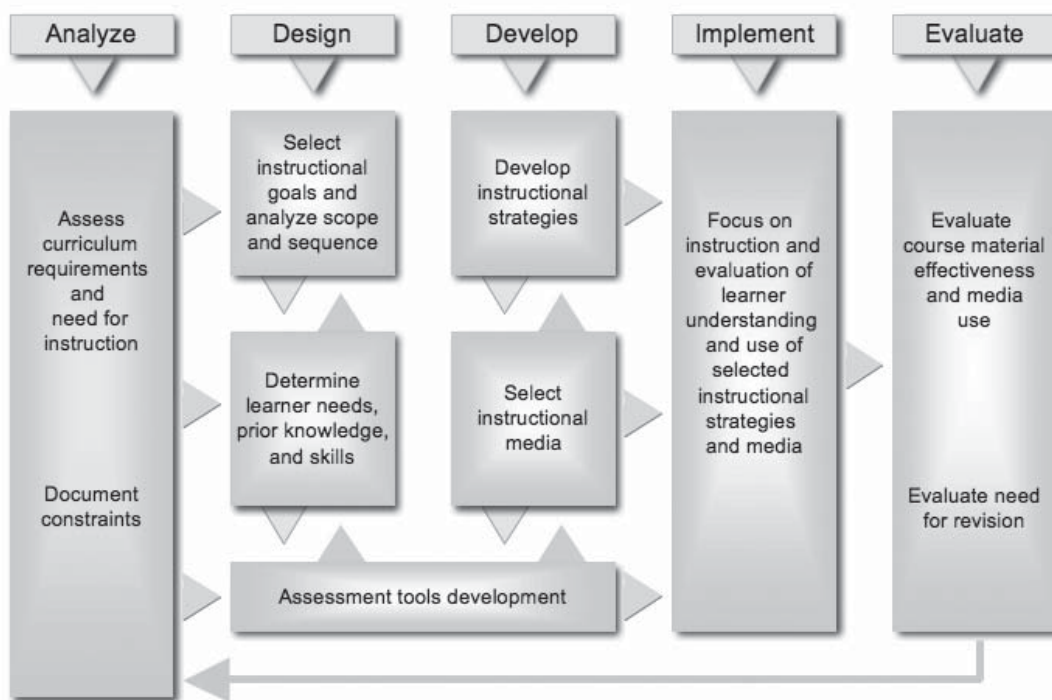


Figure 18.1. Analyze, Design, Develop, Implement, and Evaluate instructional design model used for e-learning.

charts, and prototyping occurs, and the most advantageous media types are considered. Selection of a particular authoring application depends on convenience, availability, infrastructure support capacity, expense, learner and faculty skill levels, required preparation time, technical requirements, and influences on classroom dynamics. In both the design and development phases, the type of assessment tools (knowledge and program evaluation) is a point of focus.

The *implementation* phase marks the completion of “course creation.” Strategic distribution based on the mode of delivery occurs in this phase of instructional design.

The focus in the *evaluation* phase is appraising the effectiveness of course material and media use. The 2 primary approaches used in evaluating e-learning modules are process assessment and outcome evaluation. The quality of content and method of delivery are verified through peer review. On the basis of this peer review from the students and instructors, *process evaluation* recognizes strengths and weaknesses in content as well as methods of instruction and delivery. From this evaluation, course authors and instructional designers can identify strengths and amend shortcomings. *Outcome evaluation* gauges a program’s effectiveness of changes in learners’ knowledge, skills, or attitudes. Pretest and posttest are the most common modes of assessing the impact on learning. To ensure that the content meets the learning objectives, pretest and posttest writing occurs before the content is complete. Evaluation of an e-learning course completes the 360° planning process driving instructional improvement.¹

Multimedia Presentations and E-Learning

Multimedia packages predate the Internet. They blend 2 or more media (text, graphics, animation, audio, or video) to offer engaging subject matter that learners can access via a computer. By having multimedia available in an e-learning site, learners have the flexibility to select from a large menu of media options to fit their diverse learning styles. Web-based multimedia presentations are a practical means of maintaining didactic comparability across clinical sites.

Production of a multimedia presentation is much more labor intensive than a face-to-face lecture or presentation. However, lectures compiled with PowerPoint, streaming video, or combinations of both are widely used to enhance teaching and learning. They are a superb means of preparing learners for upcoming workshops and simulation labs, enabling learners to participate in the same didactics even when they are located at geographically

distinct sites.⁶ Several programs are available to convert PowerPoint to video formats (Box 18.1). Presentations such as the On-Line EM Lectures (Adobe Articulate) offered at EMedHome.com, combine PowerPoint with full motion video presentation to yield an asynchronous Web-based presentation. Such presentations are also downloadable as an audio or video presentations for computer or portable media player. When preparing any multimedia presentation, the author must remember how important it is to connect with an audience rather than just dazzle members with special effects.

E-Learning Site Development

De novo development of an e-learning site is a daunting, lengthy process with major obstacles, including the availability and commitment of information technology support required to develop and maintain such a site, scalability, and security concerns. With the increasing emphasis on productivity, *learning management systems* (LMSs) are the most efficient strategic mode of e-learning application development. The goal of this Internet-based software is to provide the course author with a platform for rapid e-learning course design and deployment. By using the included templates and storyboards, the author has the ability to delineate and organize course materials into manageable learning segments. The author is required to maintain a logical development framework and sequence, avoiding haphazard inclusion of what used to be handouts, syllabi, objectives, and lecture notes.

The learning-management software can serve several functions beyond delivering content. Administrative tools provide learner and instructor identity management and access authentication to learner profiles, course catalogues, and examination results. LMSs also possess integrated collaborative tools, including chat boards, e-mail, threaded discussion groups, and video conferencing, and have dramatically improved faculty collaboration and synchronous course activities.⁷

Table 18.1. PowerPoint® to Video Conversion Programming

Program	Link
Presenter	www.articulate.com
PPT2Flash	www.sameshow.com
Camtasia Studio	www.softwarecasa.com
iSpring Presenter	www.ispringsolutions.com
authorPOINT Lite	www.authorgen.com
SoundBooth	www.adobe.com/products/soundbooth

Currently the most popular provider of proprietary LMSs is Blackboard (www.blackboard.com); however, more than 200 commercially available systems are currently available. An annual subscription fee is associated with these systems. Moodle (www.moodle.com) is an “open source” LMS, which requires a host server but without related subscription fees.

An announcement Web page and e-mail have dramatically simplified the day-to-day administration of the clerkship and the communication that it entails. ListServes, which are included in most LMSs, give clerkship directors the ability to provide updates to many learners, residents, and faculty members with a few keystrokes.

The number of e-learning resources available to educators has undergone a remarkable increase because of the growth of educational technologies and the Internet. Digital libraries such as MedEdPortal, HEAL, and MERLOT, give educators access to a vast array of medical e-learning materials. These repositories offer access to many high-fidelity, peer-reviewed e-learning materials. New standards in blended learning in medical education through medical school partnerships have resulted. Clerkship Web sites also provide a central repository of reference information for clerkship directors, faculty members, and learners.

Computer-based testing is an integral component of the LMS. Examinations have traditionally driven learning. Learners know that the exam will determine their academic status. The LMS test generator gives the author the option of producing fill-in-the-blank, matching, multiple answer, multiple choice, ordering, true–false, short answer, and essay type questions. On submission, the test is electronically corrected, and feedback is immediately given to the learner. The ability to support graphics (e.g., radiographs, electrocardiograms, clinical images) adds to the quality of the examination.

Tracking and monitoring of learners’ knowledge, attitudes, and skills via LMS surveys can simplify the process of evaluating improvement made through e-learning.

Effectiveness of E-Learning

Medical education has used systematic reviews of computer-assisted instruction more than other studies in higher education.^{4,8} Studies comparing e-learning with traditional instructor-led approaches consistently addressing utility, cost–effectiveness, and learner satisfaction.^{8,9} Several studies outside of health care have shown that e-learning is at least as good as, if not better than, traditional instructor-led methods.^{5,8} Studies have shown that learners using both distance learning and computer-based

instruction learned more efficiently and demonstrated better retention than learners using traditional methods alone.¹⁰ Knowledge, measured by pretest to posttest scores, has been shown to improve with computer-assisted instruction. E-learning has been shown to result in significant cost savings compared with traditional instructor-led learning.⁶

Learner attitudes toward computer presentations have been both positive¹¹ and negative.¹² Computer-aided learning is a novel approach to education, as long as the computer instruction does not supplant the more traditional face-to-face encounters.

Conclusion

To date, a comprehensive, computer-based clerkship management system does not exist. However, a Web page can be used to facilitate dissemination of course schedules, lectures, course documents, course evaluations, surveys, and examinations to learners. By its nature, e-learning offers learners and instructors the potential for widespread use, access, and sharing of information unmatched by other types of instruction.

An *adaptive learning* paradigm promotes greater learner interactivity and efficiency, motivation, cognitive effectiveness, and flexibility of learning style. A well-designed e-learning experience can motivate active participants to become more engaged with the content.⁶ Web-based materials are becoming increasingly vital in medical education as ambulatory experiences become more common and learners rotate at sites not part of their main clinical campus. The ideal system, once assembled, will transform the computer into a private tutor, providing interactive content management. Learners view Web-based instructional presentations in a positive light when augmented by discussion with faculty members. Information technology offers the clerkship director innovative approaches to medical student education. Educational programs must include opportunities for both active learning and independent study skills needed for lifelong learning.

Students do not view e-learning as a replacement for traditional instructor-led training but as a complement to it, forming part of a blended-learning strategy. Educators need to tailor their teaching media to learners' needs. E-learning goes beyond training and instruction to the delivery of information and tools to improve performance.

E-learning is a valuable addition to the medical education armory, but it does not replace traditional text, lectures, small-group discussion, or problem-based learning. Integrating e-learning into medical education programs catalyzes a shift where educators no longer serve as the distributors of content, but facilitate learning.

References

1. Greenhalgh T. Computer assisted learning in undergraduate medical education. *BMJ*. 2001;322:40–44.
2. Barzansky B, Etzel SI. Educational programs in US medical schools, 2004–2005. *JAMA*. 2005;294:1068–1074.
3. Reznich C, Shin JY, Korin T, Vincent T. Family medicine clerkship web sites: the state of the art. *Fam Med*. 2002;34:110–113.
4. Rosenberg M. *E-Learning: Strategies for Delivering Knowledge in the Digital Age*. New York, NY: McGraw-Hill, 2001.
5. Chu LF, Chan BK. Evolution of web site design: implications for medical education on the Internet. *Comput Biol Med*. 1998;28:459–472.
6. Gibbons A, Fairweather P. Computer-based instruction. In: Tobias S, Fletcher J (eds). *Training & Retraining: A Handbook for Business, Industry, Government, and the Military*. New York, NY: Macmillan Reference USA, 2000:410–442.
7. Johnson CE, Hurtubise LC, Castrop J, et al. Learning management systems: technology to measure the medical knowledge competency of the ACGME. *Med Educ*. 2004;38:599–608.
8. Bernard R, Abrami PL, Lou Y, Borokhovski E. How does distance education compare with classroom instruction? A meta-analysis of the empirical literature. *Rev Educ Res*. 2004;74:379–439.
9. Kirkpatrick D. *Evaluating Training Programs*. 2nd ed. San Francisco, Calif: Berrett-Koehler; 1998.
10. Clark D. Psychological myths in e-learning. *Med Teach*. 2002;24:598–604.
11. Steele DJ, Johnson Palensky JE, Lynch TG, Lacy NL, Duffy SW. Learning preferences, computer attitudes, and student evaluation of computerised instruction. *Med Educ*. 2002;36:225–232.
12. Lynch TG, Steele DJ, Johnson Palensky JE, Lacy NL, Duffy SW. Learning preferences, computer attitudes and test performance with computer aided instruction. *Am J Surg*. 2001;181:368–371.

SECTION FIVE

*Other Opportunities for
Student Education*

Emergency Medicine in the Preclinical Years

Jeffrey Barrett

Summary Points

- Traditional medical school curriculum requires 2 years of instruction in the basic sciences before the start of the clinical curriculum. This timing tends to limit the interaction of clinically based emergency medicine faculty with students in these preclinical years.
- Emergency medicine faculty can make some unique and important educational contributions during these formative years.
- Patient simulation now makes it possible to present fast-paced, high-acuity educational scenarios in a controlled setting.

THE MEDICAL SCHOOL CURRICULUM has traditionally been composed of 2 parts: the preclinical period and the clinical period. During the 2-year preclinical period, the basic science curriculum is traditionally taught in a lecture-based format. Generally, these lectures are delivered by basic science faculty or clinical faculty with expertise in a specific organ system, such as the cardiologist, nephrologist, and pulmonologist. It is typically not a time in which emergency medicine faculty have a chance to formally teach or interact with medical students, at least not without a concerted effort. These formative years, however, provide the foundation of the medical knowledge base for future physicians, and often specialty decisions are influenced by early exposure to faculty in particular fields. Active involvement

Active involvement by emergency medicine faculty at this stage of medical education is crucial on many levels.

by emergency medicine faculty at this stage of medical education is crucial on many levels. It can enhance medical student education by adding a unique perspective to the subject matter. Moreover, it provides an opportunity for learners with an interest in emergency medicine to find mentorship, and it can foster an interest in learners who would otherwise be unexposed to the specialty. Finally, active involvement in preclinical education fosters cross-departmental interaction and collaboration among faculty members. This exposure not only facilitates interdepartmental networking, mentorship, and research opportunities but also can increase the stature of the emergency medicine department within the medical school and the stature of the specialty within the national community of undergraduate medical educators.¹

In general, lecture-based didactics approach subject matter in a body-systems structure and have led to the heavy reliance on medical subspecialists. Emergency medicine faculty more commonly and more comfortably teach in an “approach to” structure (such as approach to dyspnea, approach to abdominal pain), which almost always involves more than 1 body system. It is therefore not surprising that emergency medicine faculty members are not often used in preclinical lectures.² In addition, many emergency medicine faculty members find themselves much more comfortable with the fast-paced, hands-on nature of emergency medicine education and perhaps less naturally suited for lecture-based didactics.

In many medical schools, there has been a shift from lecture-based teaching to small-group teaching, often with a heavy reliance on problem-based learning.¹

In recent years, however, the very rigid barrier between preclinical and clinical education has started to soften. Many medical schools have begun to integrate the 2 types of education in various ways. In addition to early clinical exposures, many schools formally teach history and physical exam skills and aspects of medical decision making early in the first year. In many medical schools, there has been a shift from lecture-based teaching to small-group teaching, often with a heavy reliance on problem-based learning.¹ Schools have not only sought new curricula but also have sought new educators, often with a strong preference and reliance on a diverse clinical faculty to provide early exposure not just to clinical medicine but also to practicing doctors. Emergency medicine faculty are a natural fit for this role, in many ways because we bring strong credibility to the table.³ We are a hands-on clinical faculty, fully engaged in the practice of clinical medicine 24 h a day, 7 days a week. Our scope of practice, and hence our knowledge base and experience, is vast. We treat all patients, regardless of ability to pay. These professional and character traits serve as a strong model and example to impressionable medical students.

As this model of preclinical education becomes more common, more of these opportunities will become available to emergency physicians, although the range of opportunities may vary widely based on the institution. Some schools make heavy use of the small-group and faculty mentor structure, often with multiple meetings per week during the preclinical period. Other schools may rely more heavily on lecture-based didactics but still use small groups for problem-based learning or other clinically focused exercises. Very commonly, the small group model is used for teaching history taking and physical exam skills. In all of these cases, however, emergency physicians have the natural training and talent to excel in such teaching, and interested faculty members should carefully assess the opportunities that exist within their institution.

The emergence of the simulated patient and its introduction to medical education has provided another enormous opportunity. Educators can create clinical correlation sessions wherein important basic science principles are correlated to the clinical practice of medicine. Emergency medicine faculty play a crucial role through their ability to connect basic science and physiology concepts with the practice of clinical medicine. In the controlled environment of the simulation laboratory, the parameters of the simulated patient can be manipulated, and concepts can be explained at the learners' pace. In addition to the reinforcement of knowledge, learners are exposed to concepts of resuscitation, simultaneous evaluation and treatment, medical decision making with incomplete data, and other challenges of "real-life" medicine.⁴

The emergence of medical simulation has also opened the door for the emergency physician to get involved in the instruction of basic medical procedures. Although the emergency department is ripe with the opportunity to perform basic clinical tasks such as venipuncture and intravenous access, lumbar puncture, laceration repair, and others, the sometimes chaotic and unpredictable environment of the emergency department may be less than ideal for the novice learner to first approach such procedures. In the controlled environment of the simulation laboratory, these procedures can be taught in a relaxed setting. This is an ideal opportunity for the emergency physician to get involved. It is therefore not surprising that emergency medicine faculty have risen to positions of leadership in medical simulation laboratories and clinical-skills training programs.

In addition to these opportunities, some medical schools allow preclinical learners to choose 1 or more "elective" courses before the start of clinical clerkship. These elective courses, which are usually relatively time limited, often provide clinical exposure to a particular field or specialty. An emergency medicine elec-

The emergence of the simulated patient and its introduction to medical education has provided another enormous opportunity for instruction in basic medical procedures.

In addition to the formal opportunities of the structured part of preclinical medical education, many medical schools have an emergency medicine interest group, almost always led by energetic and dedicated medical students with strong career interests in emergency medicine.

tive fits well in this model and can include not only shadowing experiences in the department but also formal learning through didactics, procedure and skills labs, and other modalities.⁵

In addition to the formal opportunities of the structured part of preclinical medical education, many medical schools have an emergency medicine interest group, almost always led by energetic and dedicated medical students with strong career interests in emergency medicine. Collaborating with these learners is a particularly efficient way to facilitate their exploration of this interest and for the emergency physician to become involved in preclinical medical education in a less structured way. In many ways, the opportunities that faculty can provide an interest group are similar to what might be offered in an emergency medicine elective: shadowing in the department, skill labs, simulation programs, and career guidance sessions.⁶

Some learners have an interest in pursuing clinically related work during the breaks between the first and second or second and third years. There are ample opportunities to provide this clinically related work in the emergency department. This can be approached from both a clinical and research perspective. Often during summer research programs, learners assist with various studies by identifying subjects and enrolling them in the various studies ongoing in the emergency department as well as assisting in other research-related tasks. In clinical programs, learners assist in performing various basic clinical procedures such as obtaining intravenous access, performing electrocardiograms, and inserting foley catheters. Such programs allow interested learners to explore these interests, gain valuable clinical experience, and develop lasting relationships with emergency medicine residents and faculty.^{7,8}

In summary, the traditional structure of preclinical medical education has limited the opportunities for emergency medicine faculty to become heavily involved in education at this level. With the curricular changes and educational advances that are rapidly taking place, however, emergency medicine faculty will find themselves a highly valued commodity in this realm of education. The current time is ripe with opportunities for the emergency physician, but it will still take the highly motivated and ambitious faculty to identify and take full advantage of these opportunities.

