



doi:10.1016/j.jemermed.2008.04.009

## Medical Student Forum

### BECOMING AN EMERGENCY MEDICINE RESIDENT: A PRACTICAL GUIDE FOR MEDICAL STUDENTS

Shahram Lotfipour, MD, MPH, Ricky Luu, BS,\* Stephen R. Hayden, MD,† Federico Vaca, MD, MPH,\*  
 Wirachin Hoonpongsimanont, MD,\* and Mark Langdorf, MD, MHPE\*

\*Department of Emergency Medicine, University of California Irvine School of Medicine, Irvine, California and †Department of  
 Emergency Medicine, University of California San Diego School of Medicine, San Diego, California

Reprint Address: Mark Langdorf, MD, MHPE, Department of Emergency Medicine, University of California Irvine School of Medicine, 101  
 The City Drive, Route 128-01, Orange, CA 92868

□ **Abstract**—A medical student interested in Emergency Medicine (EM) will find acceptance into residency to be competitive and possibly difficult. An applicant should become aware of the qualities valued by EM residency directors. In the pre-clinical years, an applicant should do well in the basic sciences, perform well on the United States Medical Licensing Examination (USMLE) Step 1, and find an appropriate EM mentor. In the clinical years, excellence in the third-year core clerkships and the EM rotations, as well as the USMLE Step 2, are very important. The student must then acquire strong letters of recommendations from supervisors and a Dean's letter that accurately reflects the student's academic record. Preparation for a residency interview involves an understanding of both opportunities and challenges in the specialty. Coupled with a strong academic record, this gives the best chance for a favorable match. © 2008 Elsevier Inc.

□ **Keywords**—medical education; medical student; postgraduate education; postgraduate preparation; emergency medicine residency

#### INTRODUCTION

Emergency Medicine (EM) is traditionally considered one of the more difficult specialties in which to match, despite there being approximately one entering EM residency position for every US-bound applicant. This is especially true if the applicant has geographic limitations. To optimize training options, attention to the details of the application process is important (1). An EM application is strengthened

by direction and guidance from qualified mentors, leadership experience, volunteerism/activism, and knowledge of health care systems, as well as awareness of the challenges facing the specialty of EM. In this article, we provide guidance from the perspectives of an experienced EM clerkship director, chair, residency director, and an experienced research mentor.

#### PRE-CLINICAL YEARS

The pre-clinical years can be trying for the medical student interested in clinical medicine due to extensive classroom time and focus on basic science. Students exploring EM should seek out clinical exposure, interact with EM faculty, participate in EM organizations, and increase their knowledge of EM literature. EM training programs routinely welcome pre-clinical students to shadow emergency physicians (EPs) in the emergency department (ED), attend residency teaching conferences as well as local and regional continuing medical education conferences, and participate in research. Recognized criteria for successfully matching into EM residency are class rank and performance on the United States Medical Licensing Examination (USMLE) (2). However, recent surveys of all EM residency program directors show that USMLE Step 2 (the clinically oriented examination) and clinical grades are more important than Step 1 (the basic science examination) and basic science grades (3). Nevertheless, the knowledge gained during pre-clinical years provides the essential foundation for clerkship success.

## INVOLVEMENT IN THE EMERGENCY MEDICINE INTEREST GROUP

Participation in the Emergency Medicine Interest Group (EMIG) is quite valuable. Most schools now provide an EMIG organized by upperclassmen and supervised by an EM faculty member. EMIG is a resource for students who have little information about EM. It provides mentorship, academic advising, and interaction with other students interested in EM. Although medical school EMIGs exhibit significant differences, basic components include the following:

- 1) Hands-on clinical workshops for EM procedures
- 2) EM clinical lectures
- 3) Guidance and information on the application process
- 4) Interaction with EM faculty and community physicians
- 5) Opportunities for clinical observation in the emergency department (ED) and the prehospital setting
- 6) Opportunities for research and publications
- 7) Information about EM organizations that can foster leadership in organized medicine, including the American Academy of Emergency Medicine (AAEM); the Society for Academic Emergency Medicine (SAEM); the Emergency Medicine Residents' Association (EMRA); the American College of Emergency Physicians (ACEP); and the American Osteopathic Association (AOA)
- 8) Information on local, regional, and national meetings
- 9) Opportunities to create and assist with projects that benefit the community, the specialty, or the specialty society (4).

