

# EM Resident

Official Publication of the Emergency Medicine Residents' Association

October/November 2016

VOL 43 / ISSUE 5

## **REBOA**

**A Precious Lifeline**

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**TEE in  
Cardiac Arrest**

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**NEW!  
Consult Corner –  
Orthopedics**

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# Letter from the Editor



**Abby Cosgrove, MD**  
Editor-in-Chief, EM Resident  
Washington University in St. Louis  
St. Louis, MO

**As emergency medicine physicians, our daily lives — hence our careers — are composed of collections of short stories.**

I see my mail carrier about once a week. She usually arrives around 11 am, sometimes later. If I am home, I will wave from the kitchen, occasionally running out with something I forgot to mail in my post-shift daze. We smile and say, “Hi how are you?” and then go about our business. I often wonder how much she knows about me just by the nature of the mail she delivers. A letter from mom in New Jersey, an *ACEPNow* issue, a college alumni magazine, *Fixer Upper* reruns playing on the television. Oh, the stories and secrets she must bring home from her daily peek into the lives of the citizens of the city.

Several months ago, I saw her picture pop up on the Humans of St. Louis Facebook blog. It took me a few seconds to figure out why her face was familiar. A patient, perhaps? No, it was my mail carrier. Her name is Vera. I had never even asked. The quote next to her picture read, “I just live day-by-day. Minute-by-minute. Hour-by-hour. My son was murdered last year. Shot in the head. 24 years old.” The story revealed how her son, Christopher, had been an organ donor to 5 recipients across the country. Even more coincidental, Christopher’s last minutes on earth were spent in the very same ED where I work.

I wondered if she ever thought about that as she tucked in my emergency medicine journals alongside news updates

from the very same hospital where she had touched her son for the last time. I contemplated why I had let all of those days pass without me ever even asking her name. I thought about how reading a story, a snippet from her life, had changed my entire outlook and perspective. How it humanized her, made me feel for her, made me feel *connected* to her.

As emergency medicine physicians, our daily lives, hence our careers, are composed of collections of short stories. We are drawn to these stories not only because we are caregivers, but also because we are human. We craft our history of present illness by narrating what our patients tell us, and we base our treatment decisions on our interpretation of these narratives.

The problem in emergency medicine is that we often do not have the time for, nor the access to, the entire story. And missing out on the full story takes away from opportunities to heal and connect with our patients. It detracts from our ability to create a sense of mutual understanding, of *community*. While it is difficult to change the time constraints within the ED, when taking the extra few minutes to sit down and *listen*, to hold our patients’ stories — their words, their facial expressions, their fears — within our hearts, we might be able to see their needs just a little more clearly.

And just as our patients tell us stories, we feel an inherent need to tell each

other stories about our own experiences. Some of these stories are funny, some are heartwarming, some are incredibly sad, and some are otherwise inconceivable. We cannot live through what we see and feel on a daily basis without being able to share these stories with others. Especially in this era of occupational burnout, sharing our stories with each other is a way in which we are able to re-connect with the world, to be able to take a step back, to process, to *breathe*.

I encourage you to think about the power of storytelling, both the stories our patients tell us, and the stories we tell each other. Whether within the context of initiating palliative care (p. 12), embracing new technology (p. 20), or yearning for an outlet on days when you simply feel you cannot go on (p. 34), storytelling is an indispensable part of medicine and of the human experience.

Vera has not returned to my home. She may have changed routes, or she may have changed jobs altogether. I regret not having said, or listened, more. My hope for her is that if she ever ends up in the emergency department, her provider will listen intently to the story she has to tell. She will mention she is a mail carrier. And for once, an emergency physician will be able to ask somebody else, “What’s the craziest thing you’ve ever seen?” She will tell a funny story. And they will have a good laugh together. ★

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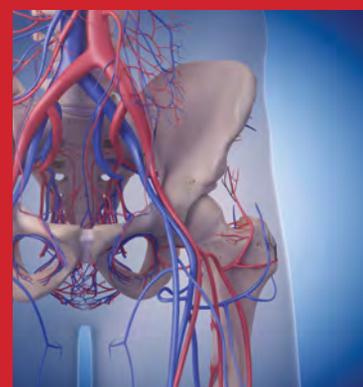
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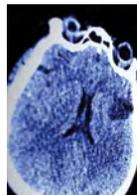


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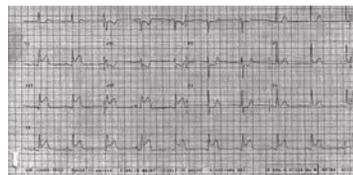
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# 5 TIPS

## for Residency and Beyond



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As I write this final article in *EM Resident* as your President, I am four months out from finishing my EM/IM Residency at Hennepin County Medical Center where I am now on faculty. My journey began two years ago in Chicago when you chose me as president-elect and culminated over this past year, when I have been honored to serve you as president and will soon be passing the reigns. During times of transition I have been lucky to have great mentors who helped guide me and gave me advice (some good, some bad, and some unsolicited). I would like to impart some things I have learned over my five years of residency and during my first few months post-residency.

### 1 Get Involved to Better the Specialty

This sounds big, and it is, but it can be done at any level. Getting involved could be at your residency to improve some aspect of the residency or serving on a residency committee. You could get involved at the hospital level on a committee or working group. This could entail a legislative issue you are passionate about, which you discuss with your city, state, or federal legislature. It could be you getting involved with EMRA, ACEP, SAEM, AMA, or other organized group.

### 2 Try to Learn Something New Every Day

Every day should be a learning day, during residency and beyond. The amount of information we are required to know can be overwhelming and it changes quickly. In an academic center it may be easier to stay on top of everything new, but in the community, this may be challenging. Take any opportunity you can to learn something new, whether that be a new presentation of an illness you already know or something newly described in the literature. This knowledge will keep you fresh and connected and help you provide the best care for your patients.

### 3 Work to Your Limits and Know Your Limits

Pushing yourself in residency is imperative, as this is the time where you have the chance to safely test yourself. Take the opportunity to get out of your normal comfort zone – you may surprise yourself! Testing your limits helps you grasp what you do and don't know. When you

finish residency and move on to your job, an understanding of your strengths and weaknesses will go a long way in solidifying your practice. You can continue to improve in areas where you need work and hone your strengths further.

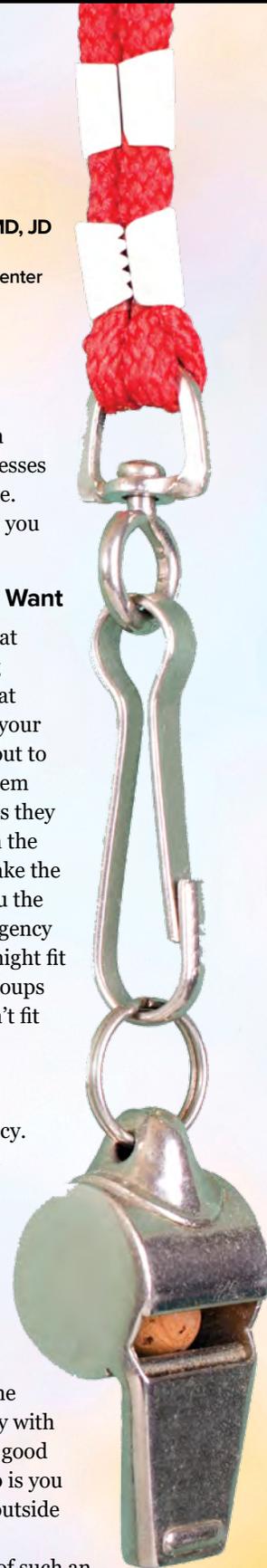
### 4 Figure Out What Type of Job You Want

During residency, take time to reflect on what type of practice you want. Start by assessing the practice you have at your residency. What do you like or don't like? What do you wish your hospital did better? Take the time to reach out to your friends who have graduated and ask them about where they work. Find out what things they like and dislike and how it might differ from the practice at your residency. If you are able, take the time to moonlight. This experience gives you the opportunity to see what other types of emergency medicine practices look like and how they might fit your needs. Use this to assess the various groups you may be interested in, because if it doesn't fit your needs, you will not be happy.

### 5 Do Things That Make You Happy

Residency is hard and so is life after residency. It is imperative to continue doing the things that make you happy, stay grounded, and have a good outlet. This may be athletics, painting, hiking, reading, or spending time with your family and friends. EM is a high-stress specialty with a higher level of burnout than many other specialties. Without a healthy means of release, the stress can build up and become a danger. The point is, the habits you develop now will stay with you as you continue your career, so create a good starting point. No matter how good your job is you will not be happy there if you're not happy outside the hospital.

Thanks for the opportunity to be a part of such an amazing organization and to represent you over this past year. I hope to continue to work to improve our specialty in whatever way I can. ★



# EMRA Membership Report

## MEMBERSHIP

**15,194**  
(up 9.4%)

## PROJECTS COMPLETED

EM Fundamentals  
Essentials of Airway Management  
Medical Student Survival Guide

## FY17 PLANS

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Rosh Review member benefit  
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2 new awards

## FISCAL HEALTH

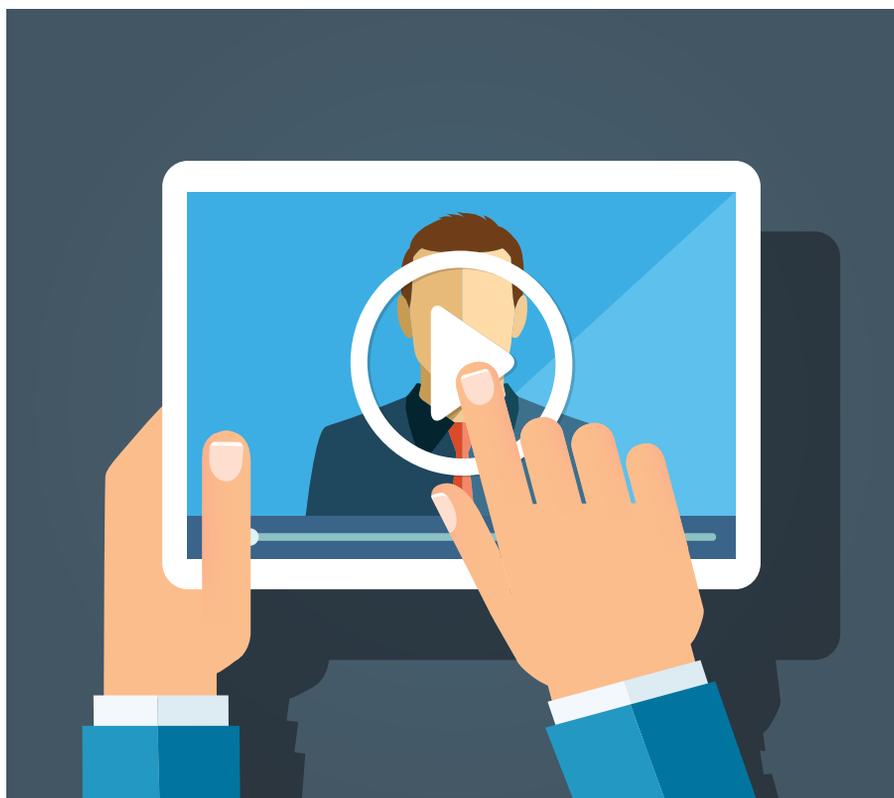
Balanced budget  
Steady investments  
No dues increase

20 in 6 Resident Lecture Competition  
New Member Kits to 100% EMRAfied programs  
Resident & student sessions @ ACEP15 & LAC  
AAMC Video Interview Advocacy Effort

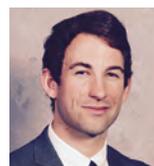
EMRA Match upgrade  
emra.org upgrade  
EMRA Hangouts for residents  
Health Policy journal club



# Fiscal Year 2016



# The AAMC Standardized Video Interview



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## A New Approach to the Residency Application?

In the increasingly tech-savvy world of medical education, it comes as no surprise that major changes are occurring at every level of the training process. While this trend has resulted in the development of new and innovative learning platforms, one area of medical education that has remained relatively unaffected over the years is perhaps one of the most important: the residency application process.

With few exceptions, individuals seeking graduate medical training in the U.S. must participate in the American Association of Medical Colleges (AAMC) Electronic Residency Application Service (ERAS). ERAS is a basic technology platform that collects a standardized set of information about applicants and distributes it *en masse* to residency programs. The result is a huge pool of data, made even larger by a trend of increasing application numbers per applicant, through which program directors must comb when deciding to

extend interview invitations. Numerical evaluation metrics such as USMLE and/or COMLEX board scores and class ranking have emerged as critical tools residency programs can use to rapidly narrow their focus to applicants who meet a certain demographic.

**To explore a new method to infuse an additional variable into the ERAS equation, the AAMC announced a new Standardized Video Interview (SVI) research study in May.** All applicants to Accreditation Council for Graduate Medical Education (ACGME)-accredited Emergency Medicine (EM) residency programs for the 2017 Match were invited to participate in this study.

### Background

The opt-in participant enrollment period for the AAMC's SVI study spanned June 27-Sept. 30, and the results analysis phase was projected to begin Oct. 1 and conclude in December 2017. The goal is to evaluate the validity, fairness, and

usefulness of the SVI in the residency application process, specifically as it relates to the generation of a new, more "holistic" score to be added into the ERAS application.

The study was designed such that applicants each received 6 random questions to assess 2 ACGME competencies (professionalism and interpersonal/communication skills). Participants got 30 seconds to read the question, and then 3 minutes to answer each question in a video recording. A brief survey followed the session. The videos were then independently scored, with the intention of later correlating this score to application data and residency performance metrics. Students who chose to participate received a \$50 Amazon gift code after completing the interview and feedback process.

As outlined by the AAMC in the informed consent document, the study was strictly voluntary and blinded to avoid any impact on applications for the 2017

*References available online.*

Match. Neither participants nor program directors (nor anyone affiliated with an EM residency program) will receive any videos, scores, or other information at any point during the process.

### Holistic Evaluation

The overall goal of incorporating some assessment of interpersonal skill into the residency application process is nothing new. For example, membership in the Gold Humanism Honor Society (an organization that recognizes individuals who provide humanistic care) is now a standalone component of the ERAS application. While the overall utility of this status varies depending on the individual evaluating the applicant, the ultimate goal of this modification to the ERAS application was to provide a relative marker of desirable competencies in a potential resident.

**The primary difference between the SVI study and previous**

**attempts at incorporating holistic components into the ERAS application is that the SVI study also aims to provide a numerical score that can be used as an objective data point to compare applicants.**

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**The study was designed such that applicants each received 6 random questions to assess 2 ACGME competencies (professionalism and interpersonal/communication skills).**

---

While it is difficult to assign a grade to a personal statement, there may be some incentive for residency programs to utilize the SVI score if the AAMC is able to standardize the scoring process and demonstrate a correlation with desirable resident performance metrics.

### Final Thoughts

As the interview season approaches, EM-bound applicants can rest assured that no dramatic changes to ERAS will be made for this cycle. However, this initiative should put medical students on notice that the residency application process may be modified in the near future.

How exactly will the residency application process change and adapt to address traditional difficulties in applicant assessment identified by educators? With the integration of new technology, the answer may trend toward an increased personalization of the application; whether this involves a video interview, however, remains to be seen. **For now, the best advice for students is to continue working hard, find mentors who can help them navigate the current application process, and stay up to date with any new changes as they are announced. \***



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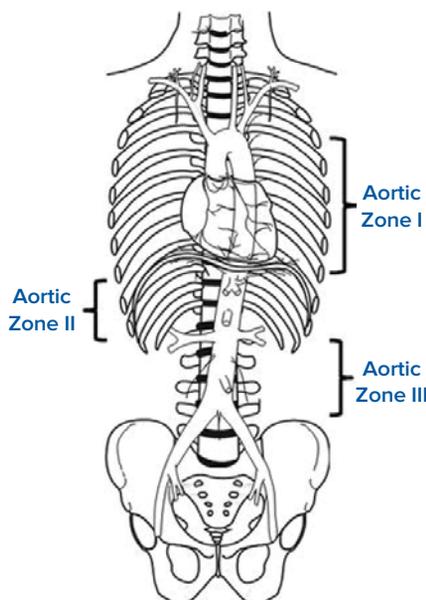
**Megan Simon Thomas, MD**  
Emergency Medicine Resident  
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A 25-year-old male is brought in by EMS with a gunshot wound. Vital signs are as follows: HR 130 BPM, BP 60/palp, RR 24, SpO<sub>2</sub> 99% RA, and temperature 37.5 Celsius. He appears pale, is unable to follow commands, and has a gunshot wound on the anterior aspect of his pelvis. You know the patient needs emergent surgical intervention, but **is he even going to make it out of the emergency department (ED)?**

Hemorrhage, especially non-compressible hemorrhage, is the No. 1 cause of death in trauma. When the bleeding is significant, as in certain cases of abdominal or pelvic trauma, resuscitative endovascular occlusion of the aorta (REBOA) is a potentially lifesaving intervention that can be used as a bridge to the operating room (OR). Simply put, it is a balloon-tipped catheter used to occlude the distal aorta proximal to the level of bleeding.

REBOA was first used during the Korean War and has since been used by the military, by paramedics in the United Kingdom, and now by emergency physicians and trauma surgeons in the United States. REBOA is not appropriate for every patient with traumatic hemorrhage; however, as it has very

**Figure 1. Relevant Anatomic Zones<sup>1</sup>**



Source: J Trauma Acute Care Surg. 2015;79(4Suppl):S236-42

**Table 1. Indications and Contraindications for REBOA**

Indications	Contraindications
Positive FAST	Age <18 or >70
Positive pelvic fracture, negative FAST	PEA arrest >10 minutes
Severe hypovolemic shock SBP<70	Traumatic proximal aortic dissection
Agonal state due to non-compressible hemorrhage	Pre-existing terminal illness or other significant comorbidities
PEA arrest <10 min secondary to exsanguination from sub-diaphragmatic hemorrhage and femoral vessels immediately identified on ultrasound	PEA arrest secondary to exsanguination from sub-diaphragmatic hemorrhage, and femoral vessels NOT immediately identified on ultrasound

specific indications and contraindications (Table 1).

### How Does it Work?

The goal of REBOA is to occlude blood flow to the major arterial vessel that is actively bleeding, and aortic insertion will target one of three relevant anatomic zones (Figure 1).<sup>1</sup> Zone I extends from the left subclavian artery to the celiac artery (level of the xiphoid process), Zone II from the celiac artery to the most caudal renal artery, and Zone III from the most caudal renal artery to the aortic bifurcation (just above the level of the umbilicus). REBOA should only be implemented if one suspects Zone I or Zone III bleeding.

### How Do You Do It?

See Table 2 for a list of materials. Otherwise, the basic procedure entails the following:

- First, identify the common femoral artery using ultrasound, and insert an arterial line.
- Next, insert a short guidewire/thin-walled needle into the femoral arterial line and sequentially dilate in order to insert a 12Fr sheath.
- Measure the desired length, marking this on the long guidewire.
- Insert the long guidewire to that mark and perform an X-ray to confirm the J-tip is at the appropriate level (Figure 2).<sup>2</sup>
- Next, insert the balloon catheter to the same length and remove the guidewire. Use an X-ray to confirm proper positioning and final placement (Zone 1 balloon at T4-L1, Zone 3 at L2-L4).
- Secure catheter with a grid lock (Figure 3) and expedite patient transport to the OR.

**Table 2. Materials for REBOA insertion**

What Materials Do You Need?
Arterial line kit
Thin-walled needle (18G, 7cm)
12Fr sheath kit
3-way tap
30mL syringe
Extra-stiff guidewire (0.035 inch, 180cm)
9Fr, 100cm in length Balloon catheter
Contrast solution

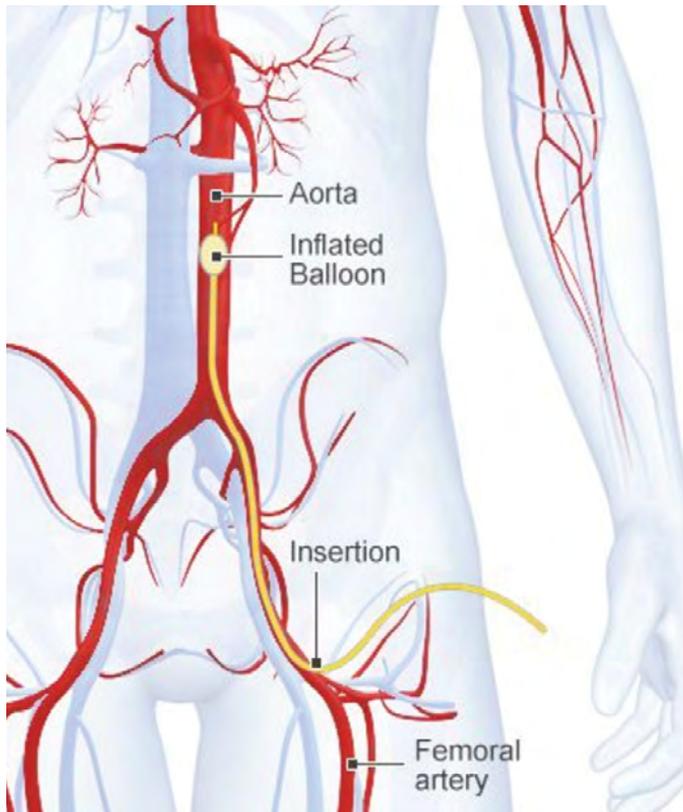
### Why Isn't This Happening in Your ED?

