

EMERGENCY MEDICINE

The Medical Student Survival Guide



Online Supplement

EDITED BY

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Dedications

To all the amazing students, residents, and faculty whom I have had the good fortune to work with over the years. You are the reason I have the best job in the world.

— Joe

To my wife, daughter, parents, and entire family for encouraging me to go for my goals, and for picking me up during the inevitable times when some challenges seemed insurmountable. I wouldn't have been able to survive the path through medical school without you! This continues to be a long, hard journey, and I have never taken your support for granted. Thank you!

— Dave

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Welcome to your journey toward becoming an emergency

medicine physician! If you have not yet decided on emergency medicine as a career, but instead are simply exploring, that is OK. I would encourage you to learn as much as possible about emergency medicine as there are many misconceptions about the specialty, and it is imperative that you are as informed as possible about choosing the area in which you will spend a 30-year career. If you have not already done so, talk to emergency medicine physicians about their careers, ask about the positives and negatives, and, most important, spend time in the emergency department. And do so as soon as possible! Real-life experience will be your best guide for choosing the specialty that is best for you, but with the Match process coming earlier in recent years, you have a limited amount of time in which to get this experience.

If you have already decided that emergency medicine is right for you, we hope you find this survival guide to be a useful resource on the first step of your journey. The first edition of this book was published in 1991, and over the years Dr. Kristin Harkin and Dr. Jeremy Cushman have provided an invaluable service educating medical students about our specialty. We hope to continue that tradition. This latest print edition has been trimmed down to highlight the most high-yield information from some of the most well-known names in emergency medicine, academicians who have taught hundreds of emergency residents over the years, as well as from a group of bright young stars and leaders in the specialty.

As you work your way through the guide, you may notice a number of topics appear in multiple chapters. This is intentional — these are key points that deserve particular emphasis. On the other hand, there may also be times when advice in one chapter may not line up exactly with advice in another chapter. This is not an accident or oversight. The path from early medical school to residency is not an exact science, and a residency director at one program may have a very different view from the director at another program. Our goal is to draw on opinions from a range of educators at multiple programs to provide you a number of perspectives on issues that are debated amongst emergency medicine leaders across the country.

Because the world of emergency medicine is large and ever-changing, we've prepared supplemental online content that provides additional information for those students who have a particular area of interest (for example, those considering a fellowship).

We hope you find this guide to be useful. This is an exciting time in your life, and we wish you the best of luck.

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Want to match into an emergency medicine residency program?

If you're like every other applicant and you've got a ton of questions about how to best prepare yourself for away rotations, ERAS, boards, SLOEs, interviews, and all the other important stuff you need to know, this book can help you get on the right track toward a successful match! There is something for everyone in this Survival Guide, no matter where you go to medical school or where you hope to do your training.

One of the biggest misconceptions about emergency medicine is that everyone who goes into the specialty is the same – that we are all ADD, thrill-seeking, jacks-of-all-trades but masters-of-none. The truth is there are so many different personalities within the EM community. Emergency physicians have a wide variety of interests and expertise in many subjects, in addition to being the best acute care providers in medicine. In the same way, there is no universal advice or path that all EM-minded medical students must follow in order to achieve their goals. Certainly there are gold standards and boxes that have to be checked off along the way, but uniqueness is often appreciated in EM. There are parts of the EM residency application that are different from any other specialty, and residency programs across the country vary greatly in how they view particular attributes of a student's application.

This Survival Guide is a collection of opinions and advice straight from the source! Our authors have been through the process of matching, and many are intensely involved in the review and selection of their programs' residency candidates. EM has become a competitive specialty within the house of medicine. Use this book to identify the strengths and weaknesses of your application. Utilize the advice given to address any concerns about your competitiveness as an applicant. Every effort has been made to generalize the recommendations, but remember, while you may feel like just another number, your situation is unique, and with some hard work, good advice, and a little creativity, you'll find a way to stand out and make programs notice you.

Study hard and get involved. Good luck!

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Frequently Asked Questions (FAQs)

USMLE

Where do I get more information about the USMLE?

www.usmle.org

Where do I get more information about the match?

www.nrmp.org

What if I failed the boards?

You can retake the test up to 3 times in a 12-month period. Failing the boards does not preclude one from successfully matching; however, it makes it more difficult. The clerkship director or program director at your school can serve as a valuable resource in exploring possibilities of matching and in making recommendations for programs to apply for.

What if I want to match at a specific program, but am concerned my board scores will prevent me from matching?

Let the program know who you are. Request an away rotation at your desired institution. This allows students to make early contact with program directors and provides the opportunity to demonstrate your potential worth and value to a program. Further, in addition to your board scores, it is important to ensure your application shines in other ways: do research, volunteer, excel clinically.

Do allopathic programs consider applicants with solely COMLEX scores?

It depends on each individual program on an individual applicant basis. It could be assumed that if an applicant scored in the 99.99th percentile on the COMLEX, that individual would likely score exemplary on the USMLE. Still, some program directors prefer to have a standard measure to compare all of their applicants. If there is question, contact that specific program.

Fourth Year

For a third EM rotation, should Pediatric Emergency Medicine be considered?

Pediatric EM is very high-yield, educationally speaking. Becoming comfortable with caring for sick children is an invaluable skill for an EM physicians. However, if your goal is to obtain an inside networking opportunity at a particular residency program without doing a formal EM elective, then it may be less valuable. In some residency programs, the Pediatric ED is staffed by the

EM attendings or the Pediatric ED is closely integrated with the EM residency program; in that case a Pediatric EM rotation could help with getting an inside perspective and the EM faculty will take note if you perform well. In other centers, Pediatric EM is separated from the core Residency Program.

Should I be concerned if I never worked with the program director or chair during an EM rotation?

No. In most well-run clerkships, feedback is global and provided to residency and department leadership. When multiple faculty members give great reviews or advocate for a student, residency leadership takes notice.

I want to match in a city that only has only one or two EM residency programs. Any advice?

Do rotations at the available clinical sites. Make sure you meet with someone from residency leadership (preferably the program director) at each site during your rotation. Explain to him/her why you are committed to that particular city for your residency training. Use him/her as a mentor and ask for advice on matching.

My medical school does not have an emergency medicine residency program. Who could I utilize for mentorship in the EM residency application process?

A number of different options exist. Potential possibilities would be the chair or medical director at your school's main hospital. If the chair/medical director at your home institution is not comfortable in this role, ask if s/he has a knowledgeable friend or colleague to refer you to. Utilize the clerkship director or program director at your first EM rotation – hopefully at a site that has an EM residency program. You could also try a virtual advising program such as SAEM. (<http://www.saem.org/membership/services/e-advising/student-faqs>).

I want to schedule my EM rotation during a month where I have a couple of other personal or educational commitments. Is this OK?

Many students think that since EM rotations require a certain number of shifts during the block they will be able to schedule “time off” for other commitments. You will have days with no clinical or didactic commitments during your rotation, but don't expect that you will be able to choose your schedule. Assume that all the days during that month are a potential shift until you get your schedule. Scheduling is a complex process that contains a lot of variables (coverage, teaching faculty on shift, didactics) so it's best to avoid over-committing yourself to other activities during the month. Short time-off requests for important life events, or other legitimate requests (such as travel time to get to another away rotation) are usually accommodated, but you don't want to be perceived as difficult or uncommitted by a program before you even get there by telling the scheduler which days you're “available.”

Application

When should I have everything uploaded into ERAS?

You should have everything ready to upload by Sept. 15. The exception is SLOEs that have not been completed. These should be uploaded as soon as possible.

Do I need to do an “away” rotation?

We strongly encourage an away rotation if at all possible. Programs place a lot of weight on the SLOE, and it is better to have two SLOEs if you can.

Do I need to take Step 2 CK early?

Most programs prefer to see your Step 2 score. This is particularly true if you have performed poorly on Step 1.

How many programs do I need to apply to?

This is largely based on your competitiveness as an applicant. If you are a top 10% applicant, you should target 15-20 programs. If you are a bottom quartile applicant, you should apply to 40+. Please see chapter for more details.

**Don't see your question?
Check the Medical Student Section
at emra.org or email emra@emra.org.**



Emergency Medicine: Pediatrics

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What is Emergency Medicine/ Pediatrics (EM/Peds)?

An emergency medicine/pediatrics residency provides a complete emergency medicine residency and a complete pediatrics residency in 5 years. You will emerge from combined training board-eligible in pediatrics and board-eligible in emergency medicine.

EM/Peds training grants you significant flexibility in your career path.

How is a combined EM/Peds residency different from a Pediatric Emergency Medicine (PEM) Fellowship?

A PEM fellowship provides specialty training in emergency pediatrics. If you go from a pediatrics residency into a PEM fellowship, you do not receive training in adult emergency medicine. Likewise, if you do an emergency residency and then a PEM fellowship, you do not receive training in general or specialty pediatrics. The fellowship route provides dedicated time for research/academics and allows you to sit for the PEM board exam.

EM/Peds combined training provides broad training in all aspects of pediatrics (inpatient specialty wards, pediatric and neonatal critical care, general outpatient peds) and all aspects of emergency medicine (adult critical care, EM-relevant subspecialty care, and adult and pediatric EM), as well as focused training in pediatric emergency medicine.

What kinds of jobs are open to EM/Peds graduates?

A major advantage of EM/Peds training is the flexibility it grants you in creating a personalized career path. Graduates of EM/Peds training work in all areas of pediatrics and emergency medicine and are exceptionally marketable job candidates. Any job opportunity or fellowship available to a graduate of either a pediatrics residency or an emergency residency is open to you, as well as specialized PEM jobs.

Many graduates will choose to work a mix of adult and pediatric ED shifts or to work in an all-comers (adult and pediatric) ED. Others will pursue fellowship training, for example in ultrasound or international medicine. EM/Peds graduates work in both academic and community settings. Here are some examples of career paths recent graduates have taken:

- Academic ED faculty physician (adult and pediatric) and pediatric hospitalist
- Academic ED faculty physician (adult and pediatric) and general community pediatrician
- Community ED physician (adult and pediatric) and pediatric critical care sedation specialist
- Director of pediatric care for a community emergency group

The vast majority of pediatric emergency departments hire physicians who are either PEM fellowship trained or graduates of a combined EM/Peds residency. Some groups prefer graduates of EM/Peds residencies since they can provide high-level care to both adult and pediatric patients. A minority of pediatric EDs will hire only fellowship-trained emergency pediatricians.

What are the benefits of combined training?

EM/Peds training provides the opportunity to care for both sick and well children continuously over the course of 5 years. You get exceptional hands-on clinical experience with a spectrum of ages and pathologies. EM/Peds graduates are perfectly poised for work in politics and advocacy and in education, because they gain a broad base of experience and knowledge in all areas of pediatrics as well as adult emergency medicine. In addition to broad training in both EM and pediatrics, most combined residencies offer additional EM/Peds-specific rotations in areas such as child abuse and protection, pediatric procedures, pediatric critical care, and supplementary pediatric ED rotations and shifts.