Although EMIG participation is helpful in preparing to become an EM applicant, participation alone is insufficient to bolster a strong application. The ideal applicant will assume a leadership position within the EMIG.

## CHOOSING AN EM MENTOR

Medical education traditionally follows an apprenticeship model. Because EM clerkships are infrequently mandatory or often reserved for the fourth year after specialty choice, selecting an EM mentor early in medical school becomes more critical than with other specialties. A mentor provides career guidance, advice regarding research and the application process, assistance with elective course selection, and insight into a student's suitability for the EM specialty as well as individual training programs (5). In addition, experienced mentors provide valuable insight into the specialty, including the role of politics and public policy, variable practice settings, and lifestyle challenges.

The EMIG can identify faculty and community physicians who are ideal for student mentoring. Leaders in academic EM such as the program director, research director, chair, and medical student clerkship director are ideal mentors. Participating in tag-along sessions is an excellent way for the student to gather information about EM. Recent graduates who have successfully matched into EM residency are another source of mentorship as they have first-hand information about the application process. In addition, the SAEM provides a virtual advisor program that answers questions concerning a career in EM. This is especially valuable for a student whose medical school lacks an EM residency program.

Although young mentors exude enthusiasm regarding student-related issues, they may lack the perspective of more senior mentors who have traversed multiple stages of an EM career. In addition, students with a subspecialty interest (such as Emergency Medical Services [EMS], Pediatrics, Toxicology, or Ultrasound) should choose a mentor with training in that particular field (5).

## USMLE STEP 1 AND USMLE STEP 2

The USMLE provides an objective tool to compare medical students. Performance helps determine the competitiveness of a candidate for EM residency programs. Each residency program is different in its emphasis on board scores and class rank vs. demonstrated clinical skills and letters of recommendation. In general, the goal for EM applicants is an above-average Step 1 score, as many EM program directors look positively at USMLE scores above the 90<sup>th</sup> percentile and negatively at those below the 50<sup>th</sup>. For those whose Step 1 score falls below the mean, it is recommended to take Step 2 before submitting the EM application (6). EM students have a clinical focus and interest more suited to the clinical Step 2 examination, and even with less preparation they perform better than on Step 1.

## THE CLINICAL CLERKSHIPS

Because the knowledge required for EM practice derives from many different clerkships, it is important to excel in each (7). Additionally, they serve as the basis for the Step 2 examination. As EM is a more competitive specialty, students should know criteria for honors grades before each rotation, and strive for excellence. To the extent allowed, students should orchestrate their clinical clerkships to maximize early exposure to the ED. This can be accomplished by taking admissions from the ED and

**Table 1. Characteristics of an Outstanding Medical Student in Emergency Medicine (9)**

- 
- 1) Learns the approach to common ED complaints, such as abdominal pain, shortness of breath, and chest pain, and reads up on their patients.
  - 2) Is able to take an accurate history and perform a thorough physical examination.
  - 3) Is able to efficiently, smoothly, but thoroughly present a patient with all the pertinent positives and negatives.
  - 4) Writes legibly.
  - 5) Knows when laboratory tests and radiology results are available.
  - 6) Cares about his/her patients and is attentive to them.
  - 7) Dresses professionally.
  - 8) Is honest, never lying about history or physical examination findings.
  - 9) Shows up on time.
  - 10) Is interested in learning and asks questions.
  - 11) Is eager to see patients.
  - 12) Most importantly, realizes that providing patient care is a privilege and approaches it with warmth and compassion.
- 

volunteering to help with resuscitation duty in the ED. Regardless, students should attempt to excel in each of their clerkships, as outstanding overall clinical performance can compensate for deficiencies in other areas of the application. Furthermore, medical schools use performance in core clinical rotations as a comparative measure of student performance relative to the rest of the class. In fact, many Deans' letters divide the class into quartile rankings using core clerkship grades.

