EM Resident
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In the Field

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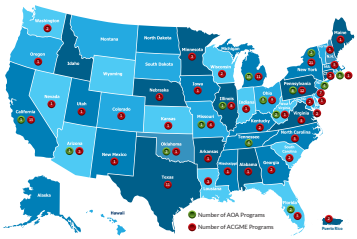

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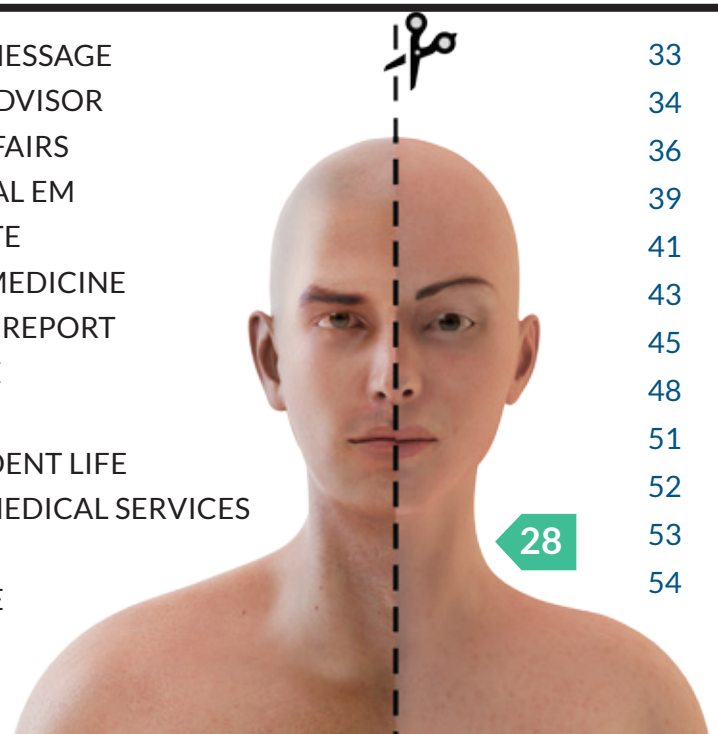

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MISSION STATEMENT

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

* * * *

1125 Executive Circle
Irving, TX 75038-2522
972.550.0920
Fax 972.692.5995
www.emra.org

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Developing the Physician Advocate

While most of you will have graduated and moved into practice by the time all these changes take place, it is important to remain informed about the current challenges of our professional pathway and the future direction of our field.

Jordan Celeste, MD
EMRA President
Brown University
Providence, RI

During my year as EMRA President, one of my goals has been to highlight the true value of membership. Going beyond our outstanding in-house publications, even going beyond free EM:Rap and other member benefits, EMRA does something more – we develop leaders. The EMpower initiative has been showcasing past members who found EMRA to be a launching pad for the rest of their careers (check out page 45 for more!). While we help to create leaders, in this issue I'd like to focus on how EMRA develops physician advocates.

I'm sure you've all been told before that as physicians, you are natural advocates. It's true – each and every day you speak for your patients to ensure that they get the resources and care that they need. Beyond that, though, EMRA develops emergency physician advocates using resources that you just can't get anywhere else.

EMRA Health Policy Committee and Legislative Advisor

EMRA has a Legislative Advisor on its board of directors who **keeps the entire membership informed about general concepts within health policy**, as well as hot topics such as health care reform and GME funding. The Legislative Advisor provides guidance for the board regarding these issues, and often serves as a liaison to external groups with shared interests. Moreover, he or she serves as the liaison to the EMRA Health Policy Committee.

As a longstanding member group, the EMRA Health Policy Committee is extremely engaged and active. Committee members keep members informed through articles in *EM Resident*, as well as via their Facebook feed. They also maintain a cache of health policy resources on the website.

EMRA Advocacy Handbook

In its third edition, the EMRA Advocacy Handbook has evolved into the go-to resource for students and residents interested in emergency medicine health policy. It is being used across the country to augment traditional EM curricula, and to inspire readers to become more involved at the local, state, and national level. So vital is this information that EMRA has made it available on EMRA.org as a downloadable, FREE e-book.

ACEP 9-11 Legislative Action Network

EMRA also enjoys a tremendous working relationship with ACEP and, as a result, **our members benefit from multiple other resources and opportunities** in the world of health policy and advocacy. All members should sign up for the 911 Legislative Action Network. It's free and easy, and provides updates about events in DC pertinent to emergency medicine. Beyond just providing information, it allows emergency medicine to maximize its voice to legislators. Member communications often contain a link that contacts your legislator with a pre-formed advocacy message that you can customize as you see fit. Free, easy, powerful.

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Log-in and become a physician advocate today!

More Information

RESOURCES FOUND ON EMRA.ORG

- EMRA Health Policy Committee
- EMRA Legislative Advisor position description
- Free downloadable EMRA Advocacy Handbook
- EMRA-ACEP Mini-Fellowship in Washington

RESOURCES FOUND ON ACEP.ORG

- 9-11 Legislative Action Network
- Leadership and Advocacy Conference information

EMRA develops emergency physician advocates using resources that you just can't get anywhere else.

ACEP Leadership and Advocacy Conference

Every spring, ACEP puts on the Leadership and Advocacy Conference in Washington, D.C. where EMRA has the great pleasure of providing programming on the first day. Here you can learn about the basics of health policy, and then delve much deeper on select topics and hear from distinguished speakers and guests. **This conference provides phenomenal opportunities to network, not only with your colleagues within emergency medicine, but also with your legislators and their staff on Capitol Hill.** After learning about health policy issues and advocacy messages, you visit your state legislators' offices to speak about these issues, providing data, but also telling patient stories. This year's conference is right around the corner, May 18-21 at the Omni Shoreham.

EMRA-ACEP Health Policy Mini-Fellowship

For residents and young physicians interested in taking an even bigger step into the realm of health policy, EMRA and ACEP offer the mini-fellowship. **This month-long experience places you in the center of the action in the ACEP Washington, D.C. office.** Here, you gain hands-on experience on Capitol Hill and customize your time to meet your particular goal – whether that be lobbying, regulations, policy, or anywhere else your interest lies. Applications for this unmatched experience are due July 15, so check out EMRA.org now for more information.

✶ EMRA = PHYSICIAN ADVOCATES

This basic equation holds true – EMRA equals physician advocates. EMRA is proud to offer various resources in order to make this so, and we encourage every single one of our members to take advantage of them. YOU have the ability to speak for medicine, our specialty, for your colleagues in the trenches, and for our patients. ✶

A Solution to the SGR

Value-Based Medicare Payments

Sarah Hoper, MD, JD
EMRA Legislative Advisor
Vanderbilt University
Nashville, TN

You have probably heard of the SGR, or Sustainable Growth Rate. It is a formula that was put in place in 1997 as part of the Balanced Budget Act that links physician payments to the gross domestic product (GDP) in order to control Medicare spending on physician services. The SGR ensures that the growth of Medicare spending on physician services does not exceed the growth of the GDP. However, the formula does not take into account recessions that cause a decrease in the GDP rather than growth, new technology that is more expensive, an increase in the number of patients enrolled in Medicare, or changes in Medicare coverage. Since 2006, the SGR has been "fixed" nine times to avoid physician payment cuts. If the SGR expires, physicians will face a 23.7% cut in Medicare payments. However, a solution may be in sight with House bill 4015 and Senate bill 2000, which aim to repeal the SGR.

If passed, the bills will not change SGR payments until 2018, when they will implement an incentive payment program based on value and quality instead of services provided. The new payment plan will be called the Merit-Based Incentive Payment System (MIPS). From the date the bills take effect, until 2018, when incentive-based payments begin, physicians will receive an annual update of 0.5%. The shift from a fee-for-service to a value-based payment program has many doctors worried. Here is a closer look at the proposed changes.

Every year, CMS will publish a list of quality measures to be used in the forthcoming MIPS performance period. The MIPS will assess the performance of eligible professionals in four categories: quality, resource use, electronic health records (EHRs) meaningful use, and clinical practice improvement activities.

- **Quality measures will be published annually.** In addition to measures used in the existing quality performance programs, the Center for Medicare Services (CMS) will solicit and fund professional organizations to develop additional measures.
- **Resource use will be assessed by CMS.** CMS will engage physicians and the public to identify resources needed for specific care episodes. Additionally, CMS will take into account the specific role of the treating physician and the type of treatment; for example, primary care versus specialist care, and chronic conditions versus acute episodes. This step addresses concerns that Medicare payment rules, specifically the SGR, failed to link Medicare payments to the cost of providing services. CMS will also try to improve risk adjustment methodologies to ensure that professionals are not penalized for serving sicker or more costly patients.
- **Meaningful use of electronic health records** will allow professionals to report quality measures through certified EHR systems to CMS.
- **Clinical practice improvement activities will be implemented.** Professionals will be measured on their effort to engage in clinical practice improvement activities. Physicians will be expected to improve their practices. The menu of recognized activities will be established in collaboration with doctors. The activities will be broad and applicable to all specialties and attainable for small practices and professionals in rural and underserved areas.

Physicians' Medicare MIPS payments will be dependent upon the doctor's performance score. The performance threshold will be the mean of the composite performance scores for all MIPS-eligible professionals during a period prior to the performance period. Physicians with scores that fall above the mean threshold will receive *positive* payment adjustments and physicians with scores that fall below the mean will receive *negative* payment adjustments.

- Negative adjustments will be capped at 4% in 2018, 5% in 2019, 7% in 2020, and 9% in 2021. Eligible professionals whose composite performance score falls between 0% and 25% of the threshold will receive the maximum possible negative payment adjustment for the year. Professionals with composite performance scores closer to the threshold will receive

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Leadership and Advocacy Conference

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LEGISLATIVE ADVISOR

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proportionally smaller negative payment adjustments. These negative payment adjustments for eligible professionals whose composite performance scores fall below the threshold will fund positive payment adjustments to professionals with composite performance scores above the threshold.

- Zero adjustments – Eligible professionals whose composite performance score is at the threshold will not receive a MIPS payment adjustment.
- Positive adjustments will be made for professionals whose composite performance scores are above the mean. These physicians will receive proportionally larger incentive payments up to a maximum of three times the annual cap for negative payment adjustments.
- Additional incentive payments will be available for physicians with exceptional performance. Incentive payments will be capped at $500 million per year for each of 2018-2023. Additional incentive payments will be allocated according to a linear distribution, with better performers receiving larger incentive payments.

The new payment plan will also be focusing on evidence-based care, starting with imaging. On November 15, 2015, CMS will specify one or more appropriate use criteria (AUCs) for advanced diagnostic imaging. Then on January 1, 2017, payments for advanced diagnostic imaging will only be made for claims that show the physicians order adheres to the applicable AUC(s). The requirement to comply with AUC(s) does not apply to imaging services ordered for a patient with an emergency medical condition as defined under EMTALA.

Even if the legislature fails to pass H.R. 4015 and S. 2000, it is likely that some form of these bills will be passed to repeal the SGR. H.R. 4015 and S. 2000 ask for physician and medical society input to provide quality measures and appropriate use criteria. It is important that emergency physicians claim their seat at the Medicare payment table, or another specialty will dictate how emergency physicians are reimbursed. ✶

Update: On March 26, Congress rejected the above bipartisan SGR repeal in favor for another 12-month SRG fix. This will be the 17th "fix" of the SGR. The new bill, the SGR fix, was discussed in the House on March 27, and the vote was delayed due to lack of a quorum. At the time of publication, it is unclear what will happen on April 1 when the current SGR fix expires. ACEP, the AMA, and many other physician organizations have sent a letter to Congress and the House of Representatives declaring their strong opposition to another SGR fix and their disappointment with the rejection of the above described SGR repeal.

UPCOMING EVENTS

- 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
- June 5-7 — AMA-RFS Annual Meeting, Chicago, IL

THE TIMES THEY ARE A'CHANGING

David Diller, MD
Academic Affairs Rep
St. Luke's–Roosevelt Hospital Center
New York, NY

EM stands at a fundamental crossroads

The world of emergency medicine education has been inundated by talk of competency-based assessments. As you may have noticed, the Milestones have arrived, and they've been the talk of the emergency medicine academic world for the past year. What you may not know is that the Milestones are part of a rapidly growing movement in medical education reform.

Modern medical education as we know it today – pre-med coursework, medical school traditionally split into two pre-clinical and two clinical clerkship years, followed by three to seven years of residency, with or without subsequent fellowships – has been around for over a century. This blueprint was developed in 1910 by Abraham Flexner, a non-physician educator. Before Flexner's proposal, there were vast inconsistencies in physician practice and no standardization in medical education, and the concept of institutional accreditation did not exist. A century later, Flexner's recommendations remain the standard for how we train physicians.[1]

We now stand at a fundamental crossroads. Over the last 104 years there have been numerous societal and technological changes. Novel concepts in adult learning theory have been discovered, the practice of medicine has progressed, and science and pharmacology have evolved. These advancements, combined with cutbacks in federal funding for medical education and a growing national physician shortage, suggest that medical education will soon undergo a dramatic transformation.

Milestones is just the beginning. By 2015 both the United States Medical Licensing Examination (USMLE) and the Medical College Admissions Test (MCAT) will undergo significant alterations in content and structure. The MCAT, while still covering biology, general chemistry, organic chemistry, and physics, has eliminated the writing skills section and will now include questions on biochemistry and an entirely new section on psychology and sociology. This new section highlights the emphasis the American Association of Medical Colleges (AAMC) has placed on expanding pre-medical coursework to include the behavioral and social science disciplines.[2]

In addition to the traditional content, USMLE Steps 1 and 2 will have an increased focus on quality improvement principles, safety science, epidemiology, biostatistics and population health, professionalism, and interpersonal and communication skills. Likewise, the USMLE Step 3 will additionally assess for an expanded range of competency-based content, including foundational science essential for effective health care, biostatistics, epidemiology and population health, literature interpretation, medical ethics, and patient safety.[3]

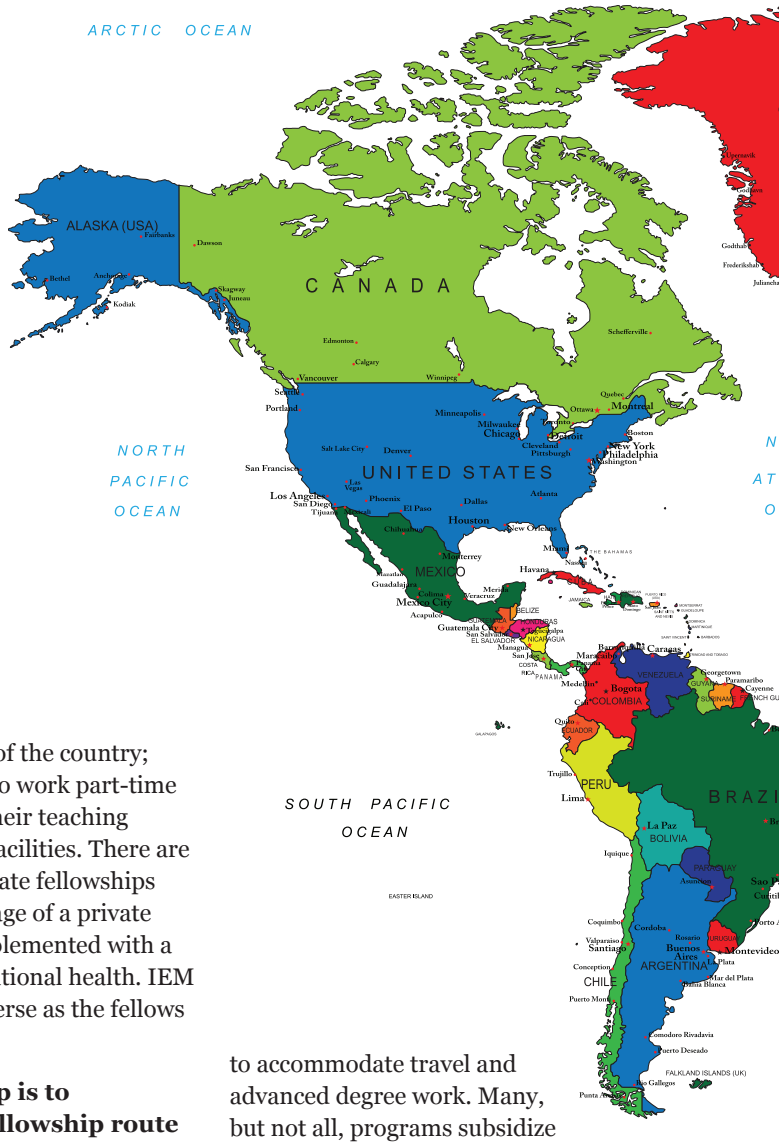
Aside from examinations, many medical schools across the country have already started to redevelop their curricula by decreasing classroom time and offering opportunities for combined degree programs and niche professional development. A handful of medical schools, including New York University, Columbia University, and Texas Tech University, are experimenting with three-year curricula.[4]

The creation of the Milestones was not arbitrary. Research has demonstrated that a competency-based training program would require one-third less time to complete than our current time-based rotation system.[5] In line with the concept of a competency-based – rather than time-based – rotation system is the notion that advanced students/residents would be able to "test out" of introductory work, while struggling learners could have a curriculum adapted to their needs, rather than the current "one-size-fits-all" approach.

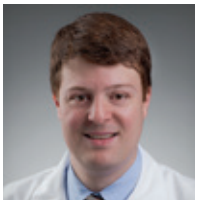
Another area of active development is in creating more well-defined and authentic clinical roles for medical students and increasing their clinical exposure, while integrating their experiences into classroom studies. Classroom learning that is not associated with adequate clinical context is associated with a 30%-50% loss in knowledge by the time students reach the clinical setting.[6] Conversely, the majority of resident education comes from experiential learning, but the demanding work schedule of modern-day residency does not allow adequate time for reflection, comprehension, and analysis of one's clinical experiences.

While most of you will have graduated and moved on from the world of academic medicine by the time all these changes take place, it is important to remain informed about the current challenges of our professional pathway and the future direction of our field. Bob Dylan famously sang, "the times they are a-changin'." Well, he was right. And change is a good thing. ✶

A Guide to International Emergency Medicine Fellowships



There are over 30 International Emergency Medicine (IEM) fellowship programs, with more being added every year. Fellowship tracks are as varied as the programs that offer them. IEM is young enough that it is not yet a board-certified fellowship, so there is no set-in-stone curriculum that governs all programs. For instance, many fellowships center on advanced degrees like a Masters in Public Health (MPH); others incorporate training in tropical medicine and infectious disease. Programs offer a variable amount of time and funding for fieldwork outside of the country; most require fellows to work part-time as clinical faculty at their teaching hospital or affiliated facilities. There are also independent private fellowships that allow the advantage of a private attending salary, supplemented with a mentorship in international health. IEM fellowships are as diverse as the fellows they train.



Nathan Ramsey, MD
Global Health Co-Director
Palmetto Health and
Carolina Care
Columbia, SC

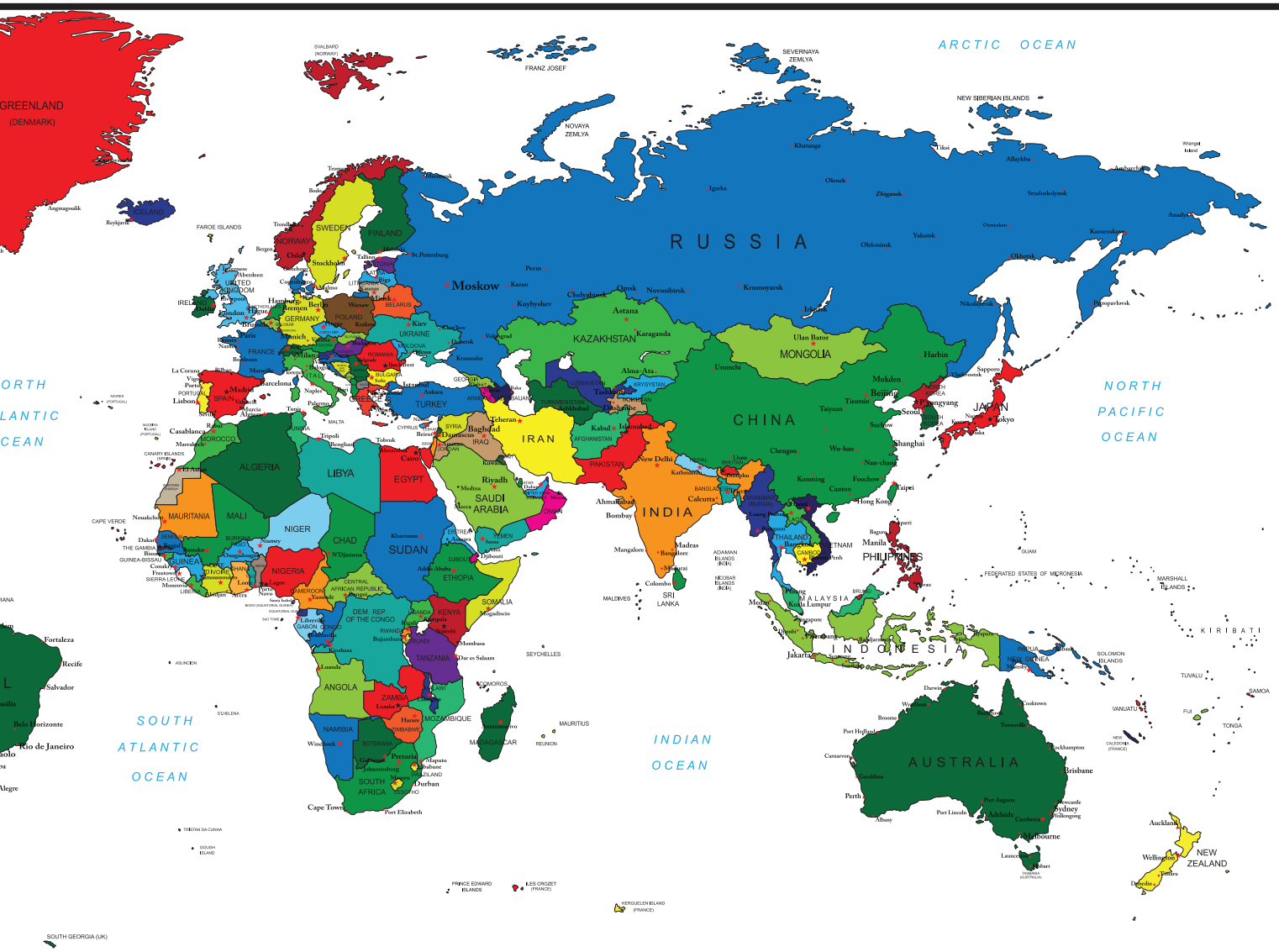
Gabrielle A. Jacquet, MD, MPH
Director, Global Health Section
Boston University School
of Medicine
Boston, MA

Bhakti Hansoti, MBChB, MPH
Fellow, International Emergency
Medicine and Public Health
Johns Hopkins University
Baltimore, MD

Step 1. The first step is to determine if the fellowship route is right for you. Clarify your career goals. If you are interested in academic medicine, a fellowship at an academic center will let you get involved in resident education and develop your niche. If your interest is research, a fellowship provides opportunities through collaboration with ongoing projects in your chosen program. Fellowships are an opportunity for networking, mentorship, and a firsthand expert education, which is priceless. IEM is still a small community where major players know one another. Personal relationships and connections you make during training will be a valuable resource for the rest of your career.