References

1. Burdick WP, Jouriles NJ, D'Onofrio G, et al. For the SAEM Education Committee, Undergraduate Subcommittee. Emergency medicine in undergraduate education. *Acad Emerg Med.* 1998;5:1105–1110.
2. Russi CS, Hamilton GC. A case for emergency medicine in the undergraduate medical school curriculum. *Acad Emerg Med.* 2005;12:994–998.
3. Coates WC. An educator's guide to teaching emergency medicine to medical students. *Acad Emerg Med.* 2004;11:300–306.
4. Patel AA, Glaiberman C, Gould DA. Procedural simulation. *Anesthesiol Clin.* 2007;25:349–359.
5. DeBehnke DJ, Restifo KM, Mahoney JF, Coates WC. Undergraduate curriculum. SAEM Undergraduate Education Committee, Society for Academic Emergency Medicine. *Acad Emerg Med.* 1998;5:1110–1113.
6. Pitre CJ. The unique educational value of emergency medicine interest groups. *J Emerg Med.* 2002;22:427–428.
7. Garmel GM. Mentoring students in academic emergency medicine. *Acad Emerg Med.* 2004;11:1351–1357.
8. Blumstein HA, Cone DC. Medical student career advice related to emergency medicine. *Acad Emerg Med.* 1998;5:69–72.

Medical Student Involvement in Research

Michael D. Witting

Summary Points

- Medical student involvement in research can greatly benefit medical student and faculty investigators, but only with careful planning and adequate resources.
- Medical students have 2 types of research opportunities—faculty initiated and medical student initiated—each with its own requirements.

PARTICIPATION IN RESEARCH offers several advantages to medical students, and medical students can be a vital resource for some research projects. In general, medical students may participate in 1 of 2 types of projects, medical student initiated or faculty initiated. Each has its own advantages for the medical student, the faculty research mentor, and the research program.

Benefits to Medical Students

By participating in research, medical students may learn about advantages and disadvantages of different study designs, and they can use these research skills to critically appraise literature in whatever field they choose to pursue. They can get a greater understanding of the state of knowledge in an aspect of emer-

Although medical students may not appropriately meet authorship criteria, their contributions should be recognized in an acknowledgment in manuscripts that result from their work.

gency medicine, and they can feel the excitement of advancing that knowledge. Medical students seeking a residency position can discuss their research participation on the interview trail. Depending on the mentoring available and the medical student's interest and ability, a medical student may initiate a project that results in a medical student–authored manuscript or a successful grant proposal, either of which could set the stage for a successful research career. Potential pitfalls in mentoring medical students are highlighted in Box 20.1.

Research Projects for Medical Students

Faculty-Initiated Projects

One model for medical student participation is the faculty–initiated project. In this model, a faculty member has a clearly defined project and needs some help, usually with data collection. A motivated medical student or team of medical students can review charts to collect data, enroll eligible research participants, enter data into a database, or collect clinical data requiring measurement. In this model, medical students can reap many of the benefits of research participation, but they will often not qualify to be co–authors on the studies that they help with.

The International Committee of Medical Journal Editors published ethical criteria for authorship in 1997 and updated them in 2008.^{1,2} According to these criteria, authors should do all of the following: (1) make substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; (2) draft the article or revise it critically for important intellectual content; and (3) approve the final manuscript.¹ For faculty–initiated projects, medical students will generally not be able to meet these criteria. Although medical students may not appropriately meet authorship criteria, their contributions should

Box 20.1. Pitfalls in Mentoring Medical Student Research

- Not establishing finite goals and deadlines for the project from the start: Often projects are too broadly encompassing and not realistic for the timeframe allotted.
- Not scheduling regular meetings with medical students to obtain periodic updates: Depending on the status of the project, these meetings may be as often as weekly or as infrequently as bimonthly. For a medical student to participate meaningfully in a medical student–initiated or a faculty–initiated project, faculty members must invest significant time and effort at the outset of the medical student's participation.
- Not ensuring that the medical student has adequate expectations, time, and resources to complete the project: Starting or joining a research project during the third or fourth year of medical school usually does not provide the medical student enough time for meaningful contribution to the project.

be recognized in an acknowledgement in manuscripts that result from their work. The success of the faculty-initiated model often depends on principal investigators being able to outline and describe clear roles for medical students and having structured projects that are likely to be completed successfully within a clearly defined timeframe.

For motivated medical students, grants are available.

Medical Student–Initiated Projects

Another model for medical student research participation is the medical student–initiated project. In this situation, a medical student presents a research idea and solicits a faculty mentor to help implement the project. The faculty member mentors the medical student throughout the process of research question formulation, study design, data collection, data analysis, and manuscript preparation. For motivated medical students, grants are available from the Emergency Medicine Foundation (www.emfoundation.org), Society for Academic Emergency Medicine (www.saem.org), and from the National Institutes of Health (www.nih.gov). This model usually requires considerable time and effort on the part of the mentor and medical student and presents greater risks and rewards than the faculty-initiated model. On the one hand, medical students often lack the perspective to come up with clearly focused research questions, may not perceive the logistical demands ahead, and start projects that ultimately go uncompleted. On the other hand, medical students learn great lessons even from projects that are not completed, and by planning the project from the beginning, medical students get a chance to experience the more creative aspects of research. Mentors and medical students should bear in mind that they have an ethical responsibility to participants, who have devoted time and effort to a study in the expectation that they will be contributing to general knowledge, not just that of the investigator. Thus, there is an ethical duty to work toward publication of results. The success of this model depends on faculty mentors with experience in research and mentorship, in addition to having adequate time to dedicate to the medical student.

New Investigator Training

Before collecting data for a research project, medical students must be familiar with regulations and ethical principles designed to protect research participants, such as the privacy provisions found in the Health Information Protection and Accountability Act (HIPAA). The institutional review board at each institution has its own requirements for new investigator training. Some in-

Medical students learn great lessons even from projects that are not completed.

stitutions may require classes be taken on campus, whereas others may offer training online. Examples of online programs include the Collaborative Institutional Training Initiative (<https://www.citiprogram.org/>) online service for research education and institution-specific online educational modules on HIPAA and biomedical ethics.

Timing of Research Participation

Both faculty-initiated and medical student-initiated projects should optimally start during the summer between the medical student's first and second years. Focusing these 3 months on a research project maximizes the medical student's chances for project completion and success. Often, however, medical students decide on emergency medicine as a career choice during their third or fourth year, and then subsequently look to research to bolster their applications in emergency medicine. They generally have little extra time during these clinical years, and few projects can take advantage of the brief, concentrated time that they have available. Medical students can take encouragement from the fact that this is a nationwide phenomenon and that many residency programs take medical students with academically strong applications that do not include experience in emergency medicine research.

Examples of Medical Student Research Programs

Summer Research Workshop

The University of Maryland hosts a summer research workshop for medical students between their first and second years. This is an optimal time to get medical students involved in research, because they are excited to get exposure to clinical medicine, their summer break is sufficiently long, and they have time to follow up on research projects beyond the summer period.

Box 20.2. Examples of Research Associate Programs

Hennepin County Medical Center*: www.hcmced.org/

University of Pennsylvania*: www.uphs.upenn.edu/em/education/dc-ass.htm

University of California–Davis: www.ucdmc.ucdavis.edu/emergency/education/undergrad/

University of California–Irvine: <http://160.87.12.42/emrap/index.cfm>

New York University: www.med.nyu.edu/emergency/electives/college/Research%20Internship/index.html

UCSF Fresno: www.fresno.ucsf.edu/em/academic_research_associates.htm

University of Texas–Houston: www.uth.tmc.edu/uth_orgs/emer_med/emrap.html

*Description includes medical students.

The program combines work on a faculty-initiated research project and didactic instruction in research methodology. In the months preceding the workshop, faculty members submit proposals for projects for the medical students to work on. Medical students are also encouraged and mentored in drafting a research question and developing a brief research proposal. Medical students are expected to have passed new investigator training before the start of the summer program.

Didactic lectures cover drafting a research question, searching the medical literature, introduction to study design, and introduction to statistics. These lectures are similar to those given at the American College of Emergency Physicians. Emergency Medicine Basic Research Skills Workshop, created by Edward Panacek. A description of the program can be found on the University of Maryland Web site (http://medschool.umaryland.edu/osr/em_workshop.asp).

To gain an appreciation for research and academic scholarship in emergency medicine, medical students can benefit from attending local, regional, or national meetings.

Research Associate Program

In 1994, at the State University of New York Stony Brook, Adam Singer and Judd Hollander created a unique model for organizing medical student research efforts known as the Academic Associate Program. Since then, many other medical schools have developed similar programs, commonly called *research associate programs*.² See Box 20.2 for examples of research associate programs.

The basic concept of the research associate program is that medical students, usually undergraduate and postbaccalaureate medical students, maintain a regular presence in the emergency department. They assist with enrolling patients in multiple, ongoing faculty-initiated projects. These projects provide several educational advantages to medical students and can be developed into for-credit undergraduate or graduate-level courses. This unique opportunity may also enhance the medical student's competitiveness in the medical school application process.³ Furthermore, the program provides an infrastructure for emergency medicine research, which faces challenges of surging volumes, limited onsite resources to recruit patients, and the need for after-hours enrollment.

Other Opportunities for Medical Students

To gain an appreciation for research and academic scholarship in emergency medicine, medical students can benefit from attending local, regional, or national meetings. At a local level, attending emergency medicine journal club meetings can familiarize medical students with current controversies in the field and instruct them in the critical evaluation of evidence. Regional

Society for Academic Emergency Medicine meetings, a day trip for most medical students, are unique opportunities to listen to presentations of original research, while also giving them an idea of what research questions are of interest to our specialty. If possible, medical students should be encouraged to attend the national Society for Academic Emergency Medicine meeting and the American College of Emergency Physicians Research Forum, which are also high-impact conferences for medical students interested in research.

Conclusion

Educating future researchers can be rewarding for both the student and teacher. Directors of educational research may choose to structure their educational programs using faculty-initiated or medical student-initiated research models. Each of these models has its own costs, benefits, and pitfalls. Educators can maximize the medical student experience by planning according to the desired model of participation.

References

1. International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. *JAMA*. 1997;277:927–934.
2. Hollander JE, Singer AJ. An innovative strategy for conducting clinical research: the academic associate program. *Acad Emerg Med*. 2002;9:134–137.
3. Sparano DM, Shofer FS, Hollander JE. Participation in the academic associate program: effect on medical school admission rate. *Acad Emerg Med*. 2004;11:695–698.

Considerations Regarding Foreign Medical Students

C. Jim Holliman

Summary Points

- Having foreign medical students in US institution clinical clerkships can be of mutual benefit for both the student and the institution.
- Clerkship directors accepting foreign students must be familiar with visa issues.
- Clerkship directors should evaluate foreign students prior to their starting a clerkship to decide if the student may need to be initially in “observation-only” mode.

PROVIDING THE OPPORTUNITY for foreign medical students to complete clinical clerkships in emergency medicine can be a very rewarding experience for both the clerkship director and the foreign learners. However, the clerkship director must consider unique organizational items when dealing with foreign medical students. Because emergency medicine is not a well-organized specialty in many countries, medical students from these countries often do not have any emergency medicine faculty role models or the opportunity to have clinical rotations in full-service emergency departments.¹ Providing rotation opportunities for foreign learners in the United States can help promote interest in the specialty of emergency medicine and the development of modern emergency medicine programs in other countries.

The clerkship director must consider unique organizational items when dealing with foreign medical students.

In most countries, learners are accepted to medical school at age 18 (directly from the equivalent of high school) and the curriculum is 6 or 7 years long.³

Having foreign learners in US rotations promotes cross-cultural education of our own medical students, residents, and emergency department staff.

Prerotation Considerations

Several issues should be considered before accepting foreign medical students (Box 21.1). To set up new eligibility for foreign learners to participate in an existing emergency medicine clerkship, the first thing to do is find out the institution's policies regarding acceptance of foreign medical students. Some US states, such as Pennsylvania (see www.pennstatehershey.org/web/md/home/visiting), have state laws that preclude eligibility of foreign learners from nonaccredited (either by the Accreditation Council for Graduate Medical Education or the International Joint Commission on Accreditation of Healthcare Organizations) medical schools from participating for academic credit in a US clerkship. Some US institutions accept foreign learners only from schools or hospitals in other countries with which they have preexisting formal affiliation agreements.² Most US educational institutions list on their application Web page whether they accept foreign learners and the unique application requirements for foreign learners.

The next consideration for the medical student clerkship director regarding foreign learners would be to determine what training prerequisites will be required of the learner. Many countries have a medical education structure that is different from the United States. In most countries, learners are accepted to medical school at age 18 (directly from the equivalent of high school) and the curriculum is 6 or 7 years long.³ This means that learners at the sixth year level are often at the equivalent of US fourth year medical students in terms of background, coursework, and clinical rotations. However in many countries (including some in Europe), even senior medical students do not have the same clinical responsibilities and opportunities typical for US medical students. Many countries' medical school curricula focus on didactic education with very little opportunity for learners to practice hands-on clinical care, and faculty supervision on clinical rotations may be scant. If the foreign learner's clinical training background is unclear or if it is not known whether the learner has had only limited hands-on experience, it is probably safest to have these learners participate in a US emergency medicine clinical rotation in an "observational mode" only. These learners would see emergency department patients in conjunction with a US medical student or emergency medicine resident but would not be allowed to care for patients independently. This limitation

Box 21.1. Prerotation Considerations for Foreign Learners

- What are the school, state, and federal rules concerning foreign learners?
- What training prerequisites should be required?
- What paperwork/logistical arrangements need to be made (e.g., letters of recommendation, mentor/sponsor, housing, transcripts, documentation of insurance, documentation of financial support)?
- What insurance is needed (e.g., health, malpractice)?
- What level of English proficiency will be required?

would need to be made clear to the foreign learners before their matriculation. Reasonable requirements to consider for foreign learners include at least 12 months of clinical rotations including internal medicine, surgery, and pediatrics, and possibly obstetrics and gynecology or psychiatry, before being eligible to take a US fourth year level emergency medicine clinical rotation.

The emergency medicine clerkship director should consider requiring a letter of recommendation from the foreign learner's home institution, a transcript, and an accepting local sponsor from the host (receiving) institution. These requirements may already be spelled out to apply to any foreign learner by the host institution and be listed on the institution's application Web site. Ideally, the local sponsor will be an emergency medicine faculty, although faculty members from other departments in the institution could serve in this role. Some learners have come to the United States for an emergency medicine rotation mistakenly believing that they were only going to be doing trauma surgery and would be spending a lot of time in the operating room. Using the "required sponsor" approach helps ensure significant interest by the foreign learner in the emergency medicine rotation versus having learners who are just trying to get into the United States for residency in another specialty. This approach also provides the foreign learner clearer expectations about emergency medicine practice.

Another consideration for the emergency medicine clerkship director is deciding whether more than 1 foreign learner can be accepted at a time. An advantage of having more than 1 learner at a time from the same other country is that these learners can provide some social support for each other during the rotation and perhaps be housed together.

The next consideration is the type of visa the matriculating learner will be required to have.⁴ This information usually would be noted in the host institution's policy on the application Web page. In starting a new rotation, however, the clerkship director must consider several visa option requirements. For countries on the "visa waiver" list, a visa is not required for a learner or tourist

If the foreign learner's clinical training background is unclear or if it is not known whether the learner has had only limited hands-on experience, it is probably safest to have these learners participate in a US emergency medicine clinical rotation in an "observational mode" only.

who stays in the United States for fewer than 90 days. For other countries, a “tourist visitor” visa may be applicable for fewer than 60 days or if the learner will be working clinically fewer than 18 h per week.⁴ For many countries, medical students (but usually not undergraduate learners) can enter the United States on a “business-related visitor” visa (B1). However, the host institution, particularly many US universities, may require a student visa (F or M visa).⁴

Obtaining the preliminary paperwork from the university personnel office for a student visa requires a lead time of at least 6 months. Completing the required paperwork for this type of visa requires coordination between the clerkship director, the university personnel office, and the matriculating learner. Another possibility is the J1 visa, which would apply to learners who may be doing additional research or educational work (or who qualify as a “scholar” in another field), and who plan to be in the United States for longer than 2 months.⁴ This type of visa requires a demonstration of external financial support of at least \$800.00 per month (this amount is greater in some areas) as well as demonstration of valid health insurance. This type of visa also must be obtained through the university personnel office and requires a lead time of at least 6 months.

All foreign learners in the United States are now required to be registered in the on-line Student Exchange Visitor Information System (SEVIS).⁴ This requirement applies to any learner using a F1, J1, or M1 visa (those on B1 “business” visas do not have to be registered in this system). The university matriculation or admissions office registers each foreign learner via a coded password into this national database (which allows the federal government to track all foreign learners). Entry into SEVIS requires prior documentation of financial support and valid insurance. After registering with SEVIS, the university then sends the learner the “I-20” paperwork, which the learner then presents to a US consulate or embassy to obtain his or her visa. The US Department of State Web site for visa information (http://travel.state.gov/visa/visa_1750.html) is the best reference for all the complicated visa application issues.⁴

Registration Considerations

The medical student clerkship director must specify ahead of time whether registration and enrollment of learners from other countries will be done through his or her office or through the medical school learner affairs office. Many universities and medical schools process most of this registration through the centralized office of student affairs. The simplest way to make sure that the foreign learners know the registration requirements is to post

these requirements and registration instructions on an application Web site. Learners should be instructed to access the Web site and follow the instructions there to register. Information that needs to be clearly noted on the Web site includes the following:

1. Specific paperwork that must be filled out ahead of time and how it should be returned (e.g., e-mail, Web site registration, fax, or standard mail)
2. Whether malpractice insurance is provided by the hosting hospital or university or must be provided independently by the learner or his home university
3. Housing arrangements and information on travel between housing and the hospital
4. Amounts, timetable, and method of payment for any applicable tuition or other fees (e.g., parking, registration, telephone)
5. Whether proof of personal health insurance is required, and if health insurance can be purchased through the university
6. Whether proof of immunization status (usually hepatitis B, mumps/measles/rubella, influenza) and negative skin test for tuberculosis status are required.
7. Whether completion of the Health Insurance Portability and Accountability Act (HIPPA) or other privacy assurance knowledge documents is required (some institutions require completion of online HIPPA and privacy act awareness training programs)
8. Whether passing the Test of English as a Foreign Language (TOEFL) is required and what minimum score level is then required
9. Dress code (e.g., if a specific type of white coat is required, exactly how and for what cost the learner may obtain it).
10. What medical equipment the learner will be expected to bring (e.g., stethoscope, ophthalmoscope).
11. The exact length of rotation with start and finish dates, and specifics as to the clinical duty hours and educational conference attendance required of the learner
12. Any books, manuals or other teaching materials the learner will be required to purchase either before or during the rotation (If the learners are expected to read any specific papers or books prior to the rotation, these should be mailed to learners very early [standard mail can take 3 to 4 weeks to some countries] if not available in electronic format or files that are too big to e-mail.)
13. The specifics of the evaluation and grading process
14. Whether full course credit from the host institution will be given for successful completion of the rotation

The new foreign learners should be clearly instructed on exactly who to contact when they arrive for their first clinical day. Usually it is best if they are kept in “observational mode” for the first shift or 2.

