

# EM Resident



Official Publication of the Emergency Medicine Residents' Association

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## Brown Recluse Spider Bites

**Pitfalls of US-guided  
IV Placement**

**ITP Beyond  
the Boards**

**Maintaining  
Wellness in  
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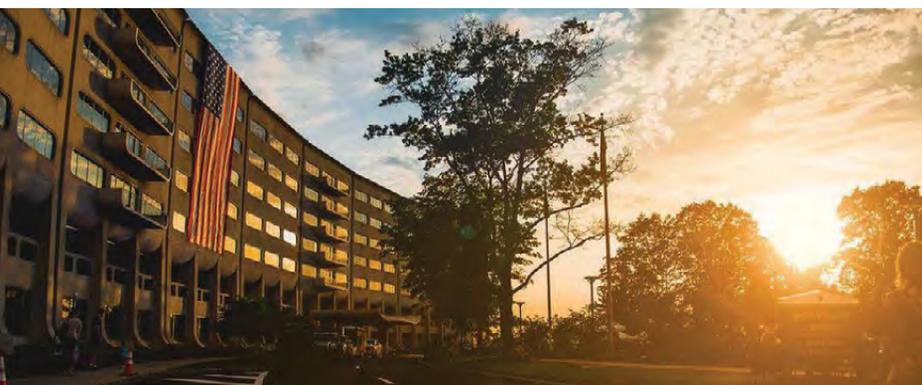
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# Time for Gratitude

Hello EMRA Family,

I will be honest; the past few months have been difficult, as I am sure it has been for a lot of you as well. It has been a rollercoaster of emotions riddled with guilt, fear, and frustration, often leaving me feeling emotionally exhausted and physically unmotivated.

COVID-19, the novel virus that forever changed the landscape of medicine and society. Globally and nationally, it brought out and highlighted our gross shortcomings as a medical institution.

It has stripped us of some of life's most joyous moments: weddings, graduation, concerts, baby showers.

It has taken lives. Countless of colleagues/family members/friends have succumbed to this virus, sometimes at the peak of their lives.

It has robbed us of humanity. We've had to tell patients' family members, while they are crying in front of us, that they will not be able to visit their loved ones in the hospital once admitted. And we've had to see our patients die in an empty room.

This has created an incredible mental and spiritual strain on all of us. This is a trauma we will be dealing with for the rest of our lives.

***But let's not let this virus take anything more from us.***

Let's not let it take our ability to connect emotionally, even if it's through our phones and laptops. Let's not let it take our ability to open up and be vulnerable to others as we share our valleys and peaks. Let's let it serve as a reminder to prioritize ourselves and the people we care about most. Friends, our careers are important, but the connections we create in this world with our fellow humans are what makes life meaningful.

*"When I was a boy, and I would see scary things in the news, my mother would say to me, 'Look for the helpers. You will always find people who are helping'"* — this quote by Mr. Rogers rings truer than ever today. During the pandemic, even while witnessing so many horrid things, I have also been blessed to see so many helpers.

I have been *inspired* by medical students who have used social media to gather PPEs to donate. *Encouraged* by everyday folks pooling their resources to provide for a struggling neighbor. *Astonished* by the physician mothers and fathers living outside their homes, isolating themselves from their family and children, while they proudly continue their mission of care and service to others.

I have also formed more profound connections with friends and colleagues who have only existed in a superficial realm until now. We have had more time to open up and speak vulnerably and honestly, and connections have been forged and strengthened by relating to collective trauma. One of my favorite questions that prompted many of these connections/conversations has been: **What's one positive you have learned from this time?**

This has led to some of the most authentic answers. I witnessed melancholy colleagues light up when answering. This question truly makes us re-frame the situation at hand.

I implore you all to ask this question AND share authentically yourself. I will help start the conversation:

**I contracted COVID-19 in March.** What I thought was just nasal congestion turned into dyspnea on exertion, extreme

exhaustion, and unrelenting body aches. Pre-coronavirus, I was a very active person — mentally and physically. I worked out several times a week, read most days out of the week, and felt motivated to continuously progress upward in my career. The STOP the virus placed on my body and life was jarring. A week and a half flew by while I mostly moved between my bed and chair. I felt unmotivated and discouraged. I felt guilty about missing my shifts while I recovered. I felt saddened, by proxy, when I spoke to my parents on video chat, who had to stay away from their sick daughter. I felt let-down that I was getting behind on my residency and EMRA tasks.

Now, close to 2 months post-recovery, I am THANKFUL.

I am thankful for that 'down-time': time to stop and focus on just myself helped me re-prioritize my life. I have used this time to reach out to friends from college and medical school that I have not spoken to in a few months. I used the lack of distractions to reconnect with my husband and friends and helped strengthen friendships and relationships.

I am filled with newfound gratitude when I go for a run on a warm day, and I can breathe in the air deeply without the dyspnea I had felt for weeks. Speaking with family members on video chat has taken on a new sense of joy as I am lucky enough to be present at this moment to be able to do it.

To my #EMRAFamily, times are tough.

But don't let this virus take away anything more than it already has. Take the time to talk to our colleagues, friends, family. Do not repress your thoughts. Journal and self-reflect authentically. **It's ok not to be ok.** Reach out when you need to. We are all in this together. ★



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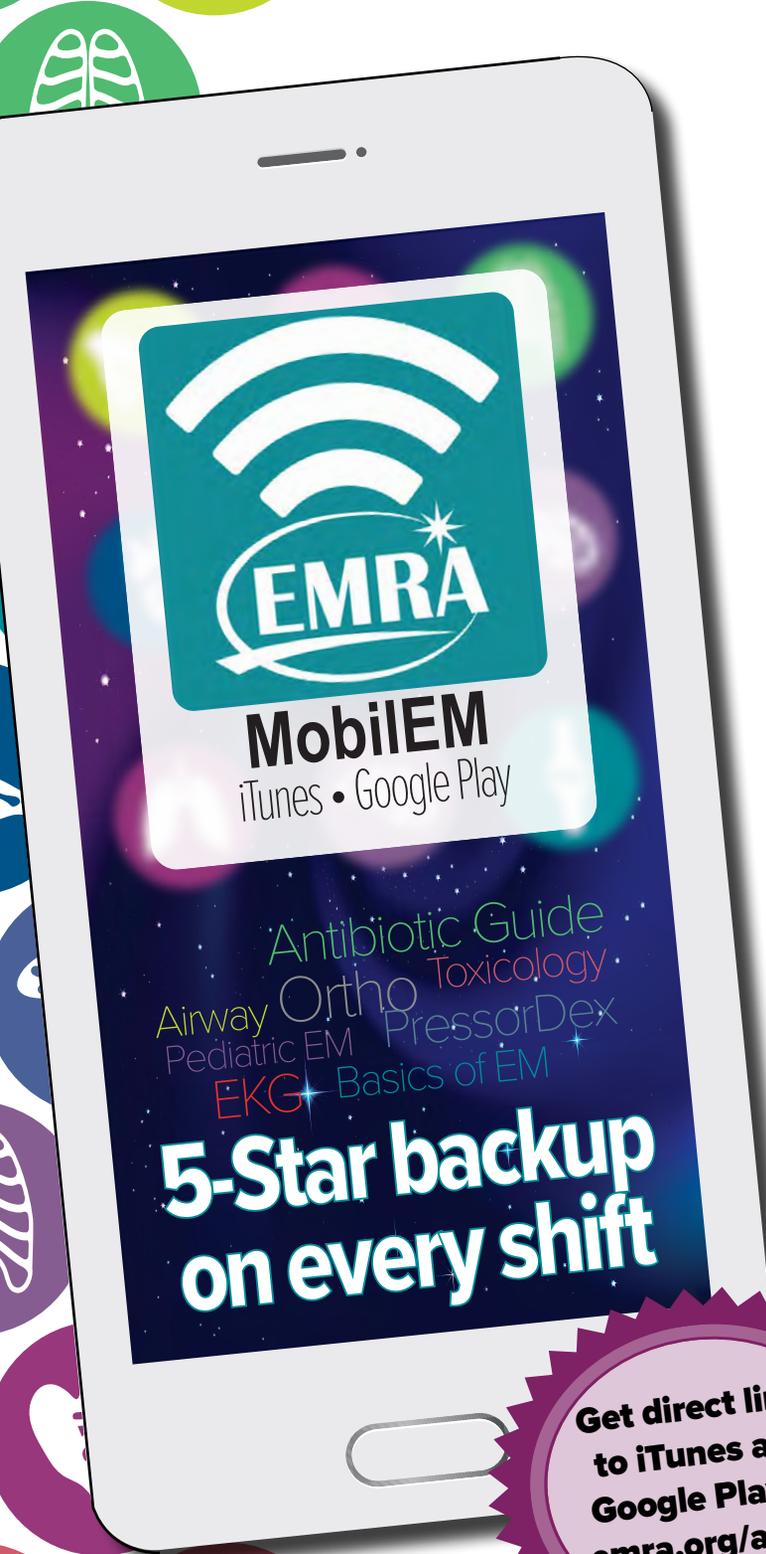
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# Transition, Not Competition

**Hannah R. Hughes, MD, MBA**

President, EMRA

Chief Resident,

University of Cincinnati Emergency Medicine

@hrh\_approved

**T**wo months into my intern year, I had my first case presented at Morbidity & Mortality conference. An elderly man with metastatic prostate cancer came in with back pain and known spinal lesions. While his neurologic exam was initially normal, he developed paraplegia within hours, and it was missed. **I was crushed.** Ten years of undergraduate and graduate education spent aiming to be at the top of my game, only to fail a patient so early in my residency training? It made for a tough transition from medical student to physician.

And here we are again, on the brink of another transition.

The start of a new academic year is full of anxiety as we all step into our new roles, regardless of what level we've reached in training. It's part of the medical maturation process. But this year, it just feels... different.

Being on the front lines of COVID-19, it seems as though we've matured years in just a matter of months, in many ways. Yet there's still this uneasiness as we step into our new roles, particularly in the setting of delayed rotations, canceled

electives, and fluctuating patient volumes. Pre-coronavirus, we would have had time to reflect on the year we just finished, prepare for the year ahead, maybe even take that vacation we've been dreaming about forever.

But now?

Now, we've endured weeks of unremitting high alert. We've been, by turns, overwhelmed by volume and driven to distraction by eerily empty ED waiting rooms. Our students are sidelined, our graduates are facing unexpected unemployment, and we don't know what this year will bring.

**It doesn't make for the smoothest transition of all time.**

As I shift from running our Shock and Resuscitation Unit as a third-year resident to supervising interns as a fourth year, I worry. *Have my extracurricular interests pulled me away from keeping up with evidence-based medicine? Have I run enough resuscitations of critically ill patients? What if my interns know more than me when I'm supposed to be the one teaching them?*

The spiral always ends with the same question: **Am I good enough?**

Having an early M&M case shook my confidence, and the same can be true for role transitions. Self-doubt can be either debilitating or harnessed as a tool for growth. Here are 3 reminders that get me

out of the imposter syndrome spiral:

1. **Don't be afraid to say, "I don't know."**

Regardless of where you are in training, no one expects you to know it all, and this is especially true for early interns who are just getting used to being called "Doctor." As my chief resident told me early in my intern year, "If you were expected to enter training already knowing everything, residency wouldn't be a thing." It's OK to not know; we're all here to learn.

2. **Demonstrate vulnerability.**

Failure is inevitable, whether it's your first patient of intern year or well into being an attending. We all are or will be #BAFERDs, but we are also human and bound to make mistakes. Sharing those with others requires vulnerability, a demonstration of bravery, not weakness.

3. **Support one another.**

Life is not a competition. There is no race – and in EM, no finish line (every empty waiting area fills up again). All those frantic footsteps you hear are *not* people trying to outrun you; they're your fellow caregivers, making sure you and your patients are not alone. And heads-up: You're doing the same for them, whether you realize it or not. EM is a team endeavor, not a solo sprint. ★



Accreditation Council for  
Graduate Medical Education

# Update from the ACGME Review Committee for Emergency Medicine

**Breanne Jaqua, DO, MPH**

ACGME Review Committee for Emergency Medicine  
Mercy St. Vincent Medical Center  
@BreanneJaqua

**A**s the resident representative to ACGME's Review Committee for Emergency Medicine, it is my pleasure and honor to provide an RC-EM update to EMRA and the readers of *EM Resident* magazine.

Please read on for updates in 5 key areas affecting emergency medicine residents:

**Hospital closures**  
**Diversity in medicine**

**Parental leave**  
**Single Accreditation System**

**COVID-19**

## 1. Hospital Closures

Excluding the global pandemic, the most well-known issue in graduate medical education over the past year was the sudden closure of Hahnemann University Hospital in the summer of 2019.<sup>1</sup> A total of 553 residents and fellows from 35 programs were affected by this abrupt announcement, including 55 residents and fellows on J-1 visas.<sup>1</sup>

The response from the medical community was overwhelming and supportive; the ACGME, AMA, AOA, AAMC, ECFMG, NRMP, FSMB, ABMS, and many other medical organizations came together to support the trainees affected.<sup>1</sup> A total of 1,530 available positions were offered to the displaced trainees, representing a total of 190 sponsoring institutions in 39 states.<sup>1</sup>

Ultimately, 100% of the displaced residents and fellows transferred to new programs, and 60% were able to stay in the Philadelphia metro area.<sup>1</sup> Hahnemann University Hospital declared bankruptcy in addition to closing the hospital, which left 1,400+ trainees and alumni without medical liability "tail" coverage.<sup>2</sup> A \$9.3 million settlement was reached in March 2020, ensuring liability coverage for Hahnemann residents, fellows, and alumni.<sup>3</sup>

Ohio Valley Medical Center's hospital closure was announced in August 2019.<sup>1</sup> All 15 internal medicine and 17 emergency medicine residents were able to transfer to other training programs, and a total of 325 positions were offered to the displaced residents.<sup>1</sup> This closure was different than Hahnemann's because Ohio Valley Medical Center did not declare bankruptcy, therefore tail coverage was provided to these residents.<sup>1</sup>

The February 2020 ACGME Annual Educational Conference included excellent discussion and recognition of the lessons learned from these events and plans for how to be better prepared for future hospital closures.<sup>1</sup>

## 2. Parental Leave

Parental/family leave is a topic that has gained a lot of attention in recent months, thanks to the advocacy of the ACGME's Council of Review Committee Residents.<sup>4</sup> In the fall of 2019, the ACGME created a multi-disciplinary task force dedicated to this topic. Parental/family leave is a multifaceted issue that has ramifications for board eligibility, which is why the task force includes direct collaboration with the American Board of Medical Specialties (ABMS).<sup>4</sup>

*"This work will lead to a more*

*standardized approach to parental leave policies for resident and fellow parents by certifying boards, accreditation requirements, Sponsoring Institutions, and programs."*<sup>4</sup>

Final recommendations are expected in 2020.

## 3. Diversity

Diversity is an important topic at the ACGME. The revised common program requirements that went into effect in July 2019 included a new core requirement, item I.C., that codifies diversity in graduate medical education.

*"The program, in partnership with its Sponsoring Institution, must engage in practices that focus on mission-driven, ongoing, systematic recruitment and retention of a diverse and inclusive workforce of residents, fellows (if present), faculty members, senior administrative staff members, and other relevant members of its academic community."*<sup>5</sup>

The ACGME hired William A. McDade, MD, PhD, as its first Chief Diversity and Inclusion Officer in March 2019.<sup>6</sup> Dr. McDade comes to the ACGME from Ochsner Health System in New Orleans, where he was executive vice president and chief academic officer. Prior to his appointment at Ochsner, Dr. McDade was

a professor of anesthesia and critical care at the University of Chicago.

On Feb. 20, 2020, the ACGME announced Bonnie Mason, MD, as the Vice President of Diversity and Inclusion.<sup>7</sup> Prior to joining the ACGME, Dr. Mason was the founder and executive director of Nth Dimensions. She is also the co-founder/chief executive officer of Beyond the Exam Room, where she has developed a comprehensive, continuing medical education (CME)-accredited business of medicine, career development, leadership, and financial curriculum for young physicians at the undergraduate and graduate medical education levels.

#### 4. Single Accreditation System

The single accreditation system will conclude its 5-year transition this year. After the completion of the transition, all GME programs in the United States will be accredited by the ACGME.<sup>8</sup> This brought unique changes to the GME landscape, including a single match through the National Resident Matching Program (NRMP).<sup>8</sup>

All GME programs can apply for osteopathic recognition, which provides osteopathic training in graduate medical education.<sup>8</sup>

As of March 2020, 89% of the 62 previously AOA-accredited emergency medicine programs have an accreditation status with the ACGME; 28 programs are on continued accreditation, 23 on initial accreditation, 4 on initial accreditation with warning, 1 had accreditation withdrawn, and 6 closed.<sup>8</sup>

#### 5. Faculty Protected Time

In the 2019 July revised common program requirements, the stipulation regarding core faculty protected time was removed. The subsequent outcry from the emergency medicine<sup>9</sup> and family medicine communities inspired the ACGME to create a task force dedicated to this issue.

The task force recommended including language that protects core faculty non-clinical time which prompted the emergency medicine review committee to add language to this effect.<sup>10</sup>

The open comment period for the

proposed language closed March 25.<sup>11</sup> If approved by the ACGME Board of Directors, the new language will take effect July 2020.

#### 6. COVID-19

These are unprecedented times. The ACGME has suspended several accreditation-related activities to allow for the prioritization of patient care, including self-study activities, accreditation site visits, CLER program site visits, and resident, fellow and faculty surveys.<sup>12</sup>

Additionally, the telemedicine supervision requirements that were scheduled to go in to effect in July of 2020 were fast tracked to help the medical community respond to the pandemic.<sup>13</sup> The ACGME president and CEO noted in March that 3 areas of priority include maintenance of duty hour requirements, adequate resources and training related to COVID-19, and adequate supervision for residents and fellows.<sup>13</sup>

This is a constantly evolving situation; please check the ACGME's Newsroom online for the latest updates. \*



The COVID-19 pandemic has changed how we live, we connect...and how we learn.

**Right now, we are fully committed to holding ACEP20 in Dallas October 26-29.**

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# ITSY BITSY SPIDER, BIG TIME DANGER

## Systemic loxoscelism



### Michael Simpson, MD

EMRA Toxicology Committee Chair-elect  
Vanderbilt University Medical Center

### Monisha Veerapaneni

Burrell College of Osteopathic Medicine  
Class of 2023

@monieeheart

**A** 20-year-old woman presents to the emergency department with a painful ulcer to her proximal thigh that she says has grown in size and become necrotic over the last 3 days. She also reports fever, malaise, and dark urine for the past day. She has been helping her parents renovate their old house in the countryside and believes she may have been bitten by a spider.

### “Is this a spider bite?”

The ED chief complaint of “spider bite” is a common one, and as most residents will realize, the majority (as high as 84% in one study) of these will have a final diagnosis of a skin and soft tissue infection like abscess or cellulitis.<sup>1</sup> Even in actual cases of spider bites, the spider will rarely be available for definitive identification, so the treating physician must be aware at least of the clinical presentation of the two most common venomous spiders in North America: those of the genus *Loxosceles* and *Lactrodectus*, frequently referred

to as brown recluses and black widows, though there are other relevant species within each genus. In this article, we will cover *Loxosceles* specifically, but would encourage readers to familiarize themselves with *Lactrodectus* as well.

### The Elusive Recluse

*Loxosceles* spiders are found in certain endemic areas in North and South America, especially the South, Southeast, and Southwest United States (Figure 1).

Location in an endemic area is a strong predictor of a spider belonging to the *Loxosceles* genus, as these spiders are rare outside of these described regions.<sup>2,3</sup> These spiders are nocturnal hunters who are not aggressive but will bite if threatened, typically found inside homes in dark, quiet areas such as

basements and attics. Outside, they can be commonly found underneath rocks and the bark of dead trees. They have 6 eyes arranged in dyads, while most other spiders have 8, and the markings on their torso are said to resemble a violin or fiddle, though the markings are less reliable and have led to the misidentification of harmless spiders in non-endemic areas as brown recluses.

While definitive epidemiological data is lacking due to the difficulty in confirming a bite, retrospective data of 359 patients over 11 years from Brazil, where *Loxosceles* envenomation is a significant public health concern,<sup>4</sup> demonstrates bites in children and adults up to 59 years of age, with males and females equally represented, and the most common sites of injuries being the thigh and the trunk.<sup>5</sup> A similar study from Chile demonstrated that 73.6% of bites occurred during the summer months of the year.<sup>6</sup>

### Local Toxicity

The stereotypical cutaneous lesion in *Loxosceles* bites is characterized by central necrosis, a middle ring of blanched skin, and an outer ring of surrounding erythema. This pattern is known as the “red, white, and blue” lesion and is highly suggestive of envenomation. The likely

**FIGURE 2. Brown Recluse Bite**



PHOTO BY MICHAEL SIMPSON

pathophysiology for this necrosis involves the cytotoxic effects of sphingomyelinase D found in *Loxosceles* venom.<sup>7</sup>

Over the 14 days following the bite (Figure 2), an eschar will develop over the site and then slough off spontaneously. The rate of healing past these first 2 weeks often depends on the location and size of the wound, but most patients recover from the cutaneous effects of envenomation and do not progress to systemic toxicity.

