

EM Resident

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Caffeine Toxicity

Acute Liver Failure

Capnography
for Asthma

Journal Club:
IV Lidocaine
for Renal Colic



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Categories


TOXICOLOGY

Caffeine Toxicity

12 Contemporary Caffeinated Complaints

14 Anhydrous Caffeine

COVER STORY



4 EDITOR'S LETTER

Kevin G. Rodgers, MD

In Memoriam



16 GASTROINTESTINAL

Management of Acute Liver Failure in the Emergency Department



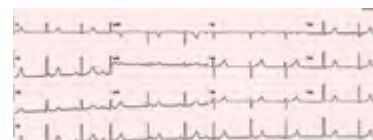
6 PRESIDENT'S MESSAGE

EMRA's 2018 Road Map



19 CARDIOLOGY

Solve this Medical Mystery



What is Your Interpretation?

8 SPEAKER REPORT

Packed Agendas and a Call for Your Opinions

“ Representative Council Recap ”

20 OB-GYN

Postpartum Seizures

10 HEALTH POLICY

Tax Ills, Market Stabilization, and CHIP



What You Need to Know About the Tax Bill

21 PAIN MANAGEMENT

Controversies Surrounding Ultrasound Guided Regional Anesthesia in the ED



22 MEDICAL EDUCATION
SIRS Criteria



A Nidus for Bias and How to Minimize It

24 ULTRASOUND
Intraoral Ultrasound Guided Peritonsillar Abscess Drainage



26 MEDICAL EDUCATION
Capnography



28 RESEARCH
EMRA Journal Club

Intravenous Lidocaine for ED Patients with Renal Colic

31 EDITORIAL
Enviromedics

Health Implications of Climate Change



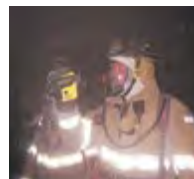
32 INTERNATIONAL MEDICINE
Cultural and Ethical Barriers



33 EM POWER
Robert Suter, DO, MHA, FACEP, FAAEM, FACOEP-D, FIFEM



35 OP-ED
Lessons on Burnout from a Fire Chief



36 NEWS & NOTES
EMRA Website Gets Smart



EM Residents' Day
EMRA Moves to CORD
and more

39 ECG CHALLENGE



41 VISUAL DIAGNOSIS
Diagnose this Condition



44 BOARD REVIEW
Questions from PEER IX

UPCOMING EVENTS

- Feb. 16:** EMF Grant Applications Due
- Feb. 21:** NRMP Rank Order List Certification Deadline @ 9 pm ET
- Feb. 27–March 3:** ABEM In-training Examination
- March 7:** EM Residents' Appreciation Day
- March 9:** EMRA Representative Council Spring Resolutions Due
- March 12:** NRMP Supplemental Offer and Acceptance Program Begins @ 11 am ET
- March 15:** LAC Video Project Submissions Due
- March 16:** NRMP Match Day!
- April 5:** *EM Resident* Articles Due
- April 22–25:** EMRA Events @ CORD Academic Assembly in San Antonio
- May 5–8:** ABEM Spring Oral Certification Exam
- May 15–18:** Essentials of Emergency Medicine — discount for EMRA members! The Cosmopolitan, Las Vegas
- May 20–23:** ACEP Leadership & Advocacy Conference



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In Memoriam

Kevin G. Rodgers, MD

He led by example, always made time to teach, and above all else, was a fierce advocate for the residents.

*I*t was the mid-afternoon shift change in the emergency department at Sidney and Lois Eskenazi Hospital in downtown Indianapolis. Typical for a Monday, the scene was hectic. I was about to begin the last hour of what had been a routine shift in the low acuity side of the department. The oncoming resident had already arrived, so I was focused on entering dispositions and finishing charts when my attention was abruptly pulled away from the computer screen.

“Come with me — I need all of the EM residents.”

I turned around to see a veteran faculty member glaring at those of us in the central workstation. He was wearing casual clothes and carrying a messenger bag. He was not on the schedule to work that day, which was my first clue that something was wrong.

“Right now. Just stop what you’re doing, let’s go.”

It didn’t faze me. At least, not at first. There were plenty of reasons to be pulled aside after a busy shift. We had been working against a full waiting room all day, so I figured that we were going to be given a stern talk about our performance. While that method of feedback would certainly be out of character for our program, it was my first month in the county ED as a resident, and I had no idea what to expect.

I wish I had been right.

Anxiously, I trailed shortly behind the attending as we began our march across the department. Over the course of a few minutes, we collected the remaining EM residents. The last to join was the sole PGY3 on shift at the time. Her eyes opened wide in a panic as she realized the situation that was unfolding. “This never happens,” she said as we moved past the triage area. The look of concern on her face was enough to convince the rest of us that something indeed was wrong.

We were ushered into a small meeting room on the outskirts of the department. There were chairs set out for us. We took our seats and the door was closed. An eerie silence was shared amidst the collective apprehension of what was to come. Then, the



Dec. 21, 1955 – Nov. 20, 2017



door opened. One of our program directors slowly entered the room. His face was solemn, unsmiling. His eyes were red and swollen as he looked around at us. He sat down and diverted his gaze toward the ground. “I’m sorry to be the one to tell you this,” he paused, voice cracking. “Kevin was murdered this morning.”

Time seemed to stand still.

“We don’t know much right now,” he looked up, tears forming in his eyes. “Please take as much time as you need to process this.”

At once, we were violently ripped away from our familiar roles as physicians and thrust into the unfamiliar position as vulnerable individuals receiving the worst possible news about a family member. The silence was gradually broken by the sounds of choking back tears. No words were spoken. One by one, we quietly got up and left the room.

Dr. Kevin Rodgers was killed in his home that morning. As a program director for the Indiana University emergency medicine residency program (IUEM), he was a beloved mentor and father figure. KRodge, as he was affectionately known, defined the program and created the culture that exists here today. He led by example, always made time to teach, and above all else, was a fierce advocate for the residents.

At his memorial service, two co-interns and I found ourselves listening to stories from one of KRodge’s extended family members. After learning that we were residents, her face lit up and broke into a smile. “I know that I’ve met some of the best people in the world now,” she said. “Kevin always told us that he trained the best people and the best doctors.”

It’s difficult to articulate the full impact of KRodge at IUEM. For those of us who were lucky enough to work with him, his lessons will live on and continue to inspire generations of emergency physicians to never provide anything less than excellent care. ★

Army veteran and Indiana University emergency medicine residency program director emeritus Kevin Rodgers, MD, was killed in November during a home invasion at his residence in Indianapolis. At the time of his death, he was president of the American Academy of Emergency Medicine and a respected mentor to emergency physicians across the country.

EMRA's 2018 Road Map

EMRA is the voice of emergency medicine physicians-in-training and the future of our specialty. That is our mission. And to fulfill that mission, your EMRA Board develops a strategic plan to use as road map for success. The three pillars of EMRA's current plan are to:

1. Make membership matter
2. Promote the interests of EM physicians-in-training
3. Thrive as a sustainable organization.

As we look forward to the year ahead, I want to celebrate our recent accomplishments and highlight innovations that demonstrate our commitment to achieving our mission.

Making Membership Matter

Leadership Development

At the 2015 ACEP Council, now ACEP President-Elect John Rogers, MD, CPE, FACEP, stood at a microphone and boldly testified that, "**EMRA is the crucible in which the future of emergency medicine is forged.**" And he couldn't be more right! For more than 40 years, EMRA has been the launching pad for young physicians who have gone on to become leaders in health policy, research, medical education, government, nonprofits, the private sector, and more. The stories of these leaders are highlighted in a series of *EM Resident* articles and EMRA•cast podcasts called **EMpower**.

In addition to the leadership opportunities offered by serving on EMRA's Board, Committees and

Divisions, Medical Student Council, Representative Council, and as EMRA Representatives to ACEP Committees, new this year, under the direction EMRA President-Elect Omar Maniya, MD, MBA, we are creating even more opportunities for our members to lead by appointing **EMRA Representatives to ACEP Sections**. By strengthening our relationship with ACEP's 38 sections, EMRA members will have the opportunity to be mentored by leaders in our field and participate in conversations that will shape the future of our specialty.

At ACEP17, we brought together leaders from across our organization for an improv-comedy teambuilding activity to break down silos, have fun, and build friendships as a community of lifelong leaders in emergency medicine. From this experience, the idea for the **EMRA Leadership Academy** was born. Scheduled to launch at the CORD Academic Assembly in San Antonio, under the direction of EMRA Board Member At-Large Geoff Comp, DO, FAWM, this series of 12 monthly flipped classroom discussions paired with teambuilding mixers at national conferences will teach current EMRA leaders the skills necessary to be engaged, effective, inspirational, visionary, collaborative, servant leaders within EMRA and beyond!

And if you're looking for a way to get involved on a local level, don't forget to check out EMRA's **ACEP Chapter Opportunities Grid**, recently updated by EMRA's Director of Membership Shehni Nadeem, MD.

Products and Programming

From the EMRA Quiz Show to the 20 in 6 Resident Lecture Competition, EMRA has always been known for creating unique, in-person experiences for our members at national conferences. (The recently revamped EMRA Awards Luncheons are another example!) But the event I'm most looking forward to attending this year will be EMRA's inaugural **CHAOS in the ED: EMRA All-Around Skills Competition**, a series of absurdly fun procedure-based challenges completed by teams assembled on-the-fly at the CORD Academic Assembly. Don't miss out on a chance for glory! Sign up to compete (or just come and cheer on your favorite team of randos).

EMRA's library of clinical and advising resources continues to grow, most recently with the addition of the **EMRA EKG Guide**, which has been extremely well-received. We've got a pipeline of other new product launches coming in 2018, including the **new EMRA.org**, which will be mobile-responsive, will feature easy-to-navigate digital versions of our prior PDF publications, will allow EMRA members to automatically join or leave committees and divisions as their interests evolve, and will recognize and remember you each time you visit the site (when you're logged in).

EMRA Match, our award-winning, collaborative, crowd-sourced, filterable residency directory, will soon be joined by **EMRA Match for Clerkships**. Students will be able to easily discover

which clerkships are on VSAS, which sites offer subspecialty rotations or diversity externship scholarships, which rotations require Step/COMLEX, whether a car is recommended, if there is on-site housing, and more.

Finally, as many have noticed, with the upgrade to Apple iOS 11, several of your favorite EMRA mobile apps are no longer available. But don't worry, we've created a **Mobile App Task Force** to evaluate opportunities and develop a plan for how to best deliver mobile-friendly educational content and bedside tools to our members. I'm looking forward to the plan from EMRA Director of Technology Nick Salerno, MD, and his task force.

Advocating for Physicians-in-Training

My favorite part of being EMRA President is having the opportunity to serve as the voice of the largest group of EM physicians-in-training in the world.

In the past year, under the leadership of Eric McDonald, MD, Resident Representative on the ACGME Review Committee for Emergency Medicine, and Scott Pasichow, MD, MPH, EMRA Speaker, EMRA has been able to defend the ACGME's intentionally broad definition of **scholarly activity**. There have been recent attempts by research directors to push to standardize scholarly activity with hopes that all EM residents will complete IRB-approved research published in peer-reviewed journals. But existing data demonstrated that the 33% of programs that currently require research are no better at producing pipelines of researchers or academicians, compared with programs that don't, and there's no evidence to support that residents must perform their own research to be competent at interpreting literature and practicing evidence-based medicine.

EMRA has been a vocal advocate for our student members regarding the new **AAMC Standardized Video Interview**. We know that over-application to residency programs is a problem, with students applying to 50% more programs

over the past 5 years, and that the only way programs can deal with this influx of applications is to use screening filters. The SVI attempts to provide an objective way for programs to identify applicants with outstanding or deficient professionalism and interpersonal/communication skills, and to balance these competencies against academic achievements, such as USMLE Step scores, that are currently used as filters. At the Interim Meeting of the American Medical Association in November 2017, EMRA members passed a resolution within the Medical Student Section that was then emergently forwarded and passed by the full AMA House of Delegates to create national policy that supports the inclusion of medical students as equal stakeholders in any working group proposing changes to the residency application or matching process, and that would oppose the expansion of the SVI to other medical specialties until there is published data demonstrating its efficacy and utility. Data from applicant and program director surveys will be published soon; however, the limited information shared so far shows that students do not feel the SVI provided them with an opportunity to be holistically reviewed and they are not satisfied overall with this new residency screening/selection tool. While a number of additional, interesting research hypotheses have been generated, it is EMRA's responsibility to advocate on behalf of our members, and based on their feedback EMRA does not support any ongoing use or pilot of the SVI.

Finally, while EMRA alone has a powerful voice, the collective voices of EM physicians-in-training will be made even more powerful through the convening of the inaugural **All EM Resident and Student Organizations**

Meeting at CORD's Academic Assembly, where — for the first time ever — we will bring together leaders from EMRA, AAEM-RSA, ACOEP-RSO, SAEM-RAMS, AAMC-ORR, AMA-RFS, ACGME-RRC, and CORD's Resident Board Member to define a collaborative list of student and resident priorities for the upcoming year.

Organizational Sustainability

Since being founded by a few visionary residents at a bar in Dallas in 1974, EMRA has grown into the oldest and largest independent resident organization in the world. We have grown to more than 15,000 members; half are residents, a quarter students, and a quarter are fellows and alumni.

Leading an organization of such incredible size and scope can be challenging when half of your board of directors turns over each year, but through the creation of a **Big Data Task Force**, led by Director of Membership Shehni Nadeem, MD, we will develop business intelligence dashboards and data analytics tools that will allow our leaders to see at a glance the progress we're making toward the goals set forth in our strategic plan — and this, in turns, will ensure we're delivering the best possible experience for you, our member. ★





Scott Pasichow, MD, MPH
EMRA Speaker of the Council
Brown University
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@SPMD16

PACKED AGENDAS

and a Call for Your Opinions

Representative Council Recap

“The resolutions you submit to the Representative Council guide our conversations and empower us to advocate on your behalf. Spring deadline: March 9!”

The EMRA Representative Council Meeting held in conjunction with ACEP *Scientific Assembly* each fall is typically busy and exciting. The entire house of emergency medicine descended upon our nation's capital from Oct. 25-Nov. 1, and while the educational sessions took center stage, your EMRA Board of Directors and residency program representatives were hard at work making great use of that time.

Representative Council

The Representative Council (RepCo) meeting featured a jam-packed schedule that extended into the afternoon. We heard from partner organizations, including the American College of Emergency Physicians, American Board of Emergency Medicine, and Council of Emergency Medicine Residency Directors. We elected 5 new officers to our Board of Directors. We also discussed and voted on 7 resolutions that made changes to the EMRA Bylaws and Policy Compendium. These resolutions help the Board of Directors set our agenda by identifying the topics you, the members of our organization, feel are important for us to work on in the coming year.

The changes to our Bylaws focused on two things: improving the clarity of our language and simplifying the way we change our Bylaws in the future. Five of these resolutions were passed at our meeting, and the current Bylaws and Policy Compendium are updated online at www.emra.org/leadership/Governing-Documents.

We also passed a new resolution dealing with the critical issue of climate

change. There is a wealth of research underway to assess the health effects of climate change, and the RepCo wants EMRA to be a part of that. The program representatives voted to support these ongoing research efforts and to make sure our members are informed of the results in an effort to increase education about this important issue.

ACEP Representative Council

Your Board of Directors not only enacts the work of our representative council, it also represents you within ACEP's Council. This body guides the agenda for ACEP for the coming years, and EMRA has 8 seats out of the 440 in the room to make sure your voice is heard. From speaking on the floor about paid parental leave and fairer and more transparent drug pricing for our patients to speaking against a narrowed definition of scholarly activity, we make sure the ACEP Council knows what the future leaders in emergency medicine want our specialty to look like. But while the issues we address are based upon what is in our Policy Compendium, not everything the ACEP Council considers is something on which we have policy.

One of the resolutions the ACEP Council passed in October relates to safe injection sites. There is evidence that these centers are associated with a decrease in opioid mortality¹ and high-risk behavior in Canada², but little research has been done on the efficacy of these sites in the U.S. ACEP discussed a resolution to work with the AMA on piloting these sites in America. The EMRA Board decided to support the resolution — but that decision was made without insight into

the will of EMRA members because there is no policy related to opioid treatment, addiction, or abuse in the EMRA Policy Compendium. Should we be researching these safe injection sites for the potential benefits they may present to our patients, or are these sites a tacit approval of illegal substance use and something we as physicians should not be participating in? What about other harm reduction strategies like needle exchange programs? What do you think we, as emergency medicine physicians, should be advocating for?

There was also considerable debate on Maintenance of Certification (MOC). Recently the state medical societies that make up the American Medical Association have been working within their state legislatures to pass laws making it more difficult or illegal for insurance companies and hospitals to require board certification for reimbursement or hospital staff privileges. They argue that board certification and the subsequent MOC comes at a considerable cost to the individual, in both time to take the test or complete the requirements and cost paid to the board of medical specialties, and does not improve patient outcomes. However, if a hospital is forbidden by state law from considering someone's board certification status when making hiring decisions, that could open the door for physicians who are not board eligible or board certified in emergency medicine to start working in the emergency department. While some ACEP state chapters have been in support of the efforts of their partner medical societies, EMRA has not taken a stance on the issue of Maintenance of Certification. We have policy stating that board certification from ABEM and AOBEM is the only pathway to the independent practice of emergency medicine, but when MOC comes up for a vote within the AMA or ACEP, how do you want EMRA to vote? Do you support the idea of ABEM and AOBEM requiring Maintenance of Certification? Do you support certifying every 10 years, as is the standard now?

What do you want to see an alternative to the high-stakes exam?

We want to hear from you!

Resolutions like those passed at our Representative Council and at ACEP's Council define the goals and advocacy missions of our organization and our board of directors. There are a lot of issues that inspire strong viewpoints, from the speaker and vice-speaker, to the board of directors, to the representatives, to you the members of our organization. However, EMRA is not about what I think or what the board thinks; it's about what *you* think. We need to hear from you! Reach out to us or your program reps when you run into a problem on shift that you think we can help you solve, or that you want us to help you find a way to solve. Find an issue that you are passionate about and craft a resolution on that topic. Don't feel comfortable with the formal resolution process? Shoot me an email and we'll build one together. Your council officers will work with you to make sure it captures your vision and helps to set the direction for our organization for years to come.

Members of our board serve within the American Medical Association's Residents and Fellows Section and are involved in the AMA's Emergency Medicine Caucus. We serve on tasks forces and working groups within ACEP, AAMC, ABEM, ACGME, and work closely with the leaders of CORD, SAEM, AAEM, ACOEP. The resolutions you submit to the Representative Council guide our conversations and empower us to advocate on your behalf. Reach out to us so we can influence emergency medicine and the house of medicine to fight for what is right for us, for our colleagues, and for our patients.