Considerations After the Rotation Starts

Foreign learners should arrive in the city where the rotation is located at least several days before the start date of the rotation. This time allows the learner to get over jet lag, make early cultural adjustments, and get settled in the local housing.

The new foreign learners should be clearly instructed on exactly who to contact when they arrive for their first clinical day. Usually it is best if they are kept in “observational mode” for the first shift or 2. This practice also allows the clerkship director to assess the learner’s English language ability (although this can be better predicted if the learner has been required to achieve a certain eligibility score on the TOEFL). Learners with very limited English language ability may need to be kept on “observational mode” for the entire rotation. Alternatively, they could be required to attend English language lessons after their clinical duty time. In addition to courses offered by universities and language institutes, often local churches and ethnic social organizations offer English language classes. These classes may be at little or no cost to the learner. It should be emphasized to the learner before the rotation that English proficiency is required to get the most value from the rotation. Also, it should be clearly stated in the application materials whether supplemental English instruction is available or not, and if so, at what cost.

Once foreign learners are allowed to independently see patients, the clerkship director should preemptively specify expectations in terms of timing, type, and to whom presentations are made (e.g., faculty versus senior resident). The learner’s role in performing different procedures and the need to first ensure direct supervision by faculty or senior residents should also be clearly delineated up front.

The clerkship director should consider having an informal meeting early in the rotation with the learner to determine whether the learner is having any social interaction problems, significant anxiety, or other remediable problems unrelated to training. This meeting might, of course, be accomplished as an enjoyable dinner or lunch. Early monitoring by the learner’s sponsor could also be used to accomplish the same goals. Learners from many different cultures may be too shy or otherwise reluctant to report social or environmental problems unless directly asked. Correcting these problems early can mean the difference between the learner having an enjoyable and successful rotation or a social disaster. During the entire rotation, but even more importantly early in the rotation, the learners should receive constructive feedback from residents or faculty members regarding their clinical performance.

Final Considerations for Foreign Learners' Clinical Clerkship

Scheduling a formal exit interview with the clerkship director near the conclusion of the clerkship is often helpful. Learners may be required by their home institution to present their evaluation or verify successful completion of the clerkship immediately on their return. Agreements and arrangements regarding future letters of recommendation should also be made at this time. If the learner will be staying at the same medical center for a follow-on clerkship, then some of this end-of-clerkship paperwork can be delayed.

Despite the extra effort and paperwork involved, having foreign learners in US emergency medicine clerkships can have some significant benefits, including⁵—

1. Encouraging the development and understanding of emergency medicine in other countries
2. Helping develop enthusiastic proponents of emergency medicine in other countries
3. Having the potential for mutual exchanges of medical students between countries
4. Providing cross-cultural education and experience for the emergency department staff
5. Identifying foreign learners who would become good emergency medicine residents if accepted into US emergency medicine residency programs
6. Developing long-term professional relationships that may serve to facilitate international research projects in the future
7. Contributing to meeting the increased interest in global health and international medicine by US learners and residents

Learners with very limited English language ability may need to be kept on “observational mode” for the entire rotation.

References

1. Kirsch TD, Holliman CJ, Hirshon JM, Doezema D. The development of international emergency medicine: a role for U.S. emergency physicians and organizations. *Acad Emer Med.* 1997;4(10):996–1001.
2. Anderson PD, Aschkenasy M, Lis J. International emergency medicine fellowships. *Emer Med Clin North Amer.* 2005;23(1):199–216.
3. World Health Organization. *World directory of medical schools.* Available at: www.who.int/hrh/wdms/en/ accessed March 17, 2010.

4. Kazzi ZN, Lewandowski C. International medical graduates and emergency medicine. In: Kazzi AA, Schofer JM, eds. *AAEM's Rules of the Road for Medical Students*. Milwaukee, Wis: American Academy of Emergency Medicine; 2003:317–326.
5. Holliman CJ, Green GB, VanRooyen MJ, et al. Proposed curriculum for an “observational” international emergency medicine fellowship program. *Acad Emer Med*. 2000;7(4):359–364.

SECTION SIX

Resources for Educators

Introduction to the Liaison Committee for Medical Education

Tom Morrissey

Summary Points

- The Liaison Committee for Medical Education (LCME) is the body charged with accrediting US schools granting the MD degree. It is jointly sponsored by the American Medical Association and the Association of American Medical Colleges.
- LCME accreditation is necessary for schools to receive federal grants for medical education and to participate in federal loan programs.
- LCME site visits are designed to ensure schools are providing the necessary raw materials to support a complete medical education, including appropriate institutional resources, educational programs, student selection processes, faculty, and educational resources.
- As clerkship directors, we will play an active role in LCME site visits.
- The LCME Web site (www.LCME.org) is a user friendly and invaluable resource.
- Emergency medicine provides a multitude of unique opportunities for the education of tomorrow's physicians. Taking advantage of these opportunities will not only produce better physicians (in all fields) but also elevate the power and respect of our specialty.

THE LIAISON COMMITTEE FOR Medical Education (LCME) is the body charged with accrediting medical schools' education programs, much the way the Accreditation Council for Graduate Medical Education (ACGME) is in charge of granting accreditation to residency programs. An LCME site visit is a necessary hurdle to receive the federal grants, participate in federal loan programs, and get the federal dollars that are so important to keeping our doors open.

Historical Overview

The LCME was officially formed in 1942, in the face of multiple pressures stemming from World War II. Earlier (from the beginning of the 1900s), the American Medical Association (AMA)

In recent decades, the LCME has placed more weight on assessment of educational programs.

and the Association of American Medical Colleges (AAMC) had been separately evaluating institutions that provided the MD degree. Their interests were divergent, with the AMA primarily representing the interests of the practicing physician, whereas the AAMC's attention was primarily focused on the educational institutions.¹ With the culmination of World War II, several stressors on the medical education system needed to be addressed. The first involved the question of how to protect medical students from the draft. The second grew out of pressure to train doctors faster. There was a push for a continuous curriculum, with an enrollment of new learners every 9 months (leading to graduation in 36 continuous months of study). The accrediting bodies were concerned that the integrity of the medical education might be compromised. They joined forces to provide a unified front and set out to make sure basic standards were still upheld. Further, because the continuous curriculum left learners without breaks between semesters to earn tuition money, learners needed to secure loans to pay for their education. Financial concerns eventually led to the one of the most daunting aspects of the need for LCME accreditation today: schools must have LCME accreditation to participate in federal loan programs, which are so critical to today's medical student. Today, LCME accreditation is also a necessary requisite for a medical school's graduates to be able to sit for the United States Medical Licensing Examination step exams and to enter into an ACGME-accredited residency program.

Over its lifetime, the focus of the LCME's charge has changed. In the early 1900s, the AMA Council on Medical Education published *Essentials of an Acceptable Medical College*.² It included only a very limited number of criteria, including premed course requirements, 4 years dedicated to medical study, attendance in class, the presence of a teaching hospital, dedicated core faculty size, available medical equipment, and a medical library or museum.

In the 1940s, most of LCME's time and energy were spent protecting medical students (and the medical education process) from the effects of the draft. In the postwar era, with the input of the US Department of Education, renewed interest in detailing the standards for accreditation has led to multiple rounds of standard setting and revision.³ In recent decades, the LCME has placed more weight on assessment of educational programs. From 2006 to 2007, some of the most frequent citations involved how we, as educators, clearly defined our educational goals and objectives and the job we did providing central oversight and timely narrative constructive feedback to our learners. The current view of what the LCME wants to see in a school granting the MD

degree is laid out in the document *Functions and Structure of a Medical School*, available on the LCME Web site (www.lcme.org).⁴

Many educational philosophies and program styles lead to the MD degree (e.g., combined degree programs, separate campuses, longitudinal programs). The LCME's job is not to micro-manage the programs but rather to make sure the "raw materials" are available for a medical school to pursue its mission of developing a complete and rounded physician prepared for entrance into postgraduate medical training.

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Organizational Structure

Because the LCME is jointly sponsored by the AMA and the AAMC, it holds main offices in both Chicago, Illinois, and Washington, DC, the headquarters of the sponsoring institutions. The AMA and the AAMC each appoint 1 secretariat and they alternate years functioning as the principal secretariat. Each body appoints 6 professional members and 1 student member. The professional members are a mix of practicing physicians, educators, and administrators. The Committee on Accreditation of Canadian Medical Schools appoints 1 member, and the LCME itself appoints 2 more. This results in a 17-member panel of our peers that conducts reviews and passes accreditation judgment on medical schools granting the MD degree (accreditation of osteopathic medical schools falls to the American Osteopathic Association Commission on Osteopathic College Accreditation). This group conducts annual reviews of data and reports from all medical schools in addition to the 20 to 30 site reviews it conducts each year. The group meets 3 times each year to discuss the reviews and determine accreditation status.

Site Visits

Arguably the most important reason to be familiar with the LCME is because you will likely need to participate in a site visit at some point in your career. This will be a very stressful time for your medical school, but it is a necessary step that must be navigated. Understanding the process will help.

Every few years, depending on the previous standing of your medical school, the LCME sends a committee (normally 5 members) to visit your school. You will get plenty of advance notice, but your school *will* need your help to show to the LCME that your clerkship meets the requirements. Many emergency medicine clerkship directors are now taking leadership roles in their medical schools and play much bigger roles in preparation for the site visit. At a minimum, this means a modest amount of paperwork. To do the paperwork correctly, you need to understand the

We need to focus on how the aspects of our specialty can add to the overall education and development of the “undifferentiated” medical student.

goals and objectives that drive the LCME. One of the best places to start, other than this chapter, is the LCME’s Web site (www.lcme.org/procedur.htm).

The LCME evaluates many different aspects of the medical school during a visit. Some are beyond our control, such as the physical plant of the institution, but we can have profound input on many of them. In fact, the multidisciplinary nature of our specialty puts us in a prime position for beefing up the qualities of our school that the LCME is looking for. By becoming familiar with the LCME and its workings, we can endear ourselves to our home institution, elevate our role in the education of tomorrow’s physicians, and maybe make our jobs a little easier.

Full accreditation cycles are usually 7 years. Newer schools, or schools with significant issues, may undergo shorter cycles or limited visits to reassess certain circumstances. The LCME maintains a Web site with a page that will allow you to see what year your next visit occurs (www.lcme.org/directry.htm). Schools are notified 18 months in advance of a scheduled the visit. Evaluation visits usually last 4 to 5 days. These visits evaluate all aspects of the medical school. For practical purposes, our involvement in these visits usually only take part of a day, unless you are more intimately involved in the structure of your medical school than just the emergency medicine clerkship. That being said, your school will count on you for many aspects of preparation for the site survey, so the behind-the-scenes work before the visit can be substantial.

The site visit often poses a special difficulty for clerkship directors. We are used to thinking specifically about how to train learners in emergency medicine. It is important to remember that the LCME is not interested in micromanaging schools’ educational philosophies, including how they educate in certain specialties. Rather, it is solely concerned that the medical schools are providing the materials necessary for a learner to mature into a residency-ready graduate. It can be difficult for us to let go of our emergency medicine focus of education. It is important, however, for us to step back and stop thinking only about how we want to teach emergency medicine. We need to focus on how the aspects of our specialty can add to the overall education and development of the “undifferentiated” medical student. This focus takes us out of our usual roles but, if done correctly, can show the school how much we contribute to the overall development of all medical students. By being cognizant of how your curriculum committee approaches educational philosophy, and working *with* them, you can demonstrate that there are many components of medical education required by the LCME that emergency medicine educators can do better than any other department in the

institution. Stepping up to fill these roles, where possible, endears us to the dean's office, thus bringing power, respect, and funding to the department.

Main Components of an LCME Site Visit

Formal notification of this LCME visit is given 18 months in advance. Twelve months before the survey, materials will be sent to the school to compile a "medical education database" and perform an institutional self-study. Your school will need your help compiling information to complete these documents. The database essentially provides detailed demographics for your school. The institutional self-study allows a school to take an objective look at itself and assess its compliance with accreditation standards before the actual visit. Areas of strengths and relative weakness can be identified in time for the school to develop strategies to deal with these issues. Changes implemented in response to the self-study are looked on favorably during the site visit. Documentation of these changes needs to be turned in to LCME 3 months before the visit.

The LCME focuses on evaluating 5 main standards: institutional setting, educational program, medical students, faculty, and educational resources. The following is a brief overview of each of these, with specific attention to those that historically have affected us or that we have been able to help our schools the most with addressing. A more detailed and specific discussion regarding how they pertain to our specialty can be found in a report from the SAEM Undergraduate Education Committee published in *Academic Emergency Medicine*.⁵

Institutional Setting

The institutional setting standards (IS #s) refer primarily to the governance and administration (the organizational structure) and the academic environment of the medical school. These standards are largely outside the level of our control as clerkship directors. As emergency medicine continues to mature as a field, however, many of our leaders are taking on roles in higher-level educational, administration, and deanship positions. Further, these standards require that the institution provide opportunities for learners to participate in research, scholarly, and service-related activities. Many emergency departments are able to provide these opportunities, which contribute to the medical school's ability to address these standards.

Educational Program

The educational program standards (ED #s) are probably the most germane to what we do on a daily basis. The school will

The LCME focuses on evaluating 5 main standards: institutional setting, educational program, medical students, faculty, and educational resources.

be required to define and detail the objectives of its educational program (i.e., developing a curriculum). We must be familiar with how our school approaches these objectives (educational philosophy), because we will be expected to adhere to this philosophy in the design of our clerkships. We must resist the temptation to think we work in a bubble. It is imperative that we take a broad view and ask ourselves how our niche can contribute to the fulfillment of the educational goals set forth by the school's curriculum committee. Some of the more remarkable standards of the educational program are outlined in the following bullets:

- *The objectives of the educational program must be stated in outcome-based terms that allow assessment of student progress in developing the competencies that the profession and the public expect of a physician (ED-1-A):* This standard states that assessment of our learners must be grounded in outcome-based terms (similar to how the ACGME expects residents to be assessed). We need to state our educational objectives clearly in terms of knowledge, skills, behaviors, and attitudes that our learners are expected to exhibit. These standards should be written in such a way that we are able to measure their successful acquisition (or lack thereof). This is often somewhere between difficult and impossible, but it is incumbent on us to do our best.
- *There must be a system with central oversight to ensure that the faculty define the types of patients and clinical conditions that students must encounter, the appropriate clinical setting for the educational experiences, and the expected level of student responsibility. The faculty must monitor student experience and modify it as necessary to ensure that the objectives of the clinical education program will be met (ED-2):* This means we must describe how we decide what types of experiences and patient encounters we require from our learners. We need to describe how we measure these and provide opportunities to fill in any gaps (e.g., didactic exercises, simulated patient encounters, skills labs).
- *There must be comparable educational experiences and equivalent methods of evaluation across all alternative instructional sites within a given discipline (ED-8):* We have to be able to show that we provide comparable educational experiences across all instructional sites. This means programs that have learners rotate at different emergency department locations need to be sure that learners are getting equivalent (but not necessarily identical) educational experiences. Common didactic lectures, simulated patients, online modules (many of the Clerkship Directors in Emergency Medicine projects) can be used to ensure this.

- *Students' clinical experiences must utilize both outpatient and inpatient settings (ED-16):* The school must show that it provides exposure to both outpatient and inpatient settings. Although this is usually not difficult, nobody can show the transition or interaction between these settings better than the emergency department.
- *There must be specific instruction in communication skills as they relate to physician responsibilities, including communication with patients, families, colleagues, and other health professionals (ED-19):* This standard relates to the development of communication skills with patients, families, colleagues, and so forth. The emergency department is an ideal place to both teach and evaluate this important skill.
- *The directors of all courses and clerkships must design and implement a system of formative and summative evaluation of student achievement in each course and clerkship (ED-30). Each student should be evaluated early enough during a unit of study to allow time for remediation (ED-31):* These standards relate to the development of formative and summative feedback practices. This development can be difficult because of the asynchronous pairing of learners and supervisors in the emergency department setting. Many programs have made use of daily shift evaluation cards to provide daily formative feedback to the learners. These cards can also be used by the rotation director at the end of the month to produce summative feedback documents.

The LCME document will ask that you have ways to ensure that visiting learners possess qualities equivalent to the home learners they will join on the rotation.

Medical Students

Most of the medical student standards (MS #s) govern the premed requisites and selection process, and thus, are out of our jurisdiction, unless you sit on these specific medical school committees. Visiting learners, however, are a common occurrence in many emergency medicine clerkships. The LCME document will ask that you have ways to ensure that visiting learners possess qualities equivalent to the home learners they will join on the rotation. These standards also mandate that the school provide a system to assist learners in career choice, selection of elective courses, and application to residency programs. Our broad range of hospital experiences and exposure puts us in a prime position to function in this advisory role. Emergency medicine faculty should strongly consider serving their school at this level.

- *Medical schools must ensure that the learning environment for medical students promotes the development of explicit and appropriate professional attributes (attitudes, behaviors, and identity) in their medical students (MS-31-A):* This standard specifi-

cally addresses how medical schools ensure that the learning environment promotes the development of professional attributes (attitudes, behavior, and identity) in their medical students. This recently (2008) adopted standard is likely to be a highlight in future LCME visits. As with all new standards, there will be a “break-in period” as both the LCME and the educational institutions struggle with just how to address the standard. Because of the stressful environment often found in the emergency department and the multiple opportunities to observe learners interacting directly with patients, families, colleagues, ancillary staff, and so forth, we provide an uncommonly rich environment for evaluating these professional attributes. Further, because we interact with most specialties, we are in a great position to watch for (and address) some of the underlying causes and principles behind “trash-talking” among different services.

Faculty

The faculty standards (FA #s) address the need to have sufficient numbers of appropriately trained and committed faculty members involved in the education of medical students. Familiarity with these standards can be an asset as you work with your chair to garner the necessary resources (e.g., funding, protected time, faculty development, promotion) to develop an effective rotation.

Educational Resources

The educational resources standards (ER #s) are also primarily outside of our control, but you may be asked to describe the resources available in your department to further the education of rotating learners. Examples include simulation lab experience, Advanced Cardiac Life Support courses, procedure labs, and so forth.

