EM Resident
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Critical Care

Intubation, hyponatremia, billing, fellowships and more

Observe vs. Admit

What it means for doctors and patients

EMRA

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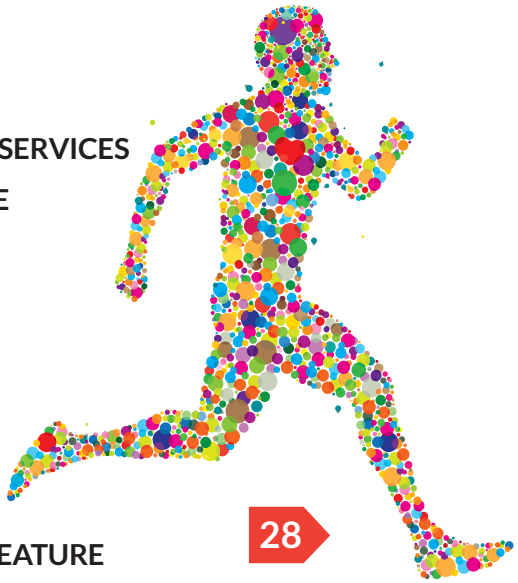

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MISSION STATEMENT

The Emergency Medicine Residents' Association is the voice of emergency medicine physicians-in-training and the future of our specialty.

★ ★ ★ ★

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Laying a Firm Foundation *in Emergency Medicine*

Jordan Celeste, MD
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EMRA provides many opportunities for you to grow your career early in emergency medicine. Here are just a few ways to learn more about specific areas of the specialty, find your niche, and start laying the foundation for the rest of your career.

Join an EMRA Committee or Division — right now!

A great way to get involved with the organization is to join an EMRA Committee or Division. These are groups of members who all share a specific interest in emergency medicine and work together to promote that interest.

What are my options?

Fortunately, EMRA has a very active and involved membership; this has been reflected by the growth of our membership groups – our committees and divisions. EMRA currently has five dynamic committees that are open to all members – editorial, education, health policy, research, and informatics. The organization also boasts an active and engaged awards committee, in which past EMRA award recipients are invited to participate, and a Medical Student Governing Council, which is a group of medical students who have been selected to serve. EMRA also has seven divisions focused on the subspecialties of critical care, EMS, international, pediatrics, simulation, ultrasound, and wilderness medicine.

What's the difference between a committee and a division?

There is very little difference between the two; both groups are comprised of members with shared interests. Per the EMRA bylaws, committees are designed to assist the EMRA Board of Directors in its work and are, therefore, assigned objectives. While it is accurate that the committees help accomplish important work for the association, in reality, the objectives are developed in a very collaborative fashion. Divisions develop their own objectives, but again, a collaborative approach is taken.

Each committee and division is assigned a board liaison, who helps ensure that the lines of communication are open, and is available to answer questions and help facilitate projects and proposals.

Make plans to check out the EMRA Representative Council at the SAEM Annual Meeting in May!

What is the EMRA Rep Council?

The EMRA Representative Council is the body that represents the membership of our organization. It convenes bi-annually (in the spring at the SAEM Annual Meeting and in the fall at ACEP's *Scientific Assembly*) to discuss and pass policy regarding issues related to residency training, professional development, and a number of other pertinent topics. The council also influences the structure of the organization itself through amendments to the bylaws and by electing the Board of Directors.

How do I get involved?

If you are an EMRA member in an RRC-EM approved training program, you are eligible to be an EMRA program rep. Residency programs differ in how they select or elect their representatives, so be sure to speak with your program director (especially since serving requires attendance at the spring and fall meetings). You can also serve as an *alternate* program rep. More information is available on emra.org, and we encourage you to attend the EMRA Rep Council meeting to check out the action.

Why should I be a program rep?

Program reps get to serve as the link between EMRA and their colleagues. You will be able to provide up-to-date information regarding EMRA news and offerings, as well as current events in emergency medicine. You will bring your program's perspective to the rep council meeting, and speak on behalf of your fellow residents. You will gain access to information and opportunities that you can't find anywhere else – meeting residents from all over the country, hearing from leaders throughout emergency medicine, and having the chance to leave your mark on the specialty through resolutions.

What is a resolution, and who can write one?

A resolution is a formal motion that states a belief of the Association or directs the Association to take specific action. Once

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a resolution is adopted, it becomes official Association policy. Direction can be given as part of the policy for EMRA to forward the resolution to the ACEP Council floor for discussion and consideration as well. In the past, multiple EMRA resolutions have been successfully adopted by the ACEP Council – for example, concerning topics such as advocacy education and the match process – allowing for even more exposure and networking for the authors.

Anyone can write a resolution – individual members in good standing, as well as representatives on behalf of their program. Again, check out emra.org for complete information regarding guidelines and instructions for writing a resolution. The deadline for submission is 45 days prior to the meeting date, so this year's deadline is March 31, 2014.

What if I'm already a program rep and looking to do something more?

Don't worry – if you've already taken the very important step of becoming a program rep, there are still many ways that you can get even more involved. You can become a regional rep and work with specific sections of the country to help identify and empower new representative leaders. You will work to optimize communication between program representatives and the EMRA leadership. Leading up to rep council meetings, you will work with other EMRA leaders to enhance the meeting experience and get the most out of time together.

You can also get more involved with the EMRA Rep Council by serving on a conference committee. The Credentials and Tellers Committee assists the speaker in ensuring accurate credentialing of and voting by program representatives. The reference committee is selected by the speaker to conduct open hearings on matters of business of the Association – most commonly the review and discussion of resolutions prior to the rep council. You actually do not have to be a program representative to serve on these two conference committees, but having past experience as one will help you to understand the process and procedures that are followed. This year's deadline to volunteer is April 15, 2014.

Apply to become an EMRA Rep to an ACEP Committee in May

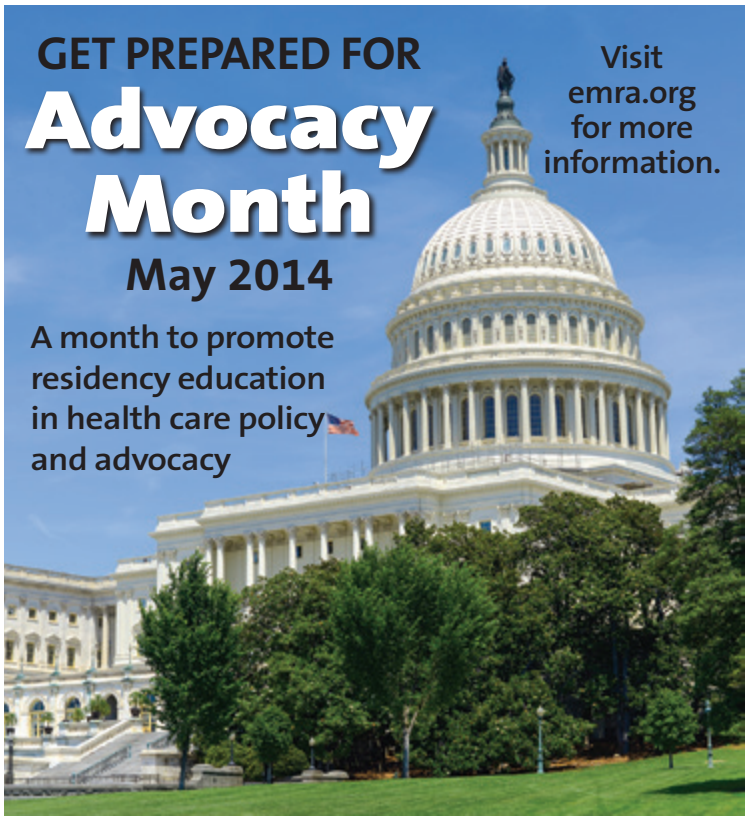
If you have already identified your area of interest in emergency medicine, and are looking to expand your involvement and networking even further, consider applying to become an EMRA rep to an ACEP committee.

What does this entail?

The commitment varies by committee, so be sure to check out the ACEP website for specifics. EMRA reps will be expected to participate in all committee business, which often takes the form of conference calls, but may also entail in-person meetings. ACEP committees formally meet at *Scientific Assembly* in the fall, so to maximize your involvement, you should plan on attending this meeting. In addition, EMRA reps write reports regarding committee activities, as well as their personal experiences and contributions.

How do I apply?

Starting in April, be on the lookout for committee interest forms on the ACEP website. These forms are due mid-May, but plan ahead. The application requires a CV as well as an optional (albeit recommended) letter of support from your ACEP chapter. ✶



UPCOMING EVENTS

- Mar 5 — Residents' Appreciation Day, Nationwide
- Mar 6-9 — American Medical Student Association Annual Convention, New Orleans, LA
- Mar 21 — Match Day, Nationwide
- Mar 30 — CORD Academic Assembly, New Orleans, LA
- April 12 — EMRA Medical Student Symposium, Chicago, IL
- April 16-20 — Student National Medical Association Annual Medical Education Conference, Washington, DC
- April 26 — EMRA Medical Student Symposium, Baltimore, MD
- May 13-17 — SAEM Annual Meeting, Dallas, TX
- May 18-21 — ACEP 2014 Leadership and Advocacy Conference, Washington, DC

The OBSERVATION EQUATION

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Have you ever been in the middle of admitting a patient and stopped to ask yourself, **"Is this an observation or inpatient admission?"** Every day, residents are asked to classify their admitted patients into *observation* or *inpatient* status; yet, we rarely receive education on the difference between the two. Maybe your residency has some general rules, or even a nurse manager to review your observation versus inpatient admission, but what do these placements mean to your hospital – and, more importantly, to your patients?

Observation vs. inpatient

***Prior* to October 1, 2013,** admission levels were dictated by the type of care a patient needed. Ideally, observation time is used by the doctor to determine if the patient requires more intensive inpatient care.

The general rule at my residency was: "If the patient was going to be in the hospital longer than 23 hours, they qualified for an inpatient admission." For example, a patient that comes after 5:00 pm for chest pain and needs admission for a cardiac stress test the next day would be an observation patient because he would likely be discharged before 5:00 pm the following day after a normal stress test. If the patient's stress test showed ischemia, his status would be changed to inpatient care. **The idea behind this informal rule was that a patient who spent less than 23 hours in the hospital probably did not need intensive nursing or complicated procedures that would normally require an inpatient admission.** Rather, the patient required treatment and/or testing that could be done on an outpatient basis, but because the patient could not get the test scheduled in a timely manner, he was admitted to observation to get the test.

***After* October 1, 2013**, the "Two-Midnight Rule," also known as the "Pumpkin Rule," was instated. Now, **a patient must be admitted for greater then two midnights to meet inpatient status.** Although the rule is already in place, Medicare will not enforce it until April 2014.

It is difficult to balance the need for decreased Medicare spending, the patient's needs, and the financial health of our hospitals, but throughout our residencies and careers this balancing act will be front and center.

Many are concerned that patients will not be categorized based on the type of care needed, but on the time of day they are admitted. If a patient is admitted at 11:59 pm on Day One and is discharged after 12:01 am on Day Two, the patient will meet the Two-Midnight Rule, even though he or she was in the hospital for 24 hours and 2 minutes and may not have required typical inpatient care and testing.

Another concern is that patients will be held overnight, rather than discharged in the evening, so that they will meet the Two-Midnight Rule and the hospital can be reimbursed at inpatient rates. The Centers for Medicare and Medicaid Services (CMS) estimates that **Medicare paid an average $1,741 for an observation stay, compared to $5,142 for a short inpatient stay.**

The American Medical Association and the American Hospital Association have sent a letter to the Department of Health and Human Services and CMS asking to delay the enforcement date of the Two-Midnight Rule to October 2014, stating that Medicare has not educated the public, physicians, or hospitals on the new rule, despite promises by the agency that more guidance would be forthcoming. They also believe the rule undermines physicians' medical judgment because Medicare will only pay based on length of stay and not the intensive services the physician has determined the patient will need.

What observation status means for your patients

1. Medicare Part A, the part of Medicare that normally pays for all of inpatient hospital stays after the $1,184 deductible has been met, **does not cover observation stays**. Medicare patients will have a 20% co-pay for the total cost of their observation stays.

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The OBSERVATION EQUATION

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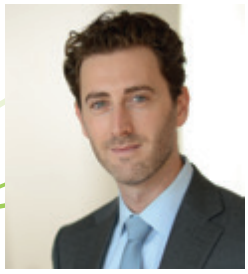
2. The patient's self-administered medications, or home medications, are not covered under observation status. **The patient will be responsible for the whole cost each time the hospital administers home medications.** The hospital charges much more for each dose of medication it administers than a patient's pharmacy would charge for the same medication.
3. Medicare will pay for the first 20 days of skilled nursing rehabilitation only if the patient is admitted for three inpatient days. **This is the costliest difference between observation and inpatient admissions.** The days the patient spends in observation cannot be counted towards the three days of inpatient care. Therefore, if a patient spends 1.5 days in observation care and then is switched to inpatient care for 1.5 days prior to transfer to the rehab facility, Medicare will not pay for rehab because the patient only had 1.5 days of inpatient care.

What observation status means for hospitals

1. Hospitals are responsible for collecting the 20% co-pay from their patients. **Many patients cannot afford the co-pay and simply will not pay the bill.**
2. Hospital administrators feel punished for running efficient hospitals with high throughputs under the Two-Midnight Rule. They argue that the patients will continue to use the same resources, but the hospital will get paid less – unless they unnecessarily keep the patient for another night. For example, some surgical patients are in and out of the hospital in less than two days, but required intensive care and procedures.
3. Hospitals have started calculating their reimbursements under the new rule and have realized they will receive significantly less money. Research at the University of Wisconsin found:
   - 26.5% of the hospital's observation status patients stayed longer than two midnights, totaling 1,211 patients. Reimbursement for each patient would increase an average of $2,639, increasing revenue by $3.2 million because these patients would automatically be categorized as inpatient for Medicare reimbursement.
   - 21% of short inpatient stays were less than two days; reimbursement would be reduced for each patient an average $3,050 and would decrease revenue by $25.1 million.

Whew! Who knew so much was riding on our hurried decision to admit the patient to observation versus inpatient? From 2001 to 2009, observation admissions have increased by 100%; with the Two-Midnight Rule observation stays are expected to climb. It is difficult to balance the need for decreased Medicare spending, the patient's needs, and the financial health of our hospitals, but throughout our residencies and early careers this balancing act is going to be front and center. It is important for us – the first doctors to categorize a patient as inpatient or observation – to understand the consequences of our actions. ✶

Springing Forward



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Think back to the moment you chose emergency medicine as a specialty. It was at this moment that your career aspirations were born. For most of us, these professional desires lay dormant – perhaps nothing more than a few fleeting images dreamt up of our future lives. Yet, they were present, and subconsciously growing, as we eagerly looked ahead toward residency. **Fast forward to the present; are your career aspirations the same? How have they changed, and why?**

As a resident, the winter months can be difficult. With shorter daylight hours and endless throngs of post-holiday patients, any glamour that came with our newfound titles in July has long since worn off. It is during these winter doldrums that many of the difficult realities of the job settle in, and our career ambitions can start to wane.

Resident burnout is a well-documented phenomenon, and while steps like duty hour restrictions and wellness curricula have been developed to limit the psychological toll that the stressors of residency inflict, the protection of our long-term career goals is often neglected. It is time to shake off the winter blues and reignite our professional desires. Here are five actions to help you maintain balance and happiness, which are paramount to a successful career.

Avoid burnout by taking stock of your priorities

1. **Get involved.** This cannot be understated. Whether you seek academic glory, or a small community position in Malibu, your future employers want to see that you are invested and engaged within the specialty. For the research-averse, consider joining a committee. Committee work not only helps strengthen your CV, but it also gives you valuable insight into your particular area of interest within emergency medicine. Further, serving on a committee can be rewarding, as the policies and innovations you put forth help shape the future of our specialty. Between EMRA's 11 standing committees and divisions, and the multitude of other national organizations, state chapters, and institutional and departmental committees, there is no shortage of opportunity for involvement.
2. **Attend a conference.** There is something invigorating about immersing yourself among thousands of your colleagues to hear presentations from the nation's leading experts. Aside from providing a morale boost, conferences allow exposure to niche areas of interest and provide excellent networking opportunities for senior residents looking for fellowships and jobs.
3. **Find a mentor**. As cliché as it sounds, a good mentor is your greatest asset in professional development. Mentors not only offer you career advice, but they also introduce you to other contacts in your areas of interest and provide you with opportunities to which you would otherwise not have exposure. Don't limit yourself to a single mentor. Having multiple mentors allows for differing viewpoints and extends your network of connections – an advantage particularly useful for residents who are undifferentiated in their future career paths. Mentorship is even available for residents interested in subspecialty opportunities not available at their home institution. Both EMRA and other national organizations have partnered with fellowship directors to offer e-advising and virtual mentorship to residents nationwide.
4. **Volunteer.** Emergency medicine is among the most humanitarian of all medical specialties. Yet, during residency, we can get lost in the fast-paced, stress-inducing environment and forget that charity and humility remain at the core of our specialty. Take advantage of the protected time afforded to you during residency to challenge yourself with a unique experience. There are numerous domestic and international volunteer opportunities both within and outside of emergency medicine. Whether it's spending a weekend at a local soup kitchen, or participating in international relief efforts to a Third World country, volunteering can remind us that compassionate care is a central tenant to emergency medicine.
5. **Take a vacation**. A happy physician makes a good physician; no matter how determined you are for career success, it is important to find that balance between personal and professional life. Sometimes the thing you need is a little time away from work to rejuvenate your psyche and reinvigorate your academic desire. So go ahead and book that vacation. After all, there is no better cure for the wintertime blues than a trip to Mexico.

Will following these five steps guarantee you that post-residency dream job? Maybe not, but they will certainly enhance your academic contentment. ✶

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Resuscitation of most non-trauma adult patients in cardiac arrest in the field should primarily be attempted prior to transport.

Field Termination of Resuscitation

Should We Stay, or Should We Go?

Background

While the actual incidence of out-of-hospital cardiac arrest in the United States is difficult to measure, it occurs in approximately 450,000 Americans annually.[1] Prehospital providers are, therefore, not uncommonly tasked with providing life-saving resuscitation. Medical directors of emergency medical service (EMS) agencies and emergency physicians who provide online medical command are often faced with the challenge of determining when it is appropriate to terminate these resuscitative efforts in the field.

Transporting is not without risks

Although the traditional "load-and-go" mantra has been used for critical EMS patients, this paradigm is not without significant risk. One critical consideration is the safety of providers and members of the public when ambulances are transporting patients in cardiac arrest. Ambulances traveling with emergency lights and sirens crash at a rate of 45.9 per 100,000 patients versus 27 per 100,000 when traveling in non-priority mode.[2] Vehicular crashes have been demonstrated to be the most significant cause for on-duty prehospital provider fatality.[3] Resuscitating patients on scene may, therefore, benefit the public and providers by reducing the risk of ambulance collisions.

Out-of-hospital cardiac arrest also represents a significant cost to the entire health care system.[4] Although the generalizability of actual financial costs is difficult across various EMS systems, it is important to consider the costs of transporting patients while undergoing resuscitation, unless there is potential benefit.

Additionally, transporting patients in cardiac arrest may be associated with less-effective chest compressions.[5] With increasing evidence that high-quality chest compressions are essential to improve chances of survival from out-of-hospital cardiac arrest,[6] EMS providers should minimize any interruptions to CPR, including moving patients to an ambulance when resuscitation can be initiated on the scene.

As opposed to patients involved in major trauma,[7] stroke,[8] or ST-segment elevation myocardial infarction,[9] where the focus is on rapid recognition and transport, prehospital providers can make a meaningful difference in patient outcomes by performing on-scene, high-performance chest compressions for patients in cardiac arrest. In fact, survival from out-of-hospital cardiac arrest is exceedingly rare unless return of spontaneous circulation (ROSC) occurs prior to hospital arrival.[10] The risk to providers and patient outcome, therefore, often make it preferable to resuscitate patients in the field.

Medical directors of emergency medical service (EMS) agencies and emergency physicians who provide online medical command are often faced with the challenge of determining when it is appropriate to terminate these resuscitative efforts in the field.

Termination protocols

It is the position of the National Association of EMS Physicians that EMS systems should have written protocols that permit terminating field resuscitative efforts of patients in non-traumatic cardiac arrest.[11] While a variety of different protocols have been published in the literature,[12,13,14,15] further research is needed to elucidate the appropriate duration of resuscitation along with the potential value of including online medical command in the decision to terminate resuscitative efforts.[16]

Additional considerations

Some exceptions to the proposed protocols have been noted in the literature. Pediatric cardiac arrests are typically excluded given the limited research on prehospital pediatric arrests and the variability of etiologies involved.[17] Pregnant patients are also often excluded due to the potential benefit of emergency cesarean section.[18] Hypothermic patients may also benefit from transport for further resuscitation and warming efforts.[16] A potentially unsafe environment for EMS providers (such as the presence of large crowds) is another situation when patients may need to be transported.[16] Local protocols should also consider the possible role of organ donation.[16]

Following termination of resuscitation in the field, the need for death notification arises. Discussing death with family members of the deceased is challenging and can be made even more difficult by the often-chaotic atmosphere of the prehospital setting. It has been demonstrated, however, that a structured curriculum aimed at improving the communication skills of paramedics during death notification is associated with increased competence at performing the crucial, yet sensitive, task.[19]

Conclusions

Resuscitation of most non-trauma adult patients in cardiac arrest in the field should primarily be attempted prior to transport. Although further research is necessary, emergency and EMS physicians may have a significant role in developing protocols or providing medical oversight in determining when it may be appropriate to terminate resuscitation efforts in the prehospital setting. ✶

Advice for EM Applicants

Planning Your Fourth-Year Schedule

For third-year medical students planning to specialize in emergency medicine, preparing a fourth-year schedule can be a daunting task – especially if you don't know where to turn for advice. We hope that by sharing our experiences, you will be well on your way to securing your top-choice residency spot.

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EM rotations: When, where, and how many?

Do them early; do them where you want to become a resident. This is the best, most concise advice we can offer; however, there may be a few caveats, depending upon your individual situation.

What months should I rotate? If possible, you'll want at least two SLOEs (Standardized Letters of Evaluation) uploaded to ERAS by October 1 – the day that MSPEs/dean's letters are released. To learn more about the SLOE, please visit the Council of Emergency Medicine Residency Directors (CORD) website at www.cordem.org. The sooner you have these letters of evaluation posted, the sooner your application is considered complete, and the sooner programs will offer you interviews. Keep in mind that some clerkship directors may be faster than others in finalizing letters of evaluation, so the earlier you can complete your EM rotations, the better. Rotations at popular programs can fill up quickly, so get them arranged as soon as possible to have more control over your schedule.

