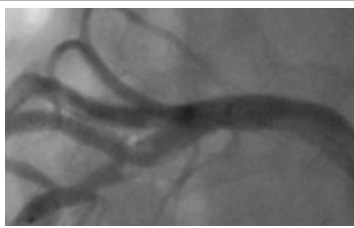




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SCREENING FOR AAA  
Seeking to  
Catch AAAs  
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# ACEPNow

The Official Voice of Emergency Medicine

APRIL 2024 Volume 43 Number 4

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CASE REPORT  
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Goin' Down:  
A Case of THS  
SEE PAGE 11



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practice trends, plus commen-  
tary and opinion pieces, go to:  
[www.acepnow.com](http://www.acepnow.com)

## Emergency Medicine Shows Rebound in 2024 Residency Match

Record number of EM applicants leads to more filled residency spots than in previous two years

by JONATHAN FISHER, MD, MPH, FACEP; MIKE KIEMENY, MD, FACEP;  
NANCY CALAWAY, CAE; AND CEDRIC DARK, MD, MPH, FACEP

After a surprisingly low number of applicants and a shockingly high unfilled rate last year, emergency medicine (EM) appears to be leveling off as it regains its status as one of the medical profession's most sought-after specialties. There was a collective exhale from the emergency medicine community after the emergency medicine results of the 2024 Match, but relief remains elusive as concerns about the specialty's program growth linger.

This year, 135 emergency medicine positions went unfilled across 54 programs—considerably down from the 554 unfilled positions across 132 programs last year. This decrease—from 18 percent to just 4 percent—in unfilled positions is encouraging news for the specialty.

For years, emergency medicine enjoyed tremendous success in the Match with near-

CONTINUED on page 6

## A NEW SPIN

# Hasta La Vista, Scribes

Can a machine, an AI, learn the value of human life?

by JULIA HUTCHISON, DO

A few months ago, I received email notification at work that indicated our phones would soon be automatically downloading a generic, HIPAA-compliant artificial intelligence (AI) scribe. I was intrigued. Could an AI scribe really get all the complexities of an emergency department (ED) encounter? How would it know what to leave in—and sometimes more importantly—what to leave out?

## Testing Out New Tech

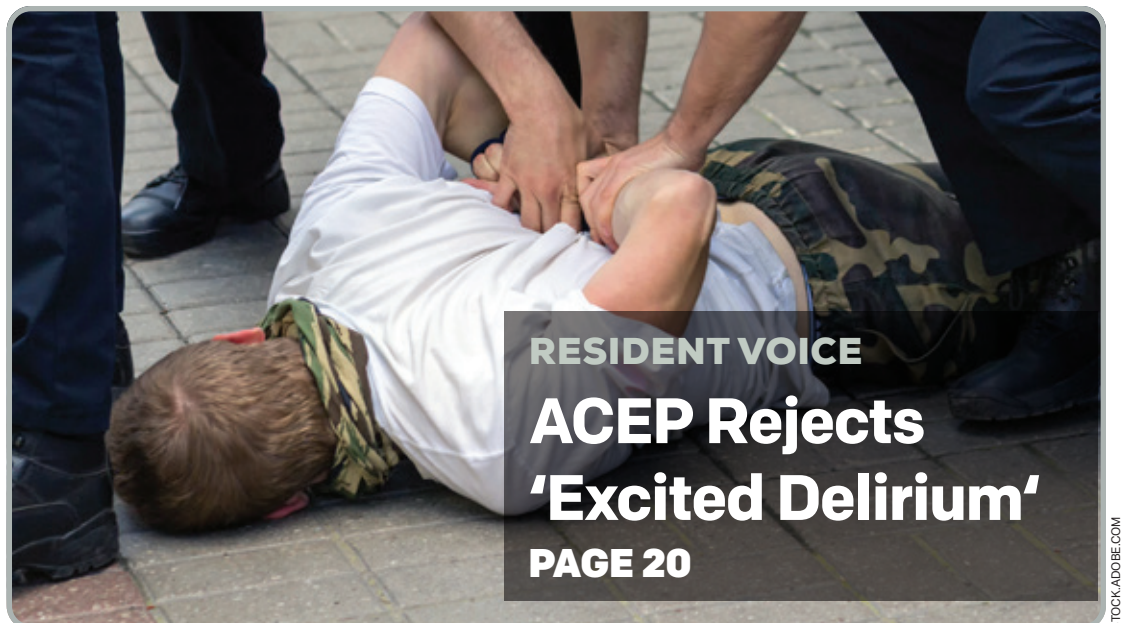
With all this in mind, I tried out the generic AI scribe. I first tried it with my husband. He pretended to be a physician, and I pretended to be a nightmare historian. I'm referring to the type of person who rambles about pickleball when you are asking them about their chest pain and has a hard time

CONTINUED on page 10

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## RESIDENT VOICE

# ACEP Rejects 'Excited Delirium'

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ACEPNow

The Official Voice of Emergency Medicine

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NEWS FROM THE COLLEGE

UPDATES AND ALERTS FROM ACEP



ACEP Executive Director/CEO Announces Retirement

Susan E. Sedory, MA, CAE, will step down from her role as ACEP Chief Executive Officer effective June 2025.

Recruited and hired in a completely virtual format, Ms. Sedory took the helm at ACEP as the COVID pandemic accelerated in July 2020 and deftly adapted ACEP staff and strategy to meet member needs in unpredictable times. Under her direction, ACEP shifted to and from virtual meetings, initiated work-from-home protocols and began a comprehensive technology overhaul. Through her tenure, ACEP was repeatedly named an employee-friendly workplace, recognized as a Best Place for Working Parents three years in a row.