LCME Web Site

LCME's homepage (www.lcme.org) is a user friendly site that is a great starting point for anyone facing an accreditation visit or just wanting to learn more about the structure and function of the LCME. It provides a detailed overview of the accreditation process for established schools, as well as standards for starting new schools or increasing class sizes, establishing branch or remote campuses, and the like. There are links to many LCME publications designed to help you navigate the site visit preparation, including recent documents describing “most frequent citations.” The site allows you to see which schools are up for evaluation in the next couple of years. There is a frequently asked question page and links to related Web-based resources.

Conclusion

With emergency medicine increasing in interest and clout, many educators have asked, “will emergency medicine ever become a required rotation?” In 2008, I had the chance to ask Dan Hunt, the past acting secretariat of LCME, this question. His answer surprised me. He stated that the LCME was not in the business of telling institutions how to teach the core medical knowledge. In its recent revision of ED-1-A, the LCME is moving toward language that describes experiences and exposures the learner must encounter rather than discipline-specific mandates. The LCME recognizes the myriad educational systems and philosophies used to prepare medical students for postgraduate education and their future careers. He stated that the LCME was not likely to mandate which rotations were necessary in a given school. Rather, he suggested we, as medical educators, look for ways in which the emergency medicine curriculum adds to the overall development of tomorrow’s physicians.

By using the unique skill set, patient experiences, and learning opportunities afforded to us by our specialty we are able to provide many of the aspects of medical education the LCME is looking for in a program. For example, the LCME is very concerned with developing appropriate professional attitudes in medical students. The aspect of medical education known as “the hidden curriculum” can be defined (perhaps oversimplified) as fostering professional and respectful interactions between different specialties.⁶ Behind-the-scenes trash talking is thought by many educators to be a contributing factor to the decrease in enrollment in primary care specialties.⁷ This concern has long been on the agenda of the LCME, but it is extremely difficult to observe, evaluate, and remediate. What better venue could there be to foster appropriate interdepartmental interactions than the place where they all come together, often under the most stressful of circumstances?

When the dean’s office recognizes what you can provide for your learners, they can make emergency medicine a required rotation at your school. Don’t look for this to come from a national-level mandate. If we, as emergency medicine educators, want to see medical students obligated to spend time in the emergency department, we need to show that there are important experiences and educational opportunities they can experience in our house . . . like no where else!

References

1. Kassebaum DG. Origin of the LCME, the AAMC-AMA Partnership for Accreditation. *Acad Med.* 1992;62:85–87.

2. AMA Council on Medical Education. Essentials of an acceptable medical college *JAMA*. 1914;63:666–668.
3. Kassebaum DG, Eaglen RH, Cutler ER. The meaning and application of medical accreditation standards. *Acad Med*. 1997;72:808–818.
4. Liaison Committee on Medical Education. *Functions and Structure of a Medical School: Standards for Accreditation of Medical Education Programs Leading to the M.D. Degree*. Washington, DC: Liaison Committee on Medical Education; 2004 (with 2006 updates). Available at: www.lcme.org/functions2006june.pdf. Accessed December 29, 2009.
5. McLaughlin SA, Hobgood C, Binder L, et al.; on behalf of the SAEM Undergraduate Education Committee for 2004–2005. Impact of the Liaison Committee on Medical Education Requirements for emergency medicine education at US schools of medicine. *Acad Emerg Med*. 2005;12:1003–1009.
6. Snyder BR. *The Hidden Curriculum*. New York, NY: Knopf; 1971.
7. Hunt DD, Scott C, Zhong S, et al. Frequency and effect of negative comments (“badmouthing”) on medical student’s career choices. *Acad Med*. 1996;71:665–669.

Resource for Medical Student Educators

David A. Wald

Summary Points

- Use your institutional resources.
- Collaborate with colleagues.
- Attend faculty development courses.
- Access the numerous available online resources.

MEDICAL STUDENT EDUCATORS SERVE many educational roles. Some are clerkship directors, whereas others may be involved with clinical skills training, simulation training, and learner mentorship. Wherever your interests lie, the role of the medical student educator can be enhanced by tapping into several resources available to help educators more effectively perform their jobs. This chapter identifies key resources available to educators involved with clerkship administration and learner mentoring and advising.

Medical School and University Resources

Starting at the level of the medical school, several resources exist that are directly applicable to the needs of the medical student

The clerkship directors committee typically consists of clerkship directors from the mandatory third- and fourth-year clerkships in addition to an assistant or associate dean of medical education.

educator. Each medical school is charged by the Liaison Committee on Medical Education (LCME) to develop its own medical school objectives.¹ These objectives can serve as a template for the clerkship director to develop specific clerkship objectives. Therefore, it is important to be familiar with the overall objectives of your medical school and how your clerkship fits into the overall picture. Each medical school typically has some type of clerkship directors committee along with central oversight of the curriculum (i.e., a curriculum committee). These committees have distinct roles in the hierarchy of the school's committee structure. The clerkship directors committee typically consists of clerkship directors from the mandatory third- and fourth-year clerkships in addition to an assistant or associate dean of medical education. This group is charged with developing and implementing the policies and procedures as they relate to the clinical education of medical students. The clerkship directors committee will typically report to a curriculum committee. The curriculum committee also has a representative from the dean's office and typically consists of basic science and clinical faculty, including course and clerkship directors as well as learner representatives across the years of training. As charged, this committee oversees the entire medical school curriculum and typically reports to the dean of the medical school. Medical school teaching academies can offer a wealth of resources for the medical student educator. In 1990, the Medical College of Wisconsin developed the concept of a society of teaching scholars. The society's mission was to stimulate innovation in medical education and to represent excellence in education in faculty forums. Simpson and colleagues published a historical review of the Medical College of Wisconsin Society teaching scholars.² Since that time, many medical schools have developed "teaching academies." Although some variation exists between institutions, these academies share a few common themes. Teaching academies have missions that typically emphasize faculty development in educational skills, the promotion of educational innovation and scholarship, and curricular development. Find out if your medical school has a teaching academy and get involved.

Medical school teaching academies can offer a wealth of resources for the medical student educator.

At the university level, many institutions have an instructional support center or office of educational development with a host of resources. One institution with educational links on its Web site is the Center for Instructional Support, maintained at the University of Colorado Health Science Center.³ This site contains information to assist medical educators in enhancing their instructional, leadership, management, and research skills. Many other institutions have similar resources and can be found by searching the Internet. In addition, university and medical

school libraries frequently offer full-text access to medical education journal articles. Services such as Journal Finder, MDconsult, and PubMed allow for easy access to recently published and previously archived articles. Contact your university or medical school librarian to identify other available resources.

National Organizations

Beyond the medical school and university infrastructures, several important resources are available for the medical student educator from various national organizations. The first of these is the LCME, specifically the Accreditation Standards for medical education programs leading to the MD degree.¹ This periodically updated document is analogous to the institutional and specific program requirements set forth by the Accreditation Council for Graduate Medical Education (ACGME) for graduate medical education training programs.⁴ All US medical schools undergo periodic reviews by the LCME for accreditation purposes. The Association of American Medical Colleges (AAMC) is another resource for medical student educators.⁵ A search of the AAMC Web site will uncover many helpful documents. One of these, published in 1998, is the *Learning Objectives for Medical Student Education: Guidelines for Medical Schools* by the Medical School Objectives Project.⁶ This project helped to develop a consensus within the medical education community on the attributes that medical students should possess at the time of graduation. Another publication is the AAMC *Recommendations for Clinical Skills Curricula for Undergraduate Medical Education*.^{7,8} This report is the result of the AAMC Task Force on the Clinical Skill Education of Medical Students' having the goal of fostering a national consensus regarding the design and implementation of clinical skills curricula in the undergraduate medical curriculum. From a medical student educator perspective, the Group on Educational Affairs of the AAMC has a section specific to undergraduate medical education.⁹ There is no cost for membership in the Group on Educational Affairs. The section holds its annual meeting in conjunction with the AAMC annual meeting each November. Another AAMC resource is the Careers in Medicine Web site.¹⁰ This site provides information for medical students to assist in career planning. In addition, the Careers in Medicine newsletter, *Choices*, is published quarterly. Each issue highlights a different specialty. The January 2009 issue highlighted the specialty of Emergency Medicine. Additional resources that can be of help to the educator who is advising and mentoring medical students, can be found on the National Resident Matching Program (NRMP) Web site.¹¹ Of interest are data tables and reports from recent and past main residency match results. Two additional doc-

ACE represents medical student educators and clerkship directors in the core clinical specialties, including family medicine, internal medicine, neurology, obstetrics and gynecology, pediatrics, psychiatry, surgery, and, most recently (November 2008), emergency medicine. ACE's mission is to foster collaboration across specialties to promote excellence in clinical education of medical students.

uments are worthy of review. The first is an NRMP publication titled *Charting Outcomes in the Match*.¹² This report highlights how applicant qualifications correlate with success in the match. The other document is the *Results of the 2008 NRMP Program Director Survey*.¹³ This document reports specialty-specific data, including factors in selecting applicants to interview and rank, use of US Medical Licensing Examination exam scores, and the percentage of interview slots filled before the November 1 release date of the Medical School Performance Evaluation (formerly known as the dean's letter).

Continuing on the national level, educators should also be aware of another organization that specifically represents medical student educators. The most comprehensive of these is the Alliance for Clinical Education (ACE).¹⁴ Founded in 1992, ACE represents medical student educators and clerkship directors in the core clinical specialties, including family medicine, internal medicine, neurology, obstetrics and gynecology, pediatrics, psychiatry, surgery, and, most recently (November 2008), emergency medicine. ACE's mission is to foster collaboration across specialties to promote excellence in clinical education of medical students. ACE holds an annual educational meeting in conjunction with the AAMC annual meeting each November. In the past few years, ACE has developed many high-quality resources that can benefit medical student educators across disciplines. The first of these is the third edition of the guidebook for clerkship directors, posted on the ACE Web site.¹⁵ Currently, ACE is beginning work on the fourth edition, with an anticipated completion date some time in 2010. Another resource developed by ACE is the landmark collaborative statement "Expectations of and for Clerkship Directors."¹⁶ This paper outlines the roles, responsibilities, and resources required to perform clerkship administration. Additional educational resources can be found on the various Web sites of the constituent organizations of ACE, including the Clerkship Directors in Emergency Medicine (CDEM), which has a specific link for medical student educators.¹⁷⁻²⁴ The Society for Academic Emergency Medicine (SAEM), the parent group of CDEM, includes additional resources for the medical student educator.²⁵ These resources include a listing of medical education and faculty development fellowships. Other faculty development resources, monographs, articles, and links to organizations providing grant opportunities are available on the SAEM Web site. Finally, the Emergency Medicine Foundation, the education and research arm of the American College of Emergency Physicians, provides many seed grants for faculty.²⁶ Another group pertinent to medical student educators is the International Association of Medical Science Educators, which formed in 1997.²⁷ The mission

of the International Association of Medical Science Educators is to advance medical education through faculty development and to ensure that the teaching and learning of medicine continues to be firmly grounded in science. In 1972, the Association for Medical Education in Europe was formed.²⁸ This group fosters communication among medical educators and helps promote national associations for medical education throughout Europe. The Foundation for Advancement of International Medical Education and Research was founded in 2000 by the Educational Commission for Foreign Medical Graduates.²⁹ In partnership, these organizations promote excellence in international health professions education through programmatic and research activities.

At the SAEM national meeting, there continues to be a growing emphasis on education.

National Conferences

Within the specialty of emergency medicine, 2 national conferences provide resources for medical student educators. The Council of Emergency Medicine Residency Directors (CORD-EM) has an annual academic assembly that emphasizes medical education on both the graduate and undergraduate level.³⁰ Within the structure of the CORD academic assembly, CDEM has developed an educational track for medical student educators. At the SAEM national meeting, there continues to be a growing emphasis on education. The CORD academic assembly is held annually in February/March, and the SAEM national meeting is held each May/June. Outside of our specialty, the largest meeting for medical student educators is the AAMC annual meeting held each November.

Online Resources and Courses

The University of Medicine and Dentistry of New Jersey (UMDNJ), through its School of Health-Related Professions, offers a 12-credit Web-based postgraduate certificate in health professions teaching. Completion of the Web-based training is designed to enhance the proficiency of faculty in teaching and curriculum design. The UMDNJ Center for Teaching Excellence is another exceptional resource for medical educators and provides links to numerous other educational resources.³¹ The Cincinnati Children's Hospital Medical Center, in partnership with the University of Cincinnati College of Education, Criminal Justice and Human Services, offers online graduate-level programs for physicians and other health care providers. The online Certificate in Medical Education and the Master of Education Degree (MEd) programs focus on 3 educational themes: adult learning, curriculum and instruction, and educational research and evaluation.

Another key online resource for the medical student educator is MedEdPORTAL, an online publication service provided

free of charge by the AAMC. Initiated in 2004, the current online collection includes various instructional and assessment materials to addressing the needs of a wide group of medical educators.

Teaching Fellowships

The American College of Emergency Physicians, in conjunction with the Emergency Medicine Foundation, offers an annual teaching fellowship consisting of 2 sessions totaling 12 days over the course of an academic year.³³ This course is designed primarily for emergency medicine faculty members who want to improve their teaching skills. The American Board of Internal Medicine, in conjunction with the National Board of Medical Examiners, offers a 4-day course called, “Evaluation of Clinical Competence: A Faculty Development Course for a New Era.”³⁴ This course is designed to train faculty to evaluate clinical competence based on the 6 general competencies of the ACGME. Another educational resource available is the AAMC Medical Education Research Certificate Program.³⁵ The program is designed for clinicians and other educators and consists of various workshops, each focusing on a specific area in educational research. The Harvard Macy Institute, formed in 1994 is a collaborative effort of Harvard Medical School, the Harvard Graduate School of Education, and the Harvard Business School.³⁶ The institute offers 3 programs for academic leaders: Program for Educators in the Health Professions, Program for Leading Innovations in Health Care and Education, and Program for Comprehensive Assessment in Health Science Education. Each program is unique and focuses on a different aspect of medical education.

Conclusion

Although it is difficult to compile a complete and comprehensive list of resources for medical student educators, this chapter should serve as a starting point. The medical student educator should take advantage of the opportunities available to them starting with internal resources at their home institution, national organizations, conferences, faculty development courses, networking opportunities with colleagues, and so forth.

References

1. Liaison Committee on Medical Education Accreditation Standards. Available at: www.lcme.org/standard.htm. Accessed February 18, 2009.
2. Simpson D, Marcadante K, Sebastian J, et al. Fifteen years of evolution as a society of teaching scholars. *Acad Psych*. 2007;31:465–471.

3. Center for Instructional Support. University of Colorado Health Science Center. Available at: www.uchsc.edu/CIS/index.html. Accessed February 18, 2009.
4. Accreditation Council for Graduate Medical Education. Available at: www.acgme.org. Accessed February 18, 2009.
5. Association of American Medical Colleges. Available at: www.aamc.org. Accessed February 18, 2009.
6. Association of American Medical Colleges. Learning Objectives for Medical Student Education: Guidelines for Medical Schools. Washington, DC: Association of American Medical Colleges; 1998. Available at: www.aamc.org/meded/msop/. Accessed February 18, 2009.
7. Association of American Medical Colleges. *Recommendations for Clinical Skills Curricula for Undergraduate Medical Education*. Washington, DC: Association of American Medical Colleges; 2005.
8. AAMC Project on the Clinical Education of Medical Students. Available at: www.aamc.org/meded/clinicalskills/. Accessed February 18, 2009.
9. Undergraduate Medical Education Section of the AAMC Group on Educational Affairs. Available at: www.aamc.org/members/gea/ugmesection/start.htm. Accessed February 18, 2009.
10. AAMC Careers in Medicine. Available at: www.aamc.org/students/cim/. Accessed February 18, 2009.
11. National Resident Matching Program. Available at: www.nrmp.org/. Accessed February 18, 2009.
12. National Resident Matching Program and Association of American Medical Colleges. *Charting Outcomes in the Match*. 3rd ed. Washington, DC: National Resident Matching Program and Association of American Medical Colleges; 2007. Available at: www.nrmp.org/data/chartingoutcomes2009v3.pdf. Accessed December 30, 2009.
13. National Resident Matching Program, Data Release and Research Committee. *Results of the 2008 NRMP Program Director Survey*. Washington, DC: National Resident Matching Program; 2008. Available at: www.nrmp.org/data/programresultsbyspecialty.pdf. Accessed December 30, 2009.
14. Alliance for Clinical Education. Available at: www.allianceforclinicaleducation.org/. Accessed December 30, 2009.

15. Fincher R-ME, ed. *Guidebook for Clerkship Directors*. 3rd ed. Omaha, Neb: Alliance for Clinical Education; 2005. Available at: <http://familymed.uthscsa.edu/ACE/guidebook.htm>. Accessed February 18, 2009.
16. Pangaro L, Bachicha J, Brodkey A, et al. Expectations of and for clerkship directors: a collaborative statement from the Alliance for Clinical Education. *Teach Learn Med*. 2003;15:215–222.
17. Association for Surgical Education. Available at: www.surgicaleducation.com/mc/page.do. Accessed February 18, 2009.
18. Association of Directors of Medical Student Education in Psychiatry. Available at: www.admsep.org/. Accessed February 18, 2009.
19. Association of Professors of Gynecology and Obstetrics. Available at: <http://www.apgo.org/home/>. Accessed February 18, 2009.
20. Clerkship Directors in Emergency Medicine. Available at: www.saem.org/saemdnn/CDEM/tabid/835/Default.aspx. Accessed December 30, 2009.
21. Clerkship Directors in Internal Medicine. Available at: www.im.org/About/AllianceSites/CDIM/Pages/Default.aspx. Accessed February 18, 2009.
22. Consortium of Neurology Clerkship Directors. Available at: www.aan.com/go/education/clerkship/consortium. Accessed February 18, 2009.
23. Council on Medical Student Education in Pediatrics. Available at: www.comsep.org/. Accessed February 18, 2009.
24. Society of Teachers of Family Medicine. Available at: www.stfm.org/. Accessed February 18, 2009.
25. Society for Academic Emergency Medicine. Available at: www.saem.org/saemdnn/. Accessed February 18, 2009.
26. Emergency Medicine Foundation. Available at: www.emfoundation.org/. Accessed February 18, 2009.
27. International Association of Medical Science Educators. Available at: www.iamse.org/. Accessed February 18, 2009.
28. Association for Medical Education in Europe. Available at: www.amee.org/index.asp. Accessed February 18, 2009.
29. Foundation for Advancement of International Medical Education and Research. Available at: www.faimer.org/. Accessed February 18, 2009.