How many EM rotations should I do? The only right answer for this question is: As many as you think you need to be competitive. That said, we feel that two is sufficient, unless you know that your board scores or overall application are a bit weaker than you'd like. If your school only allows two or three EM rotations, but you want more EM exposure, consider rotations in emergency medicine subspecialty areas such as ultrasound, toxicology, wilderness medicine, research, ED-based critical care, and more. Some students say that by their third EM sub-internship, they began to feel bored because their responsibilities have not advanced and they're doing the same sort of work-ups as they did in their first two away-rotations with the same limitations. An emergency medicine subspecialty rotation will feel new and exciting, while giving you a chance to check out another program. If you do decide to embark on a third EM rotation, asking questions ahead of time can be important. Find out the acuity level of the patients you will be seeing; whether or not you will be the primary caregiver for patients; and whether you will be staffing patients with faculty, residents, or both.

Do I have to do a home rotation? Many medical schools have required emergency rotations, while others do not. If your school has an EM rotation – especially if it is affiliated with a residency program – some will advise that you have to rotate there, even if it is not a required clerkship. However, if you're limited in the number of EM rotations that you can complete and are not interested in becoming a resident at your home program, you're not obligated – but there are at least **two major drawbacks to consider**.

The first is **lack of an advocate.** By not doing a home rotation, you may be missing out on the opportunity to find an advisor who can help you navigate the application process and use their connections within the EM community to help you secure interviews or end up near the top of another program's rank list.

The second problem is **related to an outside program's expectations of their rotators**; they may not know if you are on your first rotation, and this could potentially make it more difficult

to obtain a favorable evaluation if your presentation skills and knowledge of the evaluation and management of common chief complaints are not as polished as they could be.

Where (else) should I rotate?
If, so far, you've only trained in a community setting, check out an academic or county program – and vice versa. Each of these settings provides a unique set of pros and cons. When it comes to making the best residency choice, you'll be thankful to know what each of them have to offer.

Applicants looking to apply nationally or within certain regions of the country should also seek to rotate at programs where their SLOEs will be written by faculty with regional or national recognition. Some program directors have seen so many SLOEs from faculty at nearby or well-known institutions that, for better or for worse, they are able to read between the lines and decipher exactly what type of applicant they are dealing with. "Regionalizing" your approach can make a difference in whether or not you will be invited to interview at certain programs.

The double-edged sword analogy
Some people may warn you that away rotations are a double-edged sword that could potentially hurt your chances of matching in a program if you don't perform well there. However, it's a risk worth taking since you might discover that a program isn't the best fit for you. If you are a strong applicant with stellar scores and letters of recommendation, there is a component of diminishing marginal returns that you must consider if rotating at competitive sites.

How do I find away rotations?
Many, but not all, rotations can be found on VSAS (the Visiting Student Applicant Service, offered by the AAMC; more information is available at www.aamc.org/students/medstudents/vsas). Other means of finding rotation opportunities include web searches and the SAEM Clerkship Directory (www.saem.org/membership/services/clerkship-directory). An honest, critical advisor or mentor may also be able to provide valuable input. ✶

OTHER SCHEDULING CONSIDERATIONS

When should I take Step 2?
The importance of your Step 2 CK score may vary from program to program, but unless you feel that you underperformed on Step 1 and need to prove yourself with Step 2 CK, your EM rotations should be the first priority when planning your fourth-year schedule. If you underperformed on Step 1, it's essential that you study hard for Step 2, show a marked improvement in your scores, and have these scores posted to ERAS by the time residency programs can begin logging in to view applicants. **Unless you feel that you under-performed on Step 1 and need to prove yourself with Step 2 CK, your EM rotations should be the first priority when planning your fourth-year schedule.**

Osteopathic students interested in applying to ACGME residency programs must carefully consider when to complete USMLE Step 2. If you took USMLE Step 1 and COMLEX Level 1 and did well on both, you may be able to wait; however, the key is to remove as many potential concerns about your application to increase your chances of getting an interview. Give the ACGME program directors what they want – a USMLE Step 2 score.

As for Step 2 CS, many students complete this during spring break of their third year and pass without any problems. The sooner you can get this hurdle out of the way, the sooner you can focus on everything else that goes into making an outstanding EM applicant.

What months should I plan for interviews? Each medical school has its own policies on how time off for interviews is handled. Some programs will begin interviewing in late October, and a fair number continue through January, but November and December seem to be the peak times for interview dates.

An alternative to taking time off for interviews is to schedule a more flexible rotation during this time period, such as a reading month, computer-based asynchronous courses, self-directed research or other projects, or other opportunities to earn credit without having to be in clinic**. Don't be shy (but do be polite) about asking course coordinators what the typical duty hours are for a rotation and the possibility of options for making up missed time**. It is best to do this well in advance.

What about national conferences? Attending conferences is a fantastic way to meet movers and shakers in the field of emergency medicine. The SAEM Annual Meeting in May (this year in Dallas, TX), ACEP *Scientific Assembly* in October (this year in Chicago, IL), and EMRA's Medical Student Symposia (coming to Baltimore and Chicago in April) have programming tracks for medical students and feature residency fairs with program directors, clerkship directors, and chief residents from across the country. If you can fit one or both of these conferences into your schedule, they are highly recommended. EMRA offers travel scholarships to help defray costs for students (www.emra.org/awards). It's nice to walk into your interviews having already met key players at the program. ✶

Beneath the ED surface

Combating Human Trafficking

Emergency medicine thrives on patient diversity and varied disease manifestations. Emergency physicians intersect with numerous patients at their most vulnerable moments and are uniquely poised to notice deep and hidden issues beneath the presenting medical illness.

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Despite the position we hold in the health care system, our vision sometimes lacks *depth*. All too often we treat illnesses on the surface but miss the individual underneath. The haunting story of Marta,* a victim of human trafficking and a survivor of three years in captivity, serves as an example.

At 23 years old, Marta was lured to the United States from El Salvador with promises of a modeling career and a bright future. Once she arrived, **she quickly realized there were no modeling agencies or runways;** instead, she was forced into a clandestine brothel, where she was imprisoned with other equally misfortunate women. Repeated daily violations became her norm. Marta was forced to satisfy up to 25 customers per day and was subject to repeated beatings. Every day she lived in fear and shame. Even after discovering her unplanned pregnancy, she was forced to consume large quantities of alcohol and drugs with her clients.

Disturbingly, even in the midst of such horrendous conditions, **her captor brought her to seek emergency medical care on multiple occasions during her three years in captivity.** Each time, she wished someone would just ask her about her situation. Screaming with her eyes for someone to notice, not a question was posed, and so she was simply discharged back to her living hell.

The sad reality is that Marta is one of a rapidly growing number of victims of human trafficking. This form of modern-day slavery is not only alive and well, it has become **the world's fastest growing crime;** it is now the second-most profitable criminal enterprise in the world (behind the illegal weapons trade). **An estimated 27 million people are modern-day slaves worldwide**[1] – more than the total number of individuals transported throughout the history of the trans-Atlantic slave trade.[2]

While the term "trafficking" may imply movement across geographic borders, the majority of victims in the United States are domestic citizens, many of them minors. **More than 200,000 American children are at risk of being lured into sex trafficking each year.**[3] Vulnerable youth, usually homeless or runaways, are particularly at risk for being targeted by pimps.[3] They are sought out, given false promises, and later forced to perform acts against their will. Emergency medical providers are the front-line medical defense for these patients.

Human trafficking is a vicious crime that leaves damage far beyond bodily harm. Victims are deprived of their dignity, and their sense of trust is shattered, leaving emotional and mental damage that lasts years. Its perpetrators thrive on others' lack of awareness. There are thousands of women out there like Marta who are trapped in situations from which they cannot escape on their own. **We can be the ones to first extend a hand to guide them from a life of terror to one of safety and dignity.** We can save their lives, too, if only we take the time to peer below the surface.

Signs and symptoms

Indicators a patient is being victimized by human trafficking:[4]

- Exhibits unusually fearful, anxious, depressed, submissive, tense, or nervous/paranoid behavior
- Reacts with unusually fearful or anxious behavior to mention of "law enforcement"
- Avoids eye contact
- Exhibits flat affect
- Exhibits signs of prolonged/untreated illnesses or unexplained injuries that may be at various stages of healing

- Appears malnourished
- Third party insists on being present and interpreting

How we can help

Steps to providing care for patients who are victims of trafficking:[5]

- Provide reassurance and build trust; these patients frequently lack trust in authority, including medical professionals.
- Try to separate patient from accompanying third party.
- Specifically ask the patient about his or her safety.
- Use trained interpreters.
- Always document suspicion on patient notes.
- Call the national Human Trafficking Hotline number 1-888-373-7888. (This is a great resource to call at any time for additional help or information.) ✶

**Patient name changed for privacy purposes.*

"As emergency providers, we are positioned to see what others can't."

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Brandon Allen, MD
RRC-EM Representative
University of Florida
Gainesville, FL

A Journey of Miles

Residency Perspective of Milestones

The Milestones Project this last year has been a major change to emergency medicine residency education. Each milestone was designed by the **Emergency Medicine Milestones Working Group,** comprised of all of the major stakeholders in emergency medicine (**ACGME, RRC, ABEM, CORD, SAEM, ACEP**, etc.). Their goal was to define the training process in emergency medicine and provide a standardized process for delivering feedback and evaluating residents for promotion in their residency. Left out of the Milestones design was a "best practice" for assessment – this was done intentionally to leave room for each program's clinical competency committee (CCC) to innovate and tailor to their specific needs. As we all know, no two residency programs are alike.

At ACEP13, CORD sponsored a "Milestones Safari" with presentations from residency programs across the country showcasing how they have implemented evaluation and feedback. Starting off the event, EMRA Board alumnus Dr. Gillian Schmitz of the Joint Milestones Task Force presented survey data collected from program directors across the country. **Notable findings included:**

- 90% of program directors used daily shift evaluations.
- 75% of program directors used a combination of daily and monthly evaluations.
- Most use milestones for daily evaluations and sub-competencies for global evaluations.
- Most want the flexibility to complete evaluations on shift or later at home.
- It important that they can select which sub-competencies or milestones are relevant for a daily shift evaluation.
- Most want the flexibility to modify questions, "test out" of a milestones level, and randomize the evaluations.
- Many would like a summary report or performance dashboard on each resident.
- An iPad/iPhone application would be popular.

Following Dr. Schmitz's data, individual presenters from private companies and residency programs shared their practices and ideas for innovation. **Ideas ranged from new computer programs and personalized apps to integrative websites and online evaluation systems.** All of the ideas were impressive, but particularly well-represented were the residency programs from the Detroit, Michigan area, which dominated the Safari podium with one presentation after another. The group seized the opportunity to provide innovative ways to assess their residents and give timely, constructive feedback. Adam Rosh, program director at Detroit Receiving Hospital and the founder and CEO of Rosh Review, has even thought outside of the box to assess 25% of the milestones and sub-competencies via medical knowledge exams through his popular question bank.

Shortly after the Milestones Safari, the members of the EMRA Milestone task force polled the residents at their programs on how the milestones are being evaluated and requested suggestions for improvement.* As a unifying theme, **residents responded that they crave feedback, and that they are willing to receive it in any form**. Whether oral or written, from a program director or from environmental services, EM residents want more than just a bi-annual evaluation. There may not yet be one perfect system that is ready to deliver to all programs, but I believe that residents and faculty throughout training programs nationwide will find their own best practices for milestone evaluations and feedback.

I want to know how your residency program evaluates Milestones, too!

- What does your residency program currently use to gauge your progression through residency to ensure you are meeting the RRC milestones?
- Do you and your fellow residents feel this is effective?
- If not, how could it be improved?

Write to rrcemrep@emra.org with your responses to these questions. If enough responses are received, I will write a follow-up article with your opinions. ✶

Check out the milestones yourself at https://www.abem.org/public/publications/emergency-medicine-milestones

A special thanks to Dr. Brian Holowecky from Detroit Receiving and Dr. Benjamin Ostro from the University of Cincinnati for their participation.

Lung Labyrinth

Septic pulmonary embolism is an uncommon disorder with an insidious onset, and can be difficult to diagnose.

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UMass Emergency Medicine
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An otherwise healthy 20-year-old male presents to the ED, complaining of shortness of breath for two days and diffuse sharp chest pain, which is worse with inspiration. He also desires evaluation of a pilonidal cyst that has been a recurring problem and previously has only been treated with incision and drainage. He does report some fatigue and feeling "feverish." His vital signs are a blood pressure of 94/39, HR 62, RR 18, and PO_2 of 97% on room air. He does, indeed, have exam findings consistent with a pilonidal cyst and is found to have a 2/6 murmur at the left upper sternal border. An EKG is normal. He has a neutrophilic lymphocytosis of 12,600, and a chest x-ray reveals the following: "*14 mm focal opacity in the right upper lobe may represent a round pneumonia or lung nodule.*"

So we're done, right? The patient has pneumonia. He needs antibiotics; once a bedside incision and drainage of his cyst is done in the ED, he can follow up with his PCP in a few days to ensure his symptoms are resolving.

Well, not exactly. **What about this round pneumonia?** How common is that, anyway?

"Round pneumonia" is a well-defined round opacity that represents a region of infected consolidation, but is usually only seen in pediatric patients. The mean age of patients with round pneumonia is 5 years, and 90% of patients who present with round pneumonia are younger than 12. This is an uncommon entity in patients older than 8, since by then the interalveolar and interbronchial collateral airways tend to be well-developed.[1,2]

So what's next for this patient? Given that the sum of the patient's history, physical exam, and unusual chest x-ray simply aren't adding up, a **contrasted chest CT is the next step**. This read is more revealing: "*Multiple pulmonary nodules with one demonstrating cavitation. These may represent septic emboli, given the clinical history*." The one cavitating lesion appeared to be the "round pneumonia" on the chest x-ray. Rubbing that off as a simple pneumonia might have been a fatal mistake.

So now **he's a patient with likely septic pulmonary emboli (SPE) and a heart murmur**. Endocarditis, right? The next step is a transthoracic echocardiogram, which is performed in the ED; this reveals an echodensity consistent with vegetation on his aortic valve. However, re-examining the patient reveals no track marks, and he vehemently denies any IV drug use. He has no indwelling lines or devices. Either way, blood cultures are drawn, and he is started on broad-spectrum antibiotics. Addressing his second complaint: His pilonidal cyst is also drained and cultured.

Shortly after admission, his blood cultures grow MRSA; his antibiotics are tailored accordingly. A confirmatory transesophageal echocardiogram is obtained, and the "vegetation" seen on the TTE in the ED is revealed to only be an incidental Lambl's excrescence on the aortic valve, which has no clinical significance. So what caused his septic pulmonary emboli? His pilonidal cyst also grew out MRSA, but could that really be the source?

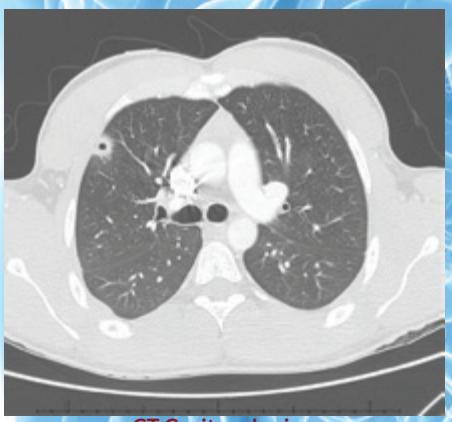
A review of the literature reveals a paucity of cases of soft tissue infection leading to SPE. Of those case reports found, most patients had underlying undiagnosed HIV/AIDS infection.[3] The patient in this scenario was subsequently tested and found to be negative for HIV. It is even rarer for an immunocompetent patient without endocarditis to have a skin source for septic pulmonary emboli.[4,5] However, without evidence of another source, and with confirmed immunocompetent status, his septic pulmonary emboli and bacteremia are thought to have been a result of his pilonidal cyst.

Septic pulmonary embolism is an uncommon disorder with an insidious onset, and can be difficult to diagnose. Septic thrombi are mobilized from an infectious nidus and transported into the vascular system of the lungs. It is usually associated with tricuspid valve vegetation, septic thrombophlebitis, or infected venous catheters. Other common etiologies of SPE include Lemierre's syndrome (caused by *Fusobacterium,* or *Bacteroides*), infected pacemaker wire or prosthetic pulmonary valve, as well as dental abscesses.[6] SPE often presents with many nondescript symptoms, which overlap with other disease presentations:[6]

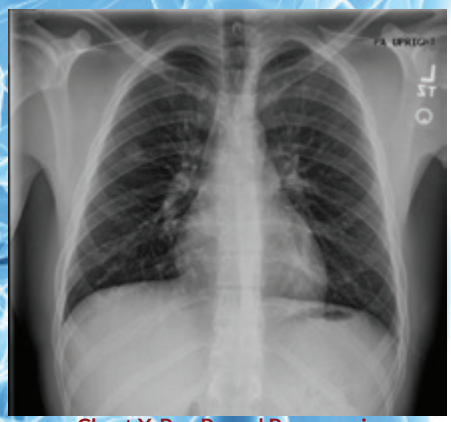
- **Fever (93%)**
- **Dyspnea (36%)**
- **Pleuritic chest pain (29%)**
- **Cough (14%)**
- **Hemoptysis (7%)**

When presented with a patient complaining of a constellation of these symptoms, septic pulmonary should always be included in the differential. Have higher suspicion for patients with known IV drug use, HIV+ status, or with indwelling devices. In rare cases, almost any infection could be the cause, including soft tissue infections. ✶

A SERIES OF UNUSUAL FINDINGS



CT Cavitary Lesion



Chest X-Ray Round Pneumonia

Heart OF THE MATTER

Luke Espelund, MD
Indiana University School of Medicine
Indianapolis, IN

The majority of children with myocarditis present with acute or fulminant disease, as opposed to adults, in which the disease is usually more indolent.

A previously-healthy 15-year-old female presents to the ED from track practice, where she experienced a syncopal episode lasting two to three minutes. After spontaneously regaining consciousness, she began complaining of "squeezing" chest pain. A prehospital EKG shows ST depression in her precordial leads, 4 mm of ST elevation in aVR, and 2 mm of ST elevation in aVL. Aspirin is given in the field. Upon arrival to the ED, she has altered mental status and hypotension. While securing her airway, frothy secretions are noted coming from her trachea. Subsequently, she goes into PEA arrest.

What is the diagnosis?

The patient in this scenario has fulminant myocarditis, as evidenced by the acute onset of her symptoms and characteristic EKG changes in a previously healthy individual. The majority of children with myocarditis present with acute or fulminant disease, as opposed to adults, in which the disease is usually more indolent. Fulminant myocarditis presents suddenly and is associated with profound hemodynamic compromise. These children often present in cardiogenic shock, displaying poor perfusion, altered mental status, and hypotension, which may progress to complete cardiovascular collapse.[1] Adding to the severity of this disease, malignant arrhythmias tend to be the rule, rather than the exception.

How common is myocarditis?

The truth is that no one really knows. This is partly because many patients are asymptomatic and are found to have evidence of myocarditis on autopsy after a sudden unexpected death. The mean diagnosis is 9.2 years; however, there is a bimodal distribution with most cases occurring in infancy or adolescence.

What causes myocarditis?

There are a multitude of potential causes:

- Viral – *Coxsackie* B, echovirus, EBV, CMV, adenovirus, and influenza
- Bacteria – *Staphylococcus*, *Streptococcus*, *Salmonellae*, TB, spirochetes, *Rickettsia*, and about a dozen others
- Toxins – CO, lead, other heavy metals
- Systemic disorders – lupus, sarcoidosis, Kawasaki disease
- Others – radiation, protozoa

How else might myocarditis present, and how can a diagnosis be made?

Unlike fulminant myocarditis, acute myocarditis generally presents with typical signs and symptoms of heart failure, including syncope, dyspnea, exercise intolerance, hepatomegaly, tachypnea, and tachycardia. However, it is important to remain vigilant. Non-specific signs and symptoms, such as vague respiratory or gastrointestinal complaints, are the most prominent historical features in patients who are misdiagnosed on their initial presentation.[2] Your exam may or may not lead you to the diagnosis. Classic exam findings include respiratory distress, an S3 or S4 gallop, and a murmur consistent with functional mitral or tricuspid insufficiency, though these alone may not be reliable in making the diagnosis.

When working these patients up, start with the basics – get an EKG, CXR, and labs, including a troponin. Troponin is a marker of myocardial necrosis and is elevated in some, but not all, cases of pediatric myocarditis. All patients with suspected myocarditis should be admitted to the pediatric ICU due to their risk for arrhythmias and sudden cardiovascular collapse. They will need an echo, and some will also require an MRI to determine the location and extent of myocardial inflammation. Cardiac catheterizations are occasionally done to obtain biopsy specimens, which is the gold standard for diagnosis. However, the sensitivity of biopsy can be quite low (25%-50%).

How is myocarditis treated?

As emergency physicians, we should do what we do best – the ABCs; you may need to intubate the patient. Remember that mechanical ventilation reduces left ventricular afterload and decreases oxygen consumption by up to 30%. Be prepared to start inotropes and pressors if needed. The antiarrhythmic of choice is lidocaine (1mg/kg bolus or 20-50 mcg/kg/min). Amiodarone is not recommended as a first-line agent, since its safety profile in children is not well-known and may be arrhythmogenic or cause hypotension with rapid infusion. Complete heart block is possible in myocarditis, so be prepared to pace. ECMO has been shown to be helpful, so if transferring a patient, it may be prudent to transfer to a children's hospital that has ECMO capability. Finally, IVIG (2 g/kg over 2 hrs) is also widely used and accepted as a potentially beneficial treatment for myocarditis in pediatric patients.[2,3] ✶

CASE FOLLOW-UP

The patient was resuscitated and underwent cardiac catheterization because there was concern for spontaneous left coronary artery dissection. She had a balloon pump placed and went to the OR for emergent salvage bypass. Her coronary artery, however, was found to be normal. The following day she was placed on ECMO. Three days after admission, a cardiac biopsy revealed acute myocardial inflammation consistent with myocarditis. Viral titers were later positive for *Coxsackie*, the cause of her acute fulminant myocarditis. Her initial EF was 8.3%, which improved to 41% at the time of her discharge. She was ultimately discharged on an ACE inhibitor and daily aspirin for life.

empower
Sharing Our Stories

An interview with EMRA leader Dr. Steven J. Stack

Dr. Steve Stack's career is quickly becoming defined by *firsts*. At 40, he became the youngest chairman – and the first emergency medicine physician — ever elected to the board of the American Medical Association (AMA) in the organization's 170-year history. He is now running unopposed to become the AMA's next president — at 43, the youngest to hold that position in more than a century.

While Dr. Stack's remarkable insight and ambition have led him to serve leadership roles in numerous state and national organizations, he credits his time on the EMRA Board of Directors for helping pave the way for his exceptional success.