We need your ideas, your energy, and your passion. What do you want EMRA to do about the opioid epidemic, gun violence prevention, the provision of and payment for health care, and how we obtain and maintain insurance eligibility, board certification, and hospital privileges? Our Board of Directors works for you, and we need to know what you're passionate about so we can represent you and advocate accordingly. ★

“EMRA IS NOT ABOUT WHAT INDIVIDUAL LEADERS WANT; IT'S ABOUT WHAT YOU — OUR MEMBERS — WANT. WE NEED TO HEAR FROM YOU!”



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Tax Ills, Market Stabilization, and CHIP

Health Policy Updates



What You Need to Know About the Tax Bill

Smilng with uncharacteristically good spirits for someone who has been living in the ICU for the past couple of months, he mouthed a “thank you” after I had suctioned his tracheostomy tube. Like many otherwise healthy people his age, he had no home medications and hadn’t seen a primary care doctor in a couple of years. After a cross-country flight, he developed severe shortness of breath and was eventually taken to the hospital with a pulmonary embolism that led to a cardiac arrest. After heroic measures, he was making a slow recovery in the ICU. Wrapping up the last shifts of my ICU rotation, I was hopeful we could get him to the next stage of recovery and out of the ICU to rehabilitation. That’s when we learned he was uninsured and his family’s income was too high to qualify for Medicaid or the hospital free care program. His life was saved — but his family would likely declare bankruptcy from the hospital bill.

Everyone who works in the ED has stories of healthy people whose lives are devastated by double hits of unexpected health emergencies and the financial quagmire that ensues. The necessity of insurance in our healthcare system was recognized by the ACA as part of a social pact that would enable insurance to protect all-comers, regardless of preexisting conditions and protect them meaningfully, regardless of the severity of illness that developed. The combination of a mandate and subsidies in the ACA reduced the number of uninsured to a record low of 8.6%. Objective evidence supports the notion that if a portion of people who are uninsured create high uncompensated care costs, there is a spillover of costs to those who have insurance: one study found that for an increase in county uninsured rate by 1%, there was a concurrent increase in ED payment by \$20. As the front door to the health care system and the only specialty with a federal mandate, EMTALA, to treat without regard to ability to pay, the ED absorbs a disproportionate share of uncompensated costs. Some 15% of ED patients are uninsured, and for these visits, 98% of the charge is ultimately written off as bad debt or free care. Recognizing the unique role the ED plays in insurance advocacy, ACEP penned a letter to House and Senate leadership requesting protection of the individual insurance mandate, noting that its repeal would destabilize markets, leading to overall worsening of coverage affordability and restrict access. However, the Republican tax bill known as the Tax Cuts and Jobs Act was signed in late 2017 and will end the individual mandate penalty starting 2019.

In addition to the mandate repeal, the tax overhaul will create long-lasting changes for corporate America and has health care implications as well. In addition to repealing the mandate, the tax bill could open the door for future cuts to the safety net of Medicare, Medicaid, and state-based social supports. There is some good news for graduate students and anyone with student debt, as the student financing changes in the original House bill were removed from the final bill.

TAX BILL FACTS

General

- Lowers the corporate tax rate from 35% to 21%.
- Lowers income taxes for all Americans and increasing after-tax income by 2.2% on average, with the largest cuts going to the 95th and 99th percentile of earners; however, this rate expires in 2027, after which those earning less than \$54K will pay more in taxes.
- An average resident physician in 2018 will realize an average tax cut of \$900, or 1.6% of after-tax income. These savings will expire in 2027.
- Will increase debt by \$1.5 trillion by 2027 to pay for these tax cuts.

Health Care

- Repeals individual mandate to buy health insurance. Because of this, by 2027, the Congressional Budget Office estimates the bill will increase the number of uninsured by 13 million people to a total of 41 million uninsured.
- Insurance premiums are expected to rise 10%. Insurance actuarial experts worry the lack of mandate will create an unbalanced market in which those who buy insurance are those who disproportionately need it, leading to a sicker insurance pool and causing insurers to charge higher premiums. Other experts estimate less of an impact because the mandate penalty was too low.
- Due to the “pay go” system, the increase in the national debt caused by the tax cuts could trigger cuts worth \$136 billion from mandatory

spending in 2018, including \$25 billion in Medicare cuts and Social Security (which together make 38% of the federal budget).

- Decreases the amount individuals can deduct from state and local tax deductions (“SALT” deduction). Previously unlimited, it is now capped at \$10,000. Some worry this will pressure states to reduce local tax-funded social services if state residents are not able to write off some of these heftier local tax bills.

Market Stabilization

The Bipartisan Health Care Stabilization Act of 2017 (Senate “Alexander-Murray bill”) funds ACA cost-sharing reductions (CSRs), which are aid from the government for lower-income people up to 250% federal poverty limit to pay their insurance co-pays and deductibles. More than half the marketplace enrollees receive aid through CSRs which ranges between \$700 - \$3,354 per year. They were initially funded through the ACA but

then suspended by executive order in October, which means enrollees still pay the subsidized amount but insurance companies aren’t reimbursed by the government anymore. Most insurers have increased next year’s premiums in anticipation of the change, but others withdrew from already barren marketplaces because of the uncertainty. This bill would allow easier access for purchasing catastrophic plans.

- CBO’s new estimate is that it will reduce the deficit \$3.8B over 10 years, but will not change the number of people with health insurance; there are no definitive estimations on effect of premium costs.

Children’s Health Insurance Program (CHIP)

As of January, 9 million middle class and poor children across the country covered by CHIP remained in limbo because insurance coverage has not been permanently funded since Sept. 30. Advocates are requesting a 5-year funding extension.

- On Dec. 21 Congress reallocated funds to temporarily keep CHIP from failing, but this money will run out in March.
- 2 million children across several states are at high risk for losing insurance after the temporary patch runs out.
- Alabama, Colorado, Virginia, and Utah have sent notices warning families their coverage could end without Congressional funding. Alabama announced it will end enrollment for children in February.

ACA Enrollment

This year’s open enrollment period for insurance on the federal insurance exchange boasted numbers nearly on par with last year’s, with 8.8 million Americans signing up. The turnout was more robust than expected given the challenges of an insurance enrollment period that was half the time of last year, government funding for marketing and outreach that was slashed by 90%, and constant uncertainty about the state of the ACA over the course of the year. ★

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Contemporary Caffeinated Complaints



Travis Marshall, MD
UNLV
Las Vegas, NV

The Drug Abuse Warning Network found that from 2005 to 2011, the number of ED visits for caffeine increased from 1,500 a year to more than 20,000.

Today's caffeine is not your mother's caffeine. When overused, it is a toxidromic agitation that spirals toward death.

While you may think this is a bit dramatic, and perhaps it is, it only requires a quick Google search to realize the prevalence of fatalities tied to caffeine. This was prominently addressed on national news following the death of a South Carolina teen in May 2017 from caffeine overdose. But regardless of media coverage, the number of patients presenting with caffeine-related complaints to the ED is on the rise.

The Drug Abuse Warning Network found that from 2005 to 2011, the number of ED visits for caffeine increased from 1,500 a year to more than 20,000 – and that number has only increased since the study. Part of the reason is that we now live in an age of caffeine genetic engineering.

Take coffee, for instance: Over the past decade, there has been a push to place more caffeine in every cup. Ten years ago, the strongest cup of coffee you could buy at home was about 100mg of caffeine/12oz cup. The most recent strongest coffee, released in October 2017, is called Black Insomnia – and it packs in more than 700mg/12oz. Even this will likely be out of date by this article's publication.

But the question remains: How much caffeine is too much?



How much caffeine is too much?

Dose — or Overdose?

Well, there's no easy answer. There is not an abundance of evidence on the topic. The few studies in existence all seem to agree the average 70kg adult can ingest about 400mg of caffeine per day before symptoms start to develop.

Key Culprits

While people think of energy drinks when they think of caffeine, most drinks available have less than 200mg of caffeine per drink. The real danger for caffeine overdose lies in powders and pills. Pre-workout powders often have between 300-500mg of caffeine per ounce, with pills usually containing about 300mg per pill. These industries are largely unregulated, and a very small overuse can lead to dramatic symptoms.

Jitters, and More

The symptoms of caffeine overdose are what you'd expect, and some you may not. Typically, it starts with agitation and tremulousness as well as GI upset that

can cause extensive volume loss from vomiting. CNS toxicity finishes with an endpoint of seizure. Cardiac symptoms typically present with palpitations and are most commonly from sinus tachycardia or SVT but may be secondary to life-threatening arrhythmias as well. These all combine to create a profound hypotension and shock state that can lead to death. How can we as emergency providers intervene to stop this process?

Treatment Considerations

To understand that, we need a basic understanding of how caffeine works. Caffeine is a methylxanthine and is closely related to theophylline. Although it's easy to get bogged down in details, remember just a couple things about how caffeine works.

First, it is a functional adenosine receptor antagonist, which is important because when you see a patient with SVT from caffeine, don't bother with adenosine because the receptors are

already saturated.

Second, it causes increase catecholamine release, which contributes to both CNS agitation and cardiac arrhythmias. Knowing this, we can tailor our treatment to our next patient with caffeine overdose.

Remember the "3 Bs" of caffeine treatment: bolus, benzos, and beta block. Use bolus crystalloid for significant GI losses, diuresis, and any hypotension the patient has. Treat with benzos for seizure activity and to decrease the catecholamine release contributing to cardiac symptoms. Finally, to really get the cardiac complaints under control, use a beta blocker to reduce the unopposed beta agonism of the catecholamine release (and don't bother with adenosine).

Bottom Line

Remember to consider caffeine overdose, and use the "3 Bs" of caffeine treatment for your next patient who overdid the caffeine. ★

Anhydrous Caffeine

The Other White Powder

Caffeine, formally known as (1,3,7-trimethylxanthine), is a natural xanthine alkaloid that acts as a central nervous system stimulant.³ It is commonly consumed as a beverage or a supplement for its stimulant effects, and it's billed to enhance energy, concentration, and athletic performance; however, it can cause severe toxicity when consumed in excess.¹

Anhydrous, or powdered caffeine, comes in many different forms and is marketed as an energy supplement and stimulant product. Unfortunately, the U.S. Food and Drug Administration does not regulate supplements, so the dangers of anhydrous caffeine may go unnoticed among the general public purchasing these products. Anhydrous caffeine is especially dangerous because small doses that can cause severe toxicity. One teaspoon of anhydrous caffeine may equal approximately 25-28 cups of coffee, which can be deadly.^{5,10}

It is important for emergency physicians to recognize that anhydrous caffeine is an unregulated substance and can be the culprit for patients presenting with a multitude of symptoms, ranging from feeling “jittery” and “anxious” to life-threatening cardiac dysrhythmias.

Pathophysiology

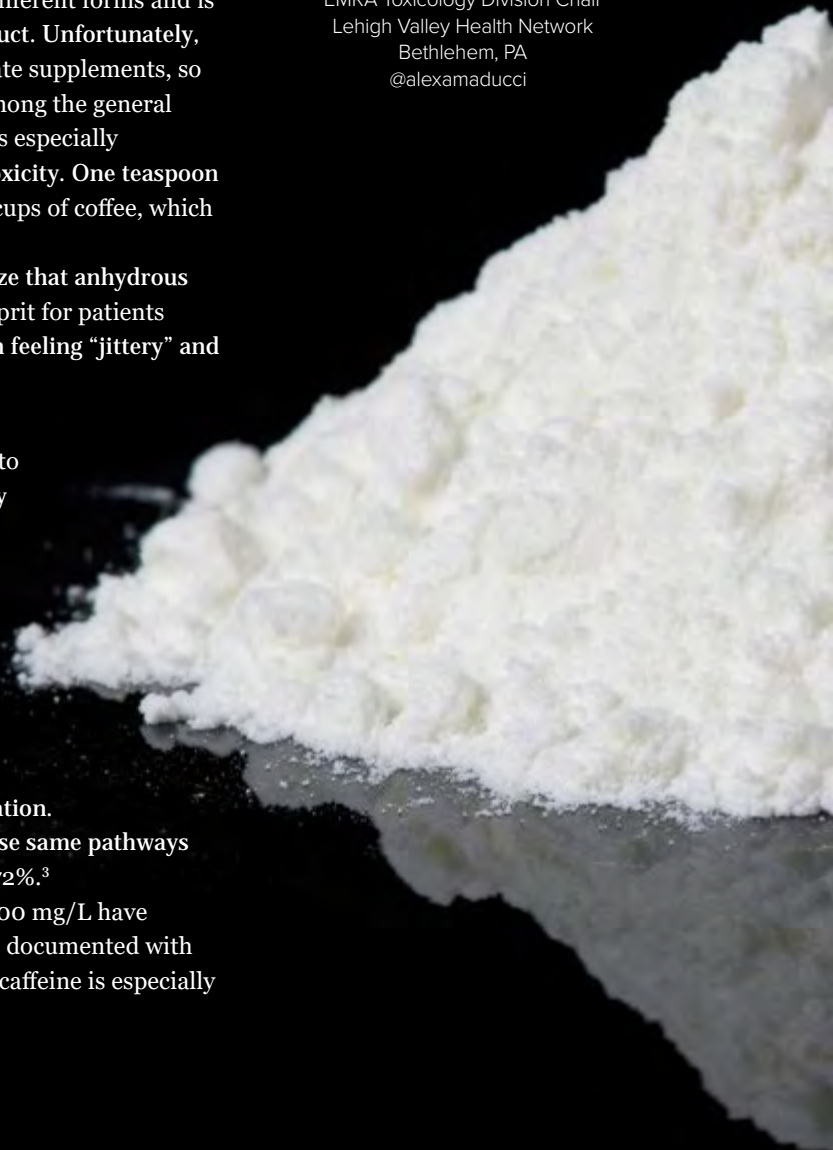
Caffeine is a methylxanthine, which is metabolized to paraxanthine, theobromine, and theophylline. It acts by inhibiting phosphodiesterase, antagonizing adenosine receptors, and releasing catecholamines.^{2,7} These changes lead to an increase in sympathetic activity.

Caffeine is especially potent because of its rapid absorption. After ingesting caffeine, it reaches peak plasma concentration within approximately 45 minutes and has a half-life of approximately 5 hours.⁷ Caffeine undergoes hepatic metabolism via N-demethylation, acetylation and oxidation. Chronic ingestion of alcohol and medications using these same pathways may prolong the half-life of caffeine by approximately 72%.³

Blood concentrations of caffeine ranging from 80-100 mg/L have been found to be lethal in humans. Fatalities have been documented with ingestions as little as 50 grams of caffeine.³ Anhydrous caffeine is especially



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**One teaspoon
of anhydrous
caffeine may equal
approximately
25-28 cups of
coffee, which
can be deadly.**

potent, and 1 tablespoon can contain a lethal dose (150mg/kg).^{4,6,8,9}

A laboratory analysis of anhydrous caffeine products available online indicates that most products that are currently being sold are extremely pure (90%) and consistently lack clear dosing instructions on the packaging.¹

Clinical Presentation

Anhydrous caffeine became more well-known in 2014, when an 18-year-old wrestler from Ohio died after a caffeine overdose. He was found to have a blood caffeine level >70 mg/L, and the autopsy revealed his cause of death was attributed to cardiac arrhythmias and seizures from the caffeine overdose. Similarly, a 39-year-old-male died after a caffeine powder overdose, and his blood caffeine level was found to be 350 mg/L.⁵

Anhydrous caffeine labels fail to warn consumers of the narrow margin of safety. Some labels recommend 1/16th teaspoon (approximately 200mg) or 1/32nd teaspoon as a serving. This is not feasible to measure with the basic kitchen tools and would require digital milligram scales.^{5,10} These misconceptions led the FDA to advise consumers to avoid pure powdered caffeine and to report any adverse effects associated with powdered caffeine.¹⁰

Symptoms of caffeine toxicity include nausea, vomiting, restlessness, altered mental status, anxiety, diaphoresis, dizziness, palpitations, seizures, and cardiac arrhythmias. These symptoms in turn can cause initial hypotension, followed by hypertension, metabolic acidosis, and vomiting. The differential diagnoses for hypotension, metabolic acidosis and tachycardia is broad. It can include such diagnoses as sepsis, diabetic ketoacidosis, ischemic states, hypovolemia, or other drug overdoses such as cocaine, amphetamines, and tricyclic antidepressants.² This sympathetic overdrive can cause cardiac dysrhythmias such as wide complex tachycardia, ventricular alternans, ventricular fibrillation, and ultimately cardiac arrest.

Recognition of a caffeine overdose is paramount, followed by appropriate treatment. Treatment includes aggressive intravenous fluid resuscitation,

heart rate control with beta blockers such as metoprolol or esmolol, and antiemetics. Metoprolol and esmolol are the beta blockers of choice. Given that severe toxicity can lead to hypotension, metoprolol and esmolol work well by providing rate control without worsening blood pressure. Patients with severe toxicity should be admitted to the intensive care unit. Given the relatively rapid absorption and elimination of caffeine, administering activated charcoal will solely worsen vomiting and will not expedite the removal of caffeine. Most patients typically have resolution of their symptoms within 24 hours.

It is important for ED clinicians to recognize and appropriately treat caffeine overdoses. Given the high purity, small doses, and availability of anhydrous caffeine, patients may experience severe toxicity quickly, and clinicians should have this diagnosis on their radar and be ready to treat appropriately. ★



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Management of Acute Liver Failure in the Emergency Department

A 57-year-old female presents with a chief complaint of hypoglycemia and altered mental status. Glucose was initially 61 in the field but increased to 110 after administration of 1 amp of D50. History was limited because of the patient's mental status; however, physical exam revealed jaundice, scleral icterus, and asterixis. A point of care (POC) glucose measurement on arrival was 73. Based on this initial presentation, our concern was for acetaminophen (APAP) induced acute liver failure (ALF).

Discussion

Although relatively uncommon — with only 2,000 cases annually — ALF should be included in the differential of a wide array of chief complaints because of the liver's many functions.¹ These can be broadly categorized as synthesis, detoxification, and storage. Synthetic functions include gluconeogenesis, and the production of coagulation factors, albumin, and cholesterol. The liver metabolizes ammonia, bilirubin, and many of the medications that patients take daily. Lastly, it is a storage center for glycogen and iron. Injury to the liver can disrupt any or all of these processes.

The most common causes of ALF in the U.S. and Europe are APAP overdose (39%), idiosyncratic drug reaction (13%), and viral hepatitis A and B (12%).² While ALF is rare, APAP overdose is frequently encountered in the emergency department.

In 2012, 50 out of every 1,000 ED visits in the U.S. were related to APAP overdose.³ Early recognition is difficult, as initial symptoms are non-specific.

In 2012, 50 out of every 1,000 ED visits in the U.S. were related to APAP overdose.

IN TOTAL, THERE ARE FOUR STAGES OF TOXICITY.