30. Council of Emergency Medicine Residency Directors. Available at: www.cordem.org/. Accessed February 18, 2009.
31. Center for Teaching Excellence at the University of Medicine and Dentistry of New Jersey. Available at: <http://cte.umdnj.edu/>. Accessed February 18, 2009.
32. Reynolds RJ, Candler CS. MedEdPORTAL: Educational scholarship for teaching. *J Continue Ed Health Prof.* 2008;28:91–94.
33. American College of Emergency Physicians Teaching Fellowship. Available at: www.acep.org/cme.aspx?id=22382. Accessed February 18, 2009.
34. American Board of Internal Medicine Faculty Development Course. Available at: www.abim.org/program-directors-administrators/faculty-development.aspx. Accessed February 18, 2009.
35. Medical Education Research Certificate program of the AAMC. Available at: www.aamc.org/members/gea/merc/start.htm. Accessed February 18, 2009.
36. Harvard Macy Institute. Available at: www.harvardmacy.org/. Accessed February 18, 2009.

Mentoring Medical Students in Emergency Medicine

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Summary Points

- Mentoring learners in emergency medicine takes time and is challenging. Mentors need to establish trust, demonstrate commitment, and share expectations and ideals.
- Despite the amount of time required to mentor learners in emergency medicine, it is a unique privilege to be in the position to have such a great impact on learners at their career crossroads.
- Mentors should encourage, support, challenge, and believe in their mentees at all times. If they are unable to do so, these reasons should be discussed privately with the learner in a safe setting.
- Ideally, all learners and educators, no matter how senior, should maintain strong mentor relationships and possess the opportunity to benefit from this aspect of personal and professional development.
- Having great faculty mentors from emergency medicine, regardless of a learner's ultimate career path, reflects positively on our faculty and the specialty of emergency medicine itself.
- Providing all medical students with productive and meaningful mentoring relationships sets an example for future mentors, which can be translated into successful future generations of physician mentors.

SERVING AS A MENTOR for medical students, residents, or junior faculty is an important component of career development, regardless of medical discipline. Mentoring is especially important for those entering or practicing emergency medicine because of the numerous challenges within our specialty. Assisting with a person's professional growth early in each phase of the career can be profoundly rewarding, regardless of the stage in the mentor's own career. Gender, age, cultural, and personality issues exist within the mentoring relationship at each stage, adding to the complexities of this important role.¹⁻⁴ Unquestionably, mentoring serves a critical function throughout all career stages for learners and mentors; the mutual benefit likely to occur for both parties should not be underestimated.

Unquestionably, mentoring serves a critical function throughout all career stages for learners and mentors; the mutual benefit likely to occur for both parties should not be underestimated.

All medical students can observe patient advocacy, professionalism, altruism, and kindness toward patients, their families, and staff, even if they do not plan a career in emergency medicine. Learners who receive outstanding mentorship are more likely to develop into future leaders. Medical students choosing other specialties will likely provide care as primary providers or specialty consultants to patients seen in emergency departments, and may work directly or indirectly with emergency departments and emergency physicians (in laboratory, radiology, or even pathology services). Strong role models can help medical students change or confirm their future medical choices.

Emergency medicine faculty are best able to mentor medical students interested in emergency medicine, because they are most familiar with the joys, demands, and nuances of this career. Because mentoring takes time and effort, emergency medicine faculty must be cautious with the number of mentees they take on at any given time. However, there is no limit to the number of mentors or advisors a learner can have or a requirement that career interests must match perfectly. The information within this chapter may be extrapolated to the challenges and privilege of mentoring residents and junior faculty.

Why Is Mentoring Important?

The literature consistently reports that professionals with strong mentors are more productive and have greater career satisfaction, both in the short and long term.⁵⁻⁸ Research suggests that academic physicians with mentors publish more articles in peer-reviewed journals and are more confident in their abilities than are their peers without mentors.⁹ Individuals describing positive mentoring relationships, as well as those with any mentoring, report greater perceived success. One study, despite its acknowledged selection bias, found that professionals without mentors reported lower salaries than their peers with mentors.¹⁰ Furthermore, strong mentoring relationships have been reported as having the most influence on a mentee's ultimate career selection.^{11,12} The advantages of mentoring hold especially true for women, despite their claim that mentoring occurs less frequently than for their male colleagues.⁹ Unfortunately, a large proportion of learners and physicians never experience a true mentor relationship and identify this lack of a mentor as one of the most important factors hindering their career progression.^{12,13} Many professional societies have formal mentoring programs, especially in business and nursing. Several emergency medicine organizations have recently responded to the importance of mentorship by establishing formalized mentoring programs at various student and resident levels. In addition, faculty development workshops

and committees have become increasingly common in our specialty, improving mentoring relationships and increasing the opportunities to network and exchange ideas.

Background and Definitions

The famous surgeon Harvey Cushing had as his mentor internist Sir William Osler.¹⁵ Such a relationship between specialists would be uncommon today because physicians with different backgrounds collaborate infrequently. However, individuals with dissimilar backgrounds in different specialties may offer various insights for those willing to learn and unafraid to benefit from others.

The word *mentor* derives its roots from Homer's *Odyssey*, in which Odysseus leaves his son Telemachus in the care of a trusted friend (Mentor) when he goes off to fight in the Trojan War.¹⁶ Mentor served as Telemachus' loyal guardian and wise advisor and later helped Telemachus find his father when Odysseus did not return. Under Mentor's guidance, Telemachus matured and developed his own identity. Athena, the goddess of wisdom, intermittently took the form of Mentor, imparting advice and wisdom of a personal nature.^{11,14,17} In Greek, mentoring has become synonymous with the term *enduring*.

Ancient Chinese kings used a form of mentoring called *Shang Jang* (to cede or to yield) to pass the crown to a successor.¹⁸ A literal translation of *Shang Jang* is "the enlightened stepping aside to create room in the center for the next deserving person to step in and take charge."^{17(pX1)} Current definitions of mentor include "a trusted and experienced advisor who has a direct interest in the development and education of another individual" and "an artist of enlightenment." Despite the importance of mentoring to physicians and the medical profession, neither *mentor* nor *mentoring* can be found in *Dorland's Illustrated Medical Dictionary, 31st edition*.¹⁹ Mentoring is an intentional process of interaction between 2 individuals that includes nurturing to promote growth and development of the mentee or protégé. It is an insightful process in which the mentor's wisdom is acquired and modified as needed, as well as a process that is supportive and often protective. The successful mentor–mentee relationship therefore requires active participation of both parties.

The mentoring relationship can be structured or loose. It can be an ongoing process or relatively short. Breaks between parties may occur during the relationship, but the relationship may get reestablished at some future time. Both individuals should be enriched by this relationship, although the gains of the mentee initially appear far greater than those of the mentor. In that sense, altruism toward and volunteerism on behalf of a less experienced

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Box 24.1. Benefits of Mentoring Gained by the Mentor

- Rekindled passion and excitement about the specialty
- Increased personal and professional growth and satisfaction
- Rewards from participating in a colleague's development
- Exposure to new ideas and opportunities
- Pride in the mentee's successes (including promotion, retention, and tenure)
- Increased creativity
- Opportunity to share the mentor's values with another
- Advancement or promotion as a result of mentoring (many academic departments now recognize, encourage, and require mentoring)

Altruism toward and volunteerism on behalf of a less experienced professional colleague are inherent in every mentor–mentee relationship.

professional colleague are inherent in every mentor–mentee relationship. Yet mentors often benefit from these relationships in unanticipated ways (see Box 24.1).

The Process of Mentorship

Mentoring is a special form of educational service that is highly personal and individualized. The mentoring relationship is dynamic. It evolves over time, during which both parties continually define and redefine their roles.²⁰ Despite the goal-directed nature of most physicians, mentoring should be considered a process, not an end product. This relationship must remain non-competitive and confidential. Mentors may see qualities in or opportunities for their mentee that the mentee does not see, and they should attempt to foster successes in areas their mentee did not think possible.

Because of advanced knowledge and experience, mentors are more powerful than their mentees. This status may complicate these relationships. Mentors must use caution if they suggest shortcuts or behaviors privileged by seniority, such as those related to direct patient care, research, authorship, committee work, or interpersonal interactions. They must be careful not to exert undue pressure on their mentee's decisions with respect to patient care, scheduling, project selection, committee participation, or career direction. Most mentees will have more than 1 mentor, which is healthy and should not be interpreted as a mentor's failure. Having more than 1 mentor offers mentees the opportunity to gain knowledge from more than 1 experienced individual with more than 1 perspective.

Learners should be encouraged to seek mentors from faculty committed to their well-being, personal and professional growth, and success within the specialty. Finding faculty mentors may be challenging for medical students, because their exposure to a

broad selection of emergency medicine faculty may be limited early in their training. Faculty biographies of those interested in mentoring, including professional and personal interests as well as previous mentoring experiences, should be made available to medical students. This information can be offered through the dean's office, department or division Web sites, word-of-mouth, or emergency medicine interest groups early in medical school.^{21,22} Learners should be comfortable changing mentors for any reason and without concern of retribution to themselves or their mentor. It is common for several mentor changes to occur during a career, because this relationship is dynamic and often includes intense personal interaction.

Medical student clerkship directors, emergency medicine program directors, and research and emergency medicine services directors are generally ideal mentors for medical students. Other administrators (including departmental chairs, chiefs, assistant chiefs, and medical directors) who have an interest in actively participating in mentoring may provide invaluable mentorship to medical students as well.²³ In addition, junior faculty members closer in age and experience to medical students should be encouraged to participate in this noble responsibility. Emergency medicine faculty member "face time" with medical students is possible during lectures, shadowing, medical school courses (e.g., introduction to clinical medicine, essential procedures, basic and advanced life support classes), interest groups, disaster exercises, or formal mentoring programs. Hosting or participating in a journal club directed at medical students interested in emergency medicine is an especially good opportunity to interact with learners in a social and educational capacity. Emergency physicians participating in these programs have greater exposure to medical students, which offers them additional exposure to our specialty and its faculty as well.

For learners at medical schools without emergency medicine residency programs, Clerkship Directors in Emergency Medicine, an academy within the Society for Academic Emergency Medicine (SAEM), has taken over the responsibility of the virtual advisor program for medical students. Renamed e-Advisors, medical students interested in participating are provided a list of volunteer emergency medicine faculty members willing to share information about our specialty. Learners initiate relationships with e-Advisors electronically and may maintain them over the Internet or arrange the opportunity to talk by phone or meet in person (e.g., at an emergency medicine conference). The information exchanged within these relationships must remain confidential, because learners should be comfortable asking questions and sharing concerns they may have about our specialty, their applica-

Learners should be comfortable changing mentors for any reason and without concern of retribution to themselves or their mentor.

tion (including their personal essay and curriculum vitae), their competitiveness, or suggested strategies to match in emergency medicine residency programs. Because the e-Advisor program is intended for learners who are at medical schools without emergency medicine programs and those considering careers in emergency medicine, it is possible that a few medical students may decide against training in emergency medicine. This decision should not be considered the mentor's failing or the result of problems with the guidance provided. Virtual advisors can answer questions about careers in emergency medicine; rotation recommendations; the residency application process; residency programs; the competitive nature of our specialty or the mentee; planning the final year of medical school; research or writing suggestions; whom to approach (and how to do so) for letters of recommendation; and personal, financial, or other important topics.²⁴ These interactions may develop into a much more intense mentor-mentee relationship over time, in which the mentor continues to offer advice and support, yet watches over and fosters the progress of the learner as he or she progresses in training. The responsibilities assumed by a mentor become far greater as this relationship develops over time, should the learner desire to continue this relationship.

Role of Mentoring in Medical Education

Medical education has changed, with bedside skills and behavior modeling assuming much greater roles for medical students. Simulation is one example in which medical school faculty observe and critique learner's interactions with "patients," colleagues, and simulated scenarios.²⁵⁻²⁷ Many medical schools have modified their curricula to get medical students out of the classroom and into the examination room earlier. Increasing numbers of introduction to clinical medicine courses illustrate this trend, many with emergency medicine faculty as instructors. As a result, medical students model their professional behaviors after clinicians earlier in their careers. Positive attitude, compassion for patients, and personal integrity are qualities they respect and emulate. According to surveys of students and young physicians, enthusiasm for the specialty and the practice of medicine are critical characteristics of role models and mentors. Although role models do not play as active a role in learner development as mentors, they share an equally important role. In fact, many learners select mentors on the basis of personal qualities rather than academic accomplishments, and many mentors started out as role models for learners only to be asked to serve as mentors at a later time (see Boxes 24.2, 24.3). Clearly, today's medical students place tremendous emphasis on doctor-patient relationships and psychosocial aspects of medicine. They are more likely to discuss

Box 24.2. Qualities of a Good Mentor^{1,5,17,25,26}

- Is committed to his or her mentee and the mentoring process
- Has realistic expectations of the mentee–mentor relationship
- Is available and approachable
- Listens well and demonstrates patience
- Maintains confidentiality
- Keeps promises and follows through
- Is not judgmental and accepts personal differences (including appearances)
- Demonstrates sensitivity to the mentee's needs
- Has mentee's best interests in mind
- Enjoys watching his or her mentee's growth and development
- Exhibits high professional and moral character
- Treats others with respect (and is respected)

personal issues with peers and supervisors than in the past. These are all reasons why meaningful and successful mentoring relationships should be encouraged at all levels of training.

Despite the positive experience that comes from having a mentor, not all learners enter a mentoring relationship. Unfortunately, a paucity of mentors exists for several reasons. Furthermore, medical students, residents, and junior faculty have insufficient awareness of the importance of the mentoring relationship. Learners may feel as if they are bothering a busy faculty member and, therefore, do not pursue such relationships. Faculty members may feel that the commitment of time, energy, and resources to a medical student distracts them from other more important academic and personal responsibilities.³⁰ Nevertheless, academic faculty should serve as mentors for our specialty's future physicians whenever possible, especially when common interests exist. It is important to make time for this growth experience once it is initiated, which includes being approachable, available, and enthusiastic about this role. Exposure to prospective mentees remains 1 important aspect of this process. Opportunities to gain exposure may occur during traditional classroom activities, leadership meetings, participation in interest groups, volunteer activities at medical student–run clinics or spectator events, informal career or classroom lectures (often during lunch or dinner), fundraising activities, or social events related to the medical school. Offering preclinical learners the opportunity to shadow or spend time in the emergency department is another terrific way to share enthusiasm for our specialty and be available to potential mentees.

Despite the positive experience that comes from having a mentor, not all learners enter a mentoring relationship.

Box 24.3. Responsibilities of a Mentor

- Commits time and energy on a regular and ongoing basis
- Encourages positive behaviors and excellence from the mentee
- Holds the mentee to high but obtainable standards
- Encourages the mentee to reach his or her potential, assisting whenever possible
- Assists in the mentee's identity development
- Protects the mentee from possible threats
- Informs the mentee about new opportunities
- Suggests alternate resources for information about academic opportunities, political culture, and networking
- Gives honest feedback in a constructive and caring manner
- Welcomes and accepts feedback from the mentee without threat
- Shares personal knowledge (medical and nonmedical), including failures
- Serves as a champion or advocate for the mentee
- Allows a confidential forum for the mentee's concerns, difficulties, or dissatisfactions

One goal of mentoring is to facilitate the acquisition of skills and knowledge required for long-term academic productivity and professional satisfaction

Goals of Mentoring

One goal of mentoring is to facilitate the acquisition of skills and knowledge required for long-term academic productivity and professional satisfaction (see Box 24.4). A mentor's primary goal is to as best as possible prepare a medical student, resident, or junior faculty member to ensure future career success.^{28,31}

However, just what *success* is must be addressed, because this definition often differs between parties. Clear yet flexible definitions should be exchanged between mentee and mentor to remove any ambiguity. Furthermore, a mentee's definition of success is likely to change over time, as will the mentor's. Additional pitfalls of mentoring are provided in Box 24.5.

The literature confirms that there are fewer effective mentors for women and underrepresented minorities in academic medicine.^{10,32-34} Although increasing, a smaller percentage of women with extended careers and advanced academic rank in emergency medicine exist.³⁵⁻³⁹ This is also true of minority faculty in emergency medicine and other specialties. Fortunately, our specialty attracts a higher percentage of women and minorities than many other specialties. Given that the current number of female medical students nearly equals the number of male medical students, there must be a shortage of experienced female (and minority) faculty to mentor learners who prefer female (or minority) mentors. Inherent gender differences in styles of communication, interaction, and competition may influence academic promotion.³² Confidence, stress, and conflict resolution are perceived and handled differently by learners, residents, and physicians,

Box 24.4. Mentor Topics

- Career choice, including fellowship training, academics, or private practice
- Coursework, especially clerkships and electives (emergency medicine and non-emergency medicine)
- Residency application process and Electronic Residency Application Service, including personal essays and advice with letters of recommendation
- Residency programs
- Clinical issues, including interpersonal skills with physicians, nurses, and staff
- Medical errors and quality improvement
- Patient safety
- Ethics and professionalism (dealing with difficult situations)
- Academic advancement, including research and administrative roles
- Career development and satisfaction
- Financial advice
- Wellness, balance, and other life skills (including family issues and sleep)

according to gender.^{40,41} It is important that our specialty's future physicians receive mentoring that accommodates differences in gender, culture, and professional satisfaction inherent in women and minority candidates. Some institutions completely lack minority emergency medicine faculty or have too few faculty members prepared to mentor learners on minority issues. Several recommendations of the SAEM Underrepresented Minority Research/Mentorship Task Force include targeting underrepresented minority medical students through early mentorship and clinical opportunities, in addition to encouraging the presence of minority emergency medicine faculty at organizations.⁴²

Learners often select their careers during exposure to clinical rotations—perhaps their most formative time.

Career Guidance

One of the best approaches to mentoring medical students who are planning careers in emergency medicine is to become familiar with learner-related issues.^{43–45} Faculty members experienced in counseling medical students, the application process, postgraduate training, career planning, satisfaction, and longevity have valuable information to share. Learners often select their careers during exposure to clinical rotations—perhaps their most formative time. Often, learners enter medical school with a predetermined career trajectory, only to become disillusioned during their clerkship experience in that particular area. This situation results in a tremendous sense of loss (or relief) for students and creates the need for them to quickly gain information about a different area of interest. Emergency medicine often fills or replaces this void, because it may offer enough variety or an

Box 24.5. Pitfalls of Mentoring²⁵

- Having inappropriate expectations (either mentee or mentor)
- Accepting responsibility or credit for work that is not one's own (such as authorship or grants)
- Lacking availability or schedule flexibility
- Engaging in inappropriate or insensitive interpersonal interactions, especially those that are gender, culture, or age related
- Failing to recognize limitations and not providing alternative resources
- Expecting exclusivity
- Doing work for the mentee
- Discomfort sharing own failures or missteps
- Breaching confidentiality
- Failing to anticipate challenges or obstacles in the mentoring process or giving up on the process too soon

Topics to discuss with learners interested in a career in emergency medicine include the number and location of emergency medicine rotations, when (and how) to schedule clerkships, how to get the most from each rotation, and how to be outstanding during the clerkship.⁴⁶

aspect of that initial career path to stimulate interest. It is at this vulnerable yet time-sensitive crossroads where strong mentorship by emergency medicine faculty is crucial.