During fellowship you are expected to focus on developing international skills; this usually translates into schedule flexibility with a reduced shift load to accommodate travel and advanced degree work. Many, but not all, programs subsidize an advanced degree program and travel expenses, but this rarely offsets lost potential gains you would see in private practice. The fellowship track is not a decision to be taken lightly.

There are other options besides the fellowship path. Many physicians must balance family and other commitments with a desire to pursue research in global health. An alternative option to fellowship is to work clinically and use spare time to undertake short-term international projects. While difficult, advanced degrees can be pursued while working full time. In addition, it is possible to opt out of U.S.-based clinical medicine altogether, and engage with non-governmental organizations (NGOs) like Médecins Sans Frontières. While good alternative options, these tracks lack the formalized mentorship that fellowship training offers.



Finding Your Niche in the World

Your list of top potential fellowship programs should be narrowed down by the summer before your graduation year.

Step 2. If you decide you want to do a fellowship, start looking for the right program. Begin the process of researching fellowships at least 18 months before graduation. Currently, the application process for applying for an IEM fellowship is more like applying for a job than for a residency position. However, with the advent of the International Emergency Medicine IEM Fellowship Consortium website (www.iemfellowships.com), the application process is becoming more standardized each year. The 2014 application season will be the second year applicants apply using a common online application with universal deadlines. The website also provides an overview of most fellowship programs, along with directors' contact details.

When looking at a program, there are several things to keep in mind. Its length, the clinical requirements, MPH funding, locations of current projects, and travel funding are all important to consider. These variables should also be taken into account when you are comparing salaries. If you have a geographic region of interest, look for programs that currently work in that part of the world. Most field

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time is spent working on projects that are already established, as opposed to creating a new program, which takes more time than is usually allotted in a fellowship. Once you make contact with a program, you may get a chance for a "test drive" as a resident by collaborating on a current project.

Step 3. Create a robust application and prepare for your interviews. Don't feel like you need to have done medical work over half of the globe to be considered. It will help if you have invested time during residency in research or international and public health. The key is getting started early to build your résumé.

Your list of top potential fellowship programs should be narrowed down by the summer before your graduation year. Interview season starts in September and typically extends through the fall. Each fellowship is unique, and a successful experience hinges heavily on your compatibility with the fellowship director. Therefore, it is important to represent yourself and your goals truthfully in your personal statement and during your interview day. It is also necessary to have insight into the fields within global health that interest you. Be sure to contact current and past fellows, as they usually have a different perspective than program directors. Just like residency program directors, fellowship directors are trying to sell their program to a limited pool of applicants. ✶

Having spent a lot of time and work in our fellowship search processes, we remember how overwhelming the experience can be. Good luck in your search for the right career, and, if it's right for you, the right fellowship.

Fellowship FAQs

How can I be a competitive applicant? Experience is a must. With medical school and residency restrictions, your international experience may not be extensive, but you need enough on your CV to demonstrate that you know what to expect. It will help if you have done research, or used residency electives for international or public health. Remember, program directors are not looking for medical tourists, but for doctors who will commit to a sustainable project.

Get to know the players. IEM is a well-networked group. You can meet many program directors if you attend the IFEM, ACEP, or SAEM conferences, or other international symposiums. It is often hard to get a feel for the competitiveness of IEM fellowships. While more established programs are very competitive, if you are committed to doing an IEM fellowship, you shouldn't have a problem getting a position. Most importantly, you need to know what you want out of your time, then seek out the best match for you.

Should I pursue a master's? Many IEM Fellowship programs are focused on obtaining an MPH. Some believe that since IEM is not a board-certified fellowship, it is wise to have a degree to take away from your time in training. Not all programs provide an MPH, but most allow you to develop an understanding of the larger issues in public health that are critical to international work. Some offer a Master of Health Science (MHS) if you are pursuing a research-focused career.

How important is training in infectious and tropical diseases? Tropical and infectious diseases, along with hygiene, are some of the predominant areas of morbidity and mortality in the developing world. Understanding local health ecology is essential to providing adequate care in international settings and is valuable in providing a context for policy development.

What about research? Realistically, it would be very difficult to develop and complete your own independent large-scale research project over a one- to two-year residency, especially if IRB approval or grant funding is required. Most often you will assist in faculty projects while developing your own research and grant-writing skills.

Clinical practice, or health system development? Most fellowships are geared toward infrastructure development, research, and developing international leaders and policy makers. If your interest lies primarily in clinical or mission work, you can subsidize your training while in private practice or work with independent agents. Instead of committing to a fellowship, you may want to pursue work with an NGO.

What special interest opportunities are available? There are lots of subspecialties within IEM, including EMS development, disaster relief, and displaced populations; each program has its own flavor. Make sure to ask program directors about your special interests and whether they are capable of facilitating opportunities in these areas.

What kind of salary will I need? Salaries vary and will always be less than what you earn in private practice. Make sure to take into account fringe benefits and program stipends. Completing a master's is costly, so programs that include an MPH may offer a lower salary but be of more value. Some programs will pay more but expect you to fund your own international travel. Don't be afraid to ask about moonlighting opportunities. An IEM fellowship can be an expensive investment – travel, conferences, and classes add up quickly. If you have outstanding school loans and/or mortgages to pay on top of living expenses, your budget may be stretched.

Is a structured curriculum better than developing my own path? Some programs are very structured in their educational curriculum and have years of experience with successful fellows. There are also programs that offer fellows a chance to formulate their own plan. Opportunities exist to help develop newer programs and blaze the trail for future fellows to follow.

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

REFLECTIONS
Council of Review Committee Residents Meeting

"Our work here is to change the landscape of our profession."

It's been a busy beginning to 2014. The week after our EMRA Board of Directors retreat for strategic planning, I traveled to Chicago for the biannual Council of Review Committee Residents (CRCR) meeting. The CRCR is composed of residents from every specialty accredited through the ACGME, so instead of focusing on things important to individual specialties, the CRCR works on making a global impact. A 30,000-foot view, if you will.

The sentiment was set by the chairman, who opened with, "Our work here is to change the landscape of our profession." The major group exercise for this meeting was a discussion on progressive independence and appropriate oversight. I was placed in the hospital-based subgroup along with representatives from radiology, genetics, nuclear medicine, and pathology – who knew nuclear medicine had an RRC? Through spirited discussion, we came to a few absolutes.

First, a "one-size-fits-all" approach to how medical education is provided does not work. Several members voiced concerns about too much or too little supervision in residency training, but none of them are emergency physicians. I couldn't help but wonder; can you generalize your own anecdotal experiences to an entire specialty?

Second, the Milestones should be a bridge for faculty to gauge how much independence a resident has earned – part of the spirit in the formation of Milestones. We were all in agreement that the faculty should have this outcomes-based data at their fingertips, so they can know in which areas residents need more supervision. Billing and reimbursement implications aside, shouldn't the goal of residency training be to have minimal oversight with appropriate supervision, earned over time? The consensus concern from the group was that, in the near future, a fellowship may be required to prepare you for independent practice. I think we can all agree that if the first time a surgeon performs a nephrectomy by himself, or an emergency physician manages multiple patients alone, occurs after residency graduation, it won't be in the best interest of our patients.

The final issue the council agreed upon was that our culture of education must become more transparent. This might be achieved through honest feedback provided to attendings, and the expectation of timely, useful feedback in return. The days of "good job" as feedback must move to extinction. You should never be blindsided by your quarterly, or six-month, evaluation because "everyone told me I was doing fine." It's hard to improve if you don't know you are not performing up to expectations.

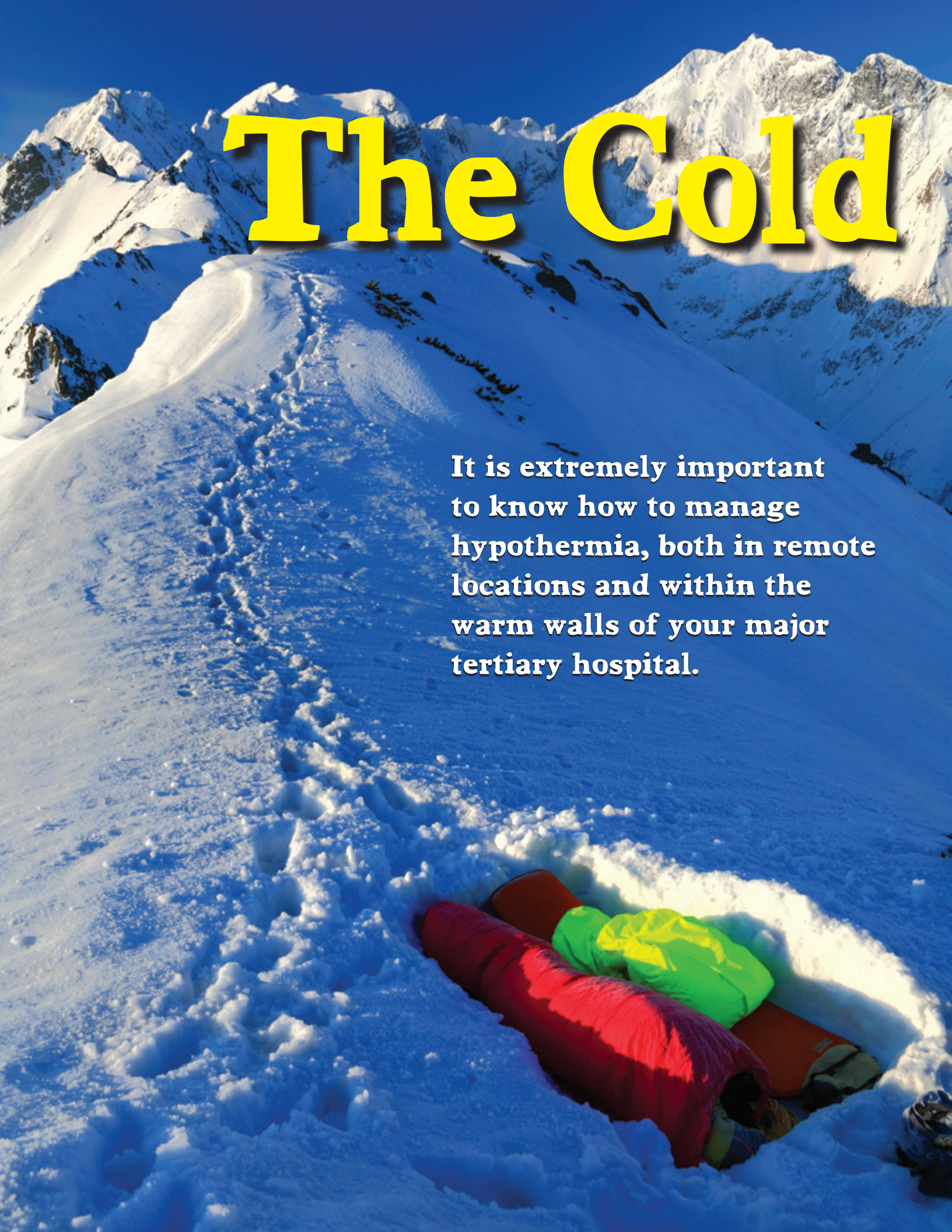
It was apparent during the CRCR meeting that emergency medicine has earned a great deal of respect from its peers in a relatively short time. As I think about the pioneers of our specialty, like Drs. John Wiegenstein, Ron Krome, and George Podgorny, I believe they would be proud that we have taken a leadership role with the development of Milestones and the Next Accreditation System (NAS). In these times of change and relative uncertainty, as we attempt to stand on the shoulders of the giants in emergency medicine, EMRA is at the forefront advocating for our members. ✶

Topic	Consensus Results
Transition from residency to independent practice: Understanding the business side of medicine	86% (18/21)
Progressive independence and appropriate oversight	81% (17/21)
Patient Safety: Revisiting duty hours with respect to patient ownership and accountability	62% (13/21)
Patient Safety: Transitions of care and handoffs	62% (13/21)
Resident Well-Being: Mental health	43% (9/21)
Resident Well-Being: Finances and planning for the future	43% (9/21)
Reducing length of training, with reference to outcome-based assessments	43% (9/21)
Incentivizing teaching among academic faculty	38% (8/21)
Patient care in the age of of the EMR: Optimizing use of technology	29% (6/21)

This table was developed from a brainstorming session at our meeting in September. It represents the issues in graduate medical education the council thought were most important. The council and emergency medicine share a lot of the same angst about what the future holds for medical education.

The Cold

It is extremely important to know how to manage hypothermia, both in remote locations and within the warm walls of your major tertiary hospital.



Hard Facts

Management of Hypothermia – from Wilderness to the ED

Nicholas Daniel, DO
University of Nebraska Medical Center
Omaha, NE

Wilderness medicine entails the treatment of exposure-related maladies in the middle of nowhere. Well, not always. While this blossoming field of emergency medicine focuses on preparedness and the ability to treat all types of medical problems in austere locations, bona fide wilderness medicine cases can pop up on your urban doorstep. Whether you live in the jungle of New York City or the middle of true Montana backcountry, you can expect to treat a range of patients with "wilderness issues," including hypothermia. It is extremely important to know how to manage hypothermia, both in remote locations and within the warm walls of your major tertiary hospital.

Case-in-point

A 4-year-old male is rushed to a rural emergency department on a cold April day. He fell out of a fishing boat and was in the lake for quite a while before eventual submersion. Vitals on presentation are a BP 128/83, HR 57, RR 8, SpO2 75% on non-rebreather at 15 L/min, and a temperature of 24.3°C. He is pale and cool to the touch, and begins to seize. An intraosseous (IO) line is placed and lorazepam is given. He is intubated, and a foley, NG tube, and rectal temperature probe are placed. Warm packs are placed at the axilla and groin, and he is covered with a warming blanket while invasive rewarming is initiated with warmed IV fluids and stomach and bladder irrigation.

Imaging workup reveals only findings consistent with water aspiration. After discussion with an accepting tertiary hospital, it is decided to transfer the patient before full rewarming is complete. Just prior to loading the patient on the helicopter, his HR is 116, and he is still hypothermic at 26.8°C.

Discussion

In developed countries, hypothermia is more common in cities than in the wilderness, likely a function of population and homelessness.[1,2] Regardless of the environment, the basic treatment of hypothermia patients is pretty logical – warm them up. The body doesn't like being cold. **Hypothermia causes physiologic changes in the respiratory, renal, and CNS systems; however, effects on the heart become the most worrisome.**

As the conduction system cools down, a decrease in the spontaneous depolarization of the pacemaker cells causes bradycardia. Conduction velocity decreases, leading to lengthening of the cardiac cycle and eventually ventricular tachycardia, fibrillation, and asystole. A decreased transmembrane resting potential puts hypothermic patients at high risk for dysrhythmia, even from minor stressors like being jostled during transport. The goal is to warm patients up at 0.5-2.0°C/hour or, if in a serious dysrhythmia, as fast as humanly possible. Dysrhythmias become much less likely once a temperature greater than 30-32°C is reached.[2]

There are two stages in the treatment of the hypothermic patient – pre-hospital management and management in the ED. While active field rewarming is difficult simply due to a lack of heating sources, several steps should be considered to improve outcomes. Further heat loss should be minimized by getting the victim into a warmer environment (ambulance/helicopter) and, if possible, cutting off wet clothing and replacing it with dry clothing, or "wrapping" the patient in an insulation system. To "wrap" a victim, a large tarp or plastic sheet is laid on the ground with a sleeping mat in the middle of it. A dry sleeping bag or blankets are then placed on the sleeping mat with the patient on top (*Image 1*). Warm water bottles can

continued on page 14

Further heat loss should be minimized by getting the victim into a warmer environment (ambulance/helicopter), and, if possible, cutting off wet clothing and replacing it with dry clothing, or "wrapping" the patient in an insulation system.

There are two stages in the treatment of the hypothermic patient – pre-hospital management and management in the ED.

be placed in the groin or axilla before "wrapping" up the patient, layer after layer.

Prior to full wrapping, it is important to assess the victim for signs of trauma or other medical issues. Fractures should be splinted and pressure dressings applied to wounds.[1] Intravenous access can be obtained and a 500-ml bolus of warmed 5% dextrose in normal saline administered, since most patients are volume-depleted, secondary to cold diuresis. The patient should be kept supine to avoid orthostatic hypotension. As previously mentioned, these interventions should be gently completed, as vigorous movement can provoke ventricular fibrillation and asystole.[1,2]

Once in the ED, patients should be hooked up to cardiac monitoring, and an esophageal or rectal temperature probe placed, if feasible. Rewarming options suited for the hospital environment abound, and range from external to very invasive techniques (*Table 1*). Monotherapy with passive external rewarming (PER), such as blankets, is used in only the mildest hypothermia cases (>32°C), when the concern for dysrhythmia is low. Shivering thermogenesis disappears at around 30-32°C, making PER much less efficacious, necessitating the need for active rewarming.

Active external rewarming (AER) involves techniques in which heat is delivered to the skin. These modalities are best used in young, healthy patients who have a temperature of <32°C, but who do not have a serious arrhythmia.[1] The most common methods include hot water bottles or warmed saline bags placed in the axilla and groin, warm blankets, hot water bath immersion, and forced-air rewarming blankets (e.g., Bair Hugger). Rewarming blankets have been shown to provide significant heat transfer and are a common

piece of equipment in many EDs.[1] Warm water immersion is an alternative option but comes with many pitfalls and poses difficulties for cardiac monitoring, not to mention it makes CPR nearly impossible.

In sicker, colder patients, or those with serious dysrhythmia, active core rewarming (ACR) should be pursued. ACR methods vary greatly in degree of invasiveness and, although many are used concomitantly, care should progress from least to most invasive, based on the patient's condition. **The two most commonly used and least invasive maneuvers are heated humidified air inhalation and heated IV fluids.** Inhaled air can be given via mask or endotracheal tube, but should be humidified and heated to 40-45°C. Whether blood or crystalloid, all IVF used in hypothermia resuscitation should be heated to 40-42°C and infused through short or insulated IV tubing. Both of these procedures provide significant heat transfer and are important methods of less invasive rewarming.[1]

Progressing beyond air and IV fluids, ACR becomes much more invasive, including gastrointestinal irrigation, peritoneal lavage, thoracic lavage via thoracostomy tubes, and mediastinal irrigation.