#### 4<sup>TH</sup> YEAR ELECTIVES AND EXTERNSHIPS

For many program directors, excellence on the EM clerkship is an extremely important factor in gaining admission to EM residency (8). It is the only opportunity for students to demonstrate to EM faculty their ability to take directed histories, perform accurate physical examinations, offer concise presentations, as well as be a productive and reliable member of the EM team. The clerkship also provides exposure to knowledgeable EM faculty who can write strong letters of recommendation (LOR). With regards to preparing for the EM clerkship, Mahadevan and Garmel summarized characteristics of an outstanding medical student (Table 1) (9).

The primary EM clerkship probably should be completed by the end of the month of September of the application year to allow faculty time to write LORs. For the few medical schools without an EM residency, applicants must do an externship. It is recommended that EM-bound students complete two EM clerkships, one at the home institution and another away (10). Another option is to do a clerkship at an institution with a related fellowship (such as EMS, Pediatrics, Toxicology, or Ultrasound).

EM advisors disagree regarding the ideal location of an externship. Options include a university hospital, municipal hospital, or a busy community ED. Regardless of the location, LORs from experienced EM faculty at an established EM residency program are considered more meaningful than LORs coming from an EM physician less experienced in evaluating medical student performance. If a student does two or more EM clerkships, it is recommended that they choose two different settings rather than two of the same. This exposes students to different training models and better informs their choice of residency.

Elective rotations in the following fields are valuable for EM preparation: EM ultrasound or general radiology, ophthalmology (not longer than 1 week), heart station/electrocardiogram interpretation, anesthesiology, dermatology, and neurology. Given the reduced clinical demands in the fourth year, we believe extensive Intensive Care Unit (ICU) exposure is important to foster comfort with critically ill and injured patients, and to begin to learn critical care procedures. Pediatric, Surgical, and Medical ICU rotations, in particular, are valuable.

#### PEDIATRIC EMERGENCY MEDICINE

A current list of pediatric EM fellowships and combined EM/Pediatric residencies can be found at the SAEM Website. Pediatric EM (PEM) specialization includes three distinct routes. The first is a combined Pediatrics/EM residency in 5 years (currently three programs). The second route is a 3- or 4-year EM residency followed by a 2-year pediatric EM fellowship (some fellowships require a third research year). The third route involves a 3-year Pediatric residency with a 3-year pediatric EM fellowship. The latter restricts future practice to children alone, whereas the first two allow for adult care in general EDs (11). Because there are more than 4000 general EDs in the US, but only approximately 188 children's hospitals, the job market for the exclusive PEM pathway is inherently more limited. However, given that there are only approximately 70 PEM graduates from fellowships, PEM physicians are still currently in strong demand. In addition, academic EDs also need PEM expertise, but would prefer the generalist PEM pathway, which permits adult care. Students interested in combined PEM programs should choose a pediatric mentor in addition to an EM mentor.

#### OTHER COMBINED FORMATS

There are approximately 11 combined Internal Medicine (IM)/EM programs of 5 years duration that will lead to board eligibility in both specialties. Other rare combinations

include IM/EM/Critical Care in 6 years (started at Henry Ford Hospital and currently three programs) and a recently approved EM/Family Medicine format in 5 years (currently only one program at Christiana Care Health Services Program). Certification in two specialties allows for a greater wealth of knowledge than in one specialty alone.