Topics to discuss with learners interested in a career in emergency medicine include the number and location of emergency medicine rotations, when (and how) to schedule clerkships, how to get the most from each rotation, and how to be outstanding during the clerkship.⁴⁶ It is equally important to encourage learners to engage in extracurricular activities during medical school, especially those involving leadership and volunteerism. It is essential to help plan non-emergency medicine electives during the remainder of medical school and to discuss research projects, the merits of research electives, and international experiences.⁴⁷ Many learners will prefer to train in geographic areas other than their medical school for a variety of reasons; therefore, discussions about programs and audition rotations in these regions should occur (and remain confidential). Medical students who express interest in training away from their medical school should be supported, whatever their reason. The residency interview process is extremely important to discuss with medical students and might even include a mock interview with practice interview questions.

Resources from published literature, medical student organizations, and the Internet should be recommended or made available to learners whenever possible. A discussion of 3-year versus 4-year training programs should occur without prejudice.^{48–50} Fellowship training opportunities might also be described, including their advantages and disadvantages.^{51,52} Short- and long-term goals are best discussed in a nonthreatening, nonjudgmental atmosphere, away from direct patient care areas and other

Box 24.6. Key Mentoring Points

- Mentoring medical students in emergency medicine takes time and is challenging; it is necessary to establish trust, demonstrate commitment, and discuss expectations and ideals.
- Despite the amount of time required to mentor learners, it is a unique privilege to be in a position to affect their development.
- Mentors should encourage, support, challenge, and believe in their mentees at all times. If they are unable to do so, these reasons should be discussed privately with the learner in a safe setting.
- All learners and faculty should maintain strong mentor relationships no matter how senior, and have the opportunity to benefit from this aspect of medical education and career development.
- Investing in mentoring will likely influence emergency medicine over time; students who receive outstanding mentorship are more likely to develop into future leaders in our specialty.
- Outstanding emergency medicine mentors reflect positively on our faculty and the specialty of emergency medicine itself.
- Providing all learners with meaningful and productive mentoring relationships sets an example for and expectation of future mentors.

individuals. A realistic appraisal of the benefits, rewards, frustrations, and difficulties of our specialty must be addressed without bias or cynicism, as well as issues related to career satisfaction.^{53–56}

At a minimum, an introduction to the political climate within our specialty and the role of organizations such as the American Academy of Emergency Medicine, American Board of Emergency Medicine, American College of Emergency Physicians, American College of Osteopathic Emergency Physicians, Emergency Medicine Residents' Association, and SAEM should occur. A discussion of both internal and external pressures influencing our practice, including the Emergency Medical Treatment and Active Labor Act,⁵⁷ boarding and overcrowding, workplace violence, circadian rhythm disruption, contracts, burnout, career longevity, and career satisfaction should take place. Finally, an honest assessment of a medical student's abilities and potential is crucial, because learners are not always aware of the challenges of our specialty or the level of competition for residency positions, particularly in some programs or geographic areas. This discussion should include a realistic appraisal of the number of programs to which a medical student should apply, as well as a best determination of the medical student's likelihood for success in the match and beyond.³¹

Conclusion

Mentoring a medical student should be considered an honor and a privilege, not a chore. Learners deserve faculty members committed to their personal and professional growth, even if academic chairs or promotion and tenure committees do not always recognize this activity. However, to be successful, mentor-

Mentoring a medical student should be considered an honor and a privilege, not a chore.

ing must remain altruistic, aimed at the needs of the learner, and confidential (Box 24.6). Defining successful mentoring remains challenging, yet if done sincerely, sensitively, passionately, and with dedication and commitment, the likelihood of success is greatly improved.

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References

1. Garmel GM. Mentoring medical students in academic emergency medicine. *Acad Emerg Med.* 2004;11:1351–1357.
2. Sambunjak D, Strauss SE, Marusic A. Mentoring in academic medicine: a systematic review. *JAMA.* 2006;296(9):1103–1114.
3. Farrell SE, Digioia NM, Broderick KB, et al. Mentoring for clinician-educators. *Acad Emerg Med.* 2004;13:46–5130.
4. Marco CA, Perina DG. Mentoring in emergency medicine: challenges and future directions. *Acad Emerg Med.* 2004;11:1329–1330.
5. National Academy of Sciences, National Academy of Engineering, Institute of Medicine. *Advisor, Teacher, Role Model, Friend: On Being a Mentor to Students in Science and Engineering.* Washington, DC: National Academy Press; 1997.
6. Clutterbuck D. *Everyone Needs a Mentor: Fostering Talent at Work.* 3rd ed. London, UK: CIPD House; 2001.
7. Paice E, Heard S, Moss F: How important are role models in making good doctors? *BMJ.* 2002;325:707–710.
8. Wright DW, Hedges JR: *Mentoring faculty members to the next level.* Available at: www.saem.org/saemdn/Communities/Faculty/FacultyDevelopmentHandbook/MentoringFacultyMemberstotheNextLevel/tabid/719/Default.aspx. Accessed December 4, 2009.
9. Ramanan RA, Phillips RS, Davis RB, et al. Mentoring in medicine: keys to satisfaction. *Am J Med.* 2002;112:336–341.
10. Jackson VA, Palepu A, Szalacha L, et al. Having the right chemistry: a qualitative study of mentoring in academic medicine. *Acad Med.* 2003;78:328–334.
11. Barondess JA. A brief history of mentoring. *Trans Am Clin Climatol Assoc.* 1994;106:1–24.

12. Maddix T. Mentors and mentoring: health care workers hope to find integrity in their work, organizations, and leaders. *Health Prog.* 2001;82:25–27.
13. Schor NF. The supportive academic environment: ingredients for success. *Ped Neur.* 2003; 29:370–373.
14. Osborn TM, Waeckerle JF, Perina D. Mentorship: through the looking glass into our future. *Ann Emerg Med.* 1999;34:285–289.
15. Bliss M. *Harvey Cushing: A Life in Surgery.* New York, NY: Oxford University Press; 2005.
16. Homer. *The Odyssey.* Butler, S, trans. New York, NY: Washington Square Press; 1965.
17. Huang C, Lynch J. *Mentoring: The Tao of Giving and Receiving Wisdom.* New York, NY: Harper Collins; 1995.
18. Gates, J. Model emperors of the golden age in Chinese lore. *J Am Oriental Soc.* 1936;56(1):51–76.
19. *Dorland's Illustrated Medical Dictionary.* 31st ed. Philadelphia, Pa: Saunders; 2007.
20. *Faculty Mentoring Guide.* Richmond, Va: VCU School of Medicine; 2002. Available at: www.medschool.vcu.edu/facultyaffairs/career_dev/facultymentoringguide/index.html. Accessed December 2008.
21. Hindiyeh R, Larkin GL. Mentorship in emergency medicine. In: Kazzi AA, Schofer JM, eds. *Emergency Medicine: AAEM's Rules of the Road for Medical Students: The Guide for a Career in Emergency Medicine.* Milwaukee, Wisc: American Academy of Emergency Medicine; 2003:371–376.
22. Kalet A, Krackov S, Rey M. Mentoring for a new era. *Acad Med.* 2002;77:1171–1172.
23. Coates WC: An educator's guide to teaching emergency medicine to medical students. *Acad Emerg Med.* 2004;11:300–306.
24. E Advisor Program. CDEM (SAEM). Available at: www.saem.org/saemdnn/tabid/1382/Default.aspx. Accessed December 4, 2009.
25. Reznick M, Harter P, Krummel T. Virtual reality and simulation: training the future emergency physician. *Acad Emerg Med.* 2002;9:78–87.
26. Reznick M, Smith-Coggins R, Howard S et al. Emergency medicine crisis resource management (EMCRM): pilot study of a simulation-based crisis management course for emergency medicine. *Acad Emerg Med.* 2003;10:386–389.

27. Gisondi MA, Smith-Coggins R, Harter PM, et al. Assessment of resident professionalism using high-fidelity simulation of ethical dilemmas. *Acad Emerg Med*. 2004;11:931–937.
28. Perina D. A roadmap for success in academia. May 2000. Available at: www.saem.org/download/perina.pdf. Accessed Dec 2008.
29. Coates WC, Hobgood CD, Birnbaum A, et al. Faculty development: academic opportunities for emergency medicine faculty on education career tracks. *Acad Emerg Med*. 2003;10:1113–1117.
30. Pololi LH, Dennis K, Winn GM, et al. A needs assessment of medical school faculty: caring for the caretakers. *J Contin Educ Health Prof*. 2003; 23:21–29.
31. Garmel GM. Achieving Success in Medical School, the Match, and Internship. Presented at AAEM/RSA Student Track, AAEM Scientific Assembly, Las Vegas, NV. March 2007. Available at: www.saem.org/SAEMDNN/Portals/0/CDEM/EMApplicantsDoc/MedStudDocs/Garmel_SuccessKeynoteAAEMScientificAssembly2007.pdf. Accessed December 4, 2009.
32. Lewis RJ. Some thoughts regarding gender issues in the mentoring of future academicians. *Acad Emerg Med*. 2003;10:59–61.
33. McGuire LK, Bergen MR, Polan ML. Career advancement for women faculty in a US school of medicine: perceived needs. *Acad Med*. 2004;79:319–325.
34. Copeland EM. Mentoring faculty members. *Surgery*. 2003;134:741–742.
35. Cydulka RK, D'Onofrio G, Schneider S, et al. Women in academic medicine. *Acad Emerg Med*. 2000;7:999–1007.
36. Nonnemaker L. Women physicians in academic medicine: new insights from cohort studies. *New Engl J Med*. 2000;342:399–405.
37. DeAngelis CD. Women in academic medicine: new insights, same sad news. *New Engl J Med*. 2000;342:425–427.
38. Yedidia M, Bickel J. Why aren't there more women leaders in academic medicine? The views of clinical department chairs. *Acad Med*. 2001;76:453–465.
39. James T. Women in Academic Emergency Medicine/Diversity Interest Group position statement. *Acad Emerg Med*. 2000;7:1032–1035.

40. Blanch DC, Hall JA, Roter DL, et al. Medical student gender and issues of confidence. *Patient Educ Couns*. 2008;72:374–381.
41. Garmel GM. Conflict resolution in emergency medicine. In: Adams J, ed. *Emergency Medicine*. Philadelphia, Pa: Saunders;2008:2171–2185.
42. Hamilton GC; SAEM Under-Represented Minority Research/Mentorship Task Force. Attitudes and opinions of under-represented minority medical students regarding emergency medicine as a potential future career choice. *Acad Emerg Med*. 2004;11:483–484.
43. Blumstein HA, Cone DC: Medical student career advice related to emergency medicine. *Acad Emerg Med*. 1998;5:69–72.
44. Garmel GM: *Career Planning Guide for Emergency Medicine*. 2nd ed. Dallas, Tex: Emergency Medicine Residents' Association; 2007.
45. Iserson KV. *Iserson's Getting Into a Residency: A Guide for Medical Students*. 7th ed. Galen Press, Ariz; 2003.
46. Mahadevan S, Garmel GM. The outstanding medical student in emergency medicine. *Acad Emerg Med*. 2001;8:402–403.
47. Garmel GM. Planning your final year of medical school. Presented at Emergency Medicine Residents' Association's Student Life Forum, New Orleans, La (Oct 2006). EMRA Web site: www.emra.org/uploadedFiles/EMRA/Articles_and_Resources/2009_EM_Resident_Articles/Medical_Students/Garmel%20-%20Planning%20your%20final%20year%20of%20medical%20school.pdf. Accessed December 4, 2009.
48. Rosen P, Hamilton GC. 3 vs 4 year. Available at: www.saem.org/saemdnn/Home/Communities/MedicalStudents/EMApplicants/3vs4year/tabid/911/Default.aspx. Accessed December 4, 2009.
49. Langdorf M, Lotfipour S. Advantages of a three-year residency [rebuttal p. 20]. *Ca J Emerg Med*. 2004;1:15–17.
50. Weichenthal L. Advantages of a four-year residency [rebuttal p. 21]. *Ca J Emerg Med*. 2004;1:18–19.
51. Perina DG, Collier RE, Thomas HA, et al. Report of the Task Force on Residency Training Information (2007–2008), American Board of Emergency Medicine. *Ann Emerg Med*. 2008;51:671–679.

52. Stern S. Fellowship training: a necessity in today's academic world. *Acad Emerg Med.* 2002;9:713–716.
53. Cydulka RK, Korte R. Career satisfaction in emergency medicine: The ABEM longitudinal study of emergency physicians. *Ann Emerg Med.* 2008;51:714–722.
54. Gendreau M. Career satisfaction in emergency medicine and burnout: all is not well. *Ann Emerg Med.* 2008;52:577.
55. Ratanawongsa N, Wright SM, Carrese JA. Well-being in residency: effects on relationships with patients, interactions with colleagues, performance, and motivation. *Patient Educ Couns.* 2008;72:194–200.
56. Clem KJ, Promes SB, Glickman SW, et al. Factors enhancing career satisfaction among female emergency physicians. *Ann Emerg Med.* 2008;51:723–728.
57. Emergency Medical Treatment and Active Labor Act, 42 USC §1395 dd; 42 USC 1395dd (1986),

Letters of Recommendation

Alice R. Chiao and Gus M. Garmel

Summary Points

- The Standardized Letter of Recommendation (SLOR) is a valuable tool currently used to evaluate emergency medicine residency applicants. The current SLOR is available for download on the Council of Emergency Medicine Residency Directors Web site at www.cordem.org/slor.htm. Despite inherent concerns and challenges, the essence of this instrument has remained unchanged because of its overwhelming acceptance.
- Letters of recommendation should include the length of time the author has known the subject and the context of their relationship, as well as whether the candidate waived the right to review the letter.
- Letters of recommendation should include a brief summary of the subject's performance in the academic and clinical setting, as well as personality traits that may predict (or prevent) success. Whenever possible, these should be described relative to the subject's peers.
- Junior faculty members and those less experienced with letter authorship should actively seek assistance, critique, and feedback on their letters to continually improve and most accurately reflect the subjects of their letters of recommendation in the appropriate frame of reference.

LETTERS OF RECOMMENDATION serve the vital function of expressing an individual's potential to others. Letters of recommendation help those considering and evaluating a candidate for a residency program, award, promotion, or employment. These letters must address the needs of both the recipient and applicant, briefly describe the circumstances on which the author bases this information, and provide appropriate information about the applicant. The information contained in the letter of recommendation needs to be clearly stated, using honest and unambiguous terms. Perhaps the most challenging task in writing a letter of recommendation is predicting the subject's future potential. Many nuances to letter authorship go largely unrecognized by novice writers and readers; these nuances may have an enormous impact

The information contained in the letter of recommendation needs to be clearly stated, using honest and unambiguous terms.

The letters with the greatest impact are most commonly written by someone who knows the applicant well and practices in the applicant's chosen specialty.

An ideal letter of recommendation should be authentic, honest, balanced, technically clear, and of appropriate length and detail.¹

on the individual described in the letter of recommendation. This chapter explores the philosophy of letter authorship and, more specifically, writing letters of recommendation pertaining to residency applications for emergency medicine.

Types of Letters and the Philosophy of Letter Writing

The letter of recommendation is generally viewed as a reliable source of information written by someone who knows and has worked with the candidate. The letter of recommendation offers insight and depth to the candidate's application not provided by transcripts, exam scores, or a personal statement. In the case of a residency application, the letter of recommendation's author is generally in a position of authority relative to the candidate. For an award or promotion, the author may be an advisor, mentor, friend, or someone who has worked closely with the subject over time. The letters with the greatest impact are most commonly written by someone who knows the applicant well and practices in the applicant's chosen specialty. Letters of recommendation are crucial factors in the resident selection process. Letters of recommendation and the Medical Student Performance Evaluation (MSPE, formerly known as the Dean's Letter) provide perhaps the greatest insights to an applicant's clinical and interpersonal skills before an interview.

An ideal letter of recommendation should be authentic, honest, balanced, technically clear, and of appropriate length and detail.¹ Readers might perceive that a long letter is stronger than a short one. However, authors should consider that a lengthy letter may confuse or tire the reader, possibly creating disinterest in the applicant. Letter authors should always describe how and how well they know the applicant, as well as in what capacity they have worked together. The letter should also indicate whether a personal relationship exists that may influence the letter's content and contribute to bias.²

Confidentiality is an important factor in the process of authoring letters of recommendation. According to the Family Education Rights and Privacy Act of 1974, candidates have the option to waive access to their letters of recommendation. Authors should note whether the candidate waived this right to review the letter somewhere within the letter. If candidates are unsure whether or not to view their letters, they should be advised against it. Knowledge that a candidate may read the letter may affect the opinion of the author and the subsequent content, style, and language of the letter.² Blinding candidates to their letters of recommendation helps ensure the accuracy of letters; it also helps preserve the relationship between the candidate and author. In our opinion, a common mistake of inexperienced au-

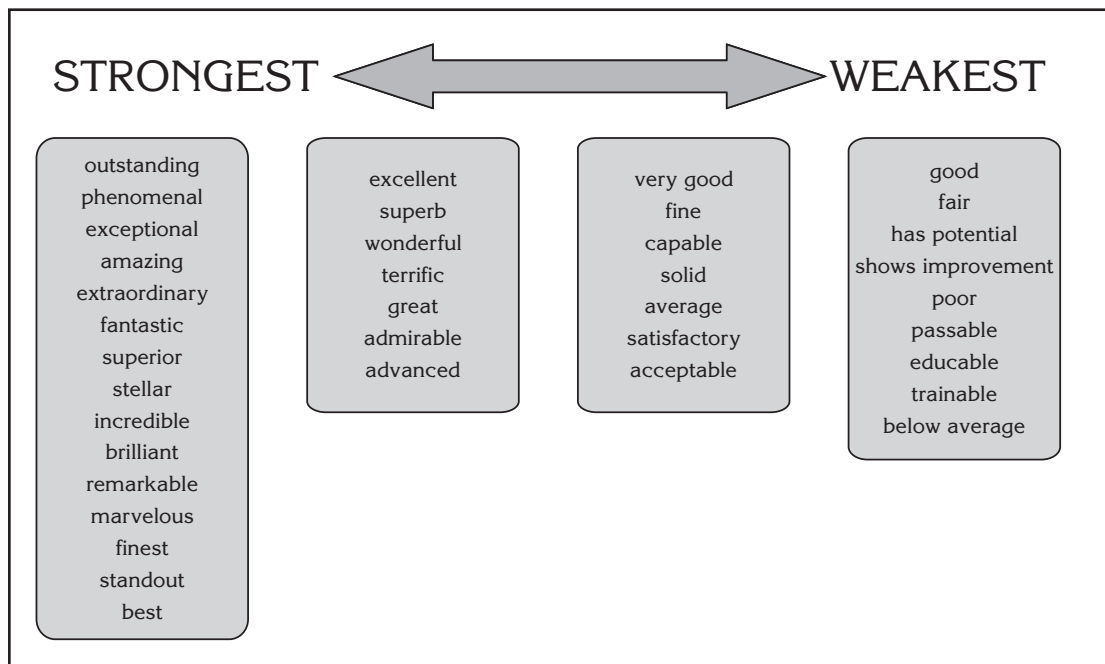
thors is sharing their letters of recommendation with some individuals but not others; this situation may create tension and may serve as a potential source of conflict for the author. However, if a candidate asks about the letter's content, an honest reply is appropriate.