Extracorporeal blood rewarming can be accomplished with venovenous rewarming, continuous arteriovenous rewarming, cardiopulmonary bypass, or hemodialysis, which can be especially beneficial in the setting of concurrent renal failure or severe electrolyte abnormalities.[1,2] Full description of these procedures is beyond the scope of this article but are described in detail in the cited sources.[1-3]

Dysrhythmias are common in severe hypothermia, and usually progressively deteriorate from bradycardia to atrial fibrillation, and then to ventricular dysrhythmias. Hypothermic bradycardia is resistant to atropine, and transvenous pacing can precipitate ventricular fibrillation.[2] **Bradycardia and atrial fibrillation are generally innocuous and usually resolve with rewarming alone, but can serve as a marker of severity of hypothermia.** As in any other scenario, CPR should be started for pulseless VT, fibrillation, or asystole. Most ACLS medications have temperature-dependent effectiveness and should be considered to be ineffective until core temperature reaches 30°C, although IV magnesium sulfate may be of some benefit.[1,2] Defibrillation can be attempted once, but the mainstay of treatment is CPR while rewarming continues. Once 30°C is reached, standard ACLS protocols can be resumed.[2] Stories of amazing hypothermia resuscitations are out there – the lowest recorded temperature in accidental hypothermia with survival was a frigid 13.7°C.[1] Until an accurate marker of death can be established, warm up your patient and remember the old adage: *No one is dead until they are warm and dead.*

Case follow up

Our 4-year-old patient had a brief episode of ventricular fibrillation requiring CPR while en route to the tertiary hospital, likely the result of his temperature of 26.8°C at time of transfer, coupled with a bumpy ride. Should the transfer have been delayed until the patient was warmed to a temperature above 30°C? It's a tough call. The treating physicians felt the risk of transfer was countered by the need to get him to a tertiary hospital. Thankfully, his arrhythmia resolved and he was discharged home a week later without significant neurologic impairment. ✶

Table 1. Re-Warming Modalities

Passive External Rewarming (PER)
Dry clothing and blankets
Active External Rewarming (AER)
Radiant heat lamps
Warm water bottles/packs
Warm blankets
Hot water immersion
Forced-air rewarming
Active Core Rewarming (ACR)
Heated intravenous fluids
Heated humidified oxygen
Gastric, bladder, colonic lavage with heated fluids
Mediastinal lavage
Peritoneal lavage
Thoracic lavage
Venovenous rewarming
Arteriovenous rewarming
Hemodialysis
Cardiopulmonary bypass
Diathermy

Image 1. How to create a hypothermia wrap.

Anant Patel, DO
EMRA Vice-Speaker of the Council
John Peter Smith Health Network
Fort Worth, TX

It is important to keep your CV up-to-date by recording experiences and honors as they come; each achievement can help to build a more solid record. Just as importantly, documenting certain things may weaken a CV, and we need to know which are not appropriate.

THE CV conundrum

How is it that one document causes so much angst and stress in its creation? Perhaps it's because that one document plays such an important role in our futures. It seems unfair that all of our potential, at times, rides on something as thin as a sheet of paper. The curriculum vitae continually forces us to re-evaluate ourselves and ask the tough question, "What have I accomplished?"

Think back to that first draft, before ERAS, maybe even before medical school. I remember the feeling of sitting down to the daunting task of regurgitating all of my experiences and compiling them into one cohesive statement. **How can you really summarize everything about you in order to impress an individual whom you've never met and maybe never will?** Many of our talented EMRA members have accumulated numerous experiences and accolades since medical school, potentially making for even better curricula. But self-evaluation can be difficult – and so can self-promotion. Looking back to when I first created my own CV, I know that more direction would have been beneficial.

It is inherent in our profession to always be looking ahead. As soon as we have accomplished one task, it seems a new one is staring us in the face. Shaping and molding your CV will perpetually be on the to-do list. It is important to keep your CV up-to-date by recording experiences and honors as they come; each achievement can help to build a more solid record. Just as importantly, documenting certain things may weaken a CV, and we need to know which are not appropriate.

We have all heard stories about those CVs that were placed in the "reject" pile. Reasons for rejection can vary: editing errors, too long, too short, not enough experience, no leadership skills, doesn't stand out, etc. As residents, how can we create that elusive perfect CV that avoids ending up in the recycling bin? Here are a few recommendations:

Go back to the basics.

As tedious as it sounds, make sure your CV follows accepted formats. Employers are accustomed to seeing things laid out in a consistent way. Formatting that is difficult to decipher causes the reader to lose attention and moves your name further down the list. Before you send it off to your future boss, have it PROOFREAD multiple times. It still astounds me how many editing mistakes I have after proofing my own documents. Do yourself a favor; have another set of eyes take a look. To help you through the basic process, multiple online and print sources provide visual examples and written instructions. EMRA's *Career Planning Guide for Emergency Medicine* has a chapter on how to build and write your CV and is a great resource for residents who are looking for more direction.

Leadership experience.

There are many ways to strengthen your leadership skills. In the last issue of *EM Resident*, our president, Dr. Jordan Celeste, gave a fantastic summary on the opportunities EMRA provides its members. **There are always leadership openings for residents through state ACEP chapters.** Roles on hospital committees and within the house staff also provide good leadership experience.

Research.

Research or a "scholarly activity" is required to graduate from residency, so all EM residents will have something to add to this area. An article from Dr. Jessica Best in the December issue of *EM Resident* presented the challenges of obtaining an academic position. For those with specific career goals, actively pursuing more extensive leadership experiences is always a plus.

Advocacy.

Being involved in advocacy will help you gain an understanding of the issues and challenges affecting our practice environment and will allow you to develop skills that employers value. EMRA has produced the *Emergency Medicine Advocacy Handbook*, which offers a basic understanding of advocacy. It is available for free download on the EMRA website. **For those looking for even more advocacy exposure, ACEP's Leadership and Advocacy conference is consistently member-rated as one of the most beneficial conferences of the year.** This year's conference immediately follows the SAEM annual meeting and takes place at the Omni Shoreham in Washington, D.C. Come learn and explore advocacy with your peers, and help to make a difference in emergency medicine.

We are lucky to be in a profession where our skills are still in high demand. Crafting a professional and honest CV is an important skill and often the first point of contact with your future employer. Hopefully some of these suggestions will help get your CV ready to land you that position you have always wanted. ✶

PULLING THE TRIGGER

A BRIEF REVIEW OF HYPERCAPNIC RESPIRATORY FAILURE

Adeleke Oni, MD
Resident, Emergency Medicine
University of Maryland
Medical Center
School of Medicine
Baltimore, MD

Semhar Tewelde, MD
Instructor, Emergency Medicine
University of Maryland
Medical Center
School of Medicine
Baltimore, MD

A 56-year-old male with a history of end stage COPD, sarcoidosis, and pulmonary hypertension comes into your ED in respiratory failure. His initial oxygen saturation is 38% on 6L nasal cannula. You quickly place him on BiPAP and his oxygen saturation jumps up to 74%. However, he becomes increasingly drowsy and more difficult to arouse, despite nebulized medications and IV steroids. His first ABG reveals a pH of 7.23, a pCO_2 >100, and a pO_2 of 58.

Standard medical treatment

We have come a long way in the treatment of acute hypercapnic respiratory failure. No longer do we intubate every wheezing hypoxic and tachypneic patient who comes through the door. Like with all patients, the standard of care is to begin with the ABCs. **Initial management should include oxygen supplementation either via high flow humidified oxygen (HFHO) or nasal cannula/non-rebreather mask, simultaneously with nebulized albuterol, IV steroid medication ± magnesium, and antibiotics (if necessary).** HFHO therapy has been shown to improve oxygenation and provide a small amount of PEEP in these patients, and may also decrease the need for intubation. If HFHO is not available, it is important to leave a nasal cannula on the patient at all times, even underneath the non-rebreather mask. This serves to prolong adequate oxygenation during the apneic period of intubation after the non-rebreather mask is taken off.[1,2]

Non-invasive positive pressure ventilation (NIPPV)

Numerous research articles have substantiated NIPPV to be the most effective first-line therapy when clinical signs (tachypnea, accessory muscle use, acidosis) of hypercapneic respiratory failure persist despite standard medical treatment. In patients with the right history and physical exam findings, BiPAP is often initiated immediately, in conjunction with other standard therapies. **NIPPV has been found to reduce mortality, help avoid endotracheal intubation, and decrease treatment failure** when initiated early, and before the onset of severe acidosis.[3]

The pH is the most significant value for predicting NIPPV failure.[4] One study revealed an association between worsening pH within the first hour of treatment and NIPPV failure.[5] This suggests a "golden hour" in which BiPAP should improve the level of acidosis, or the patient is very likely to develop progressive respiratory failure and require intubation. However, NIPPV should not be applied indiscriminately – there are clear-cut limitations of efficacy in patients with isolated hypoxic respiratory failure and/or severe acidosis. It remains controversial for treatment of status asthmaticus, ARDS, severe pulmonary hypertension, or when there is clear evidence of clinical decompensation. Using NIPPV in these patient populations may delay necessary intubation and result in a potentially avoidable death.[6,7]

Severe acidosis

Just how acidotic must a patient be to require intubation? One study found no significant difference in mortality between a group with a pH of 7.2-7.25 and a group with a pH of 7.26-7.3 when treated with NIPPV.[8] There is a school of thought that suggests that in these patients, a pH ≤7.25 necessitates immediate intubation. However, **clinical judgment will always be the superior guideline to follow, regardless of the numbers.**

Post-intubation ventilation settings should be specifically tailored to each individual patient and should be adjusted according to ABG results. **A repeat blood gas should be obtained within 10-15 minutes of being placed on the ventilator.** Tenuous patients are likely to require an arterial catheter for future ABG draws.[9] If there is difficulty in obtaining an ABG, the venous pH can be multiplied by a factor of 1.004 to accurately predict arterial pH.[10]

Case closure

Since he was not improving on BiPAP, you intubate the patient. His oxygen saturation immediately rises to 100%, and his post-intubation ABG reveals a normal pH, and a pCO_2 of 55. He is admitted to the ICU and is eventually extubated and discharged home several days later. ✶

CLINICAL PEARLS

- ✓ Nothing supercedes clinical judgment in the decision to intubate.
- ✓ Initiate NIPPV early, even before pH results come back.
- ✓ NIPPV is relatively contraindicated in severe acidosis. Patients with a pH ≤7.25 are more likely to require intubation.

Capturing a Moment

A Reflection on Mental Health and Emergency Medicine

Among our colleagues, we can reinforce the importance of mental health issues, keeping in mind the rate of serious outcomes, including suicide.

Kyra D. Reed, MD
Indiana University School of Medicine
Indianapolis, IN

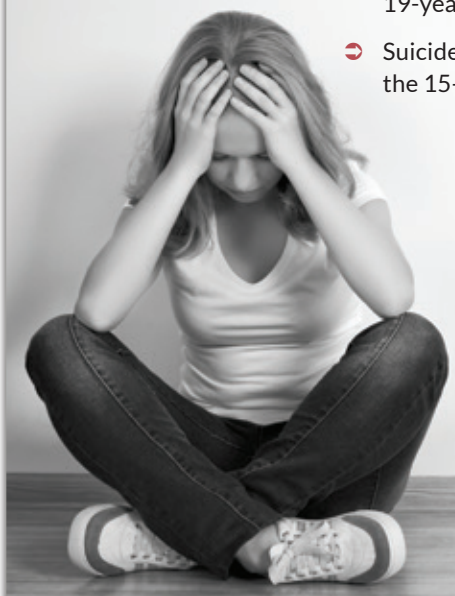
After a knock on the door, I entered the hospital room to find Lisa, a 12-year-old patient who was seated on the exam table, eyes fixed on her shoes. She only briefly made eye contact, enough to say "hello," before diverting her gaze. It was the start of the school year, and the schedule in the rural clinic where I served as a medical student was packed with kids who were there for physicals.

As I began the encounter with light-hearted comments about the upcoming school year, I noticed that Lisa began to fidget with her jewelry and massage her arms nervously. Cautiously guiding the conversation, I attempted to see if there was something she wanted to share with me. Her initial answer was that she had occasional dizzy spells and had nearly passed out on multiple occasions.

Table 1. Pediatric Mental Health FAST FACTS[1]

What does the data tell us?

- Suicide currently ranks as the fourth leading cause of death for 10- to 14-year-olds and the third leading cause of death for 15- to 19-year-olds in the U.S.
- Suicide accounted for 11.3% of all deaths in the 15- to 19-year-old age group in 2006.
- More than half of adolescents 13-19 years of age have suicidal thoughts.
- Nearly 250,000 adolescents attempt suicide each year.
- Up to 10% of children attempt suicide sometime during their lives.



Noting her thin frame and very low BMI, I replied, "You know, starting a new year at school can be fun, but it can also be scary. I was always nervous the first week of school. Do you feel the same way?"

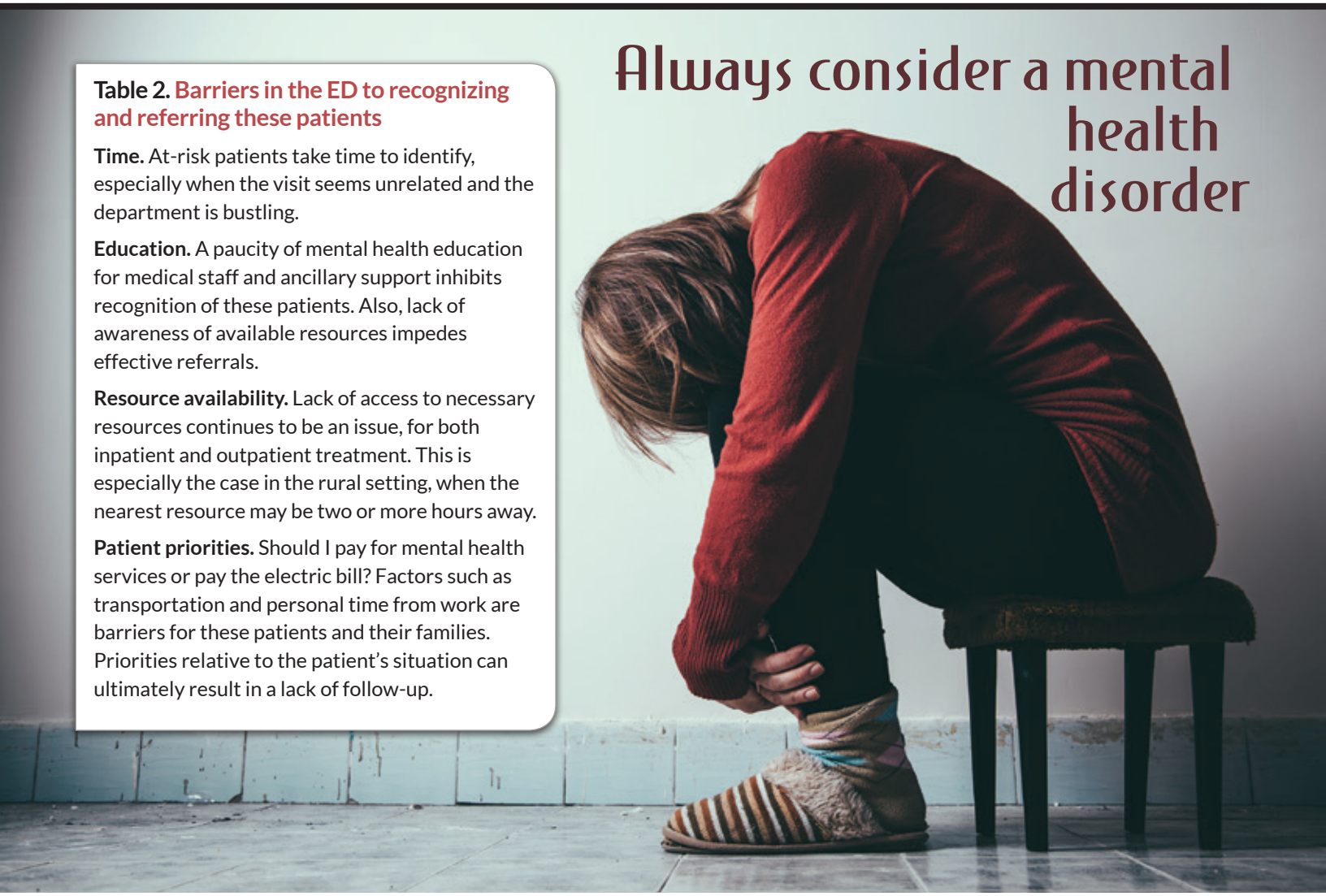
"I am really scared," was her contemplative soft reply.

"Is there anything in particular about school that worries you?" I asked.

Lisa began crying. "Yes. I'm fat and everyone knows it."

She admitted to a year-long struggle with body image and activities that are synonymous with anorexia. She was looking for help. Like others in her region, however, her access to resources was very limited. We eventually found a specialist two hours away who accepted payment on a sliding scale basis. Providing Lisa with a journal, I encouraged her to chronicle her journey through recovery. Now many years later, Lisa is still working on being healthy and happy. She has shared her story and helped others with similar issues, and aspires to be a pediatric psychiatrist.

Encounters like this one are not the typical stories of a catastrophe or a shocking incident from the ED that



Always consider a mental health disorder

Table 2. Barriers in the ED to recognizing and referring these patients

Time. At-risk patients take time to identify, especially when the visit seems unrelated and the department is bustling.

Education. A paucity of mental health education for medical staff and ancillary support inhibits recognition of these patients. Also, lack of awareness of available resources impedes effective referrals.

Resource availability. Lack of access to necessary resources continues to be an issue, for both inpatient and outpatient treatment. This is especially the case in the rural setting, when the nearest resource may be two or more hours away.

Patient priorities. Should I pay for mental health services or pay the electric bill? Factors such as transportation and personal time from work are barriers for these patients and their families. Priorities relative to the patient's situation can ultimately result in a lack of follow-up.

are often remembered as defining or important moments in a medical career, but sometimes their subtlety is what makes them striking. A few minutes of real communication with a patient can be a catalyst for transformation in life. Lisa has touched the lives of so many others with her story, creating a wave of positive change. Doctors, especially emergency physicians, see patients at their most vulnerable moments. How many patients can we save in those moments?

Reflecting on experiences like this one, I couldn't help but wonder – how prevalent are mental health disorders in adolescents? Is Lisa's story just the tip of the iceberg? Are we missing opportunities to identify these patients? The committee on pediatric emergency medicine published data in 2011 regarding mental health emergencies in the adolescent and pediatric populations. (*See Table 1.*)

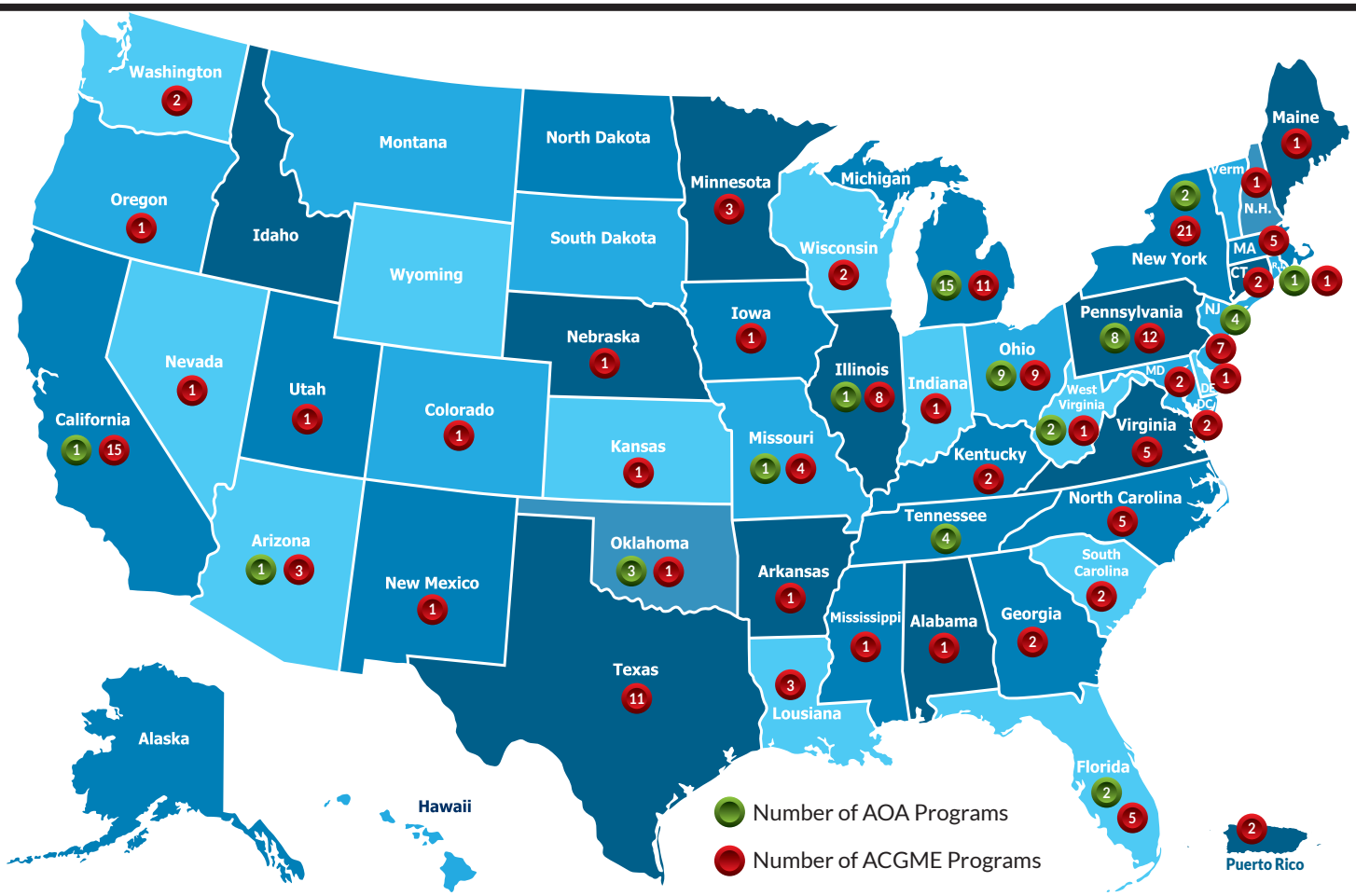
About 83% of adolescents who attempted suicide were not recognized as suicidal by their primary care physicians.