Dr. Stack was first elected to the AMA's Board of Trustees in June 2006. He also has served as medical director of multiple emergency departments, including St. Joseph East (Lexington), St. Joseph Mt. Sterling (rural eastern Kentucky), and Baptist Memorial Hospital (Memphis, Tenn.).

He has special expertise in health information technology (IT) and was chair of the AMA's Health Information Technology Advisory Group from 2007 to 2013. Dr. Stack is the secretary of eHealth Initiative, a non-profit association committed to improving health care through the advancement of health IT. Additionally, Dr. Stack has made notable contributions to the areas of physician licensure, regulation, and assessment.

Born and raised in Cleveland, Dr. Stack graduated magna cum laude from the College of the Holy Cross in Worcester, Mass., where he was a Henry Bean Scholar for classical studies. He then returned to Ohio, where he completed his medical school and emergency medicine residency training at the Ohio State University. He served as the ACEP respresentative on the EMRA board from 1998 to 2000. He and his wife, pediatric allergist Tracie Overbeck, MD, PhD, live in Lexington, Ky. with their 9-year-old daughter, Audrey. In his leisure time, Dr. Stack enjoys the study of classical Greek and Roman history, the study of early U.S. history, and traveling with his wife and daughter.

EM Resident *staff editor, Rachel Donihoo, sat down with Dr. Stack to talk about his extraordinary young career and the ways in which EMRA helped to shape it.*

What inspired you to become a physician, and what drew you to emergency medicine?

I'm not one of those people who had a passion for medicine from the time they were in the crib. I just really liked interacting with people, and I had an affinity for science and biology. It's not a very dramatic story, but I just thought – pragmatically speaking – that a medical career would allow me to combine those things.

Emergency medicine has fulfilled for me everything that I'd hoped. I interact with people with great frequency and intensity, and that is a very satisfying experience. Like a lot of my emergency medicine colleagues, I like having a broad-based familiarity with a whole wealth of things. I consider myself to be an applied scientist, who takes the knowledge researchers provide and deploys it in the real world. I feel like I'm a "real" doctor because I'm called upon on a regular basis to see, assess, and render opinions on a whole gamut of human illness and injury. I'm also comfortable that I don't have to be the absolute expert on how to put together a bone, sew a blood vessel, or manage an odd neurological condition. I prefer my ocean to be wide and a couple of inches deep.

Pictured from left: Dr. Stack; Dr. John Armstrong, surgeon general for the State of Florida; Dr. Bruce Scott; and Dr. Regina Benjamin, former U.S. surgeon general.

How did you first become involved in EMRA?

I attended my first EMRA meeting at ACEP's 1998 *Scientific Assembly*, where I ran and was elected for the board's ACEP representative. Although, since my early medical school days, I had been involved in the AMA and the Ohio State Medical Association – and had held leadership positions at both – joining the EMRA board provided a whole new level of experience.

EMRA offers an opportunity unlike any other. Other medical specialties offer leadership opportunities to their residents, but there are no other specialties that I'm aware of that have their own separately incorporated not-for-profit organization created solely for residents and medical students. Serving on the board means you have true fiduciary responsibilities and real legal obligations. As a board member, you are directly involved in bringing in revenue, publishing educational books, and managing a staff.

There are many organizations that bring together young physicians, who convene to discuss issues and make recommendations that they hope will affect policy. These like-minded groups are enormously important, but their roles are entirely different from those of boards, which have to make decisions, oversee staff, create budgets, and be accountable for the results at the end of the year. There's an autonomy that goes along with the responsibility of being on a board, which is a major step up in terms of career growth and personal accountability.

What did you learn from your time on the EMRA board, and in what ways do you think that experience helped advance your career?

The ACEP representative position I held for two years provided a remarkable inside view into the premiere medical organization of our specialty, and gave me the opportunity to interact with people who were determining the future of our specialty. Although I was not a member of the ACEP board, I was treated almost as if I were one. I got to be involved in the ACEP board's meetings and conference calls, which was invaluable experience that reshaped my view of leadership. It was an enormous benefit to have that experience so early in my career.

My residency director used to play a Jeopardy-style game with us. One of the categories was "Who's Who in Emergency Medicine." I would drive everyone crazy because I'd say, "Oh, I know that person, or I had dinner with that one…" Invariably, I knew or had met most of those people during my time with EMRA, but they were strangers to my fellow residents. It was a big advantage for me.

Like so many other things in life, the ability to communicate and build effective relationships makes the work we have to do with each other so much more successful. Frustrations and animosities are mitigated when you take the time to get to know each other and develop more personal relationships. The fact that I had that experience as a resident is uncommon; most people don't have access to the president of ACEP or SAEM, for example, that early in their careers.

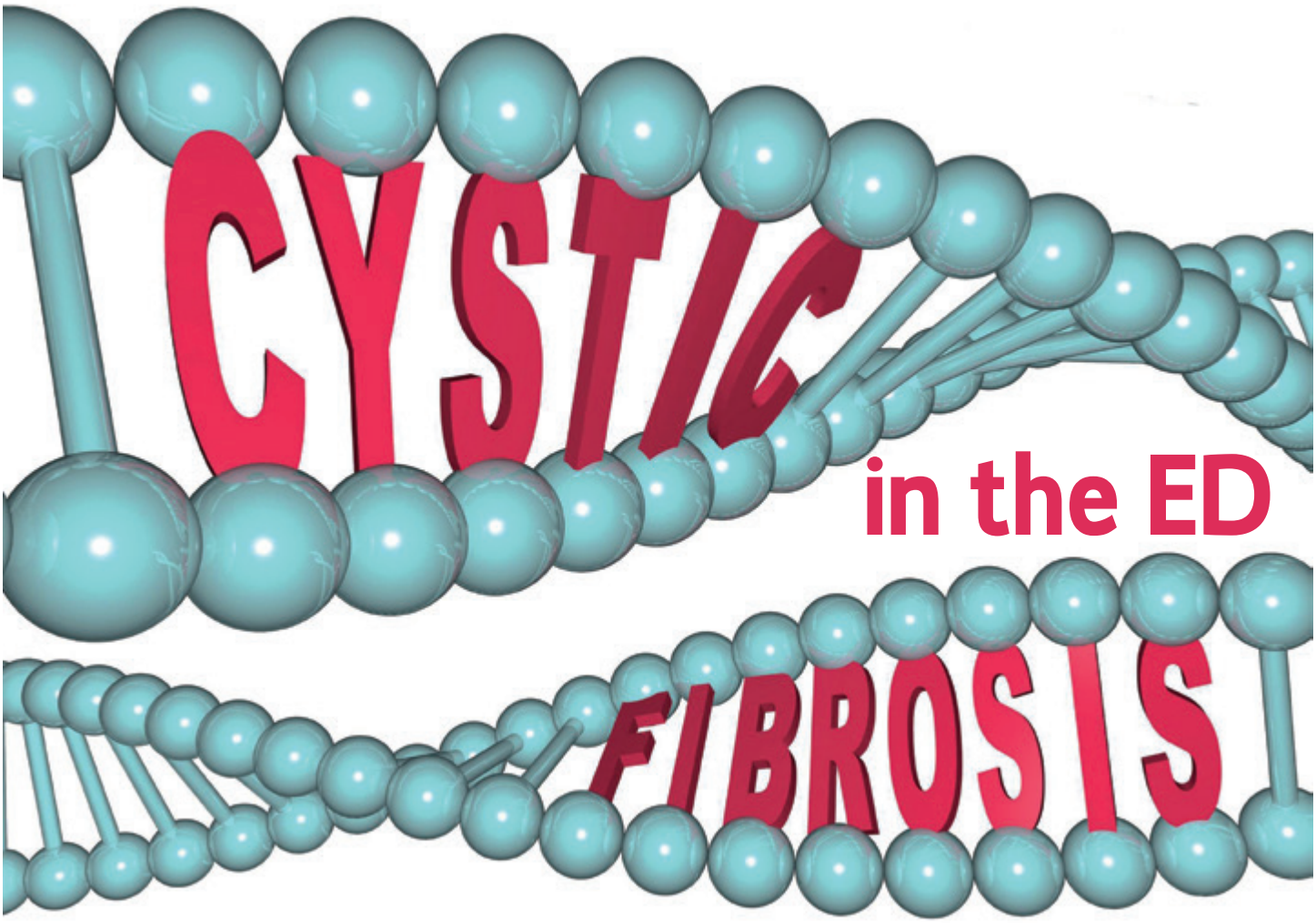
The people with whom I served on the board – Cherri Hobgood, Rebecca Parker, Matt Watson, and Gary Katz, to name a few – are strong examples of how EMRA sets the stage for continued high-level involvement in the specialty. You don't have to look any further than just the small group with which I served to see how service in the organization prepares physicians for high future accomplishments. ✶

Dr. Stack (left) with fellow EMRA Board of Directors alum Dr. Gary Katz at *ACEP13* in Seattle.

What is EMpower?

EMRA is proud to announce its newest initiative, EMpower! Every issue of *EM Resident* and our e-newsletter, *What's Up in Emergency Medicine*, will feature past EMRA leaders to highlight how their involvement in the organization has served as a launching pad for their careers and future accomplishments.

If you'd like to share how EMRA has enriched *your* educational experience or helped to propel you forward, please email president@emra.org.



Introduction

Modern advancements in medical care have enabled us to prolong the lives of patients once thought to have little chance of surviving beyond childhood. Patients with genetic diseases such as cystic fibrosis (CF) are now living far beyond conventional expectations. As these patients mature – moving or traveling away from their usual health care providers – it is important for emergency physicians to know how to treat this population effectively in the emergency department.

Presentation

Given that CF is caused by a mutation in the chloride transport molecule, CFTR, its effects are primarily related to electrolyte disturbances. **Hyponatremic and/or hypochloremic dehydration can occur with excessive sweating and should be suspected in CF patients who present during summer months.** Normally, standard fluid resuscitation should be sufficient to correct the electrolyte deficiency; however, many of these patients have been on nephrotoxic drugs (i.e., aminoglycosides) in the past, so care must be taken to avoid fluid overload.

Pulmonary

The main cause of morbidity in patients with CF is progressive lung damage caused by reduced ciliary clearance of thickened mucus, increased bacterial adherence with decreased antimicrobial effect of the airway surface, and secretion of inflammatory cytokines. This leads to significant bronchiectasis, which can cause persistent hypoxia, hypercapnia, and pulmonary hypertension.

Adult CF patients will most likely be on home oxygen. However, infection or other co-morbities, may increase oxygen requirements, contributing to respiratory fatigue. **ED management of respiratory complaints for CF patients should begin with antimicrobial and airway clearance therapy, including chest percussion and mucolytic therapy with nebulized N-acetylcysteine.** Multidrug antimicrobial therapy should focus on specific pathogens common to CF patients, such as *Pseudomonas aeruginosa*, *Burkholderia cepacia*, and *Hemophilus influenzae*. Penicillins or ceftazideme with an aminoglycoside, such as gentamicin or tobramycin, are good first choices. MRSA coverage should also be considered in those who have tested positive in the past; treatment with imipenem or meropenem also should be considered.[1] All antibiotics should be further adjusted after review of the sensitivities of previously cultured organisms, if available.

CF exacerbations can, in rare cases, be due to allergic bronchopulmonary aspergillosis (ABPA). **This condition presents with chronic wheezing, decline in lung function, chronic cough, and**

transient infiltrates on CXR. Steroids are the primary therapy, as ABPA is driven by an inflammatory process. The clinician should be suspicious for this disease process if the patient is not improving on standard IV antibiotic regimens. Antifungal therapy for ABPA is equivocal at this point, and its use should be deferred to an infectious disease specialist.

In patients who continue to decompensate on the aforementioned therapy, continuous positive airway pressure (CPAP) should be considered. **As the majority of CF patients will have severe bronchiectasis, opening of the collapsed alveoli with positive pressure is the goal of this therapeutic approach.** This can be extremely beneficial in patients who are suffering from respiratory fatigue, allowing enough time for the mucolytic therapy and antibiotics to treat the primary nidus of their exacerbation.[2] Intubation is associated with increased mortality in CF patients, and should only be performed as a last resort in respiratory failure, or if lung transplantation is imminent.

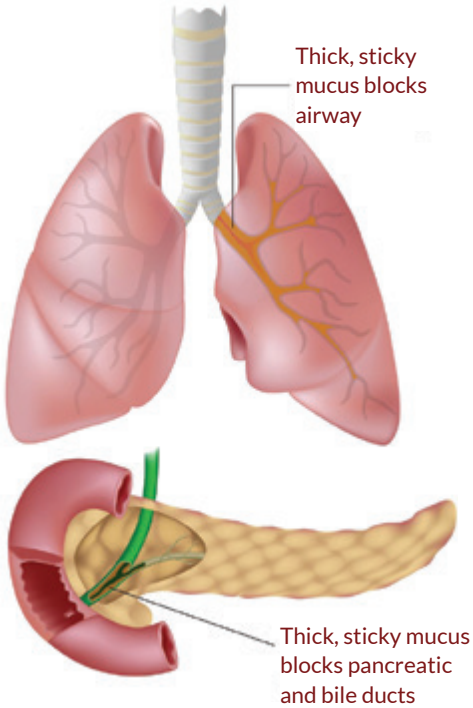
As mucus plugging in CF leads to obstruction of the smaller airways, initial ventilator settings should include a PEEP greater than 10 mmHg, lower tidal volumes, and a low respiratory rate to allow for CO_2 exhalation. Pressure support ventilation is another option, and in this instance, should have an inspiratory pressure setting greater than 30 mmHg. After placement on mechanical ventilation, arterial blood gases should be monitored for further adjustments to oxygenation. If PaO_2 is low, increase the respiratory rate before increasing the tidal volume.

In addition to the obstructive process of CF, inflammation of the lung tissue can cause decreased compliance. **Mucus plugging and air trapping can lead to increased pressure on already weakened tissue and can subsequently lead to a pneumothorax**, although a collapsed lung can be the presenting cause of sudden respiratory distress in the CF patient. High tidal volumes given by mechanical ventilation should be avoided to prevent deterioration of an already compromised pulmonary system.

GI complaints

Most patients with CF suffer from significant gastroesophageal reflux and are on H2 blockers or PPIs. These patients can develop severe nutritional deficiencies and may eventually require feeding tube placement to supplement their dietary intake. However, **the primary concern is associated with destruction of the pancreas.** As the pancreas is also victim to thick obstructing secretions, pancreatic enzymes will slowly destroy both the exocrine and endocrine cells, eventually leaving both nonfunctional. Younger patients will present with pain typical of pancreatitis and require IV fluid and pain control. However, as more pancreatic tissue is destroyed, they become progressively less symptomatic and will eventually require pancreatic enzyme replacement.

Development of Type 1 diabetes from the destruction of the pancreas is another cause of increased mortality. As the islets of Langerhans are destroyed, these CF patients become insulin dependent, and if poorly managed, can progress quickly into diabetic ketoacidosis. As CF patients have a very low reserve, they can quickly become dehydrated, and rapid rehydration and improper fluid rehydration and insulin management can lead to cerebral and pulmonary edema, which is almost always fatal. Treatment is similar to most children with DKA; however, fluid should be given with additional caution. Normal saline is the initial fluid of choice and should be given at 10-20 ml/kg over the first 2 hours, then continued at 1.5-2 times maintenance. **The final goal is not euvolemia, but rather increased organ perfusion.** After adequate rehydration has been started, insulin can be initiated at 0.1 units/kg/hr. It must be stressed that CF patients have significant electrolyte imbalances, and care must be used for adequate potassium and sodium replacement with monitoring of the anion gap. As the serum glucose concentration falls below 300 mg/dL, 5% glucose solution should be administered to maintain a target serum glucose concentration of 200-300 mg/dL.[3]



Hyperglycemia leads to extracellular hypertonicity; in response, brain cells create idiogenic osmoles, which help to prevent brain cell shrinkage. Rapid correction of fluid deficits with hypotonic saline can lead to cerebral edema, which is associated with significant morbidity and mortality." This is not limited to patients with CF diabetes; ED providers should be quick to notice this development.[4,5] **Symptoms include altered mental status, decorticate posturing, or new cranial nerve palsy.** If the physician is suspicious, the patient should be given mannitol 1 g/kg IV over 10 minutes and will most likely require intubation. 3% saline may also provide some benefit, but the evidence is still lacking.

Conclusion

As an increasing number of patients survive once-fatal childhood diseases, ED physicians need to be prepared to appropriately care for these patients. With proper management, patients with CF can easily be treated and returned back to their lives. ✶

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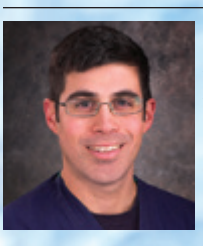
Detroit, MI

Post-Cardiac Arrest Therapeutic Hypothermia

Recently, new literature has emerged in the arena of therapeutic cooling for the treatment of out-of-hospital cardiac arrest. This has resulted in tremendous discussion of how to best implement therapeutic hypothermia (TH). Two landmark articles, first published electronically in November 2013, attempt to shed light on some of the unanswered questions in targeted temperature management.



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Background

Each year in the United States, over 300,000 patients experience sudden cardiac arrest.[1] Of those who are successfully resuscitated, many succumb to devastating neurological injury – a result of post-arrest hypoxic/ischemic injury and resultant release of excitotoxic mediators. Over the past decade, significant improvements in neurological outcomes have been achieved through the implementation of therapeutic hypothermia.

Two landmark trials, the Bernard and HACA trials, both published in 2002, showed that TH implemented in patients who remained comatose after cardiac arrest resulted in improved neurological outcome.[2,3] This led the American Heart Association (AHA) to endorse cooling patients for 12 to 24 hours at 32°C to 34°C, with level IB evidence for shockable rhythms (ventricular fibrillation/ventricular tachycardia), and level IIB evidence for non-shockable arrest rhythms (pulseless electrical activity/asystole).[4] Though some concerns were raised about the lack of a targeted temperature in the control groups (i.e., many experienced fever in the control groups), they still served as the nidus for more than a decade of TH, which is now a cornerstone of post-arrest resuscitative care. While some have questioned whether it was hypothermia — or just fever avoidance — that made the difference in post-arrest neurologic outcomes, TH has been widely practiced in both prehospital and in-hospital settings. Yet, questions remain regarding optimal implementation.

Summary

This is an exciting time for post-resuscitation management after cardiac arrest. Over the past decade, improved neurologic outcomes and survival to hospital discharge after ventricular rhythm arrests (VT/VF) have effectively doubled. This, of course, is multifactorial and is achieved by addressing all the links in the chain of survival, including good, uninterrupted chest compressions, early defibrillation, and comprehensive post-arrest care. The optimal method of targeted temperature management will be heavily investigated in the coming years; but, for now, the standard remains active temperature control and early resuscitation. ✶

STUDY #1

Effect of Prehospital Induction of Mild Hypothermia on Survival and Neurological Status Among Adults With Cardiac Arrest: A Randomized Clinical Trial[5]

This first trial, published in *JAMA* in January 2014, tested whether induction with cold IV fluids in the field after return of spontaneous circulation (ROSC) had an impact on outcomes, when compared to initiating hypothermia in the hospital, which is the current standard of care.[5] Conducted in Seattle and King County, Wash., the study found no significant benefit (or harm) to survival from initiating prehospital cooling after ROSC vs. in-hospital cooling. This adequately powered study does call into question the role of prehospital cooling; however, whether initiating **intra**-arrest cooling (rather than **post**-arrest, as done in this study) will impact outcome is currently under investigation. Some experts argue that there are other benefits from prehospital cooling, namely a greater likelihood that TH will be continued in hospital. According to the North Carolina statewide collaborative RACE CARS (Regionalized Approach to Cardiovascular Emergencies – Cardiac Arrest Resuscitation Systems): *"Our interpretation of the prehospital trial is that it remains reasonable for agencies currently using prehospital hypothermia to continue it, and it is reasonable for agencies that have not used hypothermia or who need to direct resources elsewhere to forgo prehospital hypothermia."*[6] Stay tuned, as more studies will help further elucidate the role of prehospital cooling.

SUMMARY POINTS

- Randomized control trial (RCT)
- 583 patients with ventricular fibrillation; 776 without ventricular fibrillation
- Compared prehospital cooling with 2 liters cold saline initiated **after** ROSC vs. cooling initiated in hospital
- **Outcomes**
  - No improvement in survival or neurologic status at hospital discharge in prehospital cooled group compared to in-hospital cooled group
  - Patients reached < 34°C quicker in prehospital cooled group
- **Important notes**
  - Paralytics given to all patients in prehospital cooled group
  - Prehospital cooled group had more re-arrests in the field, and increased pulmonary edema on first chest x-ray (with resolution at 24 hours).
- **Authors' discussion:** "*Perhaps early cooling needs to be applied during resuscitation and not after ROSC to achieve the desired benefit.*"[5]

STUDY #2

Targeted Temperature Management at 33°C versus 36°C after Cardiac Arrest: A Randomized, Parallel Group, Assessor Blinded Clinical Trial[7]

This second trial from the *New England Journal of Medicine*, published in December 2013, tested two different temperature targets for patients admitted to hospitals after out-of-hospital cardiac arrest.[7] Patients were assigned to a target temperature of either 33°C or 36°C, both applied for 36 hours. Both groups had greater than 50% survival to discharge, and the study determined that there was no difference in survival between the two groups.

Some have interpreted this to mean TH has no impact, and that "fever prevention" is all that is needed. This is speculation that is not supported by the data provided in this study. It is important to note that there was no treatment arm in this study without **active** temperature management. In other words, **every** patient received active temperature management and both strategies had similar survival outcomes.

The next question then becomes whether 33°C or 36°C should be the target temperature. Dr. Benjamin Abella, clinical research director at the University of Pennsylvania Center of Resuscitation Sciences, recommends cooling post-arrest patients who do not have exclusions to a goal of 33°C; but, for patients who cannot tolerate TH (bleeding, hemodynamic intolerance due to dysrhythmia, etc.), the temperature goal should be 36°C.[8]

Many experts who support the continued target of 33°C highlight that, in this study, bystander CPR was performed for 73% of the patients, and EMS response times were very short. Resultantly, the study population may have been less severely brain injured, thereby skewing the results toward more favorable outcomes than might otherwise have been the case. It is also noted that when compared to the 36°C group, individuals within the 33°C group with downtimes (time from cardiac arrest to ROSC) greater than 25 minutes trended to better outcomes. However, Dr. Stephen Bernard, author of one of the original trials on therapeutic hypothermia,[2] reports that his hospital will transition to a goal of 36°C, based on this well-designed, well-executed, and appropriately powered study.[9]

The bottom line is, the ideal target temperature is still unknown, and there are ongoing studies that hope to provide the answer. A one-size-fits-all approach may not work. Based on the literature to date, the wrong answer is to **not** provide post-arrest patients targeted temperature management.