As mentioned previously, appropriate identification of an offending spider is unlikely to be of much use to ED physicians treating patients with possible spider bites. Because the differential for a necrotic wound is large and the diagnosis is often a clinical one, dermatologists and entomologists have published a memory aid for when to consider a diagnosis other than brown recluse spider bite (BRSB): NOT RECLUSE (Table 1).<sup>8</sup>

### Systemic Illness

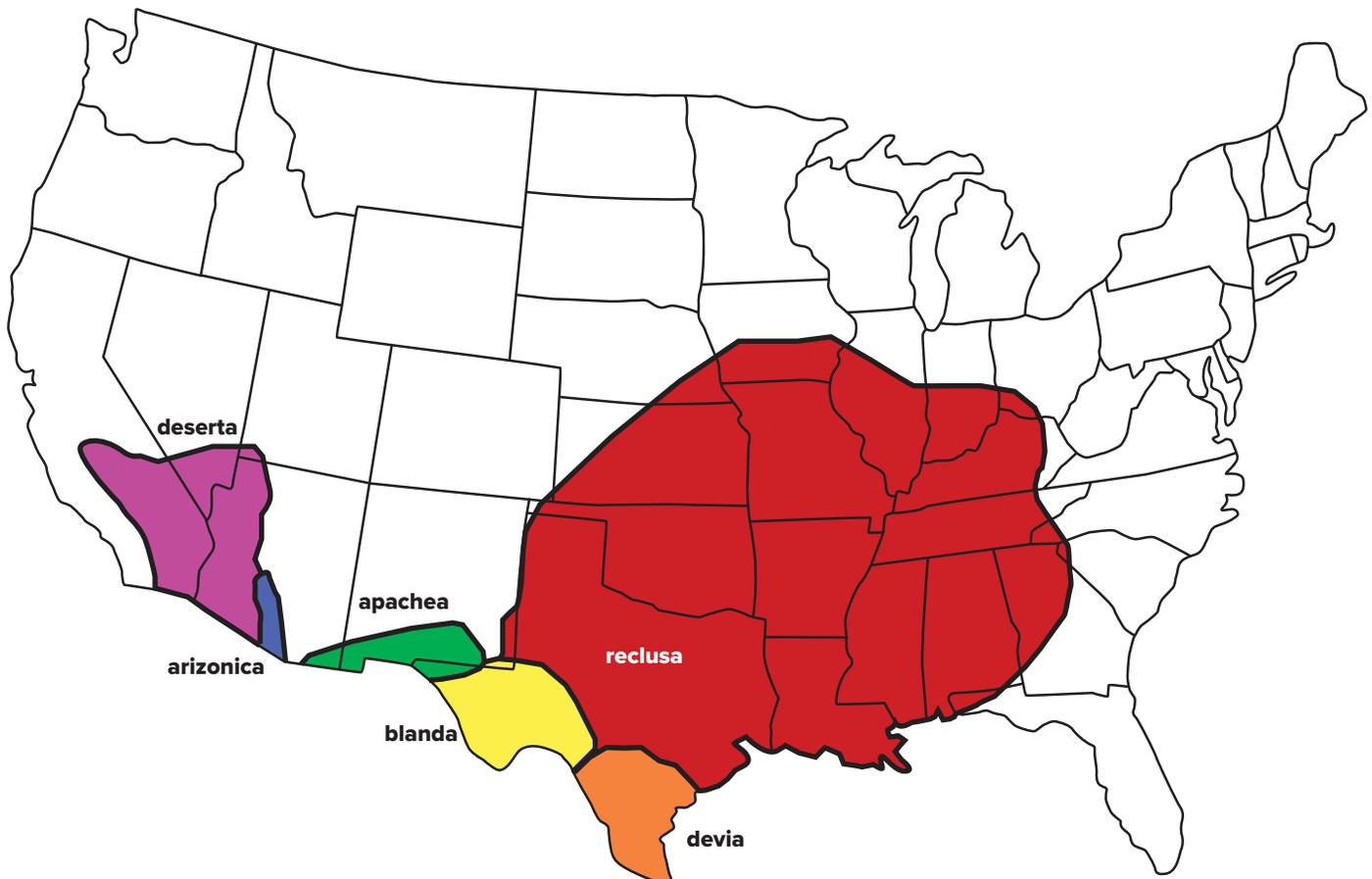
In addition to localized necrosis, some patients will develop systemic effects of *Loxosceles* envenomation, collectively referred to as “loxoscelism.” The most well-described elements of loxoscelism include fever and chills, nausea and vomiting, arthralgias, intravascular hemolysis with hemoglobinuria, rhabdomyolysis, disseminated intravascular coagulation (DIC) and acute kidney injury.<sup>9</sup> Sphingomyelinase D has also been implicated in systemic loxoscelism, damaging the erythrocyte cell membrane and recruiting inflammatory mediators leading to a systemic inflammatory reaction.<sup>10</sup>

Again due to the difficulty of confirming cases of BRSB, the true rate of loxoscelism is unknown; while it appears to be rare in North America, the condition is potentially life-threatening and can affect otherwise healthy individuals,<sup>7</sup> so it must be on

**TABLE 1. BRSB — NOT RECLUSE**

<b>Numerous</b>	If multiple lesions, consider bites by blood-feeding arthropods
<b>Occurrence</b>	If occurs outside, consider fungal infection or insect bite
<b>Timing</b>	<i>Loxosceles</i> bite very unlikely in October and March
<b>Red center</b>	If red center, consider cellulitis or insect bite
<b>Elevated</b>	If raised > 1 cm, consider abscess or cellulitis
<b>Chronic</b>	If persists > 3 months, consider skin cancer
<b>Large</b>	If > 10 cm, consider pyoderma gangrenosum
<b>Ulcerates</b>	If ulcerates in < 7 days, consider pyoderma gangrenosum
<b>Swelling</b>	If causes swelling below the neck, consider abscess or cellulitis
<b>Exudate</b>	If wound is weeping, consider abscess or purulent cellulitis

**FIGURE 1. Brown Recluse Habitats**



REPRODUCED WITH PERMISSION OF RICK VETTER

the differential when appropriate. In particular there are reports of children developing severe systemic loxoscelism prior to the appearance of the classic skin findings.<sup>11,12</sup> While there are lab tests that can differentiate *Loxosceles* bites from the necrotic wounds of several other spider species, these tests are not readily available to most ED physicians.<sup>13</sup> Instead the best way to diagnose loxoscelism is to be aware of and monitor for the feared systemic complications themselves.

ED physicians should turn their attention initially toward the airway, breathing, circulation, and mental status of the patient. Once any needed resuscitation is complete and the patient is determined to be at risk for loxoscelism, relevant labs include serum creatinine, hemoglobin/hematocrit, platelets, Coombs test, prothrombin time and partial thromboplastin time, D-dimer, fibrinogen, and creatine kinase, with additional testing dictated by the patient's presentation. Urinalysis is also indicated, as hematuria is an ominous predictor of intravascular hemolysis.

Patients with diagnostic testing

concerning for loxoscelism, including hematuria, should be admitted to the hospital and closely monitored, likely in the ICU.<sup>14</sup> Severe hemolysis should be transfused as necessary, and coagulopathy/DIC may need to be reversed in the setting of life-threatening bleeding. Those experiencing rhabdomyolysis, hemoglobinuria, or acute kidney injury require intravenous fluid hydration.<sup>5</sup> Antivenom is currently not available in the United States, so treatment is aimed at supportive care of the complications as they arrive.

**Case Conclusion**

*In the setting of a necrotic lesion concerning for BRSB, the ED team identified the dark urine as concerning for hemoglobinuria from loxoscelism. Urinalysis was positive for blood, confirming suspicion for hemoglobinuria and intravascular hemolysis. The patient's hematocrit was 35%, platelets were 163,000/mcL, her Coombs test was positive, and her creatine kinase, PT, PTT, D dimer, and fibrinogen were within normal limits. She was admitted*

*to the medical ICU and although she required a single transfusion of packed red blood cells during her admission, she recovered over the next 5 days and was discharged home with wound care for her necrotic ulcer. ★*

**TAKE-HOME POINTS**

- ✓ The diagnosis of BRSB is a clinical one, as spider identification is often not possible and definitive lab testing is not widely available.
- ✓ BRSB are extremely uncommon outside of endemic areas.
- ✓ Using the NOT RECLUSE mnemonic, consider a broad differential diagnosis.
- ✓ Systemic loxoscelism is rare but deadly – screen suspected patients for hemolysis, rhabdomyolysis, and acute kidney injury.
- ✓ As antivenom is unavailable in the United States, treatment for systemic loxoscelism is ICU admission and supportive care.

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# DENIAL OF DEATH

## The Phenomenon of Tumor Neglect



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**A** 56-year-old male with a past medical history of active tobacco use and remote intravenous heroin use presents to the ED complaining of a 2-month history of a rapidly enlarging mass on his right cheek. He states the lesion began as a “small pimple” and rapidly expanded. Exam reveals a 10 cm by 10 cm exophytic and indurated mass protruding from the right face, extending from the preauricular area and zygoma to his proximal neck with a necrotic and purulent central region. CT imaging shows a necrotic infiltrative malignant mass of the right cheek with extensive right neck neovascularity and adenopathy at all cervical levels.

Tumor neglect is a maladaptive response to grossly evident cancers that are disfiguring and life-threatening. The phenomenon, uncommon and largely unstudied, involves patients ignoring tumors in order to “cope with the obvious, outward and clearly visible signs of cancer.”<sup>1</sup> Denial is a common coping mechanism that grants individuals time to come to terms with stressful situations. However, it has the potential to become pathological, particularly when one’s own health is at stake.

Little research is available on this phenomenon, with only a few isolated case studies. The incidence is unknown. Cancers that appear to be most commonly associated with tumor neglect include those that are visible to the patient, larger than 1 cm, and especially malignancies of the skin and breast, though cases of testicular and some solid organ cancers have been reported. It is estimated that a third of women with symptoms of breast cancer will delay seeking professional care by > 3 months.<sup>1</sup> A 2018 report details a case of a 37-year-old woman with a growing breast lump for 4 months who presented to the ED with pain at the site.<sup>2</sup> Imaging confirmed the 16 cm by 13 cm fungating mass had metastasized to the lung and liver. Shortly after admission, the patient developed spontaneous tumor lysis syndrome and died of multiorgan failure.

Several case studies describe individuals ignoring their tumors for months or even decades, resisting the efforts of family and friends to persuade them to seek medical care.<sup>2</sup> Such neglect can lead to unchecked tumor growth, disfigurement, metastasis, and death.<sup>2</sup> Management of such advanced cases depends on several factors and often requires a multidisciplinary team that may include surgeons for resection and reconstruction in challenging cases.<sup>1</sup>

The reasons for this unusual phenomenon are multifactorial: distrust of the health care system, poor medical literacy, low socioeconomic status, psychosocial stressors, and the tendency to overlook the hazard of slow-growing tumors. A patient’s fear of a formal cancer

diagnosis and its potential financial burden may also be contributing factors. Patients seek to maintain control and independence as their deteriorating health threatens the status quo.<sup>3</sup> Those suffering from tumor neglect do not see their behavior as a form of denial and can feel suspicious of and threatened by the perceived interference of family and medical personnel who seek to help. Understandably, patients with tumor neglect can inadvertently become alienated by their behavior and the presence of a visible malignancy.

Emergency physicians are uniquely positioned to offer support, as potentially the first point of contact when a patient seeks help. Often, the most meaningful impact relates less to immediate management than referral to a specialist. Establish rapport, try to overcome the patient’s distrust of physicians, and eliminate barriers to health care when possible. Preserve the patient’s autonomy by seeking their input on key decisions in their care, while providing an informed perspective on their condition.

### Case Resolution

*Our patient was admitted with oncology and otolaryngology consults. Biopsies revealed HPV-negative, poorly differentiated squamous cell carcinoma of the face. A PET scan demonstrated significant metastases to the spine, liver, and lungs. Three weeks later, the patient underwent resection of the facial mass with modified radical neck dissection and pectoralis flap placement. Three months later, he was transitioned to hospice care and died under unclear circumstances. ★*

# Atypical Hemolytic Uremic Syndrome

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**A**n 18-year-old African American female presented to the ED complaining of a 3-week history of generalized fatigue, nausea, vomiting, heavy vaginal bleeding, lightheadedness. On the day prior to arrival in the ED, she developed progressively worsening dyspnea with exertion. She had been to several urgent care centers and EDs without receiving a diagnosis. She denied any fever, rash, diarrhea, or hematochezia. She denied alcohol, cigarettes, or other drug use and was not taking any medications. On presentation, her VS were as follows: 98.6 T, 140 HR, 22 RR, 180/90 mmHg BP, 96% oxygen saturation on room air. The patient appeared tired with pale conjunctiva. There was no rash or evidence of active bleeding. Pelvic exam showed minimal blood at the cervical os, and rectal exam showed normal brown stool in the rectal vault, which was hemoccult negative.

Initial lab work demonstrated WBC 23.6, Hb 5.1, HCT 14.9. The platelet count was indeterminate due to clumping. All other labs were marked as hemolyzed. Two units pRBCs were ordered for critical anemia. A bedside echo showed no pericardial effusion, no right heart strain, and normal ejection fraction. A FAST exam was negative for intraperitoneal fluid. A chest x-ray was obtained (Figure 1) with a radiology interpretation reporting, "Cardiomegaly with bilateral basilar opacities concerning bilateral pneumonia vs pulmonary hemorrhage."

An ECG was obtained (Figure 2) showing a wide-complex rhythm with peaked T-waves. While awaiting BMP results, the patient was empirically treated for hyperkalemia with 3 g calcium

gluconate, 1 amp sodium bicarbonate, 10 U insulin, 25 g D50, and nebulized albuterol. The QRS immediately narrowed on telemetry and on a subsequent ECG (Figure 3) that was obtained.

Results of a CBC with manual differential showed a platelet count of 75 and 2+ RBC fragments. Hemolysis labs and DIC screen were ordered. The patient's repeat BMP was reported as hemolyzed once again.

Given the clinical scenario of anemia with evidence of hemolysis, thrombocytopenia, and presumed hyperkalemia likely due to acute renal failure, thrombotic microangiopathy was considered with differential diagnoses including thrombotic thrombocytopenic purpura, hemolytic uremic syndrome, or complement-mediated hemolytic uremic syndrome. Nephrology and oncology were consulted for emergent dialysis and plasma exchange therapy (PLEX). A bedside istat was drawn showing a potassium of 7.5 and immeasurable creatinine. Telemetry showed recurrence of QRS widening requiring additional treatment for hyperkalemia, with improvement. The decision was made to place an emergent UDALL catheter to initiate dialysis and PLEX. After



**FIGURE 1. A Chest X-ray Demonstrated Cardiomegaly and Bilateral Basilar Opacities**

dialysis was started, the remainder of the laboratory studies results were:

- **BMP:** Na 131, K 9.4, Cl 85, CO<sub>2</sub> 6, BUN >186, Creatinine 48.3, Glucose 117, (Anion gap 39.6)
  - **Path review of smear:** Moderate schistocytes
  - Total bilirubin 0.3; LDH 1,328; haptoglobin < 10. PT; pTT and fibrinogen were within normal limits
- All are consistent with microangiopathic hemolytic anemia.

The patient was admitted to the medical intensive care unit, where she required endotracheal intubation for acute hypoxic respiratory failure. Four hours of dialysis were completed with transfusion of 2 units of packed RBCs, and shortly afterwards PLEX was started.

## Discussion

Microangiopathic hemolytic anemia (MAHA) is a condition defined by microvascular hemolysis with anemia and schistocyte formation. Thrombotic microangiopathy (TMA) is a condition characterized by MAHA and thrombocytopenia due to platelet activation and consumption. End-organ damage is caused by microvascular thrombi and occlusion leading to tissue ischemia.<sup>1,2</sup>

The major types of TMA are shiga toxin-mediated hemolytic uremic syndrome (ST-HUS, also known as classic HUS), complement-mediated TMA (also known as atypical HUS or aHUS), and thrombotic thrombocytopenic purpura (TTP). TMA is a hematologic emergency requiring prompt diagnosis and treatment. It should be suspected in any patient with evidence of hemolytic anemia and thrombocytopenia. The initial treatment of TMA includes supportive care, corticosteroids, and antibody removal with plasma exchange or plasmapheresis. Treatment should be started before definitive diagnosis is made, which can take several days.

## Comparing TTP, ST-HUS, complement-mediated TMA

TTP is caused by decreased activity of ADAMTS13, most commonly due to inhibitory autoantibodies against ADAMTS13. ADAMTS13 is a protease that cleaves von Willebrand Factor (vWF) from large multimers to shorter molecules. Normally, endothelial cells produce long chains of vWF, and ADAMTS13 binds to cleavage points and cleaves the long molecules into shorter fragments. Without ADAMTS13, large chains of vWF accumulate in arterioles and capillaries, subsequently causing platelets to clump onto vWF, leading to microangiopathic occlusion causing end-organ damage.<sup>3</sup> TTP is most commonly seen in young women. The classic pentad of TTP (found in only 5% of patients) is fever, microangiopathic hemolytic anemia, thrombocytopenia, renal failure, and neurologic symptoms (FAT RN). The hallmark of TTP is TMA with a severely reduced ADAMTS13 level of <10%.<sup>3</sup>

As previously mentioned, treatment

with PLEX should not be delayed, as 50% of deaths from TTP occur in the first 24 hours.<sup>2</sup> In cases where access to PLEX is delayed, FFP can be started, as it contains ADAMTS13, but PLEX has been shown to improve survival over FFP infusion alone.<sup>4</sup> An ADAMTS13 level should be drawn before the initiation of PLEX or FFP to avoid a false-negative result.

ST-HUS is caused by shiga toxin, commonly produced by enterohemorrhagic *Escherichia coli* (EHEC) (usually O157:H7) and is associated with diarrhea. It is diagnosed by the identification of the shiga toxin or EHEC in the stool. Treatment with antibiotics may worsen the disease, and ST-HUS usually resolves with supportive care such as fluid resuscitation and blood transfusion.<sup>5</sup>

Complement-mediated TMA is an autoimmune-mediated HUS caused by complement dysregulation. The diagnosis is suspected in any patient with TMA with a normal ADAMTS13 level and negative stool studies. Compared to patients with

TTP, patients with complement-mediated TMA are more likely to have severe renal dysfunction and pulmonary involvement (eg, pulmonary hemorrhage) and are less likely to have severe neurological changes. Prognosis of complement-mediated TMA is highly variable depending on which complement regulatory protein is mutated.<sup>6</sup> Eculizumab is a monoclonal antibody used in the treatment for complement-mediated TMA. Eculizumab binds to the complement protein C5 and prevents conversion into C5a and C5b, ultimately preventing the production of membrane attack complex (MAC) and protecting RBCs from intravascular hemolysis.<sup>7,8</sup>

## Conclusion

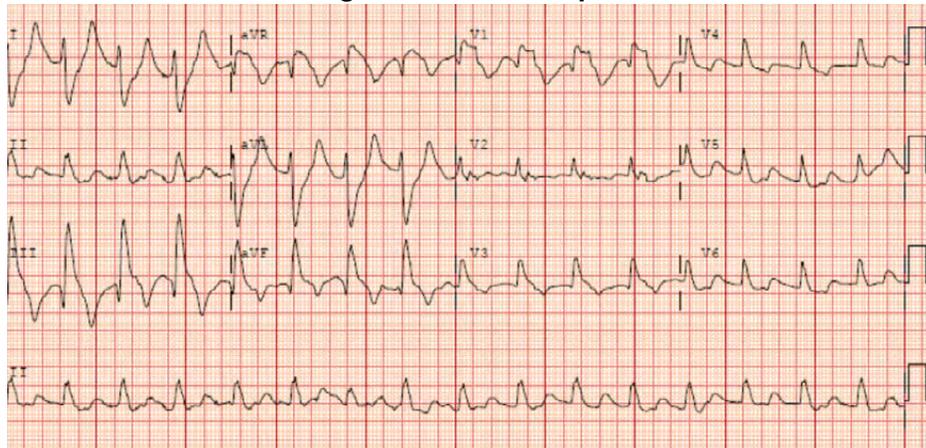
In the ICU, our patient underwent daily hemodialysis and PLEX with clinical and biochemical improvement and was extubated on hospital day 3. Workup revealed an ADAMTS13 antibody activity level within normal limits at 78%. Stool shiga toxin PCR was negative. She was found to have a decreased C3 level at 65 mg/dL (reference range 83-177) and was diagnosed with complement-mediated TMA. She was started on eculizumab and discharged from the hospital with outpatient hemodialysis.

Our patient presented with complement-mediated TMA with a symptom complex of acute renal failure, hemolytic anemia, and pulmonary hemorrhage. **Due to delays in her initial diagnosis, she presented in an advanced stage of renal failure with life-threatening hyperkalemia.**

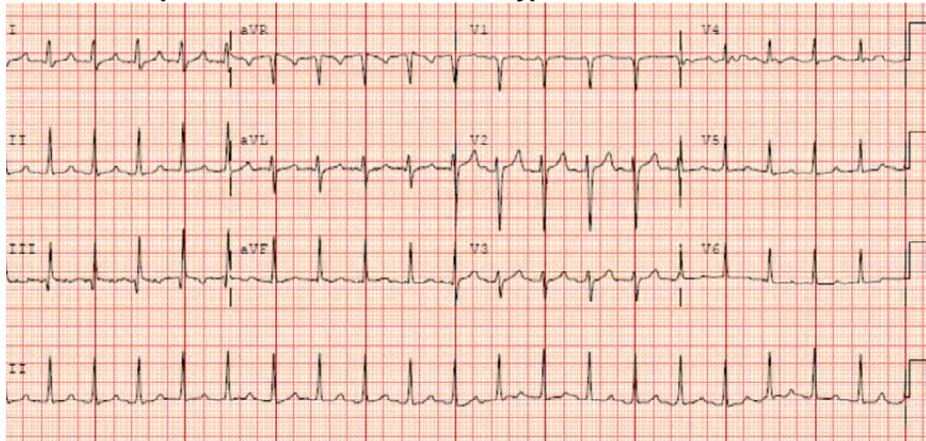
In cases of TMA, the laboratory may delay reporting results due to hemolysis being assumed to be in vitro while in fact, the hemolysis is in vivo. This resulted in a delay in reporting both the CBC as well as the BMP results. Nonetheless, clinical care was not delayed as the EKG changes of hyperkalemia were recognized and promptly treated.

While the specific treatment of complement-mediated TMA centers on eculizumab, initial treatment for the TMAs is usually started with steroids and PLEX while awaiting further diagnostic results such as shiga toxin and ADAMTS13 levels. ★

**FIGURE 2. Initial ECG Showing Widened QRS Complexes**



**FIGURE 3. Repeat ECG After Treatment for Hyperkalemia**



# Feeling Nervous?

## Recognition and Management of Nerve Agent Exposure

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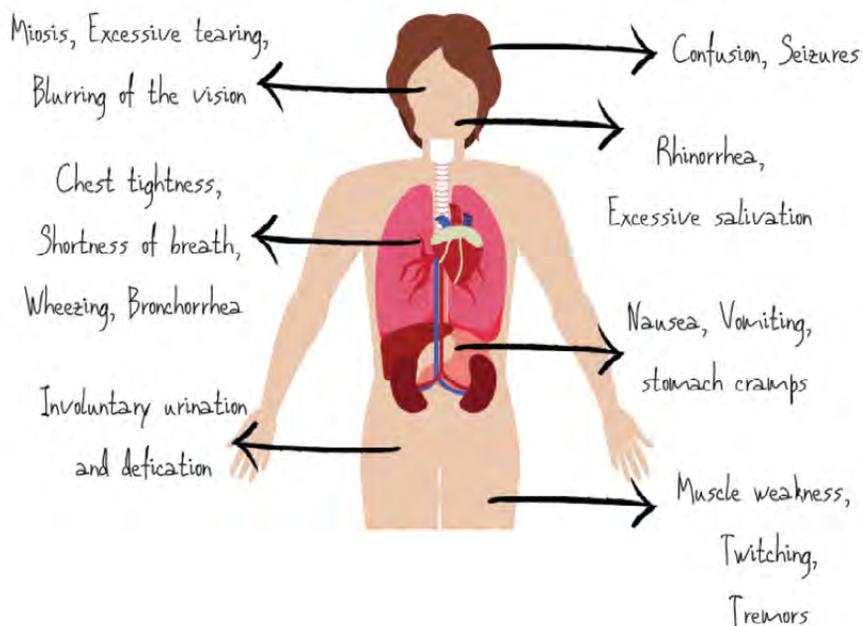
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A patient presents to your urban emergency department via EMS with shortness of breath, copious secretions, nausea, vomiting, and stool incontinence. His symptoms began abruptly at a concert and progressively worsened. During transport, he develops signs of increased work of breathing, coarse lung sounds, and hypoxia. You then receive a box call from the concert Incident Command regarding multiple casualties en route to your facility with similar symptoms. What do you do next? Who do you call, what procedures need to be initiated?