This data suggests that as emergency physicians, we have an opportunity to intervene. There is an increasing incidence of pediatric psychiatric emergencies and unrecognized suicidal ideation in adolescents, which is paired with an already underdeveloped mental health infrastructure in many communities.[1] This is particularly true in rural areas, where patients utilize EDs whether they are acutely in crisis or involved in risky behaviors leading to trauma, substance abuse, or suicide attempts.

Rotheram-Borus et al. reported that "fewer than 50% of adolescents seen for suicidal behavior in the ED were ever referred for treatment; and, even when they were referred, compliance with treatment was low."[2] We can do better.

Always consider a mental health disorder. Even if the chief complaint seems unrelated, take the time to ask a follow-up or screening question. Many of these patients have barriers to care; involve social work, if possible, and familiarize yourself with community resources. Small things like a phone call after a visit can make a huge difference. Among our colleagues, we can reinforce the importance of mental health issues, keeping in mind the rate of serious outcomes, including suicide.

By continuing to keep our eyes open to the needs of others, we can have a valuable impact. Understanding others on this basic level spans gender, geography, culture, and income. We have an incredible opportunity in medicine to contribute to this cause and improve mental health. So capture the moment – no matter how subtle it may seem. The outcome may be inspiring. ✶



Number of AOA/ACGME Residencies by State

TWO ROADS, ONE DESTINATION
OSTEOPATHIC EM

Zach Jarou, MSIV
EMRA MSGC Chair
Michigan State University
College of Human Medicine
Lansing, MI

Bradley Davis, OMS3
Michigan State University
College of Osteopathic
Medicine
Detroit, MI

The Changing Training Landscape

The single accreditation system will ensure quality, consistent training for all physicians-in-training, and will provide increased access to fellowships for osteopathic trainees.

In February 2014, after months of discussion, the American Osteopathic Association (AOA) and the Accreditation Council for Graduate Medical Education (ACGME), along with the American Association of Colleges of Osteopathic Medicine (AACOM), reached an agreement for a single accreditation system for the graduate medical education (GME) system in the United States.

The road ahead

Beginning in 2015, AOA-accredited training programs will have a five-year period to transition to ACGME-accreditation. **Programs with an osteopathic focus will continue under the new system and will be open to both DO and MD graduates.** Likewise, under the new agreement, allopathic medical school graduates will have access to the traditionally osteopathic training programs.

The single accreditation system will ensure quality, consistent training for all physicians-in-training, and will provide increased access to fellowships for osteopathic trainees. It is not yet clear whether there will be a single match program, although this seems likely. At this point, when it comes to licensure for osteopathic physicians, it seems that COMLEX-USA will not be going anywhere. However, there will likely be opportunities to help program directors better interpret COMLEX scores when considering osteopathic applicants. While a framework has been created, the impact for emergency medicine training will continue to evolve as the AOA and AACOM appoint osteopathic representatives to serve on the ACGME Board and Emergency Medicine Residency Review Committee (RRC).

The changing landscape

While some variation from this plan is to be expected, we hope to explain how the transition to a single accreditation system should unfold over the next several years, as well as summarize the options currently available to osteopathic students applying for emergency medicine residency training programs.

As of this month, **there are 50 AOA-approved EM residency programs** (www.opportunities.osteopathic.org), **and 167 ACGME-accredited programs** (https://www.ama-assn.org/go/freida). Five programs are dually accredited, bringing the combined number of training programs to 217.

Traditional AOA and dually accredited programs

For students seeking to match into AOA-approved or dually accredited programs, the process is fairly straightforward via the AOA Match. **The advantage of dually accredited programs is that graduates receive both AOA and ACGME credit, and have the option to become board certified by either, or both, the AOA and the American Board of Medical Specialties (ABMS).** All AOA-approved EM residencies require four years of training, with the first year being considered an internship year.

Rank lists for the AOA match must be finalized by late January and results are released at the beginning of February. On the other hand, the National Residency Matching Program requires rank lists to be submitted by late February, and results are released in late March. Students who successfully match in an AOA program via the National Matching Services (NMS) are not eligible to apply for ACGME programs via the NRMP.

ACGME programs +/- AOA internship

Osteopathic students seeking ACGME residency training have a number of options available to them, including the decision of whether or not to complete a traditional AOA intern year prior to applying for an ACGME program. **It may be wise for interested students to investigate the "DO friendliness" of programs they are considering.** Programs in areas of the country without a strong osteopathic representation, or that have never before accepted osteopathic residents, may not be worth aggressively pursuing. The majority of ACGME programs are three years in length with a handful of programs offering four years of postgraduate training. Some ACGME programs will not take osteopathic applicants who have not completed a traditional AOA-approved intern year, while others accept osteopathic graduates directly from medical school.

> Allopathic and osteopathic medical school graduates will have access to all training programs, including MD graduates wishing to complete osteopathic-focused programs.

Aside from program-specific acceptance requirements, it is also important to keep in mind that **without completing a traditional AOA-approved intern year, you will not be able to obtain a permanent license to practice in five states** – Michigan, Oklahoma, Pennsylvania, Florida, and West Virginia.

AOA Resolutions 42 and 29

The AOA began approving ACGME training in the 1980s, when the number of osteopathic medical school graduates outnumbered the number of osteopathic GME positions. In 2000, AOA Resolution 42 provided a mechanism for approving an ACGME PGY-1 year as equal to an AOA-approved internship, with certain stipulations.

The applicant must have an AOA membership, complete an application agreeing to the approval process and release of information, must demonstrate osteopathic educational activity (such as AOA conference presentations or attendance), and the PGY-1 rotations have to be similar to the traditional AOA internship. **Between 2002 and 2010, more than 2,000 Resolution 42 requests were approved, while only 11 were denied.** More recently, in 2010, AOA Resolution 29 allowed for approval of an entire ACGME residency, not just the intern year. **By taking advantage of these AOA recognition pathways for ACGME training, trainees are eligible for licensure in all 50 states.** ✶

OUTSIDE THE ED

How EMS can Improve Your Emergency Medicine Residency

Pre-hospital medicine offers unique opportunities to an EM physician, and EMS training complements the emergency medicine curriculum. You don't have to become an EMS fellow to appreciate that an understanding of what happens outside of the hospital translates to better care within the hospital. While it can be easy to oversimplify the role of EMS providers, there are some points worth considering, and if we take time to learn from the pre-hospital setting, our careers in emergency medicine will be better for it.

Adam Darnobid, MD
EMS Fellow
UMass Medical School
Worcester, MA

Clinical skills

Emergency medicine and pre-hospital medicine are complementary fields. Basic history taking and physical exam skills are the foundation for clinical decisions in both lines of work. Outside of the hospital, there is limited access to diagnostic tools, necessitating the need to trust what you see and hear. In these situations it becomes more important for the clinician to acknowledge abnormal findings quickly, and to trust clinical instincts, something we rely upon in the ED as well. Residency education may occasionally de-emphasize important procedures like high-quality CPR, IV starts, medication administration, ECG acquisition, and hemorrhage control. A solid EMS experience allows you to focus on these procedures, which better prepares you for any medical setting.

Undifferentiated patients

In most scenarios EMS providers have only the dispatch information when they arrive on scene. This forces them to quickly contextualize the limited information and translate it to important decisions, including what equipment will be needed outside of the rig. Patients will often have only minimal insight into their situation, which necessitates development of an efficient method of gathering and synthesizing information to create a plan. This rapid decision-making is an important skill, both in pre-hospital medicine and in the ED.

There are sometimes subtle environmental clues, only available to the EMS provider, that aid in the ability to rapidly identify the best course of treatment. For example, a provider noting a running kerosene heater in the corner of a patient's cold apartment could dramatically change the clinical course of care. This is also true for small tip-offs found on the physical exam. Quickly identifying stigmata of IV drug abuse can prompt a rapid reversal of opiate intoxication; if missed, it could lead to a respiratory arrest and code situation.

Working in the field forces you to make decisions under a unique set of circumstances, and in settings only found outside of the "controlled" ED environment. Skills in both fields translate well to the other. EMS forces you to experience decision-making in a resource-limited setting. Formulation of a differential, choice of a treatment plan, and decisions of where and how to transport are often made much more rapidly than in an ED.

Untreated patients

Patients frequently look much different in their natural environment than they do when they arrive in the ED. An amp of D50, a liter of fluid, or a nasal cannula can transform the most critically-ill-appearing patient into one who is pleasant and conversant. I repeatedly hear EMS personnel say, "The patient looked so much worse before we got here." These providers transform a patient from chaos to comfort. It's important to remember that patients can be significantly better by the time they arrive in your ER.

We treat acute illness on a day-to-day basis. It is vital to see patients at their first point of contact with the medical system, as their apparent acuity may change drastically. Through EMS experiences we observe the trajectory of illness change between initial presentation and arrival, and this informs our bedside practice.

The community

Pre-hospital and EMS providers speak to many different professionals who possess varying degrees of knowledge and different perspectives. Interactions with police, firefighters, and public works officials require different language and cultural norms. Gaining the trust of other service agencies can make pre-hospital medicine easier and safer for the patient. Police may provide cover for a patient extraction; firefighters may help gain access to the patient trapped within a house fire.

Similarly, in the ED we speak with different specialists and disciplines every day. Becoming comfortable interacting with your techs, nurses, subspecialists, and other ED physicians is necessary to deliver effective patient care. The interpersonal skills in both fields complement each other; improving the ability to communicate across boundaries is critical for our patients.

Quality assurance

As emergency physicians, we supply quality assurance for EMS calls. ED physicians provide oversight, review of calls, establishment of metrics, and consideration of system-level data to decide if reasonable care is being provided. We are instrumental in developing EMS metrics, from call and scene review to performance evaluations. EMS Q&A provides the opportunity to be involved in systems and operations feedback and evaluate the measurements of "quality" – skills that are important during a medical career. Critique and analysis of the medical care provided to our patients allow for a more inclusive model of medicine and improved outcomes.

Leadership

EMS exposure during residency allows residents to lead teams of health care professionals in advancement of patient care and quality assurance. These leadership skills can translate well to other situations. EMS and pre-hospital medicine gives us the opportunity to step up and direct patient care with different teams. EMS experience sharpens teamwork and leadership skills, and in turn allows delivery of more effective care in the ED.

Emergency medicine leads the way in pre-hospital medicine and holds a leadership position in the EMS community. This provides an invaluable opportunity for residents in training. Lessons learned in the field easily apply to the traditional clinical environment and allow EM residents to grow. Residents who seek out EMS experiences will broaden their education and gain valuable skills. Residencies that include EMS as part of their curriculum will produce better residents and stronger leaders. ✶

BACKBOARDS

Do They Really Have Your Back?

Spinal immobilization has long been considered standard practice for pre-hospital trauma patients. Placing patients on long spinal boards is one of the most common interventions performed by EMS providers, but this blanket practice is being re-evaluated, focusing instead on a more selective approach.

Benefits of spinal immobilization

The concept of spinal immobilization was developed as a mechanism to keep the spine in neutral alignment after a suspected injury. In-line stabilization attempts to limit motion of an injured spine, thereby potentially minimizing aggravation of a spinal injury or worsening of the patient's neurologic outcome. Despite the emphasis in EMS textbooks on the importance of spinal immobilization, there is little in the literature supporting this practice for all patients involved in trauma. Studies have suggested that mishandling a traumatized *cervical* spine is associated with poor outcomes. An Australian retrospective case series by Toscano et al. revealed that a large number of trauma patients developed major neurologic deterioration, attributed largely to inadequate immobilization and improper patient handling.[1]

Risks of spinal immobilization

Although the data describing the benefits of spinal immobilization is limited, several studies have questioned the universal use of backboards. Hauswald et al. compared two populations: Malaysian trauma patients without spinal immobilization and trauma patients in the United States who were universally immobilized. This study found less neurologic disability in the Malaysian population (OR 2.10, 95% CI 1.03-3.99), and revealed a less than 2% chance that immobilization had any beneficial effect on neurologic outcome.[2] Similarly, a Cochrane review challenged the concept of universal spinal immobilization, stating that its effects on mortality, neurologic injury, spinal stability, and adverse outcomes were uncertain.[3]

In cases of penetrating trauma, spinal immobilization is associated with twice the mortality compared to those patients not immobilized, as described by Haut et al.[4] This study, however, is somewhat limited by a lack of analysis on how transport times may have affected mortality. In addition to highlighting the largely unproven benefit of universal spinal immobilization, this particular study underscores the potential harm associated with immobilization in penetrating trauma. It is the position of the National Association of EMS Physicians (NAEMSP) that patients with penetrating trauma to the head, neck, or torso, without evidence of spinal injury, should not be immobilized to a backboard.[5]

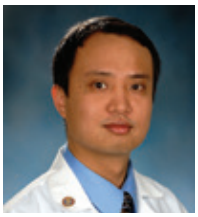
Backboarding appears to be associated with several risks to the patient. Immobilization has been linked with restriction of normal respiration by decreasing compliance of the chest, and can reproduce a restrictive pulmonary process.[6] In the pediatric population, there is a mean reduction in forced vital capacity (FVC) to 80% of baseline.[7] Furthermore, it is associated with higher pain scores and may contribute to more imaging being performed as compared to non-immobilized children, despite controlling for severity of injury.[8] Backboards have been shown to contribute to patient pain and discomfort,[9] and can also be a factor in the development of pressure ulcers.[10]

Pre-hospital decision-making

The NAEMSP recently issued a position statement on the use of long backboards in the pre-hospital setting. Immobilization is potentially appropriate in patients with blunt injury and an altered level of consciousness, spinal pain or tenderness, neurologic complaints, an anatomic deformity of the spine, high energy mechanism of injury, or for patients who are intoxicated, are unable to communicate, or have a distracting injury.[5] The NAEMSP supports judicious use of spinal boards for immobilization.

As studies have suggested that spinal immobilization is not necessarily benign, there has been an increasing focus on determining which patients truly need to be placed on a backboard. One pre-hospital study has shown that in patients who are not altered or intoxicated, the negative predictive value for spinal injury is 99.5% if no spine tenderness/pain or extremity fractures are present.[11] In 2002, the state of Maine introduced an EMS spine assessment protocol that included immobilization decision-making based upon the mechanism of injury, mental status, presence of distracting injury, neurologic findings, or spine pain/tenderness. This protocol was found to have a negative predictive value of 99.9%, and an 87% sensitivity for detecting an acute spine fracture.[12] These studies indicate that an algorithmic decision-making process is reliable in the pre-hospital setting.

Christina L. Tupe, MD
University of Maryland
Medical Center
Baltimore, MD



Jose V. Nable, MD, NRP
Clinical Instructor/EMS Fellow
University of Maryland
School of Medicine
Baltimore, MD

Conclusions

Spinal immobilization has long been an element of pre-hospital medicine. It has been taught as a necessity of trauma, though benefits of universal immobilization are unclear and potential harm has been demonstrated. An algorithmic approach based on validated criteria to limit backboarding to those who truly need immobilization may be valuable. As noted by the NAEMSP, however, spinal precautions are paramount in at-risk patients in whom spinal injury is suspected.[5] ✶

BACKBOARDING APPEARS TO BE ASSOCIATED WITH SEVERAL RISKS TO THE PATIENT.

In Their Boots

WHAT EMS TEACHES US

Emily McClain, MD
Emergency Medicine
The University of Toledo
Toledo, OH

Pre-hospital providers serve as a first chance for lifesaving intervention.

"I'm scared." The young woman was tearful. These were the words of a patient from our first call of the day, a woman from the local jail with a possible miscarriage. She had had trouble with pregnancies in the past, including a stillborn delivery that still haunted her.

The medic leaned in, talking quietly. "We'll get you to the hospital and get you checked out. Sometimes the bleeding can be normal." She then related this to her own personal experience, saying in a reassuring voice, "When I was pregnant with my son, I had bleeding in my second trimester and it was fine. Hopefully this will be okay."

The patient smiled. The medic finished the assessment, reported to the accepting institution, and we proceeded to deliver the patient to the ED. If it weren't for the police escort behind our truck, I would have forgotten that the patient had come from a jail.

I have seen many personnel in the ED treat patients from jail or police cars differently than other patients. The perception of patients can be skewed when knowledge of their personal history or the crimes they may have committed becomes known. The sincere, tender, and genuine care offered by a medic can oftentimes be compromised due to the setting. However, it is also often the case that these patients are approached, treated, and cared for as any other patient, much like the patient in this scenario.

EMS personnel on the front lines of medicine. They are the eyes through which physicians see into the patients' homes and the circumstances of their emergencies. Surrounded by medical personnel on arrival, patients often blend into the medical fray. It can be easy to forget how few people initially responded to their need, were responsible for the vital first minutes of their survival, and transported them to definitive care.

As the pre-hospital world grows in its scope, it would behoove physicians to gain a greater understanding of how pre-hospital treatment functions. Paramedics often first initiate therapy in the field – from steroids to albuterol, and from aspirin to cath lab activation for STEMI under some protocols. Pre-hospital providers work in tandem with hospital staff and physicians, and serve as a first chance for lifesaving intervention.

Residency programs vary in their education on pre-hospital care. Katzer, et al. submitted a survey regarding EMS education to all EM residency programs, of which 70% responded. They found that 89% of programs have a dedicated EMS rotation within residency.[1] Rotations varied from one to nine weeks in length, with a median of three weeks. These rotations consist mainly of ground ride-along time, which can be invaluable for understanding the role of medics in pre-hospital care.

Results from the same survey indicated that most residents would like to have more disaster training added to their EMS education. Since hurricanes Katrina and Sandy, physicians' actions in disaster scenarios have been in the spotlight. As the rest of the medical system becomes more educated and prepared, ED physicians are still not required to receive disaster certification through the Department of Homeland Security. This includes training in perhaps the most important aspect of disaster preparedness – the triage system, to which many physicians are not formally introduced. This makes it more difficult for us to function as part of the disaster response system and could lead to mistakes.

When residents are incorporated into field responses, they can gain useful education in pre-hospital procedures and emergency management.[2] At some training programs, residents provide radio consultation with pre-hospital providers, in addition to doing field work. These residents reported an increased sense of autonomy, ability to make medical decisions, and skills in dealing with high-acuity patients. This communication with medics in the field helps residents gain a greater understanding of the overarching management of patients from door to floor.

In my residency training program, we are fortunate to benefit from a strong EMS system in place around us. We take advantage of this through a mandatory EMS rotation, beginning discussions about mass disasters during orientation, and having a broad scope of simulation scenarios from botulinum to bombs. Like many other emergency training programs, we are taught to triage and manage resources, and as a result, our residents integrate well into the EMS system. While most EMS education comes from internal sources, we should not neglect the greatest educational resource we have – our pre-hospital providers. As it is all over the country, it is our local medics who provide an excellent education in the first frontier of medicine, stretching life-saving interventions into our patients' living rooms without compromising respect for the ones being treated. We as emergency medicine physicians should recognize the hard work they do and, if we pay closer attention, we will find that they have much to teach us. ✶

EMS personnel are on the front lines of medicine. They are the eyes through which physicians see into the patients' homes and the circumstances of their emergencies.

Trevor MacDonald
Winnipeg, Manitoba
Canada

A Different

Ian and I found out we were pregnant on the Sunday after Thanksgiving – one month along; everything seemed to be going right in life, and this just felt like it was meant to be. Now, five weeks later, I was on my way to the emergency room after I started to have some light bleeding. We didn't have our midwife's pager number, so I wasn't able to talk to her about what I should do. I drove myself into town and left Ian and our son, Jacob, on their own for the first time overnight.

Medically it was nerve-wracking, but emotionally it was draining, knowing that I would spend the rest of the night "coming out" over and over again. I couldn't even describe my problem without explaining the most personal, intimate details of my life and my body.

I once visited a walk-in clinic for a urinary tract infection, and erroneously assumed that the doctor knew what "transgender" meant. Partway through the visit, I realized he was utterly confused about my anatomy, to the embarrassment of both of us. Ever since, I've tried to be clearer when explaining my situation. I stop for a moment and give the care provider time to absorb what I've said and/or admit his or her uncertainty.

The intake nurse motioned me to her desk. I began, "I am transgender. I was born female, but transitioned to male by taking testosterone and having chest surgery." I paused and looked at her; she nodded.

Is that ok? Do you understand that?

I proceeded to tell the intake nurse that I was pregnant, experiencing bleeding, and feeling unwell. Without particular comment, she gave me a paper wrist bracelet and told me to sit down.

After a couple of hours, I was moved to an exam room, where I waited another three hours without speaking to anyone. I spent the time listening to the busy doctors and nurses, wondering if they would be "trans-friendly."

A nurse came in and politely asked why I was at the hospital. I started again from the beginning – transgender… born female…pregnant…10 weeks…light bleeding.

Another nurse came in later to check my vitals. She, too, asked why I was there. I went through the same spiel – transgender, born female. Like the others, she was professional and respectful.

A little later on, a student doctor entered the room. "What's going on?"

"Umm, do you know the background at all?" I asked.