High-quality evidence for the use of REBOA in clinical settings is lacking. Several animal studies in the past have shown that those treated with REBOA were less acidotic, had lower lactate levels, lower pCO<sub>2</sub>, required less fluids and pressors, averaged higher mean arterial pressures (MAPs), and had lower mortality.<sup>4,5</sup>

Meanwhile, a 2015 study using a propensity score analysis showed that REBOA may actually increase mortality, although the authors did point out that within its database, patients had a median door-to-primary surgery time of 97 minutes (as opposed to the recommended 20 minutes).<sup>6</sup> In addition, the study did not have pertinent information available from its trauma database, such as why REBOA was used, which aortic zone was targeted, and the timing of aortic occlusion.

More recently, a 2016 review article including 41 studies and 857 patients illustrated an increase in systolic blood pressure after REBOA, however the quality and quantity of the evidence in

**Figure 2.** Proper Balloon Placement Should be Confirmed with X-ray



**Figure 3.** After Securing the Catheter Placement, Expedite Transfer to the OR



these studies was a major limitation.<sup>7</sup> **While there is great potential for REBOA, there are still too many unknowns to make it standard of care.** Prospective data is on the horizon by way of the AORTA trial and the ABOTrauma registry.

Other limitations to its widespread use include access to appropriate equipment and materials, emergent access to surgical facilities, and specialized training for providers.

Additionally, this procedure requires coordination between both trauma surgery and radiology departments, as they are both essential to its implementation.

Finally, a lack of consistently strong evidence showing a morbidity or mortality benefit limit this technique to academic institutions that can use it while also studying its efficacy.

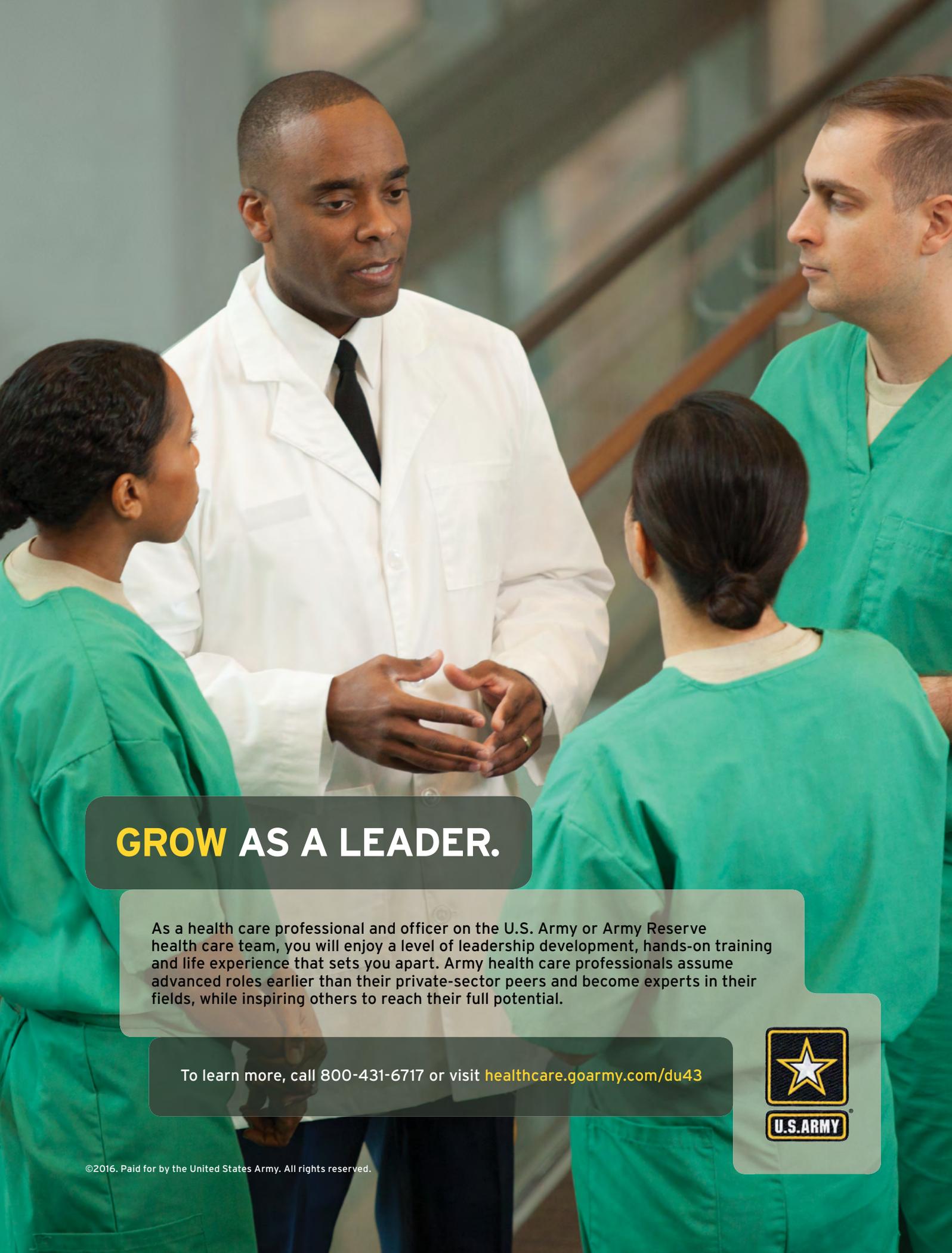
### Back to Our Patient

Zone III REBOA was used to stabilize the patient in the ED and his transfer was expedited to the operating room. The patient was found to have multiple pelvic fractures. Arteriography showed an injury to the left common iliac artery. Interventional radiology was called for an emergent coil embolization, followed by orthopedic stabilization of the patient's pelvic fractures. The patient left the OR stable and was admitted to the surgical intensive care unit. ★

## KEY POINTS

- ✓ REBOA is a procedure in which a balloon-tipped catheter is used to occlude the distal aorta proximal to the level of bleeding.
- ✓ REBOA is a potential temporizing solution to traumatic non-compressible hemorrhage.
- ✓ REBOA has specific indications and contraindications including age, sonographic findings, and degree of hemodynamic instability.
- ✓ Animal studies and case series have shown optimistic results; however, a recent study showed a possible increase in mortality with REBOA.
- ✓ Quality and quantity of evidence is lacking, but prospective data is being collected to further investigate the potential of this intervention.

*References available online.*



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## Palliative Care, Part 1

### The Importance of Early Implementation in the ED

**E**mily is tired. The illness is evident when she arrives in the emergency department (ED). You can see it in her face, her skin, her eyes. What little hair she has left is pulled back, and her face is haggard beyond its years. Her condition has not responded to treatment, and she is beginning to grow accustomed to the lack of energy. She does not grow accustomed to the pain, however — pain that increases steadily and has driven her to initiate difficult conversations with her family. With the inevitable drawing closer, her loved ones seek ways to mitigate Emily's pain and ease her suffering.

While Emily functions here only as a symbol, her story represents the stories of many patients. For these patients, the ED serves as the gateway to alleviation and amelioration of symptoms often too insurmountable or scary for them to face alone.

Early initiation and consistent provision of palliative care within hectic, overburdened, and resource-limited EDs can be challenging. Providers admittedly face several logistical barriers, including

knowledge deficits, time constraints, and infrequent advance care planning in older or terminally ill adults.<sup>1</sup> However, data have demonstrated that the provision of palliative care in the ED may not only be beneficial for patients like the fictional Emily, but also may be advantageous for departments and medical providers.

Data correlates palliative care integration in the ED with reductions in medical overtreatment, reductions in health care costs, and increased quality of life for patients with advanced illnesses; thus **ACEP and the Agency for Healthcare Research and Quality alike have begun advocating for the incorporation of palliative care in the ED.**<sup>2</sup> Likewise, the Choosing Wisely Campaign has encouraged providers to initiate palliative and hospice care services early for patients who are likely to benefit.<sup>3</sup> Through this series, the authors intend to demonstrate that, while seemingly challenging, the integration of palliative care into one's emergency medicine practice is beneficial and practical for providers and patients.

#### Why Should We Care?

Although some may argue that palliative care interventions should be implemented as part of inpatient treatment only, **literature supports that end-of-life care is both important and germane to medical practice in the ED.** Up to 81% of individuals aged 65 or older visit the ED during the last 6 months of their lives. Among these, the majority are eventually admitted to and die in the hospital.<sup>4,5</sup> Data also show that many of these visits could be avoided. One study found that approximately a quarter of ED visits made by patients receiving some form of care for advanced cancer were potentially avoidable. Another study found these visits were primarily due to uncontrolled symptoms, further supporting the role emergency physicians play in symptom management and quality of life measures within these patient populations.<sup>6,7</sup>

Conversely, the literature has shown that individuals consistently enrolled in hospice or palliative care services rarely visit the ED overall and are much less

References available online.

likely to visit within the last month of life. Reviewing Medicare-claim-linked data to identify characteristics contributing to ED use at the end of life, Smith et al. found that early hospice usage was a commonality among individuals who did not present to the ED in the last month of life.<sup>4</sup> A subsequently performed international systematic review came to the same conclusion.<sup>8</sup> This data not only highlights a need and opportunity for providers to intervene on behalf of their patients and departments, but could also prompt one to consider why, over time, the provision of costly and often futile advanced medical management continues to seemingly outweigh our utilization of advantageous palliative care management options.

### Why (Else) Should We Care?

Hospital-wide, an inpatient course is directed by ED-derived diagnoses and treatment initiation; end-of-life care is no exception. **Early implementation of palliative care into the ED cuts back on intensive care and standard admission rates, treatment costs, and length of stay.**

A systematic review of palliative care interventions in intensive care units found

that the relative risk of admission and longer length of stay was significantly reduced in those who received palliative care services.<sup>9</sup> One study performed within the ED found that, despite meeting criteria for admission to critical care or step-down units, more than half of all admitted patients who received palliative care interventions were instead admitted to medical or surgical units. Upon analyzing those who received this intervention and were subsequently discharged from the ED, more than half met admission criteria, and a staggering 50% would have met criteria for critical care admission.<sup>10</sup>

Moreover, on review of these findings, one can attempt to further extrapolate the potential resource and cost-saving implications of ED-initiated palliative care. Upon examination of end-of-life care within the intensive care unit, one study found that approximately a quarter of health care costs are spent at the end of life.<sup>11</sup> Furthermore, a review of end of life costs found that through use of hospice and implementation of advance directives, expenditures can be reduced from 25 to 40 percent.<sup>12</sup> Advance

directives were associated with decreased Medicare expenditures and lower rates of in-hospital death, particularly in higher-spending regions.<sup>13</sup>

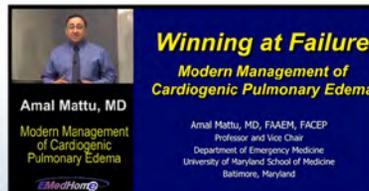
These findings not only emphasize the magnitude of potential cost saving through palliative care service enrollment and advance directive creation, they also accentuate concurrent benefits for both patients and providers, particularly with respect to the avoidance of unnecessary and intervention-laden admissions.

### Now What?

Although providers may be unable to alleviate the afflictions of patients such as our fictional Emily, they do have the power to ameliorate a portion of their emotional, financial, and symptomatic burdens. **Through the timely implementation of palliative care in the ED, practitioners can not only promote enhanced quality of care but can foster better departmental and institutional resource utilization while doing so.** How can one begin to do this within the highly taxing and hectic ED environment? Stay tuned for the second installment of our series. ★



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# Gasping FOR AIR



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## Albuterol-Induced Lactic Acidosis

Lactic acidosis is a commonly encountered phenomenon within the emergency department (ED). In the setting of sepsis, elevated lactate levels can be an indicator of hypoxia or decreased perfusion. Its clearance can be a sign of increased perfusion. However, lactic acidosis is much more encompassing and can be the result of many other pathophysiologic processes.

Broadly, lactic acid can be broken down into two isomers—D- and L-lactate. It is L-lactate that is further sub-typed into 2 categories—hypoxic (Type A) and non-hypoxic (Type B).<sup>1</sup> Hypoxic causes of lactic acidosis include ischemia, shock, cardiac arrest, carbon monoxide poisoning, respiratory failure, and regional hypoperfusion. Some non-hypoxemic causes include renal or hepatic dysfunction, uncoupling of oxidative phosphorylation, seizures, diabetic ketoacidosis and many drug toxicities.

One uncommonly recognized cause of lactic acidosis is albuterol-induced lactic acidosis. When treating asthmatic patients, lactic acidosis creates a unique situation whereby patients may appear more dyspneic despite improvement in bronchospasm. This is the result of a compensatory respiratory mechanism for their metabolic acidosis. **Unfortunately, physicians may believe their patient is not improving and administer more albuterol, leading to a vicious cycle that results in worsening respiratory status or respiratory failure.**

### Pathophysiology

The normal blood lactate concentration in patients is 0.5-1mmol/L. Hyperlactatemia is defined as an elevated lactate concentration (2-4mmol/L) without metabolic acidosis.<sup>2</sup> It occurs when lactate production exceeds lactate consumption. Lactic acidosis, on the other hand, is defined as increased blood lactate levels (usually greater than 5mmol/L) leading to a metabolic acidosis. Lactate is a byproduct of glycolysis, and its formation increases when the rate of pyruvate formation in the cytosol exceeds its rate of use by the mitochondria. This occurs with rapid rises in metabolic rates or when oxygen delivery to the mitochondria declines, which occurs in tissue hypoxia.

Albuterol is a  $\beta_2$ -adrenergic agonist, which is a potent bronchodilator. The mechanism of action by which albuterol acts is by increasing cAMP and therefore causing smooth muscle relaxation.<sup>3</sup> **The exact mechanism of action by which albuterol causes lactic acidosis is not completely known, but a dose of 1mg/kg appears to be the threshold for developing clinically significant toxicity.**<sup>4</sup> It is thought that albuterol creates a hyperadrenergic state. High levels of these catecholamines can aggravate hyperlactatemia by reducing tissue perfusion and overstimulating the  $\beta_2$  adrenoceptor.<sup>5</sup> This, in turn, enhances glycogenolysis and gluconeogenesis and subsequently increases glycolysis and pyruvate production. However, pyruvate cannot enter the Krebs cycle because of concurrent increases in lipolysis and increased free fatty acid production,

which inhibits the pyruvate dehydrogenase enzyme. This shifts pyruvate to be reduced to lactate.<sup>6,7</sup> (See formula below)

### Clinical Practice

Patients with asthma or wheezing are usually initially treated with albuterol. When a patient has had too much albuterol and a subsequent increase in lactic acid, it creates a paradoxical picture. As mentioned above, while the bronchospasm may improve, patients may appear more dyspneic or tachypneic.<sup>1</sup>

With the increased respiratory rate, patients are physiologically compensating for the metabolic acidosis that is occurring. Health care providers may interpret these signs and symptoms as worsening asthma and therefore give more albuterol.<sup>7</sup>

However, this propagates the cycle of worsening respiratory effort and can ultimately lead to respiratory failure. **The best way to identify and avoid this situation is by keen situational awareness, attentive physical exams, and serial peak flow measurements.** Physicians should complete multiple, thorough lung exams to assess for improvement or resolution of wheezing and recognize when to stop repeated doses of albuterol.

### Future

Albuterol is a very commonly used medication, especially in the ED. The best way to prevent albuterol-induced lactic acidosis is to recognize its potential to occur and assess patients accordingly. Further research is needed to decipher if what doses or combinations of medications used in asthma can be as efficacious without the potential deleterious side effect of lactic acidosis. ★



References available online.

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## Pearls From the October Issue

In 49 ED pts with agitation, the addition of ketamine (4-5mg/kg IM) quickly sedated when major tranquilizers were inadequate.

In a RCT of 376 adult asthmatics an oral dose of dexamethasone (12mg) had similar relapses as 5 days of prednisolone (60mg/day).

In a RCT of pts. with severe trauma, total body CT (702 pts) did not reduce in-hospital mortality vs standard imaging (542 pts).

An analysis of 22 studies found that CT within 6 hrs of onset accurately rules in and rules out SAH, LP benefits are minimal.

Of 12,044 No Am children with blunt abdominal trauma CTs were done in 52% of whites, 33% of blacks and 44% of Hispanics.

Of 10,351 children with anaphylaxis, variation in Rx at 35 peds EDs was large re. meds and hospitalization rates (12% vs 96%).

14 RCTs with various flaws provided limited evidence to support IV APAP as the primary analgesic for acute pain in the ED.

In 105 ant. STEMI pts eligible for IV metoprolol (15mg), the sooner the drug was given, the smaller the MI & the better the LVEF.

In a pop. study of 148,027, using restrictive criteria, 7% of strokes would qualify for endovascular treatment (13% if liberal).

Stable NSTEMI pts. admitted to a CCU (5,141) had no difference in outcomes than pts. initially admitted to telemetry (2,728).

In a meta-analysis of 21 RCTs, short-term, high-dose atorvastatin and rosuvastatin reduced the risk of CI-AKI (RR, 0.57).

...And This List Covers Less Than Half of the 30 Papers in the October Issue of EMA.



Figure 1. TEE probe position



Figure 2. Mid-esophageal 4-chamber view

# The UtiliTEE of Ultrasound IN CARDIAC ARREST



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**A** 57-year-old obese man with unknown past medical history becomes unresponsive and pulseless on the subway platform with bystander CPR initiated. EMS arrives within minutes, continues CPR, administers 1mg epinephrine and places 2 peripheral IVs. In the ED, the patient is emergently transferred to a stretcher and intubated, with ongoing CPR. During the next pulse-check, a practitioner palpates the femoral artery while you assess for cardiac activity with a phased-array probe. The window is poor but you determine there is no evidence of tamponade or ventricular activity. Chest compressions continue; however, the ultrasound gel has created a slippery field and you are forced to pause in order to wipe the chest wall and resume CPR. **Would transesophageal echocardiography (TEE) provide an advantage over transthoracic echocardiography (TTE) in cardiopulmonary resuscitation?**

Many emergency physicians use TTE to enhance their clinical approach to cardiopulmonary resuscitation. In their 2012 review, Blyth et al. postulated that TTE can be useful in predicting cardiovascular demise if asystole is visualized during resuscitation.<sup>1</sup> While TTE likely augments a provider's ability to work through their *H's and T's*, limitations like body habitus, COPD, and subcutaneous emphysema may impair diagnostic accuracy and utility.

In contrast, TEE provides an optimal acoustic window for precise, real-time images throughout the resuscitation period without the need to disrupt compressions.<sup>2</sup>

Within the past 10-15 years, various studies have demonstrated that TEE may circumvent the pitfalls of conventional TTE, potentially improving patient outcomes during cardiopulmonary arrest. The 2008 ACEP Emergency Ultrasound Guidelines designate TEE as an adjunct or emerging ultrasound application.<sup>2</sup>

The risks of performing a TEE include esophageal perforation (incidence 0.03%), pharyngeal perforation, major bleeding, dental or lip injury, dysphagia, and hoarseness.<sup>4,5</sup> Because the probe enters the esophagus, absolute contraindications include perforated viscus, esophageal pathology/esophagectomy, upper

gastrointestinal (GI) bleed or recent upper GI surgery.<sup>5</sup> Relative contraindications such as cervical spine disease, coagulopathy, prior chest radiation, hiatal hernia, and recent upper GI bleed can be weighed against the potential for higher resolution images and superior diagnostic capabilities.

## Technique

TEE utilizes a higher frequency probe (3 to 8 MHz) that penetrates 18 to 20 cm and is positioned in the esophagus posterior to the heart. The probe is passed into the esophagus in a similar manner as an orogastric tube placement. Traditionally the probe contains 2 wheels, a lock, and

buttons that angle the crystal beam. The larger wheel anteflexes and retroflexes the transducer head, while the smaller wheel moves the probe medially and laterally (Figure 1). The literature shows 20 classic views for an expert TEE operator; however, for a focused, point-of-care ultrasound, a 4-view protocol is sufficient.

Similar to the apical 4-chamber in TTE, the first view should be a **mid-esophageal 4-chamber view**, which can visualize the heart's pericardium, chambers, and valves. Introduce the transducer into the mid-esophagus at 0 degrees and avoid flexing the probe (Figure 2).

The second view, a **mid-esophageal long-axis view**, can be obtained by remaining in the same location and rotating the transducer crystals (using the small buttons on the probe) 110 to 120 degrees. This is synonymous with the parasternal long axis on TTE (Figure 3).

To acquire the third window, the **bi-caval view with M-mode**, rotate the crystals 90 to 100 degrees. This illuminates the superior vena cava (SVC), the right atrium, and the inferior vena cava (IVC). It is similar to the subcostal view on TTE (Figure 4).

Lastly, to obtain the **trans-gastric short-axis view**, straighten the crystals to 0 degrees and advance the transducer into the mid-stomach. Anteflex the probe using the large wheel. This view is synonymous with the parasternal short axis view of the left ventricle (Figure 5).

## Discussion

There are no randomized controlled trials involving TEE during cardiopulmonary arrest in the ED. In a recent retrospective case review in *Ultrasound in Emergency Medicine*, Arntfield et al. analyzed 54 TEE

examinations (43% during cardiac arrest) in 2 Canadian training hospitals between 2013 and 2015. During this study, 12 ED physicians who had previously trained with a 4-hour TEE workshop, applied the 4-view protocol for indications including cardiac arrest (intra-arrest and post arrest), hypotension, and aortic dissection.

The researchers employed a mid-esophageal 4-chamber view 96% of the time (thought to be the easiest to obtain) that frequently (43% of the time) altered CPR timing and quality based upon the images. Other TEE-specific findings included fine ventricular fibrillation (4%), aortic dissection (4%), and mediastinal hematoma (2%). The authors concluded that TEE was both feasible and advantageous for intubated patients with undifferentiated shock and cardiac arrest in the ED.<sup>6</sup>

A second study performed by an individual, highly-skilled operator in a tertiary referral ED discussed 6 cases in

which management pathways were significantly altered by TEE findings that were not apparent on TTE. These included hypovolemia, RA/RV thrombus, a misplaced PICC line, aortic dissection, fine ventricular fibrillation, and ventricular fibrillation secondary to hyperkalemia. The author concluded that further work is required to determine if TEE is cost effective and beneficial on a larger scale.<sup>7</sup>

## Bottom Line

TEE likely improves diagnostic accuracy during cardiac arrest resuscitation in the ED. Limitations include the procedure's invasive nature and availability, transducer cost (~\$40K), and the need for training. Obtaining the necessary views may seem daunting at first, but with any new application there is a learning curve. Randomized controlled trials are essential to further determine the risks and benefits as compared to conventional TTE. ★

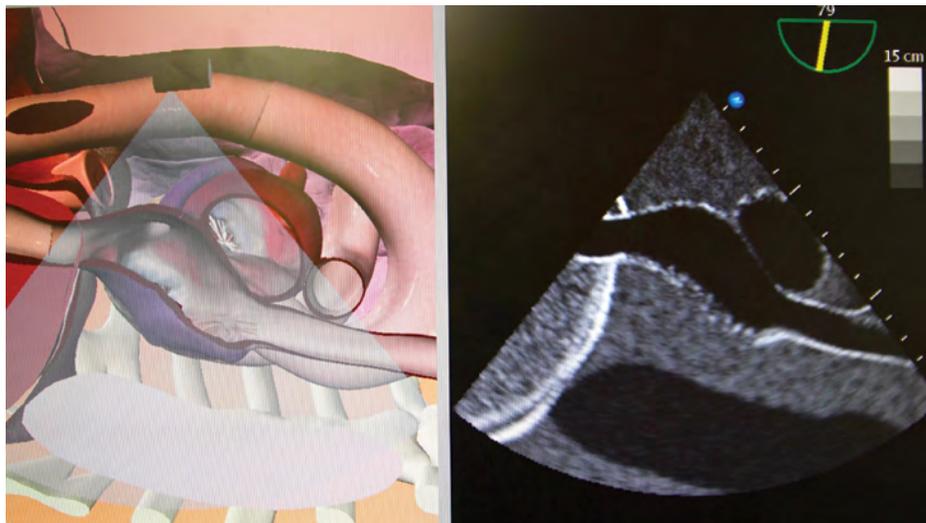


Figure 4. Bi-caval view with M-mode

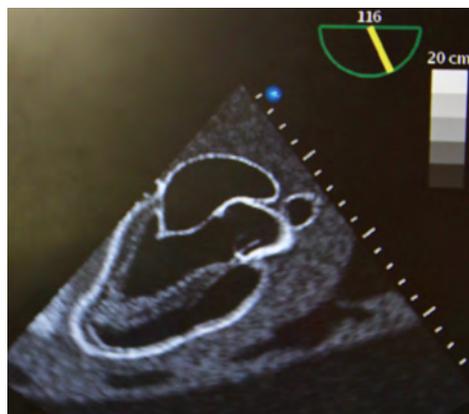


Figure 3. Mid-esophageal long-axis view

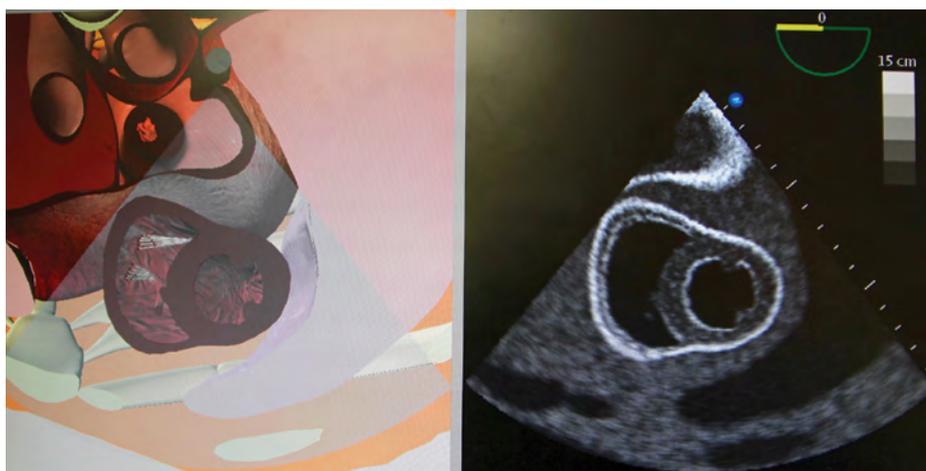


Figure 5. Trans-gastric short-axis view

# Medical Acting 101



## Becoming America's Next Top Medical Performer

Medical simulation has experienced rapid growth over the past 15 years, with up to 92% of emergency medicine residencies using simulation in some capacity.<sup>1</sup> It provides a great way to learn fundamentals of medicine, try new procedures, develop skills, and work on communication.<sup>2</sup> But all of these cases rely upon confederates: case actors pretending to be nurses, family, consultants, or paramedics who know what is expected to happen but must also improvise alongside the participants taking care of the patient.

While confederates are sometimes professional actors, many of these performances involve physicians or medical students playing the role of RN, consultant MD, or family member. It requires a unique set of skills that is rarely taught or discussed in medical school or residency training.

To learn more about how to deliver convincing performances in simulation scenarios, the authors of this article sat down with a local professional actor (MB), who works both as a standardized patient and as a confederate at the Coro Simulation Center at Rhode Island

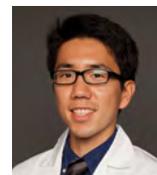
Hospital. Without further ado, here are her tips for becoming the next top medical simulation performer.

### MB's List to *SHINE* as a Performer (A-list Rec's)

1. **Stay in character** — In order for the learners to be fully engaged with the case and with your role, you have to believe in your own character first to make it as convincing as possible.
2. **Gather from real-life experiences** — You do not need to have suffered from a heart attack or be fully intoxicated to know how they present in real life. Dig deep into your memory banks with those patient encounters to create a believable performance throughout the simulation.
3. **Use your imagination** — It is often helpful to imagine yourself as the actual patient experiencing the first “worst headache of his life” or surgical abdomen. The mind is a powerful organ, and it can bring out our inner star.
4. **Take a mini-mental break** — As an actor, you do not have to fill every silent moment. Learners sometimes



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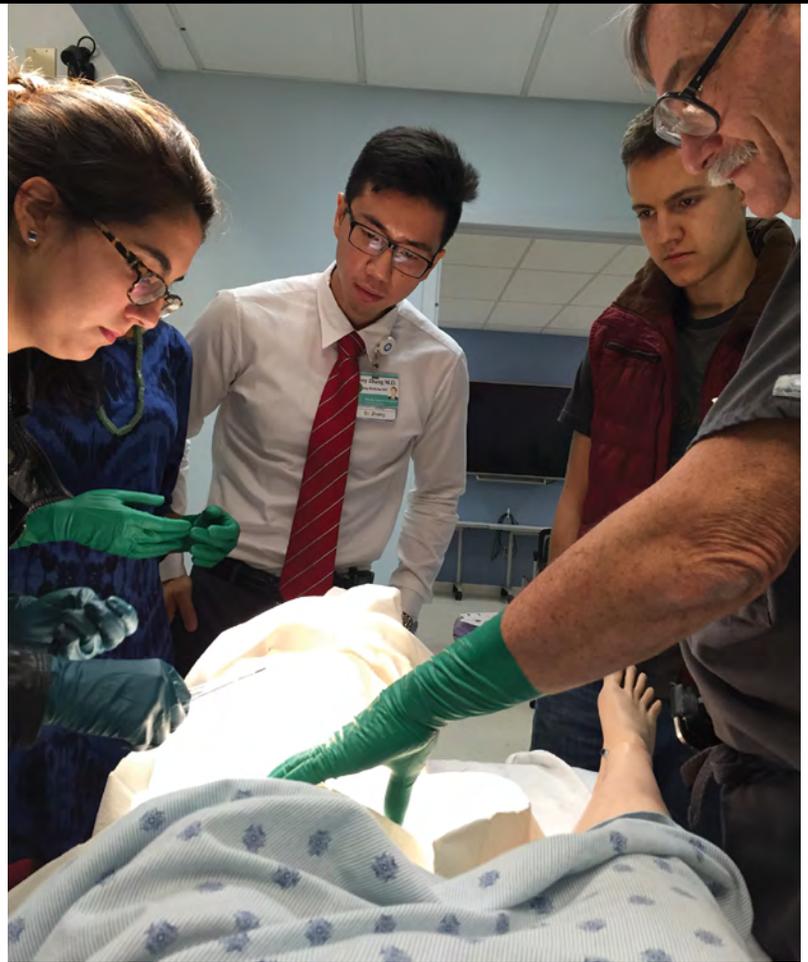
**David Lindquist, MD, FACEP**  
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learn the most during these moments when they can process the clinical situation. So, take a break, readjust, and carefully nudge your learners back to the learning objectives.

5. **Practice makes perfect actors** — We may not all be Meryl Streep or Leonardo DiCaprio, but with practice and real-time feedback, we can perfect our roles, hone our skills, and bring life to the simulation cases.

## MB's List to SINK as a Performer (a.k.a. Avoid at all costs!)

1. **“Too cool” to act** — Part of being a case confederate is creating a believable persona that complements the case scenario. By purposefully nulling your emotions, you risk disrupting the fabric of illusion and believability of the case.
2. **Stealing the spotlight** — Avoid over-acting as much as under-acting; either gesture outside the script can derail the focus away from the learning objectives.
3. **...“Line?”** — Just because your confederate role involves a patient with altered mental status, it does not mean you should forget your cues or case-specific reactions. Read and practice the scripts, and consider going over complicated case details with the writers if you have any questions.
4. **Ignoring the learning objectives** — Your main job as the confederate actor is to allow the case writers to relay their learning objectives to the learners. Getting an Oscar nomination as your institutional Best Sim Actor should be your secondary prize.
5. **Gigging** — This may sound silly, but giggling during your speech can spell instant disaster by shattering the veil of the simulated environment, thereby diminishing your credibility as a believable character.



While these great tips may not turn a novice into an expert in one read, our goal is to help residents and medical students understand the importance of a skilled confederate. Additionally, we hope to have instilled some confidence in your ability to roleplay so that you may now provide the most high-fidelity simulation experience for all future learners. \*

### ACTOR'S BIO

*Melissa Bowler is the executive director of the Providence Improv Guild and has been performing professionally since 2005. She is a simulation specialist at Women and Infants Hospital and a Standardized Patient at Alpert Warren Medical School at Brown University. She lives in Providence, Rhode Island, with her 3-year-old son, Luc.*

# THROUGH ROSE-COLORED GLASSES



## Perils and Pitfalls of Adopting Bleeding-Edge Technology in the ED

“Wearable technology” has become a part of daily life for millions of individuals. Who can remember the last time they navigated a typical day without encountering someone wearing a Fitbit®, an Apple Watch, a bluetooth headset, or some other high-tech device masquerading as jewelry? These devices provide enhanced connections to mobile phones, email, the internet, and even the human body.

The impact of this integrated technology on health and wellness is being debated even while these advances make inroads in the field of healthcare. Investigation continues on whether there is a practical and beneficial use for such devices in medicine.

Google Glass is one device that has caught the eye of many providers. Glass is a wearable device consisting of a

frame, such as those used for eyeglasses, combined with a small heads-up display (HUD). Computer processing and wireless communication circuitry are built into the frame, allowing for constant connectivity. While similar devices exist, none have achieved the level of mainstream attention afforded to Glass. Physicians took notice and have explored its use in orthopedic surgery, general surgery, pediatric surgery, and emergency medicine.<sup>1-4</sup> The utility of this technology has also been explored in medical education, pharmacy, and laboratory medicine.<sup>5-7</sup>

Google Glass seems to have great potential. The possibilities are many, including critical updates pushed to a provider’s HUD in real-time, remote procedural guidance and evaluation, remote evaluation of patient interactions, automatic algorithm reminders during codes — and the list continues.



**Philip Kray, MD**  
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### Firsthand Experience

After pitching the idea to my residency program director and department chair at The Ohio State University, we secured a Google Glass unit through the Google Glass Explorer Program.

That was the easy part. The rest of my experience translating an IRB-approved concept into reality resulted in several lessons that I hope will serve as both a guide and a cautionary tale to practitioners seeking to investigate the utility of similar technology in the future.

*References available online.*

## LESSON 1

### **ENSURE SOCIETY IS READY TO ACCEPT USE OF THE NEW TECHNOLOGY.**

Wearers of Glass in public quickly came under fire, largely due to misconceptions about when the device was recording video. Users were ejected from restaurants and even assaulted.<sup>8,9</sup> We braced, knowing that – if approved for use in the clinical arena – our patients would be even more skeptical of the technology.

## LESSON 2

### **CONFIRM THAT YOUR HOSPITAL IT DEPARTMENT HAS THE NECESSARY INFRASTRUCTURE TO SUPPORT THE TECHNOLOGY.**

Glass, and any other devices requiring an “always on” wireless connection, rely on either a cellular connection or Wi-Fi. With spotty cellular coverage in many large hospital buildings, Wi-Fi may be the only option. Make sure your IT department can provide a way to connect your chosen device. In our case, Glass had no option for connecting to a public Wi-Fi network (such as the one provided for patient use), and connection to a secure network was not an option (see Lesson #3).

## LESSON 3

### **UTILIZE TECHNOLOGY THAT IS HIPAA COMPLIANT.**

The built-in apps in Google Glass, including the video chat functionality that was key to our study, use Google servers for data processing. While our study did not collect any HIPAA protected data, this would be an obstacle to overcome prior to deployment in any clinical environment. IT departments may be reluctant to allow non-hospital-supported devices (ie, not Apple or Android smartphones) to access their secure networks.

## LESSON 4

### **DETERMINE WHETHER THE COMPANY THAT MANUFACTURES YOUR DEVICE WILL CONTINUE TO SUPPORT THE HARDWARE (AND SOFTWARE).**

Midway through preparing for data collection in the study, Google discontinued the video chat software functionality in the Glass unit, remotely removing it during a firmware update. This would have completely derailed the study if we had not been able to restore the functionality by transferring old firmware to the device (not an easy task, unless you’re an IT professional). In addition, Google stopped selling Glass in January 2015, taking the project in-house with no announced availability to the public and only rumored availability to businesses.<sup>1</sup> This left us exploring a technology with a questionable future.

## LESSON 5

### **ACCOUNT FOR UNEXPECTED DELAYS.**

The unexpected removal of the video chat functionality delayed our study while we attempted to restore the application to the Glass unit. Unexpected difficulty obtaining permission to use standardized patient models further delayed the project. If you are a resident hoping to complete a new study in 3-4 years, make sure you develop a contingency plan for handing off the project to another resident if it cannot be completed before you graduate.

## LESSON 6

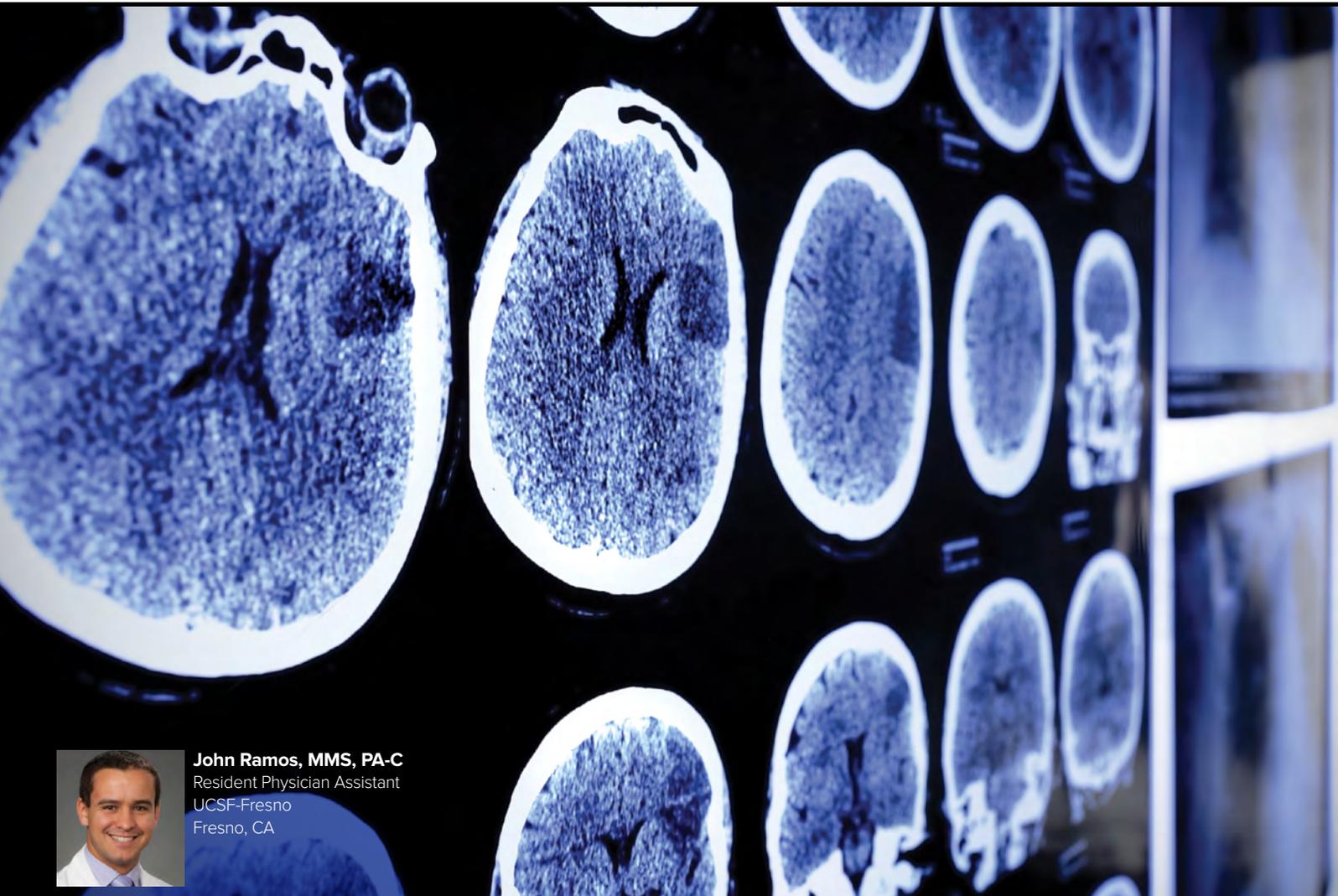
### **KNOW WHEN TO THROW IN THE TOWEL.**

Ultimately, we had to abandon our study. The unknown future of the Google Glass technology was the final straw. We could no longer continue to invest time in a grand vision that relied on technology that may or may not be supported in the future.

I continue to hope that adoption of cutting-edge technology advances the quality of care we provide for our patients and the education we provide to residents. In no way do I want to discourage those with a shared interest in pushing the technological envelope. Most important, I hope the lessons we learned from our experience will allow for smoother and more successful approaches to applying new technology in clinical settings. ★

### **Acknowledgements**

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# THE *Future* IS NOW

## *Current Advances in Rapid Stroke Diagnosis*

**A**t a rural acute stroke-ready hospital in the year 2030, you are using a tele-stroke tablet to evaluate a 62-year-old male en route by mobile computed tomography (CT) ambulance. The man's wife says he complained of left-sided weakness for the past 2 hours. A computer downloads the 20 non-contrast head CT images transmitted from the ambulance, but some of them are blurry. "Again?" the radiology tech exclaims. "These budget cuts are killing us. In the city they have ambulances that give you 300 high-definition images, in half the time!" Via the tele-stroke tablet, you find that

the patient has an NIH stroke scale score of 8. The patient's vital signs, ECG, PT-INR, and glucose are within normal limits, and a "GFAP" is below the threshold for thrombolysis exclusion. You wonder if you missed a bleed in the blurry CT images. The ambulance is 10 minutes away, and the nearest primary stroke center is 1 hour away by air. The paramedic in the ambulance speaks. "We have tPA ready. Should we administer before arrival?"

Stroke is the fifth leading cause of death in the United States, accumulating health care costs of up to \$33.6 billion each year.<sup>1,2</sup> Eighty-seven percent of

strokes are ischemic in etiology, and thrombolysis with intravenous tissue-type plasminogen activating factor (tPA) is the only FDA approved treatment for acute ischemic stroke.<sup>2</sup> An estimated 1.9 million neurons are lost every minute that treatment is delayed, and the American Heart Association/American Stroke Association (AHA/ASA) recommends tPA administration within 3 to 4.5 hours of symptom onset and within 1 hour of hospital arrival.<sup>3-6</sup> The gold standard for stroke diagnosis is head CT, and an initial non-contrast CT is essential to exclude hemorrhagic stroke or intracerebral hemorrhage, a major contraindication

to tPA administration. Per AHA/ASA acute ischemic stroke treatment recommendations, providers have a 1-hour “door-to-needle” time between hospital arrival, CT imaging and review, and tPA administration.<sup>6</sup>

However, a national multicenter study from 2011 found that fewer than 30% of stroke patients had door-to-needle times of one hour or less.<sup>7</sup> Furthermore, the Target:Stroke quality improvement initiative launched by ASA/AHA in 2010 found an improvement in this number to only 53.3%, even after their quality improvement interventions.<sup>8</sup>

Access also contributes to delayed tPA administration. Some studies found that less than 20 to 60% of stroke patients access a hospital within 3.5 hours of symptom onset, and in 2010, 55.4% of the United States population lived at least 1 hour away from hospitals with stroke treatment capabilities.<sup>9-11</sup>

There are a variety of ways to promote rapid recognition, diagnosis, and management of acute ischemic stroke. The Face Arm Speech Test (FAST), Cincinnati Prehospital Stroke Scale (CPSS), and Los Angeles Prehospital Stroke Scale (LAPSS) are assessment tools frequently used in the prehospital setting by emergency medical services personnel, with high predictive value for stroke based on patient signs and symptoms.<sup>12</sup>

Additionally, the Joint Commission accredits Primary Stroke Centers, or hospitals with adequate resources and protocols for stroke management as defined by AHA/ASA.<sup>13</sup>

Scientific and technological advances in the past 20 years have revealed the following new ways to improve early stroke recognition and management.

### Tele-stroke Networks

Telemedicine has advanced significantly over the past decade, broadening regional access to quality stroke management. Cellular connectivity with fourth generation long-term evolution (4G LTE) broadband has expanded the ability of neurologists to assess stroke patients more reliably via mobile devices like tablets.<sup>14,15</sup> Most recently, in a study of 259 consecutive stroke patients evaluated by tele-stroke providers, the mean door-to-needle time

was 42.2 minutes.<sup>16</sup> The Joint Commission claims that tele-stroke networks are the best option for stroke management in rural areas, and in 2015 created a new certification for “Acute Stroke-Ready Hospitals” with tele-stroke provider access and tPA administration capabilities, among other requirements.<sup>17-19</sup>

### Mobile Stroke Treatment Units

In Germany and the United States, researchers have investigated the viability of mobile CT imaging to exclude hemorrhagic stroke in the pre-hospital setting, thereby expediting tPA treatment.

#### PHANTOM-S

In Berlin, the Prehospital Acute Neurological Treatment and Optimization of Medical Care in Stroke Study (PHANTOM-S) used Stroke Emergency Mobile (STEMO) units. STEMO units are ambulances with a CT scanner, laboratory equipment for point of care testing, paramedics, a radiology technician, and a neurologist. For 200 ischemic stroke patients treated with tPA by STEMO, the mean alarm-to-treatment time was 25 minutes shorter than in the control group (51.8 vs. 76.3 minutes, respectively,  $P < .001$ ). tPA was used more frequently with STEMO deployment (32.6% vs. 21.1%) yet the risk of developing intracerebral hemorrhage was lower, albeit statistically insignificant.<sup>20-21</sup> Overall, they estimated an annual reduction of 18 disabilities and a gain of 29 quality-adjusted life years for acute ischemic stroke patients who were treated with STEMO.

#### PHAST

The Cleveland Pre-Hospital Acute Stroke Treatment (PHAST) study used Mobile Stroke Treatment Units (MSTUs). MSTUs are similar to STEMO units, but a vascular neurologist evaluates the patient via telemedicine, and a neuro-radiologist reviews CT images remotely. The mean time for patients entering MSTUs to completing the head CT was 5 minutes faster than patients who received conventional stroke care (13 vs. 18 minutes, respectively,  $P = .003$ ). For 16 patients who received tPA in MSTUs, the mean door-to-needle time was 26 minutes faster than the control group (32 minutes vs. 58 minutes,  $P < .001$ ).<sup>22</sup>

While mobile stroke treatment demonstrates promise for improving early thrombolysis in acute ischemic stroke, there are financial barriers limiting operational feasibility at this time, with annual net costs estimated at about \$1.05 million per year.<sup>23</sup> One analysis concluded that while the cost-effectiveness of mobile stroke treatment is high, benefit-cost ratios vary based on the travel distance and population density.<sup>24</sup> There may be ethical considerations if high costs affect availability, thereby limiting the number of patients who receive care.

### Serum Biomarkers

Research shows potential for serum biomarkers in identifying stroke and/or differentiating ischemic and hemorrhagic stroke etiology. The most significantly studied serum stroke biomarkers to date are glial fibrillary acidic protein (GFAP) and ubiquitin C-terminal hydrolase L1 (UCH-L1).<sup>25-28</sup> GFAP is an astrocytic intermediate filament protein, specifically found in brain tissue. UCH-L1 is an enzyme found in the central nervous system with functions related to neuronal repair after cellular injury.

In a recent study, median serum levels of GFAP and UCH-L1 were significantly higher in patients with intracerebral hemorrhage compared to healthy control patients and patients with ischemic stroke.<sup>28</sup>

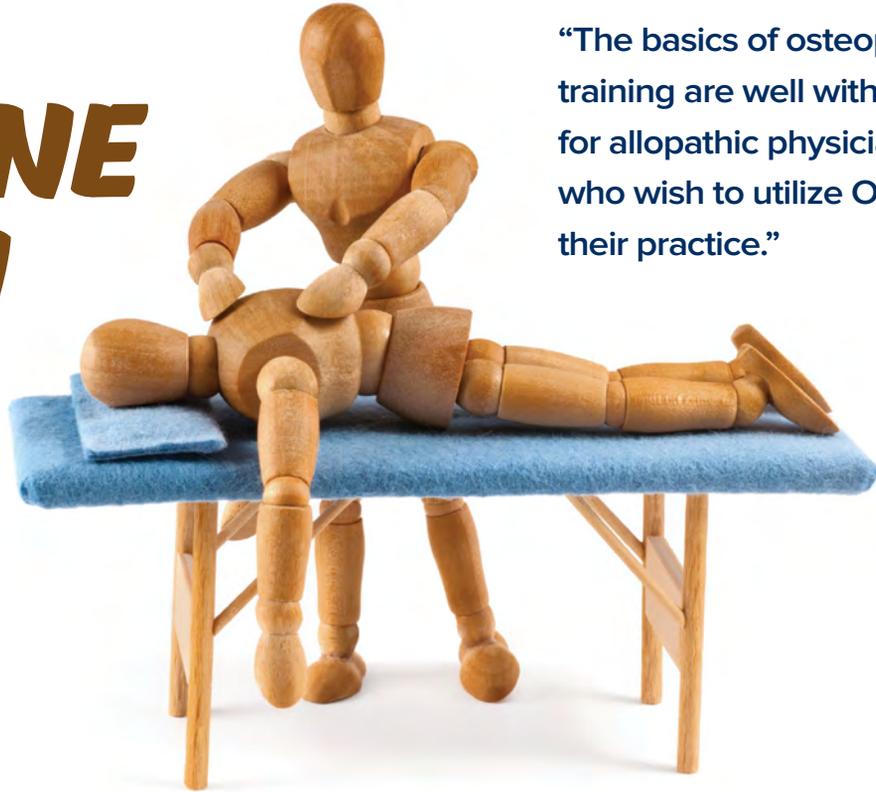
Additionally, a serum cut-off of .34ng/mL of GFAP differentiated intracerebral hemorrhage from ischemic stroke with a sensitivity of 61% and specificity of 96%. While serum biomarkers may not replace imaging in stroke diagnosis, they may be valuable for evaluating tPA eligibility and risk of intracerebral hemorrhage in the future.

### Conclusion

Rapid stroke evaluation and treatment is already moving from the emergency department into the prehospital realm. Emergency providers will have to be prepared for patients who may have already received imaging and/or treatment prior to arrival. Tele-stroke networks, mobile stroke units, and serum biomarkers are not only the future of emergency medicine, but also perhaps a new standard of care for acute ischemic stroke patients. ★

# OMM in the Emergency Department

**ANYONE  
CAN  
DO  
IT!**



“The basics of osteopathic training are well within reach for allopathic physicians who wish to utilize OMM in their practice.”

Any Doctor of Osteopathic Medicine (DO) is familiar with the following question: “Hey Doc, what does that DO mean after your name?” While a detailed response regarding homeostasis and the musculoskeletal system could ensue, most of us tend to respond with some comment about osteopathic manipulative medicine (OMM). Unfortunately, most osteopathic emergency medicine (EM) residents have only vague memories of how to perform OMM and have since abandoned any hope of renaissance.

Simply stated, OMM is a thought process regarding the usage of techniques to manipulate the musculoskeletal system, lymphatics, and nervous system to aid a patient’s body in self-repair. Somatic dysfunctions are palpable tissue texture changes that can be treated to help the body restore homeostasis and reduce pain by a number of mechanisms. In osteopathic training, this thought process is obtained through the teaching of well-known techniques and palpatory exercises as

part of a medical student curriculum.<sup>1</sup>

Unfortunately, the emergency department is often thought of as an “unfriendly place” for OMM. Physicians often lament that OMM is too time-consuming, that reimbursement is poor, and that skills are difficult to maintain with infrequent practice.<sup>1</sup> In addition, there may be doubt that OMM is any more effective than oral or intravenous medication. However, **studies have shown that OMM, when utilized alone or in conjunction with analgesic medication, is at least equally as efficacious in treating numerous musculoskeletal complaints** such as acute low back pain, ankle pain, and neck pain, often lowering the amount of analgesic medication required for pain control.<sup>1,2,3</sup>

In this article we will explore the time constraints of OMM in the emergency department, the reimbursement structure for OMM and the skills needed for EM personnel to feel comfortable with these techniques.



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## Time is of the Essence

As a practicing EM physician who utilizes OMM on a daily basis, Benjamin Paschkes, DO, FACEP, would be the first to acknowledge that time management is paramount in the ED. Current practitioners tend to utilize simple but effective techniques in conjunction

References available online.

with the physical exam – much like the practice of OMM in outpatient primary care clinics.<sup>3</sup> When done in this way, the practitioner may be able to provide immediate pain relief, improve the diagnostic accuracy of the physical examination, and add only minimal time to the full patient interview.<sup>1,3</sup> **A retrospective review of emergency room patients in osteopathic institutions over an 8-year period did not reveal any perceivable increase in patient length of stay when OMM was utilized.<sup>1</sup>**

An additional avenue for hospital and ED osteopathic care is the utilization of osteopathic medicine consultation services. Such services do exist, such as the one at St. Barnabas Hospital in New York, which is run by Dr. Hugh Ettlinger and his colleagues. When it comes to time constraints, **these services can be extremely useful in treating pain effectively and without the sedating effects of commonly used medications.**

Additionally, patients requiring “more finesse” in terms of osteopathic manipulation (severe kyphoscoliosis, etc.) are better treated with a specialty service. “The small nuances...the finesse...the



exact underlying somatic dysfunction... this is the area of the osteopathic specialist,” states Dr. Paschkes. “But the use of simple techniques in the emergency department is more than possible for any EM physician.”

### Show Me the Money!

Let’s face it: Why would we waste precious emergency department time manipulating someone’s neck or shoulder without any hope of reimbursement? Incentives come in many forms, but adequate reimbursement for skills is a tried-and-true method for getting results. With a small amount of documentation, only a fraction of time is needed to improve patient satisfaction, decrease patient, pain and increase the payroll.

Third-party payers such as Medicare, Medicaid, HMOs, and PPOs account for the primary income in health institutions. The American Medical Association’s Current Procedural Terminology (CPT) codes allow for health care institutions to bill for anything and everything medical, including OMM. Currently, 5 billing codes are used for OMM documentation, depending on the area of the body treated. Many OMM techniques treat multiple body areas, allowing for multiple billing codes to be used for the same technique.<sup>4</sup>

On occasion, third-party payers may decline reimbursement for these services. However, with proper documentation, this is a rare occurrence.<sup>6</sup> Additionally, any use of a modifier in the CPT codes can allow OMM to be billed as a separate service, avoiding service bundling. Many physicians do not do their own OMM billing, but have ensured that their credential list of billable techniques within their contracts contains osteopathic manipulation.<sup>3,5</sup>

### Training and Physician Interest

Lack of interest in performing OMM is the biggest barrier to its implementation in emergency departments. Physicians practice what they are comfortable with, and those with little exposure may feel uncomfortable or unqualified to use OMM in their practice.

Additionally, many osteopathic

emergency physicians feel it is merely a “primary care thing,” leading to biases against its timely usage in an emergency department setting. Fortunately, there is strong allopathic support for legislation favoring the American Osteopathic Association (AOA) to allow paths for OMM training for residents and attendings. **With the ACGME merger, it seems only a matter of time before allopathically trained residents who are interested in OMM can receive adequate training and billing rights.<sup>4</sup>**

The basics of osteopathic training are well within reach for allopathic physicians who wish to utilize OMM in their practice. The mere drive to learn and utilize osteopathic manipulation is the most essential first step. Currently, the American Academy of Osteopathy (AAO) welcomes MDs to many of their conventions and classes. With the current merger, it seems likely that such workshops will become even more common.

Finally, issues regarding liability further dissuade those unfamiliar with OMM from learning or practicing their skills. However, literature shows that with proper understanding of indications and contraindications, there are few medical modalities that are safer.<sup>3</sup> Moreover, after manipulation in the ED, follow up with a fellowship-trained, outpatient osteopathic physician can then be arranged for further management, particularly in refractory pain cases.

### Conclusion

In conclusion, OMM is a fast, safe, billable, and widely accessible skill set that is underutilized in the emergency department setting. This approach also tends to provide the practitioner with a more thorough and accurate physical examination, as well as a more personal relationship with his or her patients.<sup>1</sup> Both osteopathic and allopathic physicians who are eager to learn about or improve their OMM skills should assist with future research efforts and improvements in existing protocols for pain management within the ED. ★

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# Pediatric Emergency Medicine

## Evidence-Based Updates



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### CASE 1

*A 6-year-old female presents with 3 days of fever, nausea, and vomiting from a presumed viral gastroenteritis. On examination she is febrile to 39 degrees Celsius and her eyes are sunken. You order ibuprofen to treat her fever. What is her risk of acute kidney injury (AKI) from ibuprofen administration in*

*this patient population?*

In a 2013 retrospective chart review of 1,015 hospitalized children with AKI, Misurac et al. found that 2.7% had either NSAID-associated acute tubular necrosis or NSAID-associated acute interstitial nephritis.<sup>1</sup> Similarly, in a 2015 prospective study of 105 hospitalized children with dehydration and acute gastroenteritis, Balestracci, et al. found that 54% of patients that received ibuprofen developed renal impairment. Exposure to ibuprofen increased the risk of AKI by more than twofold.<sup>2</sup>

**BOTTOM LINE:** The need to use NSAIDs to control pain and fever in children should be balanced with careful consideration of the patient's fluid status to avoid the risk of NSAID-associated AKI in the setting of dehydration.

*References available online.*

## CASE 2

A 10-month-old female presents with her mother, complaining of fever, wheezing, and tachypnea worsening over the past 2 days. The patient is diagnosed with bronchiolitis. After some nasal suctioning, nebulized hypertonic saline, and acetaminophen she looks markedly better. Are there any clinical variables that may portend a higher risk of central apnea in this patient?

In a prospective study of 892 infants with diagnosed bronchiolitis in the ED, central apnea later occurred within the hospital in 5% of the infants. The authors identified six clinical variables associated with central apnea including age  $\leq 6$  weeks, birth weight  $\leq 2.5$ kg, low weight-for-age, congenital heart disease, parental report of apnea, and previous history of apnea.<sup>3</sup>

**BOTTOM LINE:** Central apnea is a life-threatening complication of bronchiolitis. Consider these high-risk variables before discharging patients with bronchiolitis.



## CASE 3

A 9-year-old female presents with her mother, complaining of abdominal pain. It began as a periumbilical discomfort that has progressed to a sharp right lower quadrant pain over the past day. Her vital signs are normal, and she has moderate tenderness to the right lower quadrant without rebound or guarding. Abdominal ultrasound reveals appendicitis without evidence of abscess or rupture. Could this patient be managed non-operatively with antibiotics only?

In a 2014 randomized trial of 77 patients aged 7 to 17 years old with uncomplicated appendicitis, parents were given the option of choosing between operative and antibiotic-only management. Of the 30 children who underwent non-operative management, only 3 patients underwent appendectomy within 30 days. None had progression to rupture or gangrene.<sup>4</sup> In a 2015 pilot study of 50 patients aged 5-15 years old with uncomplicated appendicitis, 22 of 24 patients randomized to an antibiotic-only group had initial resolution of symptoms, but 9 (38%) still underwent appendectomy within 1 year after the initial appendicitis.<sup>5</sup>

**BOTTOM LINE:** The data is limited on non-operative management of uncomplicated pediatric appendicitis. More research will be needed to further elucidate the efficacy of this management strategy.



## CASE 4

A 5-year-old presents with his father, complaining of fever, cough, and shortness of breath. On examination, he is drowsy but arousable, hypotensive, febrile, and has right-sided crackles on lung auscultation. A chest radiograph shows a right middle lobe pneumonia. Fluid resuscitation and intravenous antibiotics are initiated. The patient remains hypotensive after two fluid boluses, and you want to begin a vasopressor infusion. Which vasopressor should you choose?

Ventura et al. conducted a double-blind, prospective, randomized control trial in 2015 comparing dopamine (5-10 mcg/kg/min) and epinephrine (0.1-0.3 mcg/kg/min) in 120 children aged 1 month to 15 years old with fluid-refractory septic shock. There was a significant difference in mortality: 20.6% died in the dopamine group, while only 7% died in the epinephrine group. This yielded a survival odds ratio of 6.49 (95% CI, 1.1-37.8;  $p=0.037$ ) with the use of epinephrine.<sup>6</sup>

**BOTTOM LINE:** Although the study had several limitations (single-center, stopped early for harm, possible subtherapeutic dopamine dosing, majority respiratory infections), it is reasonable to consider choosing epinephrine over dopamine for children with fluid-refractory septic shock. ★





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# DROP DEAD GORGEOUS

## The Danger of Weight Loss Supplements

**A** 54-year-old male presents with a chief complaint of heat exhaustion. He is a truck driver who has been traveling across the country without air conditioning. Past medical history is not significant, and the only medication he takes is a weight loss supplement named DNP. Vital signs reveal a temperature of 101.3°F, heart rate 105 bpm, and blood pressure of 128/65mmHg. The patient is alert and oriented but appears sleepy. He is diaphoretic, but exam is otherwise unremarkable. Cooled intravenous fluids and ice packs are placed. The patient's temperature continues to rise to as high as 104°F despite the addition of mist and fans. His mental status begins to decline, and an arterial blood gas reveals a pH of 6.98 and pCO<sub>2</sub> of 92 mmHg. He is intubated and admitted to the ICU. Two days later he is pronounced dead.