Another benefit of combined training is the career flexibility it offers. Emergency medicine is a specialty with higher rates of burnout; EM/Peds graduates have the option of working in general pediatrics, inpatient pediatrics, urgent care, EDs, education and academics, or any variety of other career pathways.

EM/Peds graduates can intubate and vaccinate with the best!

What are the downsides to combined training?

EM/Peds training does require an additional 2 years compared with a single residency. You must have a passion for both emergency medicine and pediatrics or it will feel very long.

There are a few specific children's EDs that hire only PEM fellowship-trained providers. While these are rare, if you know you want to work at one of those specific sites, combined training may not be the right choice.

Can I work in academics after combined training?

Absolutely! Combined graduates are valuable to academic programs because they can work in both adult and pediatric EDs and provide expert teaching in both areas. EM/Peds training also puts you ahead of your peers by providing 2 years of extra experience and an automatic academic niche. The 5 years of residency also provide you additional time to complete research and academic projects.

Many leaders in the PEM section of ACEP and other national organizations are EM/Peds trained, and EM/Peds physicians speak regularly as pediatric emergency specialists at national and international conferences.

Can I work in the community after combined training?

Absolutely! Combined graduates are highly sought-after by community groups because they can work comfortably in adult, pediatric, and "all-comers" EDs, as well as in other pediatric settings. EM/Peds graduates often find work as the pediatric director within a community ED group. EM/Peds graduates are especially valued in rural and underserved areas and by larger EM groups since they can fill so many different roles within the hospital.

What will my schedule look like?

The combined residencies have you switch between EM and pediatric rotations at predefined intervals (generally every 2 to 6 months) so you will complete a full year of each specialty's curriculum every 20 months. You will function as a full emergency resident during your emergency rotations and as a full pediatrics resident during your pediatric rotations. You may intubate a 450 gram neonate one day and then perform a lumbar puncture on a 450 pound adult the next day!

You will also complete EM/Peds-specific rotations that vary by institution, as well as electives. Most programs offer specific EM/Peds journal clubs and educational activities as well as well as unique leadership and teaching roles for 4th and 5th year residents.

What are the combined residency programs?

Indiana University
LSU Health New Orleans
University of Arizona
University of Maryland

How competitive are EM/Peds residencies?

Each program offers only 2-3 positions each year, so this is a relatively competitive pathway. You will need to meet the selection standards of both emergency medicine and pediatric leadership at each institution. However, a very select group of applicants are truly interested in combined training, so if you feel that EM/Peds is a great fit for you, you're likely to be a competitive applicant.

Where can I find more information?

Look carefully at the websites for each of the EM/Peds combined residencies. You will find the specifics of their curriculums as well as the career paths of recent graduates.

Indiana University

<http://emergency.medicine.iu.edu/education/residency/curriculum/em-peds-residency>

LHSU

http://www.medschool.lsuhsu.edu/emergency_medicine/pedsem.aspx

University of Arizona

<http://emergencymed.arizona.edu/residencies/ua-combined-em-peds>

University of Maryland

<https://umem.org/page/education/residency/empeds>

2

Emergency Medicine: Internal Medicine

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In June 1989, the American Board of Emergency Medicine (ABEM) and the American Board of Internal Medicine (ABIM) announced the creation of a combined residency training program in emergency medicine and internal medicine. As outlined by both ABIM and ABEM, the goal of this combined program is to prepare physicians for an academic or community career that addresses the spectrum of disease from acute care through chronic illness. Emergency medicine/internal medicine programs are 5 years in length, with the resident completing 2.5 years of training in each specialty. Graduates of an emergency medicine/internal medicine program are eligible for certification in both emergency medicine and internal medicine. Currently, there are 12 emergency medicine/internal medicine programs offering a total of 28 first-year positions (See Table 1).

EM/IM residents gain experience in managing a busy adult emergency department.

TABLE 1. EM/IM PROGRAMS

Program Name	City, State	Number of Positions
Christiana Care Health Services	Newark, DE	3
University of Illinois College of Medicine at Chicago	Chicago, IL	3
Louisiana State University	New Orleans, LA	2
University of Maryland *	Baltimore, MD	2
Henry Ford Hospital/Wayne State University *	Detroit, MI	2
Hennepin County Medical Center	Minneapolis, MN	2
Vidant Medical Center/East Carolina University *	Greenville, NC	2
NSLIJHS/ Hofstra North Shore-LIJ School of Medicine at Long Island Jewish Medical Center *	New Hyde Park, NY	2

Program Name	City, State	Number of Positions
SUNY Health Science Center at Brooklyn	Brooklyn, NY	4
Allegheny General Hospital-Western Pennsylvania Hospital Medical Education Consortium (AGH)	Pittsburgh, PA	2
Virginia Commonwealth University Health System	Richmond, VA	2
Ohio State University Hospital	Columbus, OH	2
Christiana Care Health Services	Newark, DE	3
University of Illinois College of Medicine at Chicago	Chicago, IL	3
Louisiana State University	New Orleans, LA	2
University of Maryland *	Baltimore, MD	2
Henry Ford Hospital/Wayne State University *	Detroit, MI	2
Hennepin County Medical Center	Minneapolis, MN	2
Vidant Medical Center/East Carolina University *	Greenville, NC	2
NSLIJHS/ Hofstra North Shore-LIJ School of Medicine at Long Island Jewish Medical Center *	New Hyde Park, NY	2
SUNY Health Science Center at Brooklyn	Brooklyn, NY	4
Allegheny General Hospital-Western Pennsylvania Hospital Medical Education Consortium (AGH)	Pittsburgh, PA	2
Virginia Commonwealth University Health System	Richmond, VA	2
Ohio State University Hospital	Columbus, OH	2

* = offers 6-year EM/IM/CC track

At present, the Accreditation Council for Graduate Medical Education (ACGME) does not independently accredit emergency medicine/internal medicine programs. Accreditation status for each emergency medicine/internal medicine program is determined by the status of the respective categorical programs in internal medicine and emergency medicine. Emergency medicine/internal medicine programs are not able to recruit new residents if one of the parent programs is on probationary status with the ACGME.

Structure

Emergency medicine/internal medicine residency programs consist of 5 years of integrated training. As stated, residents spend an equivalent amount of time within each specialty. Depending on the program, residents typically alternate between specialties in 3-to 6-month blocks. During these blocks, residents function exclusively within the department in which they are working and are not expected to perform duties for both fields simultaneously. The emergency medicine component of emergency medicine/internal medicine training provides the resident with experience managing acutely ill patients of all ages.

Emergency medicine/internal medicine residents gain extensive experience managing a busy adult emergency department. In addition, each program must offer at least 4 months of dedicated pediatric emergency medicine training.

Many emergency medicine/internal medicine programs also offer excellent training in emergency ultrasound, major trauma, obstetrics, anesthesia, toxicology, critical care, and emergency medical systems management. The internal medicine component of combined training consists of a variety of inpatient and outpatient rotations. Typically, emergency medicine/internal medicine residents perform several rotations on general medical and subspecialty inpatient teams. Examples of subspecialty inpatient teams include oncology, cardiology (non-intensive care), and infectious disease. In addition to these inpatient teams, emergency medicine/internal medicine residents gain extensive critical care experience through numerous rotations in the intensive care unit (ICU). Depending on the program, ICU experience is usually composed of rotations in the medical and cardiac ICUs. Thirty-three percent of emergency medicine/internal medicine training in internal medicine must involve outpatient care. To achieve this, EM/IM residents are required to have one half-day per week of continuity clinic and a variety of subspecialty clinic rotations. Examples of subspecialty clinic rotations include dermatology, endocrinology, rheumatology, and neurology. Regardless of the program, all emergency medicine/internal medicine residents must demonstrate some form of scholarly activity. Examples of scholarly activity, as defined by ABIM and ABEM, include original research, comprehensive clinical reviews, or published case reports. In addition, emergency medicine/internal medicine programs have joint educational conferences involving residents and faculty in both categorical programs. These conferences are typically led by an EM/IM resident.

Career Opportunities for Emergency Medicine/Internal Medicine Graduates

Career opportunities for emergency medicine/internal medicine graduates have never been stronger. In contrast to early combined graduates, recent emergency medicine/internal medicine graduates are readily receiving dual departmental appointments that allow them to simultaneously practice both specialties. The success of recent graduates can be linked to career opportunities in hospitalist medicine, emergency department observation units, subspecialty training, rural medicine, and international medicine. In addition to their clinical appointments, many recent combined graduates have assumed leadership positions despite being relatively early in their careers.

The hospitalist system has become increasingly popular in community and academic centers across the nation. Hospitalists are typically internal medicine-trained physicians who solely practice inpatient medicine. Depending on the institution, hospitalists typically work 12- to 24-hour shifts. There are usually no on-call, or outpatient, responsibilities. With this model, it is easy to construct a combined practice involving part-time hospitalist work with part-time emergency department care. In fact, several recent emergency medicine/

internal medicine graduates are practicing both specialties using this system. Many emergency departments have developed observation units for patients requiring extended emergency department care but not necessarily needing inpatient admission. Examples of patient conditions ideal for observation units include mild asthma exacerbations, abdominal pain, syncope, dehydration, low-risk chest pain, cellulitis or soft tissue infections, transient ischemic attack, and hyperglycemia. EM/IM graduates are exceptionally qualified to establish and direct an observation unit.

With the depth and breadth of training, it is not surprising that some emergency medicine/internal medicine residents wish to pursue subspecialty training. With the epidemic of hospital and ICU crowding, many EM/IM residents have developed interests in critical care medicine. Similar to the hospitalist model, physicians who become certified in critical care medicine typically divide their clinical time between the emergency department and the ICU. Emergency medicine/internal medicine graduates who pursue subspecialty training often become local and national experts in their field.

Rural and international medicine remains an underserved area desperately in need of qualified physicians. Because these physicians are likely to be the only physician within a certain geographic area, the physician must be comfortable managing acute and chronic illness. Emergency medicine/internal medicine physicians are ideal for these rural and/or international medicine initiatives.

What Do EM/IM Graduates Do After they Graduate?

Graduates of combined programs have a number of career options after they graduate. Kessler et al surveyed all combined emergency medicine/internal medicine residents who graduated between 1998 and 2008 (2). The authors found that 55% of graduates practice exclusively emergency medicine, 7% practice internal medicine or a subspecialty of medicine, and 37% actively practice both fields. Combined residents are more likely than categorical emergency medicine residents to pursue academic careers. The vast majority of respondents (88%) stated they would pursue combined residency again. Eighty percent felt that their emergency medicine/internal medicine training had advanced their careers, and 92% were happy in their jobs. Nearly one-quarter of graduates pursued fellowship training, with the most common fellowship being critical care or pulmonary-critical care. Since then, 4 combined programs (University of Maryland, Henry Ford Hospital/Wayne State University, NSLIJHS/ Hofstra North Shore-LIJ School of Medicine at Long Island Jewish Medical Center, and Vidant Medical Center/East Carolina University) have created pathways giving their combined residents the opportunity to complete a critical care fellowship by extending their residency for a sixth year. Upon completion of the 6-year track, residents are board-eligible for certification in emergency medicine, internal medicine, and critical care medicine.