Did I really have to come out as transgender to each of these people, one at a time?

I'm much more practiced at it these days than I once was, but it's still stressful. **I never know how someone, even a professional, will react.** One of the first people I ever came out to was my music teacher; she yelled at me angrily in disbelief. More commonly, people respond by asking questions about my love life, my genitals, what my parents think, or why I transitioned. Sometimes, people ask me what my "real" name is, or start referring to me using female pronouns. Once I overheard an OB/GYN laugh when her colleague asked her what it was like to examine me.

"I do know the back story a bit," the student started.

"So, you know I'm transgender?"

"Yes."

"Are you ok with that?"

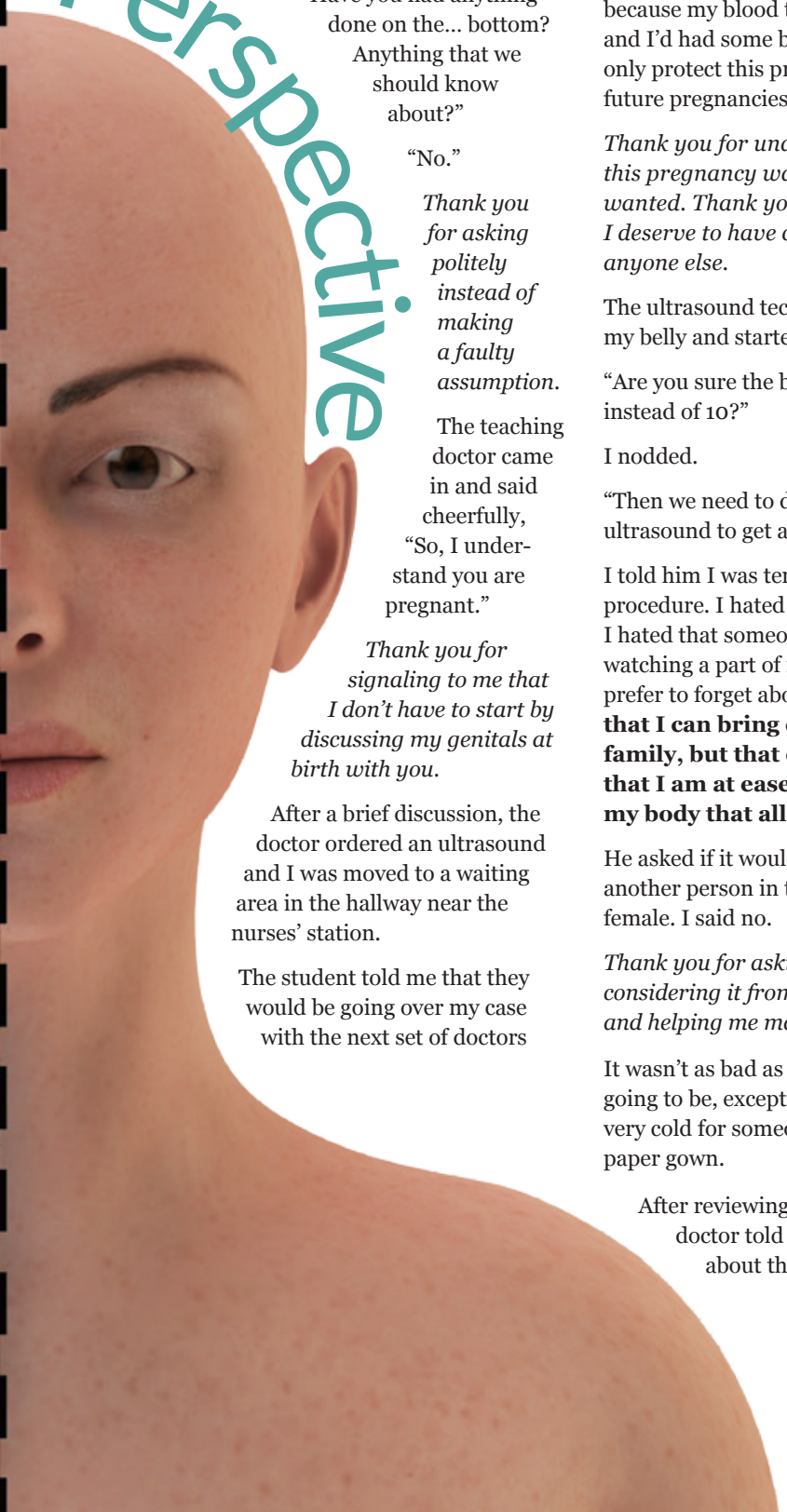
"Yeah. I did some research; I think I am caught up," he replied.

Ok, he looked in the chart ahead of time, realized he was unfamiliar with transgender individuals, and decided to look us up. Then, within a few minutes of doing some reading, he was able to use the correct pronouns and have a frank discussion about my medical problem. THANK YOU for reading up before talking with me.

He asked me plenty of questions, including confirming that I had not been taking testosterone recently.

"Not since before conceiving my toddler. I had a healthy pregnancy before this one."

He asked the same question again. Maybe he was confused by my masculine presentation – I have facial hair and a deep voice. **Many people, health care providers included, don't realize that testosterone can have a permanent effect on some secondary sex characteristics.** In many cases,



Perspective

after testosterone has stimulated the development of hair follicles in the face, only electrolysis will stop hair growth, even if the patient halts medication. Testosterone's effects on the inner workings of the reproductive system, however, are normally reversible; a trans guy can ovulate and grow a beard.

"Have you had anything done on the... bottom? Anything that we should know about?"

"No."

Thank you for asking politely instead of making a faulty assumption.

The teaching doctor came in and said cheerfully, "So, I understand you are pregnant."

Thank you for signaling to me that I don't have to start by discussing my genitals at birth with you.

After a brief discussion, the doctor ordered an ultrasound and I was moved to a waiting area in the hallway near the nurses' station.

The student told me that they would be going over my case with the next set of doctors coming in after the night shift. "You might hear us talking about you."

I watched and listened to it all. There was not a single wrong pronoun, no poorly covered laughs, and no unnecessary discussion of my body or my transition.

The new doctor sat down next to me and said I would need a WinRho shot because my blood type is Rh negative and I'd had some bleeding. "It will not only protect this pregnancy, but all future pregnancies as well."

Thank you for understanding that this pregnancy was planned and wanted. Thank you for accepting that I deserve to have children as much as anyone else.

The ultrasound technician put goo on my belly and started taking pictures.

"Are you sure the baby isn't 5 weeks instead of 10?"

I nodded.

"Then we need to do a vaginal ultrasound to get a clear picture."

I told him I was terrified of that procedure. I hated the feeling of it, and I hated that someone would be intently watching a part of me that I would prefer to forget about. **I'm grateful that I can bring children into our family, but that does not mean that I am at ease with the parts of my body that allow it.**

He asked if it would help to have another person in the room, male or female. I said no.

Thank you for asking. Thank you for considering it from my perspective and helping me make my own choice.

It wasn't as bad as I thought it was going to be, except the room was very cold for someone wearing a paper gown.

After reviewing the images the doctor told me, "You were right about the dates, but the fetus stopped growing at 6 weeks. I'm so sorry. We almost never know why this happens."

I called Ian and told him. I felt like I was stabbing him, giving him such painful news. I've never heard his voice sound as broken as it did that day.

The OB/GYN doctor and student who came to talk to me next were profoundly sympathetic and kind. They discussed the risks and benefits of a D&C versus taking a medication to help expel the fetus, and left the decision up to me. I chose the medication. Jacob and Ian came in and I got some amazing, big hugs. Jacob nursed while the various doctors and nurses gave him adoring looks. No one asked why I still chestfeed my toddler or whether doing so makes me feel like less of a man.

The doctor returned and said, "We usually give this medication vaginally, but we looked it up and found that you can also take it orally. So we can give you a prescription for it and you can use it at home when you are ready."

They understood. YES, a trans guy would likely prefer a pill.

On my way out of the hospital I caught my main doctor in between tasks. "Every single person here has been so respectful and understanding. I really appreciate it. I've had bad experiences before."

"And you will have them again," he finished. "You know that. But I'm glad that people were good this time. I think things are changing."

Ian, Jacob, and I went home, shocked. For the past four weeks, while we were planning and dreaming about a new family member, our baby was already gone. I can say, though, that **I left the hospital a little less scared of doctors than I was when I arrived**, and grateful to have shared a different perspective. ✶

Understanding Alcoholic Ketoacidosis

Although the underlying pathophysiology is complex, a proper comprehension greatly aids in the diagnosis and management of this condition.

A 49-year-old male with a history of alcohol abuse presents to the ED with complaints of generalized abdominal pain and vomiting for the last 36 hours. The patient is well-known to the department for alcohol-related visits and continues to drink daily. On arrival, he is tachycardic and tachypneic, and physical examination findings include dry mucous membranes, decreased skin turgor, epigastric tenderness, and a tremor in both hands. Laboratory studies show a serum bicarbonate of 10 mEq/L, an anion gap of 30, a serum glucose of 95 mg/dL, a lactic acidosis with pH 7.2, hypophosphatemia, and trace ketonuria. Abdominal CT scan is normal. He denies a history of diabetes mellitus, ingestion of any toxic alcohols, or recent illness.

Gabriel Wardi, MD, MPH
University of California at San Diego
San Diego, CA

Charles O'Connell, MD
Fellow, Division of Medical Toxicology
University of California at San Diego
San Diego, CA

KEY KETONES

This patient could potentially have any one of many diagnoses, but his presentation and lab findings are most consistent with alcoholic ketoacidosis (AKA). AKA can be a common ED diagnosis and typically occurs in **chronic alcohol drinkers who have an abrupt cessation in their alcohol intake coupled with decreased glycemic intake and intravascular volume depletion**.[1]

In the majority of cases, a precipitating event such as pancreatitis, gastritis, or an aspiration pneumonia leads to an abrupt decline in oral intake. About 24 to 72 hours after cessation of PO intake, AKA can develop.[2] These patients usually have a low or absent serum alcohol concentration and can present with varying degrees of alcohol withdrawal. However, a clear sensorium is a hallmark of this condition. The presence of an alteration in consciousness strongly suggests that another process is present.[3]

Although the underlying pathophysiology is complex, a proper comprehension greatly aids in the diagnosis and management of this condition.

There are three general concepts that drive AKA:

❶ Alcohol ingestion, compounded with decreased caloric intake and dehydration, favors a ketotic state.

Ketoacidosis is caused by a combination of factors, including starvation-induced hypoinsulinemia, oxidation of alcohol to its various ketone metabolites, lipolysis with free fatty acid (FFA) release, and intravascular volume contraction. The relative starvation state in AKA leads to excessive glucagon secretion and reduced peripheral insulin concentrations, which plays a key role in developing ketoacidosis. Metabolism of fats through lipolysis produces beta-hydroxybutyrate (BHB) and acytyl-acetate (ACA). These ketones are utilized for cellular respiration to provide energy through adenosine triphosphate (ATP) production, but add to the anion gap acidosis seen in AKA.

❷ During the metabolism of ethanol, high amounts of NADH (the reduced form of nicotinamide-adenine dinucleotide [NAD+]) are generated.[4]

NAD+ is a coenzyme used to carry electrons in intracellular redox reactions. The reduction of NAD+ and consequential accumulation and imbalance of NADH in the metabolism of ethanol has several important consequences. BHB generation predominates over the production of ACA in this high NADH to NAD+ ratio. This abnormal ratio leads to an inhibition of the citric acid cycle and hepatic gluconeogenesis, which partially explains why hyperglycemia is rare in these patients.

Almost counterintuitively, there is a failure to regenerate normal levels of NAD+ and ACA in AKA. The reoxidization of NADH to NAD+ appears to be limited by a combination of factors, including hypophosphatemia and a functional block within the mitochondria.[2]

The lactic acidosis seen in AKA is due to an abnormal redox state. Pyruvate is a substrate used in numerous energy-producing pathways, but in alcoholic ketoacidosis, it is shifted from its normal metabolic pathways to others that increase lactate production. In addition, the regeneration of pyruvate from lactic acid is impaired.

❸ A heightened adrenergic state and volume depletion worsen ketosis and inhibits gluconeogenesis, creating a state that favors the creation and maintenance of a ketotic milieu.

The body responds to starvation, dehydration, and hypoglycemia with the release of counter-regulatory hormones. These hormones increase sympathetic tone, decrease insulin release, and increase ketone concentration through the release of FFAs and decreased peripheral ketone metabolism. All of these changes perpetuate the ketotic state until glucose is reintroduced into the system. Significant dehydration due to vomiting and decreased oral intake lead to impaired renal ketone clearance, further exacerbating the situation.[2]

The differential diagnosis for AKA should include starvation ketosis and diabetic ketoacidosis (DKA). Although a thorough history can help to narrow the differential, a metabolic panel is essential to confirm the diagnosis. Anion gaps of 30 mEq/L or more can be seen in AKA, though the gap may be obscured by a concomitant primary metabolic alkalosis due to vomiting. In fact, there are case reports of patients with AKA who have an alkalemic serum pH due to excessive vomiting.

The anion gap in starvation ketosis is typically much lower, with bicarbonate levels rarely below 18 mEq/L, and serum pH typically above 7.30.[2] In DKA, by

continued on page 32

Table 1. Characteristics of Common Ketoacidoses

	Diabetic Ketoacidosis	Alcoholic Ketoacidosis	Starvation Ketoacidosis
Bicarbonate	Can reach single digits	Can reach single digits	> 18
Glucose	Elevated	Low to mildly elevated	Low to normal
Measurable ketonuria	Present	Absent or present	Present

contrast, the anion gap can be quite high, with bicarbonate levels frequently reaching the single digits. Hyperglycemia with glycosuria, typically seen in diabetic ketoacidosis (DKA), is rare with AKA.[4] Chronic malnutrition leads to low glycogen reserves, and the heightened adrenergic tone leads to inhibition of hepatic gluconeogenesis. Ketonuria, present in all three of these conditions, can confound the severity of AKA.

Ketonuria is measured by the nitroprusside test, in which a color change indicates the relative concentration of acetone and ACA in the urine. The presence of BHB, the most prominent ketone present in AKA, is not reflected by the nitroprusside test. This explains why patients with AKA may show no or only slight ketonuria on initial presentation, with a paradoxical increase as the condition is reversed. As the ACA:BHB ratio normalizes, both the detectable ACA and BHB are cleared in the urine.

Differential diagnosis

Other life-threatening conditions that can cause a significant anion gap acidosis should also be considered in the differential diagnosis. The toxic alcohols, specifically methanol and ethylene glycol, may be intentionally or accidentally ingested in this patient population. These ingestions can cause significant morbidity and mortality if not appropriately managed.[5] Altered mental status is a common feature of toxic alcohol ingestion but is not usually seen in AKA.[5]

Patients will typically have an initial osmolar gap that transitions to an increased anion gap as the toxic alcohol is metabolized. Elevated serum BHB concentration may be quite elevated in AKA, but this does not necessarily exclude the possibility of toxic alcohol ingestion; nor does the absence of an osmolar or anion gap rule out the diagnosis. While patients in AKA have a slight lactic acidosis, the presence of a significantly elevated lactate level should prompt the search for an underlying illness. Rarely, a combination of AKA and one of these other events may occur and present a diagnostic conundrum. Thoughtful consideration of timing, type and amount of ingestion, and associated symptoms, in combination with observation and laboratory studies, must be used to make this differentiation if a clear and accurate history is lacking.

Treatment

The reversal of ketosis and vigorous rehydration are central in the management of AKA. In addition to isotonic fluid replacement, dextrose-containing intravenous fluids are needed. Typically, 5% dextrose with half-normal saline at a rate of 150 mL per hour provides sufficient glucose to stimulate the pancreas to secrete insulin, allowing peripheral tissues to metabolize ketones and inhibit FFA release.[2] It also allows the body to regenerate NAD+, which is inhibited by the metabolic alterations caused by AKA. Intravenous dextrose-containing fluid infusions should be stopped once the bicarbonate levels have reached 18-20 mEq/L and the patient is tolerating oral intake. This typically occurs 8 to 16 hours after the initiation of treatment.[2] Alcohol withdrawal in these patients should be aggressively managed with intravenous benzodiazepines. Thiamine, folate, and other electrolytes, most notably phosphate and potassium, may need to be repleted in these patients.[6] Interestingly, the majority of morbidity seen in AKA is due to the underlying process that caused the cessation of alcohol.

Case conclusion

The patient received 4 liters of normal saline and was started on D5-1/2 NS prior to admission. He was given IV valium for alcohol withdrawal, and thiamine, folate, and phosphate were repleted. He was hospitalized for three days for management of AKA and alcohol withdrawal, then discharged once tolerating oral intake and in good condition. He was seen three weeks later in the emergency department for a similar presentation. ✶

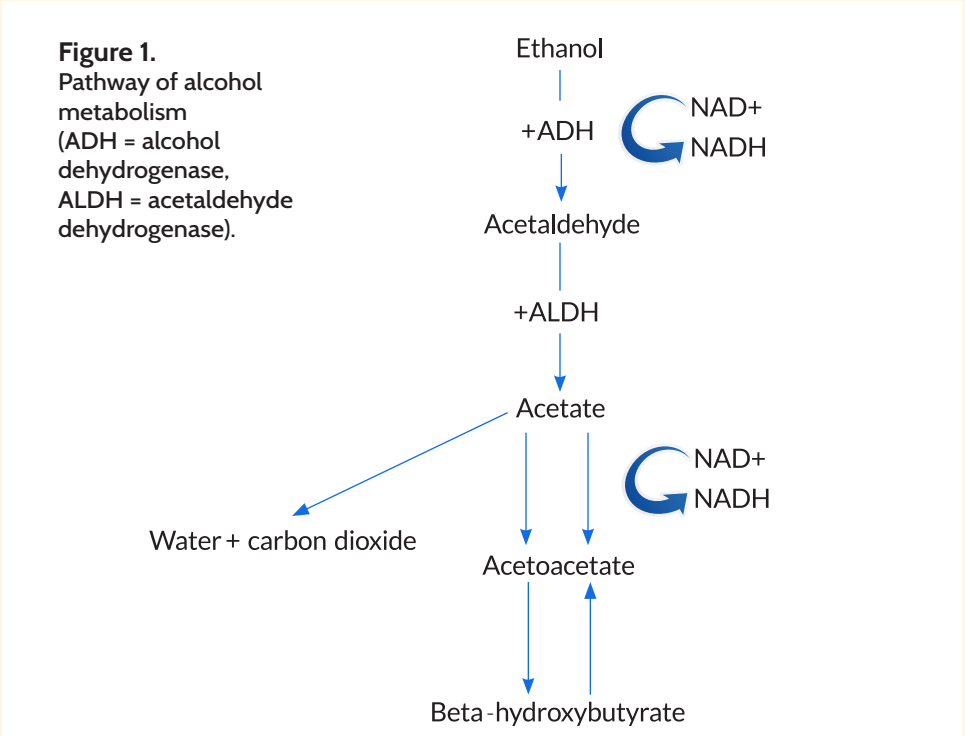


Figure 1. Pathway of alcohol metabolism (ADH = alcohol dehydrogenase, ALDH = acetaldehyde dehydrogenase).

EMRA Events at the SAEM Annual Meeting

The Sheraton Hotel, 400 N. Olive St, Dallas, TX 75201

Note: All events are at the Sheraton Hotel unless noted by "SCC" – Sheraton Conference Center

	TUESDAY, MAY 13, 2014	
9:00 am–5:00 pm	EMRA Board of Directors Meeting	Trinity 1 (3rd Floor)
	WEDNESDAY, MAY 14, 2014	
8:00 am–12:00 pm	EMRA/SAEM Simulation Academy Resident Sim Wars	Lone Star Ballroom (2nd Floor, SCC)
9:00 am–12:00 pm	EMRA Board of Directors Meeting	Trinity 1 (3rd Floor)
1:30 pm–2:30 pm	EMRA Committee/Division Chair & Vice Chair Orientation	Trinity 2 (3rd Floor)
1:30 pm–5:00 pm	EMRA Medical Student Governing Council Meeting	Trinity 4 (3rd Floor)
1:30 pm–2:30 pm	EMRA Regional Representative Meeting	Trinity 3 (3rd Floor)
2:30 pm–3:00 pm	EMRA Conference Committee Orientation	State Room 1 (3rd Floor, SCC)
3:00 pm–4:00 pm	EMRA Reference Committee Public Hearing	State Room 2 (3rd Floor, SCC)
4:00 pm–5:00 pm	EMRA Reference Committee Work Meeting	State Room 3 (3rd Floor, SCC)
5:00 pm–7:00 pm	EMRA Quiz Show	Austin Ballroom 2
	THURSDAY, MAY 15, 2014	
8:00 am–8:30 am	EMRA Rep Council Welcome Breakfast & Registration	Houston Ballroom C (2rd Floor, SCC)
8:30 am–12:00 pm	EMRA Rep Council Meeting / Town Hall	Houston Ballroom C (2rd Floor, SCC)
1:30 pm–3:30 pm	**EMRA Committee/Division Meetings**	**Rooms**
	• Awards Committee	Trinity 2
	• Critical Care Division	Trinity 4
	• Informatics Committee	Trinity 5
	• International Division	Trinity 1
	• Research Committee	Trinity 3
3:30 pm–5:30 pm	**EMRA Committee Division Meetings**	**Rooms**
	• Education Committee	Trinity 1
	• EMS Division	Trinity 3
	• EM Resident Advisory Committee	Trinity 5
	• Health Policy Committee	Trinity 2
	• Ultrasound Division	Cityview 1
	• Wilderness Division	Trinity 4
6:00 pm–7:00 pm	EMRA Spring Awards Reception	Houston Ballroom C (3rd Floor, SCC)
10:00 pm–2:00 am	EMRA Party	TBD
	FRIDAY, MAY 16, 2014	
9:00 am–5:00 pm	EMRA Board of Directors Meeting	Trinity 1 (3rd Floor)
12:00 pm–3:00 pm	EMRA Committee & Division Updates	Trinity 1 (3rd Floor)

SCHEDULE SUBJECT TO CHANGE

A networking event specifically geared toward residents, medical students, and young physicians.

SAEM Interest Group Networking Events

Check emra.org/SAEM for location and details.

The chairs or leaders of the SAEM Interest Groups and Academies will be available to network with young physicians who are interested in developing niches within EM, or just looking to get more involved.

For questions, please contact David Diller, MD at academicaffairsrep@emra.org

After 35 years in emergency medicine, you gain a little more than just medical knowledge. The day in and day out, grueling aspects of our chosen field can sometimes be difficult, and so I offer my suggestions for a long and fulfilling career in this challenging specialty. While not scientific, and perhaps not original, and certainly not always fail-proof, here are some of the points that helped me to a long and fulfilling career.

Helmut Meisl, MD, FACEP
Former QI Director
Good Samaritan Hospital
Former Chair of ACEP Quality Improvement and Patient Safety section
San Jose, CA

12 HOW WE SURVIVE
Ways to Prosper in Emergency Medicine

1 Remain humble.

The human body and the illnesses that plague it are complex; there is much we don't know, especially on a limited ED contact. The worst mistakes I have made were the result of rushing to conclusions, or adhering to an inappropriate diagnosis. Avoid jumping to quick conclusions, and be especially cautious when something appears too obvious. Admitting to myself, my consultants, and my patients that sometimes I did not know the answer has helped me numerous times. I found it mentally easier to be unsure, rather than to be wrong. An uncertain diagnosis is better than a wrong diagnosis.

2 Remember that your main goal is not to save lives.

Like most of us, I entered emergency medicine to save lives. There are the occasional resuscitations that turn out well, and they gratify this desire. However, we mostly treat moderate to minor illnesses and many worried well. Repair of a laceration, treating acute pain, talking to worried parents, and reasoning through the symptoms and making a diagnosis may seem routine, but can provide ongoing satisfaction. Feeling frustrated by rote, unexciting encounters while waiting for the next major trauma or resuscitation will breed dissatisfaction in your specialty choice. Treating minor illnesses may prevent more serious complications and benefit patients more than treating them in the end stages of their disease. After all, we treat patients, not illnesses.

3 Treat all patients as an exciting clinical challenge.

Use your history and physical exam skills, and then test as necessary. It is much more rewarding to think, to be a detective and make a diagnosis based on your personal diagnostic skills, rather than looking at laboratory results or CT images. Be cognitive, not just a computer screen monitor. The patients with chronic back pain seeking narcotics are difficult for all of us, but trying an individual approach is worth the effort. Rather than being angry at the encounter and the patient, invest interest in them as a person (even if narcotics are not prescribed). Importantly, it may prevent you from missing a true acute pathology. In essence, take all patients as a learning experience.

4 Don't rush.

This may sound impossible in a busy ED, but a deep breath and a few seconds in a critical situation can help establish the immediate priority, organize resources, and formulate a treatment plan. In other situations, take a few extra seconds with the history; it is amazing what you can learn when you allow the patient a voice. I have found it very helpful to have family at the bedside – ask if they have anything else to add. Often a diagnosis can be made by a comment from someone other than the patient.

Take time with your physical exam; looking beyond the torso may actually produce the diagnosis. Check the groin and legs, look in the ears and mouth. Patients and their family will feel that you are more thorough, and you might find what you were really looking for. Stop by to see your patient more than once – often the repeat exam reveals the diagnosis. That diffuse belly pain just might turn into focal right lower quadrant pain. Repeat interactions can reveal important clues in the history as well – like the patient I was discharging with a tension headache and anxiety asking whether the new gas space heater he's been using might be an issue. Don't rush patients along at the end of your shift – your impressions on your way hurriedly out the door are more likely to be wrong. Take time to be a doctor.

5 Realize you aren't perfect.

This goes with humility. Accept that you will not always make the diagnosis, and realize you will make mistakes. Just remember to keep trying, learning, and improving yourself.

6 Realize you can't save the world, or even every patient.

Not every patient can be saved, nor every problem solved. This includes critically ill patients, as well as the numerous drug, alcohol, and social problems we see. However, performing your best for each patient with whatever resources you have available will, in aggregate, make positive differences for all the patients we see over the years.

7 Try to please patients.

I won't go into patient satisfaction scores. Better than survey metrics is just treating patients as individuals, involving patients and families in their care, and applying your training and knowledge. It's better for your integrity and sanity. I started performing patient call-backs 25 years ago, and it has

been immensely gratifying. Patients are so happy for someone (especially the physician who saw them) to check in on them and answer questions. I've had more expressions of gratitude over the phone than in person in the ED. I even believe I've avoided some potential malpractice cases when I called the patient and realized that they didn't do as well as hoped, or that I missed the diagnosis, but was able to discuss it with them.

8 Accept help from all.

Nurses, social workers, aides, and clerical personnel often have information and ideas you never will. Don't ever play down their roles or ignore what they have to say.

9 Keep learning.

Learning helps us become involved in what we are doing, keeps the practice more exciting, and gives us more credibility when interacting with other members of the medical staff. Pick up a journal, reread your textbooks. Expanding your knowledge has obvious benefits for the patient.

10 Keep teaching.

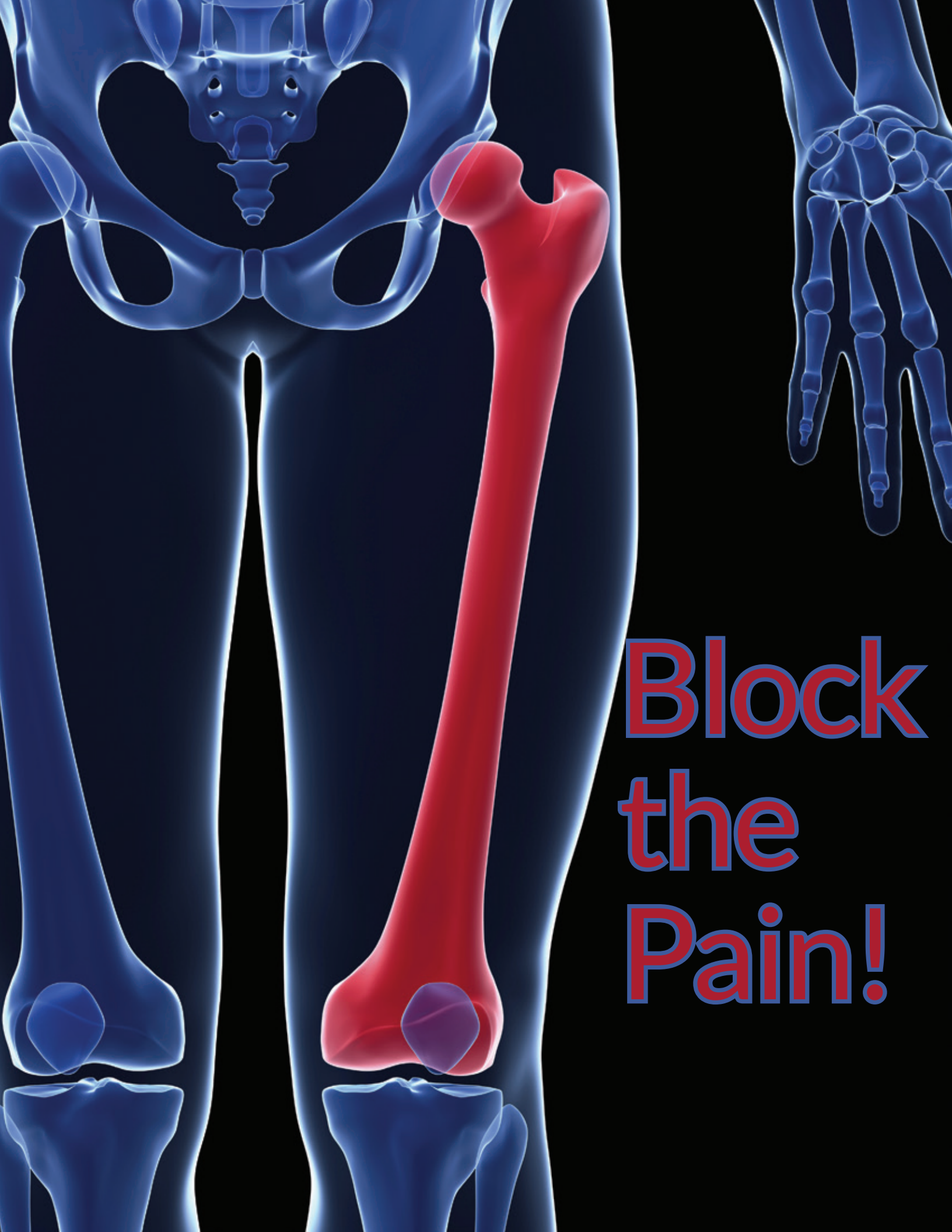
Teaching can take many forms, from explaining a diagnosis to patients to discussing concepts with nursing staff, to formal academic lectures. Teaching and receiving questions sharpens our thinking skills and makes us reflect on what we know (or don't know).

11 Get involved generally in emergency medicine.

Try to engage in medical activities outside your required clinical duties. Attendance at your local hospital medical staff departmental meetings, or presentation at grand rounds provides both personal and system improvements. Local medical societies, EMS, and state and national emergency medicine organizations are also great ways to be involved and learn from other environments, as well contribute to the specialty of emergency medicine.

12 Keep a life out of the ED.

Much has been written about life outside of work, but it can't be overemphasized. Space your shifts, and try not to be a hero working many hours. Make a priority of activities outside of the ED; most importantly, remember family and friends. Keeping some psychological space between the ED and home, such as a drive, a walk, or a nonmedical reading interlude, helps keep the stress of practice where it belongs. ✶


Block
the
Pain!

PRACTICAL TIPS

When and How to Use a Femoral Nerve Block

Kara Otterness, MD
NYU/Bellevue Hospital Center
New York, NY

Marsia Vermeulen, DO
Faculty, Associate Director of Emergency Ultrasound
NYU/Bellevue Hospital Center
New York, NY

An 82-year-old female shows up in your ED with severe hip pain after a fall at home. You already know what the x-ray is before you see it – femoral neck fracture. It's a fairly common scenario, but this patient has already received two rounds of morphine 4 mg IV with minimal pain relief, and her blood pressure is now 100/55. With her continued pain and borderline-low blood pressure, what's the next best step? **Have you considered an ultrasound-guided femoral nerve block?**

How it's done

A femoral nerve block can be used to provide anesthesia to the hip, anterior thigh, and knee. The femoral nerve branches off of the lumbar plexus and courses along the psoas muscle, before passing beneath the inguinal ligament lateral to the femoral artery within the femoral triangle. The fascia iliaca lies deep to the fascia lata, and separates the femoral nerve from the femoral artery.[1,2]

Required supplies

- An ultrasound machine with a high-frequency linear probe
- Sterile probe cover
- Sterile ultrasound gel or lubricant
- Sterile gloves
- Local anesthetic (bupivacaine is preferred for its longer duration of action)
- A 20 cc syringe
- Two needles – a 21-gauge spinal needle works well, and a smaller-gauge needle to make a skin wheal
- Betadine solution to prepare the skin

The patient is positioned supine with the affected extremity in slight abduction and external rotation, as tolerated. A high-frequency linear probe is used to visualize the femoral nerve and artery by placing the probe in the inguinal crease, parallel to the inguinal ligament, with the probe marker to the patient's right. The femoral nerve is located within a triangle bordered by the fascia lata and iliaca anteriorly, the femoral artery medially, and the iliopsoas muscle posteriorly. The nerve is hyperechoic, usually oval or triangular shaped, and is located an average of 2-6 cm beneath the skin surface.

Using sterile technique, make a skin wheal and then insert the long needle in-plane at the lateral edge of the probe, aiming for the space behind the nerve (or for the deep border of the triangle, if the nerve is not visualized). Visualize the needle on ultrasound as you advance toward the nerve. **Often you will feel a "pop" as the needle tip passes through the resistance of the fascia iliaca.**

Once the needle tip is positioned at the lateral aspect of the nerve, pull back to aspirate, and then slowly inject 1-2 mL of local anesthetic to confirm placement of the needle tip. Correct placement is verified by seeing the local anesthetic surround the nerve, which enhances its visualization on the ultrasound monitor. If the anesthetic is only seen superior to the nerve, the needle may not have penetrated the fascia iliaca, and should be repositioned prior to further injection. In an adult patient, a total of 10-20 mL of local anesthetic is injected once proper placement is confirmed. As you inject, the nerve will often become more visible as it lifts off from the iliopsoas muscle, surrounded by anesthetic. Anesthesia is usually obtained within 10-20 minutes.[1,2]

A variation of the femoral nerve block, termed a "3-in-1 block," can be utilized to provide greater anesthesia to the thigh, and is useful in severe proximal injuries. In addition to blocking the femoral nerve, the 3-in-1 block also anesthetizes the lateral femoral cutaneous and obturator nerves. Anesthesia of all three nerves can be achieved in the same procedure by spreading the local anesthetic more proximally and using a larger total volume (20-30 mL). To spread the anesthetic, have an assistant apply downward pressure a few centimeters distal to the site of injection. Pressure is sustained for 30-60 seconds after the injection is completed to ensure proximal spread.[1,2]

Though rare, potential complications include infection, nerve injury, bleeding or hematoma formation, and intravascular injection. Using sterile technique and ultrasound guidance can minimize these risks.

What's the evidence?

The argument for using a femoral nerve block to provide analgesia to patients with hip fractures derives from its relative ease and efficacy in providing high-quality pain control, as well as lack of adverse effects commonly seen with opioid pain medications. A randomized controlled trial published in *Academic Emergency Medicine* in 2013 evaluated the use of the femoral nerve block as an adjunct to opioid analgesics.[3] Adults with moderate to severe pain were randomized to receive either IV morphine with an ultrasound-guided 3-in-1 femoral nerve block, or IV morphine with a placebo injection. Thirty-six patients were randomized, and a physician co-investigator performed ultrasound-guided injection of either bupivacaine or normal saline. Both the patient and the emergency physician caring for the patient were blinded to the treatment arm, and additional analgesia administration was at

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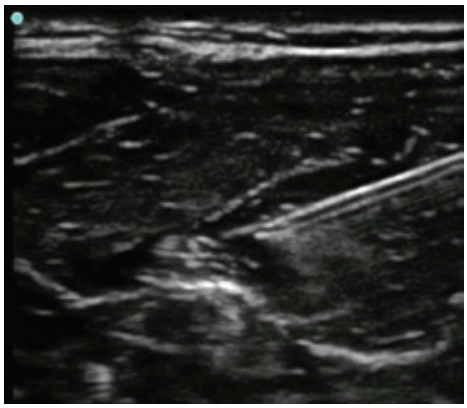
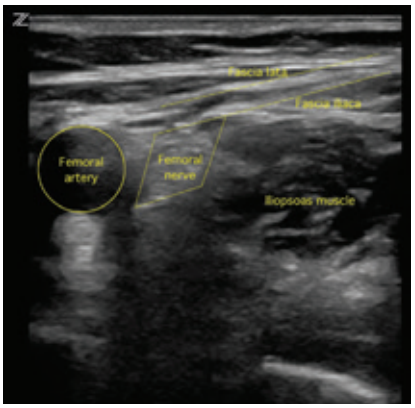
Correct positioning of probe and needle.



Delineation of femoral nerve block.



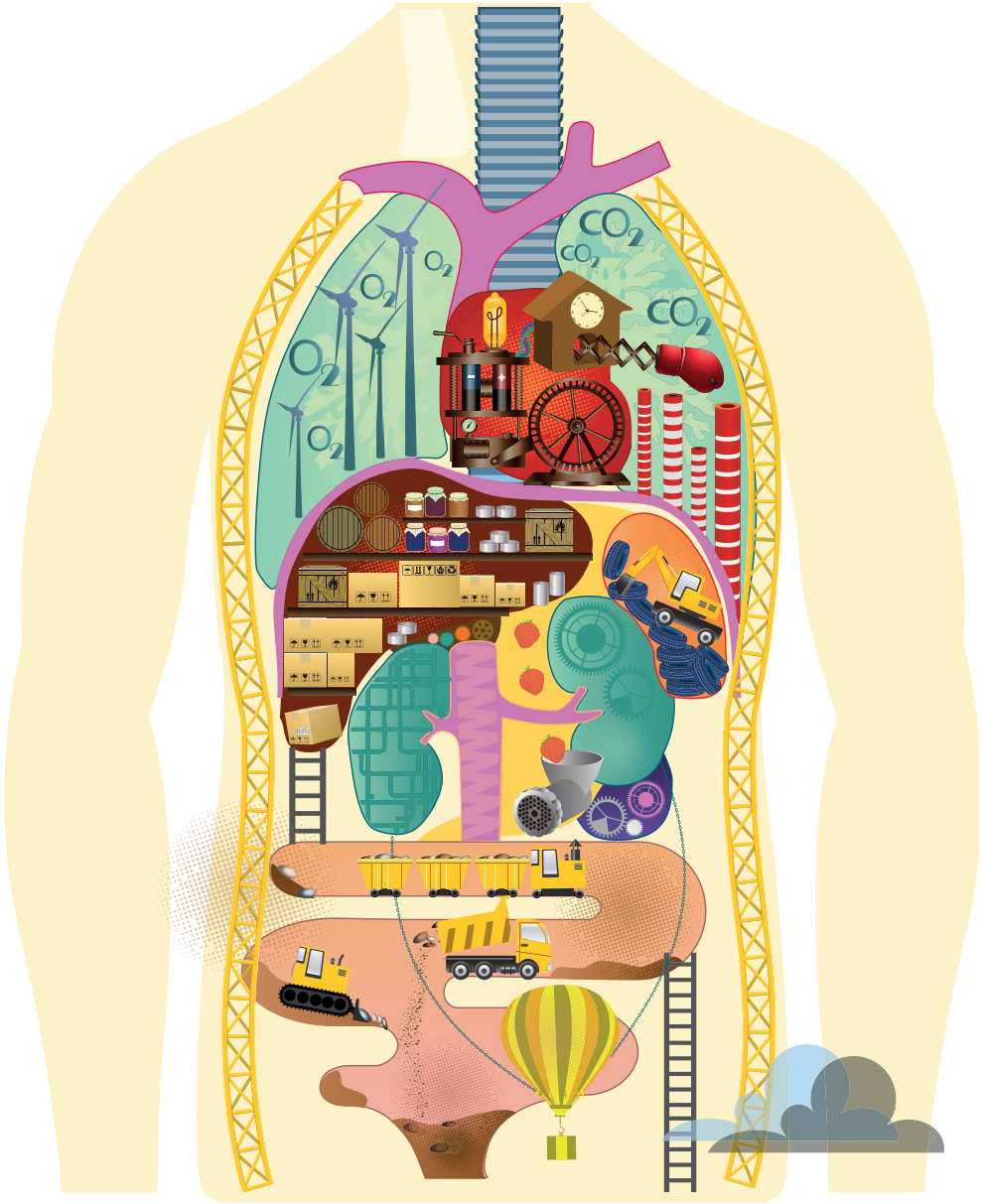
Normal visualized anatomy for femoral nerve block.

the discretion of the treating physician over the four-hour study period. Results showed a significant decrease in pain intensity, less parenteral opioid administration, and no difference in adverse effects in the femoral nerve block group compared to the standard care group.

Another study, published in *Annals of Emergency Medicine* in 2003, also compared the femoral nerve block to standard care (IV opioids), extending the study time period to 24 hours from the time of block, or to the time of surgery, whichever came first.[4] Patients receiving the 3-in-1 nerve block recorded a faster time to reach the lowest pain score, and required significantly less morphine per hour compared with control patients. Multiple physicians at different levels of training administered the nerve blocks, and no adverse effects were identified.

A femoral nerve block is feasible to perform, even in a busy emergency department. A prospective observational study published in the *American Journal of Emergency Medicine* in 2010 demonstrated a median time of 8 minutes to perform the procedure. Included in this time was five minutes of manual pressure to achieve 3-in-1 block, making the actual procedure time even shorter. All procedures required only one attempt, and there were no complications.[5] Notably, this study included a convenience sample of only 13 patients, and only two practitioners (an ultrasound fellowship-trained EM attending and an EM resident) administered the nerve blocks. However, after only a 30-minute training session, the EM resident was able to perform the nerve block with a 100% success rate.