### Historical Background

2,4-Dinitrophenol (DNP) was first used by the French army during WWI as an additive to explosives. Soldiers in the French munitions factories soon noticed that inhaling fumes and having contact exposure to DNP was causing

weight loss, weakness, dizziness, and excessive sweating.<sup>1</sup> In the 1930s, a team of researchers found that moderate doses of DNP could increase a person's metabolic rate by as much as 50% and was then promoted as an over-the-counter medication for public use.<sup>2</sup> Just 5 years

later, it was discovered to cause a wealth of adverse effects and was finally banned by the FDA in 1938.

Fast-forward to the 1980s, when a Russian physician began promoting a revolutionary new weight loss treatment called "Mitcal." Complaints about its side

effects began to accumulate, legal action followed, and in 1986 he was ordered to stop prescribing it. He continued to encourage its use and was eventually incarcerated. In 2008, he was arrested again for fraud as he was marketing a company in Europe that was developing DNP as a cancer treatment known as “intracellular hyperthermia therapy.” Since then, the internet has facilitated wide distribution, and it is now mostly used by bodybuilders and those interested in rapid weight loss.<sup>3</sup>

### Pharmacology

At the cellular level, DNP acts as an uncoupler of oxidative phosphorylation. Protons normally diffuse through the inner mitochondrial membrane into the mitochondrial matrix. As a result, a chemiosmotic gradient is produced. To relieve this gradient, the protons are allowed to drift back through the inner mitochondrial membrane.

Normally, the only way the protons can re-enter is through ATP synthase. When a proton passes through ATP synthase, its energy is used to convert ADP to ATP. When DNP is present in a cell, it serves as a protonophore – it shuttles protons back into the inner membrane of the mitochondrion, bypassing ATP synthase. The energy is used to generate heat instead of ATP. There is no natural feedback cycle to counteract this heat production, which increases in proportion to the dosage of DNP. This cellular-level heat production can quickly result in fatal hyperthermia.<sup>4</sup>

DNP is a yellow crystalline powder with a sweet, musty odor. It is typically sold as either 100mg or 200mg tablets but can also be purchased in the powder form. Because of its federal ban, there is limited pharmacokinetic information. However, it is known to have a very narrow therapeutic index, with the lethal dose (LD50) reported as 36 mg/kg.<sup>5</sup> Some studies have shown that within 3-4 days it is eliminated from the body.<sup>6</sup> Some websites offer advice on dosing regimens. A typical regimen starts with one 200mg capsule for the first few days, followed by increasing doses to a recommended maximum of 400mg/day for up to 2 weeks.<sup>7</sup> The highest reported dose taken

in acute overdose associated with survival was 2.4 grams.<sup>8</sup> Tolerance is established rapidly, but the acquired tolerance is lost if use is discontinued for 2 weeks.

### Management

DNP overdose presents similar to a sympathomimetic toxidrome. Patients may be hyperthermic, diaphoretic, or tachycardic. In more extreme cases, patients can present in PEA.

There is no antidote, and the key to management is early recognition and having a high index of suspicion. Any acute overdose should be observed for at least 12 hours, as no patient has been recorded to be asymptomatic beyond 10 hours of an acute overdose.<sup>9</sup>

A single dose of activated charcoal may be considered in those presenting within 1 hour of ingestion. There is no evidence to support multi-dose activated charcoal or whole bowel irrigation.

Aggressive fluid resuscitation and external cooling measures are paramount.

Benzodiazepines may be used for seizures or for severely agitated patients. Dantrolene is of questionable benefit. While there is insufficient evidence to support its use, there is a single case report in which it was used successfully.<sup>10</sup> If used, it should be administered as a 1mg/kg bolus and repeated until symptoms subside.

### An Ongoing List

DNP is hardly alone on the list of banned diet supplements. Diet pills are not required by law to be tested by the FDA before being made available to the public. However, the FDA can remove a product it deems dangerous after it has hit the market.

Many diet pills have active ingredients that are similar to caffeine or even amphetamines. While most are relatively harmless, the list of side effects can include hepatic or renal toxicity, rectal bleeding, agitation, convulsions, hypertensive emergencies, and death.

In addition to DNP, the list of banned diet products includes:

- Ephedra, an herbal supplement

banned in 2004 because of its risk of hyperthermia and death.

- Hydroxycut, banned in 2009 for its potential to cause hepatitis and jaundice.
- Fenfluramine, one of the 2 active ingredients in Fen-Phen, which was recalled in the 1990s. It was chemically related to amphetamines, which, aside from abuse and dependence, was linked to pulmonary hypertension and death.<sup>11,12</sup>

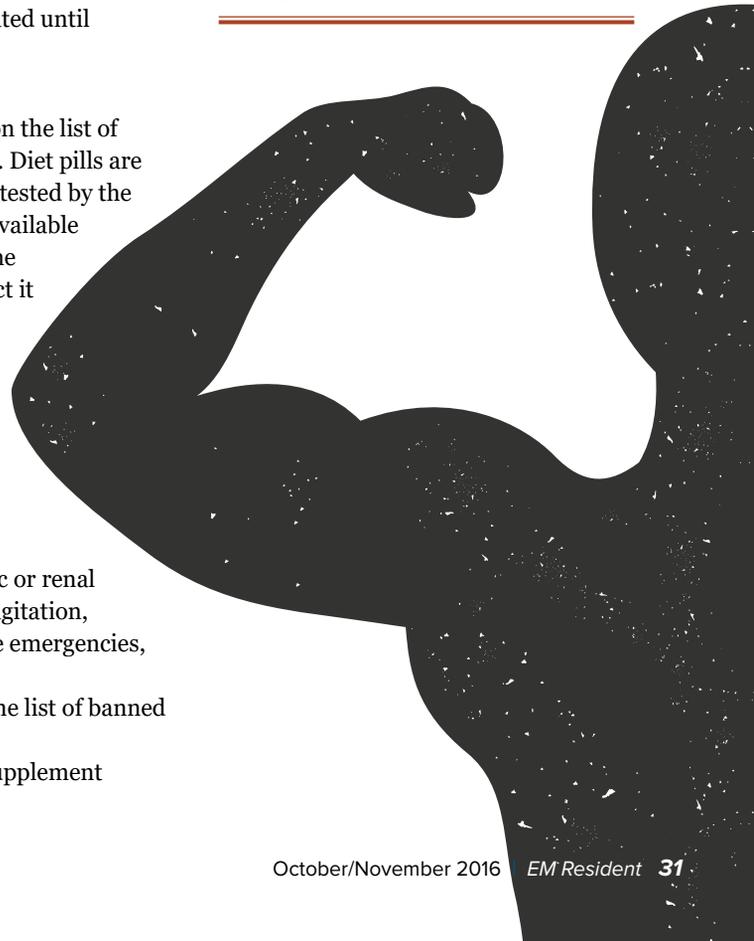
### Conclusion

It is of utmost importance to maintain a broad differential diagnosis in patients presenting with hyperthermia. Complete medical history may not be available, and ingestion or overdose should always be considered. Rapid lowering of body temperature and overall supportive care is, in general, the best course of action. ★

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**The internet has facilitated wide distribution, and DNP is now mostly used by bodybuilders and those interested in rapid weight loss.**

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# STEMI or no STEMI?

## A Challenging Diagnosis

A 26-year-old anxious, diaphoretic male presents with crushing mid-sternal chest pain that awakened him from sleep. Past medical history is unremarkable aside from an upper respiratory infection 1 week ago. He has a family history of coronary artery disease. His vital signs are within normal limits, and he has a normal cardiopulmonary exam. His ECG is shown (Figure 1).

Cardiology is consulted because of concern for ST-segment elevation inferiorly, and the cath lab is activated. Workup reveals troponin of 0.34 ng/mL. The catheterization is clean, and the patient is diagnosed with perimyocarditis.

Pericarditis is defined as inflammation of the pericardium, which consists of the visceral pericardium overlying the epicardium and the parietal pericardium surrounding the heart. The space between these two layers is the pericardial cavity, which normally contains up to 50cc of fluid. Pericarditis is the most common disorder involving the pericardium.

Myocarditis, or inflammatory cardiomyopathy, is inflammation of the heart muscle itself and is a separate disease entity, even though it may be accompanied by pericarditis. Both myocarditis and pericarditis are most commonly diagnosed in the setting of a recent viral infection, although in several studies, an etiology was identified in only 17% of cases.<sup>1,2,3</sup>

### Diagnosis

The major clinical manifestations of pericarditis include sharp or pleuritic chest pain that is often relieved by sitting up, a pericardial friction rub, suggestive ECG changes, and a pericardial effusion.<sup>4</sup> The transient friction rub is best heard at the left lower sternal border and has been reported in up to 35% of cases.<sup>5,6</sup> Another study reported the presence of a pericardial effusion in 60% of patients, with signs of cardiac tamponade in 15% of patients presenting with pericarditis.<sup>4</sup>

Laboratory findings include elevated CRP, ESR, and WBC. If myocarditis is present in conjunction with pericarditis, then cardiac biomarkers may also be elevated. In one study, Troponin I was elevated in 34% of patients, whereas CK-MB was elevated in only 5.7% of patients.<sup>7</sup> Another study found that Troponin T was elevated in 93% of patients with immunohistologically proven myocarditis.<sup>8</sup>

### ECG Findings

The electrocardiogram is the most important tool for diagnosing pericarditis. The provider must be certain that the patient is not having an ST-segment myocardial infarction (STEMI).

Classic ECG findings in pericarditis include widespread PR-segment depression and concave ST-elevations (STE) with reciprocal changes in leads aVR and V1. In general, there are 4 steps to differentiate between pericarditis and STEMI. If the answer is “YES” to question 1, 2, or 3, then the diagnosis is STEMI. If the answer is “NO” to questions 1-3, then move to question 4, which points to pericarditis.

- 1) Are there ANY ST depressions other than in leads aVR or V1?
- 2) Are there ANY convex up or horizontal STEs?



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- 3) Is the STE greater in lead III than lead II?
- 4) Look for PR depression in multiple leads

A useful finding reported in up to 80% of cases with pericarditis is Spodick’s sign, a down-sloping of the TP-segment that is best visualized in the lateral precordial leads, as well as in lead II.<sup>8,9</sup>

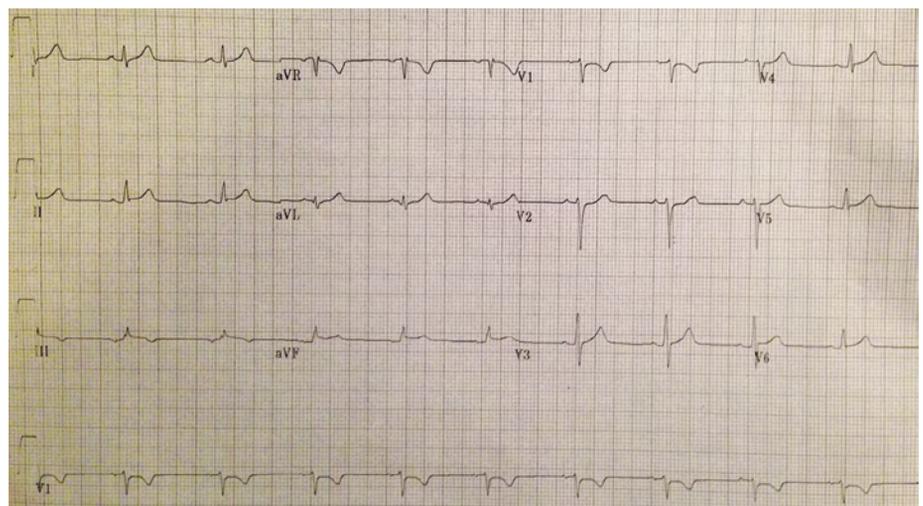
### Treatment and Disposition

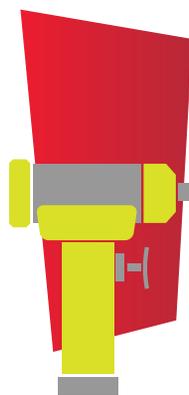
Pericarditis usually follows a benign course lasting 1-2 weeks and can be treated in the outpatient setting with high dose aspirin or NSAIDs. Specific clinical features such as fever >38 degrees Celsius, subacute course, large effusion or tamponade, immunosuppression, and aspirin or NSAID failure may be indicators of poorer prognosis or increased risk of complications.<sup>4</sup> These patients should be hospitalized.

### Case Conclusion

This patient’s ECG does not fit perfectly into either the “STEMI” or “pericarditis” box. The only ST-segment depression is in lead V1. There are no convex STEs, but there are subtle horizontal STEs in leads II, III, and aVF. The STE is not greater in lead III than in lead II. Lastly, there is PR-segment depression in leads II and aVF.

The patient was admitted to a telemetry floor and had an uneventful hospital stay. His original ECG changes returned to normal by day 4, and he was subsequently discharged with close follow-up. ★





# CONSULT CORNER

# Ortho

## **EMR:** What is the most effective way to present an orthopedic consult over the phone?

**CC:** Let me give you an example: “Mrs. J is a 56-year-old female who presents after a high speed MVC with a closed left midshaft transverse femur fracture. She is neurovascularly intact and has no other injuries. Her medical history is significant only for atrial fibrillation, on warfarin, with an INR of 3.” These basic elements give me enough information to generate immediate guidance regarding further imaging, need for antibiotics, anything that may delay operative intervention (additional injuries, lab abnormalities), and also allow me to triage other pending consults.

## **EMR:** What basic workup would you like completed prior to placing a consult?

**CC:** With rare exception, plain radiographs of the affected area are an absolute must. Despite how obvious the deformity may be, you and the orthopedic consultant need to generate a radiographic diagnosis prior to the initiation of any treatment plan. Just like a person with crushing substernal chest pain does not get a cardiology consult prior to obtaining an ECG, generally speaking, an orthopedic consult should not be placed prior to obtaining radiographs. This seems silly, but it happens more often than you would think! In the setting of a septic joint rule out, basic labs including a CBC, ESR, and CRP are also helpful.

## **EMR:** What do you consider to be urgent or emergent consultations?

**CC:** There are very few true orthopedic emergencies. A knee dislocation, especially if there is neurovascular compromise, is something that can be diagnosed clinically and warrants an immediate reduction.

Compartment syndrome and acute spine pathologies associated with a neurologic deficit should also prompt an urgent consultation. If there is any neurovascular compromise associated with an extremity injury, this should be communicated with your orthopedic consultant for urgent evaluation after obtaining radiographs. In general, most joint dislocations should be evaluated and reduced on an urgent basis, but once again, not prior to a radiographic diagnosis. Open fractures should be included in the urgent/emergent category because the timely delivery of antibiotics (as soon as they hit the door!) is one of the most critical aspects of their care.

## **EMR:** What are some common procedures that an EM resident should feel comfortable with managing in the community?

**CC:** Joint dislocations of the shoulder, elbow, hip, knee, and ankle should be part of an emergency medicine physician’s skill set. You should also feel comfortable with basic fracture reductions, including distal radius fractures. An EM resident should also be comfortable with applying the appropriate splints for each extremity in a variety of different fracture settings.

## **EMR:** Top 3 ED pet peeves?

### **CC:**

1. Consults without X-rays readily available for viewing are a universal pet peeve.
2. Digital blocks prior to the consultant seeing the patient. Traumatic hand injuries require a meticulous physical exam. This is important for both documentation and operative planning. All attempts should be made to control the patient’s pain with oral/intravenous analgesics until the consultant can

*EM Resident is pleased to introduce a new column. “Consult Corner” is designed to help you communicate effectively when seeking input from other specialists. In our inaugural column, we speak with Christopher Cosgrove, MD, an orthopedic surgery resident at Washington University in St. Louis.*



- record an accurate exam.
3. Obtain adequate exposure. Open fractures and other fun surprises can hide behind outside hospital splints. As an emergency provider, you play a critical role in making the right diagnoses and making sure no injury is missed because of inadequate exposure.

## **EMR:** Other pearls for emergency medicine residents?

**CC:** Get involved with orthopedic procedures early and often. Your orthopedic colleagues should be excited to have a helping hand in the emergency department and may even let you do the entire procedure. Mastering the management of musculoskeletal trauma is all about repetition. You don’t want to be in the final few months of your residency when you realize you’re not very comfortable reducing or splinting fractures. We know you’re busy managing sick patients, but the more you can get involved, the better off you’ll be when you are practicing in a setting where an orthopedic consultant may not be as readily available. ★





# Burning the Candle at Both Ends

## *A Personal Story of Burnout*



**Leann Mainis, MD**  
Emergency Medicine Resident  
USCF-Fresno  
Fresno, CA

During a stretch of shifts that had left me sleep-deprived, I went to sew up a laceration. It was no big deal — until I stuck myself.

Up until this past week, I thought I had a good handle on burnout. I thought I had figured it out.

At some point during the past year, during a string of overnight shifts in a low acuity zone by myself, working through one social disaster after another, I started feeling incredibly worn down. I started to hate my patients. I barely saw them as humans, merely obstacles in my way of efficiency — “things” I had to move through the department. It was at that point that I decided to take my first “Zero Day” (coined by one amazing attending)

— a day where nothing work-related was allowed. It was a mini-vacation, and it helped me reset.

“Zero Days” soon became routine and helped me cultivate other non-medical interests. I believed burnout was being held at bay. That is, until this past week, when I was proven completely wrong. During a stretch of shifts that left me sleep-deprived, I went to sew up a laceration. It was no big deal — until I stuck myself. Unfortunately, this patient was a frequent flier in our emergency department and had a

history of drug abuse. Whatever small reserve I had left disappeared. I held my composure long enough to make it back to the workstation, at which point the floodgates opened and I sobbed, hard. Everything came out at that moment — all the stress, exhaustion, frustration, fear.

As I went to get my blood drawn, an attending asked me what else was going on. **He was the first person to realize there was more to this story.** I cried again and told him how stressed I had been feeling. His response was something I will never forget: “We are human grief sponges. We see people on the worst days of their lives, and it is our responsibility to help them. If your grief sponge is already full because of stress and exhaustion, how can you help others? You need to take care of yourself first and foremost.”

It hit home.

It made me realize that whatever I had been doing to convince myself I wasn't burned out was the best lie I had ever told. Denial truly is powerful.

### What Can We Do About Burnout?

Burnout is a three-sided spectrum, composed of emotional fatigue, depersonalization, and a reduced sense of accomplishment.<sup>1</sup> It is caused by many factors, including a high-stress environment, fear of litigation, unhealthy lifestyle, risk of blood-borne illness, and lack of normal sleep patterns with associated sleep deprivation.<sup>1</sup> It places physicians at risk for work dissatisfaction, poor job performance, and substance abuse.

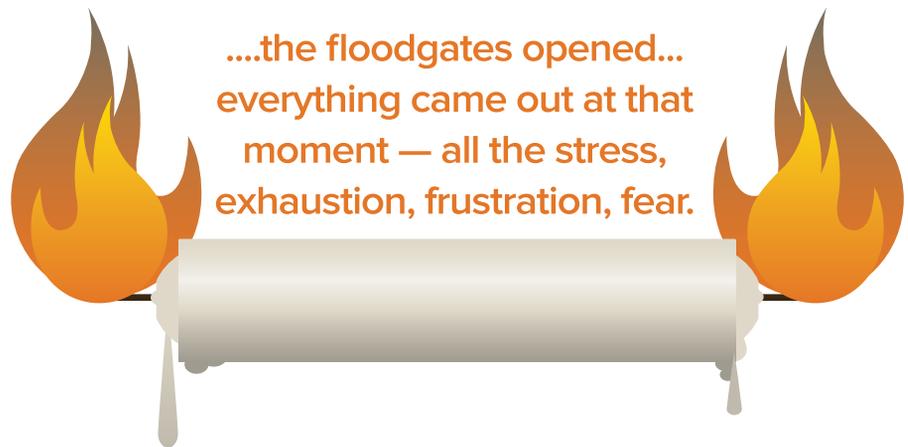
**Emergency medicine is an inherently risky job.**<sup>1</sup> We see patients quickly, often 2 or more per hour, and frequently with limited interaction. Fear of litigation in this type of environment can lead to burnout. Although we may feel protected as residents, this underlying fear may shape how we practice and where we choose to practice after residency.<sup>1</sup> For example, we may be overly conservative with ordering tests, or we may choose to practice in a state that is less litigious or has better tort reform. It is key to acknowledge this risk but not let it dictate our practice and lifestyle. If sued, it is important to have

a good support system of family, friends, and coworkers.

Substance abuse, though underreported, has a rate of approximately 8-15% among emergency residents, with the most common substance being alcohol.<sup>2,3,4</sup> **Emergency physicians overall are at a 3-times-greater risk for substance abuse than those in other medical specialties.**<sup>2</sup> Among residents who participated in one survey, 7-8% answered yes to at least one at-risk alcohol abuse question.<sup>2</sup> In the same survey, alcohol use was listed as the third most common coping mechanism, after exercise and hobbies.<sup>2,3</sup> It is important to recognize alcohol abuse within yourself and your peers. Residency programs should have a safe place to talk about alcohol or substance abuse and provide appropriate resources.

Finally, many residents forgo exercise in favor of sleep or other obligations during their busy weeks. Exercise has routinely been shown to decrease stress and improve energy, as well as contribute to an overall sense of well-being.<sup>2</sup> **It is important to not lose sight of the huge benefit of a fairly simple act.**

Sleep deprivation and the circadian sleep disruption can also lead to or worsen burnout. As emergency providers, we work all hours and all shifts. Working while sleep-deprived is associated with more errors or risky exposures (such as needlesticks, in my case).<sup>2,6</sup> Sleeping in darkened rooms during the day can increase overall sleep quality. Additionally, many programs have adopted a circadian-style schedule, which has been shown to help reduce overall disruption.



Many residents, pushing the limits of work-hour restrictions in any given week, find little time to commit to a healthy lifestyle.<sup>2</sup> It is often difficult to have a healthy meal at the hospital, because most hospitals do not provide adequate options. Even the Centers for Disease Control and Prevention has released guidelines to help hospitals improve nutritional options.<sup>5</sup> Many residents at my own institution have taken to either not eating during a shift or bringing meals from home rather than eating our hospital's food. Eating healthy snacks throughout a shift can help reduce post-shift binge eating. In addition, I have found that setting a goal of drinking 2 bottles of water during a shift has made me feel more energized.

### Conclusion

Burnout is ubiquitously prevalent in every residency. Within the last few months, I have been honest about the fact that I am tired and burned out. I have done self-reflection to identify what changes are within my control. First, I have focused on making sleep a priority, recognizing that I function poorly with less than 6 hours of sleep. Additionally, I have leaned on friends and coworkers for support and have worked on being more open with my emotions. With these simple adjustments, I have experienced a better sense of overall well-being and purpose. I hope you will too. We simply cannot afford to continue burning the candle at both ends. ★

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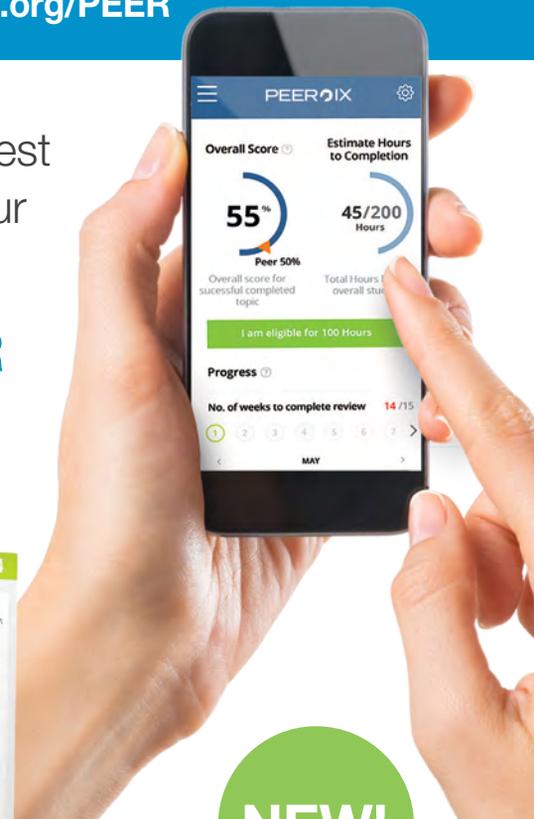
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Sharing our Stories

## Your Time, Your Legacy

**Michael J. Caudell, MD, FACEP, FAWM, DiMM**

**Medical school & residency:** Medical College of Georgia

**Current position:** Medical College of Georgia at Augusta University: Professor of Emergency Medicine; Medical Director, Wilderness & Survival Medicine; Director, Wilderness Medicine Fellowship

If you love the great outdoors and are interested in blending your passion for medicine with your passion for Mother Nature, then you're already familiar with Mike Caudell.

Considered a pioneer of wilderness medicine, Dr. Caudell is a founder of the Medical Wilderness Adventure Race (MedWAR) concept and has dedicated years to building the subspecialty through MedWAR events, service and leadership with in the ACEP Wilderness Medicine Section, and outreach/faculty service for a host of wilderness groups and courses. He is a faculty member for the Advanced Wilderness Life Support course and is the course director and instructor for American Red Cross Wilderness First Aid. In addition to holding the Diploma in Mountain Medicine (DiMM) credential, he is certified in Swiftwater Rescue and Advanced Open Water Diving.

Most recently, Dr. Caudell helped the EMRA Wilderness Division plan the very first EMRA MedWAR, held Oct. 19 in Red Rock Canyon outside Las Vegas.

### What event precipitated your love of wilderness medicine?

No specific event occurred. My emergency medicine training and the desire to be prepared for any medical emergency in the hospital setting segued into the desire to be prepared for medical emergencies and occurrences outside the hospital during my hobbies and pastimes in the wilderness and austere setting.

### Favorite national or state park?

Great Smoky Mountain National Park

### Why do you volunteer (with ACEP, MedWARs, etc.)?

A lot of it is because I'm very interested in emergency and wilderness medicine. As far as the MedWAR is concerned, I helped create that because of my interest, so it's easy to spend time helping it grow. There's always time to get involved. If you're doing something you love, it doesn't feel like work — it feels like fun.

### Best career advice you ever received?

I have to tell you the advice I received has morphed into the advice I give: Learn to say "No." You will be asked to do many fun and interesting things, and you can't do them all well. Some you must say no to, or the quality of your work will suffer.

### Favorite way to earn CME?

Hmm. It's interesting — I get most of my CME from my academic institution so I don't think about it that much. I go to a lot of conferences.

### Most-used app on your phone?

Pandora

### What goes on pizza?

Everything — except anchovies.

### Dogs or cats?

Dogs. I have 2. Mine are both mutts who have been rescued.

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# We Bet You'll Have a Blast!



## EMRA EVENTS

When the curtains rise on ACEP's *Scientific Assembly 2016* in Las Vegas Oct. 13-19, you'll see a revamped schedule of EMRA events, all designed to fit into the Entertainment Capital of the World. Highlights include a reimagined **Resident Lunch Lecture Series** (lunch and a pertinent presentation, 3 days in a row!) and the all-new **EMRA MedWAR** competition. Mark your calendars now. All events take place at the Mandalay Bay unless otherwise noted.

### Friday, Oct. 14

5:30 – 7:30 pm: EMRA Medical Student Meet Up @ Minus 5, Mandalay Bay

### Saturday, Oct. 15

8:45 am – 2 pm: EMRA Medical Student Forum & Lunch  
3 – 5 pm: EMRA Residency Program Fair  
6 – 7:30 pm: EMRA Committee & Division Leader Meet Up @ Minus 5, Mandalay Bay

### Sunday, Oct. 16

10 – 11 am: EMRA Reference Committee Public Hearing  
12 – 1:30 pm: EMRA Resident Lunch Lecture Series: "Strategies for Board Prep" with experts from board prep products. Sponsored by CEP America.  
5 – 7 pm: EMRA Job & Fellowship Fair, co-sponsored by Florida Emergency Physicians and TeamHealth

### Monday, Oct. 17

7:30 – 8 am: EMRA Rep Council Registration, Welcome Breakfast, and Candidate's Forum  
8 – 11:30 am: EMRA Rep Council and Town Hall Meeting  
9 am – 3 pm: EMRA Resident SIMWars  
12 – 1:30 pm: EMRA Resident Lunch Lecture Series: "Secrets of Success... from *The Princess Bride*," by Amal Mattu, MD, FACEP, sponsored by CEP America  
4 – 6 pm: EMRA 20 in 6 Resident Lecture Competition, sponsored by Hippo Education  
6:30 – 7:30 pm: Rep Council Meet Up @ 1923 Bourbon Bar  
10 pm – 2 am: EMRA Party @ LIGHT Nightclub, Mandalay Bay. Sponsored by EMCare

### Tuesday, Oct. 18

12 – 1:30 pm: EMRA Resident Lunch Lecture Series: "EMRA Financial Bootcamp," sponsored by CEP America  
3:30 – 5 pm: EMRA Fall Awards Reception

### Wednesday, Oct. 19

8 am – 4 pm: EMRA MedWAR @ Red Rock Canyon

**Monday, Oct. 17**  
**4-6 pm**  
South Pacific Ballroom H

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### GET MORE DETAILS

For a full listing of EMRA Events at ACEP16, visit [emra.org/events/ACEP16](http://emra.org/events/ACEP16).

To secure lodging at EMRA rates for ACEP16, visit [acep.org/bookyour2016hotel](http://acep.org/bookyour2016hotel) and use sub block "Resident" with password "Resident16."

To register for ACEP16, visit [acep.org/sa](http://acep.org/sa).

# HONORING OUR 2016 Award Recipients

Congratulations to the recipients of EMRA's fall 2016 awards — and thank you to everyone who participates in the process. Your accomplishments reflect the strength of emergency medicine!



## TRAVEL SCHOLARSHIP

### EMRA ACEP16 Scholars

Abena Obenewaa Akomeah, MD, Carolinas Medical Center  
Michael Butterfield, MD, Tampa General Hospital  
Ms. Michelle Lynch, University of Virginia  
Daniel McCabe, MD, John H. Stroger Jr. Hospital  
Mr. Jerome Rogich, University of Massachusetts  
Ms. Maria Tobar, David Geffen SOM UCLA

## EMRA EDDA SCHOLARS

Thomas W. Engel, MD, Cook County Hospital  
Rachel Gilmer, MD, Harvard Affiliated Emergency  
Medicine Residency  
Bruce Bryan Graham, MD, Case Western Reserve  
U./Metrohealth Med. Ctr./Cleveland Clinic EM  
Thiago Halmer, MD, Baylor College of Medicine  
Binoy Mistry, MD, Johns Hopkins University SOM

## EMRA EDPMA SCHOLARS

Rachel Rizal, MD, Harvard Affiliated Emergency  
Medicine Residency  
Greg Wallingford, UCLA-Olive View Emergency  
Medicine Residency

## CORD ACADEMIC ASSEMBLY SCHOLARS

Bradley Burmeister, MD, Medical College of  
Wisconsin  
Holly Caretta-Weyer, MD, Oregon Health &  
Science University  
Michael Gottlieb, MD, Cook County Hospital

## LEADERSHIP & ADVOCACY CONFERENCE SCHOLARS

Alecia Gende, MD, University of Iowa Hospitals  
& Clinics  
Anthony Kraus, MD, Maricopa Medical Center  
Rachel Solnick, MD, Yale Emergency Medicine

## MERIT AWARDS

**Global Health Initiative Award:** Nadeem Modan, MD, University of North  
Carolina  
**Local Action Grant:** Shaw Natsui, MD, Harvard Affiliated Emergency Medicine  
Residency  
**Augustine D'Orta Award:** Shehni Nadeem, MD, Baylor College of Medicine  
**Steve Tantama, MD, Award for Military Excellence:** Travis Deaton, MD, Naval  
Medical Center San Diego  
**International EM Scholar:** Benjamin Nicholson, MD, St. George's University  
SOM  
**Clinical Excellence Award:** Residents of Orlando Regional Medical Center/  
Orlando Health  
— Christopher H. Ponder, MD  
— Thomas N. Smith, MD  
— Amanda M. Stone, MD  
— Amanda F. Tarkowski, MD  
— Tory Weatherford, MD  
**Be the Change Grant:** Vincent Ted Liao, MD, Harvard Affiliated Emergency  
Medicine Residency  
**FOAM(er) of the Year:** Sean Dyer, MD, John H. Stroger Jr. Hospital of Cook  
County  
**Leadership Excellence Award:** Carrie Jurkiewicz, MD, University of Chicago  
EM Residency

## FACULTY AWARDS

**Mentorship Award:** Brian Adkins, MD, University of Kentucky Medical Center  
**Excellence in Teaching Award:** Joseph S. Turner, MD, Indiana University SOM  
**Joseph F. Waeckerle Alumni Award:** Kevin Michael Klauer, DO, FACEP,  
TeamHealth

## HEALTH POLICY AWARDS

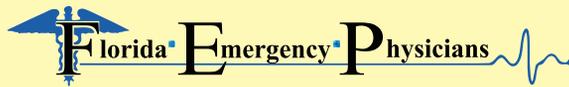
**EMRA/ACEP Medical Student Elective in Health Policy**  
Priyanka Kailash, Alpert Medical School of Brown University  
Valerie Pierre, University of North Carolina-Chapel Hill



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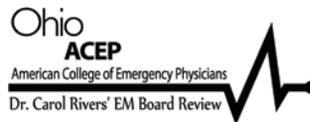
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### 100% EMRAfied Programs

(As of Sept. 8, 2016)

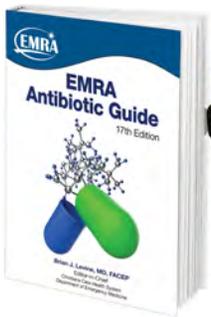
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 Detroit Medical Center/Wayne State University/  
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 Detroit Medical Center/Wayne State University  
 George Washington University  
 Hackensack University Medical Center  
 HAEMR Brigham & Womens Hosp  
 Health Partners Institute/Regions Hospital  
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Nassau University Medical Center  
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## EMRA Antibiotic Guide, 17th edition

You can't go on shift without this incredible resource — and you won't want to. The *EMRA Antibiotic Guide*, 17th ed., brings you the latest developments in the world of antibiotics, along with the return of the popular antibiogram.



Led by Christiana Care's Brian Levine, MD, FACEP, more than 100 emergency medicine residents and pharmacy experts invested a year of work in this important publication. With help from US Acute Care Solutions, EMRA is pleased to offer it to all members.

"It's our pleasure to support EMRA, the Antibiotic Guide, and other of the association's publications," said CEO Dominic J. Bagnoli, MD, FACEP, FAAEM. "At USACS we put a high price on residency training, and as the largest physician-owned and led integrated acute care group in the country, we recognize that many of you will be our business partners someday soon. Your training is in

our best interests, just as it is in the interest of the countless patients you will serve in your career."

Don't miss the accompanying mobile app, available in both iOS and Android format. The app includes the same important features, all in a convenient electronic format.

*Special thanks to editor-in-chief Brian Levine, MD, FACEP; senior editors Jamie Rosini, PharmD, BCPS; Nicole Harrington, PharmD; J. Daniel Hess, MD; Amber Ruest, MD; and Sherrill Mullenix; reviewers Bryan Hayes, PharmD, DABAT, FAACT; and Nicholas Governatori, MD; and the authors — the faculty and residents of Christiana Care Health System. ★*

## New Resources Now Available!

EMRA works hard to bring you resources that will help you on-shift and throughout your career. This fall, several new and updated publications have been added to the EMRA portfolio.

### Ventilator Management Pocket Card

Developed by the EMRA Critical Care Division, the EMRA Ventilator Management card is designed to fit in your pocket for easy access when managing patients with acute respiratory failure who require mechanical ventilation. It offers an overview of acute respiratory failure, non-invasive and invasive mechanical ventilation modes, ventilator waveforms, trouble shooting, and weaning from the ventilator. Keep this card handy for all your critically ill patients needing ventilatory support — from the ED to the ICU.

*Special thanks to lead authors Jenelle Holst Badulak, MD, and Sage Whitmore, MD; authors Danish S. Malik, MD; Josh Glick, MD; Abdullah Bakhsh, MD; and contributors Iv Godzanker, MD; Leonard Stallings, MD; and Kene Chukwuonu, MD. ★*

### Critical Medications Dosage Badge Cards

Developed by the EMRA Critical Care Division, this new product features a pair of double-sided, badge-sized reference cards to help you make the right decisions quickly when it comes to critical medication dosages. These will attach to your badge holder for speedy access, bringing key information literally to your fingertips.

*Special thanks to authors Joshua Glick, MD, and Abdullah Bakhsh, MD, and reviewers Danish Malik, MD, and Colgan "Cole" Sloan, PharmD, BCPS. ★*

### Put **Wellness** on Your Radar

ACEP will observe EM Wellness Week, Jan. 22-28, 2017. This is your chance to focus on becoming healthier and more resilient — allowing you to maintain a vibrant professional and personal life without feeling burned out. Start planning now for EM Wellness Week participation in 2017! ★

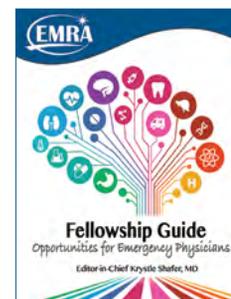
### Residents Now Welcome to Apply for CORD Committees

The fall 2016 application period for residents to apply to CORD committees is open until Oct. 21, so gather your materials now. Residents may apply for up to 3 different committees; selected candidates will serve on only 1 committee. Applicants must be member representatives of CORD. Complete the Resident Application for CORD Committees, found at [cordem.org/i4a/pages/index.cfm?pageID=3847](http://cordem.org/i4a/pages/index.cfm?pageID=3847). ★

### EMRA Fellowship Guide Opportunities for Emergency Physicians

If you're interested in pursuing advanced training in a subspecialty, our new guide is a must-read. Find out about the wide world of fellowships open to emergency physicians, including an overview of available opportunities. Get tips on how to make yourself stand out as a candidate, what to expect during training, and how to find the program best suited for you. This is a free, downloadable e-book that will be updated periodically.

*Special thanks to editor-in-chief Krystle Shafer, MD, and senior editors Bob Stuntz, MD, RDMS, FAAEM, FACEP; Lillian Emet, MD, MS, FACEP; Nicholas M. Mohr, MD, MS, FACEP; Danish S. Malik, MD; and Jenelle Holst Badulak, MD. ★*



## Leave a Legacy in Emergency Medicine

Donate a brick paver to the EMF Plaza at the new ACEP headquarters and leave a legacy in emergency medicine.

ACEP moved to a dynamic new headquarters in Irving, TX. To ensure the legacy of emergency medicine research and education, you can donate to the EMF Plaza, a beautiful collection of personalized brick pavers in the courtyard. By donating, you will have an enduring symbol of your commitment to emergency medicine and will literally lay the groundwork for future research projects that bring about the highest quality of care for your patients.

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## UPCOMING EVENTS

- Oct. 13-19 **EMRA Events at ACEP16,** Las Vegas
- Nov. 12-14 **AMA-RFS Interim Meeting,** Atlanta
- Jan. 22-28 **EM Wellness Week**
- 1st Thursday every month **EMRA Hangout**
- 10<sup>th</sup> of month even-numbered **EM Resident articles deadline**

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# Diagnose this Condition



## The Patient

A 62-year-old male presents to the ER complaining of right knee pain. He was changing a light bulb when he lost his balance and fell from a 6-foot height, landing on his feet. Since then he has been unable to bear weight. Physical exam is remarkable for the findings displayed in the image.

*What is the diagnosis?*

See the **DIAGNOSIS** on page 44

**Maryam Arshad, MD**  
Emergency Medicine Resident  
Emory University  
Atlanta, GA

# The Diagnosis

## Quadriceps tendon rupture

The image is most notable for a large suprapatellar defect. This is a classic clinical finding most consistent with a quadriceps tendon rupture. The quadriceps tendon extends from the quadriceps muscle of the thigh to the proximal part of the patella. The patellar tendon attaches distally to the tibial tubercle, and together these two tendons allow for knee extension.

Patients with a complete tear of their quadriceps or patellar tendons cannot achieve or maintain a straight leg raise against gravity while supine. This “straight leg raise test” should be performed on any patient that presents with a knee injury. Radiographs often demonstrate soft tissue swelling and may even reveal an avulsion fracture of the patella. Patella baja (an abnormally low-lying patella) may also be present when compared to the contralateral side.

Most injuries are post-traumatic and occur in persons aged 50 or older. Chronic diseases such as diabetes, lupus, and renal failure — among others — may predispose to bilateral quadriceps tendon rupture. Oral corticosteroids and fluoroquinolones are also associated with rupture.

Tears may occur following a sudden strong contraction of the quadriceps muscle, such as when landing from a height or when a person falls backwards while the foot is fixed to the ground.

ED management includes a knee immobilizer, crutches, and pain control. While not a surgical emergency, complete quadriceps tendon ruptures should seek expedited follow-up with an orthopedic surgeon for operative intervention.