SUMMARY POINTS

- Multicenter randomized controlled trial (RCT)
- 950 comatose adults after out-of-hospital cardiac arrest of presumed cardiac cause
- 80% shockable and 20% non-shockable first monitored rhythm
- Compared cooling to either 33°C or 36°C (used **active** targeted temperature management for both temperature goals)
- Outcome: no difference in survival or neurological outcome between groups (at 180 days)

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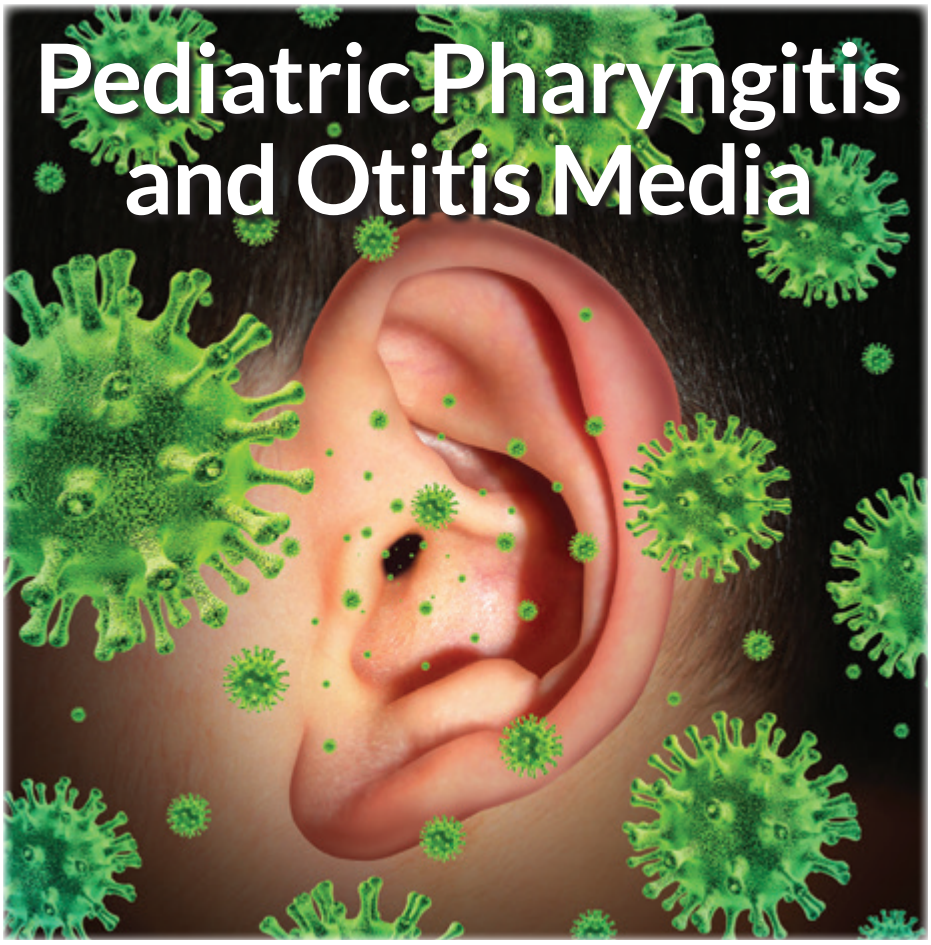
Pediatric Pharyngitis and Otitis Media



Welcome back to the *Landmark Articles Series*, brought to you by the EMRA Research Committee. In this edition, we are going to take a look at some of the major literature surrounding the treatment of two very common pediatric diagnoses: pharyngitis and otitis media.

The simple sore throat and middle ear infections are two of the most common diagnoses in pediatrics. We are all familiar with the erythematous, exudative oropharynx and the painful ear, but are we up to date on their proper treatment? Are antibiotics empirically warranted? How about steroids?

A 2006 Cochrane review addressed the topic of antibiotic administration for pharyngitis.[1] They compiled 27 randomized, and quasi-randomized, controlled trials to assess the benefits of antibiotic administration. Their findings revealed that for those patients who received antibiotic treatment, the incidence of rheumatic fever, otitis media, sinusitis, and recurrent pharyngitis were reduced, and their symptoms were slightly improved. However, there was no protection provided against post-streptococcal glomerulonephritis.

While these findings appear very favorable, there is still some controversy, which warrants discussion. The risk of post-streptococcal rheumatic fever is the primary motivator for antibiotic prescription in pharyngitis. However, in wealthy, well-developed nations such as the United States and Canada, the incidence of rheumatic fever is extremely low, due to a changing serotype of the Group A *Streptococcus* bacteria. The risk of side effects of antibiotics was not assessed in this trial and must be weighed against the potential benefits of prescription, especially in a low-risk patient population. In addition, a large number of the patients evaluated in this review were adults, which limits our ability to generalize these results to the pediatric population.

While not universally practiced, dexamethasone is sometimes provided for pediatric patients with pharyngitis, with the goal of reducing inflammation and thereby decreasing discomfort. A randomized, double-blinded trial published in 2003 in the *Annals of Emergency Medicine* attempted to assess the usefulness of oral dexamethasone in pediatric pharyngitis.[2] 184 patients were sorted into two primary groups based on rapid strep A positivity or negativity. They were then randomized to receive either oral dexamethasone or placebo. Patients who tested positive with rapid testing for Group A *Strep* experienced a much faster time to clinically significant pain relief, as compared to placebo (6 hours vs. 11.5 hours). In the strep negative group, there was no benefit to oral dexamethasone treatment. For all comers, oral dexamethasone does not decrease time to pain relief, but in the subset of patients with positive strep A antigens, it may be beneficial, and should be considered.

Lastly, we examine the use of antibiotics for acute otitis media, which has been an area of clinical controversy. With the development and use of the pneumococcal vaccine, there has been a shift in microbial flora. While *S. pneumoniae* used to be the leading cause of otitis media, it is now being replaced by non-typable *Haemophilus influenzae*. A systematic review published in *JAMA* in 2010 showed that while there is some increased clinical success with antibiotic administration, there is also an increase in diarrhea and rash in treated patients.[3] It did not show any benefit in prevention of mastoiditis or other invasive infections and showed no change in long-term outcome. There was no benefit to providing antibiotics stronger than amoxicillin, and they only increased overall cost of treatment.

We all routinely see patients with pharyngitis and otitis media. These reviews suggest that antibiotic treatment of strep A pharyngitis is reasonable, as is providing dexamethasone (so long as the patient tests positive on rapid strep). Prior to prescribing antibiotics for otitis media, a risk/benefit analysis on a patient-by-patient basis is appropriate. ✶

Catastrophic Communication

Aortoduodenal Fistula

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A 61-year-old female with a known unrepaired thoracoabdominal aortic aneurysm with dissection is transferred to a tertiary referral facility for an unstable upper GI bleed manifesting as hematemesis and frank blood per rectum. Her initial hemoglobin is 7.6 g/dl, and she is resuscitated with PRBC and IV fluid. She is started on omeprazole and octreotide infusions; an NG tube reveals a large amount of frank blood in the stomach; and she is eventually intubated for airway protection. A bedside esophagogastroduodenoscopy is performed but cannot identify the source of bleeding.

CT angiography with and without contrast is then performed, and this reveals progression of the aortic dissection, loss of the fat plane between the aneurysm and the third portion of the duodenum, and gas within the aneurysm. These findings are deemed consistent with aortoduodenal fistula.

Discussion

Primary aortoenteric fistula is a direct communication between the native aorta and the GI tract. The fistula most commonly communicates with the third portion of the duodenum because of the close contact of this segment with the underlying aorta.[1]

Primary aortoenteric fistulas are almost exclusively associated with AAA, with atherosclerosis as the most common etiology.[2] Other causes include mycotic aneurysms caused by infectious agents, radiation, carcinoma, inflammatory processes, cystic medial necrosis, or ingestion of foreign bodies.[3]

Diagnosis can be challenging, as the classic presentation of abdominal pain, GI bleeding, and pulsatile abdominal mass is present in only 11% of patients. Additional symptoms may include fever, back pain, melena, syncope, or shock.[4] An aortoduodenal fistula classically presents with a "herald bleed," which is limited by vasospasm and thrombus formation. This is generally followed by massive GI hemorrhage, hours to months later.

Endoscopy is often performed as the first step in diagnosis. While direct visualization of the fistula is rarely seen endoscopically, blood clots in the duodenum can be suggestive of the diagnosis. The main role of endoscopy, however, is to exclude other causes of bleeding.[5] When a primary aortoenteric fistula is suspected, a CT scan with intravenous contrast is indicated to confirm the diagnosis. Loss of the fat plane between the aorta and duodenum is an indicator of primary aortoenteric fistula, while visualization of intravenous contrast agent in the GI tract is pathognomonic.[6]

Figure 1.
Computed tomography imaging of the abdomen shows aneurismal dilation of the abdominal aorta along with increased fat stranding near the third portion of the duodenum. A small focus of gas is also noted at the interface of the aorta and the duodenum, highly concerning for aortoduodenal fistula.

Traditional treatment involves emergent exploratory laparotomy with aortic graft repair and fistula closure.[7] In unstable patients, or in poor open surgical candidates, endovascular surgery can be a temporizing, minimally invasive option. Even with concurrent antibiotics, there is a significant risk of fulminant sepsis with the endovascular approach; therefore, it is best used for initial stabilization, with an elective surgery planned for definitive care.

Primary aortoenteric fistula should be included in the differential diagnosis of GI bleeding in the emergency department. It should especially be considered in patients with recurrent bleeding, a known AAA, or when no other source of bleeding is identified on endoscopy. CT scan is the diagnostic procedure of choice. Definitive treatment is surgical in those patients who are appropriate candidates.

Case follow-up

Further resuscitation was performed with PRBC and FFP. Meropenem was initiated for prophylaxis. Due to being unstable with a complex presentation in the setting of morbid obesity, she was deemed to not be an open surgical candidate. An esophageal stent was placed across the third portion of the duodenum, which slowed the rate of bleeding. The next day bleeding again increased, and a plain film showed migration of the stent. A second stent was placed, with some success. However, due to overall poor prognosis, her family withdrew care, and the patient expired four days after admission. ✶

GET IN THE GAME

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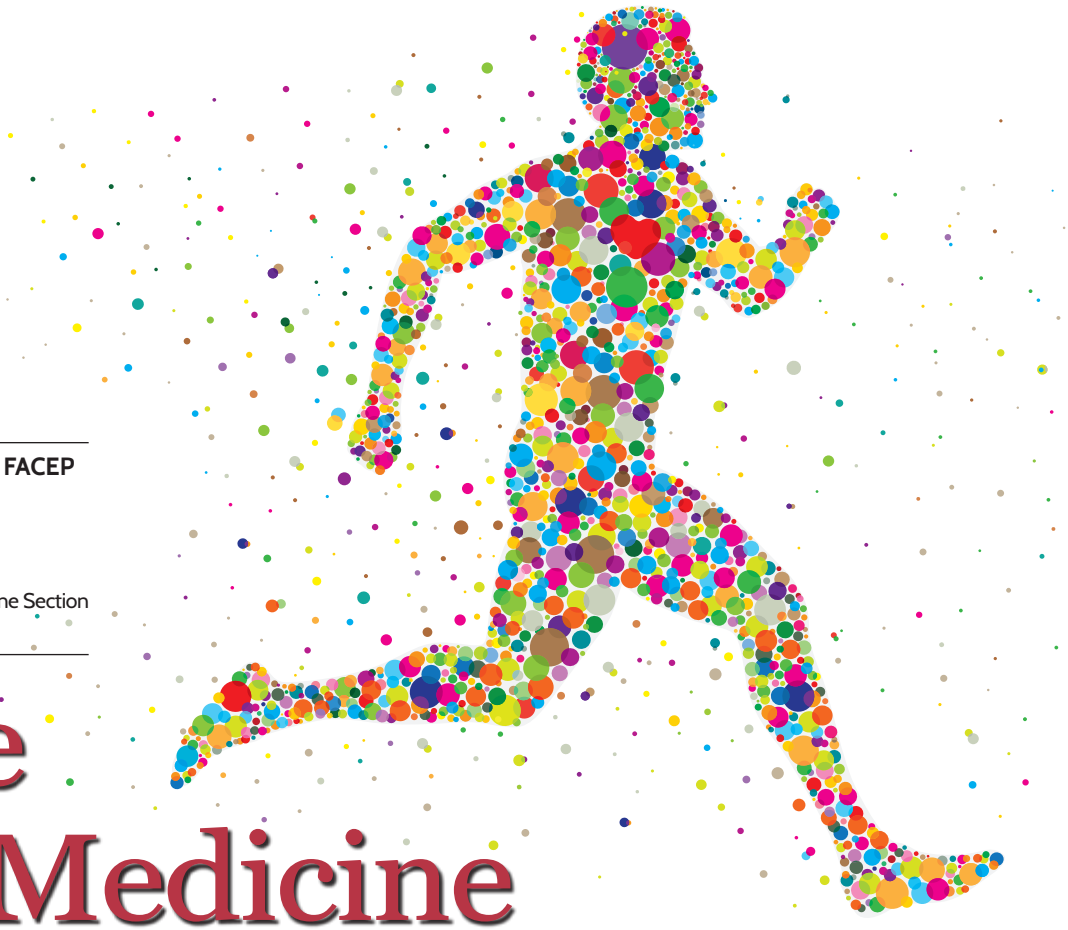

Explore Sports Medicine

If you're like me, you dabbled in a variety of sports throughout your childhood and adult years but never possessed the talent to earn millions. So you abandoned your hopes of athletic stardom in favor of an equally rewarding career in emergency medicine. Well, fortunately, all is not lost. **If you still dream of getting on the field with the pros, you can – it might just be as a team physician.** Read on to learn the answers to some frequently asked questions about the field of primary care sports medicine.

What is primary care sports medicine?

Sports medicine has roots in ancient Greece, but really accelerated as an orthopedic subspecialty about 40 to 50 years ago. The field later evolved to include primary care physicians who, with additional specialized training, became well-suited to **care for the majority of an athlete's medical and musculoskeletal needs**. Sports medicine was approved and recognized as a subspecialty under the American Board of Emergency Medicine (ABEM) in 1992, and emergency physicians continue to bring a unique skill set to this rapidly growing profession. With expertise in primary care and non-operative orthopedics, the sports medicine physician assumes a wide range of clinical and other responsibilities (*Table 1*).

Tell me more about fellowship training

Presently, there are almost **140 Accreditation Council of Graduate Medical Education (ACGME)-accredited fellowship training programs in primary care sports medicine** in the U.S. Very few programs are based in emergency medicine, but many of the programs in family medicine and other primary care specialties have graduated emergency physicians, and some have fellowship positions dedicated to emergency medicine candidates. Almost all programs are one year in length, and ACGME-accredited programs prepare the fellow for CAQ (Certificate of Added Qualification) eligibility in sports medicine, which is equivalent to board certification. The fellowship year is clinically focused, often with opportunities for research and teaching. The clinical experience is divided between the office and training room settings, in addition to game and event coverage. Primary care sports medicine physicians, orthopedic surgeons, specialty consultants, physical therapists, exercise physiologists, and certified athletic trainers comprise the fellowship faculty roster. Most fellows will work with a combination of high school and college athletic programs, and some programs may provide experience with professional sports teams.

Applicants from emergency medicine are generally very competitive for fellowship positions, due in part to the quality of our residency training, broad knowledge base, decision-making skills, procedural competency, and inherent comfort on the sidelines. However, sports medicine experience and demonstrated interest during residency will certainly enhance one's fellowship application.

What is a typical career path?

There is no "typical" career path for the physician trained in both emergency medicine and sports medicine. Career options include **academic emergency medicine**, **non-operative orthopedics** in the academic or private setting, **university campus-based athletic medicine**, **event medicine**, and **team physician** roles ranging from youth to professional sports. For example, my practice in academic emergency medicine includes two ED shifts per week – one day each week in a small sports medicine practice with a focus on sports-related concussion, and one day each week working in the office alongside orthopedic surgeons in a large academic orthopedic group. In addition, I teach orthopedics to our emergency medicine residents, and I serve as the team physician for a local high school football team and an NCAA Division III university, where I see athletes weekly in a training room setting.

Some emergency physicians may choose to practice in a community ED with expertise in orthopedics, while others have achieved executive medical positions in professional sports and at large-scale events. Combining a practice in both specialties often requires creative solutions. However, one of the great attributes of a career in EM and sports medicine is the ability to carve out your own niche; the **options appear to be endless**! Additionally, many appreciate the potential for a full-time, office-based sports medicine practice, though salaries may be less favorable compared to emergency medicine.

How can I further explore my interest in sports medicine?

If you are training at an institution where there is an EM-trained sports medicine physician, then you are one of the lucky few. If not, most large institutions now have thriving sports medicine clinics or centers staffed by orthopedic surgeons and primary care sports medicine physicians. You can start by engaging your local sports medicine team, demonstrating interest, and inquiring about opportunities for shadowing, rotations, and teaching conferences. As a second-year resident, I contacted sports medicine physicians from family and internal medicine at my institution; I was able to arrange a month-long elective and cover the sidelines of high school football games. This was immensely helpful in confirming my interest in sports medicine, developing a knowledge base for my fellowship year, and enhancing my candidacy for a fellowship position.

Apart from local networking, it is worthwhile to consider membership in the **American Medical Society for Sports Medicine** (AMSSM) or the **American College of Sports Medicine** (ACSM). AMSSM allows anyone to take advantage of its internet resources at www.amssm.org, including fellowship program listings and FAQs. Members of ACEP or SAEM can join the Sports Medicine Section, or Sports Medicine Interest Group, respectively. Both afford great networking opportunities within emergency medicine.

Regardless of how you choose to proceed, it is important to develop a mentoring relationship for ongoing advice and guidance. Through a grant awarded to the Sports Medicine Section in 2012, ACEP supports a web-based Virtual Mentorship Program that links experienced EM-sports medicine physicians with those desiring further information or direction. Visit the website at www.acep.org/sportsmedfellowship to get started. ✶

Table 1. Roles of the primary care sports medicine physician

- ✓ Specializes in the non-operative management of orthopedic problems
- ✓ Works closely with orthopedic surgeons
- ✓ Evaluates athletes, "weekend warriors," and other active individuals
- ✓ Treats acute and chronic musculoskeletal injuries and other conditions
- ✓ Manages athletes with acute and chronic medical issues
- ✓ Counsels on sports performance, exercise prescriptions, use of supplements and ergogenic aids
- ✓ Educates about injury prevention
- ✓ Manages sports concussion
- ✓ Guides decisions about returning to play
- ✓ Promotes a healthy lifestyle
- ✓ Leads the sports medicine team (comprised of orthopedic surgeons and other physician consultants, athletic trainers, physical therapists, coaches and administrators)
- ✓ Serves the local community by providing coverage for athletic events
- ✓ Conducts research on sports medicine-related issues

WATER & SALT

Evaluation and Management of Hyponatremia in the Emergency Department

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Hyponatremia (sodium <135 mmol/L) is a common electrolyte abnormality seen in hospitalized patients, although most patients remain asymptomatic until the serum sodium is less than 125 mmol/L.[1] When concomitant hyperglycemia is excluded, the incidence of hyponatremia in the emergency department is 3-4%, presenting a significant mortality risk.[1-5] Serum sodium is regulated through the effects of anti-diuretic hormone (ADH), feedback from the renin-angiotensin-aldosterone system (RAAS), and renal tubule handling of sodium, thus intimately linking serum sodium to intravascular volume status and intrinsic renal pathology. These patients commonly receive crystalloids in the ED, making it important to evaluate for the etiology of the hyponatremia prior to admission to the hospital.

Discovering the cause of hyponatremia can be directed by answering the following four key questions.

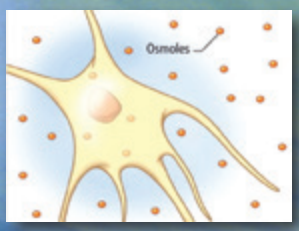
❶ Is the hyponatremia real?

Assessing the serum osmolality with both the measured and calculated values will direct the physician to consider hypoosmolar hyponatremia (<275mmol/L), versus pseudohyponatremia, also known as isosmolar hyponatremia (~280mmol/L), or hyperosmolar hyponatremia (serum osmolality >280mmol/L). The majority of patients with hyponatremia are hypoosmolar with a serum osmolality <275mmol/L.[1,6,7] These patients will require direct treatment of the hyponatremia. Paraproteinemias like Waldenstrom's macroglobulinemia, multiple myeloma, and even IVIG infusion can alter the way intravascular sodium is reported, resulting in a measured isosmolar hyponatremia. Other agents, such as mannitol, radiocontrast dye, and glucose, create an osmotic gradient that draws free water out of the interstitial and intracellular space, which dilutes intravascular sodium, but maintains a hyperosmolar state. Treatment for isosmolar and hyperosmolar hyponatremia should be directed at the underlying cause of the change in osmolar state.

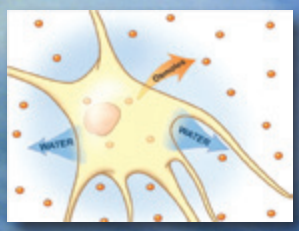
❷ What is the patient's volume status?

Hypoosmolar hyponatremia is classified into three subtypes: euvolemic, hypovolemic, and hypervolemic. In **euvolemic hyponatremia**, there is a relative excess of water compared to sodium, but since total body sodium is near normal, patients will not show signs of extracellular fluid volume derangements. This is most commonly

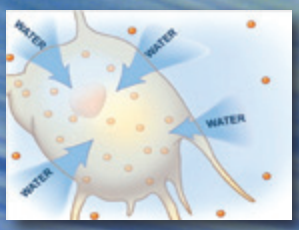
The danger of overly aggressive correction of hyponatremia



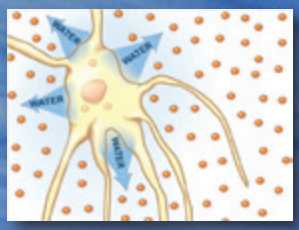
Normal state
The extracellular fluid is in osmotic equilibrium with the intracellular fluid, including that of the brain cells, with no net movement of water across the plasma membrane.



Adaptation
Over the ensuing few days, brain cells pump out osmoles, first potassium and sodium salts and then organic osmoles, establishing a new osmotic equilibrium across the plasma membrane and reducing the edema as water moves out of the cells.



Acute hyponatremia
If the extracellular fluid suddenly becomes hypotonic relative to the intracellular fluid, water is drawn into the cells by osmosis, potentially causing cerebral edema.