STAGE 1 consists of normal liver function tests (LFTs) and symptoms such as nausea, vomiting, and malaise. In significant ingestions, >500 mg/kg, you can see metabolic acidosis, rising lactate, and decreased level of consciousness without signs of hepatic injury.^{4,5}

STAGE 2, which develops after 24-36 hours, is first identified by elevation of AST, which is the most sensitive marker.⁶ The degree of rise will depend on the extent of ingestion, but levels above 1000 IU/L are generally considered to be hepatotoxic.⁶ During this time you can also start to see elevation of bilirubin, INR, PT and PTT.

STAGE 3 includes fulminant hepatic failure and can be identified by AST and ALT values higher than 10,000 IU/L. This occurs between 72-96 hours post ingestion. During this time period it is useful to monitor the grade of hepatic encephalopathy (see Table 1) and INR because these have been identified as reliable markers of prognosis.⁷ Patients in stage 3 are at risk for development of multi-organ dysfunction, and are at greatest risk of death 3-5 days after acute ingestion.⁶

If the patient survives the acute insult, s/he will enter **STAGE 4**, consisting of clinical improvement and normalization of laboratory values, which can take several weeks.

Management

The management of any patient with suspected APAP overdose first involves checking an APAP level to assess for the need of N-acetylcysteine (NAC). APAP exerts its toxic effects through the metabolite N-acetyl-p-benzoquinone imine (NAPQI). This gets degraded into non-toxic metabolites by glutathione, which becomes overwhelmed in cases of APAP overdose. NAC, a precursor to glutathione, helps to degrade NAPQI and prevent the buildup of toxic metabolites.

Common teaching involves the use of (NAC) when indicated by the Rumack-Matthew nomogram. A popular memory

aid involves the rule of 150: The toxic dose of APAP is 150 mg/kg, NAC should be given if APAP level is >150 mcg/mL 4 hours post ingestion, and the initial loading dose of NAC is 150 mg/kg. NAC has been shown to be effective if initiated within 8 hours of an acute overdose.^{8,9,10} Once started, NAC should be continued until there are no signs of hepatotoxicity and the APAP level is below detection, indicating that APAP has been completely metabolized.⁶

It is important to note that NAC can be beneficial in cases of liver failure not related to APAP ingestion. In a prospective, double blinded trial of patients with acute liver failure without clinical or historical evidence of APAP overdose, NAC use was shown to increase likelihood of transplant free survival, with the biggest benefit to those with grade 1 or 2 hepatic encephalopathy.⁵ Its use appears to be safe, as the only statistically significant adverse outcome from its administration was an increased incidence of nausea and vomiting.

For patients presenting with signs of fulminant liver failure, it is important to appropriately manage fluid status and electrolyte abnormalities after going through the ABCs. The liver is involved in both glycogen storage and gluconeogenesis, thus persistent and severe hypoglycemia can occur. In many cases these patients will require prolonged IV glucose administration. Composition of IV fluids is important, because hypotonic fluid can worsen the hyponatremia and hypokalemia that is usually found on presentation. Hyponatremia can hasten the development of cerebral edema, and hypokalemia can raise the ammonia level by inducing ammoniogenesis in the kidney. Thus, if IV hydration is necessary, it is recommended to start with normal saline with dextrose.

Red Flags

The most common cause of death in ALF is cerebral edema, which leads to intracranial hypertension and herniation. The main cause of this is the rapid accumulation of ammonia, which is normally converted to urea in the liver. A high ammonia concentration >150-200 umol/L — is specific but not sensitive in detecting increased risk of developing intracranial hypertension.^{11,12}

Initiation of medications to lower the ammonia level, such as lactulose and rifaximin, is typically recommended; however, there are no prospective trials that show a mortality benefit in this setting. If there is concern for herniation, rapid administration of hypertonic saline (20 ml of 30% NaCl with goal serum level of <150 mmol/L) or mannitol (2ml of 20% with goal of serum osmolality of <320 mOsm/L) is recommended.¹³

Case Resolution

Laboratory results in the ED revealed a significant transaminitis with AST and ALT in the 1000s, lactic acidosis, elevated bilirubin and INR. APAP level was negative. The patient was started on a D10 drip, NAC, lactulose, and rifaximin. She was admitted to the ICU for liver transplant evaluation. While inpatient, she was found to have a high-grade neuroendocrine adenocarcinoma of the lung with diffuse hepatic metastasis. She was then transitioned to comfort care and expired during admission.

Conclusion

APAP overdose is a common presenting complaint in the emergency department and is the most common cause of acute liver failure. The management of APAP overdose involves using NAC and supportive care. ★

TABLE 1. West Haven Criteria for Hepatic Encephalopathy¹⁴

Grade	Clinical features
0	No asterixis, minimal change in cognitive function and coordination
1	Asterixis, shortened attention span, slowed cognition
2	Asterixis, disorientation, lethargy, alteration of personality
3	Asterixis, worsening disorientation and somnolence
4	No asterixis, comatose



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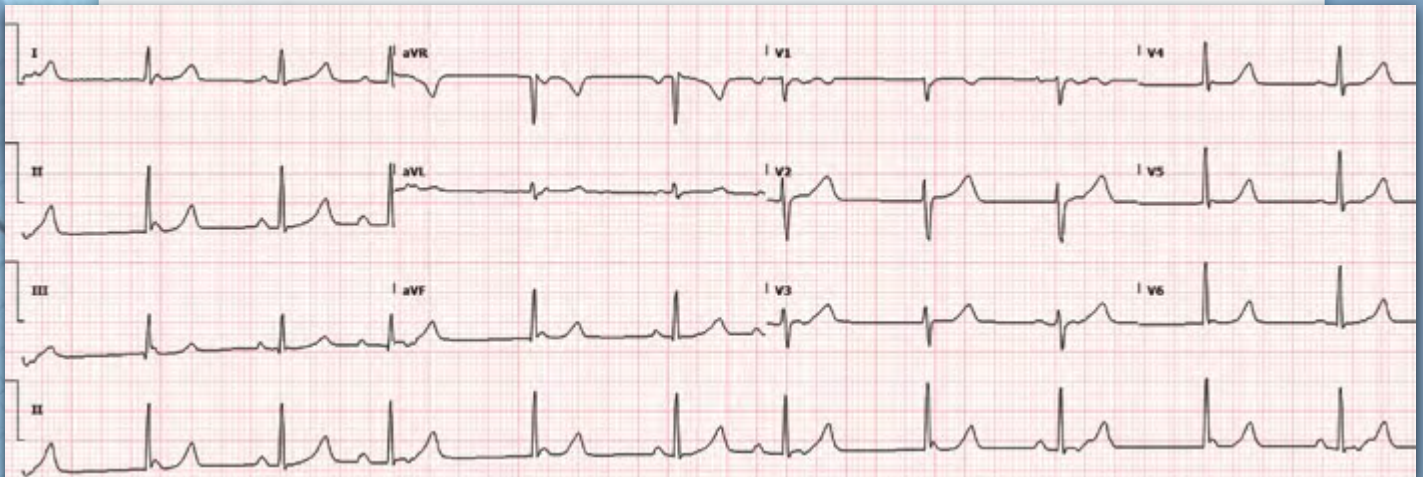
SOLVE THIS Medical Mystery

OK, residents (and ambitious students): It's time for a friendly competition. We're giving away a prize package to the person who submits the most accurate, thorough interpretation of this exceedingly rare EKG.

THE CASE

This is a case of refractory SVT in an otherwise healthy young patient. The patient would only transiently convert with vagal maneuvers and adenosine. Treatment with antidysrhythmic medications was also unsuccessful, so the patient was taken to the electrophysiology lab for mapping and ablation. EP studies showed a "retrograde only" accessory pathway with no observed spontaneous or inducible anterograde conduction. The following EKG was obtained while the patient was on a diltiazem drip.

What is your interpretation of this EKG?



THE CHALLENGE

This case, originally managed by Vitaliy Belyshev, MD, and John McGhee, MD, was subsequently reviewed by EMRA EKG Guide author Jeremy Berberian, MD, and ECG Pocket Brain author Ken Grauer, MD.

Can you see what they discovered after careful study?

Send your interpretation of this EKG to emresidenteditor@emra.org by March 30. Be thorough! Medical students, residents, and fellows are welcome to participate — but attendings cannot consult on the entry. ★

The individual who submits the most accurate interpretation
will win Amal Mattu's ECGs for the
Emergency Physician (2-book set) and ECG Pocket Brain.

Postpartum Seizures

A 25-year-old female presents to the ED after experiencing 3 seizures at home. She was discharged 1 day prior after a primary cesarean section because of failure to progress. She awoke that morning with a headache and worsening blurry vision that progressed to blindness just prior to seizures. She received midazolam from EMS. Upon arrival, she was afebrile with a blood pressure of 137/71 mmHg. Emergency physicians became aware of her recent pregnancy and subsequently administered IV magnesium sulfate. Physical exam revealed small lacerations to the upper lip, bite marks on the lateral tongue, and bilateral periorbital edema. She appeared post-ictal without focal neurological deficits. Her creatinine was elevated at 1.3 mg/dL, uric acid was 8.0 mg/dL, and urinalysis was positive for protein. The remainder of her work-up was normal. During pregnancy, she did not have any features suggestive of pregnancy-induced hypertension.

The differential for seizure is broad (Table 1). Although eclampsia and HELLP syndrome are some of the most worrisome disorders associated with pregnancy-induced hypertension (PIH), other causes must be considered. Eclampsia refers to a new-onset, generalized, tonic-clonic seizure that occurs in women with pre-eclampsia. These are diagnosed after the 20th week of gestation, but the risk of occurrence

TABLE 1. Seizure Differential Diagnosis

New Onset Adult Seizure
Metabolic Conditions: hypoglycemia and hyponatremia
Traumatic Brain Injury
Transient Ischemic Attack or Cerebrovascular Accident
Intracranial Hemorrhage
Subarachnoid Hemorrhage
Meningitis or Encephalitis
Eclampsia
Alcohol Withdrawal
Benzodiazepine or Barbiturate Withdrawal

remains up to 6 weeks postpartum. Complete blood count, electrolytes, renal function, liver function tests, magnesium level, fibrin degradation products, urinalysis, and uric acid should be ordered in all women suspected of having PIH or any of its complications. Common prodromal symptoms include headache, dizziness, visual changes, peripheral edema, and upper abdominal pain.

Pathophysiology

The pathophysiology of eclampsia is poorly understood, but many theories exist. Eclampsia leads to posterior reversible encephalopathy syndrome (PRES), which is characterized by confusion, headache, seizures, and vision loss with areas of brain edema often seen on MRI.

The two main theories of PRES associated with eclampsia are based on hypertension. The first states that hypertension causes a dysfunction of the auto-regulatory system in cerebral circulation, leading to brain edema and, ultimately, the eclamptic seizure. The second theory proposes that hypertension activates the auto-regulatory system, which leads to vasoconstriction of the cerebral circulation with hypoperfusion, ischemia, and fluid leakage.

Management

Before medicating, first maintain airway patency and place the patient in the left lateral decubitus position. Raise the head of the bed and pad the bedrails to protect from seizure-related trauma.

The first-line anti-epileptic in eclampsia is magnesium sulfate. Begin with 4-6 g of IV magnesium sulfate over 10-15 minutes followed by an infusion at

TABLE 2. Anti-Hypertensives

Anti-Hypertensives		
Labetalol	20mg IV over 2 minutes Repeat every 10 minutes	Max single dose: 80mg Max cumulative dose: 300mg
Hydralazine	5mg IV over 1-2 minutes Repeat every 20 minutes	Max single dose: 10mg Max cumulative dose: 20mg
Nicardipine	Continuous infusion at 3-9mg/hr	Must be titrated rapidly to avoid hypotension



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2 g per hour. This infusion should then be continued for a total of 24 hours while the patient is admitted to labor and delivery. If IV access is not available, administer 5g in each buttock until the seizure stops.

Initiate anti-hypertensives if BP remains >160/110 mmHg. Blood pressure management is imperative in this population to prevent stroke, a leading cause of death and disability in eclampsia. The goal diastolic blood pressure is 90-100 mmHg to prevent hypoperfusion of the placenta.

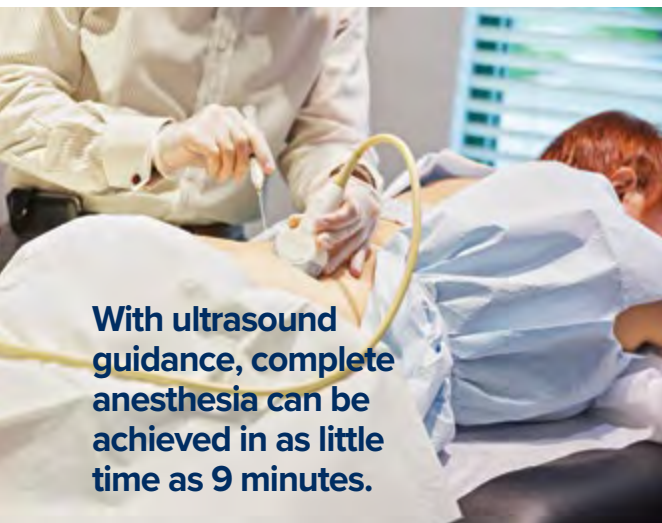
Case Conclusion

This patient was admitted to L&D for continuation of a magnesium sulfate infusion for 24 hours. She became hypertensive, and was managed with labetalol 200mg PO, twice per day. Her serum magnesium remained within the therapeutic window, and she did not develop symptoms of magnesium toxicity. On initial labs, her serum creatinine had doubled since the day of delivery and her serum uric acid was elevated, indicating poor renal clearance. Her kidney function returned to normal and she was discharged home after 2 days. ★

Controversies Surrounding Ultrasound Guided Regional Anesthesia in the ED

Ultrasound guided regional anesthesia was first introduced in 1994, and it has since become a powerful tool for achieving adequate long-term pain control while avoiding the adverse effects associated with opiates.¹ Although regional nerve blocks have become indispensable in the operating room, they have yet to become a fixture in the emergency department.

Ultrasound guided nerve blocks offer several advantages, which include direct visualization of neurovascular structures, real-time tactile feedback during block administration, and decreased risk of complications. Despite these benefits, ultrasound guided regional anesthesia is not yet mainstream in EDs across the country. Understanding these roadblocks will perhaps make this method of pain management more widespread, accessible, and available to patients who would benefit most.



With ultrasound guidance, complete anesthesia can be achieved in as little time as 9 minutes.

A key barrier to ultrasound guided regional anesthesia is the educational gap that exists among emergency physicians.² Nerve blocks are used most often in the setting of laceration repair or fracture management. Regional anesthesia in the distal extremities, such as the forearm nerve block or femoral nerve block, are relatively more common than proximal

nerve blocks. The reason for the lag behind distal nerve blocks is that proximal blocks often involve more complex anatomy, such as the brachial plexus.³ The dexterity and advanced technical skill required to navigate around this neurovascular bundle instills hesitation in many physicians.

However, ultrasound guidance provides more accurate guidance than nerve stimulator-guided blocks. Overcoming this educational gap requires experience, preferably during the formative years of residency training. Institutions that have dedicated ultrasound fellowship trained faculty tend to graduate physician well versed in ultrasound guided regional anesthesia.

Furthermore, the fast-paced environment of the emergency department makes any procedure a hindrance to efficient workflow. The extra time it takes to perform an ultrasound guided nerve block is often enough to deter some individuals from implementing it. Opting to click orders for narcotics is easier and faster than doing a regional block, especially when compelled to acquiesce to the demanding nature of the ED. This time constraint applies especially to trauma EDs, where regional blocks are most often indicated.

With adequate experience, however, ultrasound guided regional anesthesia does not have to be a time-consuming procedure. Randomized control trials have confirmed that ultrasound guidance technology reduces both the time necessary to perform the block and the time to complete anesthesia. The time it takes can be as low as 9 minutes to complete anesthesia.⁴ This modest time investment rewards both the physician and patient with better pain control and satisfaction on both ends.

Lastly, the risks inherent to the anesthesia technique itself are a reason some may balk with the



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procedure. There is the risk of vascular puncture, hemidiaphragmatic paresis, pneumothorax, local anesthetic systemic toxicity, and permanent peripheral nerve injury.⁵ These complications are serious, but they are minimized by ultrasound guidance and safe technique. Vascular puncture can be easily avoided by carefully injecting around the vessel along the nerve sheath. Hemidiaphragmatic paresis is usually secondary to involvement of the phrenic nerve, typically with interscalene or supraclavicular brachial plexus blocks.⁶ Pneumothorax is also a valid concern with the supraclavicular block. These complications can manifest as significant dyspnea. Ultrasound can help guide the needle tip to avoid the pleura and prevent a pneumothorax.

The risks associated with local anesthetic systemic toxicity include the central nervous system (CNS) and the heart. The CNS is more sensitive to the effects than the cardiac system and will thus manifest symptoms first.⁷ Symptoms include tinnitus, blurred vision, dizziness, tongue paresthesias, circumoral paresthesias, and seizures.⁸ Cardiovascular toxicity generally begins after signs of CNS toxicity, affecting intracardial conduction and inhibition of myocardial energy supply and ion channels. This may lead to extreme bradycardia, ventricular arrhythmia, or refractory cardiac arrest.⁹ Permanent peripheral nerve injury is very rare. Caution must be exercised in patients taking digoxin, calcium channel antagonists, and/or beta-blockers.¹⁰ Taken together, these complications make ultrasound guided regional anesthesia a valuable asset that remains controversial. It will take a collective effort to overcome these barriers before this practice becomes widely adopted in EDs across the nation. ★

SIRS CRITERIA

SEPTICEMIA

Septicemia, or blood poisoning -
of a bacterial infection such as a lung u.
ch your hands often, seek medical care
using tampons that are more abso

A Nidus for Bias and How to Minimize It

With the removal of Systemic Inflammatory Response Syndrome (SIRS) criteria from the 2017 Surviving Sepsis Guidelines put forth by the Society of Critical Care Medicine (SCCM) and European Society of Intensive Care Medicine (ESICM), are we beating a dead horse with another discussion about SIRS?¹ Given that the Sequential Organ Failure Assessment (SOFA) and Quick SOFA (qSOFA) clinical prediction rules are more recent and effective prognosticators of sepsis mortality, what is the current role of SIRS?² Despite new guidelines, SIRS continues to be employed ubiquitously throughout emergency departments and medicine floors for a number of reasons. As the use of SIRS persists, it's worth re-examining its intended application, potential for error, and current utility.

Use and Misuse

SIRS was broadly adopted in 1991 following a consensus conference between the American College of Chest Physicians (ACCP) and SCCM leading to the introduction of SIRS criteria and definitions for sepsis, severe sepsis, septic shock, and MODS (multiple organ dysfunction syndrome).³ Developed as an easy to apply set of parameters that would identify potential candidates for new sepsis treatments, SIRS criteria was built upon a foundation of basic clinical and laboratory data readily available to most clinicians.³ It's generally agreed upon that the criteria defines a clinical inflammatory response to a non-specific insult (either infectious or non-infectious). The pathophysiology of inflammation occurs independently of the etiology with only minor differences in the inciting cascades, leading to a highly conserved and non-



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specific process.⁴ These characteristics explain the high sensitivity and low specificity of SIRS criteria for infection and sepsis. As a tool for identifying sepsis it's limited by an inability to distinguish a normal physiologic host response from a pathologic host response leading to organ dysfunction.³ Normal physiologic responses to exercise or environment, panic, anxiety, medications and drugs

represent common and potentially benign causes of meeting SIRS criteria.