Writing letters of recommendation is a highly subjective task. Some authors invest a great deal of time making sure their letter reflects the subject in an accurate light; other authors use generic templates and a superficial tone. Furthermore, readers may interpret various adjectives used by an author differently. For example, an author who writes that a candidate has a "very good" work ethic may have the intent of conveying this as a strength; however, the reader could easily interpret "very good" as someone in the middle to lower third of the candidate pool³ (as is used in the Standardized Letter of Recommendation [SLOR] for emergency medicine). Other superlatives such as stellar, outstanding, superior, and phenomenal are often used in an effort to distinguish top candidates. Descriptors such as solid, strong, educable, competent, above average, average, very good, and good can be interpreted in a less than favorable (or even negative) manner; authors should be aware of this possible misinterpretation when choosing these modifiers.³ One of the major shortcomings of conventional narrative letters of recommendation is the phenomenon of superlative inflation. There is an unofficial hierarchy of superlatives that may not be apparent to novice authors or recipients (see Figure 25.1). For example, outstanding consistently has a better rating than excellent on a linear scale of superlatives, but may fall short of stellar. Furthermore, outstanding may be further stratified by adding "one of the best this year" or "one of the best in the past 10 years." Some authors attempt to use a fixed percentage, such as 1%, 3%, or 5%, in their narrative of where the candidate falls over a certain frame of reference. This stratification is most useful if the author provides a denominator (e.g., time, location, or caliber) from which to compare candidates. The consequence of this hierarchy is that authors who wish to provide their highest recommendation for an outstanding applicant may fall short if they use insufficient praise and incorrect terms in their letter of recommendation.

Surprisingly, statements commonly used in letters of recommendation may unintentionally portray an applicant negatively or less favorably than intended. The frequent closing remark "If I can provide any additional information, please contact me." was almost universally perceived as a negative comment in a review of letters of recommendation by academic surgeons.⁴ It may also be in an applicant's best interest not to write that the applicant "demonstrated improvement over

Surprisingly, statements commonly used in letters of recommendation may unintentionally portray an applicant negatively or less favorably than intended.

Figure 25.1. Common terms used by emergency medicine faculty authors grouped according to Standard Letter of Recommendation categories.



the course of the clerkship.” Given the concept of superlative inflation, even worse would be to write “demonstrated significant improvement.” Although likely true of most learners, this statement can be interpreted to mean that an applicant’s overall performance was not very strong or at least did not begin that way.⁵

Faculty members may be asked to write a letter of recommendation for a colleague’s promotion or award nomination. In these situations, it is important to understand the position or award as best as possible. Reviewing information provided by the candidate or the organization about the award can assist the author in this situation. It also helps to have an individual’s cover letter, personal statement, and curriculum vitae to include comments regarding some of their academic and personal achievements. As with all letters of recommendation, it is imperative to describe the nature and duration of the relationship with the applicant. Of even greater significance is discussing the motivation and intentions for the position or award with the applicant. Insights gained from this meeting may help an author write a stronger and more focused letter of recommendation, which should strengthen the candidate’s application.

A 1998 survey of emergency medicine program directors concluded that letters of recommendation were 1 of the most important selection criteria when considering an applicant for residency.⁶ Other key criteria determined in this study include emergency medicine rotation grade, clinical grades, and the interview. Among these criteria, letters of recommendation had the lowest interrater consistency—it is easy to see this given the myriad of adjectives authors use, and use without commonly accepted stratification. One study found that the most influential letters for residency applicants were written by authors practicing in the applicant's desired specialty, who knew the applicant well, could compare them with others, and who mentioned an intent to recruit the applicant to their own program.⁷ Letters of recommendation from well-known and respected authors with a history of fair and accurate letters are likely to have the greatest impact on a candidate's application.

Standardized Letter of Recommendation

In 1995, the Council of Emergency Medicine Residency Directors (CORD) established a task force to create the SLOR. The SLOR was developed to address the problem of variability in letter authorship and was the first standardized letter of recommendation for residency applications.⁸ The SLOR is a 2-page form for candidates applying to emergency medicine residency programs, and is intended to be used exclusively by emergency medicine faculty. The SLOR includes both quantitative and qualitative information and attempts to increase the amount of comparable data provided to program directors when evaluating candidates. The current SLOR is available for download on the CORD Web site at www.cordem.org. Despite inherent concerns and challenges with the SLOR, this instrument has not been changed significantly because of its overwhelming acceptance.

Most institutions with medical student emergency medicine clerkships encourage either the clerkship or program director to complete the SLOR for students. At some institutions, the SLOR is crafted by more than 1 author. Often, a more experienced faculty member will coauthor a SLOR with a more junior faculty member in an attempt to maintain the utility of the SLOR and improve its validity. Although not required, the SLOR is highly recommended as the format for all letters of recommendation written by emergency medicine faculty for medical students applying to emergency medicine residency programs. Therefore, the SLOR accounts for the majority of letters of recommendation submitted for applicants to emergency medicine residency programs. The SLOR is updated annually and is available on the CORD Web site for download in several formats.⁹

A copy of the 2009–2010 SLOR is provided in Figure 25.2; please see the CORD Web site for the most recent version. The SLOR is divided into 4 sections: (1) background information (on the applicant and author), (2) qualifications for emergency medicine, (3) global assessment, and (4) written (narrative) comments. The *background information* section (A) allows the author to describe how well and in what capacity he or she knows the applicant. This section also has the author indicate whether he or she worked with the applicant during the student's first, second, or third emergency medicine rotation, as well as the dates of the rotation. Evaluation of a student and the resulting SLOR on the basis of an applicant's third emergency medicine rotation may differ significantly from one based on a first rotation. The date of the emergency medicine rotation was recently added to the SLOR to help readers consider the SLOR (and emergency medicine grade) given the timing of the rotation. The date may also allow for a direct comparison between 2 students who rotated at the same institution. This section also requests the distribution of grades given over the previous academic year at the author's institution. This distribution should be taken in the context that some rotations are mandatory for all medical students at a particular medical school whereas others are selective or elective in nature, thus influencing the distribution of grades (Figure 25.2).

The second section (B) asks the author to rank the applicant on *qualifications for emergency medicine*, such as commitment to emergency medicine, work ethic and willingness to assume responsibility, and ability to develop and justify an appropriate differential and cohesive treatment plan. Four discrete choices are given: outstanding (top 10%), excellent (top third), very good (middle third), and good (lower third). There are also questions pertaining to personality and how much guidance the author feels the applicant will require during residency. Although faculty letters of recommendation (both SLORs and traditional letters of recommendation) have never been shown to correlate strongly with success during residency,¹⁰ the 2009–2010 SLOR explicitly asks "Given the necessary guidance, what is your prediction of success for the applicant?" Authors are given 3 choices (boxes) to check: outstanding, excellent, and good. Prospective studies are needed to determine how well these responses correlate with resident success.

The third section (C) on *global assessment* asks the SLOR author to rank the emergency medicine residency candidate on a 4-item scale (outstanding, excellent, very good, and good). In addition, the author is asked to provide the number of candidates they have recommended in each category, as well as the total number of SLORs they have written in the last year. This

information allows the reader to consider the letter author's experience (number of SLORs written) and distribution of rankings. An author who has given the outstanding rating to only a few candidates out of a large number might be less likely to inflate global assessments of candidates, might have higher performing candidates in their excellent group, and might be more impressed with the potential for those few individuals to whom they gave the highest (outstanding) rating. Many emergency medicine program directors feel that the SLOR places applicants predominantly into upper- or second-tier categories; this rating distribution in the global assessment allows the reader to see how the author distributes ratings. The other question in the global assessment section asks the author the following question: "How highly would you estimate the candidate will reside on your match list?" The reply options are 4 choices: very competitive, competitive, possible match, and unlikely match. These options replaced former categories of guaranteed match, very likely to match, likely to match, possible match, and unlikely to match, because there is really never a guarantee with respect to the National Resident Matching Program. This question requires authors to stratify candidates into 1 of 4 tiers. For authors writing SLORs at institutions without emergency medicine residency programs, authors should state that this question is not relevant.

The final section (D) is for *written comments*. This section allows the author to include free text narrative in the SLOR. Some authors write a few sentences regarding their experience with the candidate; others write the equivalent of a 1- to 2-page letter of recommendation. Emergency medicine program directors view the SLOR as a traditional narrative letter of recommendation that also incorporates a standardized ranking system within this evaluation tool. Unfortunately, these standards remain inconsistent between authors, medical schools, residency programs, emergency departments, and geographic regions, and often serve as a source of frustration for both authors and readers. These inconsistencies are especially apparent, given that students complete emergency medicine clerkships at different times (when clinical experience varies), have different levels of exposure to emergency medicine before and during medical school (required third-year emergency medicine clerkships, previous training or background, volunteer experiences, preclinical shadowing, or number of emergency medicine clerkships completed), and receive disparate amounts of mentoring. However, compared with traditional narrative letters of recommendation, the SLOR is easier and faster to complete, read, and incorporate into an overall ranking system for applicants to emergency medicine programs. On average, the reader spends much less time interpreting a SLOR than a

Although the SLOR remains extremely popular, additional studies are needed not only to determine its predictive value but also to define how “success” as a resident is measured.

narrative letter of recommendation from the same author.¹¹ According to Girzadas et al.,¹¹ the time to global assessment averaged 16 seconds on the SLOR compared with 90 seconds for the narrative letter of recommendation. The SLOR results in an increased interrater reliability compared with the narrative letter of recommendation; both novice and experienced letter readers were found to have similar interpretations of SLORs. The SLOR allows readers to better differentiate candidates. A 1999 survey of COD members showed the majority were in favor of the SLOR.⁹ Given the growing number of applicants to emergency medicine residency programs, the SLOR has been indispensable in helping program directors select candidates to interview.

The SLOR format is currently being considered by other specialties for residency applications. The Council on Medical Student Education in Pediatrics and the Association of Pediatric Program Directors have discussed using a more standardized approach to pediatric residency applicant letters of recommendation and are taking preliminary steps by determining acceptable baseline content in letters of recommendation.⁵

Limitations of the SLOR

The SLOR is not a perfect tool and is not without bias. A 2004 study by Girzadas et al. looking at SLORs from 1998–1999 and 1999–2000 found that female residency applicants were twice as likely to receive a rating of “guaranteed match” on a SLOR from a female faculty member than with any other gender combination of candidate and author.¹² Although the former choice of “guaranteed match” has been replaced with “very competitive,” whether this choice affects the overall perception of an applicant remains to be studied. As far as the former data are concerned, the use of “guaranteed match” was found to increase the more time an applicant spent with an emergency medicine faculty author or when the author worked with the applicant outside of the clinical setting (such as research). Other factors described in this study that correlated with a higher rate of using “guaranteed match” included receiving honors in the emergency medicine rotation and an outstanding work ethic.

Another concern is whether the SLOR is a strong indicator of future residency success. Emergency medicine residency program directors have the task of selecting applicants whom they think will perform well as residents. A 2005 study of 54 residency graduates found that the medical school attended was the strongest predictor of overall performance in residency.¹⁰ Surprisingly, letters of recommendation (including both SLORs and traditional narrative letters of recommendation) were not

strongly correlated with success during residency. In this study, success was measured as a function of research and scientific writing, teaching skills, and involvement in emergency medicine organizations during residency. Although the SLOR remains extremely popular, additional studies are needed not only to determine its predictive value but also to define how success as a resident is measured.

A common practice in emergency medicine is a joint letter from 2 faculty members from the same department. This letter is often a collaborative effort between a faculty member and a clerkship or program director, which enables an applicant to have various perspectives shared on 1 letter without requiring a second letter from someone less familiar with the candidate. This practice also affords applicants the opportunity to submit a letter from someone else, either from within or outside of the specialty of emergency medicine. Emergency medicine residency applications generally do not require a department chairperson's letter.¹³

Difficulties and Challenges of Letter Writing

When medical students request a letter of recommendation, they expect the author to describe them as favorably as possible. Authors may be placed in an awkward position when the candidate asks if they can provide a strong letter of recommendation when they feel this is not possible. Authors in this position should truthfully explain to the candidate that they are not able to write a strong letter of recommendation. The outcome of this practice is that it allows candidates to shop for authors who are comfortable writing strong letters of recommendation. This practice inflates letters of recommendation in the aggregate, resulting in bias regarding the candidate's application, performance, and potential. Therefore, letters of recommendation may not accurately describe learners and instead may overinflate potential. Although it is important to be truthful to candidates, it is important for readers to recognize the inherent bias in many letters of recommendation.

Another challenge of letter authorship arises when authors feel they need to discuss an area of weakness or possible improvement by the candidate. It seems appropriate to discuss areas in which a candidate might improve to reflect a more comprehensive image of the subject. However, a retrospective review of 70 letters of recommendation at an obstetric/gynecologic residency program revealed that none of the letters of recommendation contained negative information about candidates.¹⁴ A review of 763 letters of recommendation submitted to an otolaryngology residency program also demonstrated letters universally advocat-

All authors (especially junior faculty members) should actively seek feedback on their letters of recommendation, not only from peers but also from those in the position to read them and make decisions on the basis of their content.

ing for applicants.¹⁵ Perhaps applicants who were not ideal candidates for these specialties or programs were encouraged to apply elsewhere or to pursue other fields. However, it is more likely that letters of recommendation were composed identifying only the positive attributes of an applicant rather than any negatives, which is less threatening to the author and potentially detrimental to the applicant. Despite presumed confidentiality of letters of recommendation, a candid letter may potentially place the author at legal risk if harmful or inaccurate comments are discovered by the applicant.¹⁶

It is also important for both authors and readers to be aware of possible gender influences in the authoring process. Female authors were more likely to label applicants as good “team players” and “compassionate,” whereas male authors were more likely to mention an applicant’s personal life or write letters of minimal assurance.¹⁵ These findings were true regardless of applicant gender. Although these factors may not significantly influence a letter directly, it is important for both the letter author and reader to be aware of these inherent biases.

Most faculty members do not write as many SLORs as clerkship or program directors. However, junior faculty members often work more clinical shifts and therefore spend more time with students and residents in the emergency department. As such, medical students requesting SLORs generally approach faculty with whom they have worked most. Letter authorship, especially of SLORs, is not a topic conventionally taught during residency.³ In fact, residents working with and evaluating learners during emergency medicine and non-emergency medicine rotations may submit comments to clerkship directors and preceptors that are directly added to SLORs or MSPEs. The terms used to describe candidates can be even less consistent in these situations.

Residency graduates pursuing academic careers will undoubtedly be in the situation of composing SLORs for candidates bound for emergency medicine and possibly letters of recommendation for those candidates not bound for emergency medicine. They may also be asked to write letters of recommendation for other reasons, such as awards, promotion, funding, or fellowships. Junior faculty members will benefit from guidance in this area, whether in the form of attending workshops; reviewing sample SLORs from more experienced faculty members; or from having someone discuss, review, and provide feedback for each SLOR before submission. It is important for authors to be aware of the issues and biases inherent in letter authorship. All authors (especially junior faculty members) should actively seek feedback on their letters of recommendation, not only from peers but also from those in the position to read them and make decisions on the basis

of their content. Because of the many nuances to writing, reading, and interpreting SLORs and narrative letters of recommendation, it is important for authors to follow-up on how their former medical students are doing, as well as obtain feedback on the consistency, content, and accuracy of their letters.

Conclusion

Letters of recommendation are vital tools in the overall evaluation of candidates and prediction of their potential. They offer a crucial dimension of the applicant not necessarily reflected by their curriculum vitae, transcripts, or exam scores. A well-written letter of recommendation can elevate an otherwise average application, adding promise and a better understanding of the applicant's abilities. Conversely, a poorly written letter of recommendation, such as one that does not consider the stratifications associated with terms selected, may unintentionally hurt an applicant's competitiveness and affect his or her application in a negative manner. Letter authorship should be considered an evolving art and will remain integral in the application process for residency, awards, and promotions. The letter author must be cognizant of these issues and, to the best of their ability, portray each candidate accurately, honestly, without bias and with integrity—learners, future colleagues, patients, and our specialty depend on it.

References

1. Larkin G, Marco C. Ethics seminars: beyond authorship requirements—ethical considerations in writing letters of recommendation. *Acad Emerg Med.* 2001;8:70–73.
2. Garmel GM. Mentoring medical students in academic emergency medicine. *Acad Emerg Med.* 2004;11:1351–1356.
3. Garmel GM. Letters of recommendation: what does good really mean? *Acad Emerg Med.* 1997;4:833–834.
4. Balentine J, Gaeta T, Spevack T. Evaluating applicants to emergency medicine residency programs. *J Emerg Med.* 1999;17:131–134.
5. Morgenstern BZ, Zalneraitis E, Slavin S. Improving the letter of recommendation for pediatric residency applicants: an idea whose time has come? *J Pediatr.* 2003;143:143–144.
6. Crane J, Ferraro C. Selection criteria for emergency medicine residency applicants. *Acad Emerg Med.* 2008;7:54–60.
7. Wagoner NE, Suriano JR, Stoner JA. Factors used by program directors to select residents. *J Med Educ.* 1986;61:10–21.