Overly agressive therapy
Agressive therapy with hypertonic saline after adaptation has occurred raises the serum sodium level to the point that the extracellular fluid is more concentrated than the intracellular fluid, drawing more water out of the brain cells and causing the syndrome of osmotic demyelination.

due to the syndrome of inappropriate of antidiuretic hormone (SIADH). SIADH is frequently seen in cases of malignancy, pneumonia, antipsychotics or antidepressants, primary polydipsia, exercise-induced hyponatremia, low solute intake (poor nutrition, alcohol use), and reset osmostat, amongst others.[6,7]

In **hypovolemic hyponatremia**, total body sodium is decreased to a greater extent than total body water and patients may present with signs of volume loss and dehydration. Sodium loss in excess of water loss is due to either extra-renal or renal losses. Extra-renal losses include diarrhea, vomiting, nasogastric tube placement, third spacing after burns, and pancreatitis. Renal losses may be due to diuretic use, mineralocorticoid deficiency, cerebral salt wasting, nephropathy, bicarbonaturia, renal tubular acidosis, osmotic diuresis, and glucosuria.[3]

Hypervolemic hyponatremia occurs when the increase of total body water is greater than the increase in serum sodium, usually as a sign of organ failure and decreased circulating volume. Signs of fluid excess present clinically as ascites, jugular venous distention, peripheral or pulmonary edema, and pleural effusions. Commonly, patients present with nephrotic syndrome, congestive heart failure (CHF), acute or chronic renal failure, or cirrhosis.[3]

❸ Is the kidney concentrating or diluting the urine?

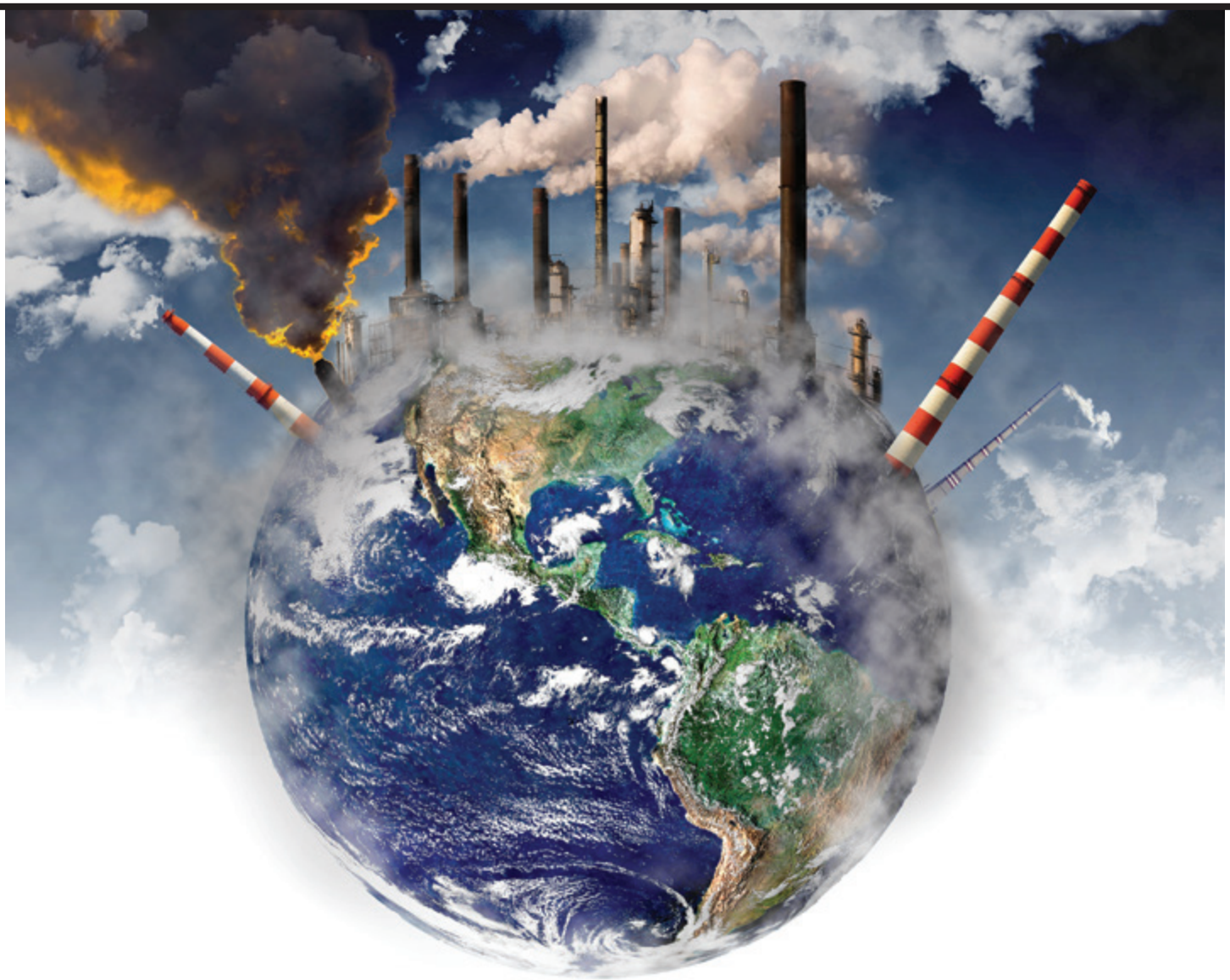
Differentiating how the kidney is handling volume by measuring the urine osmolality will provide invaluable information.

Euvolemic hyponatremia due to ingestion of hypoosmolar fluids (beer potomania, polydipsia) will result in maximally dilute urine with a urine osmolality <100mOsm/L. **Euvolemic hyponatremia** due to all other causes (SIADH, antipsychotic use, etc.), **hypovolemic hyponatremia**, and **hypervolemic hyponatremia** will have impaired renal ability to dilute urine and present with Uosm >100 mOsm/L.

❹ What is the kidney doing with sodium?

In states of extrarenal losses, perceived intra-vascular depletion (CHF, cirrhosis), and ingestion of free water, the kidney attempts to retain sodium, resulting in a urine sodium <20meq/L. The urine sodium concentration is inappropriately high (>20meq/L) in situations where the kidney is not functioning properly (renal sodium losses, medication use, SIADH, etc.).

The answers to these four key questions will guide the physician down the appropriate pathway in diagnosing and treating the hyponatremic patient.[8] The treatment approach must consider the time course (acute vs. chronic) and clinical presentation (asymptomatic vs. symptomatic). Acute hyponatremia developing over a period of <48 hrs should be treated aggressively, whereas chronic hyponatremia developing over >48 hours poses the risk of central pontine myelinolysis and must be corrected slowly.[7] Discovering the cause of hyponatremia prior to hospital admission will help EM physicians – and our inpatient colleagues – better care for these patients. ✶



The Golden hour

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We must all take collective action to save this "patient," and we must act fast. Our golden hour is slipping away.

When a trauma patient is brought in by EMS, a dedicated team of emergency physicians and staff drop what they are doing and immediately begin a coordinated response to save the patient's life. We are all familiar with the concept of the "golden hour" – critically injured patients' morbidity and mortality depend on the quality of care they receive within that first hour.

Now imagine that a trauma patient rolls into your ED, and the team just stands around staring and debating what to do. **Maybe a few members take action, but the majority of the team stands in the corner ignoring the critical condition of the patient or disagreeing on the next action to take. In the end, nothing is done.** The patient who had a shot at survival dies, not because of a lack of resources or understanding about how to treat the injuries, but because the vital team members did not take action.

This scenario would be unacceptable to anyone trained in emergency medical care. Unfortunately, this is happening as we speak – not to the typical trauma patient, but to **the fragile and collapsing ecosystems and climate of our planet.**

Climate Change and Human Health

There is a growing group of physicians who have chosen to focus their careers on treating this singular "patient." **The health of our Earth affects the collective and individual health of all 7 billion of us.** But you don't have to undergo seven years of medical training to know instinctively that the *sine qua non* of being healthy – no matter where you live – is access to clean air, water, food, and shelter. These are essential elements that enable all living organisms to grow and thrive. Yet modern medical training in the United States gives us little preparation for dealing with the effects of environmental degradation on health.

Since the 1950s, we have had compelling evidence that human-induced actions are damaging natural functions of the earth at an alarming rate. In the most recent fall report, the IPCC states: "*Human influence on the climate system is clear. This is evident from the increasing greenhouse gas concentrations in the atmosphere, positive radiative forcing, observed warming, and understanding of the climate system.*"[1] While the scientific community at large is an active participant in many of these negotiations and international meetings, the medical community has been much slower to join the debate.

A commission sponsored by *The Lancet* medical journal in 2009 has called climate change "*the biggest global health threat of the 21st century,*" and highlights the "*changing patterns of disease, water and food insecurity, vulnerable shelter and human settlements, extreme climatic events, and population growth and migration*" as some of the major threats of climate change to human health.[2] The mechanisms of these effects are both direct and indirect (*see illustration at right*).[3] Despite these global concerns, the majority of physicians are not prepared for how this phenomenon will affect our patients and our practices.

We are at a unique point in our history. We have made tremendous gains in many health indicators around the globe: Polio is nearly completely eradicated; the number of women dying in childbirth has been reduced by nearly half since 1990; and 1.1 million deaths from malaria have been averted in the last decade, thanks to targeted efforts by multiple stakeholders.[4] And yet, **all of the tremendous health gains over the last century could easily be for naught if collective action is not taken to address the continued destruction of Earth's ecosystems.** In 2005, more than 1,300 experts from 95 countries produced the Millennium Ecosystem Assessment, a consensus document reviewing the current state of the world's natural systems. The authors concluded that, "*Any progress achieved in addressing poverty, hunger eradication, improved health, and environmental sustainability is unlikely to be sustained if most of the ecosystem services on which humanity relies continue to be degraded.*"[5]

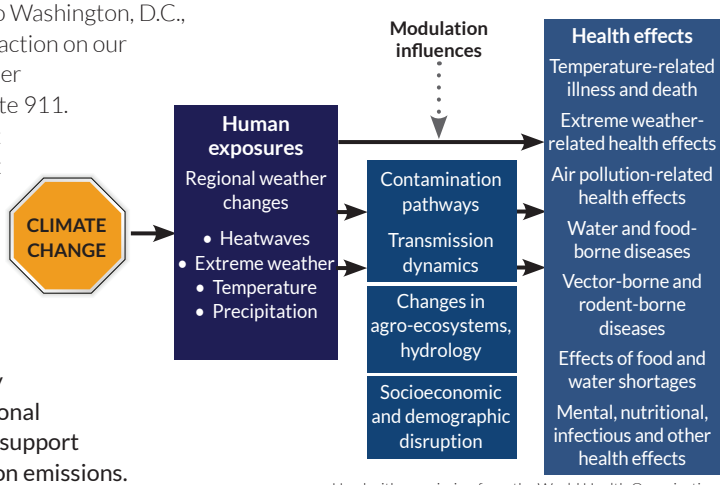
All specialties of medicine will see the effects of climate change on their patients, but the particular changes will vary according to the specialty and the practice locale. **Emergency medicine physicians are particularly well-poised to respond to climate change health effects due to our focus on urgent care, prehospital and wilderness medicine, disaster response, and broad scope of practice.**[6] ✶

Climate change is a complex issue, and one that will require a concerted effort from multiple investors to lessen and adapt to its effects. As emergency physicians, there are several ways we can take action to help combat this important problem.

Educate yourself about the issues. There are several organizations that are committed to research and advocacy regarding climate change and human health – some comprised entirely of physicians and others geared toward all health disciplines. There are a variety of free webinars and resources; see resources section for a few examples.

Attend a meeting. Recently, there have been national and international meetings focused on the health effects of climate change. Last fall, the Wilderness Medical Society held an inaugural meeting titled "Our Patients, Our Planet: Environmental Change and Human Health." There are also multidisciplinary meetings held by organizations such as the American Public Health Association and the American Society of Tropical Medicine and Hygiene. Attending these events is a good way to network with other interested parties and learn more about research efforts.

Become an advocate. There are many ways you can advocate for policy changes at both local and national levels. Healthcare Without Harm is an international consortium dedicated to increasing sustainability by the health care industry. As a group, we are a major contributor to pollution, as we use twice as much energy per square foot than those in typical office or school settings.[7] A California physician, Dr. Wendy Ring, recently rode her bike across the United States to Washington, D.C., to lobby for urgent action on our climate crisis with her organization, Climate 911. Although it may not be feasible for most physicians to conduct a campaign of this scale, we can advocate for less waste in our hospitals and lobby our local congressional representatives to support bills reducing carbon emissions.



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The Resident's Guide to CRITICAL CARE FELLOWSHIPS

Training options and tips for applying — find the right program that fits you and your career goals.

If you are an emergency medicine resident considering a critical care fellowship, now is an exciting time! There are a variety of training and board-certification options, but each pathway has a different training structure, prerequisites, and timelines, which can make the application process overwhelming. Critical care is a diverse field, and knowing where to find your niche can be difficult. We hope that a simple overview of training options, along with some tips for applying, can help you find the right program that fits you and your career goals.

Before applying

Even if you are considering a critical care fellowship, your primary goal during emergency medicine residency is to become an excellent emergency physician. Focus on becoming a well-rounded clinician with strong clinical, procedural, communication, and leadership skills. When rotating in various ICUs, make your interest known to your ICU attendings. Keep in mind that most fellowships require at least three letters of recommendation, and ideally one or two of these should come from intensivists. Critical care fellowships are becoming highly competitive, so being involved outside of clinical time is important. Research, educational projects, quality improvement initiatives, or involvement in committees like the EMRA Critical Care Division are great ways to demonstrate your commitment.

Internal medicine-critical care medicine (IM-CCM)

In 2011, the American Board of Emergency Medicine (ABEM) and the American Board of Internal Medicine (ABIM) agreed to co-sponsor board certification in IM-CCM for emergency physicians. This two-year pathway requires a minimum of 12 clinical

months, six of which must involve caring for critically ill medical patients. The remaining 12 months can be used for additional clinical training or academic development.

Emergency physicians entering this pathway must complete at least six months of direct patient care experience in internal medicine, three of which must be in a medical ICU. This may be completed either prior to entering fellowship (i.e., during residency), or during the first year of fellowship. Until this requirement is met, the EP-fellow is not allowed to supervise IM residents. Importantly, the ABIM requires that 75% of all trainees in IM-CCM fellowships (averaged over a five-year period) must be IM trained, thus limiting the number of emergency physicians in IM-CCM.

Many IM-CCM programs accept applications via the Electronic Residency Application Service (ERAS), with a deadline of July 1 in the year prior to matriculation. However, not all programs participate in ERAS, so it is important to check with each program individually. There is no IM-CCM match, so programs typically notify candidates on a rolling basis.

Surgical critical care (SCC)

In February 2013, the American Board of Surgery broadened its eligibility criteria to allow EPs board certification in SCC. The first year of this two-year fellowship is a "preparatory year as an advanced preliminary resident in surgery" during which the emergency physicians will gain expertise in the management of surgical patients. The exact composition of this year is at the discretion of SCC program directors, so it is important to check with each program individually. The second year is a traditional SCC fellowship, during which eight months must take place in a surgical critical care unit.

Many SCC programs accept applications on a rolling basis beginning in the spring or summer in the year prior to matriculation. The process varies among programs, so it is important to check with each program about specific application requirements and deadlines. While SCC is via the National Resident Matching Program (NRMP) process, programs will vary on the process by which they handle applications, often reserving slots outside the match for emergency physicians.

Anesthesiology–critical care medicine (ACCM)

Approved in June 2013, ACCM is the newest pathway to board certification in critical care for EPs. After July 1, 2014, two years of training are required. At least 12 months must involve the care of surgical patients, and the first six months of an ACCM fellowship for EPs must include three months of rotations with a surgical emphasis. Research electives are limited to no more than two months.

A notable prerequisite is that emergency physicians must have completed four months of critical care training during residency. ACCM applications are accepted on a rolling basis beginning in the winter or spring in the year prior to matriculation. A common application form and database of fellowships are available on the Society of Critical Care Anesthesiologists' website (www.socca.org). For fellows beginning in or after July 2015, ACCM programs will participate in the San Francisco (SF) Match (www.sfmatch.org), which will take place in May in the year preceding fellowship.

Neuro–critical care (NCC)

The United Council for Neurologic Subspecialties (UCNS) has accepted emergency physicians for training and board certification in NCC, and a number of fellowship programs have a history of training EPs. This pathway is also two years, with a heavy emphasis on critically ill neurologic patients and exposure to other aspects of critical care. The UCNS maintains a fellowship database (www.ucns.org). Individual programs accept applications on a rolling basis, in some cases as early as two years prior to the desired July 1 start date. While currently a non-ACGME-accredited sub-subspecialty of critical care, the prerequisites include being a graduate of a residency program in neurology, neurological surgery, internal medicine, anesthesiology, surgery, or emergency medicine accredited by the ACGME or the Royal College of Physicians and Surgeons of Canada.

Emergency medicine/internal medicine (EM/IM) pathway

Emergency physicians who have trained via the combined EM/IM pathway are eligible for any of the above critical care fellowships. In addition, there are three combined six-year EM/IM/CC programs throughout the country.

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University of Pennsylvania Health System
Chair, EMRA Critical Care Division
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Michael Allison, MD
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Vice Chair,
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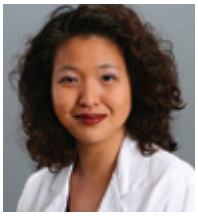
Baltimore, MD



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Director, EM-CCM Fellowship
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Resuscitation and research fellowships

There are a few non-accredited resuscitation or research fellowships that focus on the care of critically ill emergency department patients and/or resuscitation science. These fellowships are one to two years in length and are best suited for those who want to maintain a clinical practice in emergency medicine with an academic or research emphasis in resuscitation and/or ED-based critical care.

Additional resources

More resources, including a fellowship database and application guide, can be found on the EMRA Critical Care Division's website (http://www.emra.org/committees-divisions/critical-care-division). So no matter what field of critical care interests you, there is likely a place available. Be sure to strengthen your application by adding pertinent research and ICU rotations as possible, and start looking for letters of recommendation. Prepare now, and you'll find the program that's right for you. ✶

Choosing WISELY

John Anderson, MD
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Choosing Wisely is a movement launched by the American Board of Internal Medicine (ABIM) in 2011; it was spurred by Howard Brody's editorial[1] in *The New England Journal of Medicine*, "Medicine's Ethical Responsibility for Health Care Reform — The Top Five List." ABIM sees the project as a "multiyear effort to help physicians be better stewards of finite health care resources."[2] It aims to promote conversations between physicians and patients and help provide safe and concise care that is necessary and supported by evidence.

Initially, the National Physician's Alliance (NPA) piloted the concept. This pilot was limited to family medicine physicians, internal medicine physicians, and pediatricians. It has since become a formal agreement among more than 50 specialties, with each specialty contributing a list of five potentially unneeded interventions.

ACEP initially declined participation in the program, citing concerns about medical liability and reimbursement, among other issues. Subsequently, the ACEP Board of Directors formed a task force to look at meaningful, cost-effective care and to determine if the *Choosing Wisely* campaign was a responsible and impactful option. A survey asking for suggestions was sent to all ACEP members; the organization received hundreds of responses.

The group, which was made up of health care policy and thought leaders from around the country, used a modified Delphi panel technique to conduct a systematic review of the literature and data, combined it with expert opinion, and created a list of possible cost-effective measures. These measures were formally scored by evidence, contribution to cost reduction, benefit to patients, and the ability of emergency physicians to enact them. The scoring produced a weighted list that was then presented to the ACEP board. The board approved a "top five" list and sent it to ABIM and the *Choosing Wisely* campaign; the measures were unveiled at *ACEP13* in Seattle.

The lists for other specialties, as well as more information on ACEP's list, can be found at www.choosingwisely.org.

While the lists are meant to serve as a guide and not a mandate, residents should consider incorporating these measures into clinical practice and discussions with patients. Additionally, the need for cost-effective care will not stop with this publication, and residents will be asked to create and drive further efforts in this area.

The LIST

1 Avoid computed tomography (CT) scans of the head in emergency department patients with minor head injury who are at low risk based on validated decision rules.

Minor head injury is a common reason patients visit emergency departments. The majority of these minor injuries do not lead to more serious problems such as skull fractures or bleeding in the brain, which need to be diagnosed by a CT scan. As CT scans expose patients to ionizing radiation, increasing patients' lifetime risk of cancer, they should only be performed on patients at risk for *significant* injuries.

By performing a thorough history and physical examination following evidence-based guidelines, physicians can safely identify patients with minor head injuries in whom it is safe to *not* perform an immediate head CT. In large clinical trials, this approach has been proven safe and effective at reducing the use of CT scans. In children, clinical observation in the emergency department is recommended for some patients with minor head injury prior to deciding whether to perform a CT scan.

The ACEP Board of Directors formed a task force to look at meaningful, cost-effective care and to determine if the *Choosing Wisely* campaign was a responsible and impactful option.

and rationale for each measure[3]

2 Avoid placing indwelling urinary catheters in the emergency department for either urine output monitoring in stable patients who can void, or for patient or staff convenience.

Indwelling urinary catheters are placed in patients in the emergency department to assist when patients cannot urinate, to monitor urine output, or for patient comfort. Catheter-associated urinary tract infection (CAUTI) is the most common hospital-acquired infection in the U.S. and can be prevented by reducing the use of indwelling urinary catheters. Emergency physicians and nurses should discuss the need for a urinary catheter with a patient and/or their caregivers, as sometimes such catheters can be avoided. Emergency physicians can reduce the use of indwelling urinary catheters by following the Centers for Disease Control and Prevention's evidence-based guidelines. Indications for a catheter may include: output monitoring for critically ill patients, relief of urinary obstruction, at the time of surgery, and during end-of-life care. When possible, alternatives to indwelling urinary catheters should be used.

3 Don't delay engaging available palliative and hospice care services in the emergency department for patients likely to benefit.

Palliative care is medical care that provides comfort and relief of symptoms for patients who have chronic and/or incurable diseases. Hospice care is palliative care for those patients in the final few months of life. Emergency physicians should engage patients who present to the emergency department with chronic or terminal illnesses – and their families – in conversations about palliative care and hospice services. Early referral from the emergency department to hospice and palliative care services can benefit select patients, resulting in both improved quality *and* quantity of life.

4 Avoid antibiotics and wound cultures in emergency department patients with uncomplicated skin and soft tissue abscesses after successful incision and drainage and with adequate medical follow up.

Skin and soft tissue infections are a frequent reason for visiting an emergency department. Some infections, called abscesses, become walled off and form pus under the skin. Opening and draining an abscess is the appropriate treatment; antibiotics offer no benefit. Even in abscesses caused by methicillin-resistant *Staphylococcus aureus* (MRSA), appropriately selected antibiotics offer no benefit if the abscess has been adequately drained and the patient has a well-functioning immune system. Additionally, culture of the drainage is not needed, as the result will not routinely change treatment.