### Introduction

Nerve agents are one of the most terrifying weapons of war. With many direct pathophysiologic effects, the psychological terror they instill is often the intent of their use.<sup>1</sup> Often tasteless and colorless, they can be dispersed over a wide area to inflict as many casualties as possible. Although banned from use in conventional war, there have increased concerns that terrorist organizations or other non-governmental organizations may seek to use these weapons anyways.<sup>1</sup> While the United States has fortunately never seen a nerve agent attack on its soil, the possibility remains high. Emergency medicine providers must be able to recognize and treat victims of nerve agent attacks.

The 4 most common nerve agents are tabun (GA), sarin (GB), soman



(GD), and cyclosarin (GF). They have the designation “G” because they were initially synthesized by German scientists in the early 20<sup>th</sup> century.<sup>2</sup> Originally, tabun was designed as an organophosphate pesticide. However, its utility as a weapon was quickly realized and the additional agents were developed. These agents are all liquids at room temperature but can easily be aerosolized by either a dispersal device or by an explosive blast. They are all soluble in both fat and water, meaning they can readily be absorbed through the eyes, skin, and respiratory tract. They are all considered non-persistent compounds meaning that they evaporate quickly.<sup>2</sup>

The second generation of nerve agents with the designation “V” are much more stable and potent compared to the “G” agents and are considered persistent

agents.<sup>2</sup> They add a sulfur group to the organophosphates thereby making these agents less volatile as well as more fat/oil soluble. They act through direct skin contact and persist in the environment for up to several weeks due to their hydrophobic nature. The most notable example is VX which is highly toxic and can cause death within a few minutes to hours.<sup>2</sup>

### Pathophysiology

Nerve agents are very similar to organophosphates; they bind to and inhibit acetylcholinesterase. This produces a toxic accumulation of acetylcholine at the peripheral muscarinic, nicotinic receptors as well as the CNS synapses. Additionally, nerve agents appear to activate the NMDA receptors in the brain and inhibit GABA transmission.<sup>3</sup>

Overstimulation of muscarinic

receptors causes miosis, hypersecretion, bronchoconstriction, vomiting, diarrhea, urinary and fecal incontinence, and bradycardia. Over-activating nicotinic receptors in the skin cause sweating, and in skeletal muscle, they cause weakness and flaccid paralysis.<sup>3</sup> At CNS cholinergic receptors, nerve agents produce fatigue, lethargy, amnesia, ataxia, seizures, coma, and respiratory depression.<sup>3</sup>

### Symptoms

The clinical presentation of patients exposed to nerve agents depends on the route and duration of exposure. Exposure to lower concentrations of vapor leads to relatively mild symptoms such as miosis, ocular pain and rhinorrhea followed by gastrointestinal and respiratory symptoms with extended durations of exposure.<sup>3</sup>

Exposure to high concentrations of vapor induces convulsions, flaccid paralysis, loss of consciousness, and ultimately respiratory failure. The severity is due to nerve agent vapor being easily absorbed in the respiratory tract. It is so potent that it exerts its effects within seconds of exposure.<sup>3</sup>

### Treatment

Initial therapy should focus on removing the patient's clothes and decontamination to avoid further skin absorption followed by assessing the patient's airway, breathing, and circulation. The priority **MUST** be decontamination.<sup>7</sup>

Atropine remains the cornerstone of cholinergic toxicity treatment since its mechanism of action works as an acetylcholine receptor antagonist. The dose of atropine is based on the severity of symptoms.<sup>4,5</sup>

**TABLE 1. Dosing of Atropine for Cholinergic Toxicity**

Symptoms	Dose
1 Mild	0.8 mg IM
Definite SLUDGE 1 or more Mild 1 mild symptom with no effect in 30 min	2 mg IM q1hr

Be aware that you may have to utilize 2-3 times this dose in severe poisoning situations (4-6 mg) titrated to decrease in symptoms.<sup>5</sup>

**SLUDGE:** Salivation, Lacrimation, Urination, Defecation, GI upset, Emesis

In addition to atropine, providers should also administer Pralidoxime Chloride (2-PAM chloride). 2-PAM works by reactivating the acetylcholinesterase by scavenging the phosphoryl group and attaching it to the functional hydroxyl group of the acetylcholinesterase.<sup>4,5</sup> Delays in the administration of 2-PAM can render it ineffective because of the aging of the agent cholinesterase complex.

**TABLE 2. Dosing of 2-PAM for Cholinergic Toxicity**

Route	Dose
<b>IV</b>	30 mg/kg (typically 1-2 g), over 15-30 min. Followed by 4-8 mg/kg/hr IV infusion <b>OR</b> 500 mg/h infusion
<b>IM</b>	Mild Symptoms: 600 mg x3 every 15 minutes Severe Symptoms: 600 mg in rapid succession not to exceed 1800 mg total initial dose. For persistent symptoms repeat the series of three injections 1 hr after the last injection

The only class of antiepileptics effective in the management of seizures induced by nerve agents are benzodiazepines. The management of status epilepticus due to nerve agent exposure requires higher doses of anti-epileptic agents than conventional seizure therapy. Animal studies that have been extrapolated to humans estimate that doses as high as 30-40 mg of diazepam may be required to break seizures due to nerve agent exposure.<sup>1</sup>

### Provider Considerations

Your safety and the safety of the ED must be the No. 1 priority during any nerve agent attack. Proper decontamination and disaster planning at a hospital-level must be performed on a regular basis to ensure preparedness for such an event.<sup>7</sup>

The ED (and hospital) should be immediately locked down with controlled entry and exit once

an event has been identified. All emergency notifications to staff and local government agencies should be made. This includes the state health department to begin mobilizing resources.<sup>7</sup>

The specific level of personal protective equipment (PPE) is dictated by the type of release and air vapor concentrations. At a minimum level, coveralls, gloves, steel toe, shank boots [chemical-resistant], should be used if no air involvement.<sup>8</sup> It is unrealistic to expect ED staff to be trained for higher levels of PPE; however, the decontamination group should at minimum be operating in level B PPE (SCBA, Chemical-resistant gloves [double-layered], clothing, steel-toe, and boots) if operating within the hot or warm zone.<sup>8</sup> Specific federal decontamination teams are able to be mobilized; however, for the initial incident response, decontamination will fall on the local institution and local emergency response resources.

Personal provider safety is paramount! You cannot treat others if you become a casualty!

### Conclusion

Nerve agent attacks have the potential to quickly inflict a high number of casualties. As emergency medicine providers, we will be some of the first providers to treat victims of such an attack. Our ability to recognize and properly treat these patients is paramount to mitigating the damage from such an event. Of course, providers must always be mindful to protect themselves first and foremost. ★

### TAKE-HOME POINTS

- ✓ **Symptoms:** Salivation, lacrimation, urination, defecation, GI upset, emesis
- ✓ **Treatment:** Decontamination, Atropine and 2-PAM Chloride
- ✓ **Personal safety and decontamination are the most important considerations for nerve agent attacks.**



# Winter Is Still Coming!

## Reviewing Accidental Hypothermia

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Since the dawn of time, biological life has been affected by the extremes of temperature. Militarily, wars have been won and lost due to the devastation brought on by hypothermia. Hannibal lost nearly half his men in the Second Punic War. Napoleon’s army was crippled in the harsh winter of Russia in 1812. Arguably the greatest American generation suffered through the infamous European winters of WWII. Unfortunately, accidental hypothermia remains a substantial cause of death in our developed nation with nearly 1500 people dying yearly. In 1999, a Swedish physician suffered from one of the lowest recorded hypothermia cases, with a core temperature of 13.7°C after 9 hours of resuscitation — including initiating of ECMO.

### Pathophysiology

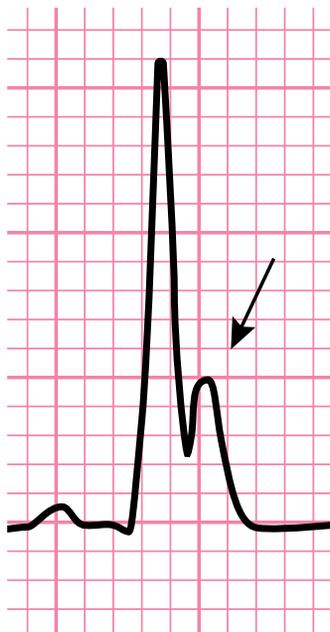
Accidental hypothermia refers to an involuntary drop in the body’s core temperature below 35°C (95°F). As the body cools with cold exposure, there is a natural response to maintain a normal core temperature, with involuntary shivering and active movement. The ability to regulate temperature and respond appropriately is multifactorial depending on age, exposure, health, nutrition, medications, and intoxicating substances. In the urban setting, the majority of patients presenting with accidental hypothermia are the homeless and alcoholics. Other at-risk populations

include the extremes of age, who have a weakened ability to thermoregulate.

### Clinical Manifestations

Cold exposure can lead to an incredibly variable clinical presentation. As the body temperature begins to decrease — breathing, circulation, and level of consciousness are affected. Below 95°F, patients will begin to have decreased cognitive function and difficulty with fine motor dexterity. Hypertension and tachycardia quickly progress to cardiac instability with associated hypotension, bradycardia, and ultimately dysrhythmia. EKG findings can consist of bradycardia, QRS widening, prolonged PR and QT intervals, as well as the classic Osborn wave.

**FIGURE 1. Osborn Wave**



Respiratory status may become tenuous as the initial tachypnea settles and eventually leads to respiratory depression as core temperature continues to drop. Pulmonary edema and aspiration pneumonia are common findings in the profoundly hypothermic patient.

### Prehospital Management

The prehospital management of a suspected hypothermic patient can be broken down to careful movement, basic and advanced life support, passive and active rewarming, and transportation to an appropriate center. There is a concept known as Rescue Collapse, which refers to the cardiac instability that is caused by the sheer movement of a patient suffering from severe hypothermia. Even basic movements can cause ventricular disturbance leading to fatal arrhythmia.

### Emergency Department Management

Determining an accurate core body temperature can often be difficult but remains paramount in the management of the hypothermic patient. An esophageal probe is a preferred method in your intubated patients. This is closely followed by the bladder probe. If unable to obtain an esophageal or bladder temperature, then rectal temperature becomes the ideal method. Modified advanced life support should be initiated as soon as possible, with the first and foremost focus remaining on rewarming the patient. Pharmacologic interventions, such as epinephrine and other vasoactive agents, can be arrhythmogenic while having little to no effect, and thus should generally be avoided. Most arrhythmias

convert spontaneously into normal sinus rhythm during rewarming. Defibrillation can be attempted if necessary but is typically unsuccessful until the core temperature is above 28-30°C. If defibrillation is unsuccessful, then further attempts should be delayed

until the temperature is above 30°C. Transvenous pacing is considered hazardous for hypothermia-induced bradydysrhythmias.

Serum potassium levels have been a controversial marker of non-survival. Research has suggested that serum

potassium greater than 12 mmol per liter (10 mmol per liter in some institutions) may be used as a hard stop for whether or not CPR may provide benefit. There is no consensus on how hyperkalemia is best treated in levels less than 12mmol per liter in the non-cardiac arrest patient.

**TABLE 1. Staging and Management of Accidental Hypothermia**

Stage	Clinical Symptoms	Typical Core Temperature	Treatment
HT I	Conscious, shivering	32 – 35°C	Warm environment and clothing, warm sweet drinks, and active movement (if possible)
HT II	Impaired consciousness, not shivering	28 – <32°C	Cardiac monitoring, minimal and cautious movements to avoid arrhythmias, horizontal position and immobilization, full-body insulation, active external
HT III	Unconscious, not shivering, vital signs present	24 – <28°C	and minimally invasive rewarming techniques (warm environment; chemical, electrical, or forced-air heating packs or blankets; warm parenteral fluids)
HT IV	No vital signs	<24°C	HT II management plus airway management as required; ECMO or CPB in cases with cardiac instability that is refractory to medical management  HT II and III management plus CPR and up to three doses of epinephrine (at an intravenous or intraosseous dose of 1 mg) and defibrillation, with further dosing guided by clinical response; rewarming with ECMO or CPB (if available) or CPR with active external and alternative internal rewarming

**TABLE 2. Effectiveness of Rewarming Techniques**

Technique	Rewarming Rate °C/hr	Indication
<b>Without Cardiac Support</b>		
Warm environment and clothing, warm sweet drinks, and active movement	2 (dependent on metabolic rate)	HT I
Active external and minimally invasive rewarming (warm environment; chemical, electrical, or forced-air heating packs or blankets; and warm parenteral fluids)	0.1-3.4	HT II or HT III with cardiac stability
Peritoneal dialysis	1-3	Uncertain
Hemodialysis	2-4*	Uncertain
Thoracic Lavage	3*	HT IV when ECMO or CPB not available
Venovenous ECMO	4*	Uncertain
<b>With Cardiac Support</b>		
Venoarterial ECMO	6*	HT III with cardiac instability or HT IV
Cardio-pulmonary bypass	9*	HT III with cardiac instability or HT IV

\*Value is approximate

**Disposition**

The disposition of the patient is highly variable depending on the degree of hypothermia and response to therapies administered. Patients who are classified as mild to moderate may be briefly observed in the emergency department and discharged home if they have an appropriate response to management with good social support. Patients who are classified as moderate to severe, or those requiring invasive procedures, should be admitted to the hospital for further evaluation and observation.

Transfer to an ECMO capable facility should be considered for any patient with cardiac instability, dysrhythmia, or severe hypothermia unresponsive to otherwise maximal invasive therapies. Termination of resuscitative efforts generally isn't considered until the core temperature as reached 32°C without other markers of futility, i.e. trauma incompatible with life or a potassium >12mmol).

**Conclusion**

Patients suffering from accidental hypothermia should be managed aggressively. Those without cardiac instability can be managed with active, external warming and minimally invasive warming techniques. Patients with severe hypothermia, especially those in cardiac arrest, should be treated at a facility capable of extracorporeal rewarming. Given the advancements in rewarming techniques, the prognosis for patients suffering from hypothermia has improved. For patients who suffered cardiac arrest secondary to primary hypothermia and were subsequently placed on ECMO, neurologically intact survival is as high as 50%; while nearly 100% of all other hypothermic patients have full neurologic recovery. ★

# Petechiae and Gingival Bleeding ITP Beyond the Boards

## A Case Report and Review on Diagnosis and ED Treatment

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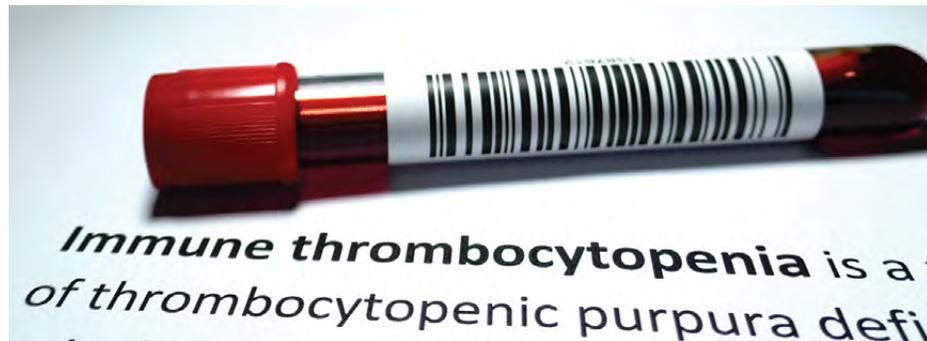
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Attending physician

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Immune thrombocytopenia (ITP) can often be first diagnosed and recognized in an ED setting, both as a primary and incidental finding. Let's review a typical presentation and the unique pathology and specific treatment for this diagnosis.

A 67-year-old woman presents to the emergency department for evaluation of a lower extremity rash. The patient was in her usual state of good health prior to presentation before the gradual onset of decreased energy and arthralgias accompanied by nasal congestion, rhinorrhea, poor appetite and concerns she had a



recent viral upper respiratory infection. The evening prior to presentation, the patient noted multiple petechiae around her ankles bilaterally which spread to involve the both legs up to her knees by morning. She has had no fever, chills, neck pain, photophobia, neck stiffness, epistaxis, cough, shortness of breath, chest pain, abdominal pain, vomiting, signs of gastrointestinal bleeding, hematuria, or lower extremity swelling. She did note frequently tasting blood in her mouth after brushing her teeth over the past day. The patient has a past medical history significant for rheumatoid arthritis, migraines, and acid reflux. The patient's medications included acetaminophen and omeprazole, with no new or different medications.

On exam, the patient was a pleasant elderly woman in no apparent distress. Physical exam was unremarkable

except for ulnar deviation of the proximal and distal interphalangeal joints consistent with her prior diagnosis of rheumatoid arthritis and lower extremity exam revealing dark purple petechiae measuring 1-2 mm each scattered throughout her bilateral lower extremities (Figure 1a and 1b).

Laboratory investigation revealed thrombocytopenia below the detectable level of 3,000/L. There were no other cell count abnormalities, and electrolytes, renal function tests, and INR were all within normal ranges.

The patient was diagnosed with suspected primary ITP without signs of active bleeding and received a dose of 50 mg of oral prednisone in the ED and was admitted to the hospital due to a critically low platelet count. Her hospital course consisted of daily doses of 50mg oral prednisone and a single dose of intravenous rituximab. The patient's hospital course was otherwise unremarkable and the patient's platelet count had returned to 94,000/L on the fifth day. The patient was discharged to home on oral prednisone after six days of hospitalization with close follow-up at an outpatient hematology clinic.

### Discussion

In the setting of isolated thrombocytopenia unexplained by another condition, a diagnosis of Immune Thrombocytopenia (ITP) can be made. Immune Thrombocytopenia (formerly known as Idiopathic Thrombocytopenia Purpura) is an autoantibody-mediated

**TABLE 1. Common Medications Causing Drug-Induced ITP<sup>5</sup>**

Abciximab	Oxaliplatin
Amiodarone	Penicillin
Ampicillin	Piperacillin
Carbamazepine	Quinidine
Ceftriaxone	Quinine
Haloperidol	Ranitidine
Heparin	Rifampin
Ibuprofen	Simvastatin
Levofloxacin	Trimethoprim-Sulfamethoxazole
Mirtazapine	Vancomycin

destruction of platelets and associated decreased release of platelets from megakaryocytes. A platelet count of less than 100,000/L is required for a diagnosis of the 3 types of ITP: primary, secondary, and drug induced.<sup>1</sup> Primary ITP is not caused by any other underlying condition or drug reaction. Secondary ITP is in the setting of systemic disease—common etiologies include HIV, Hepatitis C, systemic lupus erythematosus or leukemia and often improves with treatment of the underlying disease.<sup>1</sup> ITP can often also be seen in conjunction with other autoimmune disorders, including rheumatoid arthritis,<sup>2</sup> as was the case for this patient. Drug-induced ITP is a medication-induced antibody reaction causing platelet destruction (see Table 1 for common offending agents).

Overall severity of illness is correlated to platelet levels, though severe ITP is clinically defined as cases with significant bleeding requiring intervention.<sup>3</sup>

Typical presentations will include petechiae or purpura that develop over days, usually associated with platelet counts less than 20,000/L.<sup>3</sup> Other presentations include persistent superficial bleeding or recurrent bruising, epistaxis, gingival bleeding, hematuria, or menorrhagia.<sup>4</sup> The risk for spontaneous or traumatic intracranial hemorrhage or internal bleeding is highest in patients with platelets levels less than 10,000/L.<sup>4</sup> One pooled analysis of ITP patients with persistent platelet levels less 30,000/L showed a predicted 5-year mortality rate from fatal hemorrhage of 2.2% for patients younger than 40 and 47.8% for patients older than 60.<sup>6</sup> Patients with platelet counts above 50,000/L are typically asymptomatic and thrombocytopenia is usually an incidental finding.<sup>4</sup> Studies have shown that most cases are diagnosed in the fifth to sixth decade of life with a higher incidence in women; however, one-third to one-fifth of cases of ITP are diagnosed incidentally without symptoms, therefore true prevalence is difficult ascertain.<sup>7</sup>

Treatment of ITP has 2 major focuses: bleeding control and increasing platelet levels. Bleeding control follows direct local pressure or packing pending on the site as would be done for non-

thrombocytopenic patients. One recent case series has shown the potential for improved homeostasis with the use of intravenous tranexamic acid (TXA) in ITP patients with active bleeding.<sup>8</sup> Platelet transfusion should be considered in any

**FIGURE 1A. Peripheral Petechiae on Patient's Legs**



**FIGURE 1B. Peripheral Petechiae on Patient's Leg**



significant bleed, especially in the setting of platelet counts less than 30,000/L.<sup>9</sup> Transfusion should not be initiated in patients without active bleeding, regardless of platelet count.<sup>9</sup> However, platelet transfusions in asymptomatic patients with ITP are not associated with the higher morbidity and mortality seen in other platelet-consumptive processes such as thrombotic thrombocytopenic purpura (TTP) or heparin-induced thrombocytopenia (HIT).<sup>10</sup> One unit of platelets should increase total count by 30,000-50,000/L.<sup>9</sup> Ideally, platelet transfusion should be given with intravenous immunoglobulin (IVIG) over several hours in discussion with a hematology consultant.<sup>4</sup> In patients presenting with minor bleeds with platelet counts less than 20,000/L, initial treatment should include IV methylprednisolone (40 mg for adults) for several days or oral prednisone (1 mg/kg) to be continued for several weeks with taper.<sup>4</sup> Hospitalization is at discretion of provider but required for patients with significant mucocutaneous or internal bleeding and those who have a platelet count less than 20,000/L with a history of prior significant bleed.<sup>4</sup>

Relapses of thrombocytopenia are not uncommon and can occur following recent infection (as was seen in our case) and also treated with corticosteroids or IVIG. Complete response to treatment is achieved when platelet counts are between 30,000-100,000/L with at least double the baseline count.<sup>3</sup> Cases with refractory bleeding or severe thrombocytopenia despite glucocorticoids and IVIG may be considered for treatment with Factor VIIa<sup>11</sup> or biologics such as Rituximab<sup>4</sup> as this patient received. ★

### TAKE-HOME POINTS

- ✓ Consider ITP in patients with petechiae (often lower extremity) or recurrent bruising, epistaxis, gingival bleeding, hematuria, or menorrhagia.
- ✓ A platelet count of less than 100,000/L is required for a diagnosis and consider new drugs or disease processes as causes before diagnosing primary ITP.
- ✓ Initial treatment should include IV methylprednisolone (40mg in adults) or oral prednisone (1mg/kg). Consider platelet transfusion in those with active bleeding and admission for those with bleeding or critically low levels (<20,000/L).
- ✓ Predicted 5-year mortality rates ranged from 2.2% for patients younger than 40 years to 47.8% for those older than 60 years.