Though larger randomized controlled studies are required to confirm these findings, the literature suggests that after a short training session, EM residents can become proficient at ultrasound-guided femoral nerve blocks. With a low complication rate and minimal side effects, a nerve block is ideal for patients with persistent pain or borderline low blood pressure. So the next time you see that 84-year-old lady, just remember, a little procedure can save a lot of pain. ✶



Adult-Sized PROBLEMS

A multitude of pathologic mechanisms can cause gallstones in children, and the type of stone is largely dependent on certain inherent and environmental factors.

Lt. Adam Forrest, DO
Naval Medical Center
Portsmouth, VA

It was one of my first shifts of residency after spending a few years with the U.S. Marines. Until recently, I had not treated a patient under the age of 17 since my internship two years prior. Now, I was seeing several children per shift in our busy emergency department. Picking up the chart, I noted that my next patient was a 5-year-old girl with abdominal pain.

She was a well-appearing kid, and she smiled shyly at me when I entered the room. Good, she passed the first test – not sick. She told me that her tummy hurt, but like most 5-year-olds, her ability to give a history was limited to just about that. I turned to her mom for more information. She revealed that her daughter really hadn't eaten much that day and had been complaining of abdominal pain at school. She had thrown up a couple of times over the last two days, and hadn't had a bowel movement in close to five days.

It was starting to sound a lot like constipation – a common complaint in this age group. **She looked fine – afebrile, normal vitals, interactive, and not too bothered with my exam – until I pressed on her belly.** It was soft, but it appeared that she was generally tender on the right side. I can be fooled by ticklish vs. tender, so I had her bend her knees to relax her belly, and palpated again. Yup, definitely tender on the right – that doesn't really fit with constipation; could it be appendicitis? I ordered some "belly labs" and an abdominal plain film, not knowing exactly what I was looking for or what I would find.

Somewhat to my surprise, her labs revealed transaminases in the low 300s and a bilirubin of 3.8mg/dL. More unexpected was the read on her plain film – "a calcific density adjacent to the

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transverse process of L2…may represent gallstone." But a gallstone in a 5-year-old? Of course!

While developing the differential diagnosis for this patient, I had not even considered biliary disease, mostly because of her age. She didn't exactly fit the classic description of a "fat, fertile female over 40." However, a catchy mnemonic doesn't mean we should exclude kids from this diagnosis.

The most common type of gallstone in children is the black pigment stone, which occurs as a result of the breakdown of heme; so, naturally, they are common in hemolytic disease. Nearly half of all children with sickle cell disease will develop these kinds of stones,[1] but any child with a hemolytic disorder can get them. Prolonged total parenteral nutrition (TPN) can cause pigment stones as well, though the process is reversed upon discontinuation of the therapy.

Children can also get cholesterol stones, just like adults. The risk factors are similar: obesity, female sex, estrogen/progesterone therapy, certain ethnicities, and family history.[2,3] Cholesterol stones are increasing in prevalence, thanks to upward trends in childhood obesity.

Chronically ill children tend to develop calcium carbonate stones, which are rare in adults. Although some adult cholesterol stones do contain calcium, the proportion of calcium in the stones of chronically ill children is much higher, accounting for 90% or more by weight, as compared with less than 20% in adult stones.[4] Calcium stones may be more readily identified on x-rays due to their high calcium content, which makes a plain belly film a higher yield test in children.

There are other rare causes of stones in children, including brown pigment stones (associated with bacterial infection of the biliary tree), and the rarer ceftriaxone stones.[5] Ceftriaxone forms a salt with calcium; this salt precipitates in bile and causes stone formation. Neonates are particularly susceptible to this adverse reaction.

The diagnosis of gallstone disease in kids hinges on clinical suspicion. Physical exam findings and blood tests are inconsistent and nonspecific, and similar findings can be found in a variety of diseases. **Perhaps your best bet is ultrasound, which is noninvasive and has greater than 90% diagnostic sensitivity.**[6] You can even perform it at the bedside, but be aware that the measurements indicating pathology will be different from those seen in adults. For example, a common bile duct is considered dilated in adults if it measures greater than 6 mm, but in kids a diameter of 3 mm may be abnormal.[7]

A multitude of pathologic mechanisms can cause gallstones in children, and the type of stone is largely dependent on certain inherent and environmental factors. While pediatric cholelithiasis is uncommon, it remains important to keep it on your differential in children with abdominal pain. ✶

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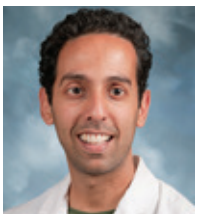
A Temporal Problem

Diagnosing and treating viral encephalitis in the ED

Case Report

A 49-year-old male presents to the emergency department with two days of confusion, agitation, and speech abnormalities. His vital signs are normal. Physical examination reveals a disoriented and agitated man who does not follow commands, but a neuro exam is non-focal. A CT of the head is shown (Figure 1, Figure 2). An LP was performed, and empiric acyclovir, vancomycin, ampicillin, and ceftriaxone were started. An MRI after admission to the ICU (Figure 3) showed temporal lobe enhancement; a CSF analysis, with cryptococcus antigen, HIV, bacterial and fungal cultures, and HSV PCR, were all negative.

James Hall, MD
Univ. of Missouri-Kansas City
Kansas City, MO



Sajid Khan, MD
Clinical Assistant Professor
Department of Emergency Medicine
Univ. of Missouri-Kansas City
Kansas City, MO

Viral encephalitis, in particular herpes simplex encephalitis, though rare, should remain on the differential diagnosis of patients presenting with altered mental status.

Discussion

Altered mental status is a very common presentation to the emergency department with an extremely broad differential that includes toxins, infections, metabolic and electrolyte disturbances, vascular events, trauma, seizures, and neoplasms. **One uncommon, but potentially fatal, cause that is often overlooked is viral encephalitis.** In the United States, the most common etiology of viral encephalitis remains herpes simplex virus (HSV), type 1, the diagnosis in this case scenario. Herpes simplex encephalitis has an annual incidence of approximately 1-2 per 500,000 and a mortality rate of around 11%.[1] It has a bimodal distribution with approximately one-third of cases occurring in those under 20 years of age and one-half of cases in those over 50. In the United States, approximately 95% of cases are seen in Caucasians.[1] Early

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Figure 1

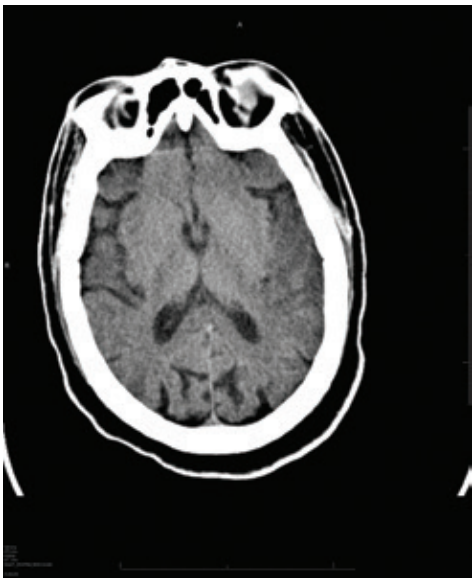

Figure 2

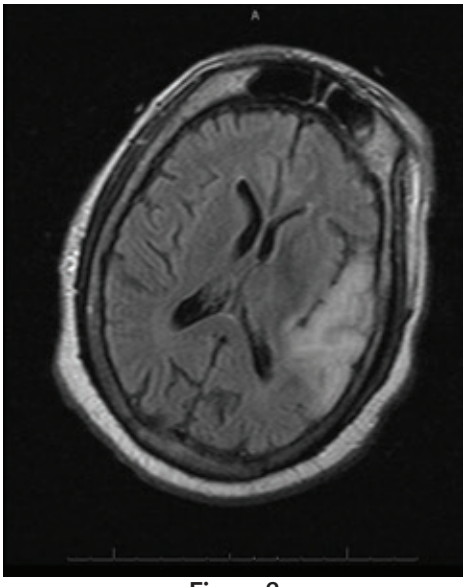

Figure 3

recognition is essential as prognosis is directly related to early administration of antivirals; prior to the introduction of antiviral treatment, mortality rates were around 70%.[2] Current mortality rates are six times higher in the immunocompromised.[3]

Encephalitis may be differentiated from the other etiologies of altered mental status by the presence of fever (92%), headache (81%), personality changes (85%), and dysphasia (76%), and the absence of nuchal rigidity and photophobia.[1] The altered sensorium of encephalitis usually takes the form of cognitive impairment with behavioral disturbances, agitation, disorientation, anterograde amnesia, and occasionally symptoms of loss of inhibition and hypersexuality. Other symptoms can include seizures, focal neurologic findings, speech abnormalities, and obtundation.[1]

Initial management of encephalitic patients includes appropriate stabilization and fever control, in conjunction with routine blood work, neuroimaging, and cerebrospinal fluid analysis. **The gold standard for diagnosis remains a brain biopsy, though this carries a high risk of adverse events.**[4] Traditionally, serologic studies for herpes simplex virus have been used, but titers are positive in only about 50% of patients at four weeks post-onset, rendering this test only retrospectively informative at best. The most useful test has become cerebrospinal fluid analysis with PCR for HSV. HSV PCR has a sensitivity of 94% and a specificity of 98%.[1,5] CSF analysis is normal in 3%-5% of biopsy-proven cases of HSV encephalitis, but clinical outcome is correlated with viral load; therefore, positive cases with negative results tend to fall on the less critical end of the spectrum.[1,2]

Neuroimaging is important for the diagnosis, as well as for ruling out other etiologies. Computed tomography (CT) is readily available in most EDs, though it is only moderately sensitive and specific for viral encephalitis.[6] **Magnetic resonance imaging (MRI) is both much more sensitive and specific.**[7,8] Classic findings include hypoattenuation of the bilateral temporal lobes and limbic areas on CT, as seen in the image from the patient scenario (*Figures 1 and 2*), and corresponding hyperintensities on T2 or FLAIR (fluid attenuated inversion recovery) sequences on MRI.[2]

Optimization of long-term outcomes of herpes encephalitis depends upon early administration of antivirals. Depending on the patient, empiric antibiotics may also likely be indicated. First-line recommendations include acyclovir 10 mg/kg IV every eight hours for 14-21 days.[9,10] **Initiation of treatment should not be delayed for diagnostic testing.** Early initiation has been defined as: before loss of consciousness, within 24 hours of the onset of symptoms, and when the Glasgow Coma Score is 9-15.[11] The role of adjunctive steroid therapy is controversial. Some studies have shown increased viral replication secondary to immune suppression with the addition of steroids.[12,13,14] Unfortunately, even with early initiation of treatment, nearly two-thirds of patients will still have long-term sequelae and 1% will be in a persistent vegetative state.[9] Memory problems, verbal and cognitive deficits, visual problems, and anosmia have all been described as complications.[15]

Conclusion

Viral encephalitis, in particular herpes simplex encephalitis, though rare, should remain on the differential diagnosis of patients presenting with altered mental status. When the diagnosis is suspected, treatment should begin immediately without delay for results of confirmatory testing. ✶

Early recognition is essential as prognosis is directly related to early administration of antivirals; prior to the introduction of antiviral treatment, mortality rates were around 70%.

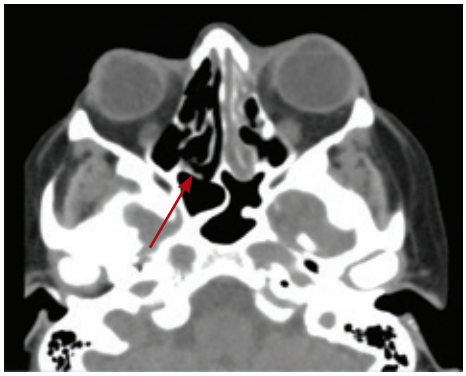

Figure 1. CT demonstrates stable partial opacification of left ethmoid air cells and mucosal thickening in left maxillary sinus related to ostiomeatal dysfunction (red arrow).

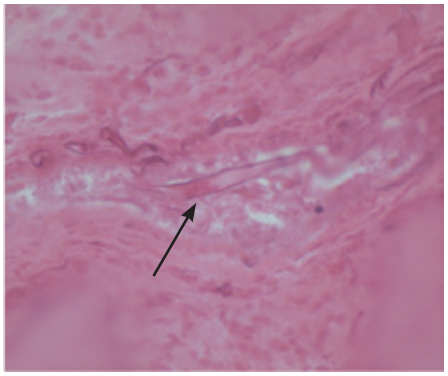

Figure 2. Orbital soft tissue demonstrating angioinvasive mucormycosis. The irregularly shaped broad hyphae with haphazard branching and infrequent septation within a blood vessel is typical (black arrow).

If untreated, the infection usually spreads from the ethmoid sinus to the orbits, resulting in compromise of extraocular muscle function and proptosis with chemosis.

Nose Dive

Sniffing out mucormycosis

Dan Nguyen, MD
Beaumont Hospital
Royal Oak, MI

Payal Shah, MD
Clinical Faculty
Beaumont Hospital
Royal Oak, MI

A 52-year-old insulin-dependent diabetic female is triaged to the low-acuity area of your department with a chief complaint of "sinus infection." She complains of worsening left facial pain that started in her left nose and face. Now, three days later, the pain has spread as far as her left ear, and she reports a few episodes of emesis. No fevers or neurologic deficits are reported, and she denies dental pain, vision changes, URI symptoms, or syncope.

Your exam reveals a normotensive, mildly tachycardic, overweight female without respiratory distress. There is tenderness over the left maxillary sinus, without visible nasal discharge. The nasal mucosa is intact and oral exam is normal. Mild ptosis of the left eye is noted.

Preliminary studies reveal a WBC of 17.9 with a left shift. Her blood glucose is 217, her bicarb 17, and a CRP and ESR are elevated. A CT face is obtained, with findings as shown (Figure 1). She is started on ampicillin/sulbactam and admitted.

After admission, she worsens and develops multiple cranial nerve neuropathies along with left eye vision loss. A nasal endoscopy reveals a nasal eschar, concerning for invasive fungal infection, and she undergoes an emergent maxillectomy and ethmoidectomy with orbital exenteration. Surgical pathology is consistent with angioinvasive mucormycosis (Figure 2). After three weeks of amphotericin B, she goes home.

Discussion

Mucormycosis is an infection caused by a fungus of the order *Mucorales* and can be life-threatening. **It is a highly invasive organism that is often relentlessly progressive, with reported mortality rates greater than 40%.**[1] *Mucorales* are ubiquitous environmental fungi that tend to cause infection primarily in patients with diabetes or defects in phagocytic function (e.g., neutropenia, chronic steroid treatment, or immunosuppression).[2] Patients in DKA tend to develop rhinocerebral mucormycosis due to excess substrate for fungal growth, vascular insufficiency, and sensory neuropathy causing wound neglect.[3,4]

On physical examination, the infected tissue may appear normal during the early stages of fungal infection and then progress to an erythematous phase, where eventually the tissue can take on a violaceous appearance. Finally a black, necrotic eschar forms. The initial clinical presentation is often nonspecific eye or facial pain progressing to facial numbness, conjunctivitis, blurry vision, and soft tissue swelling (*Table 1*). The affected tissue (usually the turbinates) appears gray and friable. The mucosa is typically anesthetic and non-bleeding because of infarction caused by mucormycostic angioinvasion. Fever is absent in up to half of cases, while white blood cell counts are typically

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Table 1. Signs and Symptoms of Mucormycosis

- Fever – 44%
- Nasal ulceration or necrosis – 38%
- Periorbital or facial swelling – 34%
- Decreased vision – 30%
- Ophthalmoplegia – 29%
- Sinusitis – 26%
- Headache – 25%

The most frequent signs and symptoms of mucormycosis. Taken from a review of 208 cases published between 1970 and 1993.[2]

The initial clinical presentation is often nonspecific eye or facial pain progressing to facial numbness, conjunctivitis, blurry vision, and soft tissue swelling.

elevated.[1] If untreated, the infection usually spreads from the ethmoid sinus to the orbits, resulting in compromise of extraocular muscle function and proptosis with chemosis.[1]

The diagnosis of mucormycosis can be very difficult to make. **Unfortunately, autopsy series have shown that half of cases are diagnosed only postmortem.**[1] Because *Mucorales* is a common fungus in the environment, definitive diagnosis requires a positive culture from a sterile site or histopathologic evidence of invasive mucormycosis. However, a probable diagnosis can be established by culture from a nonsterile site in a patient with appropriate risk factors and radiographic evidence of disease. In general, cultures are positive in fewer than half of the cases.[1] Biopsy with histopathologic examination remains the most sensitive and specific modality of diagnosis. Biopsy reveals characteristic wide, thick-walled, ribbon-like, non-septated hyphae at right angles.[1] Imaging techniques often yield only subtle findings of disease. The most common finding on CT or MRI is sinusitis that is indistinguishable from bacterial sinusitis. **High-risk patients should undergo endoscopy and/or surgical exploration with biopsy of areas suspicious for infection.**[5]

Better outcomes are more likely with an early diagnosis, reversal of risk factors, surgical debridement, and prompt antifungal therapy. If mucormycosis is suspected in the emergency department, empirical therapy with a polyene antifungal agent (amphotericin B, nystatin, perimycin) should be initiated as soon as possible. **Early initiation of therapy is directly associated with improved outcomes and decreased complications.**[6] It is also important to mitigate and/or prevent underlying defects in host defense during treatment (e.g., reducing immunosuppressive medication, promoting eugylcemia, and normalizing acid-base status).[7] Blood vessel thrombosis and resulting tissue necrosis can result in poor penetration of antifungal agents into infected tissue. Debridement of necrotic tissues is often critical for complete eradication of disease, so these patients should always be admitted and seen by a surgeon.

While it is a common organism, *Mucorales* is an uncommon pathogen. However, failure to recognize mucormycosis can be severely disfiguring, and often even fatal. The provider needs to have a high index of suspicion to be able to diagnose this infection. The next time that patient with a "sinus infection" walks into your department, remember it could be something much more insidious than you might think. Mucormycosis is one nose problem you can't afford to blow. ✶

empower

Sharing Our Stories

Dr. Debra Houry

A nationally renowned authority on violence and preventable injuries, emergency medicine physician Dr. Debra Houry has built a career devoted to public health. Although she now serves numerous organizations of global importance and directs a 12-university center for injury control, she describes her involvement in EMRA as a formative experience that helped set the stage for her distinguished career.

Dr. Houry is vice-chair for research and associate professor in the Department of Emergency Medicine at Emory University School of Medicine and in the Department of Behavioral Science and Health Education and Department of Environmental Health at the Rollins School of Public Health. She is the Director of the Emory Center for Injury Control and PI on the CDC Injury Control Research Center grant (1 of 11 nationally). She has authored more than 70 peer-reviewed publications and book chapters on injury prevention and violence, and has been the recipient of several national awards, including the first Linda Saltzman Memorial Intimate Partner Violence Researcher Award from the Institute on Violence, Abuse, and Trauma and the Academy of Women in Academic Emergency Medicine's Researcher Award. She is the president-elect of the Society for Advancement of Violence and Injury Research and is the President of Emory University Senate. ✶

"EMRA not only provided me with my first real exposure to a national emergency medicine organization, it put me in touch with like-minded people and introduced me to the leaders of our specialty. As EM physicians, we have a special vantage point from which we view society, and EMRA is an organization that understands and utilizes that unique position to enhance our role."

EMRA 2014 Spring Award Recipients

Academic Excellence Award
Nicholas Johnson, MD, University of Pennsylvania

Chief Resident(s) of the Year
Drs. Meghan Spyres, Ambrose Wong, Neel Naik, NYU/Bellevue Medical Center

Dr. Alexandra Greene Medical Student Award
Zheng (Ben) Ma, Baylor College of Medicine

EMRA EDDA Scholarship
Arsalan Azam, MD, New York Medical College Metropolitan
Brenda Oiyemhonlan, MD, SUNY Downstate
Caitlin Meghan McCord, MD, Johns Hopkins Hospital
Caitlin Schaninger, MD, University of Cincinnati
Elizabeth Davlantes, MD, Emory University SOM
Elizabeth M. Phillips, MD, George Washington University
Nataisia Terry, MD, SUNY Downstate
Peter "Rocky" Samuel, MD, MBA, Northwestern Emergency Medicine Residency
Sean Michael, MD, Wayne State University/Detroit Receiving Hospital
Shae Sauncy, MD, LSU – New Orleans

EMBRS Scholarship
Rachel S. Wightman, MD, NYU/Bellevue Department of Emergency Medicine

EMRA Resident of the Year
Torben K. (Tom) Becker, MD, University of Michigan

Jean Hollister EMS Award
Ryan Gerecht, MD, CMTE, University of Cincinnati

Local Action Grant
P. Quincy Moore, MD, Cook County Hospital

Research Grant
Jason Bowman, Texas A&M University HSC – COM
Jeffrey Duke Chien, MD; Lauren Sharan; Wayne Bond Lau, MD, FACEP, Thomas Jefferson University

AEM Consensus Conference Travel Scholarship
Carole Douriez, MD, Boston Medical Center

AEM Consensus Conference Travel Scholarship
Elizabeth Moore, DO, Lehigh Valley Health Network
Gillian Beauchamp, MD, University of Cincinnati Dept of EM

EMRA SAEM Scholarship
Bo Stubblefield, Indiana University School of Medicine
Chanel Fischetti, UC Irvine School of Medicine
Jennifer Cotton, University of Kentucky College of Medicine
Joseph Lesnick, MD, University of Texas-Houston
Joshua Robertson, MD, Carolinas Medical Center
Lillian Wong, MD, NYU/Bellevue Hospital

EMRA LAC Travel Scholarship
Mary Paden, MD, Washington University in St. Louis
Shahram Ahari, MD, University of Rochester
Tsion Firew, MD, NYU/Bellevue Hospital

Robert Doherty, MD Teaching Fellowship Scholarship
Katja Goldflam, MD, Yale School of Medicine

Residency Coordinator of the Year
Katy Oksuita, University of Wisconsin Hospitals & Clinics

Residency Director of the Year
Mark Clark, MD, St. Luke's Roosevelt Hospital Center

Assistant Residency Director of the Year
Charlotte Page Wills, MD, Alameda County Medical Center-Highland Hospital

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EMRA

Most Commonly Asked Questions by Residents

(Second in an occasional series)

Why Two Examinations to Become Certified?