5 Avoid instituting intravenous (IV) fluids before doing a trial of oral rehydration therapy in uncomplicated ED cases of mild to moderate dehydration in children.

Many children who come to the emergency department with dehydration require fluid replacement. To avoid the pain and potential complications of an IV catheter, it is preferable to give these fluids by mouth. Giving a medication for nausea may allow patients with nausea and vomiting to accept oral fluid replenishment. This strategy can eliminate the need for an IV. It is best to give these medications early during the ED visit, rather than later, to allow time for them to work optimally. ✶

ACEP Joins *Choosing Wisely*,

Jeremy Samuel Faust, MD, MS, MA
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New York, NY

After months of speculation and years of debate, ACEP unveiled its approved list of *Choosing Wisely* recommendations at ACEP13. With the five-item list, emergency medicine officially joined the American Board of Internal Medicine's multidisciplinary effort to identify ways that physicians can cut costs and improve patient care.

Prior to ACEP's decision, there was vigorous discussion among emergency physicians as to whether we should join the campaign. In favor, it was argued that anything we can do to decrease unnecessary testing and treatment is good for patients. Other medical specialties had joined and were adopting changes with which we tend to agree. Others argued that since cutbacks are inevitable, changes should be physician-driven, not imposed by politicians. On the other hand, some requested that a push for liability reform either precede or coincide with the campaign. Some noted that EPs were already adapting many of the proposed changes, but by making these "official" policies, we would risk losing reimbursement when the tests and treatments were actually necessary.

After the decision to get on board was announced, many waited with bated breath for ACEP's list to be released. Then came the big reveal, which was followed shortly by the sounds of tepid applause. While most were glad emergency medicine joined the campaign, many had been hoping for bigger-ticket items that would push the field forward.

Wondering what others thought, I asked several well-known emergency physicians for their opinions. I found I wasn't alone in feeling somewhat underwhelmed. *EM Literature of Note* blog creator, Dr. Ryan Radecki, found parts of the list to be "*great medicine, but not terribly profound… it could have been much more powerful.*" Dr. Seth Trueger, an EM health policy fellow at George Washington University, said he was "*very happy that ACEP joined*" and that it was a "*good move for the specialty*," but we shared the sentiment that – other than the palliative care entry – the list represented baby steps rather than giant leaps.

To be sure, the committees involved faced a tough task. Should the list contain consensus items or controversial ones? Should it focus on costs and efficacy or on other issues like ED crowding? From among 30 serious suggestions, the board eventually honed in on five official recommendations.

Contemplating the subject, I thought of the things we could change within our specialty, and what I might have added to the *Choosing Wisely* campaign. Monday morning quarterbacks are free from balancing the multifaceted considerations the committees faced, which is why my *Choosing Wisely* wish list probably isn't practical; but, if the guidelines are meant to make emergency physicians think about how we can do our jobs better, surely such thought experiments are worthwhile exercises. So I drew up my own list and asked a few others to do the same. Several notable EM physicians added their opinions and submitted their own "wish lists" for *Choosing Wisely*. While some of these items might have a smaller financial impact than those on ACEP's list, they are practices that lead to increased costs, longer ED visits, and probably won't change outcomes.

What's on *your* wish list? Email your ideas to jsfaust@gmail.com, or tweet at @jeremyfaust with the hashtag #myCW. The best suggestions will be retweeted.

but Chooses Conservatively

My list

- No hospital admission for low-risk chest pain. (Seth Trueger adds: "Do not draw more than two sets of troponins and ECGs. The money isn't really there on cutting out stress tests alone but looking at the downstream costs of avoiding stress tests [and] admission might actually have a reasonable cost savings.")
- No requirement of Rho testing of pregnant patients with vaginal bleeding.
- No brain natiuretic peptide testing for CHF, as it is expensive and does not change management.
- Definitive and documented findings on point-of-care ultrasound should be a contraindication for radiology "official" ultrasound or computed tomography.
- No "banana bags" for uncomplicated intoxicated patients.

Scott Weingart

Mount Sinai/Elmhurst Hospital Center, *EMCrit* podcast creator

- Stop admitting low-risk chest pain.
- Stop admitting and applying aggressive curative measures to patients with advanced dementia or dehabilitation.
- No IV ketorolac if patient has ability to tolerate oral medications.
- No head CT for syncope without headache or neurologic findings.
- No CT for pulmonary embolism without evaluation of PERC and D-dimer.

Michelle Lin

UCSF/*Academic Life in EM* blog editor

- No one-dose vancomycin for uncomplicated cellulitis.
- No lumbar spine films for back pain patients without "red flags."
- No immediate antibiotics for mild or moderate unilateral otitis media for pediatric patients >6 months; use the American Academy of Pediatrics 2013 guidelines Wait-And-See-Protocol.

Ken Milne

South Huron Hospital and creator of *The Skeptics Guide to EM*

- Require influenza shots for all staff with privileges.
- Use Ottawa ankle and knee clinical decision instruments to decrease x-ray use.
- No routine use of antivirals for Bell's Palsy.
- No routine use of proton pump inhibitors for upper GI bleeds.

Ryan Radecki

University of Texas Health Science Center at Houston, creator of the *Emergency Medicine Literature of Note* blog

- No IV antibiotic therapy when an oral alternative exists. Common oral clinically equivalent antibiotics include fluoroquinolones, metronidazole, clindamycin, and azithromycin.
- No routine use of multiple biomarker panels during the evaluation of acute chest pain. Excepting specific clinical indications, a single troponin assay is sufficient.
- Do not perform confirmatory viral testing (influenza, respiratory syncytial virus) on ambulatory patients managed as outpatients.
- Do not routinely obtain CBC, CRP, ESR, or procalcitonin levels on well-appearing, fully vaccinated febrile children without a source. ✶

Many emergency physicians believe that, in the end, ACEP chose wisely – if a bit conservatively – and the committees should be applauded for taking this on, given the pressure from many sides. Adapting *Choosing Wisely* is a step in the right direction. But, for now, in order to save our patients from the most unnecessary tests, treatments, and wasteful costs, it is up to us as individual emergency physicians to take the next step. Let's **Choose Aggressively**.

Intubating the Hemodynamically Unstable Patient

How do you optimize the hemodynamic parameters with an unstable patient before, during, and after intubation?

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A 52-year-old man presents with fever, altered mental status, and respiratory distress. After 10 minutes of initial resuscitation, his vitals are: HR 160 BPM with frequent PVCs, RR 40, blood pressure (BP) 70/30 mmHg, Temp 39°C oral, Sat 85% on non-rebreather. He is in continued respiratory distress with accessory muscle use and his mental status has not improved. The decision is made to intubate.

Physiologic changes of mechanical ventilation

This patient is already volume-depleted upon arrival due to his prolonged tachypnea and increased minute ventilation. Optimization of his hemodynamics includes volume resuscitation. After intubation and initiation of mechanical ventilation, patients rapidly switch from negative to positive intrathoracic pressure, with a resultant decrease in venous return to the heart. This will exacerbate hypotension.[1] The clinician must anticipate this decompensation and take steps to both avoid it and treat it if it occurs. **Before moving from spontaneous ventilation to positive pressure ventilation (whether CPAP, BiPAP, or mechanical ventilation), adequate intravenous access should be established and 500-1000cc of volume made ready to infuse rapidly under pressure to compensate for intrathoracic pressure shifts.**

Poor ventricular filling

Older adults do not tolerate rapid tachydysrhythmias as well as younger patients. This is particularly true in patients with re-entrant tachycardias (PSVT) or atrial fibrillation, where the rate can exceed the sinus physiologic maximum heart rate. Additionally, atrial fibrillation/flutter and ventricular tachycardias do not allow for the atrial "kick" to fully fill the ventricle during diastole. Functionally, this results in hypovolemic hypotension.

Coronary perfusion

Coronary perfusion occurs during diastole,[2] and the lower limit of coronary autoregulation can occur at a diastolic BP of 30 mmHg.[3] In the patient scenario, the BP of 70/30 mmHg suggests that this patient cannot tolerate a lower BP and still maintain adequate coronary perfusion. The frequent PVCs may be a sign of cardiac irritability, resulting from poor coronary perfusion.[4] **If volume resuscitation alone does not improve the diastolic BP to greater than 30 mmHg,[3] additional vasopressors can be given in small boluses to increase coronary backfilling, both before and during the peri-intubation period.** Phenylephrine, an alpha-1 agonist, can be

given in 100 mcg IV aliquots every few minutes to increase the BP and improve peri-intubation hemodynamics.[5,6] **Before rapid sequence intubation (RSI), have a vasopressor drip hung in-line on a pump and ready to start after intubation.**

Hemodynamic monitoring

In the unstable patient, emergency physicians are fast to place central access but often reticent to place arterial lines, often with good reason. In the hypotensive patient, radial arterial catheters are difficult to place. Femoral arterial lines are often reserved for those "who really need it." Axillary arterial lines are technically challenging, and brachial arterial lines should be avoided given the lack of collateral vasculature. **Options for invasive hemodynamic monitoring include sterile ultrasound-guided arterial lines, or placement in the immediate "post vasopressor push" period, during the temporary increase in BP.**

The benefit of arterial waveform monitoring is knowing the systolic BP variation. Large variations in the height of the systolic pressure wave with respiration suggest a greater preload dependence of the stroke volume and suggest volume responsiveness of the patient's BP.[7,8,9] In addition, arterial lines allow precise and frequent hemodynamic monitoring. The importance of this cannot be overstated in traumatic brain injury, spontaneous intraparenchymal hemorrhage, or aortic dissection, in which even transient elevations or depressions of the BP can have significant consequences. Remember, automatic BP cuffs are not accurate at low BPs, and so manual checks should be performed. If the decision is made to not pursue invasive arterial monitoring, or it is technically unsuccessful, then frequent BP checks every few minutes should be performed.

Induction and paralysis

All induction agents have the potential to worsen hypotension in the hemodynamically unstable patient because they remove the patient's endogenous catecholamine drive, both indirectly through amnesia, and directly by blunting the sympathetic response.

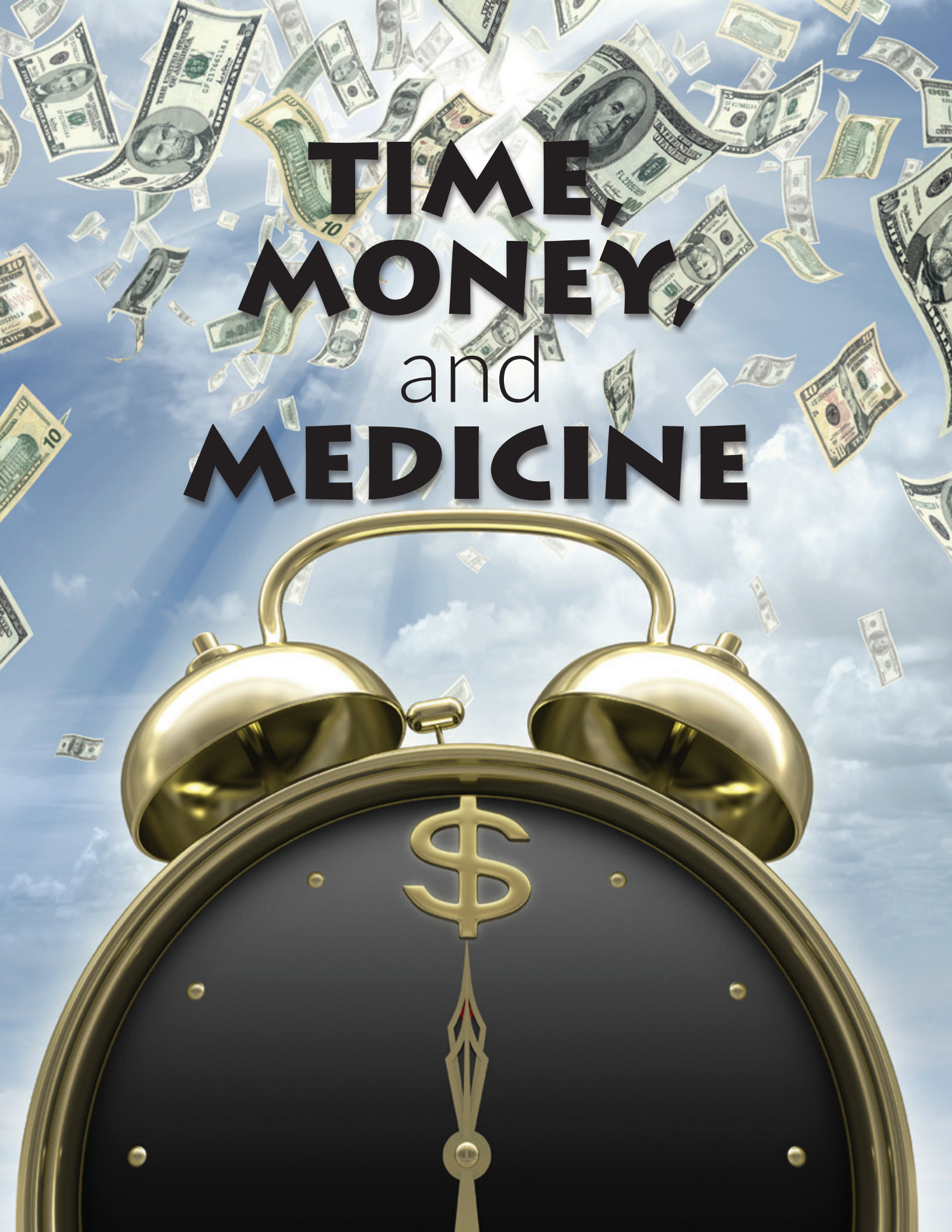
Etomidate is traditionally considered the most hemodynamically stable agent; standard induction dosing is 0.3 mg/kg IV, but smaller doses may be adequate in the hemodynamically unstable patient.[10] **Ketamine is increasingly being used for induction in the hypotensive patient, due to its cardiovascular stimulant effects, which may help to augment the BP. In addition, it has additional intrinsic analgesic properties.**[11] Other induction agents, such as propofol, barbiturates, and benzodiazepines, have more profound cardiodepressant – and, thus, hypotensive – effects. Potential worsening of hypotension may be combated by altering the dose of the induction agent used. Paralytics should be dosed higher in the hypotensive patient due to poor perfusion. Succinylcholine at 2 mg/kg IV or rocuronium at 1.6 mg/kg IV is recommended.[12]

Case closure and summary

The patient received aggressive fluid resuscitation with 2 liters of normal saline over 15 minutes. Push dose phenylephrine was given, resulting in a pre-RSI BP of 110/70 mmHg. After intubation, the patient had continued hypotension and was started on a norepinephrine drip and transferred to the ICU for further management.

After intubation and initiation of mechanical ventilation, patients rapidly switch from negative to positive intrathoracic pressure, with a resultant decrease venous return to the heart.

In summary, invasive hemodynamic monitoring with an arterial line should be considered in the hypotensive patient about to undergo induction and intubation. The clinician should pre-medicate the patient with aggressive fluid resuscitation, followed by push dose vasopressors (such as phenylephrine 100 mcg IV) as needed to achieve adequate coronary perfusion with a diastolic BP above 30 mmHg. Ketamine or etomidate should be considered for induction with increased paralytic doses. A fall in BP post-induction should be anticipated with a vasopressor drip at the ready. ✶


TIME,
MONEY,
and
MEDICINE

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University of Toledo
Toledo, OH

There will be a time when knowing how to bill patients appropriately may become integral to keeping your job, paying back loans, or maintaining your standard of living.

What You DIDN'T Learn about Critical Care in Residency

Can you imagine the conversation you'll have with the billing staff after taking your first attending position? It might go something like: "So you went to a residency program at a Level 1 trauma center and did several ICU months? Great, then you must know about critical care billing. Oh, you *don't* – why not?"

While we receive great *medical* training in critical care situations, the oft-overlooked aspect of critical care billing is one that needs more attention during residency. **Significant revenue can come from the proper billing**. (You did the work; you should get paid for it!) The Centers for Medicare and Medicaid Services (CMS) has very clear guidelines for critical care billing, and while a thorough review might take pages, some basic points might provide large dividends in increasing remuneration for services we provide as physicians. It may even help to keep you out of hot water with the reimbursement department.

What is it?

While some may know little, and a few might know a lot, most residents and physicians have somewhat limited knowledge of what critical care actually encompasses. **Here is CMS' cut-and-dried definition**:

"*Critical care is defined as the direct delivery by a physician(s) or medical care for a critically ill or critically injured patient. A critical illness or injury acutely impairs one or more vital organ systems such that there is a high probability of imminent or life-threatening deterioration in the patient's condition. Critical care involves high complexity decision making to assess, manipulate, and support vital system functions(s) to treat single or multiple vital organ system failure and/or to prevent further life-threatening deterioration of the patient's condition.*"[1,2]

This definition is notably quite broad and can be applied to many different types of patients. Mentioned specifically is that **even if there is "high probability" that deterioration may occur, critical care time can be billed**. That means your patient may be sitting up and talking to you, but that warfarin-fed subdural represents a threat to the life of your patient; time spent managing it counts toward critical care time.

Check the box! Get paid!

You just finished a critical case that backed up your ED…

A 103-year-old woman from a nursing home who is on 23 medications and has 34 diagnoses came in septic and lethargic; she coded as soon as EMS walked in the door. You intubated her, ran her through ACLS, ordered pressors, and placed a central line. You spent the next part of your day seeing other patients while juggling the time to see her family, call the ICU, and interpret all of her lab results, films, and EKG. Oh yeah, and you documented it all like you were an auditor for CMS.

This all represents time well-spent, a patient saved, and should translate to money well-earned. In most instances, your staff medical billers can infer what should have been billed based on your documentation, and can up-code and down-code if the documentation is there to support it. However, this does NOT apply to critical care time. **Unless you designate that you provided critical care time, it won't get reimbursed as such.** So check that box; dictate your critical care time or make a note of it in the chart. Unless you specify *critical care* was provided, no one will fill in that blank for you.

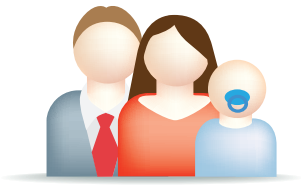
Overall time spent with the patient is important to take into consideration. Let's say you spent a total of 25 minutes directing the code and managing the patient. While you may be speedy and extremely effective, the lower limit of 30 minutes of critical care time required for reimbursement means that you're not going to get reimbursed at the higher level for this patient. CMS states that at least 30 minutes of time must be spent on a singular patient on any given day to receive payment for critical care time.

To be clear, it is the aggregate of your time that counts; you do not have to spend 30 minutes of uninterrupted care for that patient. You can see three other patients, then spend 10 minutes interpreting lab results from your critical patient. The 12 minutes you spent discussing the patient with family, the 14 minutes spent documenting in the patient's chart, and the three minutes on the phone with the ICU all count toward your 30-minute minimum of critical care time with this patient.

continued on page 44

IMPORTANT TO REMEMBER

FAMILY TIME



Time with family can only be billed as critical care time if the patient is incapacitated/incompetent or is rapidly deteriorating and you need the family to help with history or make medical decisions regarding treatment. It doesn't matter how much time you spend with the family if they are not participating in the care of the patient in some manner. Time over the phone can count if the other requirements are met.

CPR

CPR is critical to the life of your patient. You might assume that it would count toward "critical care," when, in fact, it does not. CPR is actually a separate code, which in and of itself pays quite well. You would be doing yourself, your group, and your coders a great service by including this in your documentation and diagnoses section. Remember to state the amount of CPR time spent, and exclude it from the amount of *critical care* time you spent.

PRE-HOSPITAL

EMS spent 15 minutes performing CPR en route and started pressors on a ROSC patient. You can't bill for that time. The main reason is that you were not immediately available to the patient; therefore, this treatment falls outside the CMS requirements.

OTHER PROCEDURES

Some procedures and work cannot be billed separately and are "bundled" into critical care time. These include any blood draws, peripheral IV placement, ventilator management, pulse oximetry or blood gas interpretation, reading chest x-rays, transcutaneous pacing, and NG placement. Chest tubes, intubations, central line placement, EKG interpretation, and fracture care (among other things) can all be billed separately. Simply stated, if you are performing a procedure not included in the "bundle," you can probably bill for it separately.

RESIDENTS AND MID-LEVEL PROVIDERS

Residents are not eligible to bill for critical care time, as per CMS regulations. It must be an attending provider who is immediately available to the patient. Physician assistants and nurse practitioners may bill for critical care time if the guidelines are appropriately met, but this prevents overseeing physicians from billing for the same critical care time.

Now, you may not have to be at the bedside for 30 minutes, but **CMS states that you must be immediately available to the patient**. This is usually not a problem in the ED, but it may apply in a more direct manner to an ICU or floor attending who is changing pressors or dosages on a patient from his cell phone or office.

What *doesn't* count?

By billing for some procedures separately from critical care time, you can increase both personal and hospital revenue, as well as avoid decreases in payment for including procedures that cannot be included in critical care time. Provide a statement in your documentation that explains that *total* time spent on critical procedures was separate from the time billed for critical care; this can boost reimbursement and help ensure bulletproof documentation.