# A Case of Severe Malaria in the ED

**Patients with severe malaria will have signs of end-organ damage, a high parasite density, and/or neurological findings. Once the diagnosis of severe malaria is made, the CDC will need to be notified as soon as possible in order to receive artesunate in a timely manner.**

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A 31-year-old female with a past medical history of polycystic ovarian syndrome and pre-diabetes presented to the ED for a positive malaria test taken by her PCP. The patient states she was in Ghana for 10 days last month to visit friends. She says she was offered malaria prophylaxis but declined. About 10 days after returning home she started developing symptoms of fever, night sweats, cough, nausea, and vomiting. She was seen at an urgent care facility and diagnosed with gastroenteritis. The patient says she did not get better and went to her family doctor, who tested her for malaria. She received a call the next day informing her that she tested positive for *P. falciparum* and was instructed to go to the ED immediately. Her degree of parasitemia was noted to be 7.5%, which is considered severe malaria.

On arrival to the ED the patient's blood pressure was 85/72 mmHg and her heart rate was 146 bpm. Her initial lactate was > 5 mmol/L. Her repeat parasite density was 19%, which was an increase from 7.5% less than 24 hours prior. LFT's were also significantly elevated with an AST > 1400 IU/L and a total bilirubin > 4 mg/dL. Her initial hemoglobin was 15 g/dL. Her platelets were noted to be only 14 k/mcL, which raised the concern for DIC, however, her fibrinogen was normal. She also had an acute kidney injury with a creatinine of 1.7 mg/dL. A chest x-ray did not show any pleural effusions, and she was not showing any signs of respiratory distress. The patient's blood pressure improved with a 30 mL/kg bolus of Lactated Ringers. She was given a dose of doxycycline, and Infectious Disease was consulted immediately; they recommended a one-time dose of atovaquone/proguanil.

The CDC was notified within an hour of the patient arriving in the ED and flew in artesunate from Chicago. The door-to-IV-artesunate-treatment time was roughly 7 hours. She was admitted to the hospital for further management.

## Malaria Background

Malaria is a disease caused by the protozoan parasite *Plasmodium*. According to the CDC, there are about 1700 cases of malaria per year in the U.S., 300 of which are considered severe. There are 5 known species of *Plasmodium* that can infect a human host. These species are *P. falciparum*, *P. malariae*, *P. ovale* and *P. vivax*. There is also *P. knowlesi*, which usually infects primates like the macaques but has been shown to infect humans as well. *P. falciparum* and *P. vivax* are the 2 most common species that cause malaria in humans.

The parasite spreads to humans through the bite of an infected female *Anopheles* mosquito. The *Anopheles* mosquito carries the infective form of the parasite known as sporozoites in its salivary glands. Once a human is bitten, these sporozoites travel to the liver, where they are taken up by hepatocytes. While in the hepatocytes they undergo replication and are

released into circulation as merozoites, where they infect erythrocytes. How quickly the *Plasmodium* progresses through its life cycle depends on the species of *Plasmodium*. For example, *P. ovale* and *P. vivax* can lay dormant in hepatocytes for months and even years as hypnozoites. A typical incubation period is between 10 days to 4 weeks.

Initial symptoms include nausea, vomiting, headache, fevers, chills, diarrhea, and body aches. The gold standard for diagnosis of malaria is a peripheral blood smear.

### Severe Malaria Criteria

Young children, immunocompromised patients, and pregnant women are at increased risk to develop severe malaria. Severe malaria is defined as any one of the following:

- Acid-base disturbances
- Acute renal failure
- Altered mental status
- Anemia <7
- Hyperparasitemia >5%
- Jaundice

- Pulmonary edema/ARDS
- Seizures
- Shock

Hypoglycemia and thrombocytopenia are also potential complications of malaria and should be monitored closely. Thrombocytopenia tends to be more common in *P. falciparum* compared to other species of *Plasmodium*. The degree of thrombocytopenia has not been shown to correlate with severity of infection in adults; however, a significantly low platelet count in children may be an indication of severe infection.

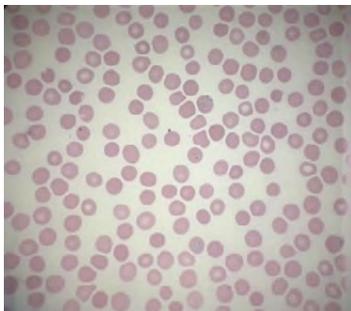
### Treatment and Prevention of Malaria

The best treatment for malaria is prevention of malaria. This can be achieved with mosquito nets, insecticide, or anti-malarial drugs. Typical drugs used to prevent malaria are doxycycline, atovaquone/proguanil, chloroquine, mefloquine, primaquine, and tafenoquine. Which drug you use may depend on the region you are traveling to, and the susceptibilities of the drug in that given region. This patient received doxycycline, atovaquone/proguanil, and artesunate.

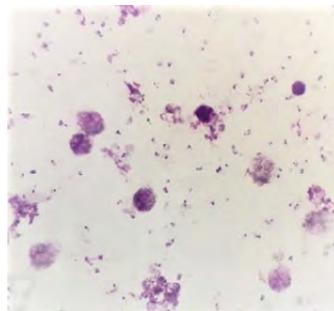
Artesunate is used as first-line treatment in cases of severe malaria and is thought to work by generating reactive oxygen species that damage malarial proteins. It is the only IV anti-malarial drug approved by the FDA in the U.S., and it is provided free of cost by the CDC. Pregnancy is not a contraindication for the use of artesunate in severe malaria.

### Case Conclusion

*While in the hospital our patient developed rhabdomyolysis and a severe kidney injury but did not require dialysis. Her parasite density was 0% after 3 doses of IV artesunate. Her LFTs and thrombocytopenia slowly resolved without any intervention. She did go on to develop a hemolytic anemia with a Hb of 7.9 g/dL on Day 4 but did not require a blood transfusion. Despite having multiorgan failure, high parasitemia, and signs of shock, the patient is expected to have a good outcome. ★*



Thin smear



Thick smear

## TAKE-HOME POINTS

- ✓ Malaria is a potentially life-threatening disease caused by the Plasmodium parasite. Symptoms usually present 1–4 weeks after infection but can present months to years later depending on the species.
- ✓ Initial symptoms include nausea, vomiting, fevers, chills, and can mimic those associated with gastroenteritis or influenza, making it important to ask patients about recent travel history.
- ✓ Patients with severe malaria will have signs of end-organ damage, a high parasite density, and/or neurological findings. Once the diagnosis of severe malaria is made, the CDC will need to be notified as soon as possible in order to receive artesunate in a timely manner.
- ✓ Patients may be severely dehydrated, and aggressive hydration may be needed.
- ✓ Always encourage patients to use malaria prophylaxis and educate them on the signs and symptoms to watch out for if they travel abroad.
- ✓ Be especially cautious in pregnant patients and young children, as they are known to have increased mortality rates from malaria.

# A Pause to Consider *Strongyloides Stercoralis* in the ED

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**A** 45-year-old female presents to the emergency department with 3 weeks of abdominal pain, nausea, vomiting, and profuse watery diarrhea. The patient is originally from Iquitos, Peru, and has been visiting friends and family for the past week.

Initial vital signs are T 37.2°, HR 140, BP 90/60, Sat 95%, RR 28. On physical examination, the patient is uncomfortable and toxic-appearing, with diffuse abdominal pain and bilateral end-expiratory wheezing. CT abdomen and pelvis with contrast is unremarkable, and malaria rapid diagnostic tests, HIV, and blood smears negative.

After initiating the workup and management for sepsis, including blood, urine, and stool cultures, you admit the patient to the ICU. Comprehensive GI PCR reveals nontyphoidal *Salmonella* sp., and the stool exam for ova and parasite are positive for *Strongyloides stercoralis* rhabditiform larvae. Ivermectin is added to the broad-spectrum antibiotic regimen, and the patient begins to improve. The patient later tests positive for HTLV-1 serology and is discharged after 1 week in the hospital.

## Understanding Strongyloidiasis

Strongyloidiasis is an infection of the parasitic nematode, *Strongyloides stercoralis*. This condition is well-known in global health as a health concern among immigrants and refugees, but it is also present in many rural areas of the United States. According to the CDC, in 1 year, the Commonwealth of Kentucky had 15 strongyloidiasis-related hospital

discharge diagnoses reported by the Healthcare Cost and Utilization Project database.<sup>2</sup>

Worldwide, *S. stercoralis* is present in 100 million people, common in tropical South America, Sub-Saharan Africa, and especially Southeast Asia.<sup>3</sup> Death is primarily caused by the overwhelming response to the parasite in an immunosuppressed host leading to Gram-negative sepsis. In Appalachian rural areas, prevalence has been found to be up to 1.9%, even with an absence of travel to endemic countries.<sup>4</sup> Endemic foci have also been found mostly within the southeastern states with the total number of cases in the U.S. thought to be underestimated due to subclinical infections.<sup>9</sup>

The unique life cycle of *Strongyloides stercoralis* is worth exploring, as it is a nematode with both a free-living and parasitic life cycle — making diagnosis potentially difficult. Typically, it is transmitted when filariform larvae penetrate the skin of humans as they walk barefoot. However, it can also be transmitted through fecal-oral transmission through person-to-person contact or self-inoculation.

Once the parasite penetrates through the skin, it makes its way into the lungs via the bloodstream. Once in the lung, it irritates and activates a cough reflex which allows the parasite to be coughed and swallowed — entering the GI tract. Fecal shedding propagates the free-living rhabditiform life cycle. Rhabditiform larvae in the gastrointestinal tract can become infective filariform larvae and lead to autoinfection by penetrating the intestinal mucosa and may again disseminate to the lungs or other organs via the bloodstream.<sup>6</sup> This repeating cycle can make diagnosis difficult, as conditions can persist many

**FIGURE 1. The Larva of Nematode Parasite *Strongyloides Stercoralis*<sup>1</sup>**



years after initial exposure without symptomatology. When should you include strongyloidiasis be on your differential? What treatments should be considered or avoided when providing emergency care for patients at risk for this condition?

## Diagnosis

To determine the at-risk patient, a detailed history and physical examination should be obtained, including travel history to endemic regions, type of home sanitation system, and immunocompromising risk factors. The increase in newer immunosuppression agents in organ recipients has led to a resurgence of *S. stercoralis*. Human T-cell leukemia virus type 1 (HTLV-1) is also associated with the disease. Other considerations for patients at risk for *S. stercoralis* according to Hunter's Tropical Medicine and Emerging Infectious Disease, may be the patient from "southeastern Kentucky and elsewhere in Appalachia — patients traditionally white, male,

older than 50 years of age, and from lower socioeconomic backgrounds."<sup>5</sup> Additionally, if larva currens is noted on skin examination, this would further aid in the diagnosis of this disease process.

Because strongyloidiasis can be retained throughout the host life-span, untreated chronic infections can present as chronically relapsing symptoms and patients are at risk for an overwhelming immune response if they receive corticosteroid therapy. The diagnosis of *S. stercoralis* hyperinfection syndrome and disseminated strongyloidiasis is often difficult, as it can present decades after first exposure.

Hyperinfection can be seen as symptoms of diarrheal illness, ileus, Gram-negative sepsis, Loeffler's syndrome, meningitis, peritonitis, endocarditis, and larva currens. According to Principles and Practice of Infectious Diseases, "the mortality associated with untreated disseminated strongyloidiasis approaches 100%, and

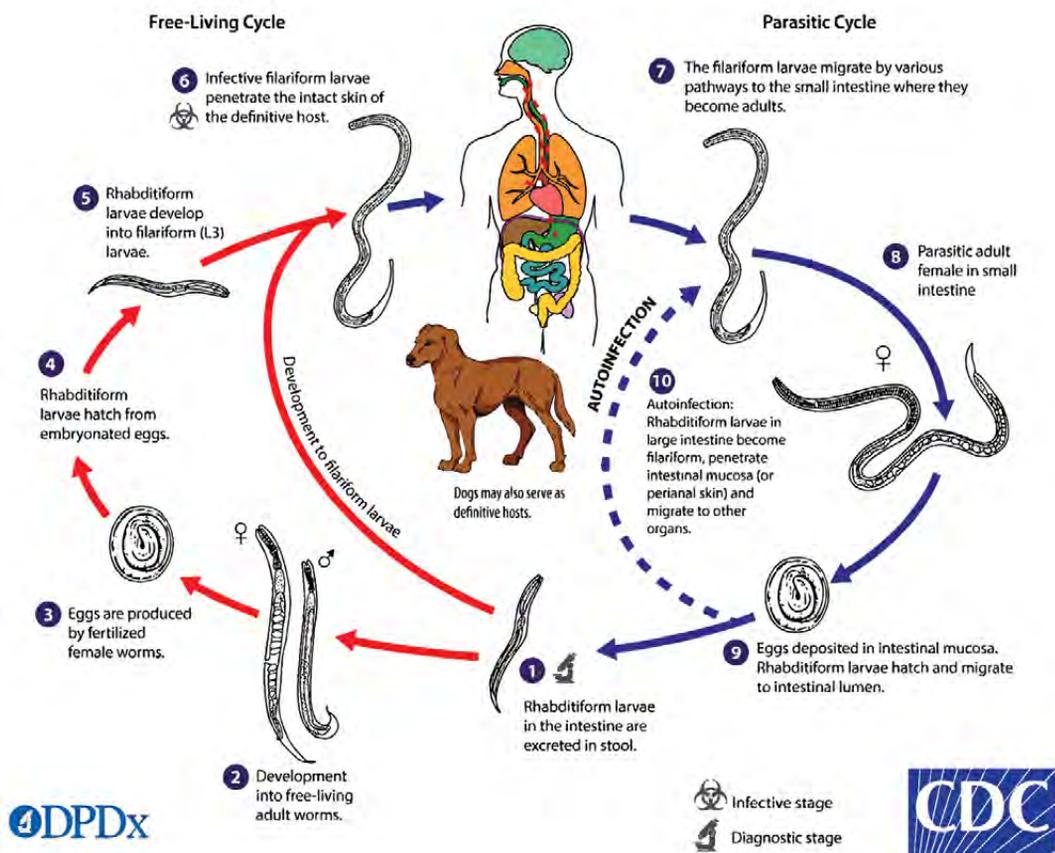
even with treatment it may exceed 25%."<sup>8</sup> Patients who present with new-onset respiratory distress with wheezing and or Gram-negative sepsis while living in or traveling to *S. stercoralis* endemic regions should be considered for hyperinfection/disseminated infections.

Diagnosis may be made through sputum, skin, or stool examination looking for larvae. IgG serology is also available for detecting chronic infections.<sup>8</sup> While elevated eosinophil counts are helpful in the diagnosis of chronic infections, eosinophil levels are not diagnostic in patients with hyperinfection.<sup>6</sup>

## Treatment

First-line treatment is ivermectin 200 mcg/kg by mouth, once daily for 1 day for the asymptomatic patient, or until the acute illness has resolved in the critically ill patient. For pediatric and pregnant patient populations, albendazole may be a safer option.<sup>5</sup> Consider avoiding corticosteroid therapy in these patients unless otherwise indicated. ★

**FIGURE 2. The Life Cycle of *Strongyloides Stercoralis*<sup>7</sup>**



## TAKE-HOME POINTS

- ✓ *Strongyloides stercoralis* should be considered in any patient from a tropical climate or the Appalachian region.
- ✓ Special consideration should be made via screening questions and outpatient screening tests prior to steroid initiation, if possible.
- ✓ Empiric treatment with ivermectin, after stool studies, may be beneficial to critically ill patients on steroids or other immunocompromising agents who are at risk for hyperinfection or disseminated strongyloidiasis.



# Common Pitfalls of Ultrasound-Guided Peripheral IV Placement

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Placement of an ultrasound-guided peripheral intravenous line (USPIV) is a common and relatively safe procedure. It has been successfully mastered by many members of the health care team, including residents, medical students, nurses, and ED technicians.<sup>1-3</sup> In cases of failed access, ultrasound-guided peripheral IV placement is more successful than blind external jugular (EJ) placement and reduces the need for central venous catheters.<sup>4-7</sup> Prior literature suggests that the greatest barrier to implementation of this procedure lies in the initial training period.<sup>1</sup> Despite extensive study on the most effective methods for the procedure, and even the optimal ways to teach the procedure, no literature has addressed the common mistakes made by trainees.<sup>5,8</sup> Interestingly, although most USPIV training programs involve some element of bedside observation by an experienced provider (eg, 5-15 supervised IV insertions), no studies have reported on the feedback given during this period.<sup>3</sup> To this end, it is possible that common initial mistakes are being corrected during the observation period and subconsciously refined through further practice.

After several months of informally teaching new residents and medical students this procedure, an indisputable theme emerged: Nearly all of my learners' unsuccessful attempts were caused by one of only a few common mistakes. From this emerged the checklist of "Common Pitfalls" of ultrasound-guided IV placement.

## The 5 Most Common (and correctable) Pitfalls of Ultrasound-Guided IV Placement

### 1. Failure of positioning

- **Mistake:** The ultrasound screen is positioned in such a way that the provider has to turn significantly to see the screen, or has to lean over such that they are looking up at the screen, resulting in challenging ergonomics.
- **Fix:** Elevate the bed to the proper height with the patient's arm extended outwards onto a table, with the ultrasound screen positioned over the patient's shoulder in line with the arm. The provider, the patient's arm, and the ultrasound screen should form one straight axis.

**Pitfall #1 is the easiest to correct. It involves no physical skills, and depends only on the provider to fight the natural urge to skip basic steps. In the scenario of a right-**

handed provider inserting a right arm IV, a novice trainee will frequently position the ultrasound screen over their left shoulder requiring them to rotate more than 90 degrees. A moment of preparation will likely save time in the end.

## 2. Failure to identify vein location and course

- **Mistake:** The provider correctly identifies a vein, but lacks the 3-dimensional knowledge of where it is and its path relative to the ultrasound probe and probe marker. After skin puncture, they realize their needle tip is not close to the target.
- **Fix:** Turn on the ultrasound reference lines to indicate the midline of the probe and deliberately note the vessel depth. With 30 seconds of scanning, a vein can be easily mapped in three-dimensional space.

**Pitfall #2 is likely to be overcome naturally with experience using ultrasound. Mapping a vein in three-dimensional space requires both visuospatial skills and hand dexterity. This is further complicated by the fact that trainees will frequently map out a vein with their dominant hand, and then realize (only when they finally reach for the needle) that they need to switch hands. Encourage trainees to do all superficial ultrasound with their non-dominant hand so that they are accustomed to manipulating the linear array probe. Ultrasound ambidexterity will confer benefit for other procedures (e.g. central venous line placement, arthrocentesis, etc). Novices are unlikely to cannulate the vein at their exact location of choice, so taking a minute to map out a longer “runway” can maximize success.**

## 3. Last-minute adjustments in position

- **Mistake:** The provider holds the needle above the skin. When looking up at the screen at the time of skin puncture, they make a minor unintentional movement just prior to insertion. As a result, the needle (and its subsequent course) is considerably off-target.

- **Fix:** Rest the needle on the skin, ensuring the midline markers line up with vessel.

**Pitfall #3 is subtle, but common and easily correctable. A good teaching analogy: the unanchored needle is like a javelin — it is likely to veer off course! Remind the trainee that simply resting the needle on the skin in the correct position will not hurt the patient.**

## 4. Failure to advance to adequate depth

- **Mistake:** The initial puncture is too superficial. If the first movement ends at only superficial depth, the needle must then traverse a significant vertical distance during which time there is a high risk of losing the tip. Furthermore, this gentle and prolonged dissection of tissue is painful (and stressful)!
- **Fix:** Deliberately insert and advance the needle to 80% of the vessel depth.

**Pitfall #4 is the most common. Trainees will cite procedural timidity, fear of hurting the patient, or prior experience placing standard peripheral IVs which require only superficial skin puncture. Frequently, the tip will become lost and subsequent attempts to locate the tip are either unsuccessful or unsalvageable due to hematoma formation. Although a sense of depth will come naturally over time, it is greatly accelerated by explicit mindfulness of the target depth. Consider practicing by inserting an angiocath into gauze at specific depths.**

## 5. Looking for a flash

- **Mistake:** The innate — seemingly unavoidable — tendency is to look down at the hub to check for a flash. Looking away from the screen causes subtle movements of one or both hands, leading to loss of the needle tip and inadvertent advancement of the catheter.
- **Fix:** Do not look away from screen until the catheter has been fully advanced inside the vessel and you are ready to put down the ultrasound probe. Identifying a flash is *not* part of successful USPIV placement.

**Pitfall #5 is an exercise in fighting instinct. The urge to look for a flash is nearly universal, likely because of experience with placing standard peripheral IVs. In the event that a flash is identified, the celebratory moment ends when attention is redirected to the screen and the target sign has vanished due to a subtle inadvertent movement of the probe. If no flash was present, the needle tip is usually buried in the vessel wall creating a hematoma. Instead, encourage learners to pursue “ultrasonic flash” (the target sign) and then continue with advancement without taking their attention from the screen until the catheter has been fully advanced. Even when reminded mid-procedure to never look down, trainees find it nearly irresistible. Continual reminders are needed to overcome this temptation.**

## Conclusions

For this limited educational undertaking, we identified a list of the most common pitfalls demonstrated by novices learning ultrasound-guided peripheral IV placement. Although there are numerous unique steps in the procedure, failure seemed to stem almost universally from a small set of common mistakes. Following this educational intervention to target these errors, the majority of trainees reported significant improvement in mastery through awareness, and the greatest benefit was made through discussion of pitfalls 4 and 5.