Is an Emergency Medicine/Internal Medicine Program Right for You?

You should consider an emergency medicine/internal medicine program if you are truly passionate about both emergency medicine and internal medicine. You must enjoy the exciting, fast-paced environment of the emergency department along with the unique aspects of inpatient rounds and outpatient continuity clinic that characterize internal medicine. In addition to simply enjoying both specialties, it is crucial to consider career goals when deciding whether EM/IM training is right for you. As discussed, emergency medicine/internal medicine training and certification are ideally suited for the physician who is interested in pursuing rural or international medicine, combining an emergency department practice with a hospitalist service, managing an emergency department observation unit, or pursuing subspecialty training in areas such as critical care medicine.

It is important that you also consider the challenges of combined training. Perhaps the most formidable is the simultaneous assimilation of two large knowledge bases. Because EM/IM residents spend half of the year in each specialty, first- and second-year combined residents can become frustrated when comparing themselves to categorical residents of the same year. The fund of knowledge of combined residents typically surpasses that of categorical residents by the third or fourth year of training. One of the most challenging times for combined residents is when they begin their fourth year and the categorical residents with whom they began their training in each program are graduating and moving on. Some of those categorical residents will stay on in faculty roles and may be in a supervisory position over a combined resident with whom they were previously colleagues. In addition to the amount of information that must be learned, the length of training must be considered. A 5-year residency program is a considerable investment of your time. If you are only interested in practicing either internal medicine or emergency medicine, completing a demanding 5-year residency may become overwhelming.

Poor reasons to pursue emergency medicine/internal medicine training include the inability to decide between each specialty and the desire to “become a better physician.” Combined residents who are unable to decide which specialty they ultimately want to practice often withdraw within the first or second year of EM/IM training to pursue a categorical program. Many students feel an emergency medicine/internal medicine program would make them a “better physician.” If your career goal is to truly practice either emergency medicine or internal medicine, an EM/IM program would not be a valuable investment of your time. Excellent categorical residency programs exist in both specialties that would make you an outstanding emergency physician or internist. If you desire additional expertise, you can always pursue subspecialty training.

Application Process

Students interested in combined training should apply to emergency medicine/internal medicine programs through the Electronic Residency Application System (ERAS). Applicants must interview with both departments while visiting an institution. Combined programs are ranked as a single program when submitting to the National Residency Match Program. Given the limited number of first-year positions in emergency medicine/internal medicine, it is imperative that applicants also apply to categorical programs in internal medicine and/or emergency medicine. Applications to categorical programs must be indicated separately in ERAS.

REFERENCES

1. American Medical Association - Fellowship and Residency Electronic Interactive Database Access (AMA-FRIEDA). <http://www.ama-assn.org/ama/pub/education-careers/graduate-medical-education/freida-online.page>.
2. Kessler CS, Stallings LA, Gonzalez AA, Templeman TA. Combined residency training in emergency medicine and internal medicine: an update on career outcomes and job satisfaction. *Acad Emerg Med*. 2009;16(9):894-9.



Emergency Medicine: Family Medicine

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In 2005, the ABEM and the American Board of Family Medicine (ABFM) announced that they would offer dual certification for candidates who enter and successfully complete the curriculum of a 5-year program. Combined training in emergency medicine/family medicine is the sole recognized pathway for emergency medicine residents to train in family medicine and the sole recognized pathway for family medicine residents

to train in emergency medicine, other than completion of both categorical emergency medicine and family medicine residency programs accredited by the ACGME. Combined training in emergency medicine and family medicine will develop physicians who are fully qualified in both specialties. The strengths of the two residencies complement each other to provide an optimal educational experience. Combined programs include components of categorical emergency medicine and family medicine residencies that are accredited respectively by the Residency Review Committee for Emergency Medicine (RRC-EM) and by the Residency Review Committee for Family Medicine (RRC-FM), both of which function under the auspices of the ACGME. Graduates of combined programs are eligible for board certification through the ABEM and the ABFM.

The EM/FM career path is an exciting program that gives you the flexibility to impact care on an individual and population-based level.

Application Process

Applications are handled through tERAS and the NRMP. The combined programs are ranked as a single program for the NRMP. Applicants interview with both departments when visiting an institution. If an applicant also wants to apply separately to a categorical emergency medicine or family medicine program, then a separate ERAS application would be required. These combined programs tend to be very competitive given the limited number of positions available in the match. Currently, there are 2 approved combined allopathic emergency medicine/family medicine residency programs, located at Christiana Care Health System in Newark, Delaware, and Louisiana State University in Shreveport, Louisiana.

There are 3 osteopathic combined EM/FM programs, located at St. Barnabas Hospital in the Bronx, New York, Aria Health in Philadelphia, Pennsylvania, and McLaren Oakland in Pontiac, Michigan.

Structure

The emergency medicine/family medicine programs are 5 years (60 months) in duration. The training is 30 months in each specialty and encompasses all of the minimum requirements of each individual residency. Residents traditionally alternate between emergency medicine and family medicine services, while maintaining continuity with their family medicine panel of patients. In addition to rotations in the emergency department and family medicine office, residents rotate through inpatient family medicine, intensive care units, geriatrics, sports medicine, OB/gyn, surgery, and pediatric services.

Certification

To meet eligibility for dual certification, the resident must satisfactorily complete 60 months of combined training, which must be verified by the director or co-directors of the combined program. The emergency medicine and family medicine certifying examinations cannot be taken until all 5 years of training in the combined EM/FM residency program are satisfactorily completed.

Program Requirements

Guidelines from the ABFM and the ABEM stipulate that combined training provide 30 months of training under the direct supervision of each specialty for a total of 60 months. Upon graduation, residents are expected to sit for both the family medicine and emergency medicine board examinations.

The combined training must be coordinated by a designated director or co-directors who can devote substantial time and effort to the educational program. An overall program director may be appointed from either specialty, or co-directors may be appointed from both specialties. If a single program director is appointed, an associate director from the other specialty must be named to ensure both integration of the program and supervision of each discipline. The two directors should embrace similar values and goals for their program. An exception to the above requirements would be a single director who is board-certified in each discipline and has an academic appointment in each department.

Why a Combined Program?

If done separately, the training would take 6-7 years (depending on whether the emergency medicine residency is 3 or 4 years). Completing a combined program offers an opportunity to become dual board-certified in a shorter period of time than separate training would involve.

Is an Emergency Medicine/Family Medicine Residency Right for You?

The combined EM/FM residencies are innovative programs that will give you a unique set of skills to care for patients in a wide variety of clinical arenas. Physicians are prepared to practice medicine in locations ranging from large urban cities to small rural communities. Upon graduation, physicians can practice clinically, have an academic career, participate in research, or explore a mix of these fields. Physicians also have the opportunity to enter subspecialty training fellowships approved by either board. The emergency medicine/family medicine program may be ideally suited for physicians seeking to practice both specialties either concurrently or sequentially. Practicing in a primary care setting as well as in the emergency department gives you a comprehensive understanding of the needs of your community, which ultimately allows you to better serve your patients. For example, current residents utilize this understanding to participate in violence prevention initiatives, improve care transitions throughout the health system, play a role in health policy reform, and travel both nationally and internationally with global health programs. In addition, experience in acute and urgent care, chronic disease management, and preventative medicine gives graduates the ability to adapt to the changing landscape of health care. If you are interested in an exciting program that gives physicians the flexibility to treat patients in countless clinical settings, while truly impacting care on an individual and population-based level, then an EM/FM residency may be right for you.'



Medical Toxicology

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Medical toxicology is a medical subspecialty focused on the identification, management, and prevention of toxicity and adverse effects due to medications, environmental and occupational toxins, and biologic agents. Most patients with toxicologic disorders who present to emergency departments are suffering illnesses from acute and chronic drug overdoses and chemical exposures; however, envenomations, medication interactions, toxic plant exposures, and workplace hazards also present clinical challenges for

the emergency physician. Medical toxicologists are uniquely poised to assist in the acute and chronic management of a wide variety of clinical presentations.

Medical toxicologists serve a valuable role in government agencies, academic medicine, and research, along with clinical practice opportunities.

Fellowship Training

Medical toxicology is an ACGME accredited specialty requiring 2 years of training beyond residency in a primary specialty. There are currently 29 fellowship training programs in medical toxicology in the United States. Candidates for a medical toxicology fellowship are most frequently emergency physicians; however, candidates have come from a variety of primary care backgrounds, including preventive and occupational medicine, pediatrics, and neurology.

A medical toxicology fellowship will train a physician in topics such as the evaluation and management of acute and chronic poisonings, the evaluation and management of occupational and environmental exposures, injury and poisoning prevention, poison center administration, research methods, and education in medical toxicology. During 2 years of fellowship, many opportunities to learn these topics are presented. Didactic sessions directed at the core content of medical toxicology offer opportunities to become experts in the many topics that toxicology encompasses. Direct clinical care, both at the

bedside of the acutely poisoned patient and in outpatient clinic settings, allows for assessment and management of toxicologic disorders in both the acute and long-term care settings. Fellows are encouraged to develop their education and administrative skills through giving toxicology lectures to learners and participating in poison center activities such as quality improvement, protocol development, and telephone consults. Understanding medical toxicology's role on a national level is achieved through participation in national toxicology conferences both in person and via telephone or Internet-based conferences.

Training also focuses on the development of academic skills such as research project development, grant writing, critical appraisal of medical literature, and biostatistics, preparing the fellow for lifelong learning required to stay current in the field. The certification examination is given every 2 years on even years and is required for board certification in medical toxicology.

Career Opportunities

Training in medical toxicology prepares the physician for a wide variety of career options. Medical toxicologists who wish to continue as educators in academic medicine can be valuable resources to their universities and hospitals through teaching of basic pharmacology to medical students, and clinical toxicology to residents, pharmacists, nurses, and other health care providers. Clinically, medical toxicologists can also serve a valuable role in the bedside assessment of acutely poisoned patients and the outpatient evaluation and management of chronic toxicities and occupational exposures. Medical toxicologists are also able to participate in forensic and post-mortem toxicology and the clinical interpretation of post-mortem laboratory findings. Additionally, each of the nation's 55 poison centers requires board-certified medical toxicologists to develop and maintain protocols, quality assurance measures, and provide phone consultations to many physicians and all other callers to the poison center. A board-certified medical toxicologist is also required to be the medical director of the poison center to continue to assist with protocol development and many other administrative duties.