### ORGANIZED EM AND CONFERENCE ATTENDANCE

Students interested in EM should join several EM organizations. There are three types: practice organizations (ACEP, AAEM, and AOA), academic/research organizations (SAEM), and resident/student organizations (EMRA/ACEP, AAEM, and AOA). Each of these has its own focus and agenda, but all offer important educational and networking opportunities. Each organization has national and regional conferences, which provide residency fairs, medical student forums, specialty research, and public policy education. Given limited resources, regional meetings (1–2 days) are more feasible, though attending at least one national meeting (4–5 days) before applying for residency is highly encouraged due to the larger amount of information and resources found at the national meetings. National meetings also draw more attendance than the regional meetings due to their increased length, allowing a future applicant the opportunity to meet and discuss issues with a greater number of emergency physicians. Each ACEP state chapter has an annual meeting, whereas SAEM has six regional meetings each year. EMRA and AAEM Resident Section meetings are attached to the affiliated ACEP and AAEM national meetings, respectively. Student registration fees at AAEM are free and reduced at ACEP. Participation in organized medicine through the American Medical Student Association membership is also important. Students can consider joining other organizations such as the Wilderness Medical Society or the National Association of EMS Physicians. Many programs will view higher level participation in such organizations (such as an officer in the medical student section or national representative to a medical student organization) as a positive factor in an applicant.

### RESEARCH

Conducting longitudinal research during medical school is beneficial and rewarding. Through EM research, a student gains knowledge of the specialty and develops critical-thinking skills. In addition, research activity demonstrates strong interest and fosters familiarity with an EM faculty researcher. This, in turn, allows the re-

search mentor to advocate on the student's behalf. Many EM programs prefer EM-related research as opposed to research in another specialty.

Meaningful research requires a minimum of 6–8 weeks, preferably spread over a period of 1 year. An ideal time to start prospective longitudinal research is during the summer after the first year in medical school. Students are encouraged to take advantage of any free time to advance their research experience. Research started during the second year in medical school and beyond is often limited to retrospective research, case reports, or involvement in ongoing projects. It is often difficult to complete a prospective research project (including Institutional Review Board approval) in < 2 years unless the research mentor is very experienced. Joining a prospective study that is already up and running is also another way to get involved in research.

The goal of the project should be presentation at a regional or national meeting in abstract/poster form, followed by submission to and publication in a peer-reviewed EM journal (12). The two major national research meetings have deadlines for submissions of January (SAEM) and June (ACEP). Regional and state chapter meeting deadlines occur throughout the year. Presenting research at a national EM forum or publishing a research paper in an EM journal is viewed very favorably by many EM programs.

### LETTERS OF RECOMMENDATIONS

Letters of recommendations (LOR) provide a detailed picture of a student's clinical skills, work ethic, and motivation. Even without a strong objective component, an exceptional letter from a respected faculty member may sway residency program directors to offer an applicant with non-competitive scores and evaluations an interview due to the importance programs place on clinical abilities. Therefore, it is valuable for a student to orchestrate time to work with a well-known EM faculty member, such as program director or assistant program director, clerkship director, research director, or Chief/Chair. Opportunities include tag-alongs, research, or educational and leadership positions in an EMIG. Letters from senior faculty or those in leadership positions will likely have greater impact than letters from junior clinicians. Conversely, a letter from a junior faculty member with personal knowledge of the student's clinical abilities would carry more weight than a superficial letter from a high-ranking faculty member. As discussed in the section on externships, a LOR from an externship provides for a more objective assessment of clinical skills in contrast to the applicant's home institution, which may

be viewed as biased. The student must decide if this externship letter will enhance his application; its absence will likely raise a red flag with some program directors. EM faculty should use the “Standard Letter of Recommendation” (SLOR) provided at the Council of Residency Directors’ website (13).

Research mentors can provide effective LORs, assuming they also know the clinical skills of the applicant. Letters from third-year clerkships are second priority to EM letters, whereas letters from pre-clinical professors carry little weight. Immediate solicitation of the LOR upon completion of the rotation fosters a more detailed description of the clinical acumen. In general, three letters are sufficient; the fourth is optional. More than four letters will likely not further enhance the application. When requesting a LOR, a student should submit a professional picture, and current curriculum vitae including board scores, clerkship grades, and volunteer and leadership activities, along with a final personal statement devoid of errors. The easier the letter-writing process is, the more positive the letter is likely to be.

Applications are generally scored when three letters arrive. Letters from non-EM faculty should not be in SLOR format. Letters from fellows or residents are not recommended.