By making trainees overtly mindful of the most common mistakes, perhaps we can accelerate the process of gaining mastery for this procedure. Future research will be aimed at implementing a formal training curriculum for EM Interns with a quantitative analysis of skill acquisition in this procedure. ★

## TAKE-HOME POINTS

- ✓ Take time to position the patient, the ultrasound, and yourself. Map out the target vein and ensure your needle is properly lined up.
- ✓ When it's time to puncture the skin, don't be timid! Make a sufficient first puncture, and stay focused on the screen.



# Implicit Bias Is Both Helpful and Harmful, So What Can We Do?

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Implicit bias is rightfully the hot topic of the year and this two-part series is dedicated to helping you acquire a deeper understanding of it. *Implicit bias* is that subtle, unconscious type of bias that is hard to pinpoint and hard to measure. It contrasts with the more outward and conscious explicit bias. Both are crucial for emergency physicians to recognize in ourselves and others.

There is a growing body of research showing that physicians have racial, gender, age, weight, LGBTQ, disability, and many other types of implicit bias toward patients and colleagues. There is also evidence that these biases translate to explicit health care disparities and professional limitations.

The ACGME requires dedicated residency training in implicit bias and health care disparities. Furthermore, the National ACEP Council regularly votes on resolutions related to this topic. This includes the 2019 resolution 14(19) which proposes creating and releasing a policy statement promoting implicit bias training for residents and physician leaders, and continuing to create and offer free online implicit bias training.<sup>1</sup> The ACEP Board has been a driving force in progress, and has released several policy statements in recent years relating to this topic.<sup>2-4</sup>

## How Can Implicit Bias be Helpful at Times?

Implicit bias is present in almost everything we do. Humans have been taught to rely on it as a natural (almost instinctive) survival skill, and our brains are hardwired to use it. A great deal of implicit bias is actually helpful and very necessary. We use it in the absence of complete information, so emergency physicians *especially* use it to make quick decisions for patients. This is a major aspect of essential heuristic decision making.

*“A heuristic is a mental shortcut that allows people to solve problems and make judgments quickly and efficiently... [They] allow people to function without constantly stopping to think about their next course of action.”*

—Kendra Cherry<sup>5</sup>

Without bias and heuristic decision making, our careers in emergency medicine would be unsustainable — we might see one patient every three hours, maximum. But improper use of bias and heuristics is harmful too. It can lead to numerous types of cognitive errors in medical decision making. Part of the battle is pinpointing which biases are helpful, and which are harmful.

Think of it this way: an unconscious mystery ED patient who *just looks* like an addict will probably get naloxone. Much of the time, that is a good thing; patients do benefit from the emergency physician's pattern recognition and quick decisions. But what happens when the physician anchors on the idea of opiate overdose, prematurely closes the case after giving naloxone, and fails to consider other causes? After all, this patient *just looks*

like an addict and nothing else. The patient's blood glucose of 20 might be missed. That is where the harm appears.

## How Can Implicit Bias Can Be Harmful?

While many implicit and explicit biases are functional and deep-rooted natural survival tendencies, some are dysfunctional and harmful. Prior studies have shown that the presence of bias in physicians is associated with lower quality of care. Research has also shown that collegial targets of destructive bias in the workplace suffer negative professional effects like reduced pay and professional limitations, as well as psychosocial effects like isolation, bullying, and depression.

We keep hearing that implicit bias can be harmful, but what specific evidence is out there?

## Gender Bias

The ACEP Diversity and Inclusion Task Force conducted a 2017 survey in which 14% of respondents reported feeling their career advancement was hindered or delayed by their gender.<sup>6</sup> Prior research suggests general hiring preference for male over female candidates, as well as preference for male over female leaders.<sup>7</sup> When women leaders show agentic (historically “masculine”) leadership characteristics, they receive worse evaluations.<sup>8</sup> And, although there is a nearly equal female-to-male ratio of medical school employees, females hold only 38% of faculty positions, 21% of full professor positions, and 16% of dean positions.<sup>9</sup>

Then there is the wage gap. A 2016 study showed that overall, female physicians make over \$18,000 less than their male counterparts after adjusting for work hours, productivity, and experience.<sup>10</sup> Women who ask for a raise are also less likely to get one than their male counterparts.<sup>11</sup>

Female doctors are less likely than their male doctors to be referred to by their professional title. Dr. Julia Files, a physician and associate professor of medicine at the Mayo Clinic, experienced this phenomenon on a large scale. At a conference, she noticed that female doctors were not introduced as “Doctor” as frequently as males. She turned this into a research project, reviewing 321 introductions made at grand rounds at two Mayo Clinic locations. Female introducers used the formal title “Doctor” when introducing any other speaker about 96% of the time, while male introducers used it about 66% percent of the time.<sup>12</sup>

## Racial Bias

Implicit racial bias hurts patients. A 2019 meta-analysis and systematic review found that black and Latino patients were less likely than white patients to receive analgesia for acute pain in the ED.<sup>13</sup> Another study found that relative to white patients, patients of color have their first electrocardiogram performed later and receive a less thorough workup for suspected coronary artery disease.<sup>14</sup> And arguably most shockingly, pregnancy-related mortality ratios are more than

three times higher for black women than white women, and more than twice as high for American Indian/Alaska Native women than white women.<sup>15</sup>

The patient experience suffers as well. A 2015 meta-analysis uncovered implicit racial bias among physicians toward black patients and revealed that this translated to patients feeling less respected and less collaborative. They also liked their physician less.<sup>16</sup> Another study of over 34,000 patient visits in 353 emergency departments revealed that black patients experienced significantly longer mean ED wait times than white patients.<sup>17</sup>

## Weight Bias

Preliminary results of a 2019 study on collegial physician weight bias show that 83% of 640 physician respondents exhibit implicit anti-obesity bias toward other physicians.<sup>18</sup> Furthermore, there is a direct, positive, significant correlation between implicit bias and explicit harmful views and practices. This includes decreased intent to collaborate with overweight physician colleagues; discomfort with and dislike of overweight physicians; decreased propensity to hire or promote overweight physicians; and in some respondents, even a belief that overweight physicians are less intelligent and trustworthy than their average-weight counterparts.

## LGBTQ Bias

Patients who identify as LGBTQ experience poorer health care outcomes due to a myriad of obstacles along their health care pathway. Specifically, they have disproportionately higher rates of substance use disorders, HIV infection, psychiatric illness, domestic violence, and death by suicide and homicide.<sup>19</sup> There is also inadequate physician training in LGBTQ health care in medical schools, residencies, and post-residency continuing education. This lack of adequate formal training leads to stigma toward patients identifying as LGBTQ and makes it difficult to establish effective

communication between patients, physicians, and staff.

## Transgender and Gender-Nonconforming Bias

A 2018 study found that almost 44% of transgender and gender-nonconforming survey participants avoid the ED when they need acute care. They cited fear of discrimination, longer wait times, and negative previous ED experiences as the reasons. Furthermore, the investigators sought input from participants on how to solve these issues. Participants recommended staff training in gender and trans health care; assurance of private gender identity disclosure; and accurate capture of sex, gender, and sexual orientation information in the EMR.<sup>19</sup>

## Compounded Biases

When multiple biases are layered on top of one another, outcomes get much worse. For example, one study compared annual physician salaries across the medical specialties and found that white males earn \$64,812 more than black males, \$89,808 more than white females, and \$100,258 more than black females.<sup>20</sup>

## What Can We Do About It?

Individuals who strongly believe they are unbiased are often the source of the most harmful prejudice. It can take some individuals a ton of convincing that sexism, racism, ageism, weight bias, LGBTQ bias, and other classically harmful biases should be their concern.

Some individuals will never be convinced, but it is our responsibility as physicians (especially emergency physicians) to fight for the principle of providing optimal care to every patient. And this means understanding our own inner tendencies toward implicit bias.

*How can we tell if we are implicitly biased? How do we know when this translates to harmful explicit prejudice? And how can we correct harmful types of bias? Stay tuned for our discussion of these questions in Part 2. ★*

## Acknowledgments

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# DIY: CI

## Tips for Getting into Clinical Informatics

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*Disclaimer: The recommendations belong solely to the authors and are not meant to represent their employers or EMRA.*

Clinical Informatics is a diverse, interdisciplinary field that harnesses information to improve healthcare. It is uniquely multidisciplinary, as the ACGME defines it as “the subspecialty of all specialties that transforms health care.”<sup>1</sup> The field includes physicians from all specialties, nurses, pharmacists, data analysts, innovators, and many others. It varies widely from doctors wanting to use their computer programming training to develop applications and statistical analyses, to those with no programming experience who just want to improve the user experience within their electronic medical record (EMR). Clinical Informatics is a relatively new subspecialty, with full board status through the American Board of Medical Specialties and certified by the American Board of Preventive Medicine.

Presently we are in the grandfathering period for clinical informatics, which means someone who has practiced at least 25% clinical informatics for three of the last five years can apply to take the boards through the “practice pathway”. You are also board eligible if you completed 2 years of formal graduate level education such as a National Library of Medicine (NLM) biomedical informatics training program. After the grandfathering period ends in 2022, a two-year ACGME-accredited fellowship will be required. Currently there are 35 fellowships around the country, many hosted by departments of emergency medicine.

Most current emergency medicine residents would need to do a fellowship

to qualify to sit for the exam. On the other hand, some informaticians aren't boarded and do well without any formal training/certification. The American Medical Informatic Association (AMIA) is planning to announce a health informatics certification for those who cannot or do not want to pursue formal fellowship and board certification. Unlike many subspecialties, there are many ways to build a career with clinical informatics, so it is best to just jump in and get involved with the part that interests you most...then see if you'd like to make a career of it.

**12 Ways to Get Started**

There is no one-size-fits-all for the field of informatics. However, here are some ways to get started:

1. Find a mentor: Contact EMRA's Informatics Committee, ACEP's Informatics Section, a nearby Clinical Informatics Fellowship program, your Chief Medical Informatics Officer, or your hospital's informatics department. If you can't find one, just ask one of us!
2. Take initiative: Invite yourself to an informatics meeting in your hospital network.
3. Read about informatics topics that interest you: for example, clinical decision support, processes (such as ED workflows) that could be improved with HIT, cybersecurity, information retrieval (search), and data science.
4. Submit requests to your information system's help desk to solve problems.

- Reach out to your information system's department to collaborate on solving that problem that has been driving you crazy and requires recurrent workarounds. Most EDs have a nurse analyst who can teach you how they handle requests. They are often receptive, just ask (nicely).
- Write an algorithm for patient care based on your studies of the subject and in-house workflow.
  - Think outside the box: sometimes the best ideas are simple and don't require significant money or technological know-how.
  - Start your own resident HIT forum, Slack Channel, or interest group.
  - Build an app to satisfy a specific workflow need or interest. There are many tools (such as Flutter or React native) that can allow you to make an app with a single code base.
  - Consider training: ACEP 10x10 Informatics Course, Master's Degree in Informatics (or a related field), or other online courses.
  - Write a proposal for an order set, show it to your colleagues, then submit it for development.
  - Join AMIA.
    - Fall/November conference
    - Spring CIC meeting (CI Fellows attend this)
  - Find out how informatics is being done locally and join these groups.

## Clinical Informatics 101

The term "informatics" is broad and usually refers to biomedical informatics, which encompasses bioinformatics (molecular and cellular biology including genomics) and health informatics (clinical, public health and consumer health informatics).

The ACGME defines clinical informatics as "the subspecialty of all medical specialties that transforms health care by analyzing, designing, implementing, and evaluating information and communication systems to improve patient care, enhance access to care, advance individual and population health outcomes, and strengthen the clinician-patient relationship."<sup>1</sup>

### How to Get Started

As an EM resident, Carrie Baker proposed and led her hospital system's transition from a faxed, paper, call schedule to a software-based paging system. This technology-based solution allows all network providers to see who is on call for each service. She also assisted with two Epic Go-Lives as a Super-User during residency.

As a medical student, Jeff Nielson started taking classes in the department of informatics. He took an informatics elective and created an education resource database.

As a resident, Ben Slovis became interested in how data collected by the

EHR could be used to improve the quality of patient care. A residency research project led to a NLM post-doctoral fellowship in biomedical informatics. This trajectory created the foundation for a career in decision support design, implementation and optimization, and informatics research.

## Section 3. Recommended Resources to get started

**Webinars and more:** Free resources include Dr. William Hersh's blog and Web site, which includes videos and documents containing an overview of clinical informatics, machine learning, data science, and information retrieval and the OHSU Clinfowiki.

[informaticsprofessor.blogspot.com](http://informaticsprofessor.blogspot.com)

[informatics.health](http://informatics.health)

[clinfowiki.org/wiki/index.php/](http://clinfowiki.org/wiki/index.php/)

[Main\\_Page](#)

### Podcasts

#### ACIF 'Go Live' Podcast

A podcast brought to you by the AMIA Clinical Informatics Fellows. This monthly podcast tries to explain current views on Informatics news and topics, bring interviews with thought leaders in the field, and hopefully keep listeners entertained along the way.

[amia.org/membership/acif/go-live-podcast](http://amia.org/membership/acif/go-live-podcast)

#### HealthCare Tech Talk

This podcast discusses issues around each technology used in the delivery of healthcare, including Healthcare Information Technology, Informatics, Telemedicine and Clinical\Biomedical Engineering Technology. They haven't released an episode since 2017, but the basic concepts they discuss are timeless.

[podcasts.apple.com/us/podcast/healthcare-tech-talk/id817023985?mt=2](http://podcasts.apple.com/us/podcast/healthcare-tech-talk/id817023985?mt=2)

#### SMA's Digital Health and Innovation

This podcast attempts to educate and inform listeners on the various systems and methods that use information, data, and communication technologies to help resolve problems, reduce inefficiencies and costs, improve access, increase quality, and help make the practice of medicine more personalized and precise.

[stitcher.com/podcast/digital-health-and-innovation](http://stitcher.com/podcast/digital-health-and-innovation)

TABLE 1. Table Title?

Terminology	Formal Definition
<b>Machine Learning</b>	"A computing technique in which information learned from data is used to improve system performance" <sup>4</sup>
<b>Artificial Intelligence (AI)</b>	"The branch of computer science concerned with endowing computers with the ability to simulate intelligent human behavior" <sup>4</sup>
<b>Clinical Decision Support (CDS)</b>	"Any process that provides health-care workers and patients with situation-specific knowledge that can inform their decisions regarding health and health care" <sup>4</sup>
<b>Computerized provider order entry (CPOE)</b>	"A clinical information system that allows physicians and other clinicians to record patient-specific orders for communication to other patient care team members and to other information systems (such as test orders to laboratory systems or medication orders to pharmacy systems)." <sup>4</sup>
<b>Health Information Exchange (HIE)</b>	"The process of moving health information electronically among disparate health care organizations for clinical care and other purposes; or an organization that is dedicated to providing health information exchange" <sup>4</sup>
<b>Data Science</b>	"The science of learning from data; it studies the methods involved in the analysis and processing of data and proposes technology to improve methods in an evidence-based manner" <sup>5</sup>
<b>Predictive Analytics</b>	"The extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions" <sup>6</sup>

**EMRA Informatics:** Dr. Zach Jarou and Dr. Abdulaziz S. Alhomod co-authored the Informatics section of the EMRA Fellowship Guide. [emra.org/books/fellowship-guide-book/informatics](http://emra.org/books/fellowship-guide-book/informatics)

**Scientific Journals:** For the annual student membership rate (\$50), the American Medical Informatics Association (AMIA) grants online access to the Journal of American Medical Informatics Association (JAMIA) and Applied Clinical Informatics (ACI) [amia.org/membership-types](http://amia.org/membership-types). There are also free open editions of both journals online. AMIA partners with ACEP to offer an informatics intro class called the 10x10 (“ten by ten”), which you may find interesting during or after completion of residency: [dmice.ohsu.edu/hersh/10x10.html](http://dmice.ohsu.edu/hersh/10x10.html).

**Medical Terminologies:** James J. Cimino. Desiderata for Controlled

Medical Vocabularies in the Twenty-First Century [ncbi.nlm.nih.gov/pmc/articles/PMC3415631](http://ncbi.nlm.nih.gov/pmc/articles/PMC3415631)

**Clinical Decision Support:** David W. Bates, Gilad J. Kuperman, Samuel Wang, Tejal Gandhi, Anne Kittler, Lynn Volk, Cynthia Spurr, Ramin Khorasani, Milenko Tanasijevic, Blackford Middleton, Ten Commandments for Effective Clinical Decision Support: Making the Practice of Evidence-based Medicine a Reality, *Journal of the American Medical Informatics Association*, Volume 10, Issue 6, November 2003, Pages 523–530, [doi.org/10.1197/jamia.M1370](https://doi.org/10.1197/jamia.M1370)

**Programming:** Data Camp offers introductory programming classes that are initially free. [datacamp.com/courses/intro-to-python-for-data-science](http://datacamp.com/courses/intro-to-python-for-data-science)

**Cybersecurity:** The American Medical Association offers some free advice about cybersecurity. [ama-assn.org/practice-management/](http://ama-assn.org/practice-management/)

[sustainability/5-things-you-didn-t-know-about-health-care-cybersecurity](#)

## Textbooks

*Biomedical Informatics: Computer Applications in Health Care and Biomedicine, Fourth Edition*, edited by Edward H. Shortliffe and James J. Cimino (2014) Springer.

*Health Informatics: Practical Guide*, Seventh Edition, edited by Robert Hoyt and William Hersh (2018) Lulu.com.

ACEP’s Board member, Dr. Finnell, co-edited *Clinical Informatics Study Guide* by John T. Finnell and Brian E. Dixon

## Conclusion

Informatics is a challenging field and there is room for any interested physician, at any point in their training. Seeing your work in action, and appreciated by physicians, can really complement the day to day emergency medicine work. As a growing field, it has room for everyone. ★

# Annals of Emergency Medicine

An International Journal

## Resident Editorial Board Fellowship Appointment

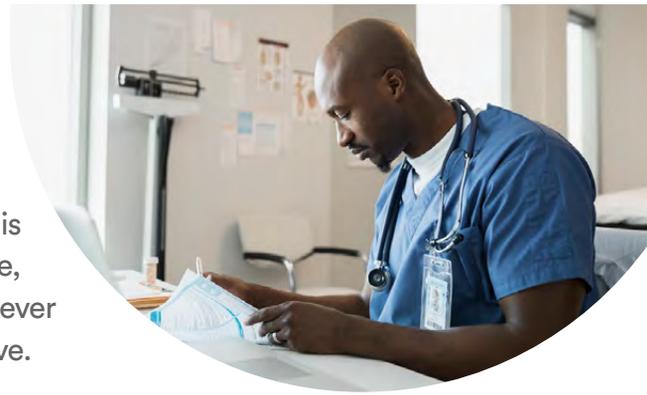
### Description

The Resident Fellow appointment to the Editorial Board of **Annals of Emergency Medicine** is designed to introduce the Fellow to the peer review, editing, and publishing of medical research manuscripts. Its purpose is not only to give the Fellow experience that will enhance his/her career in academic emergency medicine and in scientific publication, but to develop skills that could lead to later participation as a peer reviewer or editor at a scientific journal. It also provides a strong resident voice at **Annals** to reflect the concerns of the next generation of emergency physicians.

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# A Financial Guide to Surviving Residency

For many, becoming a doctor and choosing a career helping others is an innate calling. For others, it may be a family tradition. Or for some, the lure of being at the forefront of medicine is irresistible. But whatever your motivation, becoming a skilled medical professional is expensive.

According to the Association of American Medical Colleges (AAMC), 75% of the graduating class of 2018 reported leaving medical school with student loan debt. In fact, 51% of medical students that graduated with student loans in 2018 had loans of \$200,000 or more.<sup>1</sup>

With graduation in May, a move in June, and residencies beginning in June/July, there will be less free time available for dealing with finances than you might think. So, what should you do once you've been matched to a program? In this article, we'll explore ways to improve your finances and make your residency a little more manageable.

## Get Organized

Gather the records of all your debt—student loans, car payments, mortgage, personal loans, credit cards, etc.—and keep it in one safe place. Include the amount, terms, payments, interest rates, and any other key information.

## Know What you Owe

See the full picture of your debt so you can make informed financial decisions. This should encompass how much you owe, monthly payment due dates, and your current payoff dates, even if they are 10, 15, or 20 years away.

## Map Your Goals

House, kids, private practice, lifestyle—include it all. Even if plans and circumstances change, thinking about where you want to go now will help you be better prepared for the future.

## Live Like a Resident

The average yearly salary for a resident is \$59,300 according to a Medscape survey.<sup>2</sup>

So while there is the potential to make more in the future, you should budget based on your current financial situation.

## Consider Location

Remember, cost of living varies based on location. When budgeting for expenses like transportation, groceries, and housing be sure to research what these costs are near your residency program.

## Save for Retirement

It's never too early to start saving for retirement. If your workplace provides retirement savings options, take advantage of these plans and any contribution matching offered.

## Get Insurance

Disability, life, and umbrella liability preserve your investment in yourself, your assets, and your capacity to earn future income.

## Have an Emergency Fund

Since insurance can't cover every eventuality, having a financial cushion can help get you through an unexpected challenge.

## Maximize Your Deductions

You may be eligible to deduct up to \$2,500 of student loan interest paid in a given year. There are some restrictions, so check the income requirements each tax year and be sure to consult a tax professional for help.

## Set a Student Loan Repayment Strategy

To set the best repayment strategy for you, you'll need to know your options. Physicians with Federal student loans

have a number of different repayment options at their disposal, including; direct consolidation, income-driven repayment and public service loan forgiveness.

Another attractive option available to physicians is student loan refinancing – which is what Laurel Road does. With student loan refinancing you can refinance all or some of your federal and private student loans. Refinancing gives you the opportunity to do one or more of the following:

- Lower interest rate(s)
- Pay off loans faster
- Lower monthly payments
- Move from a fixed rate to a variable rate (or vice versa)
- Reduce number of loans in repayment

To learn more about the different federal repayment options and student loan refinancing, check out our latest publication, *A Financial Guide to Surviving Residency*, at [laurelroad.com/residency-guide](http://laurelroad.com/residency-guide).