Beyond clinical medicine, many other career opportunities are available to the medical toxicologist. Governmental agencies such as the Environmental Protection Agency, the Centers for Disease Control and Prevention, and the Food and Drug Administration employ toxicologists to assist with the evaluation of toxic environmental hazards, public health evaluations of domestic and international chemical associated outbreaks, and evaluations of suspected new drug toxicities. Additionally, institutions such as advocacy organizations, industrial associations, and corporations involved in chemical and pesticide development utilize medical toxicologists for their expertise in the interaction of chemicals with human biochemical processes. In these industries, toxicologists have the opportunity to contribute to pharmaceutical research and development,

regulatory compliance, and the development product safety measures. Lastly, medical toxicologists have also been utilized in clinical and forensic laboratories for the development, conduction, and interpretation of laboratory studies for new and emerging toxins.

Given the large breadth of knowledge mastered by medical toxicologists, they are well prepared to serve in a variety of clinical, governmental, and industrial settings, providing maximum flexibility for development of many unique career paths for the physician looking to diversify his/her practice.

Further Information

There are several national and international organizations dedicated to the advancement of medical toxicology and support of medical toxicologists. The American College of Medical Toxicology (ACMT) is the professional society for medical toxicologists and is dedicated to ensuring that every potentially poisoned patient has direct access to the expertise of a board-certified medical toxicologist. This organization holds yearly scientific meetings, supports research projects in medical toxicology, and manages *The Journal of Medical Toxicology*. Resident memberships are available at a discounted price, and medical student membership is free.

The American Academy of Clinical Toxicology (AACT) includes physicians, pharmacists, nurses, and doctorates and is dedicated to promoting the study of the health effects of poisons, encouraging the development of new therapies in clinical toxicology, and improving the understanding of the principles and practice of clinical toxicology. A national conference is held each fall, featuring novel research and presentations from toxicology experts in the U.S. and around the world. AACT manages the medical journal *Clinical Toxicology*.

Summary

Training in medical toxicology is available to emergency physicians and other primary care physicians. After 2 years of fellowship training, the board-certified medical toxicologist has a wide variety of potential career options available in clinical medicine, administration, research, government agencies, and industry. With support from our national organizations, the practice of medical toxicology and the care of poisoned patients continue to develop and improve, providing a lifelong, satisfying career for those dedicated to this specialty.

REFERENCES

1. Harkin KE, Cushman, JT. *Emergency Medicine: The Medical Student Survival Guide: A Comprehensive Guide to the Specialty*. Emergency Medicine Residents' Association, Medical Student Committee, 2007.
2. American College of Medical Toxicology. Web. 25 Apr. 2015.
3. The American Academy of Clinical Toxicology. Web. 25 Apr. 2015.



Emergency Medical Services (EMS) Fellowships

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With the 2010 approval of EMS as a formal subspecialty of emergency medicine, many of the 60+ “unofficial” EMS fellowship programs that existed at that time have obtained ACGME accreditation. At the time of this writing, there are 45 such programs in the U.S., and a list is available here: <http://www.acgme.org/ads/Public/Programs/Search?specialtyId=169&orgCode=&city=>.

The only practical route to board certification in EMS is through an ACGME-accredited fellowship.

What Does an EMS Fellowship Teach Me?

The official answer, according to the ABEM application for subspecialty recognition, is: “The purpose of subspecialty certification in EMS is to standardize physician training and qualifications for EMS practice, to improve patient safety and enhance the quality of emergency medical care provided to patients in the prehospital environment, and to facilitate further integration of prehospital patient treatment into the continuum of patient care.” The real answer is to prepare you to be an effective field physician, and to be an EMS medical director. The EMS core content, published in 2012, outlines the topic areas covered in an EMS fellowship program.¹

The 2015 National Association of EMS Physicians textbook, *Emergency Medical Services: Clinical Practice and Systems Oversight*, serves as the core text for EMS fellowships and is also the basis for the ABEM EMS certification exam.² It is divided into four sections: clinical aspects, medical oversight, quality management and research, and special operations (mass casualty management, tactical EMS,³ chem/bio/nuclear/explosive, mass gatherings, etc). Reviewing these documents will give you a good idea of what EMS fellowship training is all about.

Just like emergency medicine residency training, an EMS fellowship experience is a mix of didactic learning (minimum 3 hours per week), procedural training and experience, scholarly work (typically a formal research project), and in-

field hands-on patient care under the supervision of EMS faculty. Many EMS fellowship programs have physician response teams that are part of the local or regional EMS system, and EMS fellows typically staff the response vehicles, with increasing levels of independence during the fellowship year.^{4,5}

Why Do an EMS Fellowship?

While there are currently 2 “grandfather tracks” that allow physicians to sit for the ABEM EMS certification exam without completing a fellowship, those tracks close in July 2019. The “practice” track requires 5 years of practice post-residency; thus, this track is effectively already closed since only those who completed residency before June 2014 can be eligible. The “practice plus training” track requires only 2 years of practice after completion of a non-ACGME-accredited fellowship program, but there are very few of these remaining, and most are working toward accreditation. Thus, the only practical route to board certification in EMS is through an ACGME-accredited fellowship.

While completion of a fellowship and subsequent EMS board certification is by no means a prerequisite for the emergency physician wishing to serve as the medical director of a small EMS system, we are already seeing recruiting advertisements saying “fellowship training preferred” or even “fellowship training required,” and we are very likely to see “EMS board certification preferred” or “required” in the next few years, as the pool of such physicians increases. Physicians wishing to serve as faculty at EMS fellowship programs must also be either certified or eligible to take the EMS certification exam.

Additional information about EMS fellowship programs can be found at the home page of the Council of EMS Fellowship Directors: <http://www.naemsp.org/Pages/Council-of-EMS-Fellowship-Directors.aspx>.

REFERENCES

1. Force EMSET, American Board of Emergency M, Perina DG, et al. The core content of emergency medical services medicine. *Prehosp Emerg Care*. 2012;16:309-22.
2. Cone DC, Brice JH, Delbridge TR, Myers BJ, eds. *Emergency Medical Services: Clinical Practice and Systems Oversight*. Second ed: John Wiley and Sons, Ltd.; 2015.
3. Metzger JC, Eastman AL, Benitez FL, Pepe PE. The lifesaving potential of specialized on-scene medical support for urban tactical operations. *Prehosp Emerg Care*. 2009;13:528-31.
4. Burns K, Cone DC, Portereiko JV. Complex extrication and crush injury. *Prehosp Emerg Care*. 2010;14:240-4.
5. Ho JD, Conterato M, Mahoney BD, Miner JR, Benson JL. Successful patient outcome after field extremity amputation and cardiac arrest. *Prehosp Emerg Care*. 2003;7:149-53.



Emergency Ultrasound Fellowship

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The use of bedside ultrasound increasingly guides management and enhances procedural safety for patients in the emergency department. As ultrasound capabilities have become more portable, the ED is the perfect place for this technology to thrive. Point-of-care-ultrasound is now an integral and required part of emergency medicine resident training, and the ED is at the forefront of ultrasound education and point-of-care ultrasound for many reasons. Emergency medicine physicians treat and manage patients with disease processes and injuries that span the entire body and spectrum of severity – so ultrasound in the ED is not limited to any single body system or anatomic region. Learning how to appropriately use and apply point-of-care ultrasound findings can help with diagnosis and directing patient management.

EM physicians perform focused, goal-directed bedside ultrasound in the ED. The American College of Emergency Physicians provides policy statements that define scope of practice and guide resident education (<http://www.acep.org/Clinical---Practice-Management/Ultrasound>). Ultrasound in the ED is not a portion of the physical exam, nor does it replace any portion of the physical exam. It is intended to be used in conjunction with history and physical exam to assist in diagnosis, patient management, and procedural guidance. Additionally, clinician-performed ultrasound in the ED is a focused exam, answering direct questions, and differs from US imaging exams performed by other specialties (cardiology, radiology, vascular, etc.).

Emergency ultrasound fellows gain experience in bedside teaching, emergency procedures, managing critically ill patients, and interdisciplinary collaboration.

Emergency Medicine Ultrasound Fellowships

There are many emergency ultrasound fellowships throughout the United States (75+), and they are located in nearly every region of the country. Fellowships in emergency ultrasound focus on expanding the breadth of ultrasound proficiency and knowledge that was attained during the emergency medicine residency training, promoting ultrasound-based research, and providing point-of-care ultrasound teaching. Post-residency training in emergency ultrasound is a 1- or 2-year commitment, depending on the institution. Emergency ultrasound fellowships are non-ACGME fellowships. The educational requirements for a fellow involve in-depth understanding of ultrasound physics and key point-of-care and emergency ultrasound studies, as well as critical appraisal of newly published research. This assists the fellow in learning advanced imaging techniques that build upon the learning from residency. Emergency ultrasound fellows often work closely with other specialties that use ultrasound. This may include working with and learning from experts in cardiology, obstetrics/gynecology, radiology, anesthesiology, surgery, pediatrics, critical care, and others.

Fellows work clinically in the ED but have many additional responsibilities. Requirements include performing clinical bedside ultrasounds; fellowships require 800+ fellow-performed and reviewed studies. Fellows receive the majority of their instruction and training from the emergency ultrasound fellowship director as well as other ultrasound trained emergency medicine faculty. Additionally, emergency ultrasound fellows are frequently involved in the ED and EM residency quality assurance process, which entails reviewing, critiquing, and providing feedback on ultrasound studies performed in the ED.

Providing education is a key component of emergency ultrasound fellowship training, and fellow involvement can range from medical student and resident training to regional CME courses and even national and international teaching opportunities. Emergency ultrasound fellowships provide a wide variety of opportunities to teach point-of-care ultrasound. Being involved in or leading an ultrasound-focused research and/or administrative project is also a requirement of the fellowship.

After completion of an emergency ultrasound fellowship, many graduates look for academic appointments at teaching institutions. However, there is a need for community-based ED ultrasonographers as well. Many community hospitals and ED groups need a leader and advocate for ultrasound in the emergency department as well as a director and organizer of quality assurance. Additionally, as the use of ultrasound expands, emergency ultrasound fellows

are finding opportunities in wilderness medicine, EMS, international medicine, and other subspecialties of emergency medicine.

If you enjoy bedside teaching, performing emergency procedures, managing critically ill patients, and interdisciplinary collaboration, then an emergency ultrasound fellowship may be a good fit for you. For further information and an overview of available emergency ultrasound fellowships, go to eusfellowships.com.



Emergency Medicine to Pediatric Emergency Medicine: Pathway to Practice

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The gold standard in pediatric emergency medicine (PEM) education is fellowship training. Since the publication of a 2006 Institute of Medicine report, *Emergency Care for Children: Growing Pains*, unequivocally stated that those who provide care for acutely ill and injured children require advanced education in pediatric emergency care, multiple institutions have developed PEM fellowships for graduates from both disciplines of pediatrics and emergency medicine.