While we academically understand the pathophysiology and intended use of SIRS criteria, in practice there's a tendency for the reflexive interpretation of infection. When we notice a patient's vitals or labs meet SIRS criteria, we suffer the potential for sequential cognitive errors. Though speculative, it would seem those at greatest risk for this are medical students and interns, owing to higher levels of fatigue, inexperience, and cognitive load.⁵ Equating SIRS with infection increases the chances of anchoring, or the tendency to fixate on overarching features of an initial patient presentation without adjusting the impression later despite additional or conflicting information.⁶ Anchoring routinely leads to confirmation bias in which the clinician seeks out confirmatory evidence for their diagnosis while failing to consider or look for disconfirming data.⁶ A particularly relevant cognitive error to SIRS is the eponymously named Sutton's slip. This error occurs when diagnoses other than the obvious are not considered or given sufficient consideration.⁶ These errors lead to a common final pathway resulting in satisfaction of search (cessation of investigation once an abnormality is found) and premature closure (accepting a diagnosis before it has been fully verified).⁶ These mistakes are particularly dangerous in the ED as SIRS can represent the manifestation of various life-threatening emergencies.

Pearls and Avoiding Pitfalls

As masters of the undifferentiated patient, the chief task of an emergency physician is to rule out life- or limb-threatening emergencies. This means considering, but not necessarily testing for all potentially emergent etiologies of a patient's presentation. While the differential for SIRS is exhaustive and the zebras rare, unlikely sources must always be ruled out. A practical model for thinking about SIRS in the ED is the SEPTIC mnemonic created by Michael Stanley, DO, Program Director of the Transitional Year Residency and practicing EM physician at Kaweah

Delta Health Care District in Visalia, California. While not intended to be an exhaustive list, the mnemonic helps to quickly organize your differential for SIRS and ensure potential etiologies aren't missed. Stopping to think after each patient encounter, asking "Did I miss something?" and quickly using a memory device can be an effective way of minimizing cognitive errors and missed diagnoses in the ED. *

As the use of SIRS persists, it's worth re-examining its intended application, potential for error, and current utility.

TABLE 1. SIRS Criteria

Finding (any two of the following)	VALUE
Temperature	>38 °C (100.4 °F) or <36 °C (96.8 °F)
Heart Rate	>90/min
Respiratory Rate	>20/min or PaCO ₂ <32mmHg
WBC	>12x10 ⁹ /L (>12,000/mm ³) or <4x10 ⁹ /L (<4000/mm ³) or 10% bands

TABLE 2. SEPTIC Mnemonic for Patients Meeting SIRS Criteria in the ED

	ETIOLOGIES	PEARLS
Sepsis	<ul style="list-style-type: none"> Most common infectious sources include skin, lungs, genitourinary tract, abdomen Bloodstream or foreign objects CNS Unknown 	<ul style="list-style-type: none"> Look for, inspect, and potentially remove foreign objects (lines, Foley, hardware, etc.) Immunocompromised patients don't mount normal inflammatory responses — have high suspicion
Endocrine	<ul style="list-style-type: none"> DKA HHS Adrenal insufficiency Thyrotoxicosis Myxedema coma Hypo- or hyperglycemia 	<ul style="list-style-type: none"> Look for an underlying cause in DKA or HHS other than the obvious Look for cessation of steroids, hypotension, hypoglycemia, low sodium and high potassium in adrenal insufficiency. Death is from vascular collapse
Pancreas	<ul style="list-style-type: none"> Pancreatitis 	<ul style="list-style-type: none"> Ideal time for CT imaging is >48-72 hours from symptom onset
Toxins and Trauma	<ul style="list-style-type: none"> Sympathomimetics Antipsychotics Anticholinergics 	<ul style="list-style-type: none"> Avoid beta blockers with cocaine BDZs for hyperthermia
Immune	<ul style="list-style-type: none"> Systemic Lupus Erythematosus Rheumatoid arthritis Anaphylaxis 	<ul style="list-style-type: none"> Chronic inflammatory diseases increase risk of ACS, PE, and pericardial effusion
Cardiovascular	<ul style="list-style-type: none"> Acute Coronary Syndrome Pulmonary embolism DVT 	<ul style="list-style-type: none"> Exercise caution giving IVF in massive PE



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Intraoral Ultrasound Guided Peritonsillar Abscess Drainage

A peritonsillar abscess (PTA) is a deep oropharyngeal infection that results in an accumulation of purulent material in the potential space between the tonsillar capsule and the superior constrictor muscle.¹ This is often secondary to tonsillitis that progresses to tonsillar capsule rupture and peritonsillar cellulitis. PTAs are most commonly seen in adolescents and young adults with 80% of cases occurring between ages 10-40.^{2,3} Clinical exam findings for PTA include sore throat with unilateral swelling and uvular deviation, “hot potato voice,” fever, trismus and inability to tolerate secretions.¹⁻³ If untreated these infections may lead to extension into the mediastinum, erosion into vasculature (Lemierre’s syndrome), or

spontaneous rupture into the pharynx causing aspiration.⁴ In order to avoid these complications prompt diagnosis, drainage, and antimicrobial treatment must be provided.

Unfortunately, history and physical exam alone are unreliable when diagnosing a PTA. Even when performed by otolaryngologists (ENTs), physical exam has been shown to only have a sensitivity of 78% and specificity of 50%.² Blind needle aspiration is also a method of diagnosis but is unreliable as well with a false-negative rate of 10% to 24%.³ Computerized tomography (CT) studies with contrast on the other hand have a sensitivity of 100% but are not without their risks.³ With the highest rates of incidence in young populations, radiation exposure makes increasing cancer risk a real threat.

Because of this, ultrasound (US) has gained traction in the diagnosis and treatment of PTAs. Recent studies have indicated that ultrasound imaging is a safe and effective alternative to CT scans.^{2,5} Currently two methods exist to evaluate for a PTA: intraoral and transcutaneous. The intraoral approach has been more commonly used and has demonstrated a slightly higher sensitivity

and specificity and will therefore be the focus of our discussion.

Intraoral US has a sensitivity ranging from 89-95.2% and specificity of 78.5-100%, which approaches that of contrasted CT scans.² Intraoral US has been shown to decrease overall cost of care and one study demonstrated a decreased ED length of stay by 66 minutes.^{2,6} The use of US not only allows the ED provider to rapidly diagnose a PTA but also enables direct visualization of the needle during the procedure to ensure drainage. When compared to the landmark aspiration approach performed by ED providers, the use of US decreased the need for ENT consultation from 50% to 7% and had higher successful drainage rates.⁶ Complications of blind and US guided needle drainage include aspiration, hemorrhage, and puncture of the internal carotid.¹

Technique

Prior to ultrasounding the suspicious area it is essential to obtain local anesthesia, especially in patients with a strong gag reflex. This may be performed through topical gel lidocaine, nebulized lidocaine, benzocaine spray, or injected anesthetics. We recommend topical benzocaine spray due to ease of provider use and patient comfort. To avoid aspiration, have the patient sitting up in the bed with suction and a spit basin available. To improve visualization of the posterior pharynx the provider may utilize a tongue depressor or ideally a Macintosh blade inserted to the base of the tongue while the patient holds the handle for improved control and light access.

The probe of choice for intraoral PTA drainage is currently the endocavitary probe. The probe should be obtained

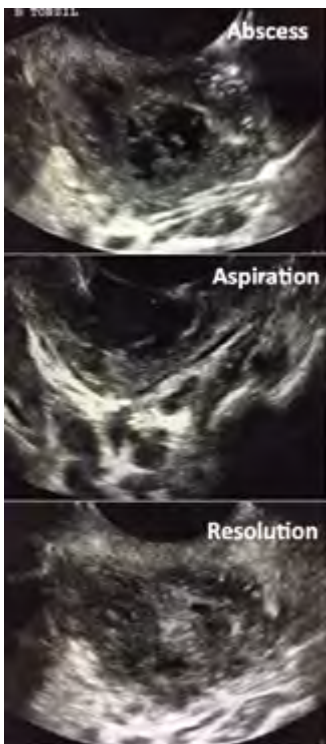


FIGURE 1.
Ultrasound
Visualization

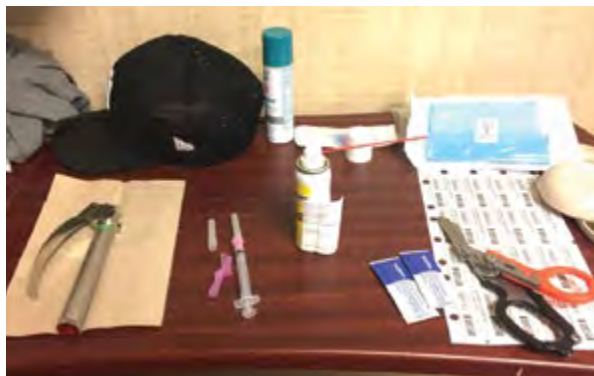


FIGURE 2. Setup



FIGURE 3. Needle Preparation

from sterile processing and a protective cover should be placed over the probe, which may be a condom, sterile probe cover or the finger of a standard glove. Prior to insertion of the probe into the cover ensure that gel is applied inside. It is not necessary to have gel on the outer surface due to the moist mucous membrane being targeted. If required sterile gel is preferred, however. If marked trismus is present using a smaller linear array known as the “hockey stick” intraorally or attempted visualization through the transcutaneous approach under the mandibular angle with a linear probe may be performed.⁷

Insert the probe in the transverse orientation starting from the contralateral side of the mouth to the ipsilateral tonsil. Begin with visualization of the unaffected side to determine normal anatomy prior to inspection of the affected side. Be aware that PTAs may occur bilaterally in <10% of cases.¹ The abscess can be identified as a hypoechoic collection between the tonsil and lateral oropharynx. It is essential to fan superior

to inferior as 70% of PTAs occur in the superior pole and 30% in the inferior pole.³ When the PTA is identified, measure it in two planes to estimate volume. Next determine the depth from the surface, average being 9 mm. Once identified locate the internal carotid artery. The internal carotid location ranges 5-25 mm posterior to the abscess wall. Color flow may aid in visualizing the vasculature.³

The plastic needle guard from an 18-gauge needle may be cut to the depth of the abscess and reinserted over the needle to help prevent damage to deep vasculature. For smaller abscesses, a 3 mL syringe is ideal to decrease resistance while improving dexterity in the oral cavity. For larger abscesses a 5 or 10 ml syringe may be necessary. The needle should be inserted lateral to the probe and visualized using an in-plane approach to keep the needle tip in view through the entire procedure. Constant negative pressure should be applied to the syringe. The provider should be able to visualize the abscess being drained. Once obtained, the purulent material should be sent for cultures. After drainage the patient’s clinical picture should be taken into consideration when determining the need for IV antibiotics as an inpatient or if stable for discharge on oral antibiotics and close ENT follow-up.

Limitations

Pediatric populations may be unable to tolerate intraoral bedside ultrasound and drainage, thus requiring either transcutaneous US or a CT scan. Operative drainage may be necessary. The learning curve for US diagnosis of PTAs at bedside has been shown to be short requiring 3 to 4 patient experiences.³ If uncomfortable with the procedure, an experienced provider or an ENT specialist should be present at bedside. If there is concern for extension of the infection or unable to confidently visualize the PTA on US, a CT scan should be performed for further characterization.

Conclusion

The use of bedside US has continued to expand the diagnostic and procedural capabilities of the EM provider. Intraoral US has been found to be a safe and cost effective way to diagnose and treat PTAs in the ED. It has demonstrated the ability to decrease patient length of stay in the ED and to drastically reduce the need for specialist consultation. With the continued rise in ED patient visits, emphasis on throughput, and focus on medical cost saving this should be a procedure in every EM provider’s skill set. ★



FIGURE 4. Patient Positioning and Prep

CAPNOGRAPHY

Monitoring Asthma Patients

Asthma is a common complaint among patients presenting to emergency departments, with approximately 2 million ED visits annually for asthma exacerbation in the United States alone.¹ The most common method of assessing the degree of exacerbation and rate of deterioration or improvement is either subjectively via a physical exam or objectively with a peak expiratory flow rate (PEFR). Both of these methods have their weaknesses. Auscultation of the lungs has been shown to have poor both interobserver and intraobserver reproducibility.² Peak flow measurements are effort-dependent and if not explained or performed properly can lead to incorrect results. Because of the lack of an objective, reproducible, effort-independent measure of the severity of exacerbation, some clinicians have looked at capnography as a possible alternative.



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Evolution of Capnography

Capnography has been used by anesthesiologists for almost 40 years. Over the past 2 decades it has developed an important role in the ED as well; among other indications, it is now routinely used for confirming endotracheal tube placement, assessing quality of cardiac compressions, monitoring for respiratory depression during sedation, and more.^{3,4}

The benefit of capnography over capnometry is that instead of just displaying the end tidal carbon dioxide (CO₂) in exhaled air, it provides a

waveform of CO₂ expired over time, referred to as a capnogram. In a patient with normal lung physiology, the capnogram has a pattern that resembles rectangles, or a “top hat” morphology, and can be separated into inspiratory and expiratory components (**Figure 1**).

Inspiration begins with a rapid decrease in CO₂ followed by a consistent low level that correlates with the concentration of CO₂ in the atmosphere. Expiration consists of three separate phases:

- **Phase E1** correlates with expiration of dead space air, during which time

the CO₂ level does not rise since dead space air did not undergo air exchange in the lung.

- **Phase E2** resembles the expiration of mixed air; if there is no obstructive physiology, a regular separation front between dead space and alveolar air should cause a rapid rise in CO₂.
- **Phase E3** results from the expiration of alveolar air. If all alveoli are ventilated equally, without a ventilation/perfusion mismatch present, a homogenous partial pressure of carbon dioxide (PACO₂) would cause a minimal rise during



Clinicians are finding capnography to be a useful addition to the toolkit for assessing asthma patients.

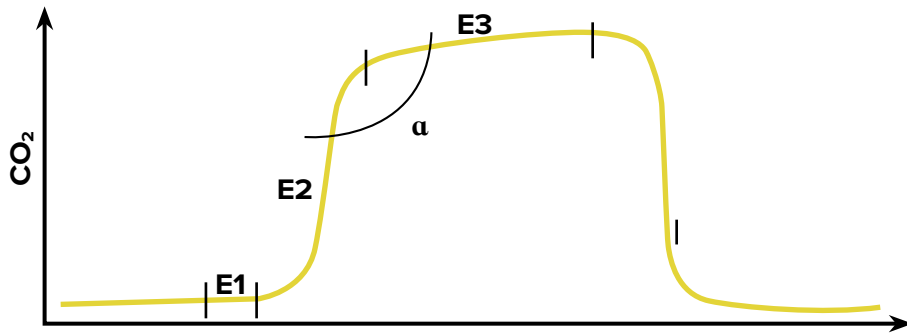


FIGURE 1. Normal Capnogram

this phase.⁴⁻⁶ Alpha angle is the designation given to the angle between Phases E2 and E3 and should be about 110 degrees in most healthy individuals.⁵

In an asthmatic patient, the waveform is altered (**Figure 2**). Because of varying degrees of bronchoconstriction throughout the lung, there is no regular separation front between dead space air and alveolar air during exhalation, resulting in a more gradual rise of phase E2. This is referred to as desynchronization.^{6,7} Furthermore, varying bronchoconstriction affects alveolar ventilation, causing “parallel heterogeneity,” with some alveoli having a higher PACO₂ than others. This inconsistency triggers a steeper rise of CO₂ during phase E3. Together, these result in the opening of the alpha angle, which – if severe enough – can lead to a “shark fin” appearance, where the alpha angle is essentially gone.^{4,6} (**Figure 2**)

Capnography for Asthma Assessment

Several studies have assessed the utility of capnography in the monitoring of asthmatic patients in the ED. In 1996, a prospective blinded trial of 49 patients found a statistically significant difference in the slope of phase E3 between healthy volunteers and asthmatic patients, and between asthmatic patients pre- and post-treatment. The results also revealed a statistically significant correlation between the slope of phase E3 and PEFV.⁷ In 2009, a prospective trial of

128 patients being treated for asthma in a university ED setting replicated the results. The study also revealed a statistically significant difference in the slope of phase E3 and alpha angle, but not in phase E2 slope pre- and post-treatment.^{3,4} These findings have also been shown to hold true in the pediatric population, where this method of monitoring may be the most useful.⁸

Although these trials were small, they have consistently shown a correlation between the capnography waveform and the patient’s clinical status. Capnography is an objective method of assessment

that is noninvasive, effort-independent, can be performed simultaneously while the patient is receiving treatment, and can be used to monitor the patient’s progress in real time.

Although routinely calculating the slopes and angles of capnogram in actual practice is not always practical, visually monitoring the change in waveform can assist in making clinical decisions. For example, the waveform in **Figure 3** is of a female in her 40s who presented to the ED with an asthma exacerbation. She was treated with 3 rounds of albuterol with ipratropium via nebulizer over the following hour. (**Figure 3**)

Although on repeat examination she was still wheezing, she reported improvement in her symptoms, and the capnogram clearly demonstrated a change in morphology from a shark fin pattern into a top hat pattern. As a result, this patient was discharged home with close follow-up with her primary care doctor.