As an EMRA member or alumni, you can get a 0.25% rate discount when refinancing.<sup>3</sup> To apply, visit [laurelroad.com/EMRA](http://laurelroad.com/EMRA) and see personalized rates in less than five minutes.

1. Medical Student Education: Debt, Costs, and Loan Repayment Fact Card, AAMC, October 2018

2. <https://www.medscape.com/slideshow/2018-residents-salary-debt-report-6010044>

3. The 0.25% EMRA member rate discount is offered for student loan applications from EMRA members in good standing. The rate discount will end if EMRA notifies Laurel Road that borrower is no longer in good standing. Offer cannot be combined with other Laurel Road offers, except any discount for making automatic payments. The partner discount will not reduce the monthly payment; instead, the discount is applied to the principal to help pay the loan down faster



# Until Help Arrives – Prehospital Emergency Education All Citizens Should Have

Luke Wohlford, MS II

University of Arizona College of Medicine – Phoenix

*“When I opened up the car door, the first thing I saw was a dark red circle on his elbow where the rest of his arm used to be.”*

As a 15-year-old taking the emergency medical responder course through a soup kitchen, I was mesmerized by stories like this told by Tom, our instructor. Tom was not a provider himself, but he was always the first person to drop everything in the case of an emergency to see who may need help. This story about an accident on an interstate resulting in a traumatic amputation not only solidified the importance of tourniquets for me, but it also piqued my interest in emergency medicine and set me on my current path early in my adolescence. Educating citizens on how they can help during emergencies outside of the hospital has become more and more important as mass casualty incidents become less uncommon.

## Background

For a long time, prehospital emergency medicine education was limited to those training for jobs in the field. Only in the last several decades have mass education initiatives emphasized emergency medicine knowledge all citizens should know. For example, bystander CPR rates have increased dramatically due to education and instruction from 911 call centers. CPR education has been so successful it is likely the first prehospital emergency intervention that comes to mind for most citizens. However, there

is more bystanders can do in emergency situations, as demonstrated by the Stop the Bleed program developed in 2015 by the American College of Surgeons and the Department of Homeland Security. Stop the Bleed has trained more than one million people worldwide in tourniquet use and bleeding control.<sup>1</sup> Hoping to have similar success with a broader curriculum, the new Until Help Arrives program developed by FEMA and ACEP in 2017 is the newest and arguably most comprehensive example of a citizen emergency medicine education program. The goal of Until Help Arrives is to prepare citizens to be safer and more effective in a variety of emergency situations, as opposed to focusing on specific prehospital interventions.

## 5 STEPS UNTIL HELP ARRIVES

1. Call 911
2. Stay Safe
3. Stop the Bleeding
4. Position the Injured
5. Provide Comfort

## Need for the Program

A poll of over 2000 adults conducted by ACEP in 2019 found that a majority of respondents are not confident in their ability to help in the case of respiratory arrest, car accidents, severe bleeding, natural disasters, gunshot wounds, or

mass shootings.<sup>2</sup> Subjective readiness and willingness to help in the case of an emergency depended on whether respondents had received any sort of emergency medicine training or not. For example, 54% of those with emergency training reported confidence in helping in a natural disaster scenario, while only 30% with no medical training reported confidence. Clearly citizens need more training to become more confident in emergency scenarios, but would it truly lead to more assistance provided when the need arises? Fortunately, 92% of respondents reported they would be more willing to assist in emergency situations if they received the Until Help Arrives training.<sup>3</sup> With 911 dispatch training constantly improving, simply being more willing to provide assistance could be enough to make a huge difference to injured people in emergencies.

## UHA Curriculum

There are several delivery mechanisms for the Until Help Arrives curriculum, but all versions emphasize the same five steps: call 911, stay safe, stop the bleeding, position the injured, and provide comfort. Several of these steps such as calling 911 and controlling bleeding are usually mentioned in other education campaigns. An emphasis on scene safety and reassurance of injured people is a strength of this curriculum.

The course also delves into the realities of calling 911, promoting concise communication with dispatchers, enabling rapid activation of other responders.

A highlight of the training features audio of a 911 call where a bystander assists their neighbor who has suffered a gunshot wound to their leg. It truly exemplifies the concepts of scene safety, 911 communication, and providing reassurance to victims. There are several versions of the training available to the public, with varying degrees of instructor involvement.

Two different interactive training modules exist on the FEMA website, taking either 5 or 30 minutes to complete. Once instructors register for with ACEP, they have access to the one-hour training presentation and the store to buy equipment such as tourniquets, bleeding control trainers, and simulated blood. Grants may be available at your

institutions to purchase the materials for community education, but instructors on a budget can improvise with cheap materials such as pool noodles to simulate bleeding control kits.

### Conclusion

Whether you are a veteran educator in courses such as CPR and Stop the Bleed or you have never taught prehospital medicine to your community, definitely check out the

Until Help Arrives movement. This course has the potential to empower many people to be more confident and competent in emergency situations. Even the time between dispatch and arrival of EMS providers can be critical to some patients, so this knowledge will save lives. And who knows? You may even inspire members of the next generation of emergency medicine providers. ★

### RESOURCES & LINKS

ACEP Until Help Arrives Homepage <https://www.acep.org/uha>

FEMA Until Help Arrives Homepage <https://community.fema.gov/until-help-arrives>

Until Help Arrives Presentation Deck <https://www.fema.gov/media-library/assets/documents/167907>

*Note: Due to the current COVID-19 pandemic the ACEP has recommended the suspension of all in-person Until Help Arrives courses, but it is certainly not too early to sign up as an instructor and to familiarize yourself with the materials and curriculum!*



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of reflection, take time to express the things you are grateful for. Not every day will be extraordinary, but there is always gratitude to be found. A correct diagnosis, a compliment from a colleague, even an exceptional cup of coffee. Finding bits of happiness in your life will only lead you to discover even more.

### Talk About Your Failures.

On the other side of the coin, expressing failure is just as critical as expressing gratitude. Disarm the part of your brain that for so many years has been reluctant to communicate reluctance and mistakes. You are in a highly competitive profession and specialty. You are not going to be perfect, and everyone who has or is completing an emergency medicine residency has felt the same trepidation or imposter syndrome that you believe is exclusive to you. Your problems are not unique. This is a matter-of-fact statement that can lead to incredible growth.

One thing my residency preaches is having a “failure buddy”. Someone in your specialty, if not your residency itself, who you can talk to about the things that make you uncertain, uncomfortable,

or just downright scared. At the bare minimum, it helps you get these important issues off your chest. More than likely though, your failure buddy will express the same concerns, and suddenly all the thoughts that have been weighing you down seem a little lighter.

### Keep Spontaneity Alive.

As wonderful as the shift work of emergency medicine is, monotony can still set in if you let it. Wake up, go to work, eat or drink something if you remember to, exercise if you are feeling extra ambitious, and sleep. Sometimes we unknowingly go into autopilot. The world quietly keeps spinning and before we know it, we are feeling the effects of burnout. One way to combat this and break the cycle is to be spontaneous. Get off your shift on time? Go to that restaurant you have heard amazing reviews about but convinced yourself you would not have the time to stop by. Somehow ended up with a whole weekend off? Take a little vacation, explore a nearby city, or even do a staycation and pamper yourself. Oftentimes it is the moments when you feel like this is not necessary or feasible that you end up

needing it the most. A dash of spontaneity every now and then can help you discover new things and remind you that you are a *person* first and a *resident* second.

### Dare to Compare.

Not to other people, but to yourself. Remember when you were a medical student, slaving away studying for board exams or too timid to speak up in the hospital? Look at how far you have come. You are taking care of patients with a great deal of autonomy and changing lives even though you may not directly see the effects of your hard work.

On days where the hours seem to stretch longer and the patients are even sicker, remember all the reasons that made you chase a career in emergency medicine in the first place. Recall all the struggles that at one time seemed insurmountable. Yet here you are, climbing mountains and conquering your dreams.

You did that, doctor. Now take all the necessary steps to ensure your own wellness so that you can continue to excel in our incredible specialty for years to come. ★

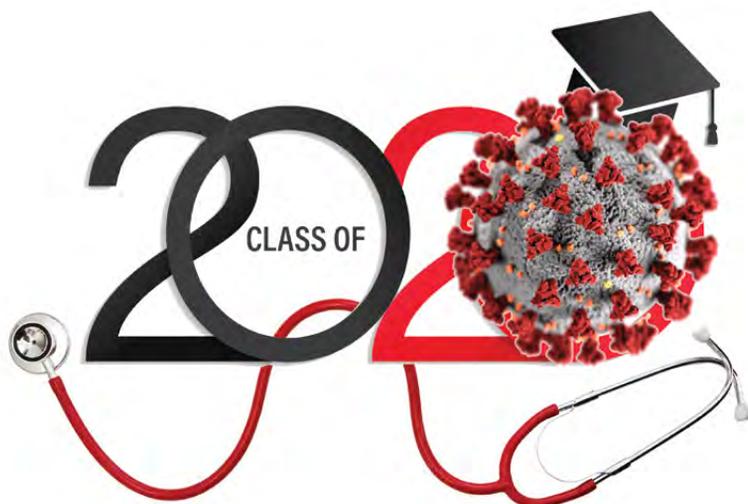


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## THANK YOU HEALTHCARE WORKERS

Words cannot express the gratitude and pride we feel to work with emergency medicine physicians and first responders during these uncertain times. From the bottom of our hearts, the Emergency Medicine Foundation (EMF) thanks you.



*Editor's note: Gus M. Garmel, MD, FACEP, FAAEM, authored EMRA's "Career Planning Guide for Emergency Medicine," followed by "A Letter to Graduating EM Residents." He now offers wisdom to the Class of 2020, who are entering a professional landscape altered by the SARS-Cov-2 pandemic.*

# A Letter to Graduating Residents & Fellows During the COVID-19 Pandemic

**Gus M. Garmel, MD, FACEP, FAAEM**

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Senior Physician,  
The Permanente Medical Group (TPMG), Kaiser  
Santa Clara, CA  
Senior Editor, *The Permanente Journal*,  
Portland, OR

## To graduating senior residents and fellows:

**T**his is an exciting and stressful time for health care workers, especially those of us on the front lines. Emergency medicine practice has changed dramatically over the past several months. Changing management guidelines, older and immune-compromised physicians and the increased risks they face, concerns about family safety (including ours), fatigue, moral injury, appropriate distribution of medical care and supplies such as PPE, ventilators, and medications, and new visitation rules are creating even greater stress than is typical in our specialty.

Everyone in EM prepares for emergencies. No person, specialty, or institution can truly be prepared for what we are facing now. At what is often

the most exciting time during residency training, the rules have changed during the period that I call (and teach about) the "transition to attending." Hospital policies, ACGME rules, or GME guidelines prevent some residents from caring for persons under investigation (PUIs) or patients diagnosed with COVID-19. I'm sure everyone wants to help, and everyone is scared. Youth has its advantages, but young people are also getting sick and dying from infections. COVID-19 exposures add an extra layer of job threat, much more than the daily threat of violence against emergency health care workers.

Without sounding morbid, this is a good time to arrange for a health care (durable) power of attorney, to construct a will or estate plan, to create instructions about whom to contact and what to have (or not have) done in case an unimaginable scenario happens (prudent advice for seniors and fellows even without a pandemic). We are all at risk, especially emergency providers. Stay safe and be careful.

Graduating from residency or fellowship training and relocating (although relocation is not always

involved) is stressful. This means transitioning from something familiar to something unfamiliar. Preparing for a new hospital environment with new responsibilities, or even new responsibilities in the same environment, is a principal objective of training (in addition to board-preparation). I have always recommended to graduating seniors and fellows the importance of getting to know the hospital culture, the ED environment and its patient care workflow, the nuances of consultation, and the electronic medical record (EMR) with its associated billing BEFORE your first shift. Learning the new hospital climate and culture is not easy. Meeting colleagues, consultants, and becoming familiar with hospital policies and consultant preferences is challenging. Remembering nurses' and staff members' names can truly be a daunting task, yet this is extremely important. Furthermore, new faculty should shadow an experienced colleague who has been in the ED long enough to know the system but not too long to have developed "seniority-privileged" shortcuts. Finding a mentor (or mentors) is a key to success. Learning the promotion and tenure (P &

T) guidelines and the advancement track requirements is important, whether or not you are at an academic medical center or a non-teaching hospital. Familiarizing yourself with the patient satisfaction survey questions used at your new ED is priceless.

In addition to the new clinical environment, finding suitable living accommodations in a safe area not too far from the hospital (nor too close), packing, and moving is never easy. Moving is likely to cause even more uncertainty given that moving companies may not have available staff even if they are considered “essential” in your area. What’s more, companies might demonstrate bias against emergency physicians given their likely exposure to COVID-19.

How should you approach this “transition to attending” during COVID-19? Here are some *new* pearls to add to prior pearls I have shared:

- **Plan ahead.** This includes moving (if doing this yourself, you will need to get boxes; if with a company, you will need to secure a moving date well in advance, if possible).
- **Find someone to take your apartment** (your GME office might provide a list of incoming interns to your or another program or distribute your contact and apartment information to them to protect their privacy). This will also help your landlord, which might come in handy if you need to store some of your possessions. Why not help other people during these worrisome times?
- **Identify storage options** (locally or in your new area), in case shelter-in-place requirements afford you limited options with respect to your possessions. Consider selling, giving away, or donating furniture you are unable to move due to COVID-19, and how this might take longer than expected due to social distancing requirements.
- **Speak with your landlord** early about extending your lease (if you need to use your apartment for storage or can’t get to your new position).
- **Work with a real estate agent** (in your new location). Property agents not only sell homes, but many also

help with (executive) apartment rentals. They may not be busy now and might be glad to help a new physician find an apartment in their area, which may establish a relationship and lead to a future home purchase.

- **Childcare arrangements**, such as finding schools, sitters, nannies, pediatricians, etc., in a new community can be extra challenging, as many groups or individuals might be uncomfortable meeting or working with you (and your child) given your constant exposure to Coronavirus.
- **Contact the new hospital.** Human Resources, Physician Wellness, or other groups (including spouses/partners of the physician staff) may be willing to assist or assigned to help new physicians relocate and adjust to the new surroundings. This is often a huge benefit to both physicians and hospitals, so take advantage of this if available (so you can...)
- **Start early** at your new position (earlier than you otherwise had planned or agreed). Graduating residents and fellows often take a month or two off between graduating and beginning as an attending. This is generally considered a healthy thing to do, not only to celebrate your successful completion of residency or fellowship, but also to reduce stress, get acclimated to the new environment, and do a few things that you might otherwise not have had time for, such as travel. Travel might be limited or not possible; we simply don’t know what will happen with this pandemic. Your new ED may be overwhelmed, and your physician colleagues might be exhausted, worried about their health, or in short supply because of COVID-19 exposures. If this is the case, your services would be greatly appreciated. You can always request (or negotiate for) time off once things return to normal.

**Caveat** — *this is not the time to use the pandemic as a bargaining tool for personal benefit. Hospitals, EDs, and staff are struggling. A better approach*

*is to demonstrate professional behavior that directors and colleagues will remember (including what you did to help during this crisis). If your offer to help your new department causes financial stress that is directly related to your offer to help (for example, staying in a hotel or having additional moving or storage expenses that otherwise would not have occurred), it is possible that your new director or hospital might be able to help cover or reimburse some of these losses given your willingness to help out earlier than planned.*

In summary, these times differ from any other in our history. The transition to attending for senior residents and fellows will therefore be unlike any transitions in the previous decades. As with any new position, advance preparation is key. The more you know about the position, its needs and requirements, and options that exist for you and for the new ED, the more likely you will be able to control your destiny. Apply for your medical license early if you will practice in a different state (if you haven’t done so already). Getting a new state medical license from the state medical board takes time and can be an onerous process, as they may request a copy of your medical school diploma (translated), letters from your supervisors, or the completion of certain tests or courses. Some of these requirements might be modified to expedite licenses during this pandemic, but that is not certain. Unless program requirements are modified due to this pandemic, you will need to complete all residency or fellowship requirements before you receive your institutional certificate.

Good luck to all of you with your careers in EM and in the future. As emergency physicians, we have the privilege and the responsibility to be available and skilled to help patients in their time of greatest need. You are all heroes. Congratulations as you enter this honorable and challenging profession as an attending physician. Thank you for your training, your dedication, your professionalism, and your commitment to the health and wellbeing of others during this pandemic and once it passes. ★



# Room 16 Right

**Julian Watson, MD**

Resident Physician, Emergency Medicine  
SUNY Downstate/Kings County Hospital Center

**There are 4 things especially frustrating in the ED.**

**The first is the alarms.**

**T**hey're too frequent and too constant to keep up with on a normal day; throw in a pandemic and you can just imagine. It often seems silly to turn them off, to be honest – give it a few minutes and they'll go right back on, I promise. But every now and then we'll still stop whatever it is we're doing to home in on an alarming monitor and turn it off.

I did this the other day.

The monitor was in room 16R. The patient was a frail older woman with

long, white dreadlocks sitting upright in a reclined bed with better posture than my 28-year-old spine has probably ever experienced. She was breathing 40 times a minute, plus or minus; it's probably why the monitor was going off. She had a mask on her face, strapped to her head like a helmet. From the front of the mask dangled a short, thick tube like an elephant trunk with a smaller tube connecting it to the oxygen port on the wall. The wall port measures 0-15 liters per minute, and the indicator was currently higher than the 15. "Flush rate" we call it, a.k.a. *"the patient needs a lot of help breathing."*

**The second frustrating thing about the ED is the interruptions.**

Constant, almost continuous interruptions, for anything, no matter how miniscule. From patients, nurses,

clerks to attendings, if you have a plan to do anything at all, expect to be interrupted by someone while you do it. 16R, however, didn't interrupt me. Instead, she just sat there silently with perfect posture and a freckled, light brown face the same shade as mine.

Her eyes were wide, almost fearful, but focused. I asked her, ironically, if everything was OK, and her brown eyes glanced up at me while her head gave a careful, subtle nod. I quickly understood why. The elephant trunk hanging from her mask was a makeshift CPAP device, designed to keep her lungs from collapsing by giving her added pressure when she exhaled – but really, it was a motley mix of pieced-together tubing and valves that had been constructed in a

*continued on page 40*

# CRITICAL CARE ALERT

## Dexamethasone in ARDS

*Editor's note: The EMRA Critical Care Committee offers a concise summary of the studies that have potentially the most impact on your practice as an emergency physician. Called Critical Care Alerts, this series is published online, with occasional follow-up in print.*

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### Article

Villar J, Ferrando C, Martinez D, et al. Dexamethasone treatment for the acute respiratory distress syndrome: a multicentre, randomised controlled trial. *Lancet Respir Med.* 2020; 8:267–276.

### Objective

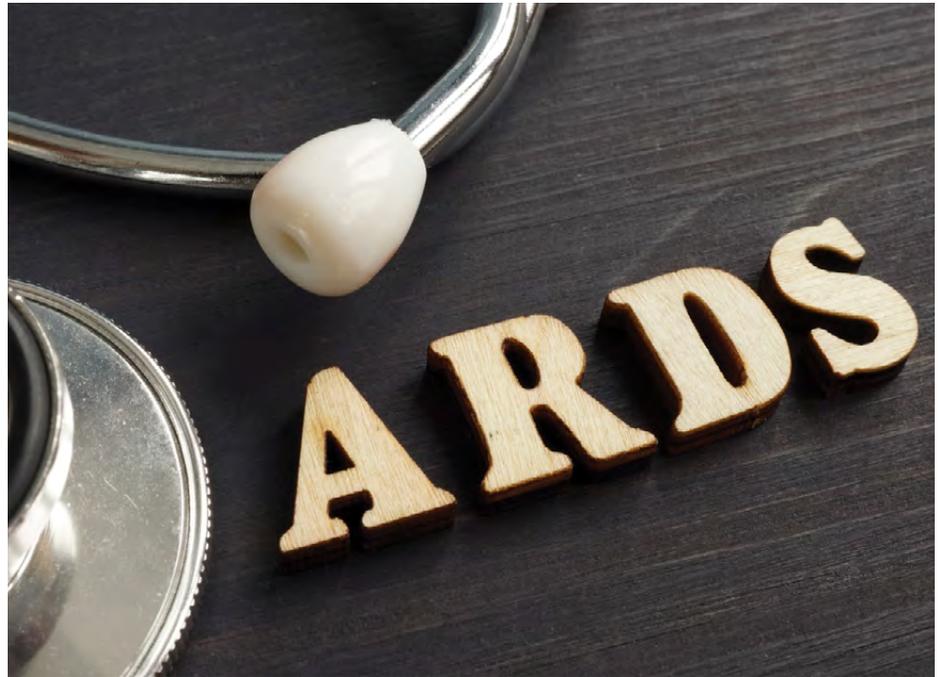
To determine the effect of dexamethasone on ventilator-free days and mortality in patients with ARDS.

### Background

Steroids have been hypothesized to be beneficial in ARDS due to their anti-inflammatory effects. A 2018 meta-analysis of several small randomized trials showed steroids reduced time to extubation, time of hospital stay, and mortality in patients with ARDS. The Society of Critical Care Medicine and European Society of Intensive Care Medicine have both recently incorporated recommendations for use of steroids into their guidelines. However, these trials were small, used various steroid drugs and doses, and did not examine steroids in the context of a lung-protective ventilation strategy. Dexamethasone was chosen for this study because of its larger anti-inflammatory effects with minimal mineralocorticoid effects and because of its longer half-life. **This is the first randomized clinical trial to investigate use of dexamethasone in ARDS in the setting of lung protective ventilation.**

### Design

Prospective, multi-center, open-label, randomized controlled trial conducted in 17 hospitals across Spain. Randomization was stratified by hospital.



### Population

Intubated and mechanically ventilated patients with acute onset ARDS using European Consensus Conference criteria for ARDS or Berlin criteria for moderate-to-severe ARDS.

Criteria included:

- Respiratory symptoms within one week of a clinical insult, or new or worsening respiratory symptoms
- Bilateral infiltrates on imaging
- Respiratory failure not explained by cardiac failure (no left atrial hypertension, pulmonary capillary wedge pressure <18 mm Hg, or no clinical signs of left heart failure)
- Hypoxemia, defined as  $\text{PaO}_2/\text{FiO}_2 < 200$  mm Hg on PEEP of 5 cm  $\text{H}_2\text{O}$

Exclusion criteria included:

- Age less than 18 years
- Pregnancy or active lactation
- Brain death
- Terminal disease including cancer

- DNR decision
- Treatment with any corticosteroids or immunosuppressants
- COPD or CHF
- Inclusion in any other experimental study

The study included an enrichment strategy to increase power to detect outcome difference by further excluding any patients who did not meet the Berlin criteria for moderate-to-severe ARDS of  $\text{PaO}_2/\text{FiO}_2 < 200$  mm Hg at 24 hours after ARDS onset on standardized ventilator settings of PEEP of 10 cm  $\text{H}_2\text{O}$  or higher and a  $\text{FiO}_2$  of 0.5 or higher.