*PEM trained physicians
are highly marketable
in an increasingly
competitive hiring
environment.*

History of PEM

Like general emergency medicine, the field of pediatric emergency medicine is among the youngest of all physician specialties. PEM originated from the field of general pediatrics, rather than general emergency medicine, which, at the time, was just starting to gain its foothold. It was pediatricians who recognized the uniqueness of children, in terms of physiology, physical and social development, and clinical interaction during times of illness or injury. While the majority of adult illnesses often center on cardiovascular disease, children are more likely to be afflicted with respiratory disease. Moreover, the scope of illness in PEM is less acute than that adult care; unique skills in physical examination and rapport are frequently more necessary than critical procedural competence.

In the mid-1970s, a small group of pediatric experts - Stephen Ludwig, Gary Fleisher, and Fred Henretig among them - began to envision PEM as a unique specialty. Within their institution, the Children's Hospital of Philadelphia, this group started a fully staffed pediatric ED and began to develop relationships with major academic organizations, such as the American Academy of Pediatrics (AAP) and ACEP, to promote PEM as a new and important specialty within pediatrics and emergency medicine. What followed were two seminal events in the history of PEM: creation of the first PEM subspecialty fellowship training program at the Children's Hospital of Philadelphia in 1981, and publication of the *Textbook of Pediatric Emergency Medicine* by Fleisher and Ludwig in 1983, which still serves as the principle PEM reference. Recognition of PEM as a specialty followed, with increased numbers of fellowship programs being formed across the country, adding new PEM physicians at a rapid pace. PEM solidified itself as a legitimate specialty in 1992, when the ABEM and American Board of Pediatrics instituted its certification process in pediatric emergency medicine.

Since 1992, the field of PEM has been defined by growth and innovation. Advances in PEM clinical medicine and research have moved pediatric emergency care forward in leaps and bounds. Management of common pediatric afflictions, including acute asthma, croup, febrile seizures, fever without source, fracture management, and laceration repair, just to name a few, has become optimized, with less diagnostic testing and more focused therapies. Control of pain and introduction of sedative techniques are of high priority, and immensely add to the care of acutely injured children. In 2001, the Pediatric Emergency Care Applied Research Network (PECARN) was created to study important but rare outcomes in PEM. PECARN is now among leading research networks in all of medicine, supported by federal funding, and producing landmark studies that definitively concluded that steroids are not indicated in bronchiolitis, and produced decision rules to minimize computed tomography use for head trauma

(a.k.a. “PECARN Head Trauma Rules”). Current foci among PECARN include care of critical illnesses, including intra-abdominal trauma, status epilepticus, sepsis, and diabetic ketoacidosis. More recently PEM has evolved from a primarily academic endeavor, with increasing involvement in community-based medicine, outreach, and education in non-children’s hospitals and general emergency departments.

What initially started as a vague concept among a handful of individuals sitting on a floor at an AAP meeting in the 1970s is now a burgeoning specialty with more than 1,800 board certified members. Annually, nearly 200 new fellowship trainees join the field, with rapidly increasing interest among young physicians, and PEM rates highly in most studies of physician satisfaction and happiness. Each year, 28 million children are treated in emergency departments: The growth and rapid increase in the PEM workforce will only continue as both pediatric and emergency medicine specialists work together to provide care for these acutely ill and injured children.

EM to PEM Fellowships

Standard requirements for application to a PEM fellowship from EM residency are outlined briefly in this section. The fellowship is ACGME accredited, and this requires use of ERAS and the following elements:

- Curriculum Vitae
- 3-4 letters of recommendation, depending on program
- Personal statement
- United States Medical Licensing Examination (USMLE) transcript
- Dean’s letter from medical school
- Medical school transcript

Fellowship programs generally accept applicants from both residency training pathways, but each program may have more experience with one type of trainee over another. The program should have different requirements for EM trained applicants once in fellowship. The rotations should cover pediatric experiences missing in an EM residency (i.e. pediatric outpatient clinics, newborn, neonatal intensive care unit, etc.)

The AAMC lists 21 programs for pediatric EM under emergency medicine and 49 participating programs listed under pediatrics. The Society for Academic Emergency Medicine (SAEM) fellowship directory lists 52 programs as accepting EM applicants. Applications are accepted starting in July for December match. Although the ABEM allows a fellowship length of 2 years to become board certified, individual programs may require 3 years, especially if

an advanced degree is required. Acceptance into a 2-year program may occur if the EM training program was 4 years, instead of 3.

What EM/PEM People Do

Data published in 2012 state that 46% of EDs across the U.S. have no separate pediatric ward, 30% have a separate pediatric ward, and only 10% are exclusive pediatric emergency departments.¹ In addition, roughly 20% of all ED visits are children under 18 years old.²⁻³ Increasingly there is need for trained pediatric emergency practitioners across the U.S., in academic centers, urban and community hospitals, not to mention rural areas. EM/PEM trained physicians have the opportunity and skill to work in any of these environments with expertise and comfort.

Regardless of the setting, PEM trained physicians are needed to act as advocates for the vulnerable pediatric patient. They are responsible not only for their medical care, but also to educate other providers at all level of trainings, and to ensure standards of care are met.

EM/PEM physicians offer broad expertise and can engage in leadership positions both educational and administrative due to the understanding of both segments of acute care medicine.

The Benefits of Fellowship Training

There are many benefits of fellowship training, irrespective of the specialty. Perhaps the most important is having the opportunity to follow your passion, with dedicated time to develop a clinical, research, or administrative niche in a field of interest.

In 2012, physicians experienced higher burnout rates than other American workers (4). Burnout rates ranged from 30%-65% across multiple specialties, with the highest ranking among emergency medicine and primary care physicians (5). From 2013 to 2015, overall burnout rate increased from 40% to 46% (6). A burnout rate of 52% was reported in emergency medicine providers in 2015, with a higher rate among females (58%) (6). Although the surveys do not include EM/PEM, pediatricians (10th in ranking) tend to rate higher in happiness compared to the EM colleagues (24th in ranking) (6). A merging of the two specialties may prove beneficial in professional longevity and fulfillment.

In general, PEM fellowship programs are small, which facilitates the development of lifelong friendships, mentoring, and support. The microenvironment of fellowship is also a great opportunity for continued experiential learning in a monitored setting, with easy access to PEM experts. There is individualized mentorship and expansion of a broader professional network.

After residency there is still a lot to learn. EM trainees enter PEM fellowship with more experience with sick patient care and invasive procedures than their pediatric colleagues. They are also generally more experienced and comfortable with ED flow and the management of a busy department. However, a survey of EM practitioners conveyed a level of discomfort when managing critically ill children. In general, children are healthy and the number of critically ill pediatric patients is low. However, volume begets skill. The volume of pediatric patients seen during fellowship allows an EM trained physician to move from competence to confidence in his/her pediatric skills.

Further PEM training for the pediatric trainee will also offer an advantage over general pediatricians who work in emergency departments, primarily in providing expertise in critical care.

PEM trained physicians are highly marketable in an increasingly competitive hiring environment, not only in urban academic centers, but also at private, non-academic urban and community facilities. Many academic positions, especially those in large cities, which are in high demands, go to PEM trained providers. More frequently, community practices of all sizes are eagerly seeking PEM trained providers to take leadership roles in quality improvement, education, and administrative projects for pediatric patients. A dually trained EM/PEM provider is attractive to employers looking for someone who can work in both practice environments.

The Cons of Fellowship Training

We would be remiss to ignore the costs of fellowship training. There are the literal costs, including applications, moving expenses, and an additional board exam. There are also opportunity costs, such as the money you forego in earnings potential during fellowship. Another cost is your time. There are many 2-year tracks available for EM residents, but some programs require 3 years, regardless of residency of origin. If you are considering fellowship training, be mindful of how you will feel about your relative lack of independence as your peers start jobs and begin to make their own decisions. Although most fellowships promote early, graduated autonomy, fellows still ultimately answer to an attending. Finally, those who ultimately want to practice both EM and PEM should be aware finding a job that is an easy fit for both specialties is possible but requires a lot of thought, coordination, and flexibility between at least two divisions, if not departments or sometimes several hospital systems.

Alternate Pathways

In addition to emergency medicine and pediatric residency training followed by PEM fellowship, combined training programs in emergency medicine and pediatrics provide a generalist rather than specialist approach to knowledge

base of both disciplines. To date, there are only 4 institutions offering this 5-year program with board certification in both pediatrics and emergency medicine. By completing both residency programs, trainees are afforded the knowledge base of the breadth of general pediatrics as well as emergency medicine. Graduates of EM/Peds residency programs have the ability to complete fellowships available to either specialty and can practice in a variety of settings.

Conclusions

Pediatric emergency medicine is a very rewarding sub-specialty. Graduates will be content experts and can apply skills to a variety of different situations. Understanding the training expectations as well as future career options will allow for a more educated career choice, and thus professional satisfaction.

REFERENCES

1. Schappert S, Bhuiya F. Availability of Pediatric Services and Equipment in Emergency Departments: United States, 2006. *National Health Statistics Reports*. Vol. 47, March 2012.
2. National Hospital Ambulatory Medical Care Survey: 2011 Outpatient Department Summary Tables. Available at http://www.cdc.gov/nchs/data/ahcd/nhamcs_outpatient/2011_opd_web_tables.pdf
3. Bloom B, Jones LI, Freeman G. Summary health statistics for U.S. children: National Health Interview Survey, 2012. National Center for Health Statistics. *Vital Health Stat*. 10(258). 2013
4. Shanafelt TD, Boone S, Tan L, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med*. 2012;172:1377-1385. <http://archinte.jamanetwork.com/article.aspx?articleid=1351351>.
5. Linzer M, Levine R, Meltzer D, Poplau S, Warde C, West CP. 10 bold steps to prevent burnout in general internal medicine. *J Gen Intern Med*. 2014;29:18-20. <http://link.springer.com/article/10.1007/s11606-013-2597-8/fulltext.html>.
6. Physician Burnout: It Just Keeps Getting Worse. *Medscape*. Jan 26, 2015.



Critical Care

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Emergency Medicine-Critical Care Fellowship Training

In the ideal setting, critically ill and injured patients are evaluated and stabilized in the emergency department and then transferred to the intensive care unit (ICU) for ongoing work-up and resuscitation. This initial phase of care should serve as the foundation of the patient's critical care management and lead to improved quality of care and increased patient satisfaction. It is well known that delays in care or inappropriate care (i.e. delay in starting antibiotics or placing patients on the incorrect antibiotics) can have dire consequences and negatively affect morbidity and mortality.

The number of patients being cared for in an ICU setting has risen nationwide, as has the number of critical care physicians caring for these patients. Despite this increase in the number of intensivists, the projection is that the demand will outpace supply.

In 2006, the Health Resources & Services

Administration (HRSA) reported that if the proportion of ICU patients whose care is directed by an intensivist were to increase from the current one-third to a more optimal level of two-thirds, then intensivist requirements would grow from a need for 3,100 intensivists in 2000 to 4,300 by 2020.¹ This represents a shortage of about 1,200 intensivists in 2000, growing to 1,500 in 2020, or 129% above the projected supply.

Since the formation of ACEP in 1968, the specialty of emergency medicine has made great strides in developing physicians who can evaluate, stabilize, and begin the initial management of the critically ill patients. But the training you obtain in residency alone is not sufficient to care for the critically ill patient long-term. Formal post-residency training in critical care medicine would provide the emergency physician with a specialized skillset and provide additional intensivists to offset the projected shortfall of critical care physicians.

The number of patients being cared for in an ICU setting has risen nationwide, as has the number of critical care physicians caring for these patients.

Prior to Sept. 21, 2011, the American Board of Medical Specialties (ABMS) did not recognize critical care as a board-certified specialty program for emergency medicine physicians in the United States. If an emergency physician wanted to attain additional certification in critical care, s/he could pursue an alternate pathway through the European Society of Intensive Care Medicine (ESICM). In 2009, the ABIM and the ABEM reached an agreement that would allow those with primary training in emergency medicine to obtain board certification in critical care, and this was approved by the ABMS in 2011. Critical care certification has now become the 7th subspecialty available to ABEM-certified emergency medicine physicians.

The number of emergency medicine physicians with interest in pursuing additional training in critical care medicine has increased, as have the options to become board certified. Emergency medicine physicians now have the option to attain certification through the internal medicine, anesthesia, or surgery pathways. Each pathway has its specific requirements and application processes (www.abem.org).

Whether you decide to train in an internal medicine, anesthesia, or surgical program, it is important to note that the curriculum will vary from institution to institution and will be unique to that program. The majority of your time is typically spent rotating between the various ICUs such as medical, surgical, trauma, and neurologic ICU. Time is also spent on off-service rotations such as radiology, transplant, and renal, and there is also time devoted to research. It is strongly recommended that you review not only the application process for that program, but also the program-specific curriculum prior to applying.

There are additional options for obtaining critical care certification. In September 1999, ABIM and ABEM agreed to institute a 6-year residency program that combined training in emergency medicine, internal medicine, and critical care medicine. This was approved by ACGME, and 4 institutions now offer this program (www.abim.org).

Emergency medicine physicians desiring to obtain certification in neurocritical care can do so through the United Council for Neurologic Subspecialties (UCNS). Until 2013, emergency medicine physicians could apply via the practice track pathway if they had completed 2 years of post-residency critical care training. This practice track is no longer available. Beginning with the 2015 board exam, only those physicians who have completed a UCNS-accredited fellowship program, are faculty of a UCNS-accredited neurocritical care fellowship program, or are physicians who have taken and failed a previous examination will be able to apply. There are 53 UCNS-accredited programs, and you can apply to these programs through the UCNS online application system (www.ucns.org).

Employment opportunities for emergency medicine physicians with additional critical care certification have grown, and jobs vary based on your career plan and the agreement with the institution of employment. Some clinicians equally divide clinical time between the emergency department and the ICU, while others may decide to focus more heavily in one area over the other. Some decide to devote 100% of their clinical time to the ICU.

As the specialty of emergency medicine continues to grow and evolve to meet the challenges and demands of tomorrow's health care system, emergency medicine physicians can now achieve additional board certification in critical care medicine. Critical care training for emergency physicians is a natural extension of emergency medicine training and clearly represents the wave of the future.

RESOURCES

EMRA Critical Care Committee: www.emra.org

ACEP Critical Care Section: www.acep.org/webportal/membercenter/sections/ccmed

Coalition for Critical Care Medicine in the Emergency Department (C3MED):
<http://health.groups.yahoo.com/group/C3MED>

EM-CCM Fellowships: www.emccmfellowships.org

Emergency Medicine/Critical Care Medicine Podcasts: www.emcrit.org

Association of American Medical Colleges (AAMC): <https://www.aamc.org>

American Board of Emergency Medicine (ABEM): <https://www.abem.org/public/subspecialty-certification/internal-medicine-critical-care-medicine>

American Board of Internal Medicine: <https://www.abem.org/public/docs/default-source/faqs/im-ccm-faqs.pdf?sfvrsn=18>

REFERENCES

1. Health Resources and Services Administration (HRSA). The Critical Care Workforce: A Study of the Supply and Demand for Critical Care Physicians. May 2006
2. Chalfin, DB, Trzeciak, S, et al. Impact of delayed transfer of critically ill patients from the emergency department to the intensive care unit. *Crit Care Med*. 2007 Jun;35(6):1477-83.
3. Osborn TM, Scalea TM. A call for critical care training of emergency physicians. *Ann Emerg Med*. 2002; 39: 562-563.
4. Winters M. "Combined Programs – Emergency Medicine/Internal Medicine." *The Medical Student Survival Guide*. 2007:65-68.

5. Bozeman WP, Gaasch WR, Barish RA, et al. Trauma resuscitation/critical care fellowship for emergency physicians: a necessary step for the future of academic emergency medicine. *Acad Emerg Med*. 1999;6:331-333.
6. Osborn T, Scalea TM. A call for critical care training of emergency physician. *Ann Emerg Med*. 2002;39:562-565.
7. Huang DT, Osborn TM, et al. Critical care medicine training and certification for emergency physicians. *Crit Care Med*. 2005;33:2104-2109 and . *Ann Emerg Med*. 2005;46:217-221.



Sports Medicine

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Sports medicine is a growing subspecialty of emergency medicine. It is estimated that there are just over 100 board-certified emergency physicians in the United States with additional certification in primary care sports medicine.¹ When you hear the name of this subspecialty, it might conjure thoughts of caring for professional athletes at major sporting events. Such experiences, however, make up a tiny percentage of a much more comprehensive field. Simply stated, primary care sports medicine involves the prevention, diagnosis, and treatment of sports-related illnesses and injuries.² It involves managing musculoskeletal, neurologic, respiratory, cardiovascular, gastrointestinal, nutritional, environmental, and psychosocial health issues that affect the function of active people.

With residency training and board certification, all emergency physicians are qualified to practice some level of sports medicine, including team and event coverage. Fellowship training and certification in sports medicine, however, allows the emergency provider to become a leader in the medical community regarding the care of athletes, and the opportunity to improve care through research. But what exactly does that mean?

What Can I Expect From a Career in Sports Medicine?

The “athletes” cared for by sports medicine physicians have become a diverse population. From the young pediatric patient with developmental concerns to the geriatric patient hoping to remain active, sports medicine focuses on the prevention, treatment, and rehabilitation of injuries and illnesses in patients of all ages and activity levels. Sports medicine is certainly not limited to the treatment of professional and high-level athletes, as is often assumed. That said, team coverage is an important part of the sports medicine physician’s career.

Sports medicine is not limited to the treatment of professional and high-level athletes, although team coverage is an important aspect of the career.

Most scholastic (high school and college) and professional athletic programs have a designated team physician. Some teams will have both an orthopedic surgeon, for surgical injuries, and a primary care sports medicine physician to help treat the preoperative, postoperative, and non-operative medical needs. Team responsibilities include individual consultation for illness/injury, pre-participation screening, “return to play” decision-making, nutritional education (including supplements, enhancements, and eating disorders), sports psychology, strength and conditioning, infection control, and injury prevention. A close relationship with the athletic training staff is critical for the physician to maximize the health of all team members.

Aside from team coverage, sports medicine physicians cover a variety of mass participation events such as marathons, triathlons, cycling events, and tournaments/jamborees. Opportunities range from volunteering for several hours at a race to serving as the facilitator for all care at an event. The sports medicine physician is well-trained for both, and for everything in between.

Team and event coverage most commonly serve as supplements to the physician’s clinical practice, with few full-time positions. Many large organizations and schools hire a physician group that will divide responsibilities while maintaining their own practices. Such positions afford the physician a great deal of variety in his/her practice, which is often more enjoyable, and helps prevent burnout. Time not spent in the athletic training facility or at events/games is usually spent in the physician’s office. The clinical setting is where community members have their opportunity to be evaluated and treated for a huge variety of conditions, depending on the physician’s specialty and areas of expertise/interest.

In addition to direct patient care, sports physicians often serve as community leaders on a variety of public health initiatives. As the obesity epidemic continues to grow, it is becoming increasingly important for physicians to champion community health and fitness. Injury prevention programs such as encouraging the use of protective equipment and implementing pitch counts are often spearheaded by the sports medicine physician.

What Additional Knowledge is Gained from Fellowship Training?

As the breadth of knowledge in medicine continues to grow and evolve, there is a greater need for subspecialty training and expertise. Every branch of medicine has areas of expertise, and sports medicine is no different. Specific research topics explored by sports medicine physicians include concussions, heat- and cold-weather related illnesses, wound care, cardiopulmonary physiology, nutritional issues, overuse injuries, injury prevention programs, use of therapeutic injections, substance abuse, and chronic disease (such as diabetes and asthma) in the athlete.

Most sports are team games. Likewise, the specialty of sports medicine relies on a team to care for the athlete. The community sports medicine team frequently includes the sports medicine physician, consulting physicians and surgeons, athletic trainers, physical therapists, other ancillary providers (chiropractors, massage therapists, etc.), coaches, family, and the athletes/patients themselves.⁴ Often the sports medicine physician serves as the “gatekeeper” for the patient, coordinating care and collaborating with other providers. Practicing sports medicine entails utilizing all personnel and resources available to treat patients and help them both compete at the highest level and maintain an active lifestyle. Fellowship provides formal training and experience in becoming a team leader and advocating for the long-term benefit of patients and families.

When and How Do I Begin My Pursuit of a Career in Sports Medicine?