RVUs

Most of us in our professional post-residency careers will have revenue valuation units (RVUs) as part of our pay scheme. Some groups are strictly RVU-based, and others use RVUs either as a calculation for partial payment, or as a bonus. The highest RVU reimbursement comes from critical care time between 30-74 minutes (4.5 RVUs). Critical care time in 30-minute blocks beyond 74 minutes gives 2.25 RVUs. CMS allows you to "round up" for the last 30-minute block, as long as you hit the 15-minute mark. Again, you specifically have to ask for and document these codes.[3]

Conclusion

On its face, billing may seem unimportant to residents and medical students; during training, it easily becomes secondary to learning how to medically care for patients. But there will be a time when knowing how to bill patients appropriately for your services, especially critical care time, may become integral to keeping your job, paying back loans, or maintaining your standard of living. By considering and beginning to implement proper documentation techniques now, you will be better prepared for the transition to attending physician. ✶

CASE 1

The patient

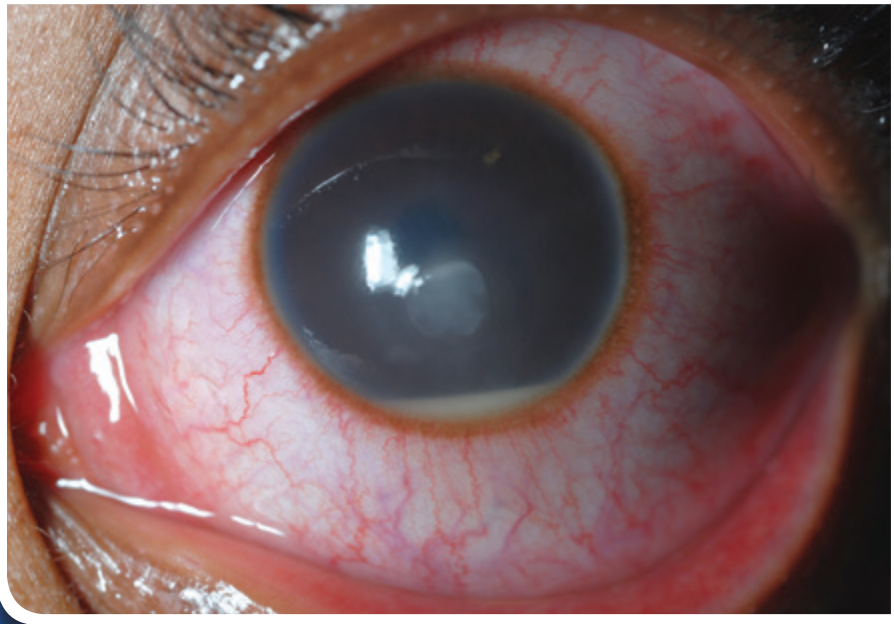
An 11-year-old female presents to the emergency department one day after being hit in the eye with an air soft pellet. She complains of pain, redness, and an abnormally shaped pupil. Visual acuity is 20/30 in affected eye. Extraocular movements are intact, and her examination is remarkable for the findings seen in the image provided.

What's the diagnosis?

What's the Diagnosis?

In this edition, we bring you two relatively common but easily confused ophthalmologic emergencies. Can you remember which is which? Images and case scenarios were provided by Drs. Larry Stack and Jason Thurman from Vanderbilt University, authors of the popular *Atlas of Emergency Medicine*.

ANSWERS ON PAGE 46



CASE 2

The patient

A 24-year-old female presents to the emergency department with severe eye pain, photophobia, and tearing. She has difficulty opening the eye secondary to pain, but when the eye is open she complains of markedly blurred vision and intense photophobia. Her vital signs are normal, and visual acuity is markedly decreased in the affected eye. Her physical examination findings are shown in the image provided. She states that she left her contact lenses in for a few days without removing them but took them out this morning due to the worsening of her pain.

What's the diagnosis?

WHAT'S YOUR DIAGNOSIS? ANSWERS

CASE 1 HYPHEMA

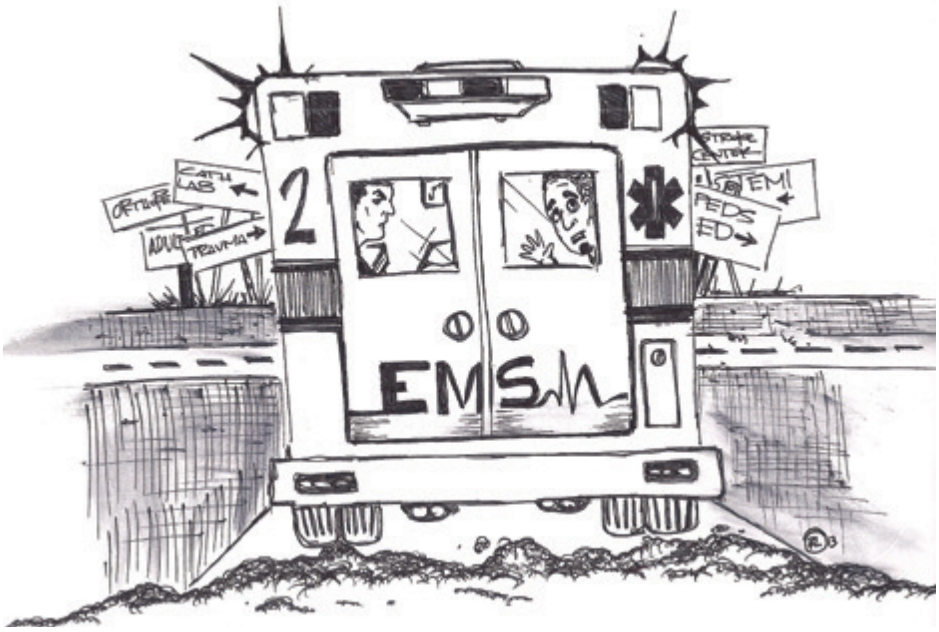
Diagnosis

The clinical findings in this patient are constant with a traumatic hyphema, which is blood in the anterior chamber due to an injury to an iris vessel. The irregularly shaped pupil should prompt suspicion for an open globe. Hyphemas may be described by the percentage of the anterior chamber filled with blood. "Eight-ball" hyphema is a term descriptive for blood filling the entire anterior chamber. Microscopic hyphemas may be seen before the blood has layered out or if the patient is supine, and may appear as a subtle difference in iris color compared to the unaffected eye. Increased intraocular pressure is a complication of hyphema and occurs when blood blocks the aqueous outflow through the trabecular meshwork. All hyphemas require ophthalmological consultation and most can be managed conservatively with rest, head elevation, antiemetics, and the avoidance of antiplatelet agents and anticoagulants. Sickle cell patients, patients with diabetes, previous eye surgery, coagulopathies, and hemoglobinopathies are at risk for spontaneous hyphemas.

CASE 2 HYPOPYON

Diagnosis

The patient has a central corneal ulcer with hypopyon, a thin layering of white blood cells in the anterior chamber of the eye. Also seen in the image are an intense ciliary flush and a hazy cornea. When a hypopyon is identified, the cause must be established to ensure there is no immediate eyesight-threatening cause. The most common cause of a hypopyon seen in the emergency department is a corneal ulcer. Other causes include post-operative complications, endophthalmitis, sarcoidosis, metastatic tumors, Beçhet disease, and other inflammatory conditions. Corneal ulcers are a potentially sight-threatening condition, and emergent ophthalmological consultation is required. Topical fortified antibiotic treatment is the typical treatment, along with cycloplegic agents and pain control.



SUBMIT A LETTER TO THE EDITOR ▶

EM Resident welcomes and encourages letters to the editor submitted to emresidenteditor@emra.org.

We reserve the right to edit all letters for accuracy, taste and grammar, and/or to refuse or condense letters for space purposes.

YPS-EMRA Call for Posters

for the

ACEP Leadership and Advocacy Conference

May 18, 2014

Washington, DC

Young Physician Section and EMRA

Abstracts will be accepted until April 11, 2014

Presenters will be notified by April 18, 2014

Questions, more information, and abstract submissions should be sent to **academicaffairs@acep.org**

Calling all SimWarriors!

We are recruiting teams to compete in the **EMRA Resident SimWars Competition**, which will be held on May 14 at the SAEM Annual Meeting in Dallas. The purpose of the competition is to allow residencies from various institutions to demonstrate their skills in teamwork and communication during the management of simulated cases in front of a **LIVE AUDIENCE**.

Application Deadline
March 10, 2014

Each team will consist of four residents from the same residency program. **We recommend one senior resident at the minimum.**

If your residency program would like to compete, please submit entries to simwars@gmail.com and include the following information: 1) Name of your residency, 2) Program director, 3) Team member's names and PGY year, and 4) Email addresses for all team members.

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BOARD REVIEW+ QUESTIONS

For a complete reference and answer explanation for the questions below, please visit www.emra.org.

Provided by PEER VIII. *PEER (Physician's Evaluation and Educational Review in Emergency Medicine)* is ACEP's Gold Standard in self-assessment and educational review. These questions are from the latest edition of *PEER–PEER VIII, which made its debut at ACEP's 2011 Scientific Assembly.* To learn more about PEER VIII or to order it, go to www.acep.org/bookstore.

1. In a well-appearing 32-year-old man who presents with crampy abdominal pain and diarrhea of 5 days' duration, which of the following is the preferred management approach?
   - A. Empiric antibiotic therapy, laboratory tests, and CT scan
   - B. Laboratory tests, empiric antibiotic therapy, and intravenous fluids
   - C. Oral rehydration and symptomatic outpatient therapy
   - D. Oral rehydration, laboratory tests, and empiric antibiotic therapy

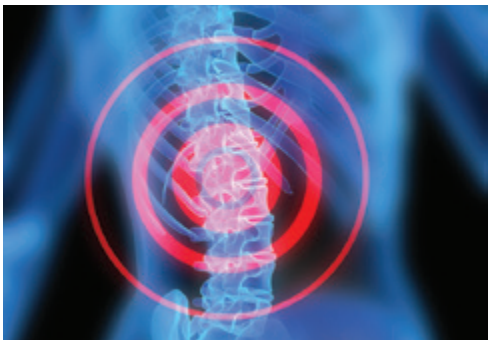
2. Which of the following findings significantly increases the pretest probability of appendicitis?
   - A. Anorexia and nausea
   - B. Right lower quadrant pain
   - C. Temperature higher than 38°C (100.4°F)
   - D. WBC count greater than 10,000/mcL

3. Which of the following statements regarding laryngeal trauma is correct?
   - A. Calcification of the laryngeal cartilages is incomplete in pediatric patients
   - B. CT is equally reliable in adult and pediatric patients
   - C. Immediate airway compromise is a distinguishing feature
   - D. Pain with tongue movement localizes trauma to the larynx

4. Which of the following statements regarding deep vein thrombosis is correct?
   - A. Most calf vein thrombi extend into the proximal deep veins, usually within a week after presentation
   - B. Most patients have classic physical examination findings
   - C. Pregnancy is a predictor according to the Wells criteria
   - D. Up to 10% to 15% of calf vein thrombi result in pulmonary embolism

5. Which of the following is appropriate for outpatient treatment of community-acquired pneumonia in a previously healthy adult?
   - A. Azithromycin
   - B. Ceftriaxone
   - C. Ciprofloxacin
   - D. Vancomycin

Answers
1. C 2. B 3. A 4. D 5. A



RISK MANAGEMENT PITFALLS
LOW BACK PAIN MANAGEMENT

EB MEDICINE
Improving Patient Care

From the July 2013 issue of *Emergency Medicine Practice*, "An Evidence-Based Approach to the Evaluation and Treatment of Low Back Pain in the Emergency Department." Reprinted with permission. To access your EMRA member benefit of free online access to all *EM Practice*, *Pediatric EM Practice*, and *EM Practice Guidelines Update* issues, go to www.ebmedicine.net/emra, call 1-800-249-5770, or email ebm@ebmedicine.net.

1. **"I didn't realize that he had a prior history of melanoma that was resected 2 years ago."**
Red flag signs, symptoms, and history are essential in the management of these patients. While some of these syndromes (eg, cauda equina syndrome, epidural abscess) are uncommon in the general population, they become a real possibility in the patient with metastatic cancer or in the patient who injects drugs.

2. **"My 70-year-old male patient with back pain had syncope in the waiting room and was rushed to the trauma bay. I thought the systolic pressure of 70 mm Hg was just an error, as the repeat was 120 mm Hg."**
More thought needs to be given to older patients with back pain, as their symptoms may be arising not from typical muscular/discogenic/degenerative joint disease sources; they may be harboring a leaking abdominal aortic aneurysm or metastatic cancer. Consider systemic symptoms such as weight loss, fever, abdominal pain, and syncope as well as risk for peripheral vascular disease.

3. **"I remember seeing this patient 4 times this past year for toothache and headache. Now he has back pain! He does have a fever this time though, very clever!"**
Even patients who are drug-seeking have real back pain. Some patients who inject drugs have infections that are the cause of this pain. There is no single laboratory test or examination finding that will rule out vertebral osteomyelitis or discitis.

4. **"The patient in bay 3 status post motor vehicle collision looks familiar. Oh yes, I just saw him for low back pain."**
The medications prescribed for back pain can cause sedation; especially muscle relaxants in combination with opioids. Be sure to remind patients that they should not drive or perform dangerous tasks while using them.

5. **"While I was waiting for the patient to be discharged, he had a tonic-clonic seizure."**
Know the side effects of the medications that you prescribe. Tramadol can decrease the seizure threshold and should not be used in patients who are at risk for seizure.

6. **"The patient told me he has had back pain and urinated on himself. I was very concerned and transferred him for emergency MRI. The MRI was normal, and I don't understand why."**
Overflow incontinence and urinary retention are worrisome findings and do require emergent evaluation. However, sometimes patients just cannot make it to the bathroom because of back pain and physical limitations. Determining the cause of incontinence and assessing for postvoid residuals will improve imaging utilization.

7. **"The patient was just seen by the pain management specialist and had an epidural steroid injection yesterday. He is here again with back pain, and he cannot walk. He seems weak in his legs, but that's just pain."**
Patients who are status postprocedure are at increased risk for developing complications that include epidural hematoma and spinal infection. These patients need imaging if they have new neurologic findings.

8. **"This patient has new paraspinal back pain and atrial fibrillation and is on warfarin. He has a hematocrit of 25, down 10 points, and is guaiac negative. His international normalized ratio is 4.8. His neurologic examination is unrevealing. I am going to send him home."**
Be more vigilant in patients with other medical problems who are on medications that cause bleeding. This patient could return to the ED after a syncopal episode and have a retroperitoneal hemorrhage.

9. **"I just saw a 36-weeks' pregnant female with paraspinal/flank pain and mild nausea. I evaluated her baby with bedside ultrasound, and things seemed normal. I planned to discharge her, but then I found she had a fever of 38.3°C."**
While back pain and sciatica are common in pregnancy, you should consider other causes in your differential. This patient could also have a urinary tract infection.

10. **"I should have thought of other causes of urinary retention in this 67-year-old male patient before placing the catheter and sending him home for urology follow-up."**
Advanced age is a red flag sign; instead of benign prostatic hyperplasia with back pain, he could have had prostate cancer with spinal metastasis and cauda equina syndrome. ✶

RISK MANAGEMENT PITFALLS

PEDIATRIC HEADACHE MANAGEMENT

EB MEDICINE Improving Patient Care — An Evidence-Based Review

From the July 2013 issue of *Pediatric Emergency Medicine Practice*, "Management of Headache in the Pediatric Emergency Department." Reprinted with permission. To access your EMRA member benefit of free online access to all EM Practice, Pediatric EM Practice, and EM Practice Guidelines Update issues, go to www.ebmedicine.net/emra, call 1-800-249-5770, or email ebm@ebmedicine.net.

1. **"I thought the teenager with unilateral facial numbness was having an atypical migraine, so I sent her home with a triptan and told her to follow up with her pediatrician."**
   Careful history-taking and thorough neurological examination can help make the correct diagnosis. A high index of suspicion is needed to avoid missing a secondary headache. Remember that primary headaches are diagnoses of exclusion.

2. **"The patient was really sick and I didn't want to sterilize the cultures, so I made sure to perform the lumbar puncture before giving antibiotics."**
   When faced with a decompensating patient with possible meningitis, do not delay the administration of life-saving antibiotics. Lumbar puncture is meant to aid in diagnosis; if you already know the treatment is needed urgently, do not wait.

3. **"The patient has a history of multiple concussions, so I figured his progressively worsening headache was just part of a posttraumatic headache."**
   Concussions and previous head injuries can be challenging to manage, but it is important to recognize acute on chronic changes or progression of symptoms as possible clues to more ominous pathology such as intracranial hemorrhage or venous thrombosis.

4. **"The patient was only 13, so I didn't bother to check a urine pregnancy test."**
   Among female adolescents who are of childbearing age, eclampsia must be considered until pregnancy has been ruled out. In addition, some migraine medications, such as triptans and DHE, are contraindicated or discouraged in pregnancy. Urine pregnancy tests are inexpensive, readily available in the ED, and generally more reliable than the average teenager.

5. **"The patient has had the same headache for 2 months, so I got a head CT to find out why."**
   Chronic headaches without progression of symptoms or other red flags do not always require emergent head imaging. In fact, an MRI (which can be arranged as an outpatient) may provide a more thorough evaluation and avoid unnecessary exposure to ionizing radiation.

6. **"He said he gets sinus headaches all the time, so I gave him a prescription for amoxicillin and sent him on his way."**
   Sinusitis can cause headache; however, these patients are more likely to suffer from under-recognized primary headaches such as migraines and tension-type headaches. Judicious use of antibiotics is necessary to prevent resistance, and diagnosis-specific medications are important to address the pain.

7. **"The patient was in so much pain, I had to give him additional doses of morphine."**
   Narcotics play little role in the management of headaches and no role in the management of primary headaches. They may provide a quick fix, but this effect is fleeting and is typically followed by rebound headaches that have been recognized as medication overuse headaches.

8. **"He kept saying his headaches bothered him the most in the mornings – I thought he just didn't want to go to school."**
   Early-morning headache is a red flag for an intracranial space-occupying lesion. A thorough history and physical examination should help differentiate this worrisome secondary headache from behavioral misconduct. Beware of drawing such conclusions before life-threatening pathology has been effectively ruled out.

9. **"She had papilledema on examination after a fall from a 3-story window, so I ordered an MRI right away."**
   A good fundoscopic examination should be performed on every patient. Since papilledema may suggest increased intracranial pressure, it is important to remember that timeliness is key. Even if MRI is available, if you have concern for an acute bleed with potential for rapid decompensation, CT would be your imaging modality of choice.

10. **"This was her third visit to the ED with status migrainosus in the last 2 months, so I started her on cyproheptadine to prevent a fourth visit."**
    Evidence for use of migraine prophylaxis in children is poor. If indicated, migraine prophylaxis should be administered by the patient's medical home (primary care provider or neurologist) with a plan in place for good follow-up care. Lack of follow-up when starting chronic medications may lead to medication overuse or hazardous, unchecked medication side effects. ✶

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Resources

Climate 911: www.climate911.org
Climate and Health Alliance:
Collaborative on Health and the Environment: www.healthandenvironment.org
Environmental Working Group: www.ewg.org
Health Care Without Harm: www.noharm.org
Healthier Hospitals Initiative: www.healthierhospitals.org
National Institute Environmental Health Sciences: www.niehs.nih.gov
Physicians for Social Responsibility: www.psr.org
US Climate & Health Alliance: climatehealthconnect.org/usclimatehealthalliance

LANDMARK – GUEST FEATURE (P. 24)

Post-Cardiac Arrest Therapeutic Hypothermia in 2014

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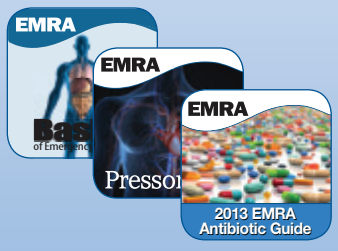

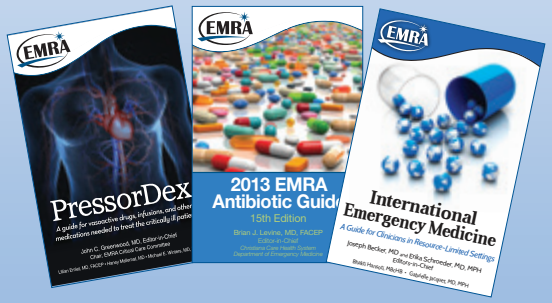

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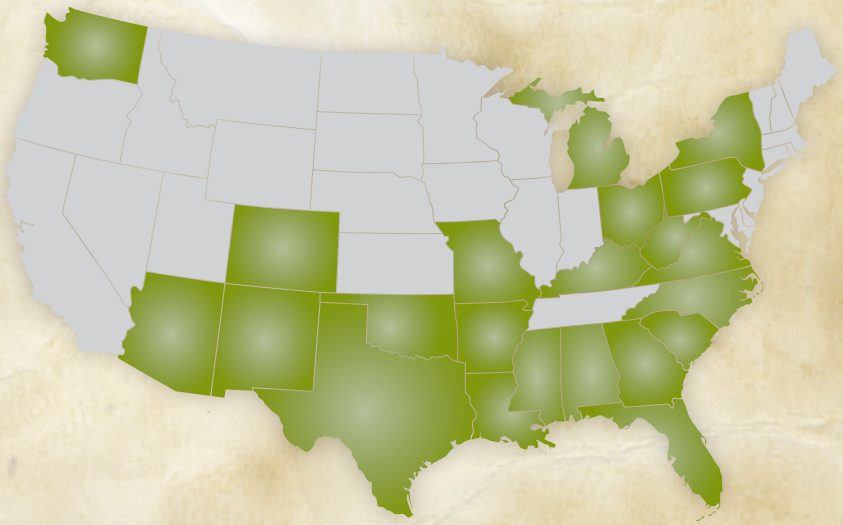

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Various Cities: HPP was recently awarded a number of EM contracts in Mississippi in addition to our existing partnerships. As a result, we have immediate Full and Part Time Emergency Physician opportunities in Biloxi, Jackson, Brandon, Amory, Canton, Natchez, Clarksdale, Batesville, Columbus, Booneville and Oxford. Our facilities offer diverse patient populations and ED volume ranges from 16K – 59K+. Enjoy hourly pay rates in the $170-$240 range along with relocation and sign-on bonuses! Must be BC/BP in EM. What's Important To You...Is What Matters To Us! ® Excellent compensation, free & discounted CME, paid malpractice with tail and flexible scheduling. Contact Christina Plain: (800) 815-8377 ext. 5295; email cplain@hppartners.com or visit www.hppartners.com.

NEBRASKA

Omaha: BP/BC EM physician sought for 2014 opening with stable group. Enjoy the exceptional benefits of working within a regional group with a very appealing model. Premier Physician Services is an equity-ownership where physicians share in both the profits and the decisions. Our mid-sized group offers the flexibility and access of independent groups without sacrificing the financial stability of larger groups. Premier's excellent package includes guaranteed rate plus family medical, employer-funded pension, expense account, incentive and shareholder status with no buy-in. As Nebraska's largest city and a leader on "top cities to live in" lists, Omaha provides both metropolitan amenities and Midwestern charm. Home to several Fortune 500 companies, Omaha offers the U.S.'s largest community theatre, 11 colleges and universities and a world famous zoo. With its rich jazz history and reputation as the heart of the Midwest, there is also great cultural appeal. Contact Rachel Klockow, (800) 406-8118, rklockow@premierdocs.com.