### Intervention

20 mg dexamethasone IV daily from day 1 to day 5, then 10 mg from day 6 to day 10. Treatment was continued for a maximum of 10 days or until extubation.

### Control

Supportive care with lung protective ventilation

## Outcomes

### Primary outcome

Ventilator-free days at 28 days after randomization. Death before 28 days was recorded as 0 ventilator free days.

### Secondary Outcome

60-day all-cause mortality

### Key Results

The trial was stopped early by the data and safety monitoring board due to slow enrollment, after having enrolled 88% of planned patients.

Patients who received dexamethasone had significantly more ventilator free days at 28 days (12.3 days vs 7.5 days,  $p < 0.0001$ ) and lower 60-day mortality (21% vs 36%,  $p = 0.0047$ ). These results suggest a NNT of 7 to reduce one death at 60 days.

There was no significant increase in adverse events, including ICU hyperglycemia, new infections in the ICU, or barotrauma.

### Strengths

- Well designed study
- Multi-center
- Enrichment strategy improved ability to measure patient-centered outcomes (mortality)

### Limitations

- Unblinded
- The trial was stopped early due to slow enrollment
- Many patients were excluded because they had already been treated with steroids
- Exclusion criteria excluded some patients with common comorbidities that may hinder external validity

## EM Take-Aways

Emergency medicine physicians frequently care for mechanically ventilated patients at high risk for ARDS. The DEXA-ARDS trial provides strong evidence that dexamethasone provides a benefit in both ventilator free days at 28 days and in 60-day mortality for patients with moderate-to-severe ARDS.

The mortality benefit found in the DEXA-ARDS trial is both large (15% ARR) and notably similar to that seen in a meta-analysis of previous trials that used other steroids and did not necessarily use lung-protective ventilation. The addition of dexamethasone did not increase the incidence of adverse events, including hyperglycemia. ★

# Room 16 Right

*continued from page 38*

last-ditch effort to prevent her from being intubated (probably a day ago, I'd say). It worked. Here she was a day later, focused on nothing else but retaining her ability to breathe on her own. The tape holding her mask together must've loosened over the hours, to the point that even slight movement caused a leak, and now I had a pretty good explanation for her posture.

I threw on some gloves, adjusted my N95, grabbed new tape, and started retightening every piece of it. Small bursts of air sporadically blew into my face shield with each tweak, and her wide eyes watched the entire time, hopeful this was the last time it would need fixing. I knew it wouldn't be, but it was the best we could do.

### The third frustration is the phones.

Between them and the monitor alarms, it's a constant cacophony of beeps and rings doing their absolute best to prevent any sort of concentration. "Dr. Watson, radiology on line 20, Dr. Watson, radiology on line 20." But it wasn't radiology. Instead it was a small voice saying she's the daughter a patient who had been there for a few days now,

and she just wanted to know if her mother was all right. Obviously, I had pressed the wrong button; line 20 was still on hold and blinking at me.

The small voice asked again for any information, explaining she had been calling all day because she wasn't allowed to visit, but she hadn't received any updates. I looked up the patient's name on the EMR and explained that her mom was admitted 2 days ago and was now in the care of the inpatient team, whereas I was just the ER doc. She couldn't hear me, of course, so I took off my N95 and offered to page her mother's team. She said they'd been paged a few times, but they hadn't called her back. I didn't doubt her, but I also didn't know what else to say. I was sifting through her mother's EMR, looking for any information I could offer, when I noticed next to the patient's name was her location: 16R.

I still didn't really know this patient, but I felt like I did. She was technically an "upstairs" patient, and on a normal day I probably never would have met her. But on this day I had a face in mind. A freckled, light-skinned face that was fighting to breathe a few minutes ago. I told the small voice on the phone that I

was just in her mother's room, and mom seemed to be breathing OK with her breathing mask — doing my best to imbue positivity into an intrinsically negative statement. I told this worried daughter I didn't know all of the details of her mother's care, but offered to ask her mom any questions. Her small voice became momentarily larger and thankful as she began to speak — "Dr. Watson, radiology on line 20, Dr. Watson, radiology on line 20." I didn't hear what the daughter said. I wrote down her number on the back of an opened gauze wrapper, weaved back toward room 16R, ignoring the repeat calls to answer radiology on line 20. Multifocal pneumonia, likely viral — I'm sure.

I dialed \*67 on my iPhone before her daughter's number as I walked into 16R and held the phone next to her sweaty, freckled face. Those same wide, brown eyes stared at me, now confused, as her mask whistled with each breath. Her daughter answered the phone, and I watched as the confusion in her eyes transformed into a mixture of joy and longing, then dripped down the sides of her cheeks. **It was the first familiar voice she'd heard in days.**

And that was the fourth frustrating thing in the ED that day. ★

# ABC...123...

## Please Make Billing Easy for Me A Resident's Intro to Billing

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**E**mergency medicine residents are used to learning and incorporating different practice styles of the various physicians we work with: one day we might be admitting every case of the “man flu” and the next we are discharging every patient we see. Education on documentation and billing is frequently no different, and we frequently must learn on the fly with tips from attendings during shift. Most programs lack a curriculum on billing, even though many post-residency jobs have at least partial compensation tied to physician productivity. The goal of this article is to increase basic knowledge of what goes into a patient's hospital bill, how billing for an emergency physician is determined, how to optimize documentation for billing, what procedures can be billed, and what may qualify for critical care time.

### What's in a Bill?

The bill a patient receives is more complicated than just the physician bill. It has multiple parts, and — depending on other services used during an ED visit — they may contain a few different charges. This bill consists of:

1. The facility fee: charges for hospital usage, supplies, medications given, radiology studies performed, and nursing staff
2. Physician's professional fees: can include multiple physician groups (for example, if radiology provided a CT interpretation or another service was consulted in the ED)

### Documentation and Coding 101

We've all been completing charts detailing patient encounters since the first day of residency. So how is billing linked to your documentation? For the emergency department most patient encounters end up being linked to an Evaluation and Management code (E/M code), and each code has a certain reimbursement level. E/M codes range from 1 (extremely simple encounter) to 5 (complex encounter). To determine the billing level, each section of the chart is assigned a level of complexity. Sections include:

1. History of Presenting Illness
  - a. Chief complaint
  - b. History
  - c. ROS
  - d. Past medical/surgical history, family history, social history
2. Physical Exam
3. MDM

Once each is assigned a level, the chart will be billed at the lowest level out of all sections. So for example, if the chart is a level 5 complexity for all sections, but your ROS is only a level 3, the chart will end up being billed as a level 3. With this example it's easy to see how a few small things can lead to a LOT of lost reimbursement!

### What Exactly Dictates the E/M Level of a Chart?

Each chart is assigned a code level based on the complexity of each section. The way CMS determines complexity level for each section generally pertains to the number of components you document in each section. Below is a chart detailing documentation requirements for each of the levels. HPI and PE sections are shown, and MDM will be discussed in a later section, as it is slightly more complicated.

E&M Code	HPI	Physical Exam	MDM
<b>Level 1 (99281)</b>	Problem focused HPI — 1-3 elements ROS — 0 systems PMH/Family/Social — 0/3	Problem focused 1 system	Straightforward
<b>Level 2 (99282)</b>	Expanded Problem focused HPI — 1-3 elements ROS — at least one PMH/Family/Social — 0/3	Expanded Problem focused 2-4 systems	Straightforward
<b>Level 3 (99283)</b>	Expanded Problem focused HPI — 1-3 elements ROS — at least one PMH/Family/Social — 0/3	Expanded Problem focused 2-4 systems	Low complexity
<b>Level 4 (99284)</b>	Detailed HPI — 4 elements ROS — 2-9 systems PMH/Family/Social — 1/3	Detailed 5-7 systems	Moderate complexity
<b>Level 5 (99285)</b>	Comprehensive HPI — 4 elements ROS — 10 systems PMH/Family/Social — 2/3	Comprehensive 8+ systems	High complexity

## MDM Complexity Levels

Medical decision making is the last aspect of the chart (*almost done, take a deep breath!*), which contributes to the overall billing level. Interpreting the complexity of the MDM is a little more nebulous compared to the concrete requirements for the HPI and PE sections. The process is performed when a coder reviews the MDM section and attempts to determine how complex the case was based off of:

- 1) Risk of presenting complaint with respect to morbidity/mortality
- 2) Number of diagnostic/management options considered
- 3) Complexity of data analyzed and ultimate disposition

In general the elements are combined and can be estimated using the table below:

Risks and Morbidity/Mortality	Number of Diagnostic and Management Options	Amount and Complexity of Data Reviewed	Type of Decision Making
Minimal	Minimal or None	Minimal	Straightforward
Minimal	Limited	Limited	Low
Moderate	Multiple	Moderate	Moderate
High	Extensive	Extensive	High

Each aspect can be split and analyzed separately, shown.

## Table. Risk of Presenting Complaint

Level of Risk	Presenting Problems	Diagnostics Ordered	Management Options
Minimal	One self-limited or minor problem (insect bite, common cold)	Labs, XR, EKG, UA, US	Rest, gargles, ace wrap, dressings
Low	Two self-limited problems <b>OR</b> Acute Uncomplicated problem Cystitis, allergic rhinitis, sprain	ABG Imaging with contrast	OTC medications, PT/OT, IV fluids
Moderate	Mild exacerbation of chronic illness <b>OR</b> Acute illness with systemic symptoms Pyelo, pneumonia, colitis <b>OR</b> Acute complicated injury Head injury w/ LOC	LP Thoracentesis/paracentesis	Rx medication Reduction/splinting IV fluids (w/ additives)
High	Severe exacerbation of chronic illness <b>OR</b> Acute illness which poses threat to life or limb MI, multi-trauma, PE, resp failure, psych illness with SI/HI <b>OR</b> Abrupt change in neuro status Seizure, CVA/TIA, weakness, AMS		Major surgery IV parenteral meds DNR decision Drug therapy requiring monitoring

## Number of Diagnostic/Management Options Considered

This section generally refers to the potential diagnoses being considered and the assumed level of investment needed to investigate those diagnoses. An unofficial scoring tool (the Marshfield Clinic Scoring Tool) was developed to guide the complexity of a proposed problem. To simplify, essentially any new problems will either be moderate or high complexity. If there is any workup planned it will be considered high complexity. Any established issues such as asthma or COPD without intervention will generally be low or moderate. Of note, an exacerbation of a chronic issue would be considered new.

## Complexity of Data Analyzed and Ultimate Disposition

Any description of your thought process and information you used to guide your decision will be weighed in a scoring system to evaluate the complexity of data review.

It is important to put your own brief interpretation for a test for it to be included in the complexity score. Be sure to note things such as XR, CT, and ECG even if you have an official read from a consultant. The table shows the type of data to include, along with how a coder will score it.

## Table. MDM Complexity Scoring

Data Reviewed	Points
Laboratory Tests	1
Radiology	1
Medical Tests (ECG, bedside echo)	1
Discussion of tests with performing physician	1
Independent review of an image	2
Decision to look at old records	1
Review and summary of old records	2
Total Points	Complexity of Data Reviewed
1	Minimal or None
2	Limited
3	Moderate
4	Extensive

MDM can get confusing and somewhat complicated in terms of billing and coding. It also is likely the most important aspect of your chart in terms of billing level.

To make sure your chart is billed appropriately, include all of the work and thought you put into a patient.

Remember to:

1. Summarize important differentials you were considering
2. Briefly explain why you gave certain medications
3. Summarize laboratory, ECG, and radiology results
4. If you looked through previous charts, give a brief explanation
5. Make sure to mention risk to your patient, even if they end up being diagnosed with a more benign condition (eg, that pregnant vaginal bleed could have been an ectopic, but ultimately was diagnosed with threatened abortion) ★

# What is Surprise Billing... and Why Should I Care?

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At the 2020, EMRA's Administration & Operations Committee joined forces with the Health Policy Committee to host physician leaders in administration, economics and policy in a panel on surprise billing:

- **Dr. Kristen Kent**, an EM physician who is the current President of the New York chapter of the American Academy of Emergency Medicine (AAEM), as well as the Co-Founder and Chief Medical Officer of Clara Technologies;
- **Dr. Elaine Rabin**, an EM physician and current Program Director at Mount Sinai Hospital, who has an extensive background in health economics including work at the National Bureau of Economic Research; and
- **Dr. Angela Cai**, an EM PGY-3 at SUNY Downstate/Kings County, who serves as the Director of Health Policy on the EMRA Board of Directors and serves leadership roles on the

ACEP Federal Government Affairs Committee as well as the Emergency Medicine Policy Institute.

Each panelist shared their unique perspective and expertise as it relates to the complex issue of surprise billing. Below, we distill their conversation down to key, actionable points.

## What is Surprise Billing?

In the complex world of health care insurance, an emergency physician is sometimes 'out-of-network' for a patient, even if the hospital that houses the emergency department is considered 'in-network.' Broadly speaking, surprise billing refers to a situation in which an insured patient receives an unexpected medical bill, usually from a physician that is outside of that patient's insurance network. This can occur when a patient is brought to the closest hospital in an emergency, where physicians that are hired as independent contractors or by large firms may offer different insurance coverage.

## Why Does Surprise Billing Matter?

Surprise billing affects many aspects of our practice as emergency medicine students and physicians, from the patient-physician relationship to reimbursement. Many patients have little choice in where

they go during a medical emergency, and in an economic landscape where medical bills have been shown to be responsible for up to 60% of US-household bankruptcies, surprise billing remains an unwelcome phenomenon<sup>1</sup>. Surprise billing has the potential to bruise the patient-physician relationship as well as patients' health, as patients limit or refuse diagnostic and therapeutic interventions due to cost concerns. Additionally, by adding administrative and legal costs alongside decreased payment, surprise billing can have downstream effects on everything from physician reimbursement to resource availability.

## Do Things Need to Change?

Currently, there is significant political momentum toward protecting patients from surprise billing, with bipartisan support for change<sup>2</sup>. Both Democrats and Republicans agree that surprise billing is problematic, and that patients should be removed as intermediaries between insurers and health systems vying for bill settlement. The challenge, however, comes with determining an adequate and fair reimbursement process between insurers and health systems.

**TABLE 1. Proposed Congressional Bills that Address Surprise Billing<sup>3-5</sup>**

	Lower Health Care Costs Act	Consumer Protection Against Surprise Medical Bills Act	Ban Surprise Billing Act
<b>Default Payment</b> (Per geographic region)	Health plan's median in-network payment rate	None specified: providers and health plans to independently negotiate	Health plan's median in-network payment rate (indexed to CPI-U)
<b>Billing/Reimbursement Restrictions</b>	Insurer plan covers bill as though in-network Provider bill may not exceed in-network rate		
<b>Dispute Resolution Process Considerations</b> (When billed amount and reimbursement are discrepant)	Median in-network payment by other plans Provider's billed rate may not be taken into account		
	Case-specific factors (severity, etc)		Case-specific factors (severity, etc)
<b>Projected Cost-Savings*</b> (Over 10-years, 2019 US\$)	\$21.9-24.9 billion	\$17.8 billion	\$23.9 billion

\*These projected cost-savings are primarily from reduced insurance premiums due to lower reimbursement amounts from insurers to health systems.<sup>6-8</sup>

## What Does Change Look Like?

Solutions to the surprise billing challenge typically take one of two forms: *arbitration*, in which a third party decides how much insurers should pay for medical services; or *benchmarking*, in which insurers agree to pay a specific, predetermined amount for medical services.

On a state level, some jurisdictions such as New York and California have implemented comprehensive policies to help address surprise billing. On a national level, there are currently three bipartisan bills making their way through Congress (Table 1). Although the mechanics differ, each of the proposed

bills ensures that patients no longer receive surprise bills for emergency services or for seeing out-of-network providers working within in-network hospitals. As drafted, these bills address surprise billing through benchmarking. Many emergency medicine advocacy groups are working to ensure that an arbitration process is also included, as there is potential for a downward spiral in overall reimbursement when it is based on the health plan's median in-network rate as currently proposed.

## What Can I Do?

Surprise billing is an important issue for both patients and emergency medicine physicians. We hope you will consider

getting involved:

- Join the Administration & Operations and Health Policy Committees on Basecamp for regular updates.
- Consider organizing a didactics-based session at your institution highlighting this important issue.
- Find an advocacy platform such as EMRA, ACEP, or AAEM to advocate for change on the local, state and national levels.
- Participate in ACEP's annual Leadership & Advocacy Conference, where you will attend sessions on Capitol Hill with your representatives to discuss these issues and gain critical knowledge of how to advance our common goals. ★

# Not Your Mother's AAWEP..

**Sarah Hoper, MD**

Chair, American Association of Women Emergency Physicians  
East Central Iowa Acute Care

Oftentimes women's groups are smiled upon kindly and seen as a nice way for the fairer sex to get together and discuss "women's issues" — like recipes, parenting, the latest novel, or TV drama. They are not always taken seriously, particularly in a large organization that consists of 60% men and has many male-dominated committees and sections. After all, currently an EM women's group only affects 25% of all active emergency physicians who are female.<sup>1</sup>

**BOLLOCKS!**

The American Association of Women Emergency Physicians (AAWEP) is ACEP's 3<sup>rd</sup> largest section, and in the past year we acted like it! We have stood strong, flexed our muscles, and made sure our voices were heard. AAWEP does not stand for "women's issues," AAWEP stands for paid parental leave, halting implicit bias in the workplace and for our patients, closing the pay gap for everyone, fairness in contract negotiation, making environmentally friendly EDs, acknowledging that our donations to conservative politicians who support medical liability reform and other issues important to medicine also unintentionally supports failure to legislate firearm safety laws (in contradiction to

current ACEP policy statements). These are issues for anyone, male or female, who works in an emergency department.

AAWEP also offers a place to grow your leadership skills. We have several active committees ready to hone your skills: special projects, ACEP council resolutions, awards, social media, education, membership, newsletter, and the executive committee.

This year the **Special Projects Committee** has submitted a section grant for the production of a gender bias booklet to explore several gender bias issues and how those issues relate to emergency medicine. This committee is also focusing on building an anonymous, secure pay database with an in-depth survey and generation of both initial charts and graphs for quick review by users as well as access to raw data (for a deep dive for interested researchers).

The **Awards Committee** regularly nominates women for ACEP awards, and it has established new AAWEP Awards: Outstanding ED Director, Outstanding Mentor, Rising Star, and Resident Rocks It! Please consider nominating yourself or others; details are at [acep.org/how-we-serve/sections/american-association-of-women-eps](http://acep.org/how-we-serve/sections/american-association-of-women-eps).

The **Education Committee** is searching for speakers at the annual AAWEP meeting at ACEP20. We strive for diverse speakers from academics, the

community, residents/early/mid and late career who are able to speak on timely topics. Watch for our call for speakers if you would like to speak at a national meeting — and see what AAWEP has to offer at ACEP20.

We have also started a Google Meet book club. Our inaugural book, reviewed in June, will be "The Moment of Lift" by Melinda Gates. We will hold book reviews quarterly.

In the past year the **Resolutions Committee** brought important resolutions to the floor about implicit bias, pay transparency, increasing postpartum Medicaid coverage to 12 months, and NEMPAC transparency. In 2020 we plan to bring resolutions on social media app awareness, an ACEP policy in support of paid parental leave, separate from the current Family and Medical Leave Policy, universal health care, no firearms in the ED, and others.

Finally, AAWEP is teeming with mentors each in various stages of their own careers looking for a mentee to "pull up." So, I invite you, EMRA (men and women), to pick AAWEP for your free section. Come see what we are about for free, grow with us, and then stick with us as an attending.

Find out more about AAWEP by visiting the Section website at [acep.org/how-we-serve/sections/american-association-of-women-eps](http://acep.org/how-we-serve/sections/american-association-of-women-eps). ★

# PLUG IN TO EMRA

Whether it's face-to-face or FaceTime, connections are more important than ever now. Be part of the #EMRAFamily by signing up for the EMRA Residency Program Fair and the EMRA Job & Fellowship Fair.

## EMRA Residency Program Fair

Sunday, Oct. 25  
1:30 – 3:30 pm

*Kay Bailey Hutchison Convention Center, Hall F*

Clerkships, SLOEs, and the interview trail look nothing like normal this year. Plug into the most popular Residency Program Fair to get valuable time with programs all across the country.

*Thanks to our sponsor, Laurel Road!*

## EMRA Job & Fellowship Fair

Monday, Oct. 26  
5 – 7 pm

*Kay Bailey Hutchison Convention Center, Hall F*

It's an atypical employment market right now — which sometimes means unexpected opportunities. Don't miss the largest recruiting event in emergency medicine. This is your chance to network and find your dream position.

*Thanks to our sponsors, emCareers.org, TeamHealth, Vitivity, and Laurel Road!*

### Get details here!

[emra.org/exhibitors](http://emra.org/exhibitors)

*Need more information?*

James Bryant, [jbryant@emra.org](mailto:jbryant@emra.org)  
469.499.0187



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## Announcing EMRA's

# **25** EMRA **UNDER 45** INFLUENCERS IN EMERGENCY MEDICINE **Award**

In honor of EMRA's 45th anniversary last year, we put 45 outstanding young physicians in the spotlight. And we quickly realized that number doesn't begin to reflect the true impact you make every day, both in stunning saves and in quiet solace.

Just as your contributions know no bounds,  
neither does our celebration of them.

**Join us in a new, annual recognition of our EM physicians:  
EMRA's 25 Under 45 Award.**

**Nominations are due July 15.  
Find details and the application at [emra.org/25under45](http://emra.org/25under45)**

**Save the date for our special reception Oct. 27!**

Reception generously sponsored by





## You Can!

**Residents and medical students,  
this is your chance to present  
at a national conference!**

Send us your zebras and unicorns; we'll select the most fascinating (or high-yield) cases to come to ACEP20 and present in a poster-style competition.

**Application deadline June 14**

Get details at  
[emra.org/casecon](http://emra.org/casecon)

# Get Involved



**Preparing for the ZOMBIE APOCALYPSE —  
or the random wilderness emergency  
— has never been more fun!**

Gather your team and show off your wilderness medicine skills in a timed course that's as unexpected as they come.