AN INITIATIVE OF  
THE EMRA RESEARCH  
COMMITTEE

By Joshua Davis, MSIV

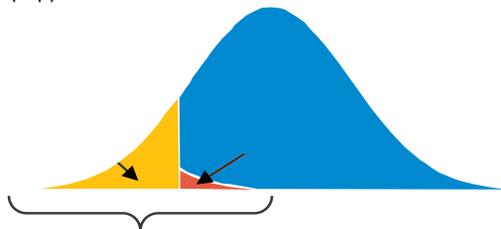
# Rapid Research Review

### POWER

Recall that **Type I error** is the probability of falsely rejecting the null hypothesis ( $H_0$ ) based on our sample even though  $H_0$  is true in the population. Alternatively, **Type II error** is the probability of *not* rejecting  $H_0$  based on our sample even though there is a true difference in the population.

### So What is Power?

Power is the chance that we will conclude from our sample that there is a difference (reject  $H_0$ ) at the level of significance that we have specified (*if a difference truly exists in the population*). In other words, power is the chance that we **won't** make a Type II error ( $1-\beta$ ).



Difference between means

Four factors contribute to power:

**1. Sample size:** The larger the sample size, the smaller the standard error around the sample mean, and the more power the study has to detect a given difference (imagine the sampling distributions above becoming “skinnier” as the sample size increases).

**2. The difference you wish to detect:** If the expected difference between groups is small, the study will have less power to detect that difference compared to a larger expected difference between the groups (imagine the two distributions sliding further apart as the expected difference increases).

**3. Standard deviation:** The smaller the standard deviation, the smaller the standard error around the sample mean, and greater the power (similar to a larger sample size, a smaller standard will make the sampling distribution “skinnier”).

**4. Predetermined alpha (Type I error):** As we become more “strict” with our chance of committing Type I error (say, setting our  $\alpha$  at 0.01 instead of 0.05) then our power will decrease proportionally (a smaller  $\alpha$  will make the yellow area larger and the red area smaller).

### \* BONUS \*

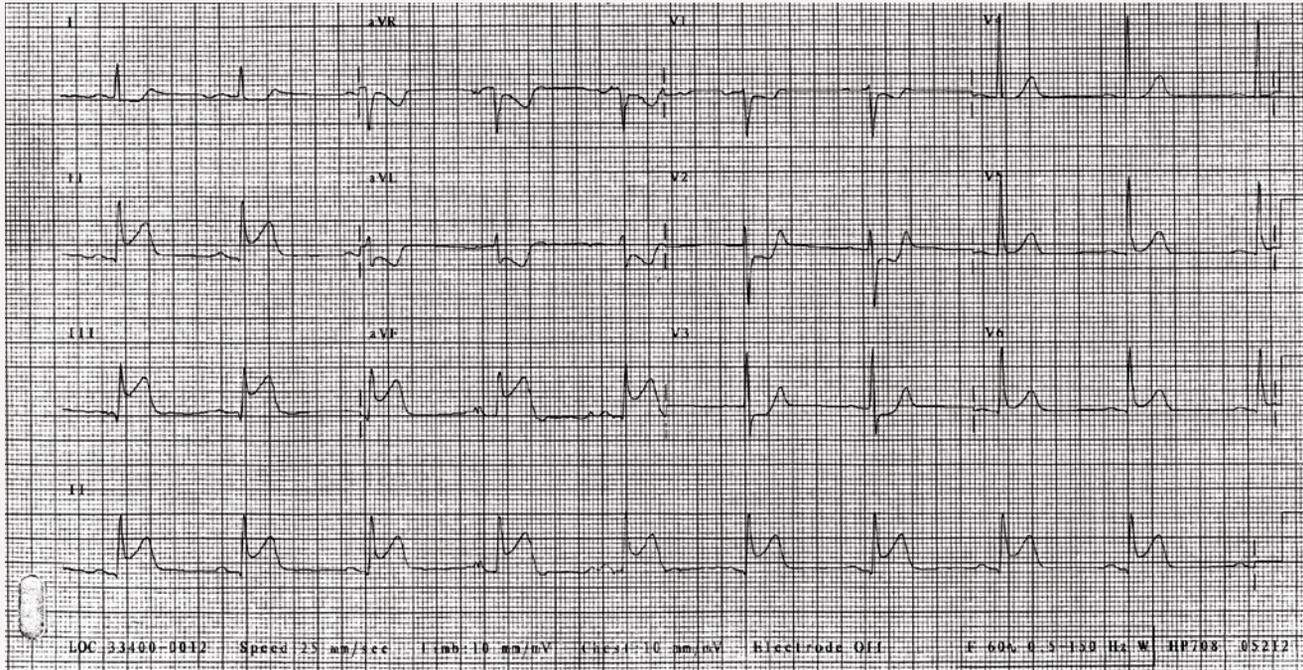
If we are designing a study and we want to know how many subjects we need to enroll in order to detect a *predetermined* difference between the groups, we can use this equation:

$$n = \frac{2\alpha^2 (Z_{1-\beta}) + Z_{1-\alpha/2})^2}{(\mu_1 - \mu_2)^2}$$

where  $n$  = sample size,  $\alpha$  = predetermined Type I error,  $\beta$  = predetermined desired power, and  $\mu_1 - \mu_2$  is the difference between the groups that you wish to detect.

# ECG Challenge

**CASE.** A 59-year-old male smoker with a history of hypertension, familial hyperlipidemia and insulin dependent diabetes presents with 2 hours of substernal chest pressure radiating to his right arm.



**This ECG is clearly concerning for an ischemic event, with both ST elevations and ST depressions. As always we will approach this ECG in a systematic way to ensure the obvious findings don't obscure subtler findings.**

First of all, this ECG demonstrates sinus rhythm with regular rate and normal axis. The PR interval is on the high end of normal, and the QTc is normal. The QRS complex is narrow and there are no delta waves in any lead. Significantly, there are ST elevations in the inferior leads (II, III, aVF) as well as ST depressions in aVL, V1, V2, V3. ST elevations in the inferior leads are concerning for inferior wall MI which usually occurs from RCA occlusion. These patients should not be given nitroglycerin as it may instigate hypotension. They are also at risk of developing bradycardia secondary to AV block. ST elevation is considered significant if there is at least 1 mm (one small box) of elevation at the J point in at least 2 contiguous leads except for the precordial leads (V2, V3) which require 2 mm of elevation to be significant.

The ST depressions in the anterior leads of this ECG should make you concerned for a posterior wall MI and should prompt a posterior ECG. This is especially concerning in the presence of upright T waves in these leads. ST depression in aVL (a lateral lead) is likely a reciprocal change from inferior ST elevations discussed above. Seeing this ECG should obligate an immediate consultation to the cardiology service and to the cardiac cath lab for possible stenting.

## LEARNING POINTS

1. ST elevation greater than 1 mm in 2 contiguous leads (2 mm in V2 and V3) should make you seriously entertain the diagnosis of STEMI in your patient and prompt immediate action to activate the nearest cardiac cath lab.
2. Remember the PAILS mnemonic when assessing for reciprocal changes. PAILS stands for P-posterior A-anterior I-inferior L-lateral S-septal. ST elevations in these leads most commonly create reciprocal ST depressions in the corresponding leads of the next letter in the mnemonic. That is to say, posterior ST elevation will usually cause anterior lead ST depressions and anterior lead ST elevations will usually be seen with inferior lead depressions.
3. Nitro should not be given in the presence of inferior wall ST elevations as it may induce hypotension. Inferior wall infarctions may also be associated with AV nodal dysfunction causing heart block and bradycardia. ★



**Zachary S. Wilson, MD**  
ECG Section Editor  
Icahn SOM at Mt Sinai  
New York, NY

# Board Review

## QUESTIONS

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 VIII*. For complete answers and explanations, visit [emresident.org](http://emresident.org) (Features section).

To learn more about *PEER VIII*, or to order it, go to [www.acep.org/bookstore](http://www.acep.org/bookstore).



1. Which of the following statements about the presence of delirium in an elderly patient is correct?
  - A. 5% of elderly emergency department patients have delirium
  - B. Delirium is assessed using the Mini-Mental State Exam
  - C. Hypoactive delirium is more common than hyperactive delirium
  - D. Mortality effects are reduced if delirium is less than 1 week in duration
2. The correct antidote for cyanide poisoning is:
  - A. Hydroxocobalamin
  - B. Pyridoxine
  - C. Thiamine
  - D. Vitamin K
3. A 3-week-old boy presents by ambulance with central cyanosis, with an oxygen mask in place and intravenous access established in the right antecubital fossa. The babysitter had called 911 and said that he turned blue. On physical examination, he is awake and alert but still cyanotic. What is the most appropriate initial step in the management of this patient?
  - A. Intravenous hydration with 20 mL/kg of D5W
  - B. Knee-to-chest positioning
  - C. Phenylephrine 5 mcg/kg IV bolus
  - D. Vagal maneuvers, including rectal stimulation
4. Which of the following findings is most likely in the evaluation of a prepubescent girl who reports sexual abuse?
  - A. Abnormal thickening of the posterior fourchette
  - B. Bilateral labial contusions
  - C. Normal or nonspecific genital findings
  - D. White or thick yellow discharge
5. Which of the following statements regarding multiple sclerosis is correct?
  - A. All patients develop optic neuritis over the course of their lifetimes
  - B. Internuclear ophthalmoplegia is more suggestive of a diagnosis of neoplasm
  - C. Neurologic symptoms worsen with cold temperatures
  - D. Sensory symptoms are common presenting complaints

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For more information or to submit a CV/cover letter please contact: **Lewis S. Nelson, MD, Chair, Department of Emergency Medicine, 185 South Orange Avenue, MSB 609, Newark, NJ 07103; Email: negrongl@njms.rutgers.edu.**

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**Sebring:** US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and majority-owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and majority-owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

### GEORGIA

**Atlanta:** EmergiNet, a progressive, well-established physician owned emergency group has positions available for BC/BP, EM residency trained physicians at multiple facilities in the Atlanta area. We work as a team emphasizing quality emergency care, dedicated customer service, professional and personal growth. Fee-for service based compensation, plus benefits, in the \$350K range. Malpractice and tail coverage are provided. Flexible scheduling, no non-compete, and much more. E-mail CV to Neil Trabel, [ntrabel@emerginet.com](mailto:ntrabel@emerginet.com); fax 770-994-4747; or call 770-994-9326, ext. 319.

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**Pali Momi Medical Center:** US Acute Care Solutions is seeking Emergency Medicine Physicians to join us at Pali Momi Medical Center. Pali Momi Medical Center is a 116 bed facility with an annual volume of 66K patients. If you have ever dreamed of moving to Hawaii, now is your chance. This is your opportunity to practice in a challenging and rewarding setting while enjoying the lifestyle that only this island paradise can offer. US Acute Care Solutions (USACS) was founded by EMP and other like-minded groups that share an ironclad commitment to a physician-led and majority-owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our incredible benefits package includes excellent compensation, the best medical malpractice, an industry leading company-funded 401(k), exceptional healthcare and the camaraderie that is exclusive to a physician led and majority owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Bernhard Beltran directly at 800-359-9117 or email [bbeltran@usacs.com](mailto:bbeltran@usacs.com).

### ILLINOIS

**Chicago Heights/Olympia Fields:** Franciscan St. James Health (2 campuses seeing 38,000 and 37,000 pts./yr.) is affiliated with Midwestern University's emergency medicine residency program. Situated just 30 miles south of Chicago, the location makes for easy access to a variety of desirable residential areas. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and

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**Chicago-Blue Island:** MetroSouth Medical Center is located in the southern end of Chicago 18 miles from downtown. This respected acute care facility treats 50,000 emergency pts./yr. A modern ED and fast track see a broad mix of pathology and admit approximately 14%. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and majority-owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and majority-owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

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**Kankakee:** Presence St. Mary's Hospital hosts an efficient, recently renovated ED seeing 31,000 emergency patients/yr. This Level II Trauma Center has an admission rate of 19% and broad pathology. Situated 50 minutes south of Chicago, the local area is very affordable and offers great housing/schools. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and majority-owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and majority-owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

### INDIANA

**South Bend:** Memorial Hospital. Very stable, Democratic, single hospital, 22 member group seeks additional Emergency Physicians. 60K visits, Level II Trauma Center, double, triple and quad physician coverage. Equal pay, schedule and vote from day one. Over 375K total package with qualified retirement plan; group health and disability insurance; medical, dental and CME reimbursement, etc. Very favorable Indiana malpractice environment. University town, low cost of living, good schools, 90 minutes to Chicago, 40 minutes to Lake Michigan. Teaching opportunities at four year medical school and with FP residency program. Contact Michael Blakesley MD FAAEM at 574.299.1945 or send CV to [Blakesley.1@ND.edu](mailto:Blakesley.1@ND.edu).

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Interested candidates are invited to contact: Antoinette Lentine, Physician Recruitment

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### MAINE

**Central Maine:** In search of BC/board prepared emergency physicians to join our democratic hospital-employed group! Central Maine Medical Center, located 30 miles north of Portland, Maine, is an accredited Level II trauma center, tertiary referral hospital, and base station for Life Flight of Maine. Our ED volume is 50,000 patients/year and our providers typically see 1.5-2.0 patients/hour with a 15-20% admission rate. The department boasts diverse pathology and has both fast track and observation areas with low patient waiting times and minimal ED boarding. We have excellent subspecialty support including a cardiac cath lab, in-house intensivists, adult and pediatric hospitalists and an EMR. As part of an integrated health system, our providers also staff 2 critical access rural EDs and 1 small community ED, each with a volume of 10-13,000 patients/year, allowing for a unique and diverse clinical practice setting. We offer a highly competitive compensation package, comprehensive benefits, a sign-on bonus and student loan repayment. Maine is known for being a safe place to live and to raise a family with nationally-ranked schools. Spend your free time enjoying a thriving arts, music and restaurant scene, and unparalleled outdoor recreation that includes skiing, biking, hiking, surfing and sailing. Learn more about Central Maine Medical Center and "The Way Life Should Be" by contacting Julia Lauver, CMMC Medical Staff Recruiter, 300 Main Street, Lewiston, ME 04240; Call 800/445-7431; Email [JLauver@cmhc.org](mailto:JLauver@cmhc.org); Fax 207/755-5854.

### MARYLAND

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Lewis Katz School of Medicine

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Interested candidates should submit a current curriculum vita and complete contact information to the address below. Personal statements summarizing teaching experience, clinical and research interests, leadership experience and contributions to diversity are encouraged.

**Robert McNamara, MD, FAAEM, Professor and Chairperson, Department of Emergency Medicine Chief Medical Officer, Temple University Physicians, C/O Debbie Hinnerschitz, Physician Recruiter, Department of Physician & Faculty Recruitment, Temple University School of Medicine, 3420 N. Broad Street, MRB 101, Philadelphia, PA, 19140, Email: debbie.hinnerschitz@tuhs.temple.edu Ph: 215-707-4419; fax: 215-707-9452**

The University is especially interested in qualified candidates who can contribute through their research, teaching and/or service to the diversity and excellence of the academic community. Lewis Katz School of Medicine is an Affirmative Action/Equal Opportunity Employer and strongly encourages applications from women, minorities, veterans and persons with disabilities.

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**Maryland/Washington DC area:** Shady Grove Medical Center and Germantown Emergency Center offer a main ED, a Fast Track ED, a pediatric ED, and a psychiatric ED. An 18-bed Observation Unit created exclusively for ED patients opened in November 2012. Annual patient census is over 70,000 at SGAH and about 37,000 at GEC. Rockville is just minutes from Washington, DC and a short drive to Baltimore. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Sandra Lee, Senior Recruiter: [careers@usacs.com](mailto:careers@usacs.com) or (301) 944-0049.

### MASSACHUSETTS



**Attleboro:** Memorial Hospital is seeking a BE/BC Emergency Medicine Physician to join our team in Attleboro, Massachusetts, located conveniently between Boston and Providence with easy access to the excellent attractions and social atmosphere both cities have to offer, as well as many beautiful beaches, skiing, hiking and much more. We are a 128-bed full-service financially stable community hospital with 50,000 annual ED visits. Low trauma volume with full specialty back-up and 24 hour hospitalist coverage. ED has up to quadruple provider coverage per day with overlapping 8-9 hour shifts plus a separately staffed fast track area. Full time hospital employed position, competitive compensation with productivity incentives, comprehensive benefits package including health, dental, disability and life insurance, occurrence malpractice, and excellent retirement package. Visit our website at [www.sturdymemorial.org](http://www.sturdymemorial.org). Contact Dr. Brian Patel at 508-236-7040 or [bpattel2@sturdymemorial.org](mailto:bpattel2@sturdymemorial.org).

**Framingham and Natick:** MetroWest Boston – Established, democratic, physician managed group has open position for a BC/BE emergency physician. MetroWest Emergency Physicians provides staffing for the Emergency Department of MetroWest Medical Center, located in the western suburbs of Boston. We have campuses in Framingham and Natick, MA with a combined annual volume of 70,000 visits. MetroWest Medical Center is a Stroke Center, Point of Entry for STEMI patients, staffs 12 hours of pediatric ER coverage 7 days a week, and staffs 24 hours of pediatric hospitalist coverage. We offer flexible scheduling, comfortable work environment, excellent salary and benefits package. Please submit inquiries to: Maureen Galaid, [MetroWest Emergency Physicians, 115 Lincoln Street, Framingham, MA 01702, 508-383-1104, maureen.galaid@mwmc.com](mailto:Maureen.Galaid@mwmc.com)

### MICHIGAN

**Grand Blanc:** Genesys Regional Medical Center is located 45 minutes north of metro-Detroit and minutes from a number of desirable residential areas. This award-winning facility hosts both allopathic and osteopathic emergency medicine residency programs and sees 62,000 emergency pts./yr. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

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### NEVADA

**Las Vegas:** Full time opportunities for Pediatric Emergency Medicine Physicians. Children's Hospital of Nevada at UMC is the main teaching hospital of the University of Nevada School of Medicine and serves as the region's only Pediatric Trauma Center and Burn Center. Our 20-bed department cares for 30,000 pediatric patients annually. There is excellent sub-specialty coverage with 24 hour in-house intensivist coverage and a level 3 NICU. US Acute Care Solutions (USACS) was founded by EMP and other like-minded groups that share an ironclad commitment to a physician-led and majority-owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our incredible benefits package includes excellent compensation, the best medical malpractice, an industry leading company-funded 401(k), exceptional healthcare and the camaraderie that is exclusive to a physician led and majority owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Bernhard Beltran directly at 800-359-9117 or email [bbeltran@usacs.com](mailto:bbeltran@usacs.com).

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### NEW YORK

**Albany area:** Albany Memorial Hospital has a newer ED that sees 43,000 pts/yr. and hosts EM resident rotations. Samaritan Hospital in Troy is a respected community hospital situated minutes from Albany and treats 42,000 ED pts/yr. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

**Binghamton: Emergency Medicine Opportunities** with Signing Stipend, Loan Forgiveness!! UHS Medical Group is a progressive multi-specialty group with a large primary care base, consisting of 200+ physicians providing care in over 20 medical and surgical specialties in multiple locations. The group is affiliated with United Health Services Hospitals, the regional leader in healthcare. There is a strong market presence in the region and an excellent referral base. We are seeking BE/BC E.M. trained or ABEM physicians to join our Emergency Medicine Departments. One opportunity is located in Binghamton, NY in our level 2 ED's. They see a combined 60,000 patients a year and have single to quadruple coverage during the busiest times. The Binghamton locations include a Level II Trauma Center, comprehensive stroke and cardiac care. There are opportunities for teaching residents, and medical students with Upstate Medical University in Syracuse, and the ability to participate in clinical research. **The area boasts numerous cultural and recreational activities and is noted for its excellent quality of life.** Competitive starting salary, signing stipend, educational loan repayment, excellent benefits and malpractice insurance. Contact Denise B. Harter: [denise\\_harter@uhs.org](mailto:denise_harter@uhs.org) or 607 337-5627.

**Cortland:** Cortland Regional Medical Center is a modern, full-service facility situated in the Finger Lakes Region between Syracuse and Ithaca. A broad mix of pathology makes up 33,000 ED pts/yr., and there is strong support from medical staff and administration. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

### THE University of Vermont HEALTH NETWORK

#### Champlain Valley Physicians Hospital

**Lake Champlain Region, New York: Emergency Medicine Opportunities:** The University of Vermont Health Network-Champlain Valley Physicians Hospital ([www.UVMHealth.org/CVPH](http://www.UVMHealth.org/CVPH)) seeks BC/BP EM Physicians to join its Emergency Department (50,000 annual visits). Schedule has 60 hrs/day of physician coverage. Enjoy working in our newly renovated ER which includes a new EMR system. Incoming physicians may either be hospital employed with a comprehensive benefit package or be independent contractors. **Community** ([www.NorthCountryGoodLife.com](http://www.NorthCountryGoodLife.com)) offers a rich family lifestyle on Lake Champlain at the foothills of the Adirondack Mountains. Enjoy close proximity to the Lake Placid Olympic Region, Montreal and Burlington, VT. Practice in a university affiliated hospital and live where others vacation! For info: Becky Larkin, 518-314-3025, [rlarkin@cvph.org](mailto:rlarkin@cvph.org).

**New York City: Premier Institution – Academic and/or Clinical Positions Available.** Exciting opportunities in Emergency Medicine in the New York City area. 1) Be part of a nationally recognized team at a premier institution. Work 1600 clinical hours and earn over \$240K! 2) Join the faculty of this EM Residency Program for a 32-36-hour workweek. Shifts vary from 8's through 12's and 3) Work in a hospital-based practice at a 40-bed ED with 65K-70K annual ED visits and a Level II Trauma Center. Four-year Residency Program with Academic Appointment. **Reference job #1428. In confidence contact Mark Ariano, TeedCo. Healthcare Recruiting, 877-901-0191, ext. 110. Visit us at ACEP Booth #s1428!**

**Port Jefferson:** John T. Mather Memorial Hospital is situated in a quaint coastal town on Long Island's north shore and sees 43,000 emergency patients per year. Pathology is broad with moderate acuity, and most services are represented. Enjoy a variety of residential options, outdoor recreation and shopping and access to NYC. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and majority-owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

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- Advocate's mission to provide the highest level of care available has resulted in a series of national recognitions
- Advocate is a financially stable organization
- Advocate offers a great work/life balance

### Locations currently recruiting:

- **Advocate BroMenn**-Bloomington/Normal, Illinois- Level II trauma, 40,000 visits
- **Advocate Trinity**- Chicago, Illinois- 40,000 visits
- **Advocate South Suburban**- Hazel Crest, Illinois- 52,000 visits

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Sarah Smith, Physician Recruiter at [Sarah.Smith5@advocatehealth.com](mailto:Sarah.Smith5@advocatehealth.com)



**Bakersfield, California**

Pinnacle Emergency Physicians (2007-present) with 3 local ED's (10h shifts) seeking FT/PT, BC/BE docs (all trauma goes to the County Hospital)

**Memorial Hospital:** 80k/y, STEMI, Stroke & Burn Receiving Center, currently 24/7 Peds, PICU, OB and adult hospitalist services.....Peds ED opening 4/2017

**Mercy Downtown:** 37k/y, Stroke Receiving Center w/ adult hospitalist services

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Dr. Kian Azimian, MD, Assistant Medical Director kianazimian@yahoo.com 661-616-8930

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**Asheboro:** 20-Bed ED – Not a trauma center – 40,000 patients/year – Seeking seventh physician – Partnership available – 14-15, 9-hour shifts/month – Competitive compensation & extremely generous benefit package including sign-on bonus, relocation, CME allowance, medical, dental, and malpractice insurance. Asheboro, located in the center of North Carolina offers: Small-town feel, rich in art, outdoor and family activities - Within an hour to Wake Forest, UNC, & Duke – Live in Asheboro or commute! Please contact Cindy Leonard, cleonard@randolphhospital.org, 336-633-7777, [www.randolphhospital.org](http://www.randolphhospital.org)

**Charlotte:** US Acute Care Solutions (USACS) is partnered with ten community hospitals and free-standing EDs in Charlotte, Harrisburg, Kannapolis, Lincolnton, Pineville and Statesville. A variety of opportunities are available in urban, suburban and smaller town settings with EDs seeing 12,000 – 83,000 pts./yr. USACS was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

**Charlotte/Statesville:** Iredell Memorial Hospital is a respected community hospital situated north of Charlotte and seeing 42,000 ED pts./yr. Statesville is easily commutable from desirable north-Charlotte suburbs like Mooresville (highly regarded schools), with access to lakeside, small town and rural residential options as well. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

**Morehead City:** Modern community hospital on the Atlantic coast minutes from Atlantic Beach and Emerald Isle! This 135-bed facility sees 38,000 emergency pts./yr., is active in EMS, and has a supportive medical staff and administration. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is



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The department has a well-established, three-year residency program and an Emergency Ultrasound fellowship. The department is seeking physicians who can contribute to our clinical, education and research missions.

Qualified candidates must be ABEM/ABOEM certified/eligible. Salary and benefits are competitive and commensurate with experience. For consideration, please send a letter of intent and a curriculum vitae to: **Robert Eisenstein, MD, Interim Chair, Department of Emergency Medicine, Rutgers Robert Wood Johnson Medical School, 1 Robert Wood Johnson Place, MEB 104, New Brunswick, NJ 08901; Email: Robert.Eisenstein@rutgers.edu; Phone: 732-235-8717; Fax: 732-235-7379.**

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**New Bern:** CarolinaEast Medical Center is a respected 313-bed regional medical center located at the intersection of the Trent and Neuse Rivers just off the central coast. 71,000 ED pts./yr. are seen in the ED. Beautiful small city setting offers great quality of life. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

**Pinehurst:** Sandhills Emergency Physicians (SEP) is seeking new partners to join our team of 27 physicians. We currently staff a 4-hospital system in adjacent counties with varying acuities, volumes, and demographics. We provide 129 hours of physician coverage and 44 hours of PA/ NP coverage daily across all facilities. Pinehurst is a world-renowned resort centrally located in the Sandhills of North Carolina. Our physicians and families enjoy a short drive to the ocean, mountains, and several highly acclaimed universities. We are also home to the 1999, 2005, 2014 and future 2024 US Open Golf Championships. The majority of our physicians start and finish their career in this family-oriented community which also boasts equestrian activities, trails, lakes, and other outdoor sports activities. Become a part of FirstHealth Moore Regional Hospital, named one of the nation's 100 top hospitals in a recent industry study conducted by Truven Health Analytics. We are looking for residency trained EM physicians seeking a partnership opportunity. Residency trained ABEM/ABOEM BE/BC physicians may apply. The offer encompasses fair and equitable scheduling from day 1 in a democratic group with a 2-year partnership track. SEP offers funded retirement plus the usual health, malpractice, CME, vision/dental allowance, etc. We annually treat a combined 125K+ patients and utilize an integrated EMR. Hospitalists handle most admissions. Competitive sign-on bonus. For more information or inquiries, please contact Peter A. Tucich at [madju@nc.rr.com](mailto:madju@nc.rr.com) or (910) 692-8224.

### OHIO

**Cincinnati Region:** The Mercy Health System in eastern and western Cincinnati includes nine respected community hospitals seeing 14,000-60,000 emergency pts./yr. Locations are proximate to desirable residential areas. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent



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**Concord, Madison and Willoughby:** Lake Health is situated in the eastern Cleveland Suburbs. TriPoint Medical Center was built in 2009 and treats 27,000 emergency pts./yr. The Madison Medical Campus hosts a freestanding ED seeing 12,000 pts./yr. West Medical Center is a state-of-the-art acute care hospital serving 35,000 ED pts./yr. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@emp.com](mailto:careers@emp.com) or (800) 828-0898.

**Lancaster:** Located 30 minutes SE of Columbus, Fairfield Medical Center sees 55,000 emergency patients per year. Modern facility, excellent back up, easy access to metro amenities, and dedicated partners make this a great place to live and work. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

**Springfield:** Springfield Regional Medical Center is a new, full-service hospital with supportive administration committed to emergency medicine. Situated 45 miles west of Columbus and 25 miles northeast of Dayton, the ED sees 76,000 patients/yr. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and majority-owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting: [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.



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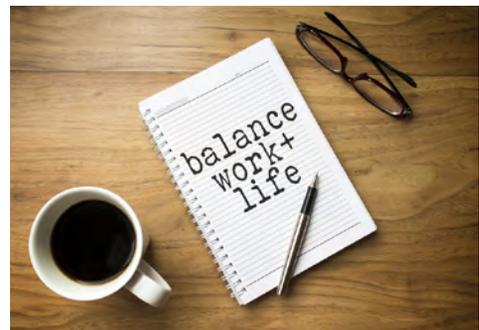
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Applicants must have graduated from an accredited Emergency Medicine Residency Program and be board eligible or board certified by ABEM or AOBEM. We seek candidates with strong interpersonal skills and the ability to work collaboratively within diverse academic and clinical environments. Observation experience is a plus.

For additional information, please contact:

**Susan B. Promes, Professor and Chair, Department of  
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**Urbana:** Mercy Memorial Hospital services the SW Ohio region's residents in Champaign County; the facility treats approximately 16,000 emergency pts./yr. Desirable residential areas in Dayton are easily accessible. US Acute Care Solutions (USACS) was founded by like-minded groups that share a strong commitment to a physician-led and owned, democratic business model. As a USACS physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. At USACS, we control our careers and love our lives! Visit us at [www.usacs.com](http://www.usacs.com). Contact Darrin Grella, Vice President of Recruiting; [careers@usacs.com](mailto:careers@usacs.com) or (800) 828-0898.

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**Pittsburgh – Natrona Heights:** Allegheny Valley Hospital is situated just 18 miles north of Pittsburgh and sees 39,000 ED pts./yr. A newer, state of the art ED and strong medical staff, administration and community support make for a great work environment. Allegheny Health Network Emergency Medicine Management (AHNEMM) has a strong commitment to a physician-led and owned, democratic business model. As an AHNEMM physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. Contact Jim Nicholas ([jnicholas@usacs.com](mailto:jnicholas@usacs.com)); (800) 828-0898.

**Pittsburgh:** Allegheny General Hospital is a highly regarded quaternary care center with Level I trauma designation and an international reputation for excellence. A full-range of medical and surgical specialties supports residency programs in 22 specialties including EM and EM/IM, plus fellowships in EMS and EM Ultrasound. 55,000 ED patients are treated annually. Allegheny Health Network Emergency Medicine Management (AHNEMM) has a strong commitment to a physician-led and owned, democratic business model. As an AHNEMM physician, you'll have an equal voice as an owner, and unparalleled access to personal and professional growth resources. Our outstanding benefits package includes excellent compensation, the best medical malpractice (occurrence – includes tail), industry leading company-funded retirement plan, exceptional healthcare and the camaraderie that is exclusive to a physician-led and owned group. Contact Jim Nicholas ([jnicholas@usacs.com](mailto:jnicholas@usacs.com)); (800) 828-0898.

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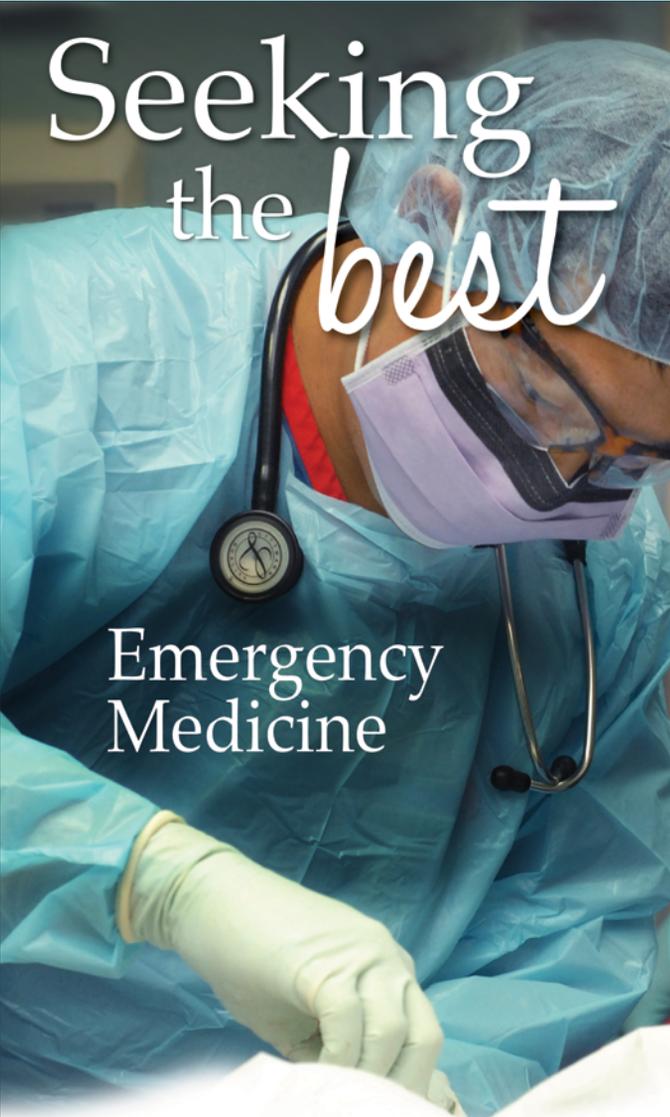
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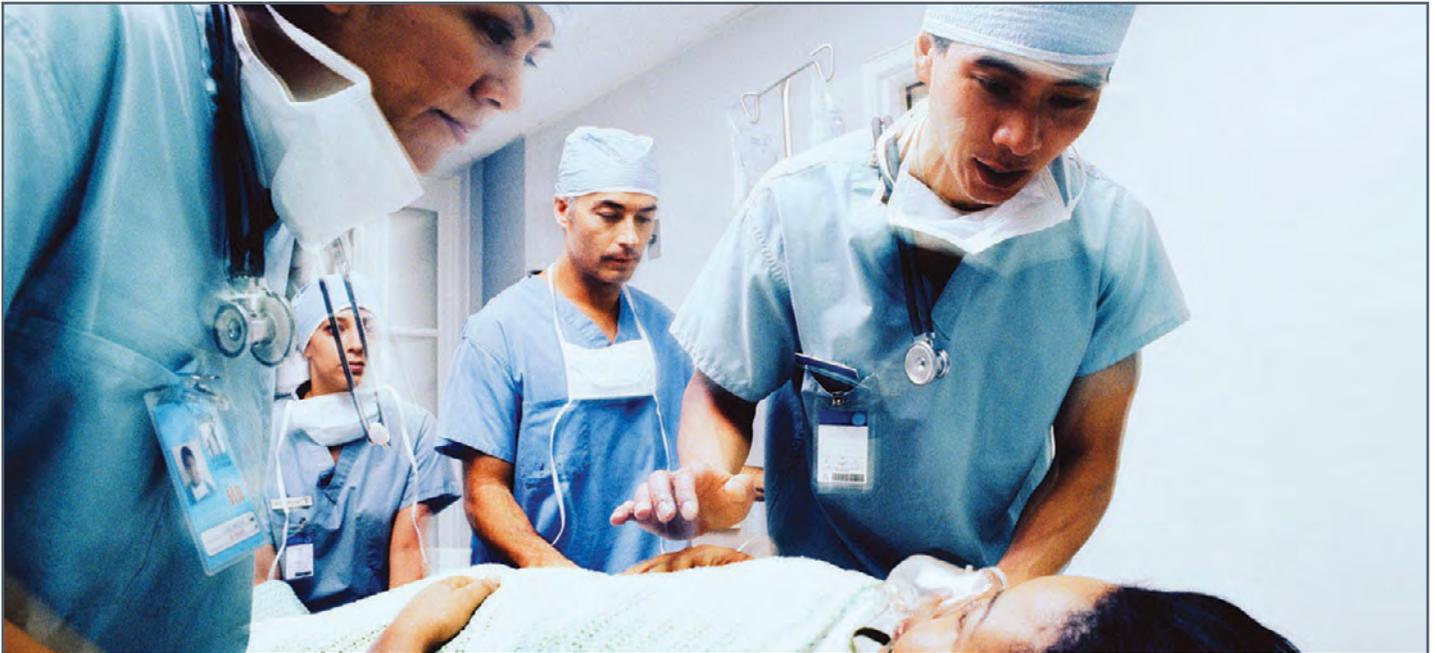
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Our multispecialty practice group and DO residency program with a truly collegial staff provide excellent support and contribute to the rewards of a balanced professional and personal lifestyle. The Southern Finger Lakes and Pennsylvania Grand Canyon and the cities and suburbs of Elmira and Corning offer a truly exceptional lifestyle. Excellent schools, convenient shopping, low crime rates, and high air and water quality combine to foster a superior environment with very affordable housing. The region is a mecca for outdoor enthusiasts offering an abundance of activities in all seasons. The region is centrally located within an easy 4-5 hour drive to major cities in the Northeast.

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### EEO Employer

For confidential consideration, please contact:  
Francis DiBari, Director Medical Staff Recruitment,  
Arnot Health, 600 Ivy Street, Suite 105, Elmira, NY 14905  
Phone: (607) 735-4620; Fax: (607) 737-7700;  
Email: fdibari@arnothealth.org

or visit our web-site at: <https://www.arnothealth.org/careers>

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Interested candidates please email your CV to [Karen\\_R.Fay@LVHN.org](mailto:Karen_R.Fay@LVHN.org) or call 484-862-3206 for more information.

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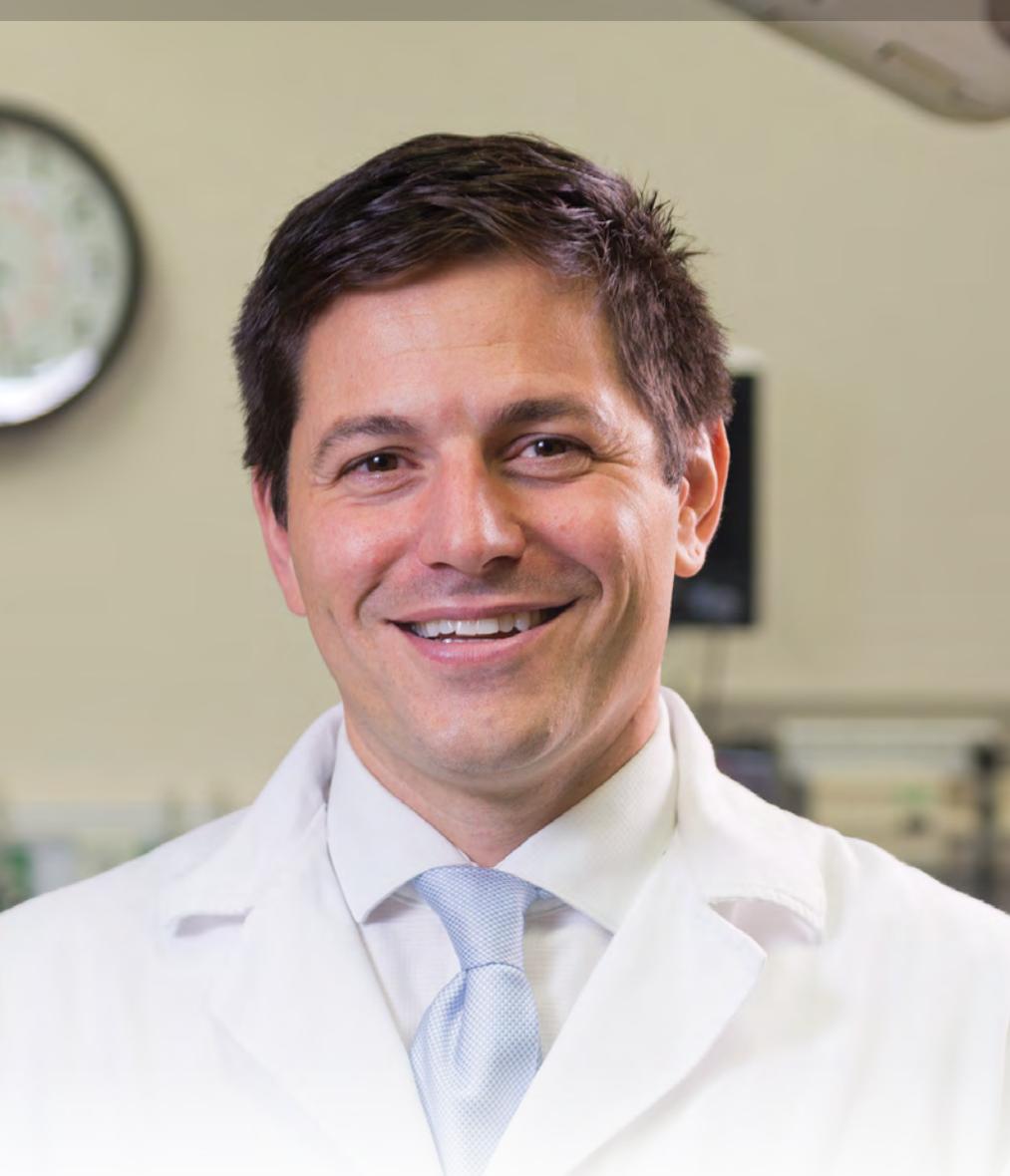
For more information about HCA  
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#### **Amber Holiman**

National Emergency Medicine Recruiter

501.226.9020

[Amber.Holiman@HCAHealthcare.com](mailto:Amber.Holiman@HCAHealthcare.com)



## *Make your career move to Myrtle Beach!*

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