### PERSONAL STATEMENT

The personal statement is the student’s opportunity to convey his or her personality and values before the interview. It should pique the reader’s curiosity through a story or personal anecdote, such as a patient encounter, leadership experience, or special accomplishment. Because the readers are emergency physicians well acquainted with the specialty, the statement should not describe what EM is, but rather how the specialty suits the student. An applicant should emphasize a strong desire for EM, as well as the reasons for choosing EM, whether it be a commitment to public service, the pace, atmosphere, or camaraderie of the specialty, or a special mentor relationship. Because it may require multiple revisions, it is critical to allow several months to write a personal statement. Because science, not English literature, has been the focus of college and medical school, students should have an experienced writer review the statement. One full page is the optimum length, single-spaced and at least 11-point font. This is one circumstance where longer is not better.

### THE DEAN’S LETTER

The Dean’s letter, or medical student performance evaluation (MSPE), as it is also known, is used by program directors to assess overall medical school performance.

In EM, it also has been shown to correlate with the future performance of a student during EM residency (14). The student should ask whether comments from the academic advisor can be included. If allowed, the Dean’s letter/MSPE should be carefully reviewed for tone. If the letter includes any unfair or undeserved statements, an appropriate explanation of any extenuating circumstances will most likely be needed in other parts of the application. It is better to be proactive than reactive. Any student who has received an unfair evaluation on a given rotation should take the time to have this amended after receiving it and before it appears in the Dean’s letter/MSPE.

### INTERVIEWS

Interviews allow reciprocal evaluation. As first impressions are critical, thorough preparation is vital. This begins with scheduling the interview appointment, as residency coordinators can influence a candidate’s position on the rank list through informal feedback. If an applicant is difficult to deal with when scheduling his interview, the program director will fear this continued behavior during residency. Mock interviews by faculty are one of the best ways to practice answers to common questions as well as receive feedback on subtle factors of posture, speech, and eye contact (15). The residency job interview is governed by important rules of engagement. The interviewer should not ask about pregnancy, children, age, religion, marital status, ethnicity, sexual orientation, or physical disability. However, if the student broaches the subject, follow-up questions are allowed. Some common pitfalls include emphasizing geography rather than program strengths, a lack of meaningful questions, and unfamiliarity with previous research projects. Website review is mandatory just before the interview and therefore internet access while traveling is important. A Medline search on the program leadership should be performed to identify their research interests. Any social events should be considered part of the interview process. Excessive alcohol consumption and politically incorrect behavior should be avoided. The student should anticipate circumstances, including bad weather, and leave extra time not only for reaching the hospital but also the exact location of the interview. If the student is delayed, the student should call to explain. This demonstrates accountability, an attractive trait in residency. If the student must cancel, he or she should do so as early as possible with apologies, as program directors may share impressions of professionalism with each other. Furthermore, negative statements about other programs should be avoided, as the program director community is quite small. Shortly after the interview, the student should send an e-mail or written thank-you note to those with whom he or she interviewed.

It is wise to accept all interviews offered, if logistically possible. Last year the Association of American Medical Colleges reported that every US applicant who had ranked at least 10 programs matched into EM (1). For programs likely to be near the top of your list, ask permission to spend extra time in the ED either before or after the interview. This will allow an opportunity to meet emergency physicians and EM residents and show interest in the program. It will also allow for greater certainty when determining your rank list order. Timing of residency interview has been shown to have no effect on rank list position (16).

One way to discern the flavor of a program's application requirements is EM Select, a service by the AAEM Resident and Student Section. This resource is distinct from Frieda and SAEM, as it was created by students to make the application and interview process easier to manage.

### FORMULATING THE RANK LIST

Given the competitiveness of the specialty, it is recommended that students rank all of the programs where they interviewed. It is much better to match in EM in a less preferred program than to be forced to "scramble" when you go unmatched. In 2007, there were only six unfilled positions nationwide, and students may not have chosen these for valid reasons. Although factors that determine a rank list are matters of personal choice, overall satisfaction should be a top criterion for an applicant when ranking programs. Other important factors are program format and, of course, geography. In the end, an applicant must determine which programs best fit his or her personality and learning style. The best way to accomplish this would be to do "second looks" at the programs of greatest interest, allowing for more interaction with residents and physicians at the respective programs.