**Competition date Oct. 29**

Get team registration deadlines  
and volunteer sign-up details at  
[emra.org/medwar](http://emra.org/medwar)

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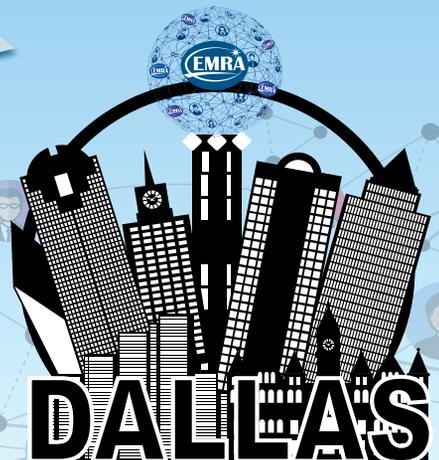


## SUIT UP FOR EMRA Resident SIMWARS

The perennially popular **SIMWars** competition is a team sport that lets your program show off its readiness on a national stage.

**Competition date  
Oct. 27**

Get team registration  
deadlines at  
[emra.org/simwars](http://emra.org/simwars)



# Get Noticed! EMRA AWARDS

We are searching for good ideas, great EM stars, and groundbreaking grant applications for our Summer Awards cycle.

Apply online  
[emra.org/awards](http://emra.org/awards)



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## EMRA **20 in 6** Resident Lecture Competition

### It's Not Just What You Say...

EMRA'S 20 IN 6 RESIDENT LECTURE COMPETITION is your training ground for becoming a powerful public speaker — or a persuasive one-on-one communicator.

It's a premier EMRA event at ACEP20, and we want you to be on that stage!

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HIPPO EDUCATION  EM Board Review

**ARE YOU READY?**  
Competition date  
**Oct. 28**

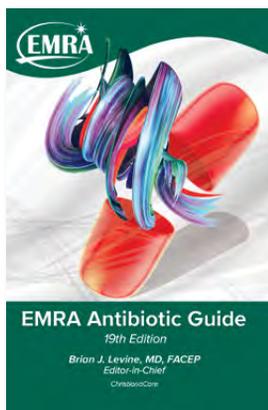
You get 20 slides and 6 minutes to make your point in the most effective manner possible.



Apply online at  
[emra.org/20in6](http://emra.org/20in6)

# Make Room for New Guides!

EMRA works hard to be there for you on every shift and to support you in all levels of training and practice. One of our favorite ways to do this is by offering clinical resources, and this summer we are introducing 4 new editions.



## EMRA Antibiotic Guide, 19th ed.

Thanks to **Brian Levine**, MD, FACEP, and the entire program at ChristianaCare, the 19<sup>th</sup> edition makes your prescription decisions fast and reliable. Get updated pneumonia guidance, stewardship tips, and the most thoroughly researched, EM-focused guidance available.

## PressorDex<sup>®</sup>, 4th ed.

**John C. Greenwood**, MD, has led more than 150 EM/critical care specialists in compiling evidence-based, updated recommendations to appropriately treat your critically ill patients. This critical care medication index is a lifesaver during ICU rotations.

## EMRA Pain Management Guide, 1st ed.

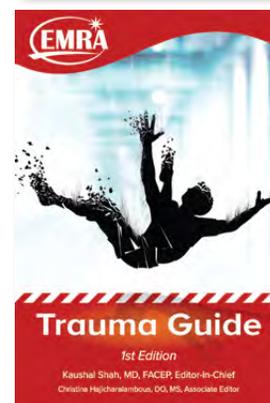
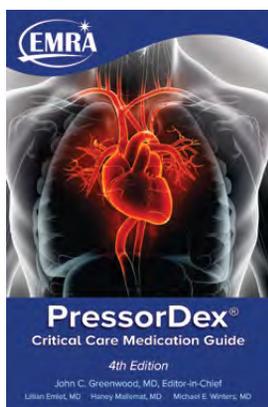
In a brand-new endeavor, **David Cisewski**, MD, MS, and **Sergey Motov**, MD, have made ED pain control both easier and more effective, particularly in relation to opioid alternatives. This guide offers a 30,000-foot view in print for on-shift guidance, plus in-depth evidence online for further research and understanding.

## EMRA Trauma Guide, 1st ed.

**Kaushal Shah**, MD, FACEP, and **Christina Hajicharalambous**, DO, MS, have created a guide that helps new learners make sense of the controlled chaos of a trauma in the ED. Find critical tips and next steps to be ready for a wide range of trauma presentations.

These guides are included in select EMRA member kits.

Find details at [emra.org/guides](http://emra.org/guides). \*



## Health Policy at Your Convenience

ACEP's Leadership & Advocacy Conference was hosted as a virtual event this year — which means the EMRA/YPS Health Policy Primer sessions are perfect, ready-made educational sessions to get your program up to speed on health policy.

Learn (or teach) about:

- COVID Legislative & Regulatory Updates
- Point/Counterpoint: Is the Solution to Health Care Coverage Public or Private?
- The Politics of Policy
- Cleavon MD's new rap, "Bill into a Law"
- Intro to Health Policy
- Primer on the Legislative Process

In addition, we've got micro-lectures from all-star EM doctors whose policy work can help inform your own activities:

- "Advocacy in Action" by Kimberly Chernoby, MD, JD, MA
- "Balance Billing" by Scott Pasichow, MD, MPH
- "Medicare Access and CHIP Reauthorization Act (MACRA)" by Charles Sanky, MD, MPH
- "X the X-Waiver" by Callan Fockele, MD, MS
- "Psychiatric Boarding in the Emergency Department: How Did We Get Here?" by Vidya Eswaran, MD

All of these videos and presentations are posted for your convenience at [emra.org/lac](http://emra.org/lac) and also can be found on EMRA's Vimeo channel. \*

## EMRA to Elect 5 New Board Members

The EMRA Representative Council elects new members to the Board of Directors each year, and applications are now open for the 2020 elections.

Anyone who is a resident member in good standing on the day of elections is eligible to seek a board position. **The deadline to declare candidacy is Sept. 12. Apply online at [www.emra.org/be-involved/be-a-leader/become-a-board-member/guide-for-emra-elections/#applytobod](http://www.emra.org/be-involved/be-a-leader/become-a-board-member/guide-for-emra-elections/#applytobod).**

In 2020, the following board roles will be up for election:

- **President-elect:** This is a 3-year term, with one year spent in each successive role (president-elect, president, immediate past president/treasurer). Prior leadership experience is strongly encouraged.
- **Vice Speaker of the Council:** This is a 2-year term, with one year spent as vice speaker and the following year as Speaker of the Council. In this role you work closely with the Representative Council and the policy-making procedures of the association.
- **Resident Representative to the ACEP Board of Directors:** This 2-year term requires presence and participation not only at EMRA Board events, but also as an ex-officio member of the ACEP Board of Directors. Prior leadership experience is strongly encouraged.
- **Director of Leadership Development:** This is a 2-year term, during which the board member works closely with EMRA's 20 committees and EMRA representatives to ACEP Sections, helping develop leadership opportunities for residents within the association and the specialty.
- **Director of Health Policy:** This is a 2-year term focused on representing EMRA in policy circles, keeping EMRA members apprised of and engaged in policy initiatives, and serving as an organizer of the annual EMRA/YPS Health Policy Primer that kicks off the ACEP Leadership & Advocacy Conference each year.

Serving on the EMRA Board requires support from your program. Clear expectations and descriptions of the time and travel commitments connected with board service can be found at [www.emra.org/be-involved/be-a-leader/become-a-board-member](http://www.emra.org/be-involved/be-a-leader/become-a-board-member).

Elections will be held during the Fall RepCo Meeting, Oct. 27 in conjunction with ACEP20. **(Please note: RepCo supports virtual participation and encourages every residency program to make sure their EMRA Program Representative participates, either in-person or virtually.)** \*



**Emergency physicians, residents, nurses, physician assistants, and medical students are servant leaders in every community, caring for and advocating on behalf of patients while working clinically.** We also respond to the call to give back to the communities we serve.

The EM Day of Service was created with this essential concept in mind.

**Throughout the month of September,** the EM community will identify and tackle greatest needs within their towns and neighborhoods. From improving public spaces through cleanup days to hosting free CPR training or micro-clinics for the underserved, EM Day of Service events offer care in a thousand unique ways. Plan your EM Day of Service event, register it at [emra.org](http://emra.org) so you get recognition on a national scale, and be sure to use the power of social to spread the message! #EMDayofService. \*

## ABEM Adjusts in Wake of Virus

Emergency physicians are facing unprecedented circumstances related to COVID-19, and therefore the American Board of Emergency Medicine is making changes to support physicians effective immediately.



- **The ConCert Exam will now be offered in an online, open-book format.**

This exam will be offered in two 3-week windows during 2020, 2021, and 2022 to eligible physicians at no additional cost to physicians. Review ABEM's "Frequently Asked Questions" online for the most current news.

- **2020 certification deadlines will be relaxed to June 2021.** Physicians with certification requirements due December 31, 2020 will have until June 30, 2021 to meet requirements.
- **Qualifying Exam plans** are being developed in the wake of disrupted travel. All spring registrants will be contacted with specific instructions.

**For details and the latest updates, visit [www.abem.org](http://www.abem.org) and follow @ABEMCert on Twitter.** \*



**EMRA\*Cast hosts have been hard at work in the second year of their podcast apprenticeships, and the content is outstanding.** If you haven't subscribed to our channel, find us on iTunes, Google Play, iHeartRadio, Lybsin, and — of course — on [emra.org/emracast](http://emra.org/emracast).

The EMRA\*Cast podcast, sponsored by Vapotherm, tackles topics that are top of mind for physicians in training. Explore clinical questions (common antibiotic mistakes in the ED, what to make of those EKG unicorns, and more), and learn how others are managing the same professional challenges you face (board prep, fellowship planning, life balance). \*

# ECG Challenge

**Emily Luvison, MD**  
ChristianaCare

**Johnny Rowles, MD**  
ChristianaCare

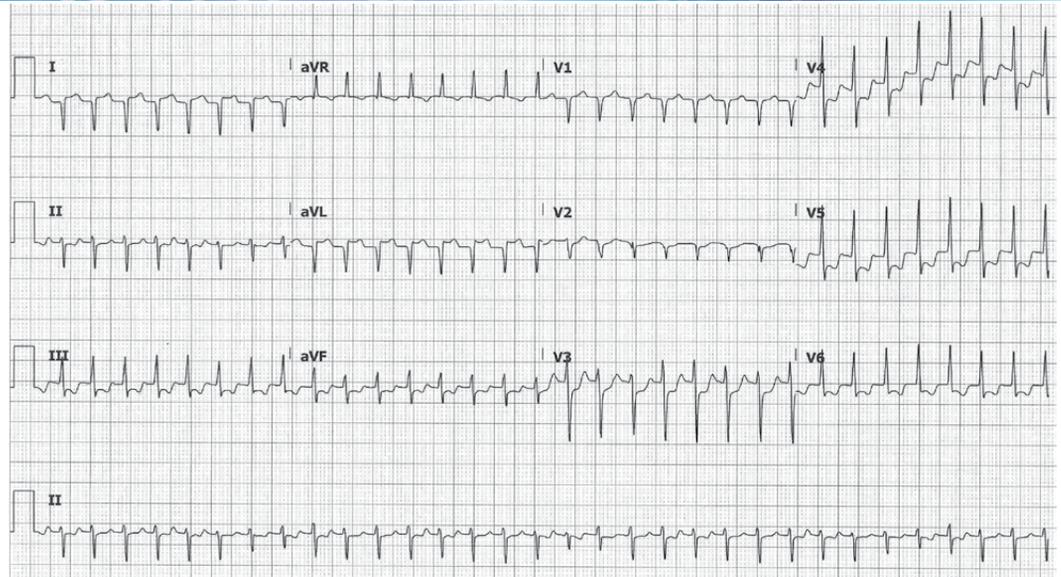
**Jeremy Berberian, MD**  
Associate Director of Resident Education  
Dept. of Emergency Medicine,  
ChristianaCare  
@jgberberian

**CASE.**

A 46-year-old male with a history of hypertension presents with palpitations and lightheadedness.

**What is your interpretation of his ECG?**

**See the ANSWER on page 52**



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# ECG Challenge



This ECG shows a regular narrow-complex tachycardia with a ventricular rate of 190 bpm, right axis deviation, STE in leads I and aVL, and STD in II, III, aVF, and V2-V6.

The differential for a regular narrow-complex tachycardia includes:

- Atrial Flutter
- Atrial Tachycardia
- AV Nodal Reentry Tachycardia (AVNRT)
- AV Reentry Tachycardia (AVRT) with orthodromic conduction
- Junctional Tachycardia

The absence of discernible P-waves rules out sinus tachycardia and atrial tachycardia. The difference between these two is the morphology of the P-waves. Atrial tachycardia, which originates from a single ectopic focus in the atrium and is associated with structural heart disease,<sup>1</sup> produces P-waves that are morphologically different compared to sinus rhythm.<sup>1</sup>

Junctional tachycardia, which is associated with ventricular rates of 90-140 bpm, is unlikely given the rate of 196 bpm seen in this EKG.

Atrial flutter with 2:1 conduction should be considered in any regular NCT with ventricular rates between 125-175 bpm.<sup>1</sup> Flutter waves typically have a fixed rate of 250-350 bpm with a uniform morphology and are best seen in leads II and V1. Note that the classic saw-tooth pattern is not always obvious with 2:1 conduction.<sup>1</sup>

AVRT is reentry tachycardia that involves the AV node and an accessory pathway (e.g., the Bundle of Kent in

patients with WPW). Conduction down the AV node and back up the AP is called orthodromic conduction and will result in a NCT that mimics AVNRT. Conduction down the AP and back up the AV node is called antidromic conduction and will result in a WCT that mimics VT.

AVNRT is a reentry tachycardia that involves two pathways in or around the AV node. It is a common cause of paroxysmal SVT that is typically seen in young patients with no structural heart disease.<sup>1</sup> It is triggered by a PAC that conducts down the slow pathway of the AV node while the fast pathway is still refractory from the previous impulse. By the time the impulse reaches the His-bundle, the fast pathway is no longer refractory, and this allows the impulse to simultaneously conduct anterograde to the ventricles and retrograde to the atria via the fast pathway.<sup>1</sup> This circuit will continue until it is terminated by another PAC or with medical intervention (e.g., vagal maneuvers, etc.). The retrograde

conduction to the atria leads to retrograde P-waves which will point in the opposite direction of those seen in normal sinus rhythm on a baseline ECG.

This EKG also shows RA-LA lead reversal. An easy way to scan for lead reversal is to compare leads I and V6 which should look similar since they both look at the heart from the same direction. In this case, lead I points down and V6 points up which suggests that lead I's "view" is coming from the opposite side of the body. This is consistent with reversal of the arm leads. Another clue is that the QRS in aVR is predominantly upright. This is very atypical outside of dextrocardia in which case there would also be dominant S-waves in all of the precordial leads.<sup>4</sup> If you mentally invert lead I and swap leads aVR and aVL, this ECG actually shows STE in aVR with diffuse STD. This pattern is seen in both ACS<sup>5</sup> and non-ACS<sup>6</sup> presentations. Tachydysrhythmias are a common non-ACS cause and is the likely etiology in this case.

## AVNRT LEARNING POINTS

### General Features

- Also called PSVT
- Re-entrant circuit within or around the AV Node, typically triggered by a PAC

### EKG Features

- Rate typically 140-280 bpm
- Retrograde P-waves can appear before, after, or superimposed on QRS
  - P-waves after QRS: appear as a pseudo S-wave in inferior leads and a pseudo R-wave in V1
  - P-waves before QRS: very rare and morphology doesn't meet sinus criteria

### LA-RA Lead Reversal Learning Points

I	II	III	aVR	aVL	aVF	V1-V6
Inverted	Switches with III	Switches with II	Switches with aVL	Switches with aVR	No change	No change

## Case Conclusion

This patient was successfully cardioverted to NSR with adenosine after vagal maneuvers were unsuccessful. Note that if this patient were in 2:1 flutter, treatment with an AV nodal blocker would have resulted in flutter waves with no QRS complexes, so treatment with adenosine was both therapeutic and diagnostic. A repeat ECG with correct lead placement showed a normal axis and no STE or STD. The remainder of the patient's workup was unremarkable and he was discharged with cardiology follow-up. ★

# Board Review Questions



**PEER (Physician's Evaluation and Educational Review in Emergency Medicine) is ACEP's gold standard in self-assessment and educational review.**

**For complete answers and explanations, visit the Board Review Questions page at [emresident.org](http://emresident.org), under "Test Your Knowledge" at [emresident.org](http://emresident.org)**

**Order PEER at [acep.org/peer](http://acep.org/peer)**

1. Which behavior is most associated with drug seeking and frequent use of the emergency department?
  - A. Asking for pain relief early in the visit
  - B. Having a disease associated with chronic pain
  - C. Lacking primary care follow-up
  - D. Rating pain greater than 10 on a 10-point scale
2. An 84-year-old woman presents following an episode of dyspnea and near syncope. A systolic crescendo-decrescendo murmur is noted on examination. Which pharmacotherapy should be avoided?
  - A. Digitalis
  - B. Lisinopril
  - C. Nitroglycerin
  - D. Statins
3. Which condition is the most likely cause of widened mediastinum in a patient who has been experiencing weight loss and fatigue for several weeks?
  - A. Boerhaave syndrome
  - B. Chest lymphoma
  - C. Descending necrotizing mediastinitis
  - D. Inhalation anthrax
4. A 20-year-old man is brought in by his friends because he took LSD and is having a "bad trip." On examination, he is warm, tachycardic, and flushed. He is paranoid, agitated, and physically combative. Which treatment is indicated?
  - A. Activated charcoal
  - B. Intravenous bicarbonate
  - C. Intravenous diazepam
  - D. Intravenous naloxone
5. A 30-year-old man presents with new-onset unilateral hearing loss after being close to an explosion. His vital signs are normal, and he is otherwise asymptomatic. A thorough physical examination is normal except for the presence of a perforated tympanic membrane. What is the most appropriate initial radiographic evaluation?
  - A. Abdominal CT
  - B. Abdominal ultrasound
  - C. Brain CT
  - D. Chest x-ray ★

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



*EMRA helps make you the best doctor you can be, the best leader you can be, and helps EM become the best specialty it can be!*



## **Emergency Medicine Residents' Association**

The Emergency Medicine Residents' Association is the voice of emergency medicine physicians-in-training and the future of our specialty. With a membership of over 16,000 residents, medical students, and alumni, EMRA provides a like-minded community of your peers for a lifetime!

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- Residents
- Fellows
- Alumni

# #EMRAFamily



# The COVID Corner: *Managing Money, in the Midst of Mayhem*

**It's not all doom and gloom,  
there are practical opportunities  
for house staff on the front lines:**

## **TAXES**

**Tax Deadline pushed back to 7/15/2020**

**OPPORTUNITY:** Extended time to fund 2019 SEP IRA and reduce 2019 tax liability, fund Roth or Back Door Roth for 2019 and 2020, accumulate funds to pay for 2019 tax bill if necessary.

## **STUDENT LOANS**

**Federal payments and interest  
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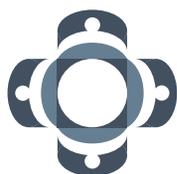
**OPPORTUNITY:** Redirect former payments to higher interest debt, building cash savings or funding that 2019 Roth IRA that you didn't think was possible!

## **DISABILITY INSURANCE**

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### **CENTRAL CALIFORNIA**

**VEP Healthcare** is seeking Emergency Medicine Physicians for MercyMedical Center Merced. This long term, stable VEP contract is part of the Dignity Health System and has had the same medical director since 2004. Merced is a busy 26-bed emergency department and sees an average of 72,000 patients annually. There are 55 hours of physician coverage daily and 50 hours, APC coverage, 24/7 Scribe coverage, and provides the opportunity to teach in the Family Medicine Residency Program. Excellent productivity-based reimbursement with night shift differential. Relocation bonus offered. Merced is located within 2 to 3 hours of San Francisco, Santa Cruz, Monterey Bay, Yosemite and the Wine Country. VEP is a democratic, provider owned and managed group with 37 years of commitment to high quality and patient satisfaction. We offer independent contractor status, paid malpractice, stock ownership, flexible schedules, leadership training and development. Contact Blake Farrill: 925-482-8225, [bfarrill@vephealthcare.com](mailto:bfarrill@vephealthcare.com).



The GW Medical  
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Department of  
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### **WASHINGTON DC**

**The Department of Emergency Medicine at the  
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The George Washington University Medical Faculty Associates, an independent non-profit academic clinical practice group affiliated with The George Washington University, is seeking full-time academic Emergency Medicine physicians. The Department of Emergency Medicine (<http://smhs.gwu.edu/emed>) provides staffing for the emergency units of George Washington University Hospital, United Medical Center, the Walter Reed National Military Medical Center, and the Washington DC Veterans Administration Medical Center. The Department's educational programs include a four-year residency program and ten fellowship programs.

Fellows receive an academic appointment at The George Washington University School of Medicine & Health Sciences and work clinically at a site staffed by the Department. The Department offers Fellows an integrated, interdisciplinary curriculum, focusing on research methodologies and grant writing. Tuition support for an MPH or equivalent degree may be provided, as per the fellowship's curriculum.

Complete descriptions of all programs, application instructions, and Fellowship Director contacts can be found at: <https://smhs.gwu.edu/emed/education-training/fellowships>



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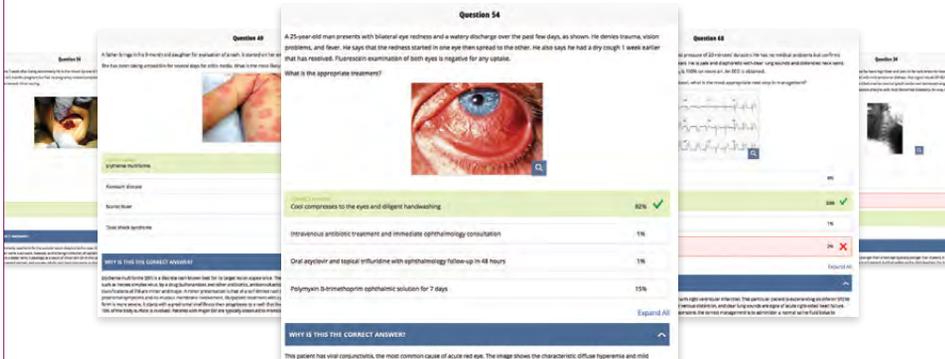
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