NEVADA

Las Vegas: Full time opportunities for Pediatric Emergency Medicine Physicians. Children's Hospital of Nevada at UMC is the main teaching hospital of the University of Nevada School of Medicine and serves as the region's only Pediatric Trauma Center and Burn Center. Our 20 bed department cares for 33,000 pediatric patients annually. There is excellent sub-specialty coverage with 24

hour in-house intensivist coverage and a level 3 NICU. EMP is an exclusively physician owned/managed group with open books, equal voting, equal profit sharing, equity ownership, funded pension, comprehensive benefits and more. Please contact Bernhard Beltran at 800.359.9117 or e-mail bbeltran@emp.com

NEW HAMPSHIRE

Exeter: Exeter Hospital is in a beautiful area less than an hour from Boston. This respected facility has 100 beds and provides a broad range of services with a medical staff of 200, treating 35,000 emergency patients annually and making up a broad mix of pathology. Outstanding partnership opportunity includes performance pay, equal equity ownership, funded pension, open books, comprehensive benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

NEW JERSEY

Residents looking for academic opportunity in great location in New Jersey will want to contact us about staff positions in this Level I Trauma Center. This excellent hospital has a residency and fellowship program & volume of 70,000 annual patient visits. There is a separate Pediatric ED and toxicology service. In addition to clinical services you will teach residents/PAs/medical students as well as do research. This is an excellent opportunity with an Affirmative Action/Equal Opportunity employer that offers great benefits and a very competitive compensation package. For full details, contact Daniel Stern at Daniel Stern & Associates 800-438-2476 or sternd@danielstern.com.

NEW MEXICO

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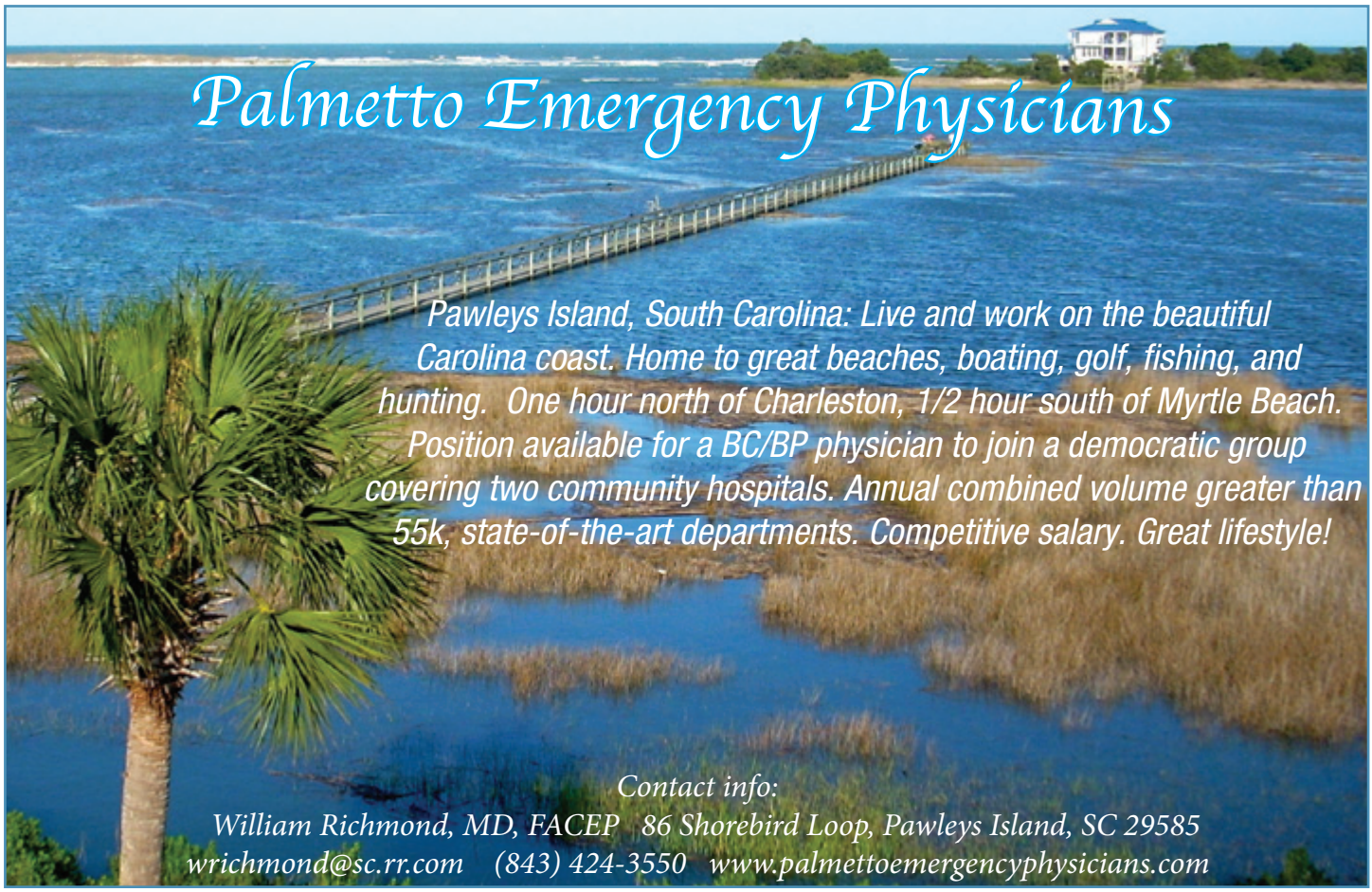
Albuquerque: Come earn $170-$250 per hour at "One of the Best Places to Work in Healthcare." Emergency Physician opportunities are available at the Lovelace Health System in beautiful Albuquerque. Three Hospital System with ED volumes ranging from 3K-34K. These are long term, stable contracts with a strong leadership team. Must be BC/BP in EM with EM Residency Required. Enjoy flexible scheduling, paid malpractice with tail and free & discounted CME. Contact Nicole Pletan: (877) 278-2056; email npletan@hppartners.com or visit www.hppartners.com.

NEW YORK

Albany area: Albany Memorial Hospital has a newer ED that sees 46,000 pts/yr. and hosts EM resident rotations. Samaritan Hospital in Troy is a respected community hospital, minutes from Albany, which also treats 46,000 ED pts/yr. Outstanding partnership opportunity includes equal profit sharing, equity ownership, funded pension, open books, full benefits and more. Contact Ann Benson, (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd, NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.



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Cortland: Cortland Regional Medical Center is a modern, full-service facility situated in the Finger Lakes Region between Syracuse and Ithaca. A broad mix of pathology makes up 33,000 ED pts/yr., and there is strong support from medical staff and administration. Outstanding partnership opportunity includes equal profit sharing, equity ownership, funded pension, open books, full benefits and more. Contact Ann Benson, (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd, NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Long Island: Brookhaven Memorial Hospital Medical Center is in Patchogue on the southern shore of Long Island and sees 72,000 ED pts/yr. Outstanding partnership opportunity includes equal profit sharing, equity ownership, funded pension, open books, full benefits and more. Contact Ann Benson, (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd, NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

NORTH CAROLINA

Gastonia/Charlotte: CaroMont Regional Medical Center is situated less than 20 miles west of Charlotte in Gastonia. This modern, full-service facility sees 100,000+ emergency pts./yr. and is a Trauma Center, Stroke Center and Cardiac Center. EMP is an exclusively physician owned/managed group with open books, equal voting, equal equity ownership, funded pension, comprehensive benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Charlotte: EMP is partnered with eight community hospitals and free-standing EDs in Charlotte, Lincolnton, Pineville and Statesville. A variety of opportunities are available in urban, suburban and smaller town settings with EDs seeing 10,000 – 79,000+ pts./yr. EMP is an exclusively physician owned/managed group with open books, equal voting, equal equity ownership, funded pension, comprehensive benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Morehead City: Modern community hospital on the Atlantic coast minutes from Atlantic Beach! This 135-bed facility sees 40,000 emergency pts./yr. and is active in EMS. Outstanding partnership opportunity includes equal profit sharing, equity ownership, funded pension, open books, full benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

New Bern: Respected 313-bed regional medical center located at the intersection of the Trent and Neuse Rivers just off the central coast, 73,000 ED pts./yr. Outstanding partnership opportunity includes equal profit sharing, equity ownership, funded pension, open books, full benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

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OHIO

Columbus: Choose from two very appealing Columbus locations. Grady Memorial Hospital and Memorial Union Hospital are located in the north Columbus suburbs of Delaware and Marysville. Volumes are 27,000 and 21,000 with MLP support. Both opportunities offer physicians the exceptional benefits of working within a regional group with a very appealing model. Premier Physician Services is an equity-ownership where physicians share in both the profits and the decisions. Our mid-sized group offers the flexibility and access of independent groups without sacrificing the financial stability of larger groups. Package includes great benefits including family medical plan, employer-funded pension, CME/ expense account, and shareholder status in one year with no buy-in. For additional information contact Amy Spegal, Premier Physician Services, (800)726-3627, ext 3682, e-mail aspegal@premierdocs.com, fax (937)312-3683.

Cincinnati: Mercy West opened in November, 2013 as a 250-bed hospital with an anticipated ED volume of 50,000-60,000. Located in the western suburbs, this will be a state-of-the-art facility with great opportunities for BP/BC EM physicians. Premier Physician Services provides an outstanding model offering equity-ownership at one year with no buy-in; giving you a voice and ownership in your company. Excellent package includes guaranteed rate plus additional incentives, family medical plan, employer-funded pension, CME/expense account and additional benefits. For additional information contact Amy Spegal, Premier Physician Services, (800)726-3627, ext. 3682, e-mail aspegal@premierdocs.com, fax (937) 312-3683.

Concord, Madison and Willoughby: Lake Health is situated in the eastern Cleveland Suburbs. TriPoint Medical Center was built in 2009 and treats 31,000 emergency pts./yr. The Madison Medical Campus hosts a freestanding ED seeing 12,000 pts./yr. West Medical Center is a state-of-the-art acute care hospital serving 37,000 ED pts./yr. Outstanding partnership opportunity includes weekend shift differential, performance pay, equal equity ownership, equal voting, funded pension, open books, comprehensive benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Dayton: Enjoy the advantage of working within an EM group offering a voice, a financial share, and the opportunity to make a difference in your company. Premier Physician Services offers the stability of a guaranteed package, along with the reward of equity-ownership. Very appealing model offers shareholder status at one year with no buy-in; an excellent package with guaranteed rate, additional incentive, family medical plan, employer-funded pension, malpractice, expense account & additional benefits. Premier also offers the opportunity to elect alternate options and receive additional compensation. This is a 40,000 volume ED in a north Dayton suburb with 9-hour shifts, collegial environment and an outstanding physical plant. For additional information contact Greg Felder, Premier Physician Services, (800) 726-3627, ext 3670, e-mail gfelder@premierdocs.com, fax CV (937)312-3671.

Lima: Meet your financial AND practice goals. Named among Top 100 Hospitals, this 57,000 volume, level II ED completed an expansive, state-of-the art renovation in 2012. Excellent coverage and terrific package with productivity-based compensation plus employer-funded pension, family medical, CME, shareholder opportunity, malpractice and significant sign-on bonus. Contact Greg Felder, Premier Physician Services, (800) 726-3627, ext 3670, e-mail gfelder@premierdocs.com, fax CV (937)312-3671.

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- # 1 in New York State and # 3 Nationally for Cardiac Care – CareChex – Delta Group 2012
- Nationally Recognized Centers of Excellence: Rochester Hearst Institute, Lipson Cancer Center, Orthopaedics, Women's Health, Primary Care, Surgical Services and Behavioral Health– Delta Group 2012
- Nurse Magnet Destination

About Rochester, NY: Located on the shores of Lake Ontario, Rochester is ranked by Forbes as the fourth most affordable U.S. city and the # 3 metro region nationwide for raising a family. The Rochester area is home to 15 of the country's finest colleges and universities, and public school districts with high schools ranked among the best in America.

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Parma: Parma Community General Hospital is situated in the SW Cleveland suburbs. State-of-the-art physical plant and equipment serve 48,000 patients per year. Outstanding partnership opportunity includes weekend shift differential, performance pay, equal equity ownership, equal voting, funded pension, open books, comprehensive benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Springfield: EMP is pleased to announce one of our newest sites – Springfield Regional Medical Center. The area's only full-service hospital, Springfield Regional is situated 45 miles west of Columbus and 25 miles northeast of Dayton, with 75,000 emergency patients treated annually. EMP is an exclusively physician owned/managed group with open books, equal voting, equal equity ownership, funded pension, comprehensive benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Toledo: This Level III facility has an annual volume of 42,000 visits with outstanding physician coverage plus PA coverage. Premier Physician Services is seeking an EM Physician sharing our commitment first to quality patient care and excellence. In return we offer superb financial and professional opportunity with the opportunity to participate fully in the decisions and financial rewards of the practice. Maximize your earnings and establish your future with productivity based compensation plus shareholder opportunity at one year with no buy-in. A very appealing benefit package including family medical plan, employer-funded pension, malpractice, expense account &

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additional benefits is also provided. Contact Amy Spegal, Premier Physician Services, (800)726-3627, ext. 3682, e-mail aspegal@premierdocs.com, fax: (937)312-3683.

Toledo: ED Physician opportunity in suburban Toledo college town. This 26,000 volume ED has excellent coverage including resident and MLP support. It also offers physicians the exceptional benefits of working within a regional group with a very appealing model. Premier Physician Services is an equity-ownership where physicians share in both the profits and the decisions. Our mid-sized group offers the flexibility and access of independent groups without sacrificing the financial stability of larger groups. Premier's excellent package includes guaranteed rate plus RVU & incentives; family medical plan, employer-funded pension, expense account and shareholder status with no buy-in. You may also elect alternate options and receive additional compensation. Premier gives you the opportunity to make the most of today without sacrificing tomorrow. Contact Amy Spegal, (800)726-3627, ext 3682, aspegal@premierdocs.com, fax (937) 312-3683.

Urbana: EMP is pleased to announce another of our newest sites – Mercy Memorial Hospital. Servicing the SW Ohio region's residents in Champaign County, the facility treats approximately 18,000 emergency pts./yr. EMP is an exclusively physician owned/managed group with open books, equal voting, equal equity ownership, funded pension, comprehensive benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

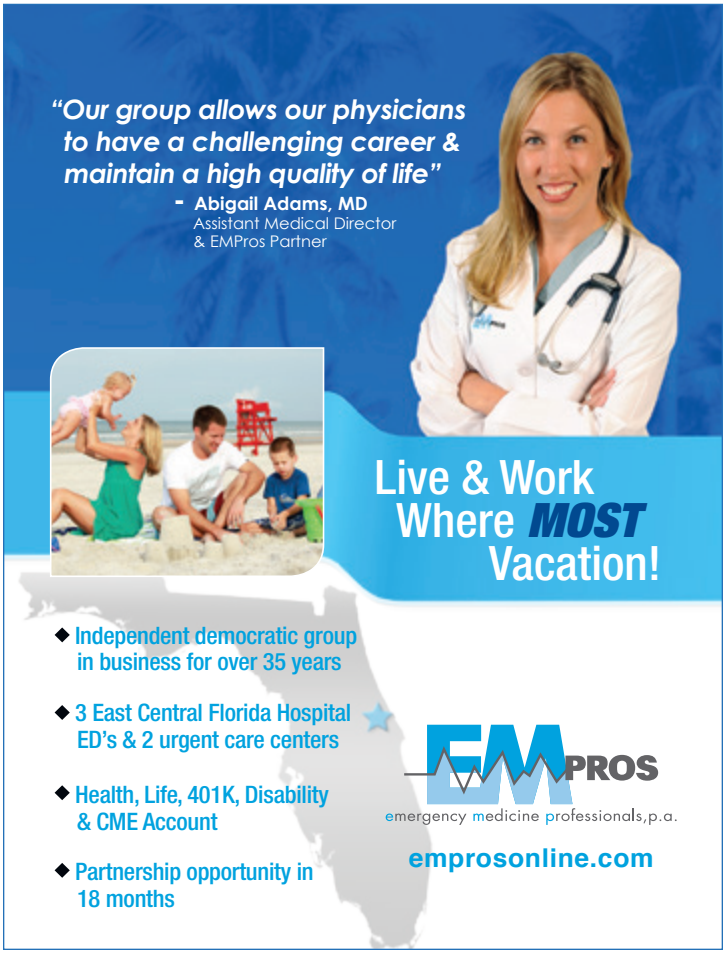
OKLAHOMA

Tulsa: Brand new, state-of-the-art 85 room ED to open in 2014! Saint Francis Hospital is a modern 971- bed regional tertiary care center seeing 91,000 ED patients per year, with broad pathology, high acuity, modern facilities and supportive environment. Outstanding partnership opportunity includes equal profit sharing, equity ownership, funded pension, open books, full benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

PENNSYLVANIA

Sharon: Sharon Regional Health System has an extremely supportive administration/medical staff, newer ED, and full service capabilities making this a great place to work with 38,000 patients treated annually. Small city setting offers beautiful housing and abundant recreation less than an hour from Pittsburgh and Cleveland. Outstanding partnership opportunity includes equal profit sharing, equity ownership, funded pension, open books, full benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Pittsburgh: Allegheny Valley Hospital in Natrona Heights boasts a brand new ED seeing 37,000 emergency pts./yr. Forbes Regional Hospital is a respected facility in Monroeville seeing 43,000 ED pts/yr. Both sites are proximate to Pittsburgh's most desirable



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residential communities; areas afford easy access to abundant outdoor recreation and nationally ranked schools. Outstanding partnership opportunity includes equal profit sharing, equity ownership, funded pension, open books, full benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

New Castle: Jameson Hospital is a respected facility situated between Pittsburgh, PA and Youngstown, OH with easy access to the amenities and residential options of each. Recent major renovation includes a new ED with 30 private rooms; 36,000 emergency patients are treated per year. EMP offers outstanding partnership opportunity including performance pay, equal equity ownership, funded pension, open books, comprehensive benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

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York: "People love working here!" That's what providers say at Memorial Hospital, named one of 'PA's Best Places to Work' 11 years in a row. Dynamic physicians and Medical Director sought for this 100-bed, 43K volume ED teaching facility in south-central PA. With a brand new hospital opening in 2015 and a great clinical and administrative support team, it's a great time to be on board. Candidates must be ABEM or AOBEM with a completed residency. HPP offers a family-feel culture and is physician-led by actively practicing clinicians who completely support you so you can focus on your practice. Contact Craig Bleiler: (800) 815-8377 ext. 5352; email: cbleiler@hppartners.com or visit www.hppartners.com.

RHODE ISLAND

Westerly: The Westerly Hospital is a 125-bed community hospital situated in a beautiful beach community in SE RI 45 minutes from Providence and 1.5 hours from Boston. Modern, well-equipped ED sees 26,000 pts./yr. Outstanding partnership opportunity includes performance pay, equal equity ownership, funded pension, open books, comprehensive benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

WEST VIRGINIA

Charleston: BP/BC EM physician opportunity within EM Residency at three-hospital system with 100,000 annual visits. In addition to Emergency Medicine, there are numerous residencies and student rotations. It also offers physicians the exceptional benefits of working within a regional group with a very appealing model. Premier Physician Services is an equity-ownership where physicians share in both the profits and the decisions. Our mid-sized group offers the flexibility and access of independent groups without sacrificing the financial stability of larger groups. Excellent package includes guaranteed rate plus RVU, incentives; family

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University Hospital, the primary affiliated teaching hospital of the University of Texas Health Science Center at San Antonio, is a 498 bed, Level 1 trauma center which treats 70,000 emergency patients annually. The University Hospital Emergency Department serves as the primary source for uncompensated and indigent care as well as the major regional tertiary referral center with a focus on transplant, neurologic, cardiac, diabetes and cancer care. A new, state of the art Emergency Department with 80 beds will open in early 2014.

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The University of Texas Health Science Center at San Antonio offers a highly competitive salary, comprehensive insurance package, and generous retirement plan. Academic appointment and salary will be commensurate with experience. Candidates are invited to send their curriculum vitae to: Bruce Adams, M.D., FACEP, Professor and Chair, Department of Emergency Medicine, 7703 Floyd Curl Drive, MC 7840, San Antonio, TX 78229-3900. Email: adamsb@uthscsa.edu. All faculty appointments are designated as security sensitive positions. The University of Texas Health Science Center at San Antonio is an Equal Employment Opportunity / Affirmative Action Employer.

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medical, employer-funded pension, expense account and shareholder status with no buy-in. Charleston offers both metropolitan amenities and easy access to outstanding outdoor recreation. Contact Rachel Klockow, (800) 406-8118, rklockow@premierdocs.com.

Huntington: Equity ownership group has a very appealing opportunity in newer ED with a patient volume of 73,000 annual visits. This Level II facility has 70 hours of physician coverage, plus 48 MLP hours daily; and 60 hours scribe coverage. An outstanding package is offered including guaranteed hourly plus RVU, family medical plan, malpractice, employer-funded pension, additional incentive income, shareholder opportunity at one year with no buy-in, plus additional benefits. Located 45 minutes from Charleston on the Ohio River, Huntington is home to Marshall University. For additional information, please contact Rachel Klockow, Premier Physician Services, (800) 406-8118; e-mail rklockow@premierdocs.com; or fax CV to (954) 986-8820.

Wheeling: Ohio Valley Medical Center is a 250-bed community teaching hospital with a brand new ED under construction, and an AOA approved Osteopathic EM and EM/IM residency program. Enjoy teaching opportunities, full-specialty back up, active EMS, and two campuses seeing 31,000 and 24,000 pts./yr. Outstanding partnership opportunity includes performance pay, equal equity ownership, funded pension, open books, comprehensive benefits and more. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

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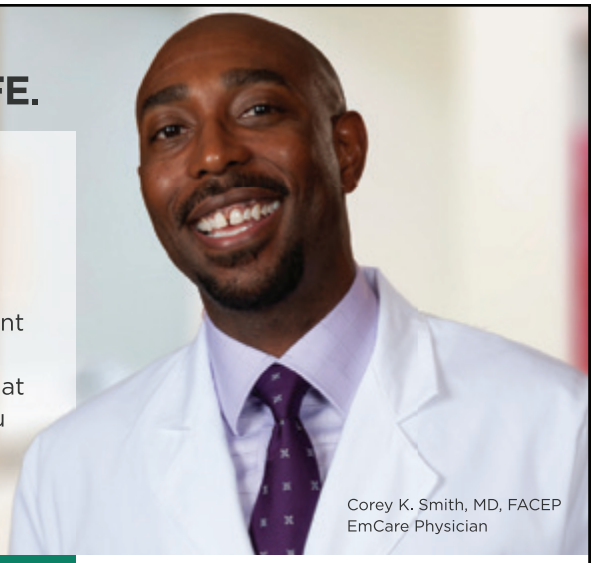

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- Community Hospital South — Indianapolis, IN
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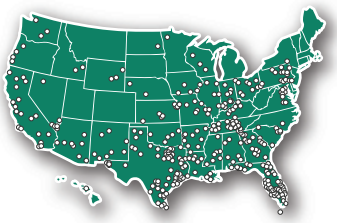
- Our Lady of Lourdes Medical Center — Camden, NJ
- St. Anthony Shawnee Hospital — Shawnee, OK
- Willamsport Regional Medical Center — Williamsport, PA
- The Heart Hospital Baylor — Denton, TX



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