With further advances in capnography technologies, we may have a new and improved method for evaluation of asthma patients. *

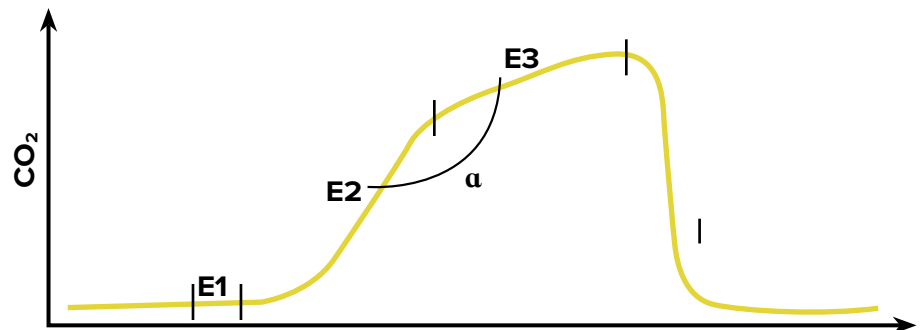


FIGURE 2. Capnogram Resembling Obstructive Physiology

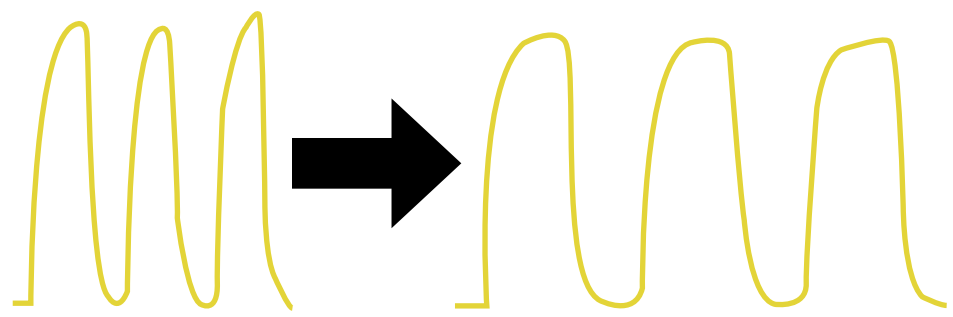


FIGURE 3. Capnography Pre-and Post-treatment of Asthmatic Patient



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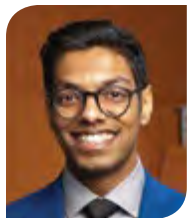
EMRA Journal Club

Intravenous Lidocaine for ED Patients with Renal Colic

Renal colic affects 12% of people worldwide and recurs at a rate of 50%.¹ First line therapy for management of pain associated with this condition includes intravenous (IV) non-steroidal anti-inflammatory drugs (NSAIDs), particularly ketorolac.² While IV lidocaine has shown promise in the management of acute pain, this has not been well studied in the emergency department (ED).³

Two groups in Iran recently studied the use of IV lidocaine for renal colic in the acute care setting.^{4,5} The research groups were particularly interested in IV lidocaine because IV ketorolac is not available in Iran, and they also note its potential use in patients with allergies or gastrointestinal intolerance to NSAIDs.

Soleimanpour H, Hassanzadeh K, Vaezi H, Golzari SE, Esfanjani RM, Soleimanpour M. Effectiveness of intravenous lidocaine versus intravenous morphine for patients with renal colic in the emergency department. *BMC Urology*. 2012;12(1):13.



Review by
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Soleimanpour, et al. compared preservative free 2% IV lidocaine to IV morphine in a prospective, double-blind randomized controlled trial (RCT) performed in an ED at a university medical center in Iran. They enrolled 240 patients aged 18 to 65 years, who presented with unilateral flank pain and positive hematuria on urinalysis. They

excluded patients who were pregnant, allergic to study medications, or had renal, hepatic, or cardiac disease. All patients first received IV metoclopramide (0.15 mg/kg). Next, 120 patients in one group received a single-dose of lidocaine (1.5 mg/kg) and 120 patients in the second group received a single-dose of morphine (0.1 mg/kg). A Visual Analog Pain Scale (VAS) from zero to 10 was used to establish a baseline pain level at presentation and then 5, 10, 15, and 30 minutes after administration of the pain medication. The authors considered an appropriate response to analgesic as a VAS score of less than three for 30 minutes after the first weight based dose or after the remainder of a prefilled syringe was administered, which initially contained either 200 mg of lidocaine in the first group or 10 mg of morphine in the second group. Results showed that 90% of patients in the lidocaine group and 70% in the morphine group had this response, which was a statistically significant difference. In the lidocaine group, reported side effects included dysarthria (1.7%), perioral numbness (2.5%), and transient dizziness (8.3%).

There are some limitations to this study. First, it is unclear how many of these patients truly had ureteral calculi, since broad inclusion criteria were used and no further confirmatory studies were performed. Additionally, the exact doses of lidocaine and morphine used are unclear. Although a weight-based dose of analgesic was administered initially, there were instances in which additional medication — the remainder of a prefilled syringe — was administered, and it is unclear how this was determined or with what frequency. Finally, they did not clearly state their primary outcome of interest.

Firouzian A, Alipour A, Dezfouli HR, et al. Does lidocaine as an adjuvant to morphine improve pain relief in patients presenting to the ED with acute renal colic? A double-blind, randomized controlled trial. *Am J Emerg Med*. 2016;34(3):443-448.



Review by
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Firouzian, et al. also performed a single-center double-blind RCT, but, in contrast to the previous trial, they used lidocaine as an adjuvant analgesic. They included patients aged 18 to 50 years with renal colic based on history and physical exam. They excluded patients with a history of asthma, substance abuse, cardiac disease, kidney or liver failure, allergies to lidocaine or morphine, use of analgesics or spasmolytics within 4 hours prior to ED admission, multiple ED admissions for renal colic, pregnancy, or hemodynamic instability. A total of 110 patients were randomized so that 55 received IV morphine (0.1 mg/kg) + IV lidocaine (1.5 mg/kg) while the other 55 received IV morphine 0.1 mg/kg + normal saline (placebo). They measured changes in pain and nausea intensity also using a VAS at time of arrival, 5, 10, 15, 30, 60, and 120 minutes after medication administration. Twenty-one cases were lost to follow-up, including 15 patients in whom nephrolithiasis was not confirmed, leaving only 89 patients in the final analysis.

One of the most significant weaknesses of this study is that, despite a good design, they do not specify a primary outcome or analysis, and performed multiple statistical tests on their pain scores. Overall, their results imply a trend towards improved and quicker control of pain and nausea with IV lidocaine and morphine, though depending how the analyzed their data, these differences were or were not statistically different. In their discussion, they do note that their study was underpowered to detect what they consider a clinically significant pain improvement.

Outcomes	Morphine + Lidocaine	Morphine alone	P Value
Time to pain resolution	87.02 mins	100.12 mins	0.071
Time to nausea resolution	26.6 mins	58.33 mins	<0.001

Highlighted Data from Firouzian, et al.

Summary

These two papers study the use IV lidocaine for renal colic in a relatively young, healthy cohort. Both studies suffer

from issues with reporting. The first study by Soleimanpour, et al. is particularly vague about some of the methods.

One general research pearl to take away is the importance of setting a single primary outcome before starting a study. This is a simple way, combined with online study registration, to reduce the temptation of performing multiple statistical tests and then only report “statistically significant” differences. Both of these studies are difficult to interpret because they do not specify a primary outcome of interest.

Without the option of IV NSAIDs in Iran, we certainly understand their search for another treatment option. In countries with IV NSAIDs, it is unclear whether there is a benefit to using lidocaine with or instead of NSAIDs and/or opiates. Its potential for use may grow in the US, especially among patients with contraindications to usual analgesia.

The other barrier to IV lidocaine usage for an indication with two longstanding treatment options is that physicians may not be comfortable with its side effects. Neurological side

effects including sedation, dizziness, and perioral numbness, typically occur at plasma levels >5 mcg/ml, above the therapeutic window of 2.5-3.5 mcg/ml. Cardiac side effects including decreased contractility, prolonged PR and QRS intervals, atrioventricular disassociation, or possible cardiac arrest typically occur after a patient has neurological symptoms and a plasma concentration over 10 mcg/ml. Despite these risks, previous authors have expressed comfort with IV lidocaine’s safety profile in analgesia.³

Both authors present IV lidocaine as an option to reduce opioid use, though this potential seems minimal. Since lidocaine has been proposed only to replace one dose of morphine in the ED at most, there is little hope that this will have any significant impact on the current state of opioid use.

Both papers introduce early and intriguing data on the use of IV lidocaine in the ED. As is usually the case, more research is needed — fortunately, more is on the way with three RCTs registered on ClinicalTrials.gov investigating the use of IV lidocaine for renal colic. ★

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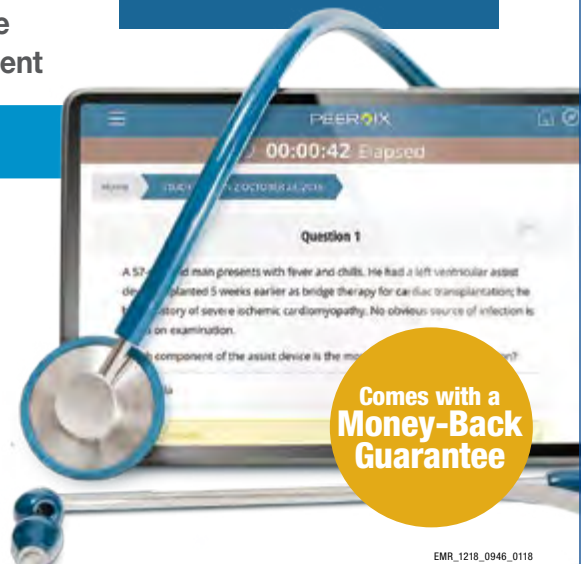
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PERSPECTIVE

Enviromedics

Health Implications of Climate Change

Like many of you, I used to see climate change as an existential topic — and one that did not relate to me specifically. Maybe one year felt warmer than another, but I failed to see how that was more than my always unpredictable Ohio climate or how it could possibly alter my training as a future physician.

Then I met **Paul Auerbach MD, MS, FACEP**, a Stanford EM faculty member and wilderness medicine expert.



Dr. Auerbach and Jay Lemery, MD, FACEP, of the University of Colorado recently released a new publication, *Enviromedics: The Impact of*

Climate Change on Human Health.

The book combines up-to-date data on the topic with a focus on how specific climate alterations will influence the pathology rolling through the doors of the emergency department.

In this Q-and-A, Dr. Auerbach shares his insight.

What inspired you to explore this topic and write the book?

In 2008, I wrote an opinion piece in JAMA entitled “Physicians and the Environment.” Dr. Lemery read it and then helped establish the Environmental Council of the Wilderness Medicine Society. Next, he edited a multi-authored textbook titled “Global Climate Change and Human Health: From Science to Practice.” I suggested that he write a book for laypersons, and he invited me to partner with him. Jay invented the

word *Enviromedics*, and I helped a bit with the definition. To us, “enviromedics” is the impact of environmental change on human health and its related study.

What kind of impact do you hope the book will have?

We hope this book does more than frighten people. We want them to be inspired and confident that the right thing to do is to become educated and then take action to preserve and improve our environment. The short-term crisis is global warming, but that is just the tip of the iceberg, as depicted on the cover of *Enviromedics*. The single operative concept at this point is action. So, we want the book to move the discussion to a place where everyone can identify and form an opinion.

What challenges are in store for EM physicians, residents, and medical students?

Emergency physicians will treat increasing numbers of persons with climate change-related medical conditions. Some of their patients will be neighbors and family members. While disadvantaged populations suffer disproportionately from the sequelae of global warming, no person is immune. Sea level rise will sink rich and poor cities alike. Emergency physicians enjoy taking care of sick people, but they also realize that injury prevention is the name of the game. For our planet, injury prevention means no more burning fossil fuels, no more dumping chemicals into our water supply, and of course doing everything possible to make advances in clean energy generation. I would like emergency physicians to understand the basic science of climate change and be able to point out to their patients situations in



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which the doctor believes climate change could be linked to the medical problem. A good example would be acute asthma attack during a heat wave in someone who otherwise would have been fine.

How should medical students and residents prepare?

Residents should have the courage to explore new territory or improve existing situations. As medical professionals, they have the obligation to understand the medical implications of climate change and communicate to their patients what they need to do to stay healthy and whole in what probably will become worsening environmental conditions.

Now that the book is done, what interesting adventures do you have planned next?

I still have a lot of work to do. Another medical interest of mine is concussions in sports, so I'll be spending time on that, as well as getting our next edition of the *Field Guide to Wilderness Medicine* ready. Then, I'll be ready to take some time off to get up in the mountains and head overseas to Nepal again soon.

Enviromedics, available on Amazon at <https://www.amazon.com/Enviromedics-Impact-Climate-Change-Health/dp/144224318X>, highlights the human health implications connected to unaddressed climate change. Grab your copy to better understand the problem and inform your patients. ★



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Cultural and Ethical Barriers

One evening, while practicing in a rural Ugandan emergency department (ED), I was called to see a young girl who had been struck by a vehicle just minutes prior. I rushed out to the front gates of the ED, and my eyes were immediately drawn to a small, lifeless body in the arms of an older gentleman. A thin trail of blood followed behind as she was taken to the ED and placed on a stretcher. There was an obvious large open skull fracture, an open ankle fracture with small abrasions, and lacerations scattered over her small, battered body. Upon primary assessment, she had a faint pulse with agonal respirations. We placed a nasal cannula, as this was the only supplemental oxygen available, and prepared to perform a FAST exam while the nurse began assessing vital signs. Seconds later, the young girl lost a pulse, and the emergency provider I was working with stated, “She just took her last breath.” I immediately asked the nurse to begin chest compressions, and I asked for some epinephrine to begin resuscitation. Instead of the compressions and medicine, I got a puzzled look from the nurse and the other provider. I asked them why we were not attempting to save her life, and they again stated, “She took her last breath. She’s gone.” I couldn’t comprehend: Why were we not doing everything we could to save this child’s life? The stoic look on the faces of the gentleman who brought her in, the nurse, and the other provider puzzled me.

International Emergency Medicine (IEM) has become a growing field of interest among recent medical school and residency graduates. A 1999 study showed that 62 of 113 (55%) EM residency programs reported participation in international projects.¹ By 2002, 86% of EM residents wanted to participate in an international rotation during residency training.² Although the interest has

increased substantially, there is inadequate guidance and support from most accredited organizations and residency programs.³ A survey of 102 EM residency programs looked at the preparation residents received prior to participating in an IEM elective and found that 40% did not receive any formal training.

The benefits of international clinical rotations for a physician’s development have long been recognized, including improved physical exam skills, broader medical knowledge, and improved procedural competency.⁴ In addition to



the individual physician’s development, the knowledge and skills acquired abroad can also help us meet the current needs of the U.S. health system, which is seeing a continual rise in the number of immigrants.⁵

While acquiring and assimilating large amounts of information is inherent to a physician’s education, adequate ethical training may not be. A recent survey of family medicine residency programs showed that only 6 programs were found to have appropriately constructed, well-defined, comprehensive learning objectives in ethics education, and cultural competence was generally not included in any of the programs curricular aims.⁶ In contrast, trainees in the United Kingdom

and Canada are required to demonstrate competence in ethics outcomes before becoming board certified as an emergency physician.⁶ A paper by Iserson et al. asserts that we need to “prepare participants for the cultural and clinical situations they may face.”⁷ In 2010 the Working Group on Ethics Guidelines for Global Health Training (WEIGHT) recommended that trainees “should demonstrate cultural competency and engage in appropriate discussions about different perspectives and approaches.”⁸

Unfortunately, our training during residency may not be adequate. Furthermore, as emergency physicians it is essential to our profession that at times we must “learn on the fly,” and this is how we commonly approach the ethical dilemmas we face. However, when approaching similar situations in an international setting, we must be able to recognize cultural uniqueness and be keenly aware of local customs.

About 10 minutes after our young patient died, her parents arrived. The gentleman who had brought the child in, the nurse, and the other provider informed them of what happened. Again, their expressionless faces puzzled me. Not one tear was shed. This young girl, who minutes before was playing outside of her school with friends, suddenly was dead — and there had no tears or questions, quite unlike most similar events in the U.S. This is just one example of cultural disparities and reactions that may seem confusing to many physicians and volunteers.

Unfortunately, scenes like this play out daily around the world, and tragedy is something many cultures become accustomed to. As physicians, nurses, pharmacists, or just volunteers wishing to lend a helping hand, we must be prepared for the ethical and cultural barriers we face when working abroad and learn not only how to cope, but to overcome these challenges. ★



Standout Volunteer Roles

EMRA President, 1991-92; ACEP Council, 1991-99; ACEP President; 2004-05; EMF Chair 2005-06; IFEM President, 2006; AAEM Board 2011-2017; ACOEP Board and President-Elect (currently serving)

It's hard to know where to start when explaining Dr. Robert Suter's contributions to emergency medicine. Stretching back to residency — when he served as EMRA President — he has advocated for the specialty and built bridges between emergency medicine and the rest of the world (literally). All the while, he has served in the U.S. Army, crisscrossing the globe to care for patients. This penchant for championing emergency medicine globally while building up his colleagues internally is part of the reason he is decorated with a mile-long list of awards (including EMRA's highest honor, the Joseph F. Waeckerle Founders Award).

What's Dr. Suter's advice for the medical students and residents of today?

empower

Sharing our Stories

Your Time, Your Legacy

Robert Suter, DO, MHA, FACEP, FAAEM, FACOEP-D, FIFEM

Medical School: Des Moines University

Residency: Brooke Army Medical Center

Current Position: Emergency Medicine Consultant (USAR) to the Surgeon General; Professor of Military and Emergency Medicine, Uniformed Services University; Professor of Emergency Medicine, UT Southwestern Medical School

Why EM?

Probably because it was the best fit for my somewhat ADD/OCD personality and as a new specialty the opportunities to make a difference were wide open, which was also attractive. Combined with experiences with providing first aid that led to becoming an EMS provider, it made me want to do emergency care, although because of the state of the specialty in the 1980s it was only after my first year of medical school that I really understood what Emergency Medicine was as an academic discipline.

If you were in medical school now, what would you do differently?

Nothing, because I have been very lucky, so the result been a great ride. That said, my advice to today's students who want to do emergency medicine is to prioritize studying and doing well academically, then make the world a better place with the energy you have left. Our specialty is just too competitive to do otherwise. Once you have that residency spot you can rebalance. Also, get involved in your school's EM group and network; you will benefit in the short run and if you are wise will develop ongoing lifetime friendships that will enrich and ground you, even if it is only by getting together at national EM meetings.

Best career insight you want to pass along?

Prepare yourself educationally to make a difference, then when opportunity knocks, answer the door without hesitation and make it happen! When you do this early in your career you build a track record that you can benefit from the rest of your life.

What can the average emergency physician learn from military medicine?

Since EMS, disaster, public/population health, and wilderness medicine are all subspecialties or overlap significantly with EM, most of the big lessons from military medicine are well-known. In addition, our practice in the ED involves leading a multidisciplinary team by our example and expertise, also akin to military medicine. So, for the most part our professional knowledge is pretty intertwined. That's why the military has recently significantly increased the number of positions for emergency physicians and is recruiting hard to bring more of us in, especially into the Guard and Reserve.

How do you prevent burnout?

Professionally, by working to impact the big picture, including teaching and organizational/committee work. The worst thing you can do is narrowly focus on things that upset you that you feel you can't change. Personally, spending time with my family and making that more of a priority, including playing ice hockey with my sons.

2 things on your desk right now?

Global History of EM project and family vacation plans

What goes on pizza?

Everything except anchovies and pineapple

How do you get your exercise?

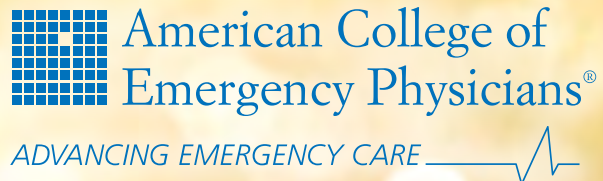
I run 5 miles every day, or walk it if sick or injured, and look for opportunities to play sports, including ice hockey, whenever I can. ★

Thank You!

Alameda Health System - Highland Hospital
Arrowhead Regional Medical Center
Case Western/Metro Health Medical Center
Central Michigan University College of Medicine
Cleveland Clinic Akron General
Comanche County Memorial Hospital
CORE/Grandview Hospital & Medical Center
CORE/Marietta Memorial Hospital
Dartmouth-Hitchcock Medical Center
Geisinger Medical Center
Genesys Regional Medical Center
Health Partners Institute/Regions Hospital
Hennepin County Medical Center
Henry Ford Macomb Hospital
Henry Ford Wyandotte Hospital
Johns Hopkins Hospital
Kingman Regional Medical Center
Lakeland Health
Louisiana State University - Shreveport
Madigan Army Medical Center
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MSU - Allegiance Health
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Naval Medical Center Portsmouth
NYCOM/St Barnabas Hospital
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The 2018 Early Bird Renewal Period begins in March.
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when you renew by June 30.



Eric McDonald, MD
ACGME RC-EM Liaison
University of Mississippi
Jackson, MS

Lessons on Burnout from a Fire Chief

It was a dark, calm night at the fire station. I had just dozed off for what I'd hoped would be a long, peaceful night of rest. Out of nowhere, the tones sounded. "Engine 3, need you to respond to Williams Road for a structure fire." Quickly coming back to reality from my dreamland, my fellow firefighters and I went to work. We donned our gear and quickly responded to the scene.

There it was.

You could barely see the house because of all the fire. I could make out the front door, but only because the house looked like a wall of black shadow and the front door, well — it had flames billowing out that lit up the yard like daylight.

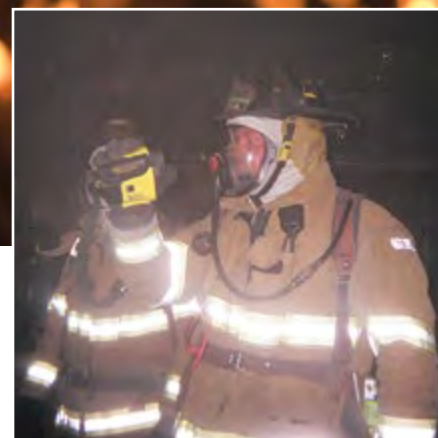
I approached the entrance, fire hose in hand. I felt my partner's hand on my back. That was the sign; we were going in. I opened the nozzle and began to spray. Eventually the fire was knocked back

from the doorway. Not that the smoke-filled entryway was much more inviting, but we went in anyway — because that's why we were there. Once inside, I felt as though my ears were being melted off my head. It was painfully hot. I remember thinking, "Stay calm, stay low, keep your head up, and make sure everyone is out." We fought fire for what felt like hours, eventually turning that blazing glow into a gloomy, dark, foggy mess.

It was then that I felt someone tap my shoulder. I turned to find my fire chief standing next to me in outdated fire gear. He wasn't even wearing a breathing apparatus. "You guys doing ok?" he said. "I was trying to get you on the radio, but didn't get an answer."

This remains one of the most memorable moments of my 15-year firefighting career. It wasn't because it was the hottest, biggest, or longest blaze. It was because of my chief.

He was a true leader, and everyone looked up to him. He wasn't just someone in charge who told you what to do; he was a leader who knew what to do, because he could do it. In fact, he was exactly what I wanted to be. He led by example. He led by respect. He led by dignity. He cared about his people and knew how to play up their strengths and protect them



When the fire of residency is burning you up, remember to stay calm, stay low, keep your head up, and focus on what matters most.

from their weaknesses. He kept his team focused on what mattered without getting stuck in the weeds.

He would — and did — run into a fire for us.

Burnout in residency is real. Often, we get burned out because we are stuck in the weeds. We have difficulty focusing on what truly matters most. This is where leadership should prevail. Are you feeling burned out because you can't stop focusing on the weeds? Are you struggling with someone who's not a true leader? Are you, yourself, not a good leader?

To get through residency, we must remember the qualities of a good leader and portray them. When the fire of residency is burning you up, remember to stay calm, stay low, keep your head up, and focus on what matters most. ★





EMRA Website Gets Smart

If you've visited emra.org in recent weeks, you've noticed some big changes. Welcome to the new — and smart — EMRA online!

This new site has built-in functionality that will remind you of important dates, feed tailored content we think you will want (or need), and make it easy for you to plug in to the specialty.

But first – help us help you!

1. Go to emra.org.
2. Log in as an EMRA member.
3. Join the committees and divisions doing work that interests you.
4. Click through to your membership benefits with single sign-on when you log in at emra.org. ★

Dial Up the Pizza! It's Time for EM Residents' Appreciation Day

EM Residents' Appreciation Day takes place March 7 this year. Is your program ready to celebrate? What will you do to set your program apart?

Considering the vast and varied landscape of emergency medicine residency, we think the door is wide-open for creative, meaningful events that will publicly recognize the service EM residents provide on a 24/7 basis as a significant and vital workforce. Let us know how you celebrate EM Residents' Appreciation Day – post your #EMDocsRock photos on Twitter, Facebook, or send them to us at emra@emra.org! ★

Now at CORD Academic Assembly

Let us know you want a team by **February 28**
 Teams will be selected by a lottery.
surveymonkey.com/r/wewanttoplay

Fun and games like you've never seen!

EMRA Quiz Show

Sunday, April 22
 CORD
 Academic Assembly,
 San Antonio, TX

Better study up on pop culture!



Mind-blowing medical mysteries!

You want a team, you know you do!

Event sponsored by **RoshReview**



ACEP's 50th anniversary — which will be celebrated all year — reflects on the moments that matter most for our specialty, our members, our patients — moments that matter most to you.

Throughout 2018, ACEP will honor the titans of emergency medicine who blazed the trails so others could follow. Participate in the conversation! Watch for:

- *Social media campaigns to share the highs, lows, and life-changing moments in emergency medicine*
 - *50th anniversary-themed podcasts on the past, present, and future of emergency medicine*
 - *Anniversary editions of ACEP Now and Frontline*
 - *A blow-out celebration at ACEP18 in San Diego featuring an interactive history museum that chronicles the journey of emergency medicine from battlefield to inner city to rural America and every spot in between*
- ACEP will release a commemorative anniversary book chock-full of images that show how the specialty has evolved during the past half-century. Pre-order your copy by visiting acep.org/50thbook.

Follow the conversation on Twitter via [#EMeverymoment](https://twitter.com/EMeverymoment). ★

EMRA Moves to CORD

For the first time ever, EMRA's spring meetings will be held at CORD Academic Assembly! Join us in San Antonio April 22–25 for “iDEAS: innovation, Development, Education, Academics.”

Show up for all your favorite EMRA events (like **Quiz Show**, **Rep Council meeting**, **C&D meetings**) plus the brand-new **Chaos in the ED: EMRA All-Around Skills Competition**. This wildly engaging take on medication will keep you on the edge of your seat!

We will also focus on wellness through an interactive art therapy activity center open to all.

CORD has planned educational programming just for residents as well. The resident track helps residents foster the skills that will be critical to your development and transition to your first academic position. Interactive sessions will focus on:

- CV preparation
- Landing your dream job
- Transitioning to junior faculty
- Presentation skills and design
- Leadership

Plus, don't miss the Chief Resident symposium to learn the crucial skills necessary to excel in that role. Get all the details of EMRA's debut at CORD Academic Assembly online at emra.org/events/EMRA-at-CORD-2018. We hope to see you there! ★

Register today!
APRIL 22-25, 2018

We welcome EMRA to the Academic Assembly for the first time! Bringing the best that CORD & EMRA have to offer, including the Quiz Show, Rep Council, EMRA Party, Design Thinking, Chief Resident Track & so much more.

.....

Discover the historic city of **San Antonio!** Enjoy the sites and colors of **Fiesta** and the year long celebration of their tricentennial.

For Registration and Travel Information
www.cordem.org/aa
#CORDAA18

Advocate for Your Specialty with ACEP on Capitol Hill

EMRA urges all residents and medical students to attend the ACEP Leadership & Advocacy Conference, May 20-23 in Washington, D.C. The EMRA Health Policy Committee and ACEP Young Physicians Section will reprise their can't-miss [Health Policy Primer](#) to help familiarize new attendees with the issues at hand, ranging from GME funding to MACRA and more. The primer also explains how to get involved in advocacy at every level.

Strong participation in the LAC event and ongoing involvement throughout the year is crucial in the changing political climate. [Sign up now to join your colleagues at the Capitol!](#)

One more thing you can do:

Submit a short video testimony explaining how health policy directly impacts your patient care.

This doesn't need to be a professionally produced video. Grab your cellphone and tell your story — and speak up for your patients. All video clips will be combined in a video montage of real stories on how health policy impacts our patients. We want this video to help inspire other residents about why advocacy outside the ED matters just as much as advocacy in the ED.

These videos will serve as a tribute to emergency medicine residents and young physicians who work so hard to provide care in a system that is not always working with us. The video will be shared during the Health Policy Primer during LAC, on the EMRA website, and circulated through social media.

All entries received by March 15 will be entered in a drawing for free LAC registration! Find the details at <https://www.emra.org/events/Leadership-and-Advocacy-Conference>. ★

WHAT DO WE DO NEXT?

Spring Resolutions Due

The deadline to submit EMRA resolutions for the next Representative Council meeting is March 9! If you have an idea about EMRA policies and practices, or you want your association to take a stand on a topic near and dear to you, write a resolution before the deadline.

If there's a topic addressed by other groups within the house of medicine, consider whether EMRA needs to take a stand. If you think the EMRA bylaws need a change, submit it! You set the direction of the association, and you do it most effectively by submitting resolutions to your Representative Council.

Find the Guidelines for Writing a Resolution at emra.org, under the "Leadership > Representative Council" tab. ★



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*Emergency medicine resident or medical student who contributes \$120 annually.

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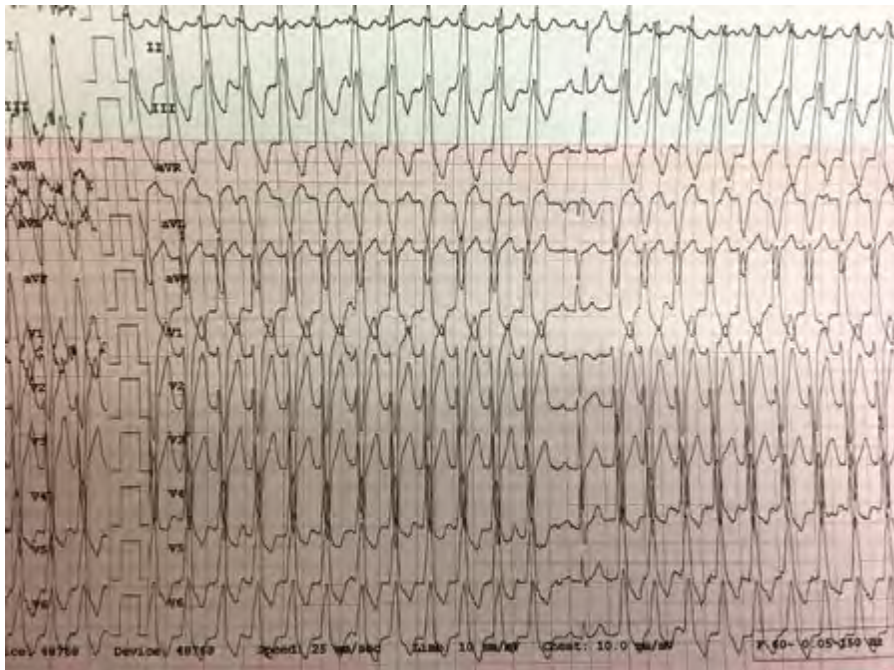


ECG Challenge

CASE.

An otherwise healthy 35-year-old male presents with 1 week of intermittent palpitations associated with substernal chest discomfort and dyspnea.

What is your interpretation of the following 12-lead ECG rhythm strip?



Jason Stankiewicz, MD
 Emergency Medicine/
 Internal Medicine
 Christiana Care Health System
 Wilmington, DE
 @StankMD



Jayram Pai, MD
 The Mount Sinai Hospital
 New York, NY



Jeremy Berberian, MD
 Associate Director of
 Resident Education,
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 Wilmington, DE
 @jgberberian

**See the ANSWER
 on page 40**

ECG Challenge



For more, see
p. 24-27 of the
EMRA EKG Guide

ANSWER

The ECG shows a regular wide complex tachycardia with a ventricular rate of ~165 bpm and left axis deviation. The important question is whether this is VT or SVT with aberrant conduction. Although there is a LBBB pattern (which supports the likelihood of SVT with aberrant conduction), there are 2 findings with high specificity for VT:

1. AV dissociation (there are intermittent identifiable P-waves with no consistent relationship with the QRS complexes).
2. The 13th beat is a capture beat.

Differentiating VT from SVT with aberrant conduction can be challenging. There are multiple algorithms for VT that have good specificity, but none of them have great sensitivity for VT. This EKG has multiple findings supporting VT, but in the absence of any features supporting VT, it is best to assume VT as erroneously treating VT as SVT with aberrant conduction could be clinically disastrous. It is important to note that response to treatment with nodal blockers does not rule out VT. "Idiopathic VT," a general term for various forms of VT in structurally normal hearts, often looks like SVT with aberrant conduction and responds to nodal blockers. It is also important to note that the findings specific for VT are not sensitive for VT, and the absence of these findings isn't specific for SVT with aberrant conduction.

LEARNING POINTS

Regular WCT

- Ventricular rate >100 bpm, QRS >120 ms, and constant RR interval
- DDx includes:
 - Monomorphic ventricular tachycardia
 - SVT with aberrant conduction
 - Antidromic SVT (WPW)
 - Any SVT (sinus tach, AVNRT, atrial flutter, etc.) with fixed or rate-related BBB
 - Any SVT with metabolic abnormalities
 - Any SVT with sodium channel blocking toxicity

Monomorphic VT

- ≥3 consecutive, regular, wide complex beats with rate >100
- Non-sustained: <30 sec duration with no hemodynamic instability
- Sustained: ≥ 30 sec duration OR causes hemodynamic instability

SVT with aberrant conduction

- Aberrant conduction can be due to BBB (rate related or pre-existing), bundle dysfunction (metabolic or toxicologic), or accessory pathway
- Baseline QRS morphology due to pre-existing BBB can change in the setting of tachycardia

EKG Features that increase likelihood of VT in WCT

- QRS >200 ms is almost always VT or hyperkalemia with aberrancy
- AV dissociation (note that AV association isn't specific for SVT as VT can have 1:1 retrograde conduction)
- Positive or negative QRS concordance in leads V1-V6 (entirely or predominantly positive or negative QRS complexes from V1 to V6)
- Extreme axis deviation ("northwest axis")
- If BBB pattern is present, the absence of typical RBBB or LBBB pattern suggests VT (i.e., normal RBBB or LBBB pattern makes SVT with aberrant conduction more likely)
- Fusion beats- hybrid QRS complex formed by both supraventricular and ventricular focus
- Capture beats- sinus QRS formed by transient normal conduction amid AV dissociation
- Brugada's sign- time from the onset of the QRS complex to the nadir of the S-wave is >100 ms
- Josephson's sign- notching near the nadir of the S-wave

Algorithms for VT

- Includes Wellens, Kindwall, Brugada, Verekei (aVR), Becker & Crijns
- No algorithm is diagnostically superior
- Assume VT if uncertain

Diagnose this Condition

The Case.

A 43-year-old man presented to the ED with a 3-week history of a rash in a C7 dermatomal pattern that was burning and painful in nature. The rash began 3 weeks prior to the ED visit as a “group of little blisters” anatomically localized to the right upper back extending to the right arm. He mentioned having the shingles vaccine in the past. The patient was worried and in mild distress as the rash continued to burn, and he reported numbness to the area.

On physical examination, the rash was yellow, crusty, and tender upon palpation. The area was hyperkeratotic with noticeable scabbed lesions and cracked skin. The patient had normal range of motion without motor deficits in the right arm. The patient was discharged with tramadol, acyclovir ointment, clindamycin, and oral acyclovir. He was instructed to follow up with his primary care physician in 1-2 days.

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What is the diagnosis?

See the ANSWER on
pages 42–43

The Diagnosis

The shingles infection is a well-known, dreaded potential consequence of a prior varicella zoster virus, VZV, infection. The shingles vaccine is a protective measure offered to individuals 60 years or older,¹ but does the vaccine really protect all patients, or is there a remaining risk for contracting shingles post vaccination?

Herpes Zoster

Herpes zoster (HZ) is caused by reactivation of VZV, which occurs when immunity to VZV declines because of aging and/or immunosuppression. This condition most commonly affects the elderly population (more than half of the cases of HZ occur in patients >60 years).⁷ The condition is diagnosed clinically by the distinctive dermatomal characteristics of the rash and painful sensation. Herpes zoster lesions contain high concentration of VZV, which can spread through physical contact or airborne transmission. Exposure to airborne VZV can result in primary varicella infection in susceptible persons. However, HZ is only contagious from the time after the rash appears until the lesions crust.

The condition, commonly referred as shingles, comes from the Latin word *cingulum* meaning “belt,” which describes the rash’s dermatomal pattern. The rash is characterized as grouped vesicles on a red base that are located unilaterally (do not cross the midline) and undergo different stages: red macule to papule within the first 7-10 days progressing to vesicles and ultimately pustules and crusty lesions. These crusty lesions may take up to 4 weeks or more to completely resolve. Herpes zoster presents with pruritus, dysesthesia, and pain along the involved dermatome. This pain may occur days before the onset of the rash, leading to multiple workups and misdiagnoses. Early detection and treatment of HZ reduces the acute symptoms and the severity of post-herpetic neuralgia, PHN.

Differential diagnoses for HZ include HSV, candidiasis, contact dermatitis, impetigo, autoimmune blistering diseases, and dermatitis herpetiformis. The most sensitive and specific diagnostic test to confirm the diagnosis

of HZ is viral DNA PCR. However, PCR is not necessary if the clinical presentation is distinctive for HZ.

Complications

Common complications include post-herpetic neuralgia (PHN), superinfection with *Staphylococcus aureus* and *Streptococcus pyogenes*, scarring, and hyperpigmentation. Shingles can also lead to pneumonia, hearing problems, blindness (herpes zoster ophthalmicus), encephalitis, cranial and peripheral nerve palsies, and sometimes death.

Approximately 13% of people 60-years-old and older with HZ will get PHN7, which mainly consists of pain persisting for more than 3 months after the initial shingles rash has healed. The risk of PHN increases with age and low immunity. In a large population study, the rate of PHN increased from 5% in HZ patients under 60-years-old to 10% in those ages 60-69 years and to 20% in those ages 80 years or older.² The pain occurs due to viral damage to the sensory nerves. Since the condition is refractory to most analgesics, effective therapy often requires multiple drugs started in a systematic pattern, initially administering a low dose and increasing the dose gradually until the pain is resolved and/or adverse effects are noted. The medications used for PHN include: topical agents, antidepressants, anticonvulsants, and opioids.