8. Keim S, Rein J, Chisholm C. A standardized letter of recommendation for residency application. *Acad Emerg Med.* 1999;6:1141–1146.
9. 2009–2010 COD Standard Letter of Recommendation. Available at: <http://www.cordem.org/slors.htm>. Accessed December 3, 2009.
10. Hayden S, Hayden M, Gamst A. What characteristics of applicants to emergency medicine residency programs predict future success as an emergency medicine resident? *Acad Emerg Med.* 2005;12:206–210.
11. Girzadas DV Jr, Harwood RC, Dearle J, et al. A comparison of standardized and narrative letters of recommendation. *Acad Emerg Med.* 1998;5:1101–1104.
12. Girzadas DV Jr, Harwood RC, Davis N. Gender and the Council of Emergency Medicine Residency Directors standardized letter of recommendation. *Acad Emerg Med.* 2004;11:988–991.
13. Loftipour S, Garmel GM. Letters of recommendation. In: Kazzi A, Schofer J, eds. *Emergency Medicine: AAEM's Rules of the Road for Medical Students. The Guide for a Career in Emergency Medicine.* Milwaukee, Wis: AAEM/RES Resident Section; 2003:65–72.
14. Blechman A, Gussman D. Letters of recommendation: an analysis for evidence of accreditation for graduate medical education core competencies. *J Reprod Med.* 2008;53:793–797.
15. Messner AH, Shimahara E. Letter of recommendation to an otolaryngology/head and neck surgery residency program: their function and the role of gender. *Laryngoscope.* 2008;118:1335–1344.
16. Schneider A. Why you can't trust letters of recommendation. *The Chronicle of Higher Education.* June 30, 2000:A14–16.

Figure 25.2. Copy of the 2009–2010 Standardized Letter of Recommendation.

2009-2010 APPLICATION SEASON Emergency Medicine Residency Recommendation Form Emergency Medicine Faculty ONLY – Read Instructions first @ www.cordem.org	
Applicant's Name:	AAMC ERAS ID No.
Reference Provided By:	
Present Position:	Email:
Institution:	Telephone Number:
A. Background Information	
1. How long have you known the applicant?	
2. Nature of contact with applicant: (Check all that apply)	
Know indirectly through others/evaluations	<input type="checkbox"/> Extended, direct observation in the ED <input type="checkbox"/>
Clinical contact outside the ED	<input type="checkbox"/> Advisor <input type="checkbox"/>
Occasional contact (< 10 hours) in the ED	<input type="checkbox"/> Other <input type="checkbox"/>
3. If this candidate rotated in your ED, what grade was given?	
Honors <input type="checkbox"/>	High Pass <input type="checkbox"/> Pass <input type="checkbox"/> Low Pass <input type="checkbox"/> Fail <input type="checkbox"/>
Optional: One Key Comment from ED Faculty Eval:	
4. Is this the student's first, second, or third EM rotation? _____	
What date(s) did this student rotate at your Institution? _____	
5. Indicate what % of students rotating in your Emergency Department received the following grades last academic year:	
Honors	% Total # students last year:
High Pass	%
Pass	%
Low Pass	%
Fail	%
100% Total	
B. Qualifications for EM. Compare the applicant to other EM applicants/peers.	
1. Commitment to Emergency Medicine. Has carefully thought out this career choice.	
Outstanding (top 10%) <input type="checkbox"/> Excellent (top 1/3) <input type="checkbox"/> Very Good (middle 1/3) <input type="checkbox"/> Good (lower 1/3) <input type="checkbox"/>	
2. Work ethic, willingness to assume responsibility.	
Outstanding (top 10%) <input type="checkbox"/> Excellent (top 1/3) <input type="checkbox"/> Very Good (middle 1/3) <input type="checkbox"/> Good (lower 1/3) <input type="checkbox"/>	

- 3. Ability to develop and justify an appropriate differential and a cohesive treatment plan.
Outstanding (top 10%) Excellent (top 1/3) Very Good (middle 1/3) Good (lower 1/3)
- 4a. Personality; ability to interact with others.
Superior Good Quiet Poor
- 4b. Personality; ability to communicate a caring nature to patients
Superior Excellent Adequate Poor
- 5a. How much guidance do you predict this applicant will need during residency?
Almost None Minimal Moderate
- 5b. Given the necessary guidance, what is your prediction of success for the applicant?
Outstanding Excellent Good

C. Global Assessment

- 1. Compared to other EM residency candidates you have recommended as such last academic year, this candidate is ranked as:

<u>Ranking</u>	<u># Recommended as such last academic year</u>
Outstanding (top 10%) <input type="checkbox"/>	
Excellent (top 1/3) <input type="checkbox"/>	
Very Good (middle 1/3) <input type="checkbox"/>	
Good (lower 1/3) <input type="checkbox"/>	

Total # of letters you wrote last year:

- 2. How highly would you estimate the candidate will reside on your match list?
Very competitive Competitive Possible match
Unlikely match

D. Written Comments

Signature: _____ Dated: _____:

STUDENT HAS WAIVED RIGHT TO SEE THIS LETTER

Dealing With the Difficult Learner

Jennifer Avegno

Summary Points

- Problem learners are not uncommonly encountered in emergency medicine clerkships and should be identified and addressed as early as possible in an individualized, direct manner.
- Intrinsic learner difficulties may be caused by inadequate knowledge base, nontraditional learning styles, or interpersonal issues.
- Extrinsic factors, such as emergency department and clerkship setup, as well as educator constraints, may further contribute to learner difficulties.
- Emergency medicine clerkships should be structured to clearly define expectations and available resources.

EMERGENCY MEDICINE CLERKSHIP directors and other medical student educators, like their counterparts in other specialties, will occasionally encounter learners who have difficulties during their course of training. In a survey of internal medicine course directors, up to 15% of learners were identified as “struggling” or “problem” learners during their rotation; however, many times these people were not formally reported, identified, or graded accordingly.¹ Lack of agreement over what makes a learner problematic or unsuccessful, as well as fear of reprisal for negative feedback, can hamper educators’ ability to identify and deal with difficult learners. However, identification of problem learners is paramount, because these people may have a profound impact on medical institutions and the larger community. Undereducated

or unprepared learners may become physicians with a substandard knowledge base and may provide inappropriate medical care. Furthermore, unprofessional learner behavior often correlates with future problems and disciplinary action.² Emergency medicine educators should thus be diligent in understanding and identifying the problem learner(s) in their clerkship and have effective strategies for early intervention and remediation.

Identifying the Difficult Learner

The emergency department is often a challenging place for all who walk through its doors, and medical students are no exception. Problems that occur on an emergency medicine rotation may be caused by 1 or more factors: learner characteristics, systemic or administrative constraints, and educator issues.

Learner Characteristics

One of the more common learner problems is an inadequate knowledge base. Learners may be unprepared to perform at the level expected of the clerkship, both in terms of patient care and formal methods of evaluation (e.g., tests, simulation exercises). This situation may be because of a lack of attention to studies, poor preparation for the rotation, reasoning difficulties, underdeveloped critical thinking skills, or a learning disability. Although an unprepared or unknowledgeable learner may be frustrating and time-consuming, educators may be most comfortable with dealing with this type of learner problem, because these issues are often the most straightforward to identify and remediate.²

Different learning styles may also result in people being thought of as difficult or problematic. If the medical student learns best in a traditional, didactic classroom setting, the learn-as-you-go environment of most emergency departments may be overwhelming and a poor fit. A previously undiagnosed learning disability should always be considered in the learner who appears to have difficulty acquiring basic knowledge or skills in the methods presented by the clerkship environment.

Interpersonal issues, or those of professionalism, may be the most difficult and feared problems encountered with learners on emergency medicine rotations. Indeed, many educators are uncomfortable with addressing issues of professionalism directly. The Accreditation Council for Graduate Medical Education lists professionalism as 1 of the core competencies for graduate medical education, and it is equally important in the undergraduate setting. Learners should appropriately demonstrate basic concepts such as integrity and respect, responsiveness to patients, accountability, and sensitivity to a diverse patient population.³ Learners who show deficits in adherence to these principles may do so

because of a lack of awareness, differing value or belief system, or different expectations of the clerkship experience.² A key to identifying problems with professionalism is to observe learner interactions with others: how do they get along with other learners, residents, nurses and ancillary staff, or patients? If difficulties are identified, the possibility of personal stressors or substance abuse should always be considered when attempting to identify causation and plan remediation strategies.

System or Administrative Constraints

In the current health care environment, learners often face pressures limiting their role in the emergency department team. Each clerkship differs in the degree of autonomy given to learners in their ability to see multiple patients independently, document in the medical record, and perform procedures. Learners with more limited roles that are not clearly defined or understood may become frustrated and less willing to put forth the effort expected by educators. Furthermore, learners' previous medical experiences are likely to be in inpatient or ambulatory settings, and they may be unfamiliar with the unique working environment of the emergency department, leading to confusion over responsibility and expectations.

Mandatory emergency medicine clerkships may also, by their nature, produce more "difficult" learners because not every learner has independently chosen to do the rotation. It has been suggested that emergency medicine-bound learners in a clerkship do better overall, need less remediation from educators, have fewer problems with perceived effort or motivation, are able to see more and sicker patients, and perform a greater number of procedures.⁴ Whether deserved or not, learners who are not identified as seeking emergency medicine for a career choice or who rotate as part of a mandatory experience may suffer from a real or perceived lack of interest and be more likely to be thought of as problematic.

Educator Issues

There is wide variation in departmental support for emergency medicine clerkship activities. If faculty, staff, and residents do not feel adequately compensated and encouraged to participate in formal and informal teaching activities, they may be less patient with learner needs and demands. In a busy emergency department, a steady flow of junior medical students unfamiliar with emergency medicine may be perceived as a hindrance rather than an asset. It stands to reason that such learners may be more likely to be labeled as difficult. Any investigation of learner problems should include an assessment of educator factors that may make the entire experience problematic for both teacher and learner.

Structuring the Clerkship to Identify and Mitigate Problems

An emergency medicine clerkship should be optimally structured to minimize the potential for problem learner interactions. Although each institution is unique, consistent goals and expectations should be defined.

At the start of a rotation, an orientation session provides an opportunity to clearly delineate objectives and structure. Material presented should include all expectations of learners on the rotation (i.e., clinical, didactic, and academic). The role of the learner in the emergency department and as part of the health care team should be clearly defined. Expectations of professionalism should be plainly stated, with examples provided, if necessary. Orientation materials should be provided in the form of detailed written or easily accessible online handouts that are ideally verbally reinforced to learners. A comprehensive tour of emergency department facilities and areas, and an explanation of emergency department-specific policies, also should be provided to enhance learners' familiarity with the environment from day 1.

Methods of evaluation, feedback, and grading should be explained at the beginning of the rotation so that learners fully understand the requirements to successfully pass, or excel in, the course. Learners should understand early on how their evaluation forms will be collected and used for grading and how professionalism will be assessed. Direct grading methods of required tests or lab activities should be explained. Clerkship directors should consider using evaluation methods that can best identify problem behavior. A study of evaluation methods in an internal medicine clerkship found that descriptive written feedback and staff-only professionalism evaluation meetings were far better at detecting learner deficiencies in professionalism than a standard evaluation checklist.⁵ Too often, evaluators get caught in the “nice guy/gal, works hard” trap when asked to evaluate learner activities without detailed or more pointed categories of assessment that are specifically designed to identify areas of concern or exceptional success. Learners should also be made aware of opportunities to evaluate (anonymously or otherwise) the rotation experience, and it should be stressed how their feedback is used to improve the clerkship for subsequent rotators.

Learners should understand the resources available to them during their rotation. Emergency medicine clerkship leadership and core teaching faculty or residents should be identified early with methods of contact, and, if possible, hours of availability should be identified. Access to online or traditional textbooks and other academic resources should be demonstrated. From an

emergency department perspective, full administrative support for teaching activities—such that the emergency department is staffed to capacity to allow adequate learner teaching and evaluation time—should be a priority when setting up or restructuring a clerkship.

Identifying Learner Problems During the Clerkship

Most authors and educators agree that frequent individual assessment of learners is necessary to identify problems during a rotation.² Although regular, direct one-on-one interaction with learners is often best to identify both obvious and subtle deficiencies, it is often not practical for a single clerkship director to interact repeatedly with every rotating learner. A standardized patient encounter form on which the learner must be directly observed by core faculty or residents throughout a full emergency department course of care may offer an opportunity for formal, objective feedback. Regular (weekly or biweekly) reviews of shift evaluations and academic progress in labs or tests, combined with frequent meetings or conversations with core faculty and residents (and perhaps ancillary staff) about learner performance, can provide sufficient data to recognize problems. Early detection is important, and attention should be paid to even minor comments or clues from direct observation or others' evaluations. These comments can be used to examine specific behaviors more closely, or to ask others to do so, and allow minor issues to be addressed quickly before they become more serious.⁶

Once a problem has been identified with a learner, attempt to categorize it as described previously. Is the problem a knowledge deficiency or an academic concern? Are there issues of professionalism or motivation? Have particular emergency department-based problems (e.g., overcrowding, understaffing, lack of support by faculty or residents) created difficulties? Once the exact issue has been identified, the clerkship director should undertake copious data gathering—as much in writing as possible—to substantiate the problem's existence. This effort may involve investigating details of patient or staff encounters with a learner, examining medical records, or reviewing evaluation and test results. Some authors have advocated the “SOAP” approach to documenting problem learner interactions: subjective (what do others think or say about the issue), objective (what specific behaviors have been observed), assessment (the clerkship director's “diagnosis” of the problem), and plan (data gathering, intervention with learner, and get more help if necessary).⁷

Once a problem with a learner has been identified and researched, it may be helpful to find out if the particular learner

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has had similar problems in other rotations by discussion with other clerkship directors, non-emergency medicine advisors, or learner affairs personnel. Some controversy surrounds how much of a learner's past experience should be shared between medical educators, however. A study of internal medicine clerkship directors found that nearly two thirds of medical educators believed that information about problem or struggling learners should be shared outside of formal medical school channels, although there were few written institutional policies to guide this.¹

Strategies for Learner Remediation

After identifying a learner problem, the next step should be a face-to-face meeting with the learner, either one-on-one or with a small group of previously identified clerkship leaders. This meeting should take place in a nonthreatening environment that is as comfortable as possible to all parties. Some educators allow the learner to begin the session by offering thoughts on the rotation to date and possibly identifying what the purpose of the meeting might be. Early on, the clerkship director (or another member of the education team) should clearly state the issue at hand in a detailed and specific way. Care must be taken to ensure that a learner with poor insight into his or her difficulty has a full understanding of the exact problem and how it deviates from expected learner behavior. The learner should be allowed to tell his or her story, and the clerkship director should carefully listen to and document it as part of the data-gathering process. As much positive reinforcement as is appropriate should be provided to the learner during this meeting.

Care must be taken to ensure that a learner with poor insight into his or her difficulty has a full understanding of the exact problem and how it deviates from expected learner behavior.

Once the learner and educator understand and are in agreement over the nature of the problem, the remediation process can begin. Together, they should develop a detailed plan to address specific issues based on the type of difficulty. For knowledge or learning deficits, an academic plan with a way to measure outcomes objectively may be required. Suggestions include assigning extra text or journal reading or interactive (online) exercises on core topics with the goal of preparing a short paper or case presentation or completing a test to assess learner compliance and improvement. Having the learner shadow a particular emergency department staff member or resident who is especially skilled in teaching or can provide more individualized instruction may also be a useful way to improve a knowledge deficit, as long as learner improvement can be assessed in an objective manner. A study of clinical performance outcomes in an emergency medicine clerkship found that standardized, chief complaint-driven patient encounters tailored to a learner's area of deficiency (e.g., having

learners who struggled to work up chest pain diagnoses see a certain quota of patients with chest pain) improved test performance.⁸

For learners with professionalism issues, the clerkship director should state and document clear expectations of behavior with methods of frequent reevaluation. This documentation may include specific forms signed by the emergency department attending or resident after each shift to demonstrate that goals were met, a daily log of interactions, or a behavior contract. Standardized patient or simulation exercises designed to enhance professional behavior in real-life scenarios may also be of benefit, as may communication skills or other behavioral training offered by the institution. Any issues of substance abuse or dangerous behavior should be explored and dealt with according to the institution's policy for intervention. The learner should understand that persistent failure to meet the goals set may require intervention from medical school learner affairs or other administrative personnel and may have a significant negative impact on the learner's plans for graduation and residency.

Follow-up after the initial learner meeting should be regular and detailed—educators should not wait until the rotation is over and grades are due to provide feedback. All necessary members of the emergency medicine educational team should be aware of the plan and provide consistent enforcement. Documentation of events and meetings should be kept on file as long as possible in case it is needed later. If the learner is repeatedly unable or unwilling to comply with the remediation plan agreed on, he or she should be informed of this concern as well as of the consequences of noncompliance. Such consequences should be enforced regularly and consistently for each learner, because they will set the tone for future learner interactions. Finally, when grading the learner with difficulties, it is imperative to award him or her the grade that was earned—to do otherwise would be to contribute to grade inflation and inaccurately reflect the learner's abilities and progress.⁶

Conclusion

Although most learners fulfill the expectations of the emergency medicine clerkship, problem interactions are not uncommon. Many different factors can lead to learner difficulty in the emergency department, but optimizing clerkship structure and goals may serve to mitigate serious issues for most. Clear and explicit expectations of rotating learners, as well as an organized system of feedback, evaluation, and remediation by the clerkship director will help prepare for unexpected educational challenges.

For learners with professionalism issues, the clerkship director should state and document clear expectations of behavior with methods of frequent reevaluation.

References

1. Frellsen SL, Baker EA, Papp KK, et al. Medical school policies regarding struggling medical students during the internal medicine clerkships: results of a national survey. *Acad Med.* 2008; 83:876–881.
2. Hicks PJ, Cox SM, Espey EL, et al. To the point: medical education reviews—dealing with student difficulties in the clinical setting. *Am J Ob Gyn.* 2005;183:1915–1922.
3. *ACGME clinical competencies. Common program requirements: general competencies.* February 13, 2007. Available at: www.acgme.org/outcome/comp/GeneralCompetenciesStandards21307.pdf. Accessed January 10, 2009.
4. Coates WC. The emergency medicine subinternship—a standard experience for medical students? *Acad Emerg Med.* 2001;8:253–258.
5. Hemmer MD, Hawkins R, Jackson JL, et al. Assessing how well three evaluation methods detect deficiencies in medical students' professionalism in two settings of an internal medicine clerkship. *Acad Med.* 2000;75:167–173.
6. Langlois JP, Thach S. Preventing the difficult learning situation. *Fam Med.* 2000;32:232–234.
7. Langlois JP, Thach S. Managing the difficult learning situation. *Fam Med.* 2000;32:307–309.
8. Lampe CJ, Coates WC, Gill AM. Emergency medicine subinternship: does a standard clinical experience improve performance outcomes? *Acad Emerg Med.* 2008;15:82–85.

About Clerkship Directors in Emergency Medicine

Clerkship Directors in Emergency Medicine (CDEM), formed in 2008, is the first Academy within the membership of the Society for Academic Emergency Medicine (SAEM). CDEM members are medical student educators who are committed to enhancing medical student education within our specialty. CDEM provides the opportunity for emergency medicine clerkship directors and medical student educators to join forces, collaborate, and become a unified voice at the national level.