The specialty of primary care sports medicine was born in March 1992 when the certifying boards for emergency medicine (ABEM), family medicine (formerly ABFP, now ABFM), pediatrics (ABP), and internal medicine (ABIM) gained approval from the American Board of Medical Specialties (ABMS) to offer subspecialty certification in sports medicine. In March 2007, the American Board of Physical Medicine and Rehabilitation (ABPMR) was approved by ABMS as a co-sponsor of sports medicine. The ABFM has administered the certification exam since it was first offered in 1993.⁵ In order to pursue a career in sports medicine, one must first complete a primary residency in either family medicine, internal medicine, pediatrics, physical medicine and rehabilitation, or emergency medicine.⁵ At the beginning of the final year of primary residency, starting in July, applicants can begin to apply to fellowships through the ERAS application system (<https://www.erasfellowshipdocuments.org/>). The application deadline varies by program and lasts into the fall. Most non-military programs that are accredited by the ACGME then participate in the National Resident Matching Program. After ERAS application, the NRMP opens in September for registration by programs and applicants and closes in December. Match day takes place in early January. It is important to attend an accredited fellowship in order to take the certificate of added qualification (CAQ) examination in sports medicine.⁵ In the 2015 NRMP match, 325 applicants applied for 236 positions in 152 programs.²

In 1991, the primary organization for non-surgical sports medicine physicians was formed: the American Medical Society for Sports Medicine (AMSSM.-). Their website, <https://www.amssm.org/>, offers valuable information for pursuing a career in sports medicine. It includes a comprehensive list of both accredited and non-accredited fellowships and links to the individual programs. Not all programs accept EM-trained physicians, and the best way to find out

is to contact the individual programs directly. The AMSSM website not only contains fellowship information but also includes educational resources for patients and physicians, advocacy information, opportunities for grants and scholarships, networking with others in the field, schedules of national meetings and training courses, and current job opportunities. Joining the AMSSM and exploring what the organization has to offer is the first step toward a career in sports medicine. Medical students interested in sports medicine would be well-advised to follow the AMSSM “road map” to a sports medicine fellowship:³

- 1) First and foremost, focus on doing well in medical school courses.
- 2) Make contacts in sports medicine (AMSSM: local docs, mentorship program, etc.).
- 3) Choose a residency that best fits you and your career goals.
 - a. Residencies that are affiliated with primary care sports medicine fellowship may offer more exposure and access to the specialty.
 - b. Participate in a Fellowship Participation Track.³
- 4) During residency, build a strong foundation in your primary specialty (emergency medicine) and continue to make contacts in sports medicine.
- 5) Obtain ERAS fellowship application early and begin to build resume through residency.
- 6) Get involved locally in event coverage, high school coverage, community groups, and mass participation events.
- 7) Join and participate in national organizations and attend their meetings:
 - a. American Medical Society of Sports Medicine (AMSSM: <https://amssm.org>)
 - b. American College of Sports Medicine (ACSM: <https://www.acsm.org>)
 - c. American Osteopathic Academy of Sports Medicine (AOASM: <https://www.aoasm.org>)
 - d. American College of Emergency Medicine (Sports Medicine Section)
 - e. Society for Academic Emergency Medicine (Sports Medicine Interest Group)
 - f. American Academy of Emergency Medicine
- 8) Look for case presentations, journal article, and research opportunities.
- 9) Participate in an away elective at a fellowship program (contact programs year in advance).
- 10) Research and contact individual fellowships, apply, and interview.

Individual fellowships will vary from program to program. However, all programs will involve coverage of sports teams and mass participation events. ACGME guidelines also require fellows to spend at least one half-day per week refining their skills in their primary specialty (emergency medicine). Clinical activities account for a minimum of 50% of the time in the program, with the remainder spent in teaching, research, didactic teaching, and maintenance of primary specialty skill.⁶

How Do I Find Career Opportunities in Sports Medicine?

Completing a fellowship in sports medicine and passing the certification examination unlocks the doors to many opportunities in this great field. The best way to find job opportunities is by networking. Their websites also list current openings. As there are still very few sports medicine physicians in emergency medicine, many opportunities exist at academic centers for teaching and research. Beyond traditional careers, many in sports medicine are creating unique opportunities, including working for sports governing bodies (NFL, NCAA, Olympic Committee, etc.) and players associations, creating policy at the local and national levels, and innovating devices, procedures, and techniques in all things athletic. Many sports medicine physicians are former athletes themselves, and this medical specialty bridges a love of medicine and a love of sports. A career in sports medicine may not necessarily reap a higher salary, but job satisfaction and enthusiasm remain very high.

Why is Sports Medicine a Good Fit for Emergency Medicine Physicians?

Emergency medicine and sports medicine fit together perfectly. Emergency medicine training prepares you to care for patients of all ages, with all kinds of diseases, from all walks of life. A hands-on specialty, it provides an excellent procedural foundation in joint and fracture reduction, wound care, injections, splinting, nerve blocks, and basic dental care. Emergency physicians are the experts in prehospital care, and this translates well to on-site medical treatment at sporting events and game coverage. Emergency physicians become very adept at treating acute musculoskeletal injuries and illnesses, as well as the many neurological, dermatological, psychiatric, environmental, cardiovascular, and respiratory illnesses that athletes face. Additional training in the musculoskeletal exam, rehabilitation, clinic practice and management, chronic disease management, exercise biomechanics, and nutrition are just a few areas that help prepare you for a career in sports medicine.

No matter how you pursue a career in emergency medicine, it is important to maintain balance, personal wellness, and professional satisfaction. Sports

medicine is a unique opportunity to add variety to your practice, prevent burnout, and facilitate an enjoyable and successful career.

REFERENCES

1. ACEP website: http://www.acep.org/_sports-Medicine-Mentorship/About-the-Mentorship-Program
2. NRMP website: <http://www.nrmp.org/fellowships/primary-care-sports-medicine-match>
<http://www.nrmp.org/wp-content/uploads/2015/02/Results-and-Data-SMS-2015.pdf>
3. ASSM website: <http://www.amssm.org/Content/pdf%20files/WhatisSMSpec-Patient-broch.pdf>
http://www.amssm.org/Content/pdf%20files/Medical_Student_Guide.pdf
<http://www.amssm.org/Content/pdf%20files/SportsMedFPTFinalDraft.pdf>
4. McKeag DB, Moeller JL. *ACSM's Primary Care Sports Medicine*, 2nd ed. Philadelphia: Lippincott, Williams, & Wilkins; 2007.
5. ABEM website: <https://www.abem.org/public/subspecialty-certification/sports-medicine/sports-medicine-overview>
<https://www.abem.org/public/subspecialty-certification/sports-medicine/sports-medicine-initial-certification/sports-medicine-application-requirements-and-credentialing-process>.
6. ACGME website: https://www.acgme.org/acgmeweb/Portals/0/PFAssets/ProgramRequirements/116-127-333-342_sports_medicine_07012014_1-YR.pdf.



Hospice and Palliative Care Medicine

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Choosing Palliative Care

Palliative care is a specialty that focuses on improved quality of life through the relief of the pain and symptoms of a serious illness. It is appropriate that a patient receive palliative care at any point of his/her illness, including during visits to the emergency department.¹ Palliative care should be integrated into the everyday practice of emergency medicine. In October 2013, ACEP included early engagement of ED patients into palliative care services as part

of its “Choosing Wisely” campaign.² The practice of palliative care is a partnership between physician and patient to establish a patient’s individual goals of care. Completing a fellowship and obtaining board certification in palliative care could provide a unique niche for emergency medicine physicians. When considering a fellowship, it is essential to get exposure to the practice of palliative care. IPAL-EM, improved palliative care in emergency medicine, is a section of the Center for Advanced Palliative Care, CAPC, dedicated to palliative care in emergency medicine. CAPC provides a list of clinical resources and opportunities for advanced training in palliative care outside of fellowship training.³ Work with your residency program director to find and complete an elective in palliative medicine. Join the palliative care section of ACEP to meet other dual-trained physicians and network with leaders in the field.⁴ Through these multiple avenues you can discern if you have an interest in a palliative care fellowship.

Palliative care sees the person beyond the disease. It is a fundamental shift in focus for health care delivery.”

Source: Center to Advance Palliative Care

Considerations When Applying

The number of EM-trained palliative care fellows is growing. However, many palliative care fellowship programs have not trained EM physicians. Prior to applying, contact fellowship programs to ask if they have had emergency medicine physicians as fellows. The fellowship directors can speak to other programs that have worked with EM physicians. When investigating programs,

ask if the program has particular policies concerning moonlighting. For many EM physicians freshly out of residency, it is important to continue working in the ED to maintain skills. The ED medical director will have to be willing to work with the schedule of the fellowship program.

Palliative Care Fellowship Training

Starting in July 2016 the ACGME-accredited hospice and palliative medicine fellowship programs will be joining the NRMP Specialties Matching Service (SMS).⁵ Go to <http://aahpm.org/career/clinical-training> to find a list of ACGME-accredited programs. Palliative care fellowships are 1 year and may include rotations in inpatient and ambulatory palliative care, inpatient and home hospice, oncology clinic, radiation oncology clinic, pain clinic, research, ethics, and pediatric palliative care. Emergency medicine residents traditionally receive less training in oncology compared to primary care residents. It may be helpful for EM physicians to request fellowship elective time in oncology to improve education and exposure to oncology patients. A few palliative care fellowships offer an additional focus or tract in particular areas of palliative care, including ethics, geriatrics, public health, and research. At completion of fellowship training, fellows are board-eligible for certification in hospice and palliative medicine. The board exam is offered every other year through the ABEM.

Career Opportunities

The career path for EM/palliative care physicians is very individualized, and the possibilities are endless. Some dually trained physicians split their time between palliative medicine and emergency medicine. Others work primarily in either specialty. While there is emerging research on palliative care in the ED, there is abundant opportunity for careers exploring this field. The Center to Advance Palliative Care also has examples of emergency department palliative care collaborative programs and systems.¹

REFERENCES

1. *About Palliative Care*. 2015 [cited 2016 May 2]; Available from: www.capc.org.
2. *ACEP Announces List of Tests As Part of Choosing Wisely Campaign*. 2013 [cited 2015 May 2]; Available from: <https://www.acep.org/Clinical-Practice-Management/ACEP-Announces-List-of-Tests-As-Part-of-Choosing-Wisely-Campaign>.
3. *Palliative Care and Emergency Medicine*. 2015 [cited 2015 May 2]; Available from: <https://www.capc.org/ipal/ipal-emergency-medicine>.
4. *Palliative Medicine*. 2014 [cited 2015 May 2]; Available from: <http://www.acep.org/palliativesection>.
5. *Clinical Training in Hospice and Palliative Medicine*. [cited 2015 May 2]; Available from: <http://aahpm.org/career/clinical-training>.



Hyperbaric Medicine

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You can earn a certificate of special competency in undersea and hyperbaric medicine after your EM residency or an alternative residency. Certification requires a 1-year fellowship that can be completed at approximately 10 different medical centers in the U.S.¹ The focus of training is stabilization and management of disorders such as decompression sickness and air embolism, as well as a variety of conditions treatable with hyperbaric oxygen (HBO₂).

Many disorders treated with HBO₂ are diagnosed in the emergency department. This fact, and the high acuity of the illnesses with need for supportive critical care, make hyperbaric medicine a natural progression following training in emergency medicine. Because of the variety of conditions that are treated, hyperbaric medicine also offers the opportunity for close clinical collaborations with many other types of medical and surgical specialists. The growing role of HBO₂ in management of refractory wounds due to peripheral vascular disease also offers opportunities for emergency physicians to get heavily involved with wound care. Additionally, there is ample room for basic and clinical research, especially in academic centers, which provides intellectual stimulation and opportunities to add important knowledge to this relatively young field.

More than 400 medical centers in the United States and Canada operate clinical hyperbaric chambers. These are either the large, walk-in chambers where hands-on-care can be delivered to patients during treatment, or smaller, one-person chambers that are pressurized with pure oxygen. No matter which device is used, the mechanisms of action for HBO₂ are based on both elevated pressure and increased oxygen tension in the patient's tissues. Elevated pressure is typically viewed as the predominant treatment goal in bubble-related disorders

Hyperbaric medicine offers practitioners the opportunity for close clinical collaborations with many types of medical and surgical specialists.

such as air embolism and decompression sickness. Elevated oxygen partial pressures trigger several secondary effects that appear helpful when treating carbon monoxide poisoning, anaerobic or mixed necrotizing infections, compromised skin grafts and flaps, osteoradionecrosis, some thermal burns, and several types of peripheral ischemia.²

Following completion of fellowship and board certification, most physicians work at a medical center associated with a hyperbaric facility, splitting time between emergency department duties and helping to operate the clinical hyperbaric chambers.

REFERENCES

1. Current information on training opportunities can be found at <https://www.uhms.org>.
2. Thom, S.R. Oxidative stress is fundamental to hyperbaric oxygen therapy. *J. Appl. Physiol.* 2009 106:988-995.



Disaster Medicine

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Catastrophes and disasters resulting in large numbers of casualties have plagued humans for millennia. However, the study of disaster medicine (DM) is a relatively new field. The need for disaster medicine as a specialty came became apparent after large numbers of casualties required battlefield treatment during World War I and World War II, and the imminent threat of nuclear holocaust during the Cold War in the 1950s and 1960s also highlighted the potential role for disaster medicine specialists. The increased interest in new types of chemical and biologic weapons led to realization that with these new agents would come new

types of injuries and casualties. The establishment of the Federal Emergency Management Agency (FEMA) in 1979 and the development of the National Response Framework (NRF) after the September 11, 2001, attacks and Hurricane Katrina in 2005 solidified the institutional framework and funding models for the scientific study of disasters, which led to educational models including masters programs and advanced medical training.

A disaster medicine specialist must first and foremost be a strong clinician who can act decisively under pressure and make life-and-death decisions with limited information.

What is Disaster Medicine?

Disasters and mass casualty incidents are commonly defined as incidents that overwhelm the response abilities of local health care systems. This means that although a multi-vehicle accident might be a routine event for an inner-city trauma center, it could be a disaster for a small rural hospital. Disasters may involve tornadoes, floods, or other weather-related events. They can also be

man-made acts of violence and involve chemical, biologic, or nuclear devices. A disaster might even be an epidemic of a new or virulent disease and may stretch out for months or years, such as the Ebola epidemic of 2014-2015.

Disasters affect all aspect of health care systems and the broader community. The field of disaster medicine and the closely-related field of emergency management were born to mitigate and prepare for disasters before they occur, effectively respond to disasters once they occur, minimize morbidity and mortality from the event, and help both people and organizations recover from disasters after they occur.

A disaster medicine specialist must first be a strong clinician who can act decisively under pressure and make life-and-death decisions with limited information. S/he must be able to stabilize and treat multiple patients simultaneously, often with very limited resources or in less than ideal conditions. DM specialists must also understand hospitals and health care systems and how they respond to patient surges. Finally, they must also understand how health care interacts with public health, public safety, regional, and national preparedness and response organizations.

Fellowships and Other Advanced Training

Disaster medicine is not currently a rigidly defined specialty. A number of disaster fellowships exist around the country (Fellowship Directory, 2015). Most of these began in combination with or as an area of concentration under emergency medical services (EMS) fellowships. There is still some overlap with EMS fellowships, because EMS providers are often the first responders in mass casualty incidents and often participate in preparation for mass gathering events where there is potential for high numbers of casualties. Currently there is no generally accepted path to board certification in disaster medicine.

Because disaster medicine is still being defined as a specialty, different fellowships will likely emphasize different aspects of training. Some may emphasize EMS training; some may emphasize public health issues; some may emphasize international medicine; and some may emphasize emergency management and health care systems issues. Fellowships may also offer coursework or advanced degrees in these various fields.

Careers in Disaster Medicine

Fellowship training in disaster medicine can afford an emergency physician many unique opportunities. Many emergency medicine physicians are interested in participating in disaster response, and advanced training in disaster medicine can help clinicians participate in and rise to leadership positions in response organizations. Examples of response organizations include

urban search and rescue (USAR) teams, disaster medical assistance (DMAT) teams, and non-governmental response organizations such as International Red Cross/Red Crescent or Doctors Without Borders. Physicians in the military also have opportunities to respond to disasters or battlefield mass casualty situations.

As disaster medicine is a new and emerging field, many areas for research exist for an academic physician. Areas for research might include the epidemiology of disasters, infectious disease epidemics, mass gathering medicine, and response to chemical, radiologic, or biologic attacks. Research areas may also expand to other social sciences and hard sciences such as psychology, economics, geology, and city planning. An emergency physician can also enhance his/her career through advanced training in disaster medicine by serving on hospital emergency management committees, participating in or leading mandatory hospital disaster drills, and being the point person when a hospital disaster plan is activated.

Finally, disaster training allows clinicians to participate in leadership positions in public health and public policy organizations. These may be local organizations such as county or state public health offices, or they may be regional or national organizations such as FEMA, the department of Veterans Affairs, Centers for Disease Control and Prevention (CDC), the Centers for Medicare and Medicaid Services (CMS), and the Office of the Assistant Secretary for Preparedness and Response (ASPR).

Disaster medicine clinicians have the ability to be national leaders and policy-makers in this important and burgeoning field. Opportunities exist in a wide variety of areas, including disaster response, research, and health care leadership and policy-making. As awareness of disaster medicine as a specialty continues to increase, the role of DM specialists will also expand, making this an exciting career choice for emergency physicians.

REFERENCES

- About the Agency.* (2015, April 24). Retrieved from FEMA.gov: <https://www.fema.gov/about-agency>
- Disaster Medicine.* (2015, April 24). Retrieved from American Board of Physician Specialties: <http://www.abpsus.org/disaster-medicine>
- Fellowship Directory.* (2015, April 24). Retrieved from Society of Academic Emergency Medicine: <http://www.saem.org/membership/services/fellowship-directory>



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International emergency medicine (IEM) is a rapidly growing subspecialty of emergency medicine that focuses on improving health care around the world through education, research, and direct clinical care ¹. Many aspiring emergency physicians look for IEM opportunities in their residencies and future work, and a subset of those will launch into a full-time career in IEM ². The breadth of opportunities in IEM is vast and includes specialty development, management of disease-specific programs, clinical care in low-resource settings, refugee health, disaster medicine, research, and travel medicine ³.

The best way to know if you want to dedicate your life to international emergency medicine is to gain experience.

What are the Activities of International Emergency Medicine Specialists?

Specialty development: These are activities aimed at promoting and educating persons in emergency medicine. In many parts of the world, emergency care is delivered by providers who are not specialty trained and working in conditions with very few resources ⁴. Working with local partners, a group can develop a full residency training program or a diploma aimed at general providers, nurses, or other health care workers. Academic activities are often tied to development of the specialty through a society and conferences.

Disease-specific programs: Other providers focus on the management of programs that tackle specific diseases such as Ebola, HIV/AIDS, TB, or trauma. While these diseases are often not taught to the level of expertise of some other specialists, the emergency physician's adaptability, broad-based knowledge, and appreciation of systems issues make us excellent providers and directors for these types of programs.

Refugee health: Perhaps this is the aspect that most medical students think of when they when they imagine IEM: A basic tent in a sun-baked, dusty plain with literally thousands of patients at our doorstep. Most of these trips are at least 1 month long and often closer to 6-12 months.

Others: There are numerous other avenues to develop a career in IEM:

- EMS development is often linked to disaster preparedness and relief.
- Research: Both conducting research and developing local capacity.
- Ultrasound: Several have combined ultrasound skills and IEM very effectively.
- Clinical work in low-resource setting is often referred to as missionary work.
- Leadership in non-governmental organizations (NGOs) or international organizations

Translating Skills to the Home Institution

While many of us aspire to live years in a beautiful tropical country, family and professional reality mean that most of us will one day need to return to the U.S. To remain marketable, we need to develop an expertise that is applicable at home. Two principal academic pathways exist:

- Clinician educator: This is the more common pathway, as education is the common thread that links all the aspects of IEM.
- Clinician researcher: Some will develop a research expertise and an ability to successfully apply for grants.

In addition, one should develop some topical expertise, and infectious disease is often a natural fit. It can also lead to a part-time career in travel medicine.

Fellowship

For all those interested in a career in IEM, a fellowship is key to starting your career. The fellowship will expose you to the breadth of opportunities within IEM. The fellowship will also give you a framework and mentorship on how to be successful in your projects, train you in specific knowledge and skills (tropical medicine with a DTMH or the Health Emergencies in Large Populations (HELP) course), as well as provide an opportunity for a Master's of Public Health (MPH). While the MPH is demanding and can be seen as constraining in a 2-year fellowship, it is imperative to gain the expertise and common language required to work alongside public health workers and other experts involved in global health.

How Do I Get Started?

Jump in! Yes, the best way to know if you want to dedicate your life to IEM is to gain experience. Most medical schools offer some elective opportunity abroad. You can also look for opportunities at the ACEP international section website.

Don't focus on the location unless you are exploring a personal tie. Your experience during a medical elective is very different from a vacation trip, and you will likely meet locals who can show you the true nature of their home. However, language familiarity will enrich your experience significantly. It is better to look for an experience that is ongoing and sustainable with good local and international support.

If you've been bitten by the IEM bug, look for residencies that offer international electives. It is unlikely that you will have the time to organize an elective from scratch. Some residencies will ask you to take vacation time; this is fairly common and should not necessarily be a deal breaker.

Begin networking by joining the international sections of EMRA, ACEP, and SAEM. Go to their meetings at the annual scientific conferences. Go to one of the international conferences such as the International Conference on Emergency Medicine (ICEM), or the Developing EM conference. There are also numerous regional and national conferences around the world for those interested in a specific geographical area. Talk to many people with experience, find a mentor, and you may be on your way to a very fulfilling career!

REFERENCES

1. Martin IBK, Levine AC, Kayden S, Hauswald M. More than just a hobby: Building an academic career in global emergency medicine. *J Emerg Med.* 2014;47(1):107-112. .
2. Schechter-perkins EM, Forget NP, Mallon WK. A survey of the beliefs regarding international emergency medicine among fourth-year medical students planning on matching in emergency medicine. *Int J Emerg Med.* 2013;6(1):1
3. Burdick WP, Hauswald M, Iserson K V. International emergency medicine. *Acad Emerg Med.* 2010;17(7):758-761.
4. Kobusingye OC, Hyder AA, Bishai D, Hicks ER, Mock C. Emergency medical systems in low- and middle-income countries: recommendations for action. *Bull World Health Organ.* 2005;020412(04).