Treatment

During an acute episode of HZ, symptom control and disease complication prevention is achieved with a combination of antiviral therapy, corticosteroids, and analgesics. The antivirals include acyclovir, famciclovir and valacyclovir, which inhibit viral replication and thus decrease the duration of viral

shedding. This decrease allows for faster rash healing and reduces the duration of severe pain and the risk for PHN. Antiviral treatment is specifically recommended for patients older than 50 years who have moderate to severe pain and have facial involvement.³ Clinical trials demonstrate the effectiveness of treatment 72 hours after rash onset;³ however, in a clinical practice setting, this timing is not always feasible. Initiating antiviral treatment after 72 hours of rash onset and its benefits have not been studied, however, patients with severe HZ symptoms should be started on antivirals regardless of timing, especially if there is new vesicle formation. Valacyclovir and famciclovir may be administered in an outpatient setting because they require less frequent dosing than acyclovir. If a patient is immunocompromised, he or she requires a more aggressive, IV treatment. Corticosteroids do not have any effect on PHN; their only benefit is assistance in a faster resolution of the acute symptoms when combined with antiviral therapy. NSAIDs are ineffective in treating acute HZ pain; instead, acute pain can be relieved by antivirals, and associated HZ pain can be treated with opioids.

Vaccination Recommendations

The shingles vaccine, Zostavax, is a live attenuated vaccine given as a one-time, subcutaneous injection. It is composed of an antigen glycoprotein E (IgE) and an adjuvant system. Zostavax is the only shingles vaccine approved in the USA since 2006. The study by Cunningham et al. in 2016 found that the herpes zoster subunit vaccine reduces the risks of herpes zoster by 89.8% and post herpetic neuralgia by 88.8% among adults 70 years or older.³ The CDC recommends that people 60 years of age and older receive the shingles vaccine



Herpes zoster (HZ) is caused by reactivation of VZV, which occurs when immunity to VZV declines because of aging and/or immunosuppression.

to prevent shingles and PHN.¹ The 2015 Shingles Prevention Study gathered individuals ages 60 years and older who received the shingles vaccine and determined that the vaccine significantly reduced the incidence of shingles. The shingles vaccine decreases the risk of contracting shingles and PHN by 51% and 67% respectively.¹ While these results suggest a benefit associated with early vaccination, there is still a risk for reactivation of VZV resulting in shingles as demonstrated by a study completed by Morrisson et al.⁴

One of the causes for shingles infection in vaccinated adults is the issue of decreased vaccination efficacy over time.

The Morrisson et al. study highlights the decline of the vaccine's efficacy

from years 7 to 11 post vaccination (46% decline in efficacy year 7 to 14% decline in efficacy in year 10).⁴ The downward trend of the vaccine's efficacy throughout the years may be due to decreasing levels of vaccine-induced immunity and/or a decline in the host's immunosenescence (immune response).

Although HZ vaccination is recommended for the elderly population as a preventative measure against shingles, research demonstrates the possibility of shingles infection despite being vaccinated. Current guidelines do not support revaccination with Zostavax; however, future studies may allow researchers to assess long-term protection of the HZ vaccine as well as the possible benefit of revaccination. ★

Board Review

QUESTIONS

NEW! PEER IX QUESTIONS NOW AVAILABLE!

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 PEER IX, which made its print debut in June 2017. For complete answers and explanations, visit the [Board Review Questions page under "Features" at emresident.org](#).

To order PEER IX, go to acep.org/bookstore.



1. A 42-year-old man presents with lower back pain for the past 2 days after lifting some boxes. The pain is worse with movement and better with rest. He denies weakness, bowel or bladder incontinence, and fever but does say that he has a tingling feeling in his left leg every now and then. He also has hypertension. Physical examination is significant only for tenderness in the lower left paraspinal muscles. Neurologic examination findings are normal. What is the best next step?
 - A. Order CT of the lumbar spine
 - B. Order MRI of the lumbar spine
 - C. Recommend bed rest and physical therapy
 - D. Recommend light daily activities
2. A 62-year-old man presents by ambulance with chest pain and nausea for the past 30 minutes. He told the paramedics he has high blood pressure. En route, he received aspirin 325 mg PO, morphine 2 mg IV, and 1 inch of nitroglycerin paste. An ECG demonstrates sinus tachycardia with new ST-segment elevation >2 mm in leads V1-V4. A STEMI alert is called, and the hospital cardiologist confirms that she will take the patient emergently for PCI in the next 20 to 25 minutes. Vital signs are BP 158/85, P 102, R 18, T 36.8°C (98.2°F); Spo₂ is 99%. He rates his pain as 1 on a 10-point scale. What is the most appropriate pharmacotherapy while waiting for the cardiologist?
 - A. Intravenous alteplase bolus
 - B. Intravenous lorazepam and no beta blockers
 - C. Oral antiplatelet therapy and intravenous heparin bolus
 - D. Oral ibuprofen and intravenous heparin bolus
3. Which of the following pathogens most commonly causes pneumonia in HIV-infected persons?
 - A. *Pneumocystis jirovecii*
 - B. *Pseudomonas aeruginosa*
 - C. *Staphylococcus aureus*
 - D. *Streptococcus pneumoniae*
4. Which of the following best characterizes the presentation of patients in alcoholic ketoacidosis?
 - A. Abdominal pain and vomiting are common
 - B. Bradypnea is expected
 - C. Coma is common
 - D. Intoxication with ethanol is nearly universal
5. Which of the following statements about perimortem cesarean delivery following trauma is correct?
 - A. Begins with a horizontal incision 3 cm above the pubic symphysis
 - B. Contraindicated when maternal survival is likely
 - C. Ideally performed within 20 minutes of maternal cardiac arrest
 - D. Indicated when the fetus is greater than 24 weeks of gestation ★

1. D; 2. C; 3. D; 4. A; 5. D
ANSWERS



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The Brown Department of Emergency Medicine is proud to sponsor diverse fellowship training programs and is accepting applications for positions beginning July 1, 2017.

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For more information please visit our website at:

www.brownemresidency.org/fellowships.html



Clinical Associates/EMED Scholars

The University of Chicago's Department of Medicine, Section of Emergency Medicine, is pleased to offer the opportunity for qualified candidates to receive training in medical education, medical operations and leadership, or global health as an Emergency Medicine Scholar. These positions offer protected time for professional development while working clinically as an attending in our emergency department at a reduced effort. Applicants must have a medical degree, be board certified or board eligible in Emergency Medicine by the time of appointment and be eligible for medical licensure in Illinois.

Those interested must submit a cover letter and CV online at academiccareers.uchicago.edu/applicants/Central?quickFind=55205. Compensation is dependent upon qualifications. A generous package of fringe benefits is provided. Review of applications will continue until all available positions are filled.

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Mobile: ACADEMIC EMERGENCY MEDICINE POSITIONS ON THE GEORGEIOUS GULF COAST — The University of South Alabama, is seeking faculty for growing EM academic programs at both hospital ED's (level 1 University Medical Center and the Children's Hospital). Must be EM or Peds EM trained and board eligible/certified. Fellowship in PEM, EMS, education/admin or research is a plus. Opportunities to lead, initiate or contribute to new programs and services. Also recruiting for Chief, Division of Peds EM and Research Director. Applicants are invited to submit CV and letter of interest to: Edward A. Panacek, MD, MPH, Chair of Emergency Medicine, USA-COM, Mobile, AL (epanacek@health.southalabama.edu). Further information at www.southalabama.edu/departments/academicaffairs/resources/healthsciencepositions/medicine/USA.EM.%20Recruitment.notice_2015.pdf.

ALASKA

Fairbanks: New full-time position for a BC/BE Emergency Medicine physician to join a stable, democratic group of 10 physicians. This is a hospital practice based at Fairbanks Memorial Hospital. Annual visits exceed 36,000. Fairbanks Memorial Hospital is a JCAHO accredited 159-bed hospital that is the primary referral center for the 100,000 citizens of Alaska's interior. Fairbanks is a truly unique university community with unmatched accessibility to both wilderness recreation and urban culture. We aim to strike a balance between life and medicine, offering excellent compensation and benefits with a 2-year partnership track. 10 hour shifts with excellent mid-level coverage. For additional information please contact: Michael Burton MD, President (907) 460-0902 mrb5w@hotmail.com or Art Strauss MD, Medical Director (907) 388-2470 art@ghepak.com.

CALIFORNIA

Los Angeles – Culver City: Southern California Hospital at Culver City! Rare opportunity to join a Westside Los Angeles ER group. Group seeks BC/BE emergency physician to work Part Time/Full Time as an independent contractor. Excellent compensation in top 15% locally with malpractice insurance and tail paid. Nine hour shifts with 11 hours of PA double coverage. 85% of the night shifts are covered by night doctors. Very manageable 1.6–1.9 patients per hour. Our emergency department sees 25,000 patients per year. A complete ED refurbishment has been completed with an ER rebuild and expansion in the future. Brand-new Sonosite SII Ultrasound machine and Glidescope video laryngoscope in the department. Computerized Charting and PACS at every physician station. Email CV and references to clumel@repmg.com; phone 951-898-0823.

Riverside: Parkview Medical Center — Great opportunity to join an established 16 year ER group. Group seeks BC/BE Emergency Physician to work Part Time/Full Time as an independent contractor. Excellent Top 10% Compensation based on productivity with malpractice insurance and tail paid. Ten hour shifts with MD double coverage and 12 Hour mid level triple coverage. Our emergency department sees 48,000 patients per year. Computerized equitable shift scheduling. Efficient Computerized Charting and PACS at every physician station. New Sonosite Ultrasound machine and Glidescope video laryngoscope in the department. A brand new ER expansion has already broke ground and will quadruple the size of the existing ER! Join us and practice in a brand-new ER Department! Email CV and references to clumel@repmg.com Phone (951) 898-0823.

San Francisco Bay Area – Pleasanton, Stanford ValleyCare Medical Center: Single hospital, democratic physician-owned group is seeking full and part-time Emergency Physicians. Our community hospital has 34,000 annual ED visits. We have double physician coverage 18 hours/day, with shift duration ranging 7-8 hours, and equitable distribution of night shifts. Pleasanton is a very desirable area with easy access to San Francisco, the mountains of Tahoe and Yosemite, as well as top-ranked schools. Candidates must be residency trained and EM board qualified or certified. For more information about this position, contact email: pleasantonemgroup@gmail.com.

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Emergency Medicine Physicians

Cape Emergency Physicians is a small independent emergency medicine physician owned and operated practice that has been staffing Cape Regional Medical Center for over 20 years. It is a small community based hospital in Cape May County New Jersey with approximately 45k visits per year. The hospital is just minutes away from the beautiful beaches of Stone Harbor, Avalon and Cape May.

We are seeking BC/BE emergency medicine physicians for FT, PT, or per diem positions.

- Competitive hourly rates of \$175/200/225 per hour
- Sign on bonus
- Biannual bonuses
- Generous benefit package
- Profit sharing and 401K
- CME allowance,
- 10 hour shifts
- Allscripts EMR
- 11 bed acute care, 9 bed sub acute care, 9 bed fast track and 5 bed behavior health unit

If interested, please reply to Laura Ashley at staffing@urgentcarephysicians.org with your contact information and CV.

Exceptional Emergency Medicine Opportunities with EMMC and Affiliates in Maine!

Eastern Maine Medical Center is seeking BC/BE Emergency Medicine physicians for full-time permanent positions at primary locations in Bangor, Blue Hill, Waterville and Ellsworth.

- Dynamic physician-led collaborative Emergency Medicine Model
- Supportive hospital administration
- Join well-established team at a primary site, with options to work at other sites within our system
- Flexible schedule/no call
- Medical student teaching options
- Full Spectrum of Sub-specialty backup and consultation
- In-house collaborative hospitalist service, radiology & Night Hawk Services
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- In-System ACS-Verified Level II Trauma Center < 1 hr away
 - Trauma Service: on call consult
 - Critical Care Intensivists: on call consult
 - Pediatric Intensivists: on call consult



EMMC and affiliates are located in highly desirable, family-centered locations throughout Maine! Enjoy year-round access to Maine's unmatched coastline, mountains and lakes with limitless outdoor recreational opportunities and unspoiled natural beauty!

J-1 Visa candidates welcome to apply!

For more information, please contact:
Amanda L. Klausung, AASPR, Physician Recruiter
Email: ProviderJobs@emhs.org
Phone: (207) 973-5358



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Physician Affiliate Group of New York, PC

Chair of Emergency Services Bronx, New York

Lincoln Medical Center, Weill Cornell Medicine affiliate, a 362-bed hospital, with Level 1 Trauma Center, Joint Commission Certified Primary Stroke Center, and several centers of excellence, is seeking an outstanding clinician to serve as the Chair of the Department of Emergency Medicine, with over 170,000 annual visits, and a competitive training program in Emergency Medicine, committed to academic excellence.

Successful candidate will plan, manage, and implement strategies that enhance quality and efficiency, patient experience, physician engagement, mentor faculty and trainees, and foster professional and scholarly growth of the department. You must be an accomplished physician leader who has demonstrated by earlier accomplishments an ability to oversee operations, work collaboratively with other departments to ensure delivery of patient centered coordinated care, and ensure optimum use of resources to achieve superior outcomes in alignment with the institution's mission of improving health of the community. Applicant should have attained recognition in the specialty as evidenced by active involvement with academic professional societies, publications in referenced professional journals and formal presentations at academic meetings.

To be considered and/or learn more in complete confidence, please email your CV and Cover letter to Stephanie Tristine at: tristines@pagny.org.

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- BC/BE Emergency Medicine Physician
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- **Competitive compensation** and benefits package, including productivity option and relocation

Berkshire Medical Center, BHS's 302-bed community teaching hospital and Trauma Center, is the region's leading provider of comprehensive healthcare services.

Interested candidates are invited to contact:

Shelly Sweet, Physician Recruitment Specialist
msweet@bhs1.org or

Apply online: www.berkshirehealthsystems.org



**Berkshire
Health Systems**

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Ventura: New hospital under construction and scheduled to open in the fall of 2017 with a state-of-the-art Emergency Department. Practice with a stable ER group on the central coast of California and only 70 miles from LAX. Positions available in two facilities for BC/BE emergency physician. Main facility is a STEMI Center, Stroke Center with on-call coverage of all specialties. This is a teaching facility with residents in Family Practice, Surgery, Orthopedics and Internal Medicine. Admitting hospital teams for Medicine and Pediatrics. 24-hour OB coverage in house and a well-established NICU. Annual volume is 48K patients with nearly 70 hours of coverage daily and 12 hours of PA/NP coverage. All shifts and providers have scribe services 24/7. Affiliated hospital is a smaller rural facility 20 minutes from Ventura in Ojai. Malpractice and tail coverage is provided. New hires will work days, nights, weekends and weekdays. Come work with a well-established high caliber group with expected volume growth potential at our new facility. Enjoy the life style of a beach community yet outside the hustle of the LA area. Please send a resume to Alex Kowblansky, MD, FACEP, at kowblansky@cox.net.

FLORIDA

Jacksonville: St. Luke's Emergency Care Group, LLC — Jacksonville, Florida. Independent Physician group at St. Vincent's Medical Center-Southside in beautiful Northeast Florida. Great area/community with river and ocean access. Good schools, sports, and entertainment. Emergency Medicine residency trained BC/BE physicians. FT/PT available. Low physician turnover. Flexible scheduling with overlapping shifts. Holiday pay, shift differentials, competitive base salary, quarterly RVU bonus pool. Sign-on bonus and moving stipend. Cerner EMR. In house hospitalists and ICU coverage, L&D/Neonatal ICU. Supportive Medical Staff back-up and consultation coverage. 37,000 ED visits/year. Please contact us and send CV to: Katherine Considine, MD, [Katherine.considine@ascension.org](mailto:katherine.considine@ascension.org) or (904) 296-3885.

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. Email CV to Neil Trabel, ntrabel@emerginet.com; fax 770-994-4747; or call 770-994-9326, ext. 319.

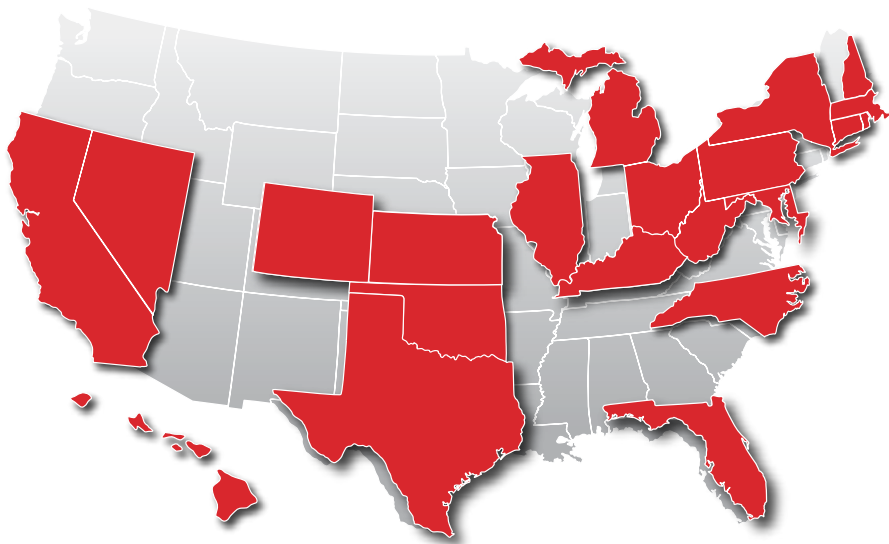
INDIANA

Richmond: Long standing Emergency Medicine group of 12 — recruiting 3 BE/BC residency trained EM physician. Partnership day one! Excellent compensation package including \$50K signing bonus, \$100K student loan repayment and \$10K relocation. 401(k) with match and profit sharing! Community hospital with annual volume of 48,000 emergency room visits. New 217-bed hospital featuring 33-bed ER designated as Level 3 trauma. Epic EMR, no admitting orders, and strong specialty support. Richmond is a college community of 40,000 with draw area of 150,000. Three major metro cities within one hour — Indianapolis, Dayton and Cincinnati. Family oriented community with relaxed lifestyle and excellent schools. Outdoor Recreational activities abound. Great place to live and practice medicine. **Contact Amy Powell, Recruiter, Reid Health, PhysicianRecruitment@ReidHealth.org or 765-983-3104.**

South Bend: Memorial Hospital. Very stable, Democratic, single hospital, 24-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,



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dgrella@usacs.com or 800-828-0898.

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MidState Medical Center
Meriden, CT | 48,000 pts./yr.

Marshall Medical Center
Placerville, CA | 33,000 pts./yr.

Chicagoland
* Chicago, IL | 30-60,000 pts./yr.

Albany Memorial Hospital
Albany, NY | 43,000 pts./yr.

Allegheny Health Network
* Western PA | 12-61,000 pts./yr.

Saint Francis Hospital
* Tulsa, OK | 10-99,000 pts./yr.

Providence Health Center
Waco, TX | 73,000 pts./yr.

Valley Baptist Medical Center
Harlingen, TX | 30,000 pts./yr.

Peterson Regional Medical Center
Kerrville, TX | 29,000 pts./yr.

CHI St. Joseph Health Regional Hospital
Bryan, TX | 51,000 pts./yr.

Meritus Medical Center
Hagerstown, MD | 78,000 pts./yr.

LifeBridge Health
* Baltimore, MD | 64-72,000 pts./yr.

Lake Health System
* Cleveland, OH | 12-35,000 pts./yr.

Summa Health System
* Akron, OH | 10-100,000 pts./yr.

Mercy Health
* Cincinnati, OH | 14-60,000 pts./yr.

Florida Hospital
* Tampa/Heartlands, FL | 13-45,000 pts./yr.

University Medical Center
* Las Vegas, NV | 17-81,000 pts./yr.

Carolinas HealthCare System
* Charlotte, NC | 17-69,000 pts./yr.

CarolinaEast Medical Center
New Bern, NC | 71,000 pts./yr.

* Denotes multiple locations available

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good schools, 90 minutes to Chicago, 40 minutes to Lake Michigan. Teaching opportunities at four year medical school and with FP residency program. Contact Joseph D'Haenens MD at southbendemergency@gmail.com.

OREGON

Salem: Outstanding BC/BE EM physician partnership opportunity at Salem Health Emergency Department (SEPS). Well-established, independent, democratic group with 37 physicians and 6 APPs who staff 110K annual visit, Level II trauma center, with excellent specialty backup. Competitive pay and benefits including scribes, flexible scheduling, malpractice, 401k, and more. We structure our practice to minimize turnover through maximizing work-life balance. We love living in Salem, the heart of Oregon wine country, as it is convenient to the bounty of Oregon's recreational opportunities, and is a safe and affordable community. See what we're about at sepspc.com, then send your CV, cover letter, and a recent photo to sepspc@salemhealth.org or call us at 503-814-1278.

PENNSYLVANIA

Bryn Mawr: Superb suburban Philadelphia community hospital opportunity in stable multi-ED group. Physician owned democratic group seeking BC/BE ED physician for FT partnership track or PT employed night time position. Regional stroke center and pediatric referral center. ED sees 48K pts/year with 60 hrs of PA coverage and 50 hours of physician coverage daily. Peds section staffed by Pediatric Emergency Physicians. Great position for graduating EM resident with fabulous reward at end of track. Please send CV to Fred Kotalik, MD, at drfredko@yahoo.com.

TEXAS



Leading Edge Medical Associates is a one-of-a-kind, private, independent group of all board-certified EM physicians in northeast Texas, offering a full range of clinical opportunities in EM. Our physicians enjoy shifts in a tertiary care trauma center as well as in nearby, lower volume clinical settings, all with high compensation and excellent full benefits. We are known for innovation in the industry and for developing strong EM leaders through LEMA's Leadership Development Institute. Almost half our physicians are former chief residents. LEMA is unique in its ability to offer physicians the best of both worlds, hospital-based and freestanding, academic and community medicine. LEMA is a group of exemplary physicians who work together as a team, value each member's input, and have a level of integrity, honesty, and trust that makes this innovative group truly one-of-a-kind. Interested in joining Texas's premier private group? Contact: [SUZY MEEK, MD, CAREERS@LEMA-EM.COM](mailto:SUZYMEEK@LEMA-EM.COM).

WISCONSIN

Milwaukee: Emergency Medicine Specialists (EMS) is a Physician-owned democratic EM group of approximately 40 EM Physicians based in Milwaukee, WI, just 1 hour north of Chicago. We are seeking full time and/or part time BC/BP Emergency Medicine Physicians to join our growing but well-established practice. Our group staffs five EDs in Southeastern Wisconsin, including a new contract starting in January 2018! Partnership tracks are available. Excellent work environment, benefits, compensation. We pride ourselves on being fair, equitable, and democratic. Interested Physicians contact Matthew Deluhery, MD, matthew.deluhery@ems-wi.com, 414.877.5350.



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- ▶ Physician-founded, physician-led group focused on improving patient care and ED throughput performance
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ST PETERSBURG, Florida

Bayside Emergency Physicians is recruiting for a BC/BE Emergency Physician at its new State-of-the-Art Emergency Center with 65,000 annual visits. BEP is an established independent democratic group with a partnership track.

Competitive Guaranteed Hourly/ RVU Based Compensation. Full benefit package including 401k with employer match and profit sharing.

Please submit CV's to Alice Gent:
AGent@Bayep.com
WWW.BAYEP.COM



A Rare Opportunity in California!

Mountain View Emergency Physicians Medical Group is currently interviewing for BC/BE Emergency Medicine physicians for a partnership track full time position, as well as part time positions.

We are a democratic, single-hospital, independent group, practicing in the same location for over 40 years. We are located 30-45 minutes from beach, mountains or desert in Southern California. Los Angeles and Palm Springs are short drives away. The possibilities for any lifestyle are endless. Great schools and world class universities are nearby. We see 80,000+ patients a year in our ED and we are growing. Coverage is excellent with 58 hours of physician and 51 hours of midlevel coverage daily, working 8-10 hour shifts with scribes. Night and weekend differentials are offered on top of a competitive hourly rate. We moved into a new 52-bed ED this year. Ancillary services and call panel backup are robust. We are a STEMI and stroke receiving center. Our group is transparent and run by ED physicians. Our partnership track is clear, fair and well-defined.

Interested physicians please contact Kevin Parkes at MTNViewEPMG@gmail.com

Emergency medicine physician opportunities at Geisinger

Geisinger, a national leader in healthcare innovation and technology, is seeking BC/BE Emergency Medicine trained physicians for opportunities throughout central, south central and northeast Pennsylvania.

Join Geisinger's growing team of Emergency Medicine staff physicians in practicing state-of-the-art medicine in one, or a variety of settings.

With Geisinger, you can take advantage of:

- Competitive compensation package
- Exceptional work life balance, defined clinical hours
- Support from a full range of dedicated specialists and subspecialists
- Scribes, pharmacists and Advance Practice support
- Ongoing enhancements to our fully-integrated Electronic Health Record (EHR) – Epic
- \$150,000 medical school loan repayment
- \$100,000 forgivable loan
- \$2,000 monthly stipend available to current residents upon signature of an offer letter

Locations throughout PA include:

- Geisinger Bloomsburg Hospital (GBH)
Bloomsburg
- Geisinger Wyoming Valley Medical Center (GWV)
Wilkes-Barre
- Geisinger South Wilkes-Barre (GSWB)
Wilkes-Barre
- Geisinger Holy Spirit (GHS)
Camp Hill
- Geisinger Shamokin Area Community Hospital (GSACH)
Coal Township

Geisinger is nationally recognized for our innovative practices and quality care.

A mature electronic health record connects a comprehensive network of 13 hospital campuses, two research centers and nearly 1,600 Geisinger primary and specialty care physicians.

**For more information, visit geisinger.org/careers
or contact Miranda Grace, Talent Management, at 717-899-0131
or mlgrace@geisinger.edu**

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AA/EOE: disability/vet

geisinger.org/careers

HIRING Emergency Medicine Physicians

Kettering Health Network is seeking a BC/BE Emergency Medicine physician to join a highly regarded, regional private group located in **Dayton, OH.**

- Strong group of 70+ physicians and advanced practice providers
- Provide care at six of Kettering Health Network's Emergency Departments, including 4 hospitals and 2 freestanding Emergency Centers
- Trauma Level II and III options
- Competitive salary, generous benefits package
- Sign-on bonus up to \$40,000 matched by group and hospital
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Site visits are being scheduled now!

Contact Cindy Corson
Physician Recruitment Manager
cindy.corson@ketteringhealth.org
(937) 558-3475 (office)
(503) 201-8588 (cell)



Beautiful Historic Williamsburg Location

Williamsburg Emergency Physicians, Inc. – a well established, highly regarded democratic ED group - is looking for BC/BP ED physician to join their practice. Sentara Williamsburg Regional Medical Center is a state of the art hospital located in historic York County, VA recently named one of the nation's 100 top hospitals by Truven Health Analytics. ED sees 32,000 visits per year with a 6 bed Fast Track. Staffing is supported by ED trained full time/part time PAs along with a strong Scribe program affiliated with the College of William and Mary.

Competitive salary and compensation package, which includes health insurance, malpractice and a retirement plan.

Williamsburg is one of the fastest growing areas in Virginia with excellent quality of life.

For more information please email CV to wepi6@aol.com.

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- **115 bed Emergency Department**
- **3 ERs (Community, Trauma and Pediatric)**
- **150,000 patient visits annually**
- **Level I Trauma/ Regional Referral Center**
- **40+ Physicians in current employed group**

The position offers an excellent compensation package including above MGMA average salary with RVU-based incentives, paid vacation, CME allowance, health and life insurance, malpractice insurance, and a 401k plan with employer contribution. The hospital has 24/7 in-house Hospitalist, Radiology, Cardiology, Trauma, Orthopaedic and Neurosurgical Coverage as well as EMR and Mid-Level support. Four different units make up our Emergency Department: Level I Trauma Center downtown with 75 beds and fast track, Medical Observation Unit with 16 beds, Pediatric ER at Children's hospital with 16 beds, and a 21 bed community hospital ER in Madison. Teaching opportunities with 3rd/4th year medical students from UAB and Family Medicine and Internal Medicine Residents at UAB-Huntsville rotate through our ED. Qualified candidates include: Emergency Medicine, Med/Peds, Pediatric Emergency and Family Medicine Physicians.

Huntsville, is situated in the fastest growing major metropolitan area in Alabama, and with the highest per capita income in the southeast, Huntsville is the best place to live, learn and work. We are a community on the move, rich with values and traditions while progressing with new ideas, exciting technologies and creative talents. With a population of 386,661 in the metro area, we are a high-tech, family oriented, multi cultural community with excellent schools, dining and entertainment.

**For further information, please contact Suzanne LeCroix
at (256) 265-9639 or suzanne.lecroix@hhsys.org**



huntsvillehospital.org



North Country Emergency Medicine Consultants, P.C. is recruiting a physician to join our expanding group of 25 physicians and midlevel providers at Samaritan Medical Center in Watertown, New York.

Our new state of the art Emergency Department compliments our hospital's new Operating Suite, ICU and Telemetry Suites, and parking garage with helipad. Our new facility includes in-department CT scanning, standard imaging, bedside ultrasound and point of care lab testing. We have 36 hour physician coverage and 36 hours of midlevel coverage per day to evaluate 50,000 civilian and military patients per year. Our group's compensation package exceeds \$400K per year and covers occurrence based malpractice, health/dental/vision insurance, a matching retirement fund and CME. In addition to a notable, recruitment package that is tailored to meet your personal needs, there is also an incentive program to augment your salary.

Our hospital is located 1 hour north of Syracuse, 30 minutes south of the Canadian border and is known as an outdoor enthusiast's paradise with 4 season activities available, including boating, sailing, skiing and hunting.

If you are interested, please e-mail Maja Lundborg-Gray, MD at MLGRAY@SHSNY.com or call 315-786-4813 and we will be happy to host you and your family for a visit.



Contact us at recruitment@umem.org or 410-328-8025

UMEM is an EOE/AEE



UNIVERSITY of MARYLAND EMERGENCY MEDICINE

Academic and Community Openings for BE/BC Emergency Physicians

Vibrant and varied career possibilities in academic and community settings in the Baltimore metropolitan area as well as near Washington, Philadelphia and Maryland's coastline.

Live and work in an urban, suburban or rural community, in an atmosphere that encourages work/life balance.

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{ Job Opportunities }

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EMERGENCY MEDICINE RESEARCHER POSITIONS



The Emergency Medicine Department at Penn State Health Milton S. Hershey Medical Center seeks energetic, highly motivated and talented physicians to join our Penn State Hershey family. Opportunities exist in both teaching and community hospital sites. This is an excellent opportunity from both an academic and a clinical perspective. As one of Pennsylvania's busiest Emergency Departments treating over 75,000 patients annually, Hershey Medical Center is a Magnet® healthcare organization and the only Level 1 Adult and Level 1 Pediatric Trauma Center in PA with state-of-the-art resuscitation/trauma bays, incorporated Pediatric Emergency Department and Observation Unit, along with our Life Lion Flight Critical Care and Ground EMS Division. We offer salaries commensurate with qualifications, sign-on bonus, relocation assistance, physician incentive program and a CME allowance. Our comprehensive benefit package includes health insurance, education assistance, retirement options, on-campus fitness center, day care, credit union and so much more! For your health, Hershey Medical Center is a smoke-free campus. 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 Emergency Medicine, c/o Heather Peffley, Physician Recruiter, Penn State Health Milton S. Hershey Medical Center, 500 University Drive, PO Box 855 Mail Code A595, Hershey PA 17033, Email: hpeffley@pennstatehealth.psu.edu
OR apply online at: <http://hmc.pennstatehealth.org/careers/physicians>



EMERGENCY MEDICINE OPPORTUNITIES AVAILABLE AT SANFORD HEALTH

Seeking BE/BC Emergency Medicine Residency trained ER physicians to join a fast growing, physician-led practice in Minnesota, North Dakota and South Dakota.

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- Bemidji, MN: Avg. 27,000 visits per year
- Worthington, MN: Avg. 6,000 visits per year
- Bismarck, ND: Avg. 31,000 visits per year
- Fargo, ND: Avg. 62,000 visits per year
- Aberdeen, SD: Avg. 7,800 visits per year
- Sioux Falls, SD: Avg. 45,000 visits per year

Pediatric Emergency Medicine

- Sioux Falls, SD: Avg. 45,000 visits per year

Competitive Compensation & Benefits

- Competitive Hourly Salary
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celia.beck@sanfordhealth.org

Amy Lozensky

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amy.lozensky@sanfordhealth.org

Martty Trout

Fargo • (701) 417-4814
martty.trout@sanfordhealth.org

Jessilyn Healy

Sioux Falls/Aberdeen/Worthington • (605) 328-6986
jessilyn.healy@sanfordhealth.org



Academic Emergency Medicine Physicians

The University of Chicago's Department of Medicine, Section of Emergency Medicine, is seeking full-time faculty members to serve as Emergency Physicians as we prepare to open a new adult emergency department and establish an adult Level 1 Trauma Center. Academic rank is dependent on qualifications. Applicants are required to be board certified or board eligible in emergency medicine and to be eligible for Illinois licensure by the start of appointment. Responsibilities will include teaching in the educational programs sponsored by the Section and participation in scholarly activity. We seek candidates looking to develop an academic niche that builds upon our faculty expertise in basic and translational research, health equity and bioethics research, geriatric emergency care, global emergency medicine, medical education, prehospital medicine, aero-medical transport, and ultrasound. We host one of the oldest Emergency Medicine Residency programs in the country and serve as a STEMI receiving hospital, a Comprehensive Stroke Center, a Burn Center, and a Chicago South EMS regional resource hospital. The Adult ED has an annual volume of 65,000 and our Pediatric ED cares for 30,000 patients per year, including 1,000 level 1 trauma patients.

This position provides competitive compensation and an excellent benefits package. Those interested must apply by uploading a cover letter and current CV online at academiccareers.uchicago.edu/applicants/Central?quickFind=55160. Review of applications will continue until all available positions are filled.

The University of Chicago is an Affirmative Action/Equal Opportunity/Disabled/Veterans Employer and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender identity, national or ethnic origin, age, status as an individual with a disability, protected veteran status, genetic information, or other protected classes under the law. For additional information please see the University's Notice of Nondiscrimination at http://www.uchicago.edu/about/non_discrimination_statement/. Job seekers in need of a reasonable accommodation to complete the application process should call 773-702-0287 or email ACOppAdministrator@uchicago.edu with their request.

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UPMC and University of Pittsburgh

UPMC has a long history of emergency medicine excellence, with a deep and diverse EM faculty also a part of the University of Pittsburgh. We are internationally recognized for superiority in research, teaching and clinical care. With a large integrated insurance division and over 25 hospitals in Pennsylvania and growing, UPMC is one of the nation's leading health care systems. We do what others dream - cutting edge emergency care inside a thriving top-tier academic health system.

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Expecting to be excited and challenged? Come join our team today!

SEEKING EMERGENCY DEPARTMENT PHYSICIANS

The busiest ED in North Carolina, and one of the top 15 busiest in the nation, treats 95k adult and 35k pediatric cases annually in its 92 beds. We are currently seeking residency trained BC/BE emergency physicians to work in the 75 bed adult ED. This ED serves a high acuity patient population with 28% annual admission rate. There are over 90 hours of adult physician coverage daily and over 110 hours mid-level coverage daily. It is a Level III Trauma Center with robust hospitalist service, interventional cardiology 24/7, cardiac surgery, neurosurgery, etc. The facility is Chest Pain and Stroke accredited. The EMS system is hospital owned and managed with an award winning paramedic program. Of note, the Pediatric ED is separate and has 17 dedicated beds with an additional 24 hours of physician coverage and 20 hours of mid-level coverage. We welcomed our inaugural class of Emergency Medicine Residents in July 2017. Opportunities exist for both clinical and academic emergency physicians.



MEDICAL DIRECTOR OF ULTRASOUND

The Department of Emergency Medicine at Cape Fear Valley Health is seeking a highly-motivated **Director of Emergency Ultrasound** to join our staff and faculty. The ideal candidate will be fellowship trained in Emergency Ultrasound and have experience with advanced ultrasound applications; resident, faculty, and staff education; research; ultrasound workflow; image management; equipment maintenance; and a working knowledge of credentialing, billing, documentation, and reimbursement.

Affiliated with Campbell University School of Osteopathic Medicine, the candidate will enjoy a Core Faculty appointment commensurate with experience, in our Emergency Residency Program with associated dedicated protected time.

TOP TIER COMPENSATION

The cash compensation package is valued at over \$250/hour, including evening, night, and holiday differentials, as well as a quarterly incentive bonus. We offer a generous sign-on bonus plus moving stipend. The comprehensive benefits package includes Malpractice Insurance Paid; CME Time and Allowance; 403(b) match and 457(b); and health, dental, and other desirable benefits.

THE AREA

Cape Fear Valley Health is located in the thriving and diverse community of Fayetteville, NC which consists of more than 319,000 residents. Fayetteville has received the prestigious All-America City Award three times from the National Civic League.

Known for its many golf courses (Pinehurst is located only 30 minutes away), our central location provides easy access to beautiful beaches to our east and to the majestic Blue Ridge Mountains to our west. Our mild climate, low cost of living, and patriotic spirit makes our location ideal for rising healthcare professionals and families.



CAPE FEAR VALLEY HEALTH

Please contact Ashley Dowless, Interim Director,
Physician Recruitment at 910-615-1888
or adowl@capefearvalley.com
for additional information.



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