One of the most commonly asked questions newly graduated residents pose to ABEM is "Why do I need to take two examinations in order to become board certified in Emergency Medicine?" The answer is fairly straightforward. The first examination, the qualifying examination (QE), is a multiple choice, single-best answer examination. The exam is designed to measure your diagnostic reasoning skills and the breadth and depth of your medical knowledge. After you pass the QE, you are eligible to take the oral certification examination. The oral examination tests additional skills not as easily assessed on a written examination. These skills include data acquisition, problem solving, clinical judgment, interpersonal relations, and management of multiple patients. Taken together, the exams are designed to ensure that physicians who pass meet the standards the ABEM Board of Directors has determined physicians should possess in order to practice Emergency Medicine.

If you have a question or topic you would like ABEM to write about, send an email to communications@abem.org, or call 517.332.4800, ext. 345.

Application for Initial Certification

REMINDER!

ABEM will begin accepting applications for initial certification on April 15.

Complete the online application by **July 2, 2014**, to avoid late fees! Residents who fulfill the eligibility criteria can access the online form from their Personal Page on the ABEM website beginning April 15 (you must be logged in to view your page).

EMRA Quiz Show

Residents vs. Residents from coast to coast in a battle of medical wits you don't want to miss!

New This Year!

The audience gets to play along for fun and prizes!

Wednesday, May 14
5:00 pm – 7:00 pm

Join us at SAEM to watch Denver Health Center compete to keep their title as reigning champions.

A great way to unwind after a day of meetings and you might just learn something new!

ACEP RESEARCH FORUM

Abstract Submissions

Abstracts due April 25, 2014

This year, the ACEP Research Committee will also present awards for best medical student paper and best resident paper.

The Best Medical Student Paper Award will be given to a medical student who is the primary investigator of an outstanding abstract presentation.

The Best Resident Paper Award will be given to a resident who is the primary investigator of an outstanding abstract presentation.

Awards will be presented at the

2014 ACEP Research Forum

October 27-28, 2014

Chicago, IL

YPS-EMRA Call for Posters

for the

ACEP Leadership and Advocacy Conference

May 18, 2014

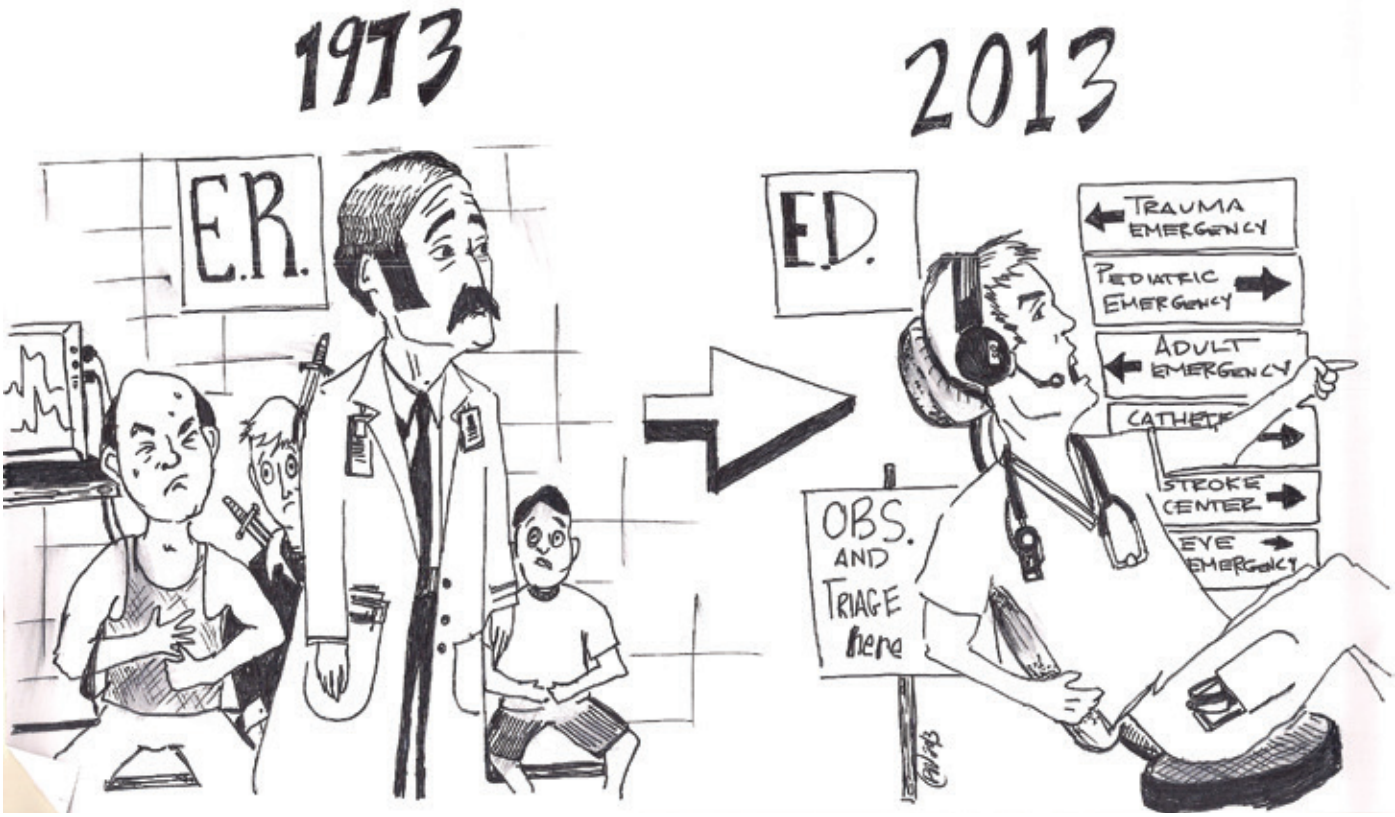
Washington, DC

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**



The Evolution of Emergency Medicine

Please join us for a fun, educational experience and root for your favorite team!

EMRA/SAEM Simulation Academy Resident Sim Wars Competition

SIMULATION ACADEMY
OF THE SOCIETY FOR ACADEMIC EMERGENCY MEDICINE

May 14, 2014

8:00 a.m.
Lonestar Ballroom

We're very excited to announce this year's SAEM SimWars teams!

Returning Champions
Stanford University/Kaiser

University of Mississippi Medical Center
University of Kentucky
Hennepin County Medical Center
Carolinas Medical Center
Icahn School of Medicine at Mt Sinai
Washington University in St Louis

Stanford University/Kaiser
Returning Champions

ACEP'S 911 Legislative Network

Are you interested in health policy?
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Then consider signing up for ACEP's 911 Legislative Network!

As a Network member, you will receive weekly emails informing you about the latest legislative and regulatory developments. You will also receive notification of critical times to contact your congressman to advocate for the most effective policies to protect emergency patients and emergency physicians. If you are an EMRA member, you are also an ACEP member and are qualified to be a member of this grassroots advocacy network.

Join today!
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Questions?
Contact Jeanne Slade
Director, NEMPAC & Grassroots Advocacy
at 1-800-320-0610, ext. 3013
or jslade@acep.org

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 the evaluation of a patient with back pain, which of the following features of the pain is reassuring for the absence of serious underlying pathology?
   A. Gradual onset
   B. Nocturnal pain
   C. Onset with heavy lifting
   D. Unrelieved by rest

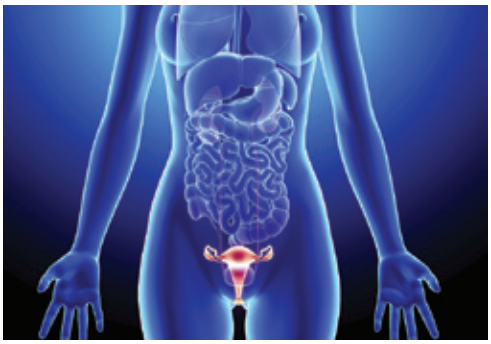
2. A 24-year-old woman at 14 weeks' gestation presents with symptoms suggestive of acute appendicitis. The appendix cannot be visualized using ultrasonography. What is the appropriate next step?
   A. Admit for treatment with parenteral antibiotics
   B. Obtain surgery or obstetrics consultation
   C. Order abdominal and pelvic CT scanning
   D. Perform serial abdominal examinations in the observation unit

3. Which of the following statements regarding penetrating neck trauma is correct?
   A. Angiography is not typically needed for zone 3 vascular injuries
   B. Duplex ultrasonography has replaced angiography in the evaluation of zone 1 vascular injuries
   C. The carotid artery is the most frequently injured vessel in the neck
   D. The most common cause of immediate death is exsanguination

4. A 30-year-old woman presents with nonradiating, nonexertional, pleuritic anterior chest pain that started the day before while she was painting. She denies fever, cough, shortness of breath, and leg swelling. She has no significant past medical history. Her only medications are oral contraceptive pills. Vital signs are blood pressure 130/85, pulse 105, respirations 18, and oxygen saturation 99% on room air. Physical examination is unremarkable except for partially reproducible right parasternal chest wall tenderness. Which of the following diagnostic tests should be ordered next?
   A. Chest radiography
   B. Chest radiography and ECG
   C. Chest radiography, ECG, and chest CT angiography
   D. Chest radiography, ECG, and D-dimer

5. Which of the following chest radiograph views is most sensitive for a small pleural effusion?
   A. End expiratory
   B. Lateral decubitus
   C. Supine AP
   D. Upright PA

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



RISK MANAGEMENT PITFALLS
VAGINAL BLEEDING IN THE NONPREGNANT PATIENT

EB MEDICINE
Improving Patient Care

From the August 2013 issue of *Emergency Medicine Practice*, "Emergency Department Management Of Vaginal Bleeding In The Nonpregnant Patient." 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 "The patient denied being sexually active, so I didn't think I needed to do a pregnancy test."
All patients of reproductive age with vaginal bleeding must have a pregnancy test. Many patients participate in activities that they do not consider "sexual activity" but that may result in pregnancy. Vaginal bleeding in pregnancy can be life-threatening, as in the case of ectopic pregnancy, and cannot be missed.

2 "The patient was from a nursing home, and the caregiver had noted blood in the patient's underwear when changing her. I performed a vaginal examination and didn't see any bleeding, so I discharged her back to the nursing home."
Patients and caregivers often assume that blood seen in underwear or on a diaper is pelvic in origin, but this is not always the case. If no blood is found on pelvic examination, a rectal examination and hemoccult test of stool is indicated as well as urinalysis for hematuria.

3 "The patient said that oral contraceptive pills had helped stop a bleeding episode in the past, so I started her on an oral contraceptive pill taper even though she was 40 years old and smoked."
Use of estrogen-containing oral contraceptive pills increase the risk of developing thromboembolism, and they are contraindicated in women aged > 35 years who smoke.

4 "The 51-year-old patient had been having intermittent vaginal bleeding for the past few months. I told her it was likely the beginning of menopause and that she shouldn't be concerned."
Anovulatory cycles are physiologic as a woman approaches menopause; however, perimenopausal and postmenopausal women with abnormal bleeding should be considered to have a malignancy until proven otherwise, and they should be referred to see a gynecologist as soon as possible.

5 "A mother brought her 5-month-old daughter in for vaginal bleeding. I found a foreign body which was the likely cause, so I discharged the patient after removing it."
Sexual abuse must always be considered when evaluating a young girl with vaginal bleeding. A 5-month-old child would be unable to insert a foreign body into her vagina on her own. In such cases, Child Protective Services should be contacted, and the patient should be admitted if a safe environment cannot be guaranteed.

6 "The child had a vulvar hematoma from a straddle injury. She said she didn't have to urinate while in the ED, so I discharged her."
Patients with vulvar hematomas should demonstrate the ability to void while in the ED prior to discharge. If the patient is unable to urinate, a urinary catheter should be placed, and the patient may require admission.

7 "The vaginal laceration was deep and complex, but I thought I could repair it in the ED and avoid transferring the patient."
Deep or complex genital lacerations require evaluation by a gynecologist or surgeon, and they are usually repaired in an operating room where appropriate lighting and anesthesia can help visualize all injured structures. Incorrectly closed genital wounds place the woman at risk for continued pain, sexual dysfunction, and urinary or bowel incontinence.

8 "The patient said that the bleeding wasn't heavy, so I didn't think I needed to do a pelvic examination."
A pelvic examination is required for all patients complaining of vaginal bleeding. The provider must confirm that the bleeding is pelvic in origin and assess for trauma, masses, and signs of infection.

9 "The patient was taking warfarin, but she said her international normalized ratio (INR) had been checked recently and it was therapeutic, so I didn't think I had to repeat it."
Any patient presenting with abnormal vaginal bleeding who is anticoagulated should have coagulation studies performed in the ED. Drugs such as warfarin interact with many different medicines and foods, and a patient's INR can easily become supratherapeutic.

10 "Even though the patient was hypotensive and tachycardic when she checked in, she felt so much better after a few liters of intravenous fluid that I discharged her."
Any patient with bleeding requiring significant fluid resuscitation or blood products should be admitted for observation and gynecology consultation. ✶

RISK MANAGEMENT PITFALLS

MOTOR VEHICLE TRAUMA IN CHILDREN

EB MEDICINE Improving Patient Care — An Evidence-Based Review

From the August 2013 issue of *Pediatric Emergency Medicine Practice*, "Diagnosis And Management Of Motor Vehicle Trauma In Children: An Evidence-Based Review." 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. **"There were no rib fractures on chest film, so his chest must be fine."**
Pediatric rib cages are pliable and, as a result, significant pulmonary injury in the form of pulmonary contusions or hemothoraces can occur without overlying rib fractures. Emergency clinicians should consider pulmonary injuries in children with tachypnea, hypoxemia, or bruising of the thorax even in the absence of rib fractures.

2. **"She had a femur fracture on examination, but I didn't see any other injuries, so I didn't get any further imaging."**
The presence of a femur fracture is often indicative of a serious mechanism of injury. Even when an obvious femur fracture is seen, a full evaluation for other injuries should still be performed.

3. **"The child wasn't hypotensive, so he couldn't have lost that much blood."**
Hypotension is a late finding in children with significant hemorrhage. Unlike adults, children can often effectively compensate for hemorrhage until 30% to 45% of the blood volume has been lost.

4. **"He was wearing a lap and shoulder belt, so his injuries probably aren't severe."**
Because of their stature, young children are at increased risk for injuries from seat belts. Without a booster seat, the lap belt often rides up onto the abdomen and the shoulder belt often rides up onto the neck, increasing the risk for intra-abdominal injuries, thoracolumbar spinal injuries, and injuries to the neck.

5. **"She's younger than 2 years of age, so she must have been in a car seat."**
Although the American Academy of Pediatrics recommends that children aged < 2 years be restrained in a rear-facing car safety seat, rates of unrestrained and improperly restrained children in the United States remain high, putting these children at increased risk for injury.

6. **"She was backed over in her driveway at a very low speed, so her injuries probably aren't severe."**
Although back-over or driveway injuries occur at a low vehicular speed, they are associated with a significantly greater injury severity than other types of MVCs or pedestrian-versus-automobile accidents. Emergency clinicians must maintain a high index of suspicion for occult injuries with this mechanism of injury.

7. **"His FAST examination was negative, so he can't have a serious intra-abdominal injury."**
Although the utility of the FAST examination has been demonstrated in adults, its utility in the pediatric population remains unclear, given its low sensitivity. While a positive FAST examination can be helpful in decision-making, a negative FAST examination is of minimal utility and cannot be used to rule out intra-abdominal injury.

8. **"We removed her cervical collar while we were intubating her, since there was no risk of her moving on her own."**
In patients who are unconscious or chemically paralyzed, it is crucial to either leave the cervical collar in place during intubation or to maintain inline stabilization of the cervical spine during intubation. Although the patient is unable to move, passive movements that occur during intubation could cause further damage to the spinal cord.

9. **"His abdominal CT showed a splenic laceration; he will definitely need a splenectomy."**
Although, historically, both splenic and hepatic lacerations were managed operatively, the current standard of care for most pediatric solid organ injuries is nonoperative management. Only patients who are hemodynamically unstable require urgent operative intervention.

10. **"He's just a child. We can't clinically clear his cervical spine."**
Although it may be challenging to obtain a reliable physical examination in some children, it is possible to clinically clear the cervical spine in many pediatric patients. Particular caution should be exercised, however, in children aged < 2 years. ✶

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CLINICAL CASE (P. 43)

Nose Dive

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EM PEDIATRICS (P. 39)

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CLINICAL CASE (P. 30)

Key Ketones

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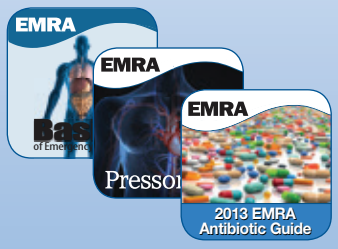

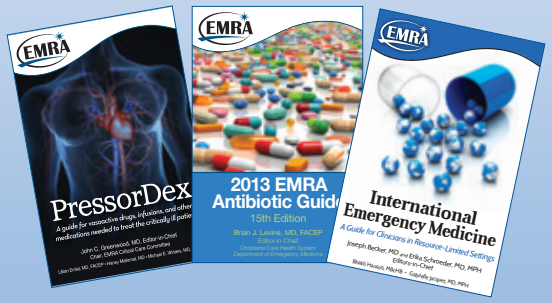

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NEW HAMPSHIRE

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Columbus: Doctors Hospital is host to an award winning osteopathic emergency medicine residency training program where 82,000 ED patients are treated annually. 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.

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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 excellent coverage, 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.

Parma: University Hospitals Parma Medical Center is situated in the SW Cleveland suburbs. State-of-the-art physical plant and equipment serve 47,000 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 & 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.

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.

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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 and suburbs, Canonsburg, Connellsville, New Castle and Erie: Allegheny Health Network and Emergency Medicine Physicians are pleased to announce the formation of Allegheny Health Network Emergency Medicine Management (AHNEMM), which offers a professional arrangement unlike that previously available in the region. Equal equity ownership/partnership, equal profit sharing and equal voting will now be available to the emergency physicians at Allegheny General Hospital in Pittsburgh, Allegheny Valley Hospital in Natrona Heights, Canonsburg Hospital in Canonsburg, Forbes Regional Hospital in Monroeville, Highlands Hospital in Connellsville, Jameson Hospital in New Castle, and Saint Vincent Hospital in Erie. Comprehensive compensation package includes performance bonuses, funded pension (13.27% in addition to gross earnings), CME/business expense account ($8,000/yr.), family health/dental/vision plan, occurrence malpractice (all physician partners own the company and share in its success), short and long-term disability, life insurance, 401k, flex spending program, and more. Contact Jim Nicholas (jnicholas@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 Jim Nicholas (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

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.

TEXAS

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Weslaco: EM Physician opportunities in Weslaco. Enjoy working with a great group of physicians and a friendly & supportive staff in our 37K annual ED volume, 19 beds facility. This includes 36 hours physician coverage, 20 hours of MLP coverage. Must be BC-EM. Additional perks include access to a comprehensive benefits package, paid malpractice, free and discounted CME, flexible scheduling and much more! Contact Bill Masters: (800) 815-8377 ext. 5551; email bmasters@hppartners.com or visit www.hppartners.com.

WEST VIRGINIA

Charleston: EM Physician/Ultrasound Educator. Excellent opportunity within EM Residency program for BP/BC EM physician with ultrasound fellowship or significant proficiency. This three-hospital system has 100,000 annual ED visits and includes a Level 1 facility. In addition to EM, there are numerous residencies as well as student rotations. Role will include overseeing ultrasound training for 16 position EM program as well as assisting in training within simulation laboratory. Equity-ownership group provides outstanding package including family medical, employer-funded pension, CME, plus shareholder opportunity. Charleston offers both metropolitan amenities and outstanding outdoor recreation. Contact Rachel Klockow, Premier Physician Services, (800) 406-8118, rklockow@premierdocs.com.

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Huntington – Equity-ownership group seeking top notch EM physician for 73,000 volume ED. Excellent coverage of 60 physician, 48 PA & 60 scribe hours daily. Premier Physician Services' shareholder model allows you to participate in the decisions and financial rewards of the practice. Outstanding Package includes family medical, malpractice, employer-funded pension, incentive, and more. Contact Rachel Klockow (800)406-8118, rklockow@premierdocs.com.

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 29,000 and 22,000 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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