Ms. Sedory sharpened ACEP’s focus by establishing a member-centric strategic plan and expanded the association’s capabilities with the launch of the Emergency Medicine Data Institute. She steered ACEP through contentious legislative and policy battles, including efforts to fix the flawed implementation of the surprise billing law, as well as campaigns to prioritize emergency physician leadership when defining scope of practice lanes of medical authority. Ms. Sedory has dedicated her nearly 40-year career to improving health care, from research through organizational leadership, and currently serves as the president of the Council of Medical Specialty Societies.

“It has been an honor to serve ACEP and its members during unprecedented times,” said Ms. Sedory. “I am fiercely proud of our achievements in support of the nation’s emergency physicians and their patients.”

The ACEP Board of Directors will form a search committee and enlist a search firm to identify Ms. Sedory’s successor. Plans for a smooth transition will be implemented and the new leader will be chosen in early 2025, with a transition period of executive overlap to follow.

“We deeply appreciate Sue’s leadership and the significant steps she took to make ACEP stronger during tumultuous times,” said Aisha Terry, MD, MPH, FACEP, president of ACEP. “ACEP’s voice on physician workforce issues has grown louder and more resolute at Sue’s direction. She leaves ACEP well-positioned to be heard by policymakers, regulators, hospital decision-makers and others in the house of medicine. On behalf of the ACEP Board, we thank her as she plans for a well-deserved retirement.”

Research Forum Submissions Accepted Through April

If you have original research you would like to see showcased at the world’s premier emergency medicine research event, now is the time.

ACEP Research Forum—which will take place in conjunction with ACEP24, Sept. 29 to Oct. 2 in Las Vegas—is accepting abstract submissions through April 30. The Research Forum typically selects more than 400 abstracts per year, presented live during the event.

Find out more about the criteria, format and submission process online at [acep.org/RF](http://acep.org/RF).

ACEP Anytime, ‘The Netflix of Emergency Medicine’ is Now Available

This all-in-one, online medical education library offers conference content, webinars, podcasts, and more. When time is limited, efficiency matters—trust ACEP Anytime. Subscribe and learn pearls you can use on your next shift at [acep.org/anytime](http://acep.org/anytime).

Discover Employer Practices with ACEP Open Book

Make career decisions that are best for you and your needs with the help of ACEP Open Book, developed with Ivy Clinicians. This online resource offers actionable insights about group structure, leadership, policies and more. Explore the tool today at <https://openbook.acep.org>.

Expand Your EM Business Knowledge

Practice essentials—an online curriculum developed by Emergency Medicine Residents’ Association (EMRA) and ACEP—dives into reimbursement, contracts, operations and risk management, and other topics that may not have been covered in depth during medical school or residency. Free for EMRA and ACEP members at [acep.org/practiceessentials](http://acep.org/practiceessentials). ➕

CORRECTION

The figure for fascia iliaca block in the February 2020 issue incorrectly labeled the location of the femoral vasculature. The femoral artery lies between the femoral nerve (lateral) and the femoral vein (medial).

SEND YOUR THOUGHTS  
AND COMMENTS TO  
ACEP NOW@ACEP.ORG

# THE BREAK ROOM



## 'Revisiting Nitroglycerin in MI with Right-Side Ventricular Involvement' (March 2024)

Another question to ask is why do we give nitrates at all to patients with acute myocardial infarction. There is no benefit to morbidity or mortality.

—Andrew Schare, MD, FACEP

Nitroglycerin will cause venodilation in every patient. If they are dependent on right ventricular filling for contraction as during myocardial ischemia/infarction, then you will expect this effect to be pronounced. It's not that you can't give NTG for the anti-anginal effect of potentially pain relief (that's all the benefit you will ever get from NTG unless there is actual coronary artery spasm without complete coronary occlusion/thrombosis) but you need to be ready to intervene by stopping the NTG (it should be IV and not SL or topical since you need the effect to go away quickly) and give an IV fluid bolus. If you give a SL NTG and do not have IV access yet to give an IVF bolus, you will never forget this mistake even if the patient hopefully doesn't arrest.

—Joseph Shiber, MD, FACEP

## 'Survival Tactics for Emergency Department Boarding' (March 2024)

Thank you, Shari. Your contribution to addressing this and other serious health care issues over the years has been laudable.

The failure of inpatient bed capacity to keep up with population is stark, albeit same day outpatient surgery with new techniques have changed a two-day hospital stay into a long afternoon in post-op. And changes in health care funding policy have forced hospitals and others to dramatically change business practices.

In Arizona, in the late 1990s to late 2000s the Arizona ACEP Chapter had a huge impact on hospital crowding, to which you alluded.

But, now, here we are again and what appears to be worse and more wide-spread. So once again, the Arizona Chapter Board is taking action to draw attention to and impact this serious issue.

This time, we have chosen to employ data (not readily available in the past) to incentivize hospitals to take appropriate action & join with the emergency medicine community to lobby for policy changes. Anyone interested may contact me for a summary.

Thanks again for summarizing this timely topic.

—Todd B. Taylor, MD, FACEP

## 'Case Report: Acute Urinary Retention and Fever in a Man' (January 2024)

Acute urinary retention (AUR) is an important clinical issue especially with an aging population. But, fever is also common in these patients, since many of them have urinary tract infections (UTIs). Prostatitis is sometimes the cause, but far less often than the article implies. The article neglects the most common cause: benign prostatic hypertrophy (BPH). Prostatitis is far less common than BPH, and most men with AUR and evidence of UTIs do not need four to six weeks of antibiotics (in spite of some urologists' recommendations).<sup>1</sup> In reality, BPH is the cause of AUR more than 50 percent of the time.

—W. Anthony Gerard, MD, FAAFP, FACEP

### