

EM Resident

Official Publication of the Emergency Medicine Residents' Association

February/March 2016

VOL 43 / ISSUE 1

Redefining the (Emergency) Physician-Astronaut



***WE CELEBRATE
YOUR
ACHIEVEMENTS!***



**Cheers to the recently matched medical students!
*Welcome to the specialty!***

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

A LETTER FROM THE EDITOR

If you had asked my elementary school self what I wanted to be when I grew up, I would have said an astronaut. I wore space suits made of painter's coveralls, built a paper-mâché-and-Legos space station, read every book on Mars I could find, and begged my mom to pack freeze-dried ice cream in my lunch. I watched *Apollo 13* repeatedly, and it was never any less stressful to hear Tom Hanks tell Houston he was having a problem. But fast-forward 15 years and you'd find a pre-med music major track athlete confused about her future.

The problem wasn't too few interests, but too many. The idea that I had to choose one great thing to be good at in life was overwhelming. But medical school sets us on a tightly focused path, forcing us to deprioritize things we once enjoyed for the sake of pursuing a dream. Before we know it, our identity seems more defined by our career than by anything else in our lives.

EM residents work long shifts during unfavorable hours; we pore over literature, toil on research projects, and likely spend more time with each other than with our families. **In the drive to become "what" we want to be, we disconnect from "who" and "how" we want to be.**

Medicine is a noble pursuit, but if we are not physically well, if we do not spend time with family and friends, if we do not allow ourselves to be inspired by art, music, nature, and love, then our careers will ultimately suffer. Our lives inside and outside the hospital walls are inseparable; one cannot thrive if the other is in poor health.

While my interest in aerospace may have faded over time, the creativity it cultivated, the excitement it stirred, and the quality time it fostered (science museum trips with my mother, bottle rocket catastrophes with my brother) were invaluable to my development. Likewise, the daily experiences we share and the people with whom we surround ourselves will enhance our residency experience. Does being a parent make you more tolerant when dealing with difficult patients, more forgiving of yourself when a patient's course does not go as expected? Does the physical strength you gain from exercise make you more confident when caring for a critically ill patient? **As we go through this training experience, we must be mindful that our identity, while heavily influenced by emergency medicine, need not be exclusively defined by it.** Consciously refocusing our efforts on becoming "who" we want to be will have a larger and more lasting impact than concentrating solely on "what" we want to be.

Our cover story was written by a former space shuttle engineer, now EM resident. Dr. Pedersen chronicles the fascinating history of space medicine and proposes a future niche for emergency physicians interested in space travel. The story's quote from John F. Kennedy struck a particular chord with me: "We choose to go to the moon, not because it is easy, but because it is hard." Much like residency.

Recently, I left the hospital after a particularly emotionally taxing overnight shift. It was a quiet, unusually balmy winter morning, and the sunrise stopped me in my tracks. Though exhausted, I felt inspired by the dynamic masterpiece unfolding around me – much the same way I used to look at the stars and dream of flying through the solar system. "Thinking of you on this beautiful winter morning," I texted my family as I stared in awe. In that moment, it was clear *who* I wanted to be: someone who never forgets the simple pleasures that make life meaningful, who will stop – even for moment – to enjoy a beautiful sunrise. ★

TABLE OF CONTENTS

EDITORIAL STAFF

EDITOR-IN-CHIEF

Abby Cosgrove, MD

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SECTION EDITORS

CRITICAL CARE

Maite Huis in 't Veld, MD

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Categories

12 SPACE MEDICINE **Redefining the (Emergency) Physician-Astronaut**

Could the future of space exploration include the presence of emergency physicians on every extended mission?



COVER STORY

Cover: Astronauts conduct a mission on the Hubble telescope. ALL IMAGES COURTESY OF NASA.

4 PRESIDENT'S MESSAGE **Wellness** The Life You Save May Be Your Patient's... and Your Own



18 SPORTS MEDICINE **Fellowship Playbook** Preparation for a Sports Medicine Fellowship



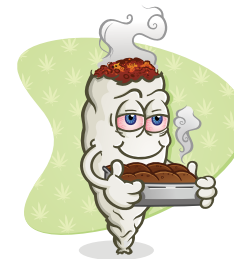
5 LEGISLATIVE UPDATE **The Sky is Falling!**



A Health Policy Update

9 MEMBERSHIP DEVELOPMENT **Diversifying EM** The Importance of a Diverse Physician Workforce

20 TOXICOLOGY **Cannabinoid Hyperemesis Syndrome**



As recreational cannabinoid use continues to increase, so too does a relatively new phenomenon.



11 MEDICAL STUDENT COUNCIL **What You Want to Know About EM Residency Programs**

22 CRITICAL CARE **ED-ECMO: Coming Soon to an ED Near You**

The actual initiation of ECMO is within the scope of practice of emergency medicine physicians.

24 OB/GYN
Botched
Management and Treatment
of Septic Abortion

26 EMS
The EMS Handoff



A Critical Time for Critical
Improvement



28 HEALTH POLICY
Out of Ativan?!
The Drug Shortage Crisis
in the U.S.

30 CRITICAL CARE
Toxic Shock Syndrome
It's (Not) All About the Tampons,
Baby

32 PEDIATRICS
Freak Out or Chill Out?

 Approach to Apparent
Life Threatening Events

35 RESIDENT EDITORIAL
On Being the Best
Time does not heal all wounds
— it's what you do with time
that aids healing.

36 EM NEWS & NOTES
Current EM News of Note
We're on the clock in February,
with some key deadlines
looming. Don't miss your
chance to get involved!



39 VISUAL DIAGNOSIS
**What kind of rash
is this?**

40 RESEARCH
Rapid Research Review
This new feature will offer
research tips and wisdom.

41 BOARD REVIEW
Questions

42 PEARLS AND PITFALLS
Urinary Tract Infections

43 PEDIATRIC PEARLS AND PITFALLS
**Inflammatory
Bowel Disease**

A lot of medical trivia,
a little pop culture!

Fun
and
games

You want
a team, you
know you
do!

Let us know you're in!
academicaffairsrep@emra.org

May 11

SAEM's Annual Meeting
New Orleans

EMRA
Quiz
SHOW

WELLNESS

The Life You Save May Be Your Patient's... and Your Own

Residency has been a challenging but fulfilling chapter in my life. But there have been times when I've fought cynicism and burnout. On a recent stretch of back-to-back night shifts, my typically optimistic and empathic temperament was replaced by a short fuse, and I found myself blaming my patients for their condition instead of focusing on how I could help them. My wife noted my snappiness and compared my behavior to a grumpy child. I realized I hadn't been taking care of myself. I hadn't been sleeping well, I had not worked out in a week, I was eating terribly, and I had been finishing my shifts with a few beers before going to bed. I wasn't well — and it was affecting both my work and home life. Does this sound familiar?



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The topic of wellness has come to the forefront in residencies across the country. Statistics show that 7-10% of physicians are disabled by depression, suicide, alcoholism, drug abuse, or unhappy marriages.¹ Emergency medicine residents have been found to have a higher prevalence of substance abuse compared to other specialties.² This leads to burnout, which has been defined as a combination of three elements:

- 1. Emotional exhaustion:** the depletion of emotional energy by continued work-related demands.
- 2. Depersonalization:** a sense of emotional distance from one's patients or job.
- 3. Low personal accomplishment:** a decreased sense of self-worth or efficacy related to work.³

Burnout obliterates our job satisfaction and can lead to medical errors. Wellness is not only important to physician health, but also affects the care we give our patients.

Yet wellness has not traditionally been a focus in resident education. One limitation is the lack of a shared model of wellness. If you ask 10 different people what wellness means, you may get 10 different answers. The World Health Organization defines wellness as "a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity." The National Wellness Institute describes it as "a conscious, self-directed, and evolving process of achieving full potential." No matter your definition, it is clear that residency training presents an imminent threat to physician wellness at a time when physicians are developing work-life habits that will impact the rest of their lives. Resident wellness must be addressed.

EMRA is taking steps to help residents and residencies across the country improve wellness. To start, EMRA established a Wellness Committee tasked with identifying resources to incorporate into training. We took part in the first-ever *Emergency Medicine Wellness Week*TM



Jan. 24-30, and we will be publishing wellness-related articles throughout the year. As EMRA works to create an online community, we invite you to share what you and your residency are doing to address wellness. This will establish a database of national best practices.

One of my attendings, Dr. Steve Smith (author of the ECG blog and one of the happiest people I know) told me his secret to wellness is to be grateful. In his words, "Expectations drive your mental state." Take this to heart, especially when you're feeling negative. Be grateful for your family, your friends, your health, and your job.

Now is the time to confront a dangerous stigma in emergency medicine: that it is a sign of weakness to admit to experiencing rough patches. As a professional society, we must look out for one another and find meaningful ways to support our colleagues. We can change our culture, but we must first acknowledge there is a problem. Speak up! The road to wellness starts with you. ★

References available online.

Is the Sky Falling?

A HEALTH POLICY UPDATE

The past year saw a flurry of activity in the world of health policy, with movement in the regulatory and legislative realms on multiple fronts. For emergency medicine physicians, there have been times when it seems like the sky is falling. Funding for residency spots has become problematic; the lack of political will for mental health reform has left our emergency departments with few effective treatment options for psychiatric care; and our future reimbursement has been endangered by regulation and legislation related to balance billing (a.k.a. fair payment). With so many perceived threats, it's no wonder that alarm bells are sounding. There is a clear need for our specialty and individual emergency physicians (like us!) to get involved and advocate. To that end, let's review some topics that will be important to our future practices.

★ Graduate Medical Education ★

The Issue

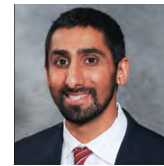
There is a great debate brewing about the future of residency funding. Medicare has provided the vast majority of graduate medical education (GME) funding since the mid-1960s. Funding from Medicare is divided into two pots: direct graduate medical education (DME) and indirect graduate medical education money (IME). Medicare DME funds total about \$3 billion per year and cover things like resident salaries and the costs of an education infrastructure. IME funding amounts to nearly \$7 billion per year and is intended to cover the higher complexity of patients at teaching hospitals as well as the inherent inefficiency of resident care. The Balanced Budget Act of 1997 restricted the number of residents that teaching hospitals could claim, thereby essentially freezing Medicare spending on residency spots to 1996 levels. Citing the projected shortfall in the number of physicians

(including emergency physicians), groups like the American Medical Association, the American Association of Medical Colleges, and ACEP have argued that further money from Medicare is needed.

Things have gotten complicated since the Institute of Medicine released a report on GME funding in 2014 that challenged longstanding norms in GME. First, the report questioned the presence and size of the impending physician shortage, arguing the problem is instead one of geographic and specialty distribution. Accordingly, the report's authors imply that the federal government should better organize funds rather than increase funding. They propose abolishing the current DME and IME system and replacing it with one that gives teaching hospitals a standardized per-resident amount while keeping \$3 billion of the \$10 billion spent annually for a transformational fund that would sponsor pilot projects aimed at innovating GME. Lastly, the report supports the creation of a GME office within the Department of Health and Human Services that would be charged with ensuring transparency in residency program spending and holding residencies accountable for meeting performance metrics.

What's Going On

Due to the price tag associated with GME funding expansion and now the IOM report, it has been difficult for GME advocates to drum up meaningful support in Congress. The Resident Physician Shortage Reduction Act of 2015 (H.R. 2124) was introduced in May, but – despite support from organizations like the AMA, AAMC, and ACEP – it



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likely will die in committee. Bills that work to incorporate some of the IOM report's recommendations have also started appearing in Congress. The Medicare IME Pool Act of 2015 (H.R. 3292) was introduced in July and would eliminate IME funds in favor of a single DME allocation. This would take away a considerable funding stream from academic hospitals and is opposed by the AAMC.

There is some hope for funding increases via the Veterans Administration. The "Choice Act" became law in 2014 and allows for the creation of 1,500 new residency spots at VA facilities. To that end, an effort within the VA called "Building Bridges" was created to increase the number of EM residencies that include VA hospitals among their clinical sites. Many residencies are looking to take advantage of this funding opportunity, while others are unaware of the program. ACEP is also advocating for legislation that relaxes funding restrictions for resident rotations at non-hospital and rural sites. This would allow residents to experience rural emergency medicine in residency, with the intent of getting more residents to

There is a clear need for our specialty and individual emergency physicians (like us!) to get involved and advocate.

practice in rural settings after graduation. Lastly, there is a continued push from ACEP and other medical organizations to convince congress to fund the ACA's Workforce Commission. This yet-unfunded component of the ACA was charged with eliminating the controversy about the physician shortage by performing an unbiased assessment of future workforce needs.

★ Mental Health Reform ★

The Issue

The state of our mental health system is poor. Over the past 40 years, there has been a push to deinstitutionalize psychiatric care, leading to the closure of inpatient facilities and an increased reliance on outpatient treatment centers and programs. Unfortunately, there has been a concurrent decrease in reimbursement for psychiatric services, such that outpatient systems are becoming overwhelmed. The ACA included provisions to improve funding and reimbursement for mental health care, but it's unclear whether any of these provisions have helped in a significant way. For example, a policy brief published by Health Affairs in November highlighted that despite ACA requirements, many insurers were not providing equal coverage for mental health care compared to conventional medical care.

In the emergency department, we see the effects of our broken system every day.

As avenues for inpatient and outpatient treatment have disappeared, the ED has become a place of refuge for patients with acute and chronic mental illness. With no timely options for care, EDs are increasingly "boarding" psychiatric patients while they await psychiatric evaluation and eventual transfer to a mental health facility. While some hospital systems and municipalities have worked within the current system to expand resources, most of the country still struggles mightily with the issue of acute psychiatric care.

What's Going On

In response to both of these issues, there has been ample activity at the federal level to find solutions. One recent success story was the "Improving Access to Emergency Psychiatric Care Act" (S.599). The bill was signed into law by President Barack Obama on Dec. 12, 2015. It extended an ACA-initiated Medicaid demonstration project that lifts restrictions on reimbursement to psychiatric hospitals. In states without the demonstration project, Medicaid cannot reimburse inpatient psychiatric facilities with more than 16 beds (so-called "Institutes of Mental Illness" or IMDs) for care delivered to patients who were not initially admitted to a conventional acute care hospital. The "IMD exclusion" was meant to spur states to independently fund mental health services. Unfortunately, states have been mostly unwilling or unable to do so, leaving the most vulnerable psychiatric patients to navigate a maze-like system. The IMD exclusion is part of the reason why it is so difficult to place Medicaid enrollees

into psychiatric facilities from the ED. Though the demonstration project is only extended through fiscal year 2016, there is a possibility it will be extended to 2019.

More comprehensive mental health legislation has also been introduced in both the House and Senate. However, it remains to be seen if there is enough political will to move forward with reform. Perhaps most notably, a bill sponsored by Rep. Tim Murphy (H.R. 2646), "The Helping Families in Mental Health Crisis Act," has been introduced in the House Energy and Commerce Committee. Among other things, the bill proposes to eliminate the Medicaid IMD exclusion, funds expansion of the mental health workforce, and promotes telemedicine services. The bill initially had 40+ Democratic co-sponsors, but many Democrats and civil liberties groups have expressed concerns about a provision that gives caretakers more access to patient records, plus another that increases funding to states participating in court-ordered treatment programs.¹ It's unclear whether Rep. Murphy will be willing to modify the bill as it moves through the House. Other mental health legislation, like Sen. John Cornyn's "Mental Health and Safe Communities Act of 2015," has been even more controversial. Democrats and gun-control advocates have universally panned the bill because of NRA-friendly provisions that relax gun ownership restrictions on the mentally ill. It seems more pressure is needed from patient and provider groups to push legislation forward.

★ Balance Billing ★

The Issue

Perhaps the hottest policy issue in emergency medicine is "balance billing." What is this? Balance billing comes into play when physicians treat patients who are considered "out-of-network" (OON) by

the patient's insurer. When no contract exists between a patient's insurer and a physician, the physician will often submit a claim for their usual rate (as opposed to the discounted rate they would accept from a contracted insurer). Depending on the insurer and the type of insurance, the insurer may only pay a portion of the physician's charges, leaving the physician to collect the unpaid balance from the patient. A 2010 federal regulation known as the "greatest of three" (GOT) rule mandates that insurers pay a minimum amount to emergency providers in order to protect patients from large balance bills.² Insurers can pay the greatest of their in-network rate, their "usual" out-of-network rate, or the Medicare rate. Seeing that insurers control 2 of the 3 amounts, they have predictably used GOT to put downward pressure on OON reimbursement. Out-of-network emergency physicians are stuck between a rock and a hard place: they can simply accept lower reimbursement from insurers or they can bill their patient for the unpaid balance. From a patient's perspective, imagine seeking care from a physician you thought was in-network but ends up being OON – and then getting a bill for much more than planned. Stories of patients receiving exorbitant "surprise bills" have permeated the news and have prompted consumer groups and insurers to propose bans on balance billing in many states.^{3,4,5}

For a number of reasons, these bans are particularly problematic for emergency physicians. When contracting with insurers, the only real leverage emergency physician have is their out-of-network rate. Moreover, with the GOT regulation, insurers are only required to pay an amount they control. Without the ability to balance bill, insurers will have no incentive to negotiate contracts with emergency physicians. In this manner, in-network rates will be forced lower and lower. As mandated by our specialty ethos and EMTALA, emergency physicians see anyone who comes to the ED, regardless of their ability to pay or their insurance plan. As a result, insurers know we will care for patients regardless of our contract status. If they also know that emergency physicians will be forced to accept their OON payments without the option to balance bill, there will be no financial reason to contract. If not combined with a payment standard that is fairer than the "greatest of 3," bans on balance billing would put our ability to seek fair payment for our services in serious jeopardy.

What's Going On?

Legislation targeting balance billing has been passed or is being considered in many states.^{6,7} ACEP and other specialty organizations are working together in many states to modify and/or defeat balance billing legislation while still working to protect our patients' financial well-being. Some chapters are proposing alternative consumer protection laws that aren't as punitive toward physicians. This includes more robust disclosure requirements, arbitration processes, and

May 15-18, 2016

Grand Hyatt
Washington, DC



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LEGISLATIVE UPDATE

“hold harmless” provisions. Notably, “hold harmless” laws essentially take the patient out of the OON reimbursement fight, and put the onus on insurers to pay OON charges or negotiate another rate with the physician. Another strategy is to tie minimum OON reimbursement to an objective, unbiased database of physician charges. Physicians would then get a much fairer minimum OON reimbursement from insurers. Lastly, in the regulatory realm, ACEP and sister organizations continue to speak with federal regulators at CMS about changing the language of the GOT rule. No doubt, this issue will require significant legislative and regulatory advocacy by emergency physicians for the foreseeable future.

★ What Can You Do? ★

Attend LAC

Issues that affect emergency medicine will ultimately affect us as residents. **It is in all of our best interests to learn about the issues, stay informed, and be willing to advocate on our specialty's behalf.** The ACEP Leadership

and Advocacy Conference (LAC), coming up May 15-18, is the perfect opportunity to get acquainted with the issues, meet leaders in emergency medicine, and interact with legislators who make the decisions that affect us. The conference is one of ACEP's most popular events and is offered to residents at a heavily discounted rate. This year's conference will also feature the release of the 4th Edition of the famed EMRA Advocacy Handbook. LAC kicks off Sunday, May 15, with a “First-timers Track” hosted by EMRA and the ACEP Young Physicians Section. The half-day track introduces residents and recent graduates to the most important policy issues affecting emergency medicine, including GME, balance billing, alternative payment models, and how to become an advocate leader. EMRA offers travel scholarships to the conference, and many residencies, academic chairs, and state ACEP Chapters offer the same.

Join the ACEP 911 Network

If you want to get informed and involved before LAC, join the ACEP 911 Network.

You'll receive weekly legislative updates from the ACEP D.C. office as well as action alerts when your voice is needed.

Impact the 2016 Elections — Support NEMPAC Today!

The National Emergency Medicine PAC is gearing up for a highly competitive 2016 election season. NEMPAC has special donor levels and benefits for EM residents that include invitations to VIP receptions and briefings. Check out the NEMPAC website to contribute and see how your EM colleagues are getting involved. NEMPAC is committed to staying in the top tier of medical PACs and residents' support is essential to keep emergency medicine issues front and center in Congress and ensure the future of the specialty.

Stay Informed

Last but not least, join the policy conversation on Twitter by following the EMRA Health Policy Committee at [@emadvocacy](https://twitter.com/emadvocacy). ★

References available online.

YPS-EMRA presents
Health Policy Primer
May 15–18, 2016
Washington, DC

- Intro to Health Policy Basics
- Fair Payment and Balance Billing
- Do Alternate Payment Models Work?
- GME Funding: Is Federal Funding for GME Going Away?
- Journal Club

Register at acep.org/LAC

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Deadline for Abstracts is March 15, 2016

Questions and abstract submissions should be directed to:
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The Importance of a Diverse Physician Workforce

In 2015, the Association of American Medical Colleges (AAMC) released a report highlighting that the number of black males applying for and matriculating into medical school hasn't budged in nearly 40 years. News of this ongoing imbalance in the makeup of the physician workforce came as no surprise to those who have dedicated themselves to reducing health care disparities.

Aside from the intrinsic value of learning and working in a diverse environment, diversifying the physician workforce has specifically been shown to increase access to care for racial and ethnic minorities, the un- and underinsured, and non-English speaking patients. Building a strong pipeline of high school, college, and medical school graduates from all backgrounds could help produce a physician workforce as diverse as the patient population we serve – not just in the emergency department, but in medicine as a whole. Tackling this challenge now is especially important as our national demographics continue to shift in a way that will create an even greater need for culturally competent providers in the future.

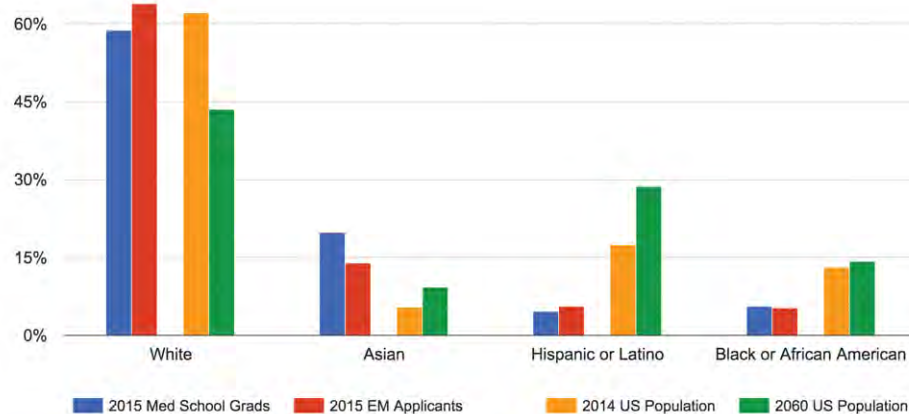
Mentorship

The majority of underrepresented minority physician leaders credit at least part of their success to a mentor who helped make connections and unlock

EMRA is proud to co-sponsor an annual reception for students interested in pursuing emergency medicine at **SNMA's Annual Medical Education Conference (AMEC)**, which this year will be held in **Austin, Texas, March 23-27**. We hope to see you there!

Diversifying Emergency Medicine

FIGURE 1. Comparison of racial and ethnic proportions of medical school graduates, emergency medicine residency applicants, and the current/projected population of the United States.*



*Medical school graduate and emergency medicine residency application data obtained from AAMC FACTS (aamc.org/data/facts). Population projections obtained from U.S. Census Bureau (census.gov/population/projections/data/national/2014.html). Data for "American Indian or Alaskan Native" and "Native Hawaiian or Other Pacific Islander" not included because they would not be interpretable at this scale, accounting for 1.2% and 0.2% of the current population, respectively, and 0.1% and 0.0% of medical school graduates/EM applicants, respectively.

opportunities to advance their careers. For underrepresented students without a mentor or support community, here are a few organizations to explore:

EMRA: From clinical and advising resources, to awards and scholarships, leadership opportunities, resident mentorship, EMIG resources, and complimentary regional and national medical student symposia, EMRA has the tools to help you succeed. Join today!

ACEP: When you join EMRA, you automatically join ACEP as well – and the College is pursuing a strategy to increase

diversity in leadership positions. **"We're going to hold a diversity summit this spring to begin the conversation about diversity and how to enhance it more than ever,"** said ACEP President-Elect Rebecca Parker, MD, FACEP. "We are going to be looking at diversity not only from the attending level but all the way to our students, because we want to capture the best and the brightest for our future, and we know diversity is an important part of that."

SNMA: Formed in 1964, the Student National Medical Association is "committed to supporting current and future underrepresented minority medical students, addressing the needs of underserved communities, and increasing the number of clinically excellent, culturally competent and socially conscious physicians." snma.org

MEMBERSHIP DEVELOPMENT

AMSA-REACH: The American Medical Student Association’s Race, Ethnicity, and Culture in Health Action Committee has a tremendous list of resources available for students looking to get more involved. amsa.org/advocacy/action-committees/reach

AMA-MAS: The American Medical Association-Minority Affairs Section is free for all students, regardless of AMA membership. Notably, its scholarship programs have awarded more than \$1 million during the past 20 years. ama-assn.org/ama/pub/about-ama/our-people/member-groups-sections/minority-affairs-section.page

SAEM-ADIEM: The Society for Academic Emergency Medicine’s Academy for Diversity and Inclusion in Emergency Medicine is an excellent place to find an EM mentor. saem.org/saem-community/academies

FIGURE 2. Visiting Elective Scholarship Programs

Within Departments of Emergency Medicine	
<ul style="list-style-type: none"> • Denver Health/University of Colorado • Highland Emergency • Oregon Health & Sciences University • SUNY Downstate/Kings County 	<ul style="list-style-type: none"> • University of California – San Francisco • University of Illinois – Chicago • University of Iowa • University of Pennsylvania
Institution-Wide Programs	
<ul style="list-style-type: none"> • Boston Medical Center • Duke University School of Medicine • Icahn School of Medicine at Mt. Sinai • Mayo Clinic • Northwestern University • University Hospitals 	<ul style="list-style-type: none"> • University of California – Davis • University of Chicago • University of Mississippi • University of North Carolina • University of Tennessee • Wake Forest School of Medicine • Washington University in St. Louis

Visiting Elective Scholarship Programs

As the health care system and residency training programs in particular continue to see the value of increasing the diversity of their organizations, minority

applicants are being actively sought. Third-year medical students planning their away EM rotations should consider the list of programs that offer travel stipends/scholarships to visiting underrepresented minority students (see Figure 2). *

BE PREPARED
for productive job searches.
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ACEP and EMRA’s
Official Online Career Center



Sean Ochsenbein, MSIII
 Chair, EMRA Medical Student Council
 ETSU Quillen College of Medicine
 Johnson City, TN



What You Want to Know About EM Residency Programs

FIGURE 1. Applicant Ranking of Program Characteristics When Choosing an Emergency Medicine Residency

Program Factor	Percentage of Applicants Ranking as Important (n = 261)
Hospital type — University vs. County vs. Community vs. Mix	78.2% (204)
Hours worked per shift (8 vs. 10 vs. 12)	66.7% (174)
Number of shifts per month	63.2% (165)
USMLE scores required for consideration	59.8% (156)
Hospital ED visits per year	56.7% (148)
Program size by total number of current residents	49.4% (129)
Culture description of the ED program provided by the program	48.3% (126)
Is moonlighting allowed	43.3% (113)
% DO & % IMG currently in program	42.1% (110)
Compensation & meals paid/credit by the hospital	37.9% (99)
Number of weeks spent in the ED during intern year (R1)	37.5% (98)
Accredited fellowships	34.9% (91)
Percentage of graduates entering fellowship/academic jobs	31.8% (83)
Dedicated children's ED at the main training hospital	30.7% (80)
Research requirement vs. scholarly activity only	21.1% (55)
Total alumni from the program	6.9% (18)

**N.B. Geographic location and program length were excluded from the survey because of their known importance.*

As medical students, we are in love with understanding our future. If crystal balls ever become available on Amazon Prime, we'll all choose same-day shipping. How many times have you asked upperclassmen about exams or questioned them about the "stories" of 3:30 a.m. mornings during surgery clerkship? That's who we are. Knowing what is around the corner prepares us for the future and guides our current decision-making. As they say in the South, never jump into a cloudy pond (you know, snapping turtles and all).

In an effort to filter the pond, the EMRA Medical Student Council (MSC), in coordination with the Council of Emergency Medicine Residency Directors (CORD) and the Clerkship Directors in Emergency Medicine (CDEM), conducted a survey with just one simple question: **What characteristics of emergency medicine residency programs are the most important to you?**

A residency program is like a family. Some are big, and some are small. Some eat at the dinner table, and some bunch up on the sofa in front of the TV. But there's no way to know that as an outsider. Yet as medical students, we are more comfortable and confident in our decision-making when we have access to information. Therefore, the MSC sent out this survey to help students apply to residency programs with more confidence in finding their best "fit" (Figure 1). After all, selecting a residency program is a life-changing decision.

Our mission was to expose

We are confident that students will soon have a trusted platform to guide their decision-making when applying to emergency medicine residency programs.

the factors students take into consideration when evaluating an emergency medicine residency program. The survey was completed by 261 EMRA students, of which 210 were MSIVs. It represented a demographic of roughly 67% MD, 27% DO, and 6% IMG. As you will see, this survey uncovered quite useful data for students and program directors alike.

Our next step is to capitalize on this data by integrating it within EMRA Match. With the help of our collaborators, we are confident that students will soon have a

trusted platform to guide their decision-making when applying to emergency medicine residency programs.

The MSC's sole purpose is to ensure that medical students who dream of becoming emergency physicians are equipped with the knowledge they need to reach their goals. If you want to be a part of change and help shape your future career, apply for the MSC by Feb. 15 on EMRA.org.

Don't lose a toe in the cloudy pond; know what you are looking for and go after it! ★

***Houston, we
have a problem.***



“Houston, we have a problem. Commander is experiencing abdominal pain localized to the right lower quadrant. No trauma, no prior similar episodes. Nausea and fever present.”

A physician is rarely included as part of a space flight crew. In the past 50 years of spaceflight, more than 400 people have flown in space, but only 26 have been American physicians. In 1973, Dr. Joseph Kerwin was the first U.S. physician selected for astronaut training, serving as the Science Pilot for the Skylab2 mission to the first U.S. orbital space station. Like Dr. Kerwin, when physicians have flown, they have served as scientists, engineers, spacewalkers, and project managers. Rarely has a physician-astronaut served as the on-board medical provider.

Surprisingly, few serious medical emergencies in space have been reported. While documented conditions have included urosepsis, renal colic, cellulitis, pneumonitis, and cardiac arrhythmia, only 17 of these nonfatal severe medical events have been reported during spaceflight between 1961-1999.¹ The relatively benign nature of medical problems in space flight is likely due to shorter missions, selection of healthy astronauts, on-board medications, and countermeasures to environmental effects and prolonged microgravity.² The comprehensive profiling process includes an evaluation of astronauts' physiological and psychosocial well-being, medical history, and extensive laboratory and genetic markers. Astronauts also undergo simulations and classroom activities to prepare for these missions and the extraordinary events they may encounter.

When emergencies have occurred, they have been managed by both Earth-based medical teams and the assigned crew medical officer on board. The training of the crew medical officer includes limited medical instruction (less than 60 hours of training) and minor surgical skills such as suturing.² That being said, **medical kits on board include a large variety**

of supplies and medications, from stool softeners and Foley catheters to antipsychotics and tracheostomy tubes. Astronauts are additionally faced with the challenges of medical resuscitation in a microgravity environment, where usual physiologic conditions and advanced life support protocols may not even be relevant.

neighboring planets, and establishment of bases are underway. Extended time in space inevitably leads to questions on how the Human Space Flight (HSF) program can support in-flight emergencies, particularly when a return to Earth may not be practical. For example, one study estimates that the risk of an emergency medical event during a 7-member space

Redefining the (Emergency) Physician-Astronaut

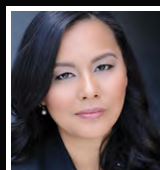
Thus, the medical training of physician-astronauts will become a valuable asset as plans for increased space travel and extended duration missions become reality. **Furthermore, the physician with a background in emergency medicine seems ideally suited for such endeavors.**

The Future

With recent aerospace successes, such as the launch of the Orion spacecraft in December 2014, the *Curiosity* mission in Mars, and unmanned missions to comets and asteroids, the future of space flight seems promising. Plans for commercial space flight to the International Space Station (ISS), interplanetary expeditions, a return to the moon, colonization of

flight to Mars would be about 1 emergency event per trip. This may seem negligible until put in the context of a 6-month return to Earth.^{1,3} **Thus, the capability to administer advanced care for illness and injury will undoubtedly be a prerequisite for interplanetary travel and prolonged human spaceflight beyond low Earth orbit.**² Additionally, as space vehicles move further from Earth's orbit, telemetric medical support and traditional communication traveling at the speed of light will have a longer delay (eg, in the case of Mars, two-way radio contact will require a minimum of 44 minutes).² Given such delays, the current practice of relying on Earth-based medical consultation and a crew medical officer without extensive medical training may not

At left: Emergency physician and ACEP member Scott Parazynski, MD, participates in an Extravehicular Activity during STS-120. ALL IMAGES COURTESY OF NASA



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Mae Jemison, MD, (a general practitioner) floats in zero gravity at the Spacelab Japan Science module aboard STS-105, *Endeavour*.

The medical training of physician-astronauts will become a valuable asset as plans for increased space travel and extended duration missions become reality.

longer be enough.

The preparation for medical emergencies in future missions will require using experience from previous missions, submarines expeditions, remote habitats, stations in extreme environments like Antarctica, and simulations. Other medical events unique to space also must be anticipated, particularly higher incidence of space radiation, injuries from increased extravehicular activities, space debris, and increased susceptibility for infection.

Future space travelers are unlikely to

be as fit and healthy as past astronauts, adding to the likelihood of increased medical incidents in space. As NASA redirects its scope beyond low Earth orbit, the goal of commercial space travel is being pursued by private agencies. Despite the fatal October 2014 crash of Virgin Galactic SpaceShipTwo, Virgin continues with the development of a vehicle for customers wishing to undertake suborbital travel. The ISS medical community has issued standards for spaceflight participants ("space tourists") to the station. The

Federal Aviation Administration has also issued regulations on operating space taxis, including general security, training, and minimum health restrictions for potential customers. Despite these restrictions, **the space tourist will be less healthy and less equipped to handle emergencies than previous space travelers who spent years preparing for a mission.**

Although a Soyuz spacecraft docked on the ISS can be used for evacuation today, space emergency medical systems and emergency departments may soon adopt more visible roles as more tourists fly and as extended missions become a reality. International space agencies will need to provide advanced medical care for acute illness and injury and manage the safe return of astronauts.

Emergency Physician-Astronauts

Only 6 EM-trained American physician-astronauts have flown in space: Thomas Marshburn, MD; Anna Fisher, MD; William Hendrick Fisher, MD; Scott

INFLIGHT MEDICAL EVENTS FOR U.S. ASTRONAUTS DURING SPACE SHUTTLE PROGRAM

Medical Event or System	Number	Percent
Space Adaptation Syndrome	788	42.2
Nervous System and Sense Organs	318	17.0
Digestive System	163	8.7
Skin and Subcutaneous Tissue	132	8.1
Injuries or Trauma	141	7.6
Musculoskeletal System/Connective	132	7.1
Respiratory System	83	4.4
Behavioral signs and symptoms	31	1.8
Infectious Disease	26	1.4
Genitourinary System	23	1.2
Circulatory System	6	0.3
Endocrine, Nutritional, Metabolic Immunity	2	0.1

(STS-1, April 1981 through STS-89, January 1998) using the International Classification of Diseases 9th Edition (Billica, 2000).



Top: Astronaut Luca Parmitano collects fundoscopic images with the help of astronaut Chris Cassidy for the Ocular Health experiment.

Left: Astronaut Franklin R. Chang-Diaz performs an eye exam on astronaut Ellen S. Baker, MD, MPH, on the middeck of the Earth-orbiting space shuttle Atlantis.



Japanese astronaut Koichi Wakata performs an ultrasound scan using the Human Research Facility (HRF) Ultrasound2 on Expedition 38.

Parzynski, MD; and Kjell Lindgren, MD.⁴ **The emergency medicine training experience has many qualities that make emergency physicians the best potential medical providers for the future of human space flight:** comfort with rapid assessment and treatment, resuscitation expertise, ability to perform a wide range of advanced procedures, exposure to diverse pathologies, and creativity in resource limited settings. Given that the models for extended missions are based in part on experience from extreme environments and remote settings, training in wilderness medicine will also complement the skillset necessary for future space endeavors.

In addition, all emergency medicine graduates must demonstrate competency in bedside ultrasound, also the main imaging modality in space because of its portability and the fact that images are not affected by space radiation. In fact, the ultrasound in ISS has proven useful in evaluating the musculoskeletal

system, performing FAST exams, renal and bladder surveys, ocular exams, and even nitrogen bubbles in the presence of decompression sickness.⁵

The HSF program will be faced with many challenges in clinical management as space exploration progresses to longer missions, interplanetary travel, and extraterrestrial colonization. It is now suggested that a physician be included in every spaceflight crew on long-duration space flights in order to enhance mission safety.⁶ Physician-astronauts will be a valuable asset to these missions because of their adaptability to be scientists, engineers, managers, and clinicians who can manage space emergencies and provide long-term crew health monitoring. Because of the training and experience, emergency physicians seem the ideal clinical specialists for providing these medical services.

Canadian physician-astronaut Robert Thirsk, MD, wrote an editorial on similarities in the training experience

It is now suggested that a physician be included in every spaceflight crew on long-duration space flights.

of physicians and astronauts. “The knowledge, skills, and attitudes of a clinician are valuable but not sufficient, of course, to be an astronaut,” he wrote. “A burning passion for space exploration is also required. We take our inspiration from John F. Kennedy, who, when the United States was initiating its Apollo moon program, declared, ‘We choose to go to the moon, not because it is easy, but because it is hard’... For some people, the benefits of space exploration do not outweigh the arduous work and risk. For physician-astronauts, they clearly do.”⁷ ★

References available online.



DISABILITY INSURANCE PROGRAM

An Approved Member Benefit Program

An individual, long-term disability insurance program designed for EMRA students, residents and alumni.



Just for Emergency Medicine Residents

Important highlights of this program are:

- Up to \$7,500 monthly tax-free benefit with no financial disclosure questions
- Specialty Specific definition of disability – 6 options in most states
- Personalized comparison of plans, taking advantage of regional, GME or association discounts as available to you
- Easy, online application process
- We are specialists in providing Disability Insurance for Emergency Medicine Physicians

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Solutions
to the EMRA
Membership
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**INTEGRATED
WEALTHCARE**

Collaborative Wealth Management
for the Medical Community

**You take care of them.
We'll take care of you.**

The EMRA Sports Medicine Division is excited about its mission to increase awareness, resources, and opportunity for those emergency medicine (EM) residents and medical students interested in pursuing a career in sports medicine (SM). Initiatives are aimed at providing EMRA members with access to sports medicine-specific resources, including fellowships, mentorship support, elective opportunities, career guidance, and clinical content as it pertains to the treatment and prevention of injury and disease in the active individual.

The field of primary care sports medicine (PCSM) is quickly gaining

general guide for the emergency physician seeking an SM fellowship.

Pre-game: Medical School

Focus on your coursework and clinical experiences. This is the time to build a strong foundation in the fundamental principles of medicine that will carry you throughout your career.

Get involved. You should already be a member of your school's EM Interest Group. Also join the SM Interest Group. If your institution doesn't have one, consider starting your own! There are Medical School Interest Group leadership positions within the American Medical Society for Sports Medicine (AMSSM) and American

SM fellowship may provide a specialized fellowship track that incorporates exposure to PCSM beyond the EM core residency education.

1st Period: Intern Year

Start your CV and keep it updated. Staying on top of your CV will save you time and headaches later. How many times have we heard, "If you didn't document it, it didn't happen"? In this case, if you don't document it, you will likely forget it. EMRA's CV prep makes it easy to keep your CV current.

Get connected. Join as a resident member of the EMRA Sports Medicine Division. We are in our infancy, so there



Kylie Conroy, DO

EMRA Sports Medicine Division Chair
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EMRA SPORTS MEDICINE FELLOWSHIP PLAYBOOK

popularity because the vast majority of all sports-related injuries are non-operative. SM specialists are board-certified in EM, family medicine, internal medicine, pediatrics, or physical medicine and rehabilitation. Since 1992, PCSM has been a recognized subspecialty by the American Board of Emergency Medicine (ABEM). Developing a unique niche by blending career interests within EM and sports medicine is a rewarding strategy to deter burnout and promote career longevity.

There are more than 140 ACGME-accredited PCSM fellowships. Of these, 124 programs accept EM-trained candidates, with that number growing each year. Most SM fellowships are based in family medicine, but 7 are EM-run programs.

Today, there are approximately 160-200 EM-SM certified physicians practicing in the United States. Therefore, it can be challenging for students and residents interested in SM fellowship training to gather the knowledge and resources necessary to become well-prepared and competitive as EM-trained applicants. The Sports Medicine Division wants to bridge that gap by providing a

Osteopathic Academy of Sports Medicine (AOASM). Don't forget to become a member of the EMRA Sports Medicine Division. It is never too early to start networking and seeking leadership roles.

Make contacts. Reach out to local sports medicine physicians to find out how they incorporate their advanced training into daily practice. Get firsthand exposure by shadowing these practitioners, volunteer to provide pre-participation physicals for local middle and high school athletes, and familiarize yourself with the sports medicine team as whole - athletic trainers, physical therapists, exercise physiologists, psychologists, and nutritionists. Through these endeavors you will begin to form relationships within the SM community while determining whether a future in sports medicine is right for you.

Choose a residency program. It's important to choose programs that are a great fit for you and your career goals in emergency medicine. Consider a residency with a PCSM affiliation that can provide you direct access to game and event coverage, research opportunities, and faculty trained in SM. Residencies that do not have their own

is an abundance of opportunities and projects in which to get involved. If you are interested in a leadership position, submit an application for Vice Chair. Joining a national organization like the AMSSM, AOASM, or American College of Sports Medicine (ACSM) will get you connected to additional online resources, publications, and networking opportunities within the world of sports medicine.

Cultivate mentorship. ACEP supports a mentorship program through its Sports Medicine Section that links experienced EM-SM physicians to those desiring further guidance in the field of sports medicine. Visit emra.org/committees-divisions/Sports-Medicine-Division or acep.org/sportsmedfellowship to get started.

Consider a fellowship preparation track. If your program does not have a formal sports medicine track, use the sample curriculum provided by the AMSSM as a general guide of activities to pursue during residency to increase your strengths as a clinician and fellowship candidate (Table 1).

Don't get overwhelmed. Residency is a huge adjustment, so start small. Use

this outline to set short-term goals and update them as needed. Never forget your primary goal: to become an excellent emergency physician. Peter Rosen, MD, gave a great piece of advice during intern year: "Revisit your ideals often." Think about the ideals that led you to pursue a career in medicine, and hold them close when times get tough.

assistance to attend their annual meeting.

Research fellowship programs. Not all programs accept EM trainees, so check out the most up-to-date list of EM-friendly PCSM fellowships on the EMRA SM Division Web page. Attend the EMRA Job & Fellowship Fair during ACEP *Scientific Assembly* and a similar fair at the AMSSM annual meeting, where you can

strongly interested in, giving yourself the opportunity to interview at the same time.

Jet set. Interview season typically occurs between October and December.

Meet your future colleagues. If you have the opportunity to attend ACEP *Scientific Assembly* as a senior resident, stop by the Sports Medicine Section meeting to see all of the major EM-SM

Game Plan



TABLE 1. Sample Fellowship Preparation Track Curriculum

- 4-week elective in sports medicine
- 1 year of longitudinal team physician experience with local high school team
- Provide medical coverage at 1 mass participation event
- Present at 2 or more sports medicine conferences
- Present at least 1 journal club article related to sports medicine
- Complete a scholarly project in sports medicine
- Attend at least 1 sports medicine conference

Source: American Medical Society for Sports Medicine

2nd Period: PGY-II

**Note: If you are completing a four-year program, spread the PGY-II activities over PGY-II and PGY-III years.*

Take on more responsibility.

Consider starting a longitudinal coverage experience for a local high school team in the fall of your PGY-II or PGY-III years. Volunteer at a mass participation event. Pump up your CV and clinical knowledge by completing a case presentation and/or journal club critical appraisal on a musculoskeletal or sports medicine related topic.

Attend a national or regional meeting.

It is a valuable way to expand your clinical knowledge, network, collaborate with like-minded colleagues, and enjoy an environment dedicated to topics you are passionate about. If you present at a conference, your residency program may offer funds to offset travel and attendance costs. Additionally, the AMSSM offers resident scholarship

meet programs face-to-face.

Complete an elective. Electives are typically 2-4 weeks in length and are suggested in the second half of the year. Some opportunities have an application deadline up to 6 months before the rotation begins, so start looking early. Similar to 4th-year audition rotations, be prepared and put on your game face.

Start the application process. In the spring you should update that CV, start working on your personal statement, and begin collecting letters of recommendation (LOR). You will need 3-4 LOR, including your program director and at least one SM certified physician.

3rd Period: PGY-III

Submit your application. SM participates in the July ERAS subspecialty cycle. Programs may start accessing applications around July 15 of each year.

Audition elective. Set up a fall rotation at a fellowship program you are

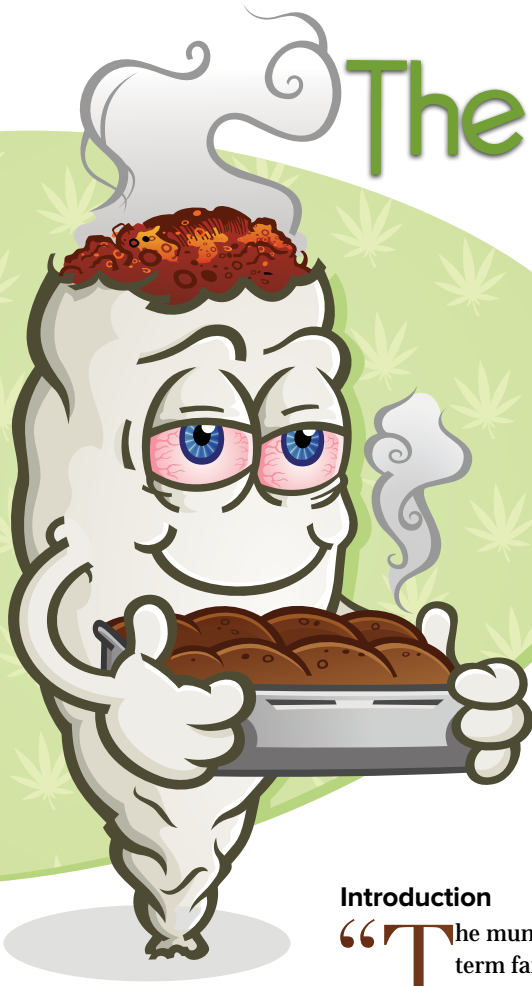
players in one room. We would also love for you to attend an EMRA Sports Medicine Division meeting at ACEP or SAEM to share your fellowship application experience!

Be a musculoskeletal rock star.

There are more than 4 million ED visits each year for musculoskeletal-related complaints, providing plenty of opportunities on shift to hone your skills. Perfect your musculoskeletal exam. Expand your musculoskeletal ultrasound techniques. Review various sport medicine texts and publications. Your patients will benefit, and you will be extremely well-prepared to start fellowship.

Stay tuned for more to come from the new EMRA Sports Medicine Division. If you believe a career in sports might interest you, please join us! There are plenty of projects in the pipeline, ways to get involved, and leadership opportunities available. We hope to meet you at our next division meeting at SAEM 2016 in New Orleans! ★

The Anti-Munchies



Cannabinoid Hyperemesis Syndrome

As recreational cannabinoid use continues to increase, so too does a relatively new phenomenon.



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Introduction

“The munchies” is a common term familiar to both casual and chronic marijuana users that amusingly describes the appetite-stimulating effect of cannabinoids. In medicine, this effect is desired and often therapeutic in patients experiencing nausea and vomiting from chemotherapy or loss of appetite from a chronic disease. Paradoxically, as recreational cannabinoid use continues to increase, so too does a relatively new phenomenon known as Cannabinoid Hyperemesis Syndrome (CHS), which can be thought of as “the anti-munchies.”

CHS was first described in South Australia in the early 21st century, when a few internal medicine physicians sought to explore an apparent association between chronic cannabis abuse and cyclic vomiting syndrome.¹ Since this initial observation in 19 patients, many more cases have been reported in the literature. **Patients with CHS frequently and repeatedly present to the emergency department (ED);** thus it is important for emergency physicians to have increased awareness of this disease process.

Clinical Presentation

CHS is a recurrent disorder in chronic cannabis users that is interspersed with symptom-free intervals. It is described in 3 phases: the prodromal phase, the hyperemetic phase, and the recovery phase.² During the prodromal phase, which can last months to years, patients may report intermittent nausea and vomiting that is typically worse in the morning. However, appetite remains normal and eating patterns remain consistent.

The hyperemetic phase is characterized by intractable nausea and vomiting, inability to tolerate oral intake, profound dehydration, and weight loss. As one can imagine, patients typically present to the ED repeatedly during this time. They often undergo extensive diagnostic workups that are largely unrevealing. **An unusual phenomenon during the hyperemetic phase is a proclivity for compulsive hot water bathing.** The hot water seems to acutely alleviate symptoms, so much so that patients have burned themselves with attempts to relieve their discomfort.¹

The recovery phase, which can last for days to months, is associated with near-

TABLE 1. Proposed Clinical Criteria for CHS*

Major Features	Supportive Features
Severe cyclical nausea and vomiting	Age < 50 years
Resolution with cannabis cessation	Weight loss > 5kg
Relief of symptoms with hot bathing	Morning predominance of symptoms
Abdominal pain	Normal bowel habits
Weekly use of marijuana	Normal radiographic/laboratory findings

*Essential for diagnosis is long-term cannabinoid use. Source: World Journal of Gastroenterology

References available online.

resolution of symptoms and a return to baseline eating and bathing habits.

Pathophysiology

The exact mechanism of CHS is largely unknown, although there are several proposed theories. Δ^9 -tetrahydrocannabinol (THC) is the primary metabolite of cannabis and binds to two types of receptors: CB₁ and CB₂. The anti-emetic effect of THC appears to be largely mediated by CB₁ receptors in both the brain and the intestinal tract via stimulation of appetite, inhibition of gastric acid secretion, lower esophageal sphincter relaxation, and altered intestinal motility.^{3,4}

CB₁ activation in the gut, however, appears to significantly reduce gastric motility and gastric emptying, which in chronic users could potentially override the centrally mediated anti-emetic effects in the brain and lead to hyperemesis. Additionally, cannabis metabolites are extremely lipophilic, and a large reservoir of THC in the adipose tissue of chronic users may lead to increased sensitization and paradoxical nausea and vomiting during times of stress.

Chronic marijuana use may also disrupt brain pathways responsible for keeping a balanced equilibrium of satiety, thirst, and thermoregulation, particularly in the

hypothalamus.¹ The learned and compulsive hot shower behavior may actually serve to “reset” the internal thermostat, thus providing temporary relief.

Diagnosis and Treatment

Unfortunately, CHS remains a diagnosis of exclusion and is often unrecognized, especially during initial presentations. In one case series, an average of 7 ED visits occurred prior to diagnosis, with a delay in diagnosis of up to 9 years.⁵ Clinical history is the key to diagnosis, and patients with chronic abdominal pain or cyclic vomiting syndrome should be specifically questioned regarding cannabis use and bathing habits (Table 1). Patients with CHS are often young, otherwise healthy individuals who have a history of regular cannabis for many years, although cases have been reported with frequent cannabis use for less than a year.⁶

Abstinence from cannabinoids is the most effective treatment; therefore, treatment should focus on cessation education. Supportive therapy, although largely ineffective, typically serve as the mainstay of treatment during the hyperemetic phase. This includes anti-emetics and intravenous fluids for dehydration. Narcotics may be used for abdominal pain, but they may also worsen

emesis. Acid suppression therapy is also reasonable, as some CHS patients have had esophagitis and gastritis diagnosed on esophagogastroduodenoscopy.² Finally, **several cases have successfully described the use of haloperidol and capsaicin cream** as treatment modalities.^{7,8}

Future

Marijuana is the most commonly used recreational drug in the United States. Currently, 4 states and the District of Columbia have legalized marijuana for recreational use, with many others legalizing medicinal marijuana and decriminalizing penalties associated with cannabinoids. As marijuana arguably becomes more prevalent, and as the illegal stigma wears off, physicians are likely to see an increase in patients presenting with marijuana-related adverse effects. For example, **the prevalence of “cyclical vomiting” has doubled in Colorado following marijuana legalization.**¹⁰ Synthetic cannabinoid use is also on the rise and has been associated with CHS.⁹

Abdominal pain and vomiting is, for better or for worse, a frequent ED chief complaint. Increasing ED provider awareness of CHS will lead to improved recognition, improved treatment, and a decrease in unnecessary diagnostic testing. ★



the SIM•WARRIORS

Coming to the Big Easy

RESIDENCY PROGRAMS! Demonstrate your teamwork skills, show how residents manage a simulated case and do it all in front of a LIVE AUDIENCE at the annual SAEM Meeting in New Orleans.

The EMRA Resident SimWars Competition is so popular, we hold a lottery to compete, so you must act now!

Application Deadline March 4, 2016

Each team will consist of four residents from the same residency program.
WE RECOMMEND ONE SENIOR RESIDENT AT THE MINIMUM.

Want to compete? Submit entry to simwars@gmail.com and include the following:

- (1) Name of your residency
- (2) Program Director
- (3) Each team member name and PGY year and
- (4) E-mail address for all team members.

ED-ECMO

Coming Soon to an ED Near You

A 52-year-old man experiences crushing sub-sternal chest pain while walking through the mall and slumps to the floor. EMS performs an EKG and notes tombstone ST elevations in the anterior leads, but the patient loses pulses en route to the emergency department (ED). CPR is initiated, and the first pulse check reveals ventricular fibrillation (VF). The patient remains pulseless despite defibrillation. Upon arrival to the ED, the patient remains in VF despite continuation of high-quality CPR, airway securement, multiple shock attempts, multiple rounds of epinephrine, and a trial of amiodarone. This patient needs coronary reperfusion but is not stable for transfer to the cardiac catheterization lab. Is he a candidate for extracorporeal membrane oxygenation (ECMO)?

History

ECMO today is a less invasive form of the cardiopulmonary bypass pioneered for use in open-heart surgery. The first successful use of ECMO for resuscitation was described in 1971, when a 24-year-old man was placed on venous-arterial ECMO (VA-ECMO) for respiratory failure in the setting of ARDS following a traumatic injury to the thoracic aorta.¹ In the ensuing decades, venous-venous ECMO (VV-ECMO) became a valuable intervention in the care of pediatric patients with severe respiratory distress. Today, VV-ECMO is used more commonly in intensive care units for respiratory failure refractory to traditional support measures.

An exciting new development in emergency department critical care is the use of VA-ECMO for patients needing immediate cardiopulmonary support as a bridge to a definitive therapy, like the patient in the case above. One group in France has even studied *pre-hospital* VA-ECMO resuscitation for persistent cardiac arrest using a mobile ICU system.²

Definitions

ECMO is a means of providing mechanical support to a patient whose heart and/or lungs are not providing

adequate gas exchange. Deoxygenated blood is withdrawn from the venous circulation (typically the femoral vein), pumped through an oxygenator outside the body that removes CO₂ and replenishes O₂, and returned to the venous or arterial circulation. ECMO used in the emergent setting has also been termed extracorporeal life support, or **ECLS**.

VV-ECMO provides respiratory but not circulatory support. The oxygenated blood is returned to the venous system, and the heart must still be pumping adequately to ensure circulation of this oxygenated blood. Thus, a patient with severe respiratory failure but no pump failure is best served by VV-ECMO.

VA-ECMO provides both respiratory and circulatory support. The oxygenated blood is returned to the arterial system, in effect bypassing the pump function of the heart. Patients in the emergency department with persistent cardiopulmonary arrest thought to be *reversible* are best served by VA-ECMO, as they are in need of temporizing circulatory support.

ECPR (extracorporeal cardiopulmonary resuscitation) refers to the initiation of ECMO during CPR. Percutaneous access of femoral artery and



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**The actual initiation
of ECMO is within
the scope of practice
for these emergency
medicine physicians.**

vein are accomplished while traditional CPR (chest compressions and ventilation) is continued. When extracorporeal circulation through the venous-oxygenator-arterial circuit is established, chest compressions can be discontinued and minimal “lung-protective” ventilator settings can be initiated.³

Who Is a Candidate for ED-ECMO?

Clearly, ECMO is not indicated for every cardiac arrest who fails to achieve return of spontaneous circulation. Two main criteria should be met before considering ED-ECMO:

1. The patient should be relatively healthy prior to the inciting event and subsequent cardiac arrest. Patients with extensive comorbidities are unlikely to do well in spite of all resuscitative efforts and will potentially pose an ethical dilemma if they are inappropriately placed on ECMO and are then unable to be weaned.
 2. There should be an identified, reversible cause for the cardiac arrest. ED-ECMO is a bridge to a definitive therapy that has a reasonably good chance of reversing the initial cause of arrest.
- ED-ECMO pioneers at Sharp Memorial

Hospital in San Diego have adopted certain inclusion/exclusion criteria (Table 1).

Refractory VF or VT in an otherwise healthy individual who has suffered a STEMI followed by a witnessed arrest and prompt initiation of quality CPR is an obvious choice for ED-ECMO. Less apparent but reasonable cases to consider for ED-ECMO might include:

- Hypothermia/hyperkalemia with refractory VF
- Type A aortic dissection with tamponade
- Massive PE with cardiogenic shock
- Acute cardiotoxicity from beta-blocker overdose

Return to the Case

After successful initiation of VA-ECMO, the patient was deemed stable for transfer to the cardiac catheterization lab. At this point, his persistent VF was no longer impacting his circulation, and his end organ perfusion had returned to near normal with the use of an extracorporeal pump system. He underwent percutaneous angioplasty and stenting of the proximal LAD artery, with resultant cessation of ventricular fibrillation. The patient awakened, was extubated successfully, and was found to be neurologically intact. Three days later, his left ventricular ejection fraction had returned to normal, and he was weaned off of ECMO. The patient was decannulated, underwent left femoral arteriotomy repair, and ultimately walked out of the hospital with no apparent cognitive sequelae.

The Next Step: Bringing ECMO to the ED

An obvious challenge to initiating ECMO in the ED is the amount of

resources required to provide this therapy. Currently, most EDs with ECMO capabilities require close collaboration with cardiothoracic surgery and intensive care staff who are comfortable with ECMO and have the resources to mobilize an ECMO team when needed.

The Sharp Memorial Hospital group has introduced a two-physician model for ECPR in which one emergency physician directs overall resuscitation efforts while

to convince hospital departments to devote the necessary resources for establishing an ED-ECMO program as long as it remains clinically indicated for only a small subset of cardiac arrest and refractory shock patients.

Take-Home Points

- ED-ECMO/ECPR is an exciting new intervention for refractory cardiac arrest or shock.

TABLE 1. ED-ECMO Inclusion and Exclusion Criteria³

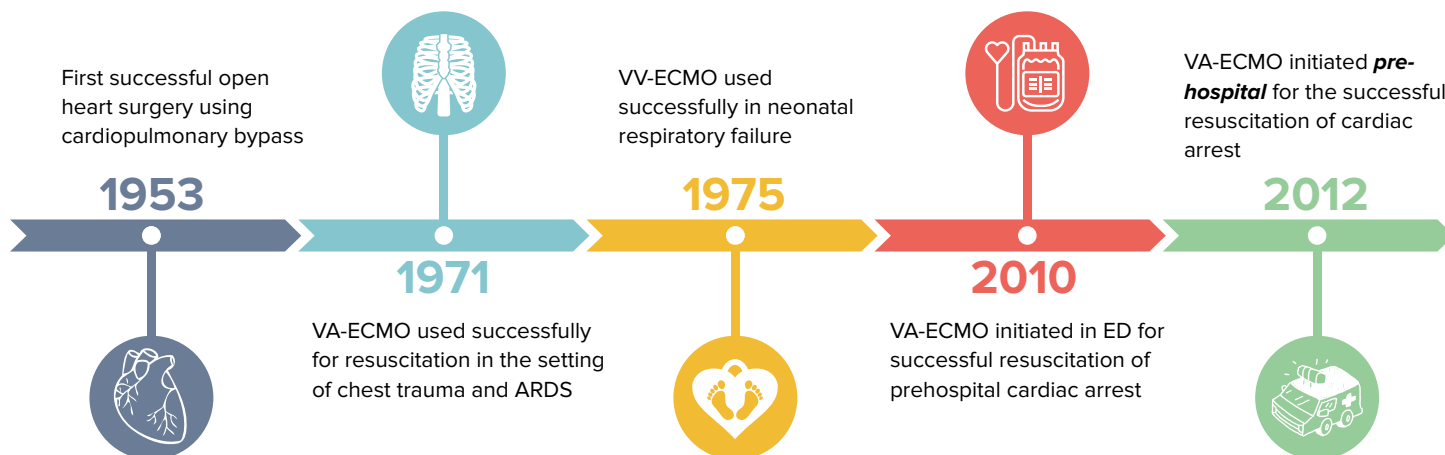
Inclusion Criteria	Exclusion Criteria
Persistent cardiopulmonary arrest despite traditional resuscitative efforts (ACLS)	Initial rhythm asystole
Shock (SBP < 70 mm Hg) refractory to standard therapies	Chest compressions not initiated within 10 minutes of arrest (either by bystanders or EMS personnel)
	Estimated EMS transport time > 10 minutes
	Total arrest time > 60 minutes
	Suspicion of shock due to sepsis or hemorrhage
	Pre-existing severe neurological disease prior to arrest (including traumatic brain injury, stroke, or severe dementia)

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the other accesses the femoral vessels. Simultaneously, a specially trained nursing team is called to bring a mobile ECMO unit. Thus, the initiation of ECMO is within the scope of practice for EM physicians.

Perhaps the greatest challenge to widespread ED-ECMO use is related to supply and demand. It will be difficult

- VA-ECMO is what is being done emergently. There is little role for VV-ECMO in the ED as this provides pure respiratory support.
- Patients must be chosen wisely, ie, relatively healthy without prolonged down time and with an identified *reversible* cause of their arrest or shock state. *



BOTCHED

Management and Treatment of Septic Abortion

If diagnosis and treatment are delayed, it can cause devastating consequences.

A 21-year-old female with no past medical history is brought to the emergency department complaining of abdominal pain and vaginal bleeding for the past day. She underwent an induced abortion at 20 weeks gestation at an “unofficial” abortion clinic overseas several days prior. Initial vital signs are significant for fever and tachycardia. Physical exam reveals diffuse abdominal tenderness, foul-smelling vaginal discharge and bleeding, and cervical motion tenderness.

Introduction

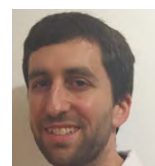
A septic abortion is an infection of the placenta and fetus, or products of conception, of a pre-viable pregnancy. Infection is primarily in the placenta; however, potential spread to the surrounding uterus, pelvis, and distant organs is possible with prolonged or potent toxin-producing bacteria. Worldwide, the majority of septic abortions occur as a result of unsafe abortion techniques, which the World Health Organization defines as “a procedure for terminating an unintended pregnancy either by individuals without the necessary skills or in an environment that does not conform to minimum medical standards, or both.”¹ Often, this patient population is reluctant

to seek care in the traditional outpatient setting, making the emergency department a common place for initial presentation.

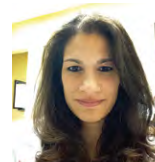
If diagnosis and treatment are delayed, it can cause devastating consequences, including infertility, septic shock, or death.

Epidemiology

Approximately 21.6 million unsafe abortions took place worldwide in 2008. Complications from these abortions accounted for 13% of all maternal deaths and were second only to maternal hemorrhage.² In one case series, mortality specific to septic abortion was found to be around 19% overall, and in up to 55% of women who developed septic shock.³ Nearly all unsafe abortion procedures occur in developing countries, with the highest rates occurring in sub-Saharan Africa (36 per 1,000 women aged 15-44 annually in Eastern Africa, versus 1 per 1,000 women in developed countries annually). Likewise, estimated case-fatality rates per 100,000 abortions range from nearly 0 in the United States to close to 100 in Eastern Africa.⁴ **This difference is largely attributed to the fact that the surgical treatment of spontaneous abortion is readily available and that illegal abortion is uncommon in the U.S.**



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Pathophysiology

Septic abortions, whether induced or spontaneous, occur because of improper, unsafe, or inadequate removal of products of conception. These products of conception become infected, bacteria infiltrate the placental tissue, and the infection spreads into the uterus via the maternal intervillous space, resulting in bacteremia 60% of the time. If the infected placenta remains for a prolonged period of time, bacteria can invade the endometrium and myometrium in as little as 6-12 hours.⁵ Gestational age also correlates with infection severity and mortality because as the placenta grows, so too does the volume of tissue that can become infected.

Most bacteria causing septic abortion arise from the vaginal flora; however, a high rate of anaerobic bacteria have also been isolated.⁶ In fact, anaerobic *Peptostreptococcus* is the most common blood isolate from cases of septic abortion.⁵ Some toxin-producing organisms, such as *Clostridium perfringens*, group A streptococcus, and some strains of *E. coli*, proliferate rapidly within dead tissue, become isolated from the vasculature, and essentially render antibiotic therapy ineffective.

TABLE 1. Common History and Physical Exam Findings in Septic Abortion

History	Physical Exam
Otherwise healthy, child-bearing age	Usually ill appearing
Intrauterine damage (retained products after abortion, attempted unsafe abortion, IUD in place)	Severe abdominal pain or peritonitis
Fever	Trauma to cervix
Vaginal Bleeding/Discharge	Foul-smelling vaginal discharge
Abdominal Pain	Retained products on ultrasound

Diagnosis and Testing

History and physical examination are crucial for identifying septic abortion (Table 1). The differential diagnosis includes spontaneous abortion with endometritis and incomplete abortion with another cause of fever, such as pyelonephritis, appendicitis, and influenza. Aside from routine blood work, aerobic and anaerobic blood and cervical cultures should be obtained to help guide future therapy by obstetricians. Ultrasound should also be obtained to look for products of conception. In the truly critical patient, studies looking for disseminated intravascular coagulation are warranted.

Management

Like other forms of sepsis, resuscitation with intravenous fluids and antibiotics are the mainstay of treatment in the emergency department. Vasopressors and blood transfusions are used as needed. The antibiotic regimen selected should cover all potential aerobic and anaerobic pathogens (Table 2). Of note, clindamycin should be considered in patients suspected of harboring a toxin-producing organism, as it

TABLE 2. Empiric Antibiotic Therapy Recommended for Septic Abortion

1. Gentamicin (5 mg/kg/d) + clindamycin (900 mg IV q8) +/- ampicillin (2 g IV q4)
2. Ampicillin + gentamicin + metronidazole (500 mg IV q8)
3. Levofloxacin (500 mg IV qd) + metronidazole
4. Imipenem (500 mg IV q6)
5. Piperacillin-tazobactam (4.5 g IV q8)
6. Ticarcillin-clavulanate (3.1 g IV q4)

Adapted with permission from David Eschenbach, MD5

appears to have a direct antitoxin effect.⁷

Most importantly, prompt obstetric/gynecologic consultation is required for evacuation of the infected products. This is considered the most critical step in the treatment of septic abortion. Fetal death is inevitable, so procedural intervention should not be withheld even if fetal heart activity is found. Clinical improvement after fluids, antibiotics, and curettage should be seen within 6 hours. If there is insufficient clinical improvement after such treatment, then a hysterectomy may be necessary. Finally, anti-D immunoglobulin should be administered to all Rh-negative women.

Antibiotics will be stopped after 48 hours if clinical improvement is evident and there are no signs of pelvic abscess.⁵

Case Resolution

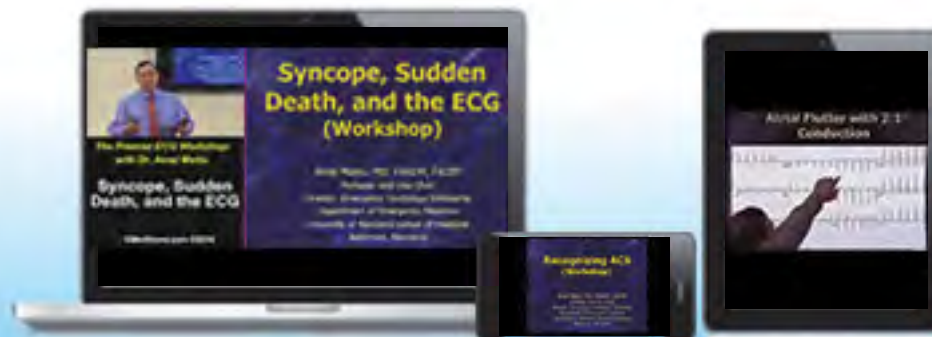
Ultrasound exam showed retained products of conception. Blood work was significant for WBC of 28,000/ul with 10% bands, and a serum lactate of 4.5 mmol/L. The patient received 3 liters of normal saline, as well as gentamicin and clindamycin. The obstetrician performed a curettage and evacuation of the placenta. The patient spent the next few days recovering in the surgical ICU and walked out of the hospital 5 days later. ★

References available online.



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In the middle of a busy shift, you are hastily beckoned to a new patient's room just as he has begun to seize. Your patient is an 8-year-old boy dropped off by EMS as a transfer from a rural clinic. The nurse hands you an EMS trip sheet that states, "Patient found unresponsive in his home. Empty pill bottles nearby. No obvious signs of trauma. Assessed vitals and transported to care facility." Aside from a set of vitals, additional details are sparse. Your nurse thinks the EMS providers may have mentioned which pills were found nearby; however, he was busy getting lorazepam drawn up and does not recall specifics.

As you are trying to figure out what happened to this little boy, your next patient arrives in respiratory distress on BiPAP. You are given a clear,

concise, uninterrupted presentation by EMS with both nursing and physician present at bedside. You receive a printed copy of the electronic prehospital note, as well as automatic sets of vitals, an ECG, and a list of interventions with time stamps. You are grateful this crew has been thorough and complete, but as you struggle to figure out what the little boy ingested, you wonder what can be done to improve the handoff

process for all patients arriving to the emergency department by EMS.

Despite unusual origins, EMS has become an absolutely essential part of patient care in the prehospital setting.¹ As true first responders, their assessment and interventions have the potential to significantly alter patient outcomes, long before they arrive in an emergency department. However, variations in education, training, protocols, health information exchange, and established guidelines for a formal transfer of care often leave a lot to be desired at the time of handoff to hospital providers.

The EMS handoff is a crucial opportunity to obtain accurate information about a patient's presenting signs and symptoms, environment, changes in

status, and response to interventions. **But physicians may not be present at the handoff of a critically ill patient.** Such a missed opportunity can lead to potential incorrect diagnoses or inefficient care in the workup of the undifferentiated patient.

The recent ACEP policy statement, "Transfer of Patient Care Between EMS Providers and Receiving Facilities," addresses the handoff:

*"In addition to a verbal report from EMS providers, the minimum key information required for patient care must be provided in written or electronic form at the time of transfer of patient care...The minimum key information reported at the time of handoff must include information that is required for optimum care of the patient - examples include vital signs, treatment interventions, and the time of symptom onset for time-sensitive illnesses."*²

Other essential information may include details of the scene and the patient's extrication, bystander reports, and clinical impressions by pre-hospital providers. These key pieces of information may help direct patient care and evaluation in the emergency department.

Rather than a single formula, however, each EMS service and each emergency department may have their own standards for appropriate transfer of care, particularly when it comes to patients of different acuity levels. In particular, high-risk handoffs should include clear and effective communication of vital information. These handoffs may benefit from algorithms such as the model proposed by the Council of Emergency Medicine Residency Directors (CORD) Transitions of Care Task Force. **The popular 5-step model developed for intra-departmental handoff includes identification of high risk handoffs, uninterrupted time and space during handoff, and opportunity for questions and clarifications.**³

By standardizing parts of the handoff and enabling open communication with the emergency physician in a calm and quiet environment, many potential barriers to safe handoff can be addressed.⁴ Of course such a standardized approach would require buy-in from both prehospital agencies and receiving hospitals, and it would need to be driven by a culture change at the administrative level. Physicians and residents involved in or interested in

THE EMS HANDOFF

A Critical Time for Critical Improvement



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EMS are in an excellent position to help cultivate this change.

One of the more difficult aspects of health information transfer and review is the fractured system of health data exchange. Electronic medical records between prehospital and hospital systems are rarely integrated, and systems that allow patient follow-up and integrated chart review are exceedingly rare. While data is being compiled at a national level with some groundwork in place via the National EMS Information System (NEMSIS), useful implementation is infrequent and often with limited practical scope.⁵

One proposed strategy has been to develop data silos in the form of statewide or regional data to target useful implementation. One such trial in Pennsylvania linked nearly 2,700 prehospital electronic records to their counterpart hospital-based EMRs and developed a model for the infrastructure needed for prehospital comparative effectiveness research.⁶ In this process, the authors of the study tackled some of the biggest barriers to good data linkage, including EMS records not being uploaded,

inadequate prehospital record databases, lack of data use agreements, and inability to access records outside of a health system partnership. This type of implementation has been shown to be feasible, albeit with a significant number of barriers.⁷ **While an integrated EMR would help facilitate ideal patient care and handoff, it would also allow for more robust research on how the quality of the patient handoff actually affects patient outcomes.**

In addition to evaluating patient outcomes, a key aspect of quality assurance and improvement includes process improvement, particularly in feedback. Some EMS agencies may have faculty or staff on hand working specifically in these areas. Feedback can be department-wide, or it may occur via direct feedback to a crew. In an effort to include the critical handoff, morbidity and mortality case reviews should include details of the EMS report whenever possible. Prior studies have confirmed that hospital-directed feedback improves performance during handoff, for both the EMS providers

and the hospital personnel accepting the patient.⁸ A relationship that fosters an environment of collaboration and systems improvement on both ends will improve satisfaction and patient care.

The emergency department and prehospital care providers are often seen as innovators of health care processes. With the frequency of high acuity patient care handoffs, it falls to emergency care providers to seek strategies to improve the first and potentially most critical transfer of care for the ill and injured. **The drive for change must start “in the trenches,” with emergency physicians serving in the resident or supervising role.** Examining institutional policies or developing new ones as part of quality improvement may reveal simple solutions that have a meaningful impact on patient care. While integrated electronic records are a far cry from complete, examining educational feedback mechanisms, working with local EMS leadership, and implementing improved handoff practices may go a long way in improving patient care. ★

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Out of Ativan?!

The Drug Shortage Crisis in the U.S.



Emergency departments across the United States have felt the effects of the growing and constantly changing list of nationwide drug shortages. These shortages have long existed on a smaller scale, but in the past 10 years the number of drug shortages has climbed to unprecedented levels. Emergency physicians now must navigate alternate drugs to replace otherwise well-established medications, adding yet another challenge to patient care in the emergency department (ED). **Although federal efforts have been made to decrease drug shortages, we continue to struggle to gain access to several life-saving medications for our patients.**

A Trial of the Past Decade

Between 2005 and 2010, the number of medications on the drug shortage list tripled (Figure 1),^{1,2} sparking the interest of the federal government. In 2011, President Barack Obama signed an executive order encouraging early reporting of potential disruptions to drug manufacturing and an expedited regulatory review of new drugs.³ The FDA followed by establishing the Food and Drug Administration Safety and Innovation Act (FDASIA) to identify

and mitigate causes of drug shortages.^{4,5} FDASIA also encouraged early reporting of impending shortages by pharmaceutical companies.

The FDA estimates its efforts prevented 700+ drug shortages between 2011 and 2014.⁶ However, multiple new and unexpected drug shortages, including prescription drugs, continue to occur annually. Although the average number of reported *new* drug shortages has declined since 2011, the number of active drug shortages remains high, and many vital medications are still difficult to obtain.² EDs are particularly hard-hit: Shortages affecting acute care medications are being seen at higher frequencies and for longer times than other drug shortages. **Thus, FDASIA may be inadequate to address drug shortages impeding emergency patient care.**⁷

Logistics

Regulatory changes in quality, evolving discrepancies between supply and demand, limited access to raw materials, and ceasing production of a medication altogether are frequently reported causes of drug shortages.⁸ However, according to the American Society of Health-System Pharmacists (ASHP), 47% of the



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drug shortages in 2014 were attributed to an unknown cause as reported by manufacturers (Figure 2).⁹

The FDA assists in mitigating shortages by locating alternative suppliers and encouraging pharmaceutical companies to increase production of medications that are expected to experience a shortage.² However, when a single supplier exists for a medication, any impediment to manufacturing that drug can be devastating, resulting in an unpredictable shortage with limited solutions. When this occurs, judicious use, rationing, and smaller dosages may be required until supplies can be reinstated.^{7,10}

Drug shortages also affect the overall costs of medical care. Mismatch of supply and demand increases drug pricing (both for the drug in short supply and for the substitute medication), alternative drugs sell at different price points, and the need to acquire supplies from overseas

changes packaging and shipping costs. For example, the recent shortage of normal saline production in the United States has resulted in the import of intravenous fluids from suppliers in Norway, Germany, and Spain, presumably causing prices to skyrocket.²

Disrupting Patient Care

Emergency physicians and patients expect timely, effective, and accurate treatments for acute medical conditions. Unfortunately, sterile injectable drugs germane to emergency medicine are the most frequently affected by drug shortages.⁷ Examples have included resuscitation drugs (etomidate, epinephrine, succinylcholine, and atropine), intravenous electrolyte solutions, and several broad-spectrum antibiotics (vancomycin, piperacillin/tazobactam, and multiple cephalosporins).^{7,11} In the past year, we have witnessed shortages of common medications used every day in EDs across the country: prochlorperazine, propofol, lorazepam, diltiazem, mannitol, and hypertonic saline.

Physicians, nurses, and pharmacists memorize doses of medications required to treat acute medical conditions immediately and without delay. When medications in that armamentarium are no longer available, lesser-known medications are required. Less familiarity with these substitute medications increases the risk for errors. Additionally, when the drugs

previously deemed “standard of care” are no longer available, patients do not receive optimal care. **So far, several deaths have been attributed to lack of necessary drugs or inferior alternatives.**¹² Furthermore, if drug shortages affect medications in the same class (eg, anti-epileptics or broad-spectrum antibiotics), this risk increases significantly. That being said, current evidence is largely anecdotal; further research is needed to demonstrate the actual impact drug shortages are having on patient safety in the ED.

Vital Actions

Since the spike of shortages in 2011, the government has taken steps to decrease the number of new shortages, find alternative manufacturers for short-supplied products, and give providers early warnings of potential shortages. A number of drug shortages can be expected, but shrinking the shortage list and preventing new drugs from being added to it will be vital to sustainable practice.

Providers should be aware of which drugs are on the shortage list or may experience limited availability in the near future.

Formal announcements and education of ED personnel can decrease the risk of adverse events when transitioning from a commonly known drug to an alternative. For drugs used in rapid sequence intubation or cardiac arrest, post alternative medications and doses

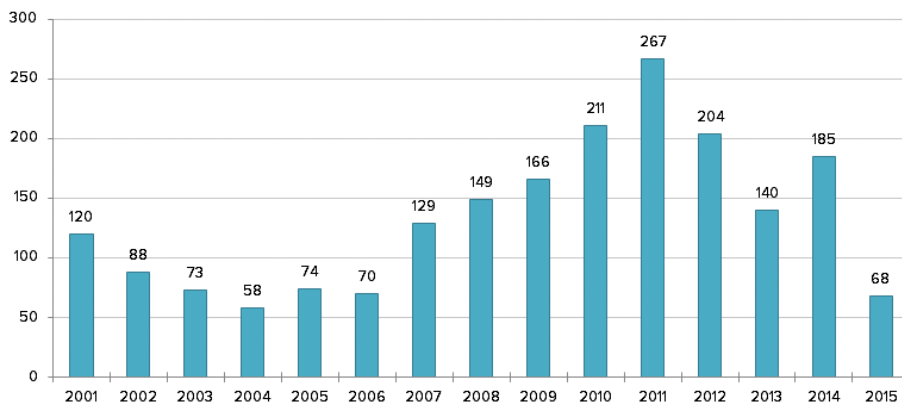
in resuscitation bays to help prevent errors. Physicians and emergency staff can advocate for their patients by becoming involved in medication management or pharmaceutical and therapeutic committees. Finally, further research on how drug shortages are affecting the ED patient population is also needed. **We should feel empowered to take on the task of evaluating how the drug shortage crisis is impacting the stabilization of acute medical conditions.**

Free resources are available with current information on drug shortages and FDA actions, including:

- FDA Drug Shortages Web page (fda.gov/Drugs/DrugSafety/DrugShortages/default.htm);
- Searchable ASHP Drug Shortages website (ashp.org/menu/DrugShortages);
- FDA’s Drug Shortages mobile app, available for free on iTunes or Google Play.

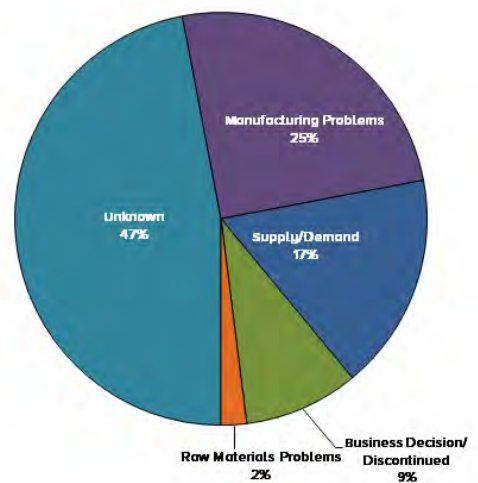
*Special thanks to Devon E.S. Johnson, PharmD, BCPS, Clinical Pharmacist, Emergency Medicine at Vidant Medical Center, for her assistance with this article. **

FIGURE 1. New Drug Shortages by Year, January 1, 2001 to June 30, 2015



Based on information obtained from American Society of Health-System Pharmacists Drug Shortages Statistics (2015) and the University of Utah Drug Information Service.

FIGURE 2. Reasons for National Drug Shortages (2014)



Based on information obtained from American Society of Health-System Pharmacists Drug Shortages Statistics (2015) and from data reported by manufacturers to the University of Utah Drug Information Service.



Toxic Shock Syndrome

A 36-year-old man presents to the emergency department (ED) with altered mental status. Family reveals no significant medical history outside of recurrent epistaxis and a progressive flu-like illness for the past week. Vital signs are: temperature 39.4 degrees Celsius, heart rate 128, blood pressure 88/56, respiratory rate 24 breaths per minute, and oxygen saturation 98% on room air.

Physical exam reveals an obtunded patient responsive only to painful stimuli. Desquamation of the palms is noted, as well as diffuse macular erythroderma. Unilateral nasal packing is found on inspection of the right nasal cavity. Lab studies are remarkable for white blood cell count of 42,000 cells/ μ L, creatinine of 3.4 mg/dL, total bilirubin of 4.3 mg/dL, and lactate of 5.4 mmol/L. The clinician suspects toxic shock syndrome and begins aggressive fluid resuscitation.

Pathogenesis

Toxic shock syndrome (TSS) refers to an infection with *Staphylococcus aureus* or *Streptococcus pyogenes* that results in the release of bacterial toxins. Toxic Shock Syndrome Toxin-1 (TSST-1) was the first toxin identified, but many others (eg, enterotoxins B, C, D, and E) also have



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TABLE 1. Staphylococcal toxic shock syndrome (TSS) 2011 Case Definition

Clinical Criteria (must meet all 5 criteria)
Fever: temperature greater than or equal to 102.0°F (greater than or equal to 38.9°C)
Rash: diffuse macular erythroderma
Desquamation: 1-2 weeks after onset of illness, particularly on the palms and soles
Hypotension: systolic blood pressure less than or equal to 90 mm Hg for adults or less than fifth percentile by age for children aged less than 16 years; orthostatic drop in diastolic blood pressure greater than or equal to 15 mm Hg from lying to sitting, orthostatic syncope, or orthostatic dizziness
Multisystem involvement (three or more of the following)
<ul style="list-style-type: none"> • Gastrointestinal: vomiting or diarrhea at onset of illness • Muscular: severe myalgia or creatine phosphokinase level at least twice the upper limit of normal • Mucous membrane: vaginal, oropharyngeal, or conjunctival hyperemia • Renal: blood urea nitrogen or creatinine at least twice the upper limit of normal for laboratory or urinary sediment with pyuria (greater than or equal to 5 leukocytes per high-power field) in the absence of urinary tract infection • Hepatic: total bilirubin, alanine aminotransferase enzyme, or aspartate aminotransferase enzyme levels at least twice the upper limit of normal for laboratory • Hematologic: platelets less than 100,000/mm³ • Central nervous system: disorientation or alterations in consciousness without focal neurologic signs when fever and hypotension are absent
Laboratory Criteria
<ul style="list-style-type: none"> • Blood or cerebrospinal fluid cultures blood culture <i>may</i> be positive for <i>Staphylococcus aureus</i> • Must have negative serologies for Rocky Mountain spotted fever, leptospirosis, or measles, if obtained.

CDC the Centers for Disease Control and Prevention (CDC) clinical criteria for diagnosis of staphylococcal toxic shock syndrome.⁵

been observed to produce TSS. As infection develops, these toxins are released hematogenously and act as superantigens eliciting an exuberant immune response. Large numbers of activated T-cells result in a massive cytokine release, thus producing a shock state.¹

Epidemiology

TSS was first described in 1978.² Reports increased in the 1980s as TSS became associated with the use of super-absorbent tampons. The last population-based assessment of TSS from 1986 revealed an annual incidence of 0.53 cases per 100,000 persons in the U.S.³ While

TSS has become synonymous with tampon use, current literature shows roughly half of reported cases are not related to menstruation.⁴

Nonmenstrual cases^{4,5} have been reported in patients with surgical wounds, postpartum infections, focal cutaneous and subcutaneous lesions, adenitis, bursitis, deep abscesses, respiratory infections following flu, burns, and osteomyelitis.

Overall mortality attributed to TSS has decreased from 5.5 to 1.8%; however, nonmenstrual TSS still has a mortality rate of 6%^{6,7} — likely secondary to decreased provider recognition.

Diagnosis

TSS should be considered in all patients with fever, rash, hypotension, and evidence of organ dysfunction. Evaluation should include a thorough physical exam and targeted imaging to identify foreign bodies or other brewing sources of infection. Lab studies should include complete blood count, basic metabolic and hepatic function panels, blood cultures, and a lactate level.

Clinicians should carefully consider other life-threatening diagnoses, such as meningitis/encephalitis, septic shock, Steven's Johnson Syndrome/Toxic Epidermal Necrolysis, Staphylococcal Scalded Skin Syndrome, and necrotizing soft tissue infection. Because no specific diagnostic test exists for TSS, the CDC clinical criteria are used for diagnosis (Table 1).⁵ **Cases are confirmed if patients meet all 5 of the CDC-defined clinical criteria and 1 lab-based criterion.** Clinical criteria include fever, rash, desquamation, hypotension, and multisystem involvement. Lab-based criteria include blood or CSF cultures positive for *Staphylococcus aureus* and negative studies suggesting alternative etiologies.

TABLE 2. Suggested Empiric Antimicrobial Regimens for TSS⁹

- Penicillin G 24 million units/day IV in divided doses (Streptococcal TSS) OR
- Nafcillin 2 gm IV q4h or Oxacillin 2 gm IV q4h (Staphylococcal TSS) AND
- Clindamycin 900 mg IV every 8 hours (suppress toxin production)

Consider:

- Vancomycin 15-20 mg/kg gm IV every 12 hours (if MRSA suspected or penicillin allergy)
- Piperacillin-tazobactam 4.5 gm IV q8h (if gram negative infection suspected)
- IVIG 1 gm/kg on day 1, then 0.5 gm/kg on days 2 and 3 for refractory hypotension

**Antimicrobial regimes vary institutionally and local hospital protocols should be evaluated.*

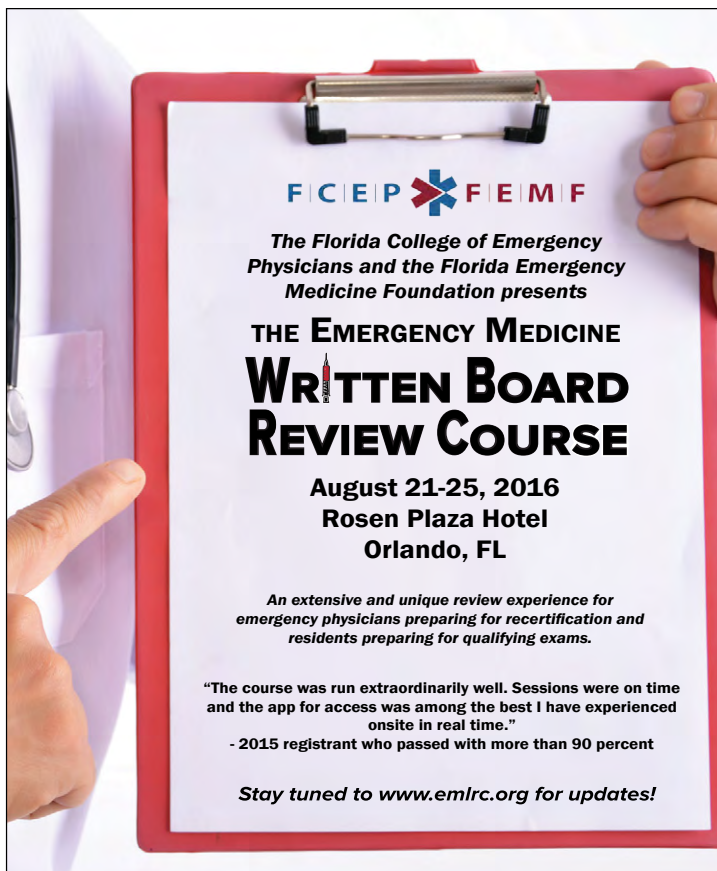
***Duration of therapy is individualized; minimum of 14 days if associated bacteremia*

It is important to note that group A *Streptococcus* can cause Streptococcus toxic shock syndrome (STSS), which presents in similarly to staphylococcal toxic shock syndrome and is diagnosed based on isolation of group A *Streptococcus* from a normally sterile site (eg, blood, CSF, joint, or pleural fluid) in combination with hypotension and involvement of 2 or more organ systems. STSS most often occurs in association with infection of a cutaneous lesion; however, it may occur with infection at any site.⁸

Treatment

Initial treatment for patients with TSS includes aggressive fluid resuscitation and vasopressor therapy with the goal

of restoring end-organ perfusion. Broad antimicrobial therapy must be initiated early and should include agents with activity against both *S. aureus* and *S. pyogenes* (Table 2).⁹ Removal of indwelling foreign bodies, surgical debridement, or drainage of infection may be necessary to achieve source control. These patients require admission to the intensive care unit, and clinicians may need to consult with general surgery and/or dermatology. Cases refractory to initial resuscitation may benefit from intravenous immunoglobulin. It is suspected to assist patients who are immunosuppressed or who are otherwise unable to produce an adequate antibody response to the toxins.¹⁰ *



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Freak Out or Chill Out?

Approximately one-half of all infants presenting with ALTE will leave the hospital without a specific diagnosis.

Approach to Apparent Life Threatening Events

Nothing terrifies a parent more than watching their child go limp or struggle to breathe. The term “apparent life threatening event,” or ALTE, was established in 1986 by the National Institutes of Health Consensus Development Conference on Infantile Apnea and Home Monitoring.¹ By itself, ALTE is not a specific diagnosis, but a constellation of symptoms in which the child exhibits some combination of apnea, change in color, change in muscle tone, coughing, or gagging that causes distress for the observer.¹ The challenge for the emergency physician is to effectively manage the immediate event, decide what tests to order, attempt to discern the underlying cause, and determine the need for further monitoring.

While the true incidence is not known, **ALTEs are believed to occur in 0.5% to 6% of all newborns, and they account for approximately 1% of all emergency department (ED) visits in children younger than 1 year old.**^{2,3}

No good predictor identifies children who will suffer from an episode, have repeat episodes, suffer long-term sequelae, or ultimately die from these events. However,

prematurity and maternal smoking are understood to be significant risk factors for ALTEs. Additionally, an ALTE is more likely to be significant if there is true color change, change in muscle tone, or if the episode necessitates vigorous stimulation, mouth to mouth, or CPR.⁴

The preliminary differential diagnosis for ALTE is extensive. Even with a thorough (and potentially costly) evaluation, approximately half of all infants presenting with ALTE will leave the hospital without a specific diagnosis. **When a diagnosis is made, the most common conditions are gastroesophageal reflux, seizure, and respiratory tract infection.** But a wide differential is imperative so that no diagnosis is overlooked. The differential should include other pathologies within the gastrointestinal, neurologic, and pulmonary systems, as well as cardiovascular, metabolic, and even non-accidental processes.

Gastrointestinal

Gastroesophageal reflux is a diagnosis of exclusion. Therefore, a detailed history is crucial. Specific questions aimed at eliciting a temporal association between



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feeding and the event will help identify any potential gastrointestinal cause of an ALTE. Was there an episode of emesis immediately preceding the event? Was the infant trying to swallow when the event occurred? The answers to these questions can help differentiate between reflux-induced laryngospasm causing apnea and anatomic malformations such as tracheoesophageal fistula, laryngeal cleft, or other pathologies that will require an upper GI fluoroscopic study.

Neurologic

Determining the level of consciousness and presence of any clonic movements or abnormal eye positioning can identify neurologic sources for an ALTE.

Seizures have been noted to cause 4-15% of ALTEs and are known to have a particularly high risk of sudden death in this population.⁷

⁸ Practitioners frequently debate which came first: seizure or apnea? Could one

be triggering the other, or are these separate but nearly simultaneous events? Sometimes, apnea may be the only manifestation of seizure activity. As a result, an EEG may be needed. Other potentially deadly neurologic causes that must be considered include CNS tumors, subdural hematomas, and Arnold-Chiari malformations.

Infectious

Always inquire about infectious symptoms. Has the infant been febrile or around any potential ill contacts? Does the infant have rhinorrhea, a cough, or foul-smelling urine? Infectious causes of ALTE often include upper and lower respiratory tract infections. Additional causes include UTIs, meningitis, bacteremia, botulism, and sepsis. **For some infections, such as respiratory syncytial virus (RSV) and pertussis, apnea while sleeping may be the only presenting symptom.** It typically manifests early in the course of the illness and is caused by either respiratory muscle fatigue and/or hypoxemia.

Pulmonary

Breath-holding spells occur in approximately 3% of all children, with more than 25% of these patients manifesting signs and symptoms before 6 months of age.⁹ These events, which frequently present as ALTEs, are typically in response to painful or noxious stimuli, and the spells are often reflexive and involuntary. The breath-holding spell can lead to a physiologic right to left intrapulmonary shunt, with deoxygenated blood bypassing the alveoli and returning to the systemic circulation. Often, this can cause the infant to become cyanotic within approximately 5 seconds of the stimulus. To further complicate this picture, the infant could lose consciousness and have a seizure or posturing during the episode.

Other significant respiratory causes of ALTE, although rare, include obstructive sleep apnea (typically in infants with craniofacial abnormalities or large tonsils and arytenoids), CNS disorders causing abnormal respiratory drive — such as an immature or dysfunctional respiratory center (ie, apnea of prematurity or central hypoventilation syndrome), vascular malformations, and carbon monoxide poisoning.

Non-Accidental Trauma

Non-accidental trauma (NAT) should never be overlooked in the child presenting with ALTE. In one study, 1 out of every 40 admissions for ALTE was caused by NAT.^{10, 11} In cases of suspected NAT, a fundoscopic exam, skeletal survey/bone scan, and brain imaging are useful. Other causes not readily diagnosable through imaging include smothering, poisoning, and cases of factitious disorder imposed on another (a.k.a. Munchausen syndrome by proxy). Bleeding around the mouth or nose and petechiae on the eyelids should prompt directed questioning, as these are common signs of asphyxiation caused by smothering. In cases of factitious disorder imposed on another, the mortality can be as high as 10%, as the time from initial presentation to diagnosis averages 15 months.¹² Therefore, a high index of suspicion is imperative when the history does not correlate with physical findings.

Metabolic

Although rare, metabolic causes for ALTE typically present as very severe ALTEs. Causes include hypoglycemia, hypocalcemia, disorders of fatty acid oxidation (most commonly medium-chain acyl-CoA dehydrogenase deficiency), urea cycle disorders, and mitochondrial disease. A metabolic cause of an ALTE should move up the differential when the ALTE is more severe, the infant is ill-appearing, in cases of consanguinity, and in infants with a positive family history for metabolic disorders.⁹

Cardiovascular

Additional rare but potentially serious causes of ALTEs include those of cardiovascular origin. While most tachydysrhythmias or prolonged QT syndromes will be caught on a screening ECG, other causes may necessitate further evaluation by echocardiography. These causes include patent ductus arteriosus, atrial and/or ventricular septal defects, hypoplastic left ventricle, fibroelastosis, or cardiomyopathy.⁶

Workup

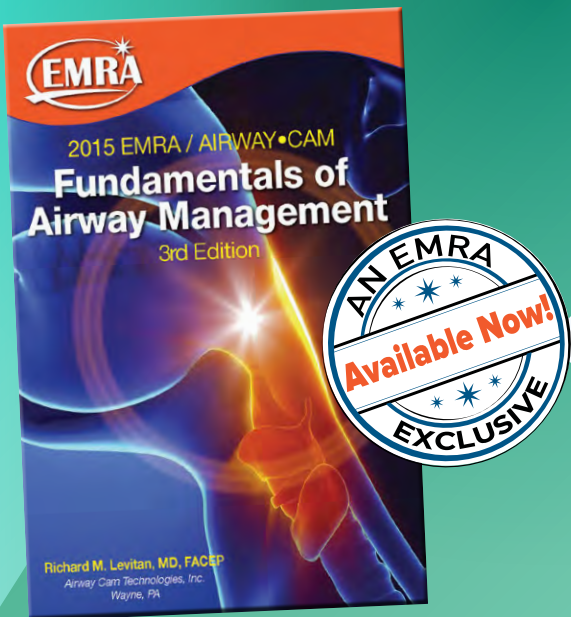
The initial evaluation in the ED is crucial for determining which patients need to be admitted. The potential to order invasive, ultimately unnecessary tests is extremely high. Hospitals vary in

their approach to the initial diagnostic workup for ALTE. Historically, some studies have recommended a minimum initial diagnostic panel including a CBC with differential, C-reactive protein, glucose, sodium, potassium, urea, calcium, magnesium, ammonia, lactate, pyruvate, arterial blood gas, urinalysis, toxicology screen, EKG, and assessments for Bordetella pertussis and RSV if presenting during the appropriate season.¹³ In reality, the most common diagnostic tests obtained are complete blood cell count (70%), electrolytes (65%), chest x-ray (69%), EKG, (36%), and upper gastrointestinal fluoroscopy (26%).⁵ Currently, it is more commonly accepted to let the history and physical exam drive the initial management, and then expand if necessary based on the patient's clinical course.

After assessing the patient and obtaining the appropriate tests, the question remains: Who should be admitted to the hospital? This is a highly debated topic - and one that is not easily answered. **High-risk infants (those who have had repeated events), suspected seizure, NAT, or cardiovascular pathology, infants who continue to be altered in the ED, and those with abnormal tests or imaging should be admitted.**¹⁴ As for low-risk patients who have returned to their baseline and remain without an obvious cause, there is no required or recommended length of observation. Follow-up and family comfort level must be taken into consideration when considering discharge.

Conclusion

Starting the workup of an infant who has experienced an ALTE can seem overwhelming. Although nearly half of all patients will leave without a diagnosis, the majority will be found to have an episode that was caused by gastroesophageal reflux, seizure, or respiratory infection. An initial diagnostic panel should be ordered based on the infant's clinical presentation and the clinician's degree of suspicion. Again, a thorough history and physical exam is the most important aspect of evaluation when determining which children are most at risk. With this approach, any clinician should feel prepared to tackle the ALTE. ★

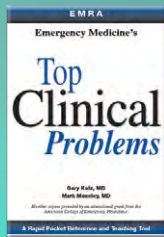
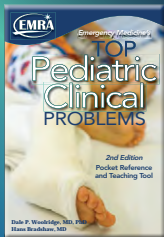
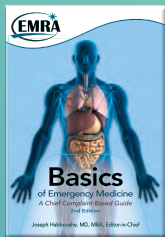


By Richard M. Levitan, MD

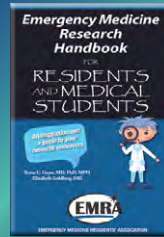
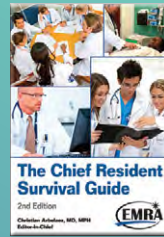
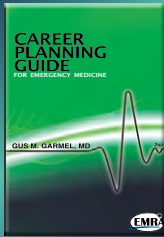
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From Bookshelf to Bedside

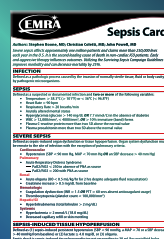
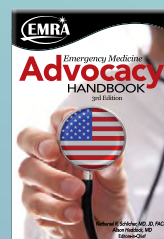
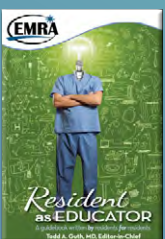
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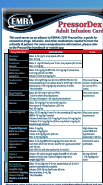


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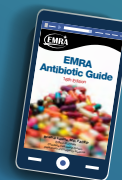
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On Being *Best*

The first-ever Emergency Medicine Wellness Week™ was observed this January. It was a good opportunity to take stock of wellness on a personal, program-based, and profession-wide level. Any resident worth a salary knows that ignoring our own fallibility is a good way to end up in trouble. This got me thinking about my own psychological well-being and the techniques I use to protect it.

Psychological well-being is something we preach. We've studied the DSM, interviewed PTSD patients, seen "vicarious trauma" as an option on written exams. Yet, despite shifting paradigms (even the Armed Forces now recognize that "suck it up" is not often a valid response to personal suffering), health care workers often view themselves as psychologically invincible. We get uncomfortable at the thought of being susceptible to the same psychological ailments as our patients.

Most of us have been spent at least 10 years and hundreds of thousands of dollars on higher education. We've delayed other parts of our lives, we've sacrificed, and we know how to be tough — sometimes too tough and too self-sacrificing.

Suicide rates among medical students, residents, and staff physicians are alarming. Depression, substance abuse, and marital disharmony are also present in the ranks. Yet our own mental health continues to be the elephant in the room. Learn to recognize in yourself the same red flags you would note in a patient, and have a management strategy at the ready should you need it.

This is hard; most of us are Type-A personalities who view struggling as a weakness. We frown on "touchy-feely" sentiments and set aside both small and large stressors. It's akin to having chest pain on a run, ignoring it, having chest

pain at rest, ignoring it, getting sweaty and pale while having chest pain one morning, ignoring it, and then...you get the idea. There is no strength or intelligence in waiting to fall apart.

Compassion Fatigue in Health Care

When we stop being nice to ourselves, our colleagues, and our patients, something is seriously wrong. It indicates a process that leads to hypo- and hyper-arousal during crises and results in underperformance. Compassion fatigue makes us susceptible to vicarious trauma, PTSD, and suicidal ideation. Signs include negativity, diminished tolerance for ambiguity, intrusive thoughts about difficult patient situations, dread of going on shift, anger, depression, absenteeism, and organic illness.

Conclusion

Your mental health is extraordinarily important; refresh your memory of the services available to you through your employer (e.g., employee assistance plans, extended health benefits, and wellness services), your school (e.g., resident affairs offices and social supports), and your communities. Residency should be an enjoyable and healthy part of your life and lead you to prosper in your profession, your relationships, and your own sense of wellbeing.

So, to all my fellow Type A's, be the BEST at self-care. Or nothing else will matter. ★

How Do We Fix It?

Time does not heal all wounds — it's what you do with time that aids healing. Don't stop using what already works for you, but consider these additional tips.

Change your physiology in 2 minutes. Inhale through your nose; exhale through your lips as if they were wrapped around a straw.



Shift your thoughts: If you shift your attention, your previous overwhelming emotions will usually subside in 90 seconds.



Practice gratitude: Research shows that if you have gratitude, you are much more likely to have happiness.



Journaling: Not for everyone, I admit, but put pen to paper, and you just might run out of ink.



Exercise humor! It's essential in all health care environments.



Speak up! If a colleague is struggling, call them out on it in a sensitive way. Give them permission to talk about how stress is negatively manifesting.





Your Chance to Be a Leader

EMRA is looking for motivated members who want a chance to hone their leadership skills. Become a vice chair for any of EMRA's 17 committees and divisions.

Applications are due Feb. 15, including the application form, letter of interest, CV, and a letter of support from your program director. All applicants must be members of EMRA.

Committee and division vice chairs serve a 2-year term: the first year as vice chair, followed by automatic succession to chair. It's an unbeatable opportunity to connect with like-minded peers and grow as a leader in the profession.

APPLY BY FEBRUARY 15!

Find details at emra.org/committees-divisions/EMRA-Committee-and-Division-Application.

A Cure for High Hotel Bills



Each year, the interview season brings a flurry of travel – and a blizzard of bills. Flights, rental cars, Uber rides, hotels, meals... it all adds up. Quickly.

But an online community founded by Megan Tresenriter and Jessica Paz, fourth-year medical students at UC-Davis, is offering a cure for at least part of the challenge. **Swap & Snooze** (swapandsnooze.com) connects medical students going through the match process with others who have volunteered to open their houses to interviewees. It's free, and it relieves pressure on the wallet during an already stressful time.

Swap & Snooze continually adds hosts throughout the country, and it recently launched **Share & Snooze**, which helps interviewees coordinate to split the cost of a hotel, meals, ground transportation, etc.

"Since Oct. 1, we've verified over 450 members from over 100 schools," Tresenriter said. "We've even had a group from Australia contact us about spreading the word to their applicants."

Paz said they're working to ensure Swap & Snooze is sustainable. "We also want to offer other avenues to help applicants save some money," she added.

Find details at swapandsnooze.com.



Abstracts for Annals

Now in its 18th year, the Residents' Perspective section in *Annals of Emergency Medicine* is made up entirely of articles written by EM residents and fellows. The purpose of the column is to create a forum for the discussion and analysis of topics affecting trainees in the specialty. They are written as informative instructional pieces, educational research, referenced position papers, or unique resident perspectives on current topics.

Submit an Abstract for Consideration!

Authors of promising abstracts will be invited to submit a full manuscript for peer review. Themes of interest this year include:

- Either primary research or information about research using methods *other than comparative statistics*, such as descriptive statistics, qualitative research, complex systems modeling, etc.;
- Future of the practice of emergency medicine, including but not limited to the future of the role of the emergency department and emergency physicians;
- Gaps in emergency medicine training;
- Disparities in emergency medicine, academic emergency medicine, and delivery of emergency medical care.

Abstracts are limited to 300 words and should be double-spaced. Submit your abstract to annalsfellow@acep.org. Email subject should read "Resident Perspective Submission – author's last name." Invited manuscripts will undergo the same peer review process as all other submissions to *Annals*. Find more at annemergmed.com/content/categories#residentsperspective.



Applications for EMRA's spring awards are due Feb. 15, and we are searching high and low for the most deserving EMRA members.

Complete the online application in time to be considered for any of the 17 awards offered in the spring. There are opportunities for travel, research, continued scholarship, and straight-up kudos for work well-done. Find details at emra.org/awards.

#EMDocsRock!



Time to start dropping hints: **EM Residents' Appreciation Day** is just around the corner, on **March 2**.

Always held the first Wednesday of March, EM Residents' Appreciation Day honors the dedicated service residents provide 24/7. Not only are EM residents working tirelessly on behalf of their patients, but also on behalf of the profession as a whole. Through education, research, advocacy, and leadership efforts, residents provide the spark in the engine of emergency medicine.

EMRA encourages all EM residency programs, ACEP state chapters, and institutions to join us in celebrating this day, through any number of local activities. Let us know how you're going to highlight the fact that **#EMDocsRock!** Find details at www.emra.org/Events/EM-Residents--Appreciation-Day.

Speak Up to Help Steer the Ship

One of the most unique and powerful privileges of membership in EMRA is participating in the policymaking process. We're listening – and it's your turn to talk.

EMRA's official spring **Call for Resolutions** is underway, with submissions due **March 28**. If you have ideas about existing EMRA initiatives or policies, or you want to suggest a new direction, write a resolution. The EMRA Representative Council (Rep Council) will review and vote on each and every suggestion. If a resolution is passed by the Rep Council, it becomes a binding call to action.

Resolutions must be properly written, so get the template at emra.org/Content.aspx?id=302, and then put your voice to good use.

Making 2016 a Year of Wellness

Did you make a pledge for the first-ever **Emergency Medicine Wellness Week™** in January? Did you keep that pledge?

The inaugural wellness week kicked off 2016 with a focus on taking care of the caregivers – primarily by making your own wellness a priority. From getting more sleep and/or exercise to practicing gratitude and connecting with friends, pledges abounded in the social media universe. We want to keep the momentum rolling all year long.

Keep up the good work you started during Emergency Medicine Wellness Week™ and encourage others to do the same by sharing your efforts through **#EMWellnessWeek** posts.



PHOTO CREDIT: RENEEMEDIA

Generations of Care

Phillip M. Harter, MD, FACEP, associate professor of emergency medicine at Stanford School of Medicine, visited the EMRA Studio at the Residency Program Fair in Boston to show support not only for the specialty, but also for his daughter – second-generation emergency medicine resident Katherine Harter, MD. The Drs. Harter are building a family tradition of dedication to patients and EM learners.

UPCOMING EVENTS

- February 15 [EMRA C&D Vice-Chair Applications Due](#)
- February 15 [EMRA Medical Student Council Applications Due](#)
- February 15 [EMRA Spring Awards deadline](#)
- March 2 [Emergency Medicine Residents' Appreciation Day](#)
- March 4 [SIMWars @ SAEM Team Applications Due](#)
- March 6-9 [CORD Academic Assembly Nashville, TN](#)
- April 9 [Medical Student Symposia Columbus, OH](#)
- May 10-13 [SAEM Annual Meeting New Orleans, LA](#)
- May 15-18 [Leadership & Advocacy Conference Washington, DC](#)



PHOTO BY DAN SULLIVAN

Walls and Progress

A mild winter in Texas has led to noticeable progress on the new ACEP headquarters. Construction has been underway for months, but as crews raised the walls in January, the building sprang from the pages of a blueprint into living color.

DONATE A BRICK

“Pave the Way”
for the
Future of
Emergency Medicine



You've built your career in emergency medicine—now is your chance to build the future of the specialty.

In 2016, ACEP is moving to a dynamic new headquarters in Irving, TX. To ensure that emergency medicine research always has a home in ACEP's new building, you can add your personalized brick to the EMF Plaza, a beautiful collection of brick pavers in the courtyard.

For \$250, residents will have a personalized brick in the EMF Plaza, receive a brick certificate, and recognition in EMF's newsletter, *SCOPE*, and *ACEP Now*.

Donate today! EMFoundation.org/PaveTheWay

Diagnose this Rash



PHOTOS COURTESY OF
LAWRENCE B. STACK, MD



The Patient

A 36-year-old female presents to the emergency department complaining of a rash. She states that she has experienced this type of rash once before, but the rash is worse this time. She denies trauma, direct chemical contact, or any other exposures. She has no known autoimmune disorder or inflammatory bowel disease, joint pain, or back pain. She states that she smokes, abuses alcohol, and occasionally uses cocaine. She has had a low grade fever but has no other complaints at this time. When she had the rash before, it primarily involved her left earlobe, nose, and extremities. On this presentation, it is most prominent on her right leg (See images).

What is the diagnosis?

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Chief Medical Officer
TriStar Skyline and
Hendersonville Hospitals
Nashville, TN

Saralyn Williams, MD
Associate Professor of Emergency
Medicine, Medicine and Pediatrics
Department of Emergency Medicine
Vanderbilt University

See the
DIAGNOSIS
on page 40

The Diagnosis

This patient has acute levamisole induced vasculitis. Levamisole was first used as an antihelminthic for human and veterinary use. Initial human use in the 1970s for inflammatory conditions resulted in publications of levamisole-associated agranulocytosis and vasculitis. In 2003, the U.S. Drug Enforcement Agency identified levamisole as an adulterant in cocaine. In 2009, case reports of agranulocytosis and vasculitis associated with levamisole-contaminated cocaine were published. The dermatologic manifestations may include retiform purpura with possible skin necrosis and tend to appear on the ears and nose but can affect any area of the body. Case reports of levamisole associated complications suggest a high level of recurrence upon re-exposure to levamisole-contaminated cocaine.

Complications have been reported from both cocaine hydrochloride and crack cocaine, via all methods of use. The reason for adulterating the cocaine with levamisole is not clear, but it is thought the levamisole enhances the effects of cocaine. For both the agranulocytosis and the cutaneous vasculopathy, serologic testing assists with the differential diagnosis; however, no one classic pattern is diagnostic for levamisole as the etiologic agent. In the setting of agranulocytosis, neutropenic fever may occur and should be managed accordingly with antibiotics. Deaths from infectious complications have occurred. Cessation of exposure to the levamisole-adulterated cocaine is imperative.

TERMS

Sensitivity: Ability of a test to detect a disease when it is present

Specificity: Ability of test to detect absence of disease

	Test +	Test -
Disease +	A	B
Disease -	C	D

Sensitivity = $A/(A+C)$

Specificity = $B/(B+D)$

Example: The NEXUS cervical spine rule has been shown to have a sensitivity of between 90-99% and a specificity of 36-38%, depending on the source.

What does this mean?

Sensitivity: The NEXUS criteria will be positive for 90-99% of patients that have a cervical spine injury. (Alternatively, the NEXUS criteria will be negative for 1-10% of cervical spine injuries in patients that have an injury.)

Specificity: The NEXUS criteria will be negative for 36-38% of patients that do not have a cervical spine fracture. (Alternatively, the NEXUS criteria will be positive for 62-64% of patients without a cervical spine injury.)

Rapid Research Review

****Extra Point: Do NOT use sensitivity or specificity to predict presence or absence of disease. It should only be used to understand the test's characteristics.****

Board Review

QUESTIONS

Provided by *PEER VIII*. *PEER (Physician's Evaluation and Educational Review in Emergency Medicine)* is ACEP's gold standard in self-assessment and educational review. These questions are from the latest edition of *PEER VIII*. **For complete answers and explanations, visit emresident.org (Features section).**

To learn more about *PEER VIII*, or to order it, go to www.acep.org/bookstore.



- In a patient with confusion, a primary psychiatric disorder is suggested by:
 - Disorientation
 - Fluctuating level of consciousness
 - Gradual onset
 - Visual hallucinations
- A child who accidentally ingested her grandmother's glyburide developed hypoglycemia and a depressed level of consciousness that were reversed with the administration of dextrose by prehospital providers. Which of the following agents should be administered next?
 - Diazoxide
 - Glucagon
 - Octreotide
 - Somatostatin
- Which of the following is the most common single organ system injury associated with death in children?
 - Abdominal injury
 - Cervical injury
 - Head injury
 - Thoracic injury
- Which of the following is the preferred site for emergent intraosseous needle placement in a 6-month-old child?
 - Distal femur
 - Humerus
 - Proximal tibia
 - Sternum
- The most common type of primary headache is:
 - Cluster headache
 - Migraine headache
 - Tension headache
 - Trigeminal neuralgia

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



RISK MANAGEMENT PITFALLS

Urinary Tract Infections



From the July 2014 issue of *Emergency Medicine Practice*, “Diagnosis and Management of Urinary Tract Infections in the Emergency Department.” Reprinted with permission. To access your EMRA member benefit of free online access to all *EM Practice*, *Pediatric EM Practice*, and *EM Practice Guidelines Update* issues, go to ebmedicine.net/emra, call 1-800-249-5770, or send e-mail to ebm@ebmedicine.net.

❶ **“Fever and tachycardia are routine with pyelonephritis, and I only need to screen for sepsis if the patient looks septic.”**

The definition of sepsis has recently been defined much more broadly by the Surviving Sepsis Campaign guidelines. A patient needs only to have a source of infection and 2 of 24 criteria positive to meet the current definition for the diagnosis of sepsis. Fever and tachycardia, which are frequently present in pyelonephritis, qualify the patient as having sepsis by the Surviving Sepsis Campaign guidelines. Nonetheless, in our view, the criteria for sepsis cannot be interpreted to mean that every patient who presents febrile and tachycardic must be admitted. Rather, the presence of fever and tachycardia should serve as a trigger to treat the fever and tachycardia and to consider further workup for the presence of sepsis as a definite process. IV fluids are indicated as well as treatment of the fever. Further laboratory tests (such as a complete blood count, a basic metabolic profile, and a lactate level) can be considered to see if more criteria for sepsis are present. Select patients can be safely sent home on a case-by-case basis; the first dose of parenteral antibiotics prior to discharge and mandatory follow-up in 24 hours is warranted.

❷ **“I don’t think about also prescribing pain and nausea medications for home.”**

Patients return to the ED for preventable and unpreventable reasons. Unpreventable reasons include new resistance patterns and poor response to appropriate therapy. Preventable reasons include use of an antibiotic with known high resistance in the community, poor patient compliance, and inadequate treatment of pain and nausea. The emergency clinician can reduce the preventable returns by reinforcing the need to take the full course of antibiotics, by prescribing according to local antibiotic stewardship programs and antibiograms, and by prescribing medications for pain and nausea control in addition to antibiotics at discharge.

❸ **“Her heart rate is still 120 beats/min, but that is just part of having a UTI. She will be fine.”**

A certain percentage of patients will return, even with sepsis, after being appropriately diagnosed and treated. To decrease the risk of bounceback or occult sepsis, emergency clinicians are encouraged to resolve abnormal vital signs before discharge. Pyrexia should be treated. If the tachycardia is associated with dehydration, intravenous fluids should be administered. It should be clear to anyone reviewing the chart that the practitioner searched for and reasonably ruled out the presence of clinical sepsis.

❹ **“He has a positive urine dipstick, so my work here is complete.”**

When performing a fever workup, it can be tempting to assume a diagnosis of UTI or pelvic inflammatory disease in a patient with a fever and trace or 1+ leukocytes. Particularly in the case of a patient with high fever, abnormal vital signs, or immunosuppression, it is important to consider other possibilities. The emergency clinician should also bear in mind that fever is relatively uncommon in isolated cystitis. Strategies to reduce risk include gathering history and physical examination information to rule out other causes of infection, catheterization of the urinary bladder to obtain a more reliable sample, and running a microscopic urinalysis to confirm the presence of leukocytes and rule out the presence of contamination.

❺ **“I didn’t know *that* counted as a complicated UTI.”**

UTIs will behave differently in different patients. It is important to consider the host patient as well. Has the patient been recently hospitalized or is the patient immunosuppressed? Does the patient have diabetes mellitus? Conditions that weaken the host should be considered.

❻ **“I didn’t know appendicitis could cause pyuria.”**

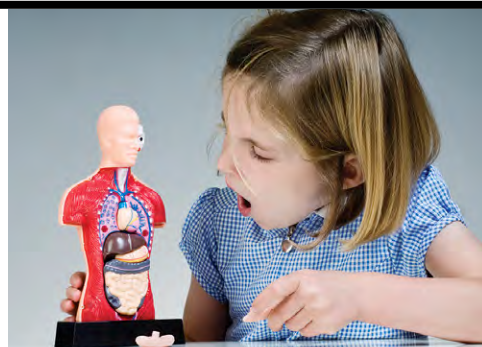
In the case of lower abdominal pain, the presence of trace or 1+ leukocytes can lead to premature closure in the evaluation of abdominal pain. Cystitis characteristically causes pain mostly with urination. Pyelonephritis characteristically presents with fever and flank pain (except in transplant patients where the tenderness will be over the graft site) and not with abdominal pain. When the inflamed appendix is close to the ureter, it can cause sterile pyuria. In patients with lower abdominal pain and trace or 1+ leukocytes on a urine dipstick, the diagnosis of appendicitis should be at least considered, and it should be clearly documented that the right lower quadrant is nontender if no more workup is to be done.

❼ **“She had lower abdominal pain and pyuria, so I didn’t think a pelvic examination was indicated.”**

With pelvic inflammatory disease or tubo-ovarian abscess, irritation of the bladder can also cause sterile pyuria. In women, the diagnosis of pelvic inflammatory disease or tubo-ovarian abscess should always be at least considered when lower abdominal pain and mild or minimal pyuria are present. It is recommended to establish and document that there are no concurrent pelvic symptoms in women with UTI. Pelvic examination may be warranted. ★

RISK MANAGEMENT PITFALLS

Inflammatory Bowel Disease



From the July 2014 issue of *Pediatric Emergency Medicine Practice*, “Pediatric Inflammatory Bowel Disease in the Emergency Department: Managing Flares and Long-Term Complications.” Reprinted with permission. To access your EMRA member benefit of free online access to all *EM Practice*, *Pediatric EM Practice*, and *EM Practice Guidelines Update* issues, go to ebmedicine.net/emra, call 1-800-249-5770, or send e-mail to ebm@ebmedicine.net.

❶ **“You can’t diagnose IBD when patients don’t have any GI symptoms.”**

Although IBD typically manifests with abdominal pain/distention and diarrhea that is often bloody, it can also present with only extraintestinal manifestations. These are particularly prominent in the pediatric population (especially arthralgias, delayed puberty, and delayed growth).

❷ **“I am worried about an intra-abdominal abscess, but I decided not to order CT of the abdomen in this pediatric patient because the radiation risk is too high.”**

There are various imaging modalities that could aid in the diagnosis of IBD or in the detection of IBD-related complications. Such imaging modalities include radiograph, CT, MRI, ultrasound, and endoscopy. The choice of imaging modality largely depends on the patient’s clinical presentation, consideration of risks versus benefits, and availability of the chosen modality. If the patient appears toxic and the clinical examination is concerning for possible bowel perforation and/or toxic megacolon, then abdominal CT may provide the necessary information in the shortest period of time. Computed tomography with oral contrast can evaluate the bowel wall and lumen, and it can identify perforation, obstruction, and abscesses. If using oral contrast and there is a concern for perforation, use a water soluble contrast medium.

❸ **“If all laboratory testing results are normal (including inflammatory markers), then this patient does not have IBD.”**

Normal laboratory test results do not exclude the diagnosis of IBD, but laboratory testing should be done when IBD is suspected. Common abnormalities seen in laboratory testing include anemia (usually normocytic or microcytic), thrombocytosis, elevated erythrocyte sedimentation rate and C-reactive protein, mild elevation of aspartate aminotransferase and alanine transaminase, and hypoalbuminemia. In addition, studies have shown that red blood cell distribution width is markedly increased in active IBD and may be useful in monitoring disease progression.

❹ **“I saw a pediatric patient with painful oral ulcers. She has a history of IBD and is taking multiple immunosuppressants. She appeared well otherwise, so I sent her home with ibuprofen only.”**

In addition to pain medication, such oral lesions may be treated with topical prednisolone syrup (5 mg/5 mL) or dexamethasone (0.5 mg/5 mL), either applied directly to the lesions or by the swish-and-spit method twice daily. If the lesions are localized to

the lips, triamcinolone 0.1% may be used 2 to 4 times per day.

❺ **“Patients with IBD always need antibiotics when they present with abdominal pain.”**

Antibiotics are indicated when there is suspicion of infectious colitis, toxic megacolon, or intestinal perforations. Blood and stool cultures should be sent prior to initiating antibiotics.

❻ **“I can’t tell if the patient is having an acute flare or having complications secondary to Crohn disease, so I was unsure of the best way to treat the patient.”**

It is often difficult to distinguish between acute flares or IBD complications solely based on physical examination and laboratory testing, as findings can be very similar in both circumstances. Imaging can aid in differentiating these 2 etiologies; however, it may not be needed because management is similar for both conditions. Patients often require intravenous steroids, intravenous fluid hydration, and broad-spectrum intravenous antibiotics (if underlying infection is suspected).

❼ **“This parent is asking for a flu shot for her child, but the boy is taking immunomodulators for IBD.”**

Patients taking immunomodulators have suppressed immune systems and are more prone to developing infections. Sepsis is one of the leading causes of mortality in patients with IBD. Thus, it is important to vaccinate patients. Immunization with inactivated vaccines (particularly influenza, *pneumococcus*, and *meningococcus*) should be maintained and updated. Depending on the level of immunosuppression, live attenuated vaccines (Measles, Mumps, and Rubella; *Varicella*; intranasal influenza) may be contraindicated. Decisions regarding whether specific vaccinations are appropriate for patients on immunomodulatory medications for IBD should be made by the prescribing clinician.

❽ **“X-ray findings of toxic megacolon are the same in adults as in children.”**

Findings of toxic megacolon in both adults and children include colonic dilatation with an abnormal mucosal contour, which is typically most pronounced in the transverse colon. Acute dilatation of the transverse colon to 5-6 cm with loss of haustral folds during a severe exacerbation of colitis is diagnostic of toxic megacolon in older children and adults. In children aged < 10 years, transverse colonic diameter > 4 cm is suggestive of toxic megacolon. ★

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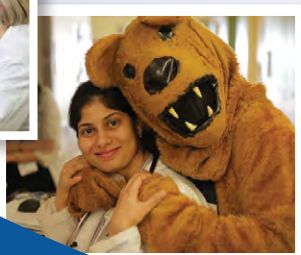
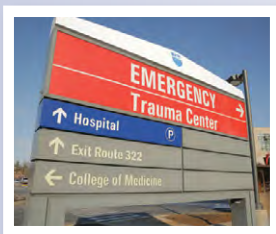
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day for 27,000 visits. The Bangor and Penobscot Bay area offers a variety of cultural attractions, including the flagship campus of the University of Maine. We are home to one of the largest collections of natural and organic food producers in the world. The region offers a pleasant pace of life, low crime, friendly people, excellent educational opportunities, great public schools and affordable housing. The Bangor area is widely regarded as a wonderful place to raise a family. This area has become a four-season sports, recreation and tourist destination, with nearby Acadia National Park, Bar Harbor and the many other scenic harbors and towns up and down the Penobscot River and Bay. Sugarloaf USA, one of the premier outdoor, golf and ski resorts in the east, is just two hours away by car. Interstate 95 is adjacent to the city and we are served by Bangor International Airport, with connecting flights to any destination. We offer highly competitive compensation and benefit packages, including relocation, student loan repayment, retirement, signing bonus, plus contracted vacation and CME time. Please contact: Charles F. Pattavina, MD, F.A.C.E.P., Medical Director and Chief, Department of Emergency Medicine, 207.907.3350, cpattavina@sjhhealth.com. MAINE: "The Way Life Should Be."

MASSACHUSETTS

Northampton: Cooley Dickinson Hospital, a dynamic 140-bed community hospital in Northampton affiliated with Massachusetts General Hospital in Boston, is currently seeking BC/BP Emergency Medicine physicians to join our independent and democratic Emergency Medicine group. We are looking for physicians who are excited by the prospect of joining the staff of a full-service, highly regarded community hospital. Our department is currently staffed by Emergency physicians and physician assistants with the support of great nursing staff and techs seeing a patient volume of approximately 33,000 with 20-25% admission rate. The present staffing model in the ED consists of 8-10 hour shifts — double, triple, and quadruple coverage at the busiest time of day. Competitive compensation including a rapid path to partnership will be offered. Northampton Massachusetts, a vibrant community in the western part of the state, is located in the midst of the "Five College" area including Smith College, Amherst College and the flagship campus for the UMass system in Amherst. There is an active downtown scene, dynamic arts and culture community, and



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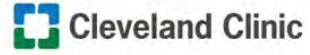
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To join our team, the successful applicant will be an excellent clinician, interested in resident and medical student education and will develop an area of EM expertise. The applicant must also be fun and a good fit for our emergency care team.

Interested?
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 Professor & Chair, Emergency Medicine
 Northeast Ohio Medical University
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great educational opportunities for all ages. Leisure Magazine has named Northampton one of the best U.S. destinations for restaurants, theater, galleries and overall quality of life. It is conveniently located to all points throughout New England including three major cities (Hartford, Boston and New York City). For more information about Cooley Dickinson and the communities we serve: www.cooley-dickinson.org; www.explorenorthampton.com; www.visithampshirecounty.com. For more information or for confidential consideration, please contact Josh Maybar, Recruitment Manager, at 413-582-2720 or josh_maybar@cooley-dickinson.org.

NEVADA

Las Vegas: Full time opportunities for Pediatric Emergency Medicine Physicians. Children's Hospital of Nevada at UMC is the main teaching hospital of the University of Nevada School of Medicine and serves as the region's only Pediatric Trauma Center and Burn Center. Our 20-bed department cares for 31,000 pediatric patients annually. There is excellent sub-specialty coverage with 24 hour in-house intensivist coverage and a level 3 NICU. EMP is a physician managed group with

open books, equal voting, equity ownership, funded pension, comprehensive benefits and more. Please contact Bernhard Beltran at 800-359-9117 or e-mail bbeltran@emp.com.

NEW YORK

Albany area: Albany Memorial Hospital has a newer ED that sees 44,000 pts/yr. and hosts EM resident rotations. Samaritan Hospital in Troy is a respected community hospital, minutes from Albany, which also treats 45,000 ED pts/yr. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson, (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd, NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Cortland: Cortland Regional Medical Center is a modern, full-service facility situated in the Finger Lakes Region between Syracuse and Ithaca. A broad mix of pathology makes up 33,000 ED pts/yr., and there is strong support from medical staff and administration. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded

Kettering Health Network, a not-for-profit network of eight hospitals serving southwest Ohio, is assisting a highly regarded, regional group in their search for full-time **Board Certified/Board Prepared Emergency Medicine physicians**. These positions offer competitive salary, sign-on bonus of up to \$40,000, a rich benefits package, and moving expense reimbursement.

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Port Jefferson: EMP is pleased to announce our newest affiliation with John T. Mather Memorial Hospital. Situated in a quaint coastal town on Long Island's north shore, the facility sees 42,000 emergency patients per year. Pathology is broad with moderate acuity, and most services are represented. Enjoy a variety of residential options, outdoor recreation and shopping and access to NYC. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson, (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd, NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Saratoga Springs: Practice In the Perfect Place: Vibrant Saratoga Springs, NY! Saratoga Emergency Physicians, P.C. (SEPPC) seeks enthusiastic, BC/BP Emergency Medicine physicians to join our comfortable, physician-owned practice

PEDIATRIC EMERGENCY MEDICINE CAREER OPPORTUNITY

The Department of Emergency Medicine at Penn State Hershey Medical Center is seeking Pediatric EM-trained board-eligible physician. Penn State Hershey is a major pediatric referral center for central Pennsylvania and hosts faculty from all major pediatric specialties. A five-story Children's Hospital opened in 2013, which includes 128 beds, five pediatric-only operating rooms, a pediatric cardiac catheterization lab, blood bank and pediatric cancer pavilion. Named a national leader in six pediatric specialties (cancer, cardiology and heart surgery, nephrology, neurology and neurosurgery, orthopaedics, and urology) in *US News & World Report's* 2014-2015 Best Children's Hospitals rankings, we are currently in the process of an ED Redesign Expansion Project which will include a new Pediatric Emergency Department.

Our ED cares for approximately 20,000 pediatric patients per year in a dynamic, high-acuity emergency service, with Emergency Medicine and Pediatric Residents and 18+ hrs/day of Advanced Practice Clinician support. Research and educational missions are critically important, as is providing outstanding patient care, and providing opportunities for integrated faculty development. Penn State Hershey is a twice designated 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.

Known for home of the Hershey chocolate bar, Hershey, PA is rich in history and offers a diverse culture. Our local neighborhoods boast a reasonable cost of living whether you prefer a more suburban setting or thriving city rich in theater, arts, and culture. Outdoor and sporting activities are numerous. We are home to the Hershey Bears hockey team and Harrisburg Senators baseball team. The Susquehanna River and Appalachian Trail are in our backyard.

Conveniently located within a short distance to major cities such as Philadelphia, Pittsburgh, NYC, Baltimore, and Washington DC, we offer a great place to live, work, play, and learn. We're proud of our community involvement and encourage you to learn more about our organization at pennstatehershey.org/web/emergencymedicine/home.

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in the small, but vibrant Upstate New York city of Saratoga Springs, near Albany, at the edge of the Adirondacks. This is an exceptional opportunity to join a stable practice at Saratoga Hospital, with annual volume of 40,000 visits, in a spacious, state-of-the-art, 41-bed ED, constructed six years ago. SEPPC has staffed the hospital for 26 years. We offer comprehensive benefits and locally competitive compensation. There is a two-year shareholder track with no financial buy-in. Check out our website at www.seppc.com. Contact: Denise Romand, Saratoga Hospital (518)583-8436, email: docfind@saratogacare.org. Famous venues locally include Saratoga Race Course, Saratoga Spa State Park, and the Saratoga Performing Arts Center. Visit us at: www.saratogahospital.org, www.saratoga.org, <http://discoversaratoga.org>, and www.ilovesaratoga.us.

NORTH CAROLINA

Charlotte: EMP is partnered with eight community hospitals and free-standing EDs in Charlotte, Lincolnton, Pineville and Statesville. A variety of opportunities are available in urban, suburban and smaller town settings with EDs seeing 12,000 – 81,000 pts./yr. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus

industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Charlotte/Statesville: Iredell Memorial Hospital is a respected community hospital situated north of Charlotte and seeing 41,000 ED pts./yr. Statesville is easily commutable from desirable north-Charlotte suburbs like Mooresville (highly regarded schools), with access to lakeside, small town and rural residential options as well. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Morehead City: Modern community hospital on the Atlantic coast minutes from Atlantic Beach! This 135-bed facility sees 39,000 emergency pts./yr. and is active in EMS. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs,

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support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

New Bern: CarolinaEast Medical Center is a respected 313-bed regional medical center located at the intersection of the Trent and Neuse Rivers just off the central coast. 70,000 ED pts./yr. are seen in the ED. Beautiful small city setting. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Pinehurst: Sandhills Emergency Physicians needs ABEM BC/BP physicians to join our 27 physician democratic group. You'll have scheduling equity from day one, competitive salary, and a comprehensive benefits package. Partnership in two years. We staff four Emergency Departments in the Sandhills of North Carolina, combined volume 125k. With the flagship FirstHealth Moore Regional Hospital in Pinehurst, golf and equestrian activities abound. Equidistant between Blue Ridge Mountains

and NC Beaches. Excellent working environment with Wellsoft, ultrasound, and extensive specialist coverage. Many of our staff have, or will, enjoy the area and their practice enough to stay their entire EM career with our democratic group. We welcome all inquiries, and have openings for Advanced Practice Providers also. Email us at madju@nc.rr.com or call 910-692-8224.

OHIO

Canton: Unique opportunity to join a top-quality, democratic, well-established and physician-owned group with an opening for an ABEM or AOBEM BC/BP physician. Stark County Emergency Physicians staffs a 65,000+ volume ED and a 30,000+ volume Urgent Care. The ED is nationally recognized as the first-ever accredited chest pain center in the US, is a multi-year recipient of the HealthGrades Emergency Medicine Excellence award, and is also a level II Trauma Center and Stroke Center. Equitable and flexible scheduling. Excellent provider staffing levels. Newly renovated ED. Great work-lifestyle balance. Clearly defined equal-equity partnership track (including equity interest in an independent billing company). Generous benefits include signing bonus, 100% employer-funded retirement plan, BE/CME account, PLI insurance with corporate tail, and HSA-based health insurance. Contact Frank Kaerberlein, MD at (330)-489-1365 or frank.kaerberlein@cantonmercy.org.

Cincinnati: Mercy Hospital-Anderson is located in a desirable suburban community and has been named a "100 Top Hospital" ten times. A great place to work with excellent support, the renovated ED sees 43,000 emergency pts./yr. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Cincinnati Region: EMP's affiliation with the Mercy Health System in eastern and western Cincinnati includes nine respected community hospitals seeing 14,000-60,000 emergency pts./yr. Locations are proximate to desirable residential areas. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

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Concord, Madison and Willoughby: Lake Health is situated in the eastern Cleveland Suburbs. TriPoint Medical Center was built in 2009 and treats 31,000 emergency pts./yr. The Madison Medical Campus hosts a freestanding ED seeing 12,000 pts./yr. West Medical Center is a state-of-the-art acute care hospital serving 37,000 ED pts./yr. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Lancaster: Located 30 minutes SE of Columbus, Fairfield Medical Center sees 55,000 emergency patients per year. Modern facility, excellent back up, and dedicated partners make this a great place to live and work. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Springfield: Springfield Regional Medical Center is a new, full-service hospital with supportive administration committed to emergency medicine. Situated 45 miles west of Columbus and 25 miles northeast of Dayton, the ED sees 75,000 patients/yr. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Urbana: Mercy Memorial Hospital services the SW Ohio region's residents in Champaign County, the facility treats approximately 18,000 emergency pts./yr. Desirable residential areas in Dayton are easily accessible. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Emergency Medicine Physician Opportunity in Kennewick, Washington

Kennewick Emergency Physicians, in collaboration with Trios Health, is seeking an emergency medicine physician to join their expanding team. The group welcomes applicants who are completing residency in 2016.

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For immediate consideration please contact:

Tamie Bradbury, Physician Recruitment
509-221-5980 • tamie.bradbury@trioshealth.org

About Trios Health

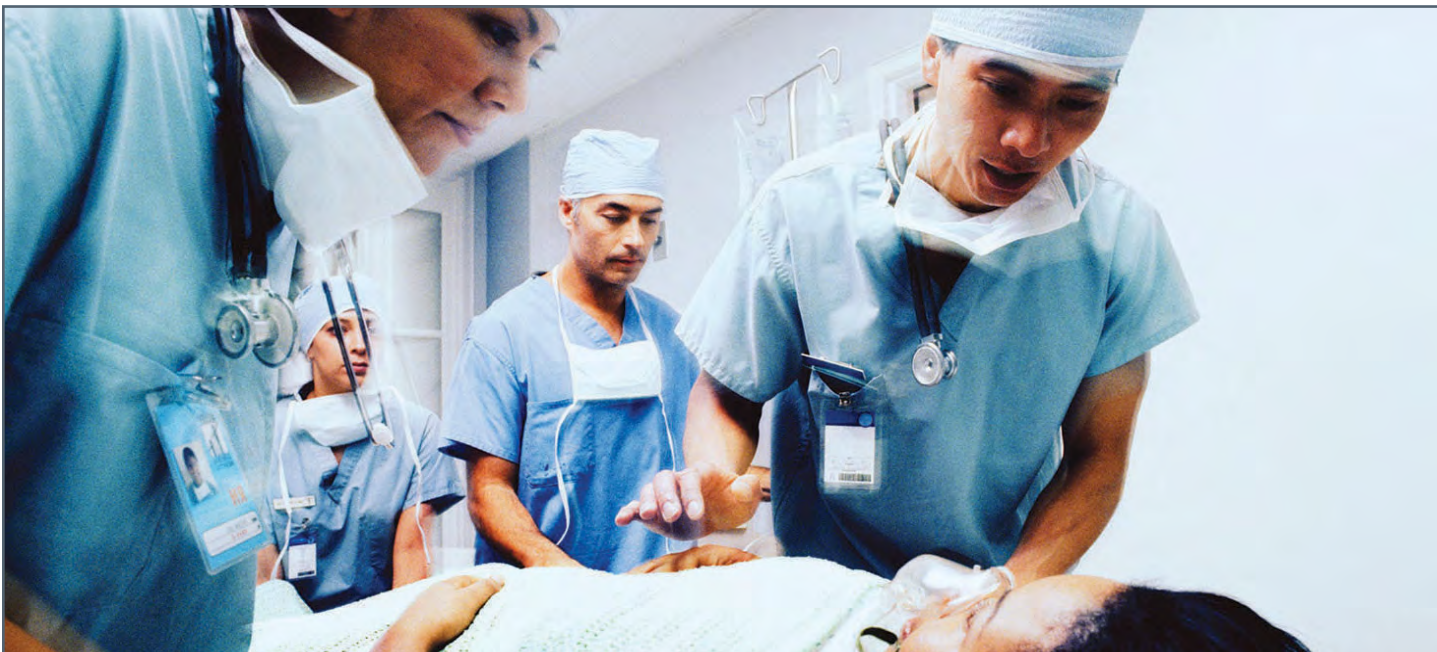
Trios Health is the Kennewick Public Hospital District's system of care serving the greater Tri-Cities. The District operates two hospitals to accommodate the area's fast-growing population: Trios Women's and Children's Hospital and Trios Southridge Hospital—a new, state-of-the-art facility that opened in July 2014.

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The Tri-Cities is situated at the confluence of the Columbia, Snake, and Yakima rivers in southeastern Washington. With over 300 sunny days a year, we are home to endless outdoor recreational opportunities. We are a thriving suburban community with easy access to major metropolitan areas of the Pacific Northwest. Excellent education systems, affordable housing, and cultural arts and entertainment all combine to make the Tri-Cities a rich, vibrant community.



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OKLAHOMA

Tulsa: Brand new, state-of-the-art, 85-room ED opened in Fall 2014. Saint Francis Hospital is a modern 971-bed regional tertiary care center seeing 96,000 ED patients per year, with broad pathology, high acuity, modern facilities and supportive environment. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

OREGON

Salem: Partnership opportunity with independent, democratic, and well established group at 95K annual volume Salem Hospital, Level II trauma center with excellent specialty support. New ED built in 2009, EPIC EMR with scribes, extensive leadership opportunities. Benefits include flexible scheduling, CME stipend, malpractice, medical, 401K, and more. Must be EM BC/BP. Salem is located 45 minutes south of Portland, in the heart of Oregon's wine country. We love it here and you will too. Send CV, cover letter and recent photo to sepspc@salemhealth.org or call us at 503-561-5634.

PENNSYLVANIA



Eastern Pennsylvania Opportunities: Lehigh Valley Health Network (LVHN) has immediate openings for two residency trained EM physicians to join our employed group of 74 emergency medicine physicians (including 3 toxicologists) and 31 advanced practice clinicians. One position is available on the network's main campus in Allentown, PA and a second position is available at the Hazleton, PA campus. The Hazleton area is nestled in the foothills of the beautiful Pocono Mountains, 60 minutes north of Allentown, and is home to 100,000 people. The LVHN emergency medicine physicians staff 5 ERs and record approximately 240,000 patient visits. As part of the employed physician group, we offer an attractive compensation and benefits package in addition to sign on and retention bonuses. LVHN has a Level I Trauma Center with primary angioplasty, MI alert and stroke alert programs, 4 helicopters and PACs. The area served by LVHN is primarily suburban with excellent schools, diverse recreational and cultural offerings, a moderate cost of living and a convenient location only 1 hour north of Philadelphia and 1.5 hours west of New York City. Board

certified or prepared EM residency trained physicians should email a CV to Karen_R.Fay@LVHN.org or call 484-862-3206 for more information. Visit our website at www.LVHN.org/lvpg.

Sharon: Sharon Regional Health System has an extremely supportive administration/medical staff, newer ED, and full service capabilities making this a great place to work with 37,000 patients treated annually. Small city setting offers beautiful housing and abundant recreation less than an hour from Pittsburgh and Cleveland. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Western — Connellsville, Ellwood City, and New Castle: Allegheny Health Network Emergency Medicine Management (AHNEMM) is a majority physician owned organization offering outstanding opportunity with equal equity ownership, equal voting and industry leading benefits and professional development programs. Ownership Matters! These smaller town settings within an hour of Pittsburgh provide a great practice



Emergency Medicine Faculty Position

University Physician Associates, the physician group practice for the **University of Missouri-Kansas City School of Medicine**, is recruiting for faculty at the Assistant Professor or Associate Professor level in the Department of Emergency Medicine at **Truman Medical Center-Hospital Hill**. Candidates must be board-certified/board-eligible emergency physicians. All qualified candidates will be considered, but preference will be given to candidates with Operations, EMS, or Ultrasound expertise. The department supports one of the nation's oldest fully-accredited three-year residency programs, with 11 residents per year. Truman Medical Center is a level I trauma center and the ED has an annual volume of 65,000 adult patients in a modern, state-of-the-art facility with 48 beds.

Kansas City offers an attractive lifestyle with low cost-of-living and affordable housing, renowned suburbs with top-ranked schools, and numerous outdoor activities. Interested candidates should e-mail a letter of interest and CV in confidence to:



Matthew Gratton, MD
Professor and Chair
Department of Emergency Medicine
2301 Holmes Street
Kansas City, Missouri 64108
matthew.gratton@tmcmcd.org

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of emergency medicine. The Ellwood City Hospital sees 12,000 emergency pts./yr. and affords easy access the north-Pittsburgh's most desirable suburbs. Highlands Hospital in Connellsville, Jameson Hospital in New Castle, and Saint Vincent Hospital in Erie. Contact Jim Nicholas (jnicholas@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Somerset: Somerset Hospital has a beautiful new ED seeing 19,000 ED pts./yr. The facility hosts close-knit and supportive EM and administrative staffs which provides for a great work environment. Located in the Laurel Highlands region, easy access is afforded to the mountains and great ski resorts, biking/hiking and a number of rivers and lakes, as well as the metropolitan amenities of Pittsburgh which are just an hour away. Ownership Matters — we are a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Jim Nicholas (jnicholas@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Indiana: Indiana Regional Medical Center is a full-service community hospital in a college town located 50 miles northeast of Pittsburgh. IRMC sees 45,000 ED pts./yr. and is situated in a nice college town. AHNEMM/EMP offers equal equity ownership/partnership, equal voting and the opportunity to be part of a progressive EM group. Ownership Matters — we are a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Jim Nicholas (jnicholas@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Pittsburgh – Canonsburg: Canonsburg Hospital is a friendly, community oriented facility situated 21 miles south of Pittsburgh near the region's most attractive suburbs including Peters Township, Upper St. Clair and Mt. Lebanon. A modern ED sees 19,000 pts./yr., and most major services are available on-site. AHNEMM/EMP offers equal equity ownership/partnership, equal voting and the opportunity to be part of a progressive EM group. Ownership Matters — we are a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Jim Nicholas (jnicholas@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Pittsburgh – Natrona Heights: Allegheny Valley Hospital is situated just 18 miles north of Pittsburgh and sees 39,000 ED pts./yr. A newer, state of the art ED and strong medical staff, administration and community support make for a great work environment. Ownership Matters — Allegheny Health Network Emergency Medicine Management (AHNEMM) offers an outstanding professional arrangement. We are a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Jim Nicholas (jnicholas@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

Pittsburgh: Allegheny General Hospital is a highly regarded quaternary care center with Level I trauma designation and an international reputation for excellence. A full-range of medical and surgical specialties supports residency programs in 22 specialties including EM and EM/IM, plus fellowships in EMS and EM Ultrasound. 50,000 ED patients are treated annually. Ownership Matters — Allegheny Health Network Emergency Medicine Management (AHNEMM) offers an outstanding professional environment. We are a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Jim Nicholas (jnicholas@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

RHODE ISLAND

Westerly: The Westerly Hospital is a 125-bed community hospital situated in a beautiful beach community in SE RI, 45 minutes from Providence and 1.5 hours from Boston. Modern, well-equipped ED sees 26,000 pts./yr. Ownership Matters — EMP is a majority physician owned group with equal voting, equal equity ownership, funded pension and comprehensive benefits, plus industry-leading training programs, support services and career development options. Contact Ann Benson (careers@emp.com), Emergency Medicine Physicians, 4535 Dressler Rd. NW, Canton, OH 44718, 800-828-0898 or fax 330-493-8677.

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Partnership Opportunity. Single hospital democratic group in Coastal South Carolina, increasing staffing due to increasing volume at Conway Medical Center. Conway Emergency Group a stable group of 13 BE/BC physicians, staffing ED with 55K+ volume and 34 beds with 10 bed expansion planned. Shifts 8-12 hours; 56 hours of physician and 20 hours of mid-level

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coverage daily. Level 3 Trauma Center. Hospitalist program. Medhost EMR. Conway Medical Center is located 10 miles from Myrtle Beach. Live in Conway, Myrtle Beach, Surfside Beach or Murrells Inlet. Within a couple hours of Charleston and Wilmington. Contact Dr. Charles Tarbert, ctarbert@cmc-sc.com, (843) 347-8015.

VERMONT

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Champlain Valley Physicians Hospital

Emergency Medicine Opportunities: The University of Vermont Health Network-Champlain Valley Physicians Hospital (www.UVMHealth.org/CVPH) seeks BC/BP EM Physicians to join its Emergency Department (50,000 annual visits). Schedule has 60 hrs/day of physician coverage. Enjoy working in our newly renovated ER which includes a new EMR system. Incoming physicians may either be hospital employed with a comprehensive benefit package or be independent contractors. **Community** (www.NorthCountryGoodLife.com)

offers a rich family lifestyle on Lake Champlain at the foothills of the Adirondack Mountains. Enjoy close proximity to the Lake Placid Olympic Region, Montreal and Burlington, VT. Practice in a university affiliated hospital and live where others vacation! For info: Becky Larkin, 518-314-3025, rlarkin@cvph.org.

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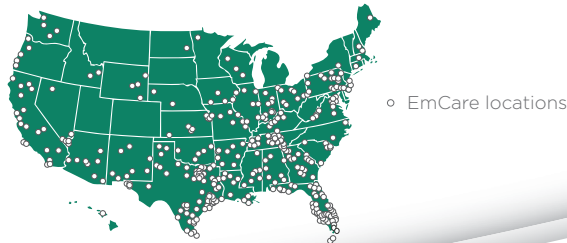
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Huntsville Hospital is a 941-bed hospital that serves as the regional referral center for north Alabama and southern Tennessee. The hospital has 24/7 Hospitalist, Radiology, Cardiology, Trauma, Orthopedic and Neurosurgical coverage. The hospital also has dedicated Adult, Cardiovascular, Neurological and Pediatric ICUs.

For more information contact **Kimberly Salvail**
(256) 265-7073 | kimberly.salvail@hhsys.org



Huntsville, AL

Huntsville is situated in the fastest growing major metropolitan area in Alabama with the highest per capita income in the southeast. With a population of 386,661 in the metro area, Huntsville is a high-tech, family oriented, multi-cultural community with excellent schools, dining and entertainment. It is nestled at the foothills of the Appalachian Mountains with an abundance of indoor and outdoor activities.

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patient care mix; Patient Focused Environment; Integrated Practice Unit – Collaborative care model working to facilitate disease management. Median Income – \$285,000. **We offer above market compensation with comprehensive benefit package including malpractice, CME, Medical/Dental/Vision, 401K with match and more!** About Us: Our providers and our staff do what is right for each patient. This core value, and the opportunity to work alongside other trusted experts, is why excellent healthcare providers choose to practice medicine here. The Everett Clinic featured on the PBS documentary “U.S. Health Care: The Good News.” See more at: <http://www.everettclinic.com/about-us/more-90yearsexcellence#sthash.13Y7hWoq.dpuf>. Founded in 1924, The Everett Clinic is a multi-specialty physician operated group practice providing comprehensive, community-wide healthcare to 300,000 patients in greater Snohomish County, Washington. The Everett Clinic’s team of nearly 500 providers offers more than 40 specialty care services. **Who We Care For:** 318, 329 active patients; Includes 49,553 Medicare patients; 942,000 patient visits annually (total in 2013); 3,464 patient visits daily; 27,000

procedures annually. **Our Healthcare Team:** 359 Physicians; 145 Advanced Care Practitioners; 504 Total healthcare providers; 1,679 Staff; 2,183 Total Staff and Providers. See more at: <http://www.everettclinic.com/aboutus/clinicservices#sthash.b3oYCxfh.dpuf>. Contact Kelly Ulrich (Ristow), The Everett Clinic, KUlrich@everettclinic.com.

Wenatchee: Stable Democratic ED group seeking BC/BP ED Physicians for expanding volume ED in a great family oriented community. Great outdoor recreation with skiing, mountain biking, hiking, fishing, hunting. Great schools. Level 3 trauma center with patient volume 40,000. Competitive income with partnership in one year. Contact Dr Eric Hughes, cehughes@nwi.net.

WEST VIRGINIA

Wheeling: Ohio Valley Medical Center is a 250-bed community teaching hospital with an AOA approved Osteopathic EM and EM/IM residency program. Enjoy teaching opportunities, full-specialty back up, active EMS, and two campuses seeing 27,000 and 20,000 pts./yr. Ownership Matters — EMP is a majority physician owned

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Geisinger Health System serves nearly 3 million people in central, south-central and northeast Pennsylvania and is nationally recognized for innovative practices and quality care. A mature electronic health record connects a comprehensive network of 9 hospital campuses, 43 community practice sites and more than 1,200 Geisinger primary and specialty care physicians.

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WISCONSIN (CENTRAL)



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package. Loan repayment options are available. **Ministry Good Samaritan Hospital:** 9-Bed Trauma Level IV; annual volume 12-13,500, Easy access to sub-specialty referrals off site; easy one call transfers, Dynamic team of three physicians and two advanced practice clinicians that boast strong staff/physician relationships as well as low nurse turnover rates, Charming rural setting with opportunity to treat a full range of patients, Ideally located just 15 miles outside of the Wausau/Weston area (pop. est. 55,000), **Ministry Saint Clare's Hospital:** 15-Bed Trauma Level III; annual volume 14,000, Experienced team of 6 physicians and two advanced practice clinicians, state-of-the-art, technologically renowned referral center ideally located in the center of the state, growing metropolitan area — urban amenities coupled with small-town charm and affordability, Physicians who have recently joined us indicate that the excellent work/life balance combined with friendly, safe and affordable communities was ultimately what drew them here. Visit ministryhealth.org/recruitment to hear from our physicians. For more information, contact: Brad Beranek, 715-342-7998, mmgrecruitment@ministryhealth.org.

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