### CONCLUSION

This discussion provides guidance on most components of the application process. A more detailed treatment of these and other issues is contained in AAEM's *Student Rules of the Road*, which is free to medical students, and the Emergency Medicine Resident's Association's *Emergency Medicine: The Medical Student Survival Guide*.

*Acknowledgment*—We would like to thank June Casey for all of her editorial assistance.

### REFERENCES

1. Jolly P. Charting success in the NRMP main residency match. Washington, DC: National Resident Matching Program and Association of American Medical Colleges; 2006.
2. Balentine J, Gaeta T, Spevack T. Evaluating applicants to emergency medicine residency programs. *J Emerg Med* 1999;17:131–4.
3. Crane J, Ferraro C. Selection criteria for emergency medicine residency applicants. *Acad Emerg Med* 2000;7:54–60.
4. Pitre C. The unique educational value of emergency medicine student interest groups. *J Emerg Med* 2002;4:427–8.
5. Garmel MG. Mentoring medical students in academic emergency medicine. *Acad Emerg Med* 2004;11:1351–7.
6. Lawson LE, Ankel F, Kazzi A. What do program directors look for in an applicant? In: AAEM's rules of the road for medical students, 1<sup>st</sup> edn. Milwaukee, WI: American Academy of Emergency Medicine; 2003:51–9.
7. Phelps MA, Lubavin B. You're interested in emergency medicine . . . now what? A year by year guide. *J Emerg Med* 2001;21:99–100.
8. Winters ME, Mattu A. Your emergency medicine clerkship: how to be a star! In: AAEM's rules of the road for medical students, 1<sup>st</sup> edn. Milwaukee, WI: American Academy of Emergency Medicine; 2003:155–62.
9. Mahadevan S, Garmel G. The outstanding medical student in emergency medicine. *Acad Emerg Med* 2001;8:402–3.
10. Counselman F, Griffey R. Fourth-year elective recommendations for medical students interested in emergency medicine. *Am J Emerg Med* 1999;17:745–6.
11. Younggren B, Markovchick V. Fellowships and subspecialty certification. In: AAEM's rules of the road for medical students, 1<sup>st</sup> edn. Milwaukee, WI: American Academy of Emergency Medicine; 2003:193.
12. Bitros M. Medical students and research. Available at [www.saem.org/inform/ugeccomm.html](http://www.saem.org/inform/ugeccomm.html). Accessed January 29, 2006.
13. Lotfipour S, Garmel GM. Letters of recommendation. 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, WI: American Academy of Emergency Medicine. Resident Section (AAEM/RSA); 2003:65–72.
14. Hayden SR, 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;12:206–10.
15. Bruno EC, Haydel MJ. Visits and interviews. In: AAEM's rules of the road for medical students, 1<sup>st</sup> edn. Milwaukee, WI: American Academy of Emergency Medicine; 2003:81–90.
16. Martin-Lee L, Park H, Overton DT. Does interview date affect match list position in the emergency medicine national residency matching program match? *Acad Emerg Med* 2000;7:1022–6.

### ELECTRONIC RESOURCES

1. AAEM student rules of the road. Available at [http://www.aemrsa.org/rules\\_road.html](http://www.aemrsa.org/rules_road.html). Accessed May 5, 2007.
2. Council of residency director's website. Available at <http://www.cordem.org>. Accessed May 5, 2007.
3. Emergency medicine select. Available at <http://www.EMSelect.org>. Accessed May 5, 2007.
4. SAEM virtual advisor. Available at <http://www.saem.org/advisor/index.html>. Accessed May 5, 2007.
5. The American Academy of Emergency Medicine. Available at <http://www.aem.org>. Accessed May 5, 2007.
6. The Society for Academic Emergency Medicine. Available at <http://www.saem.org>. Accessed May 5, 2007.
7. The Emergency Medicine Resident's Association. Available at <http://www.emra.com>. Accessed May 5, 2007.
8. The American College of Emergency Physicians. Available at <http://www.acep.org>. Accessed May 5, 2007.
9. The American Osteopathic Association. Available at <http://www.DO-online.org>. Accessed May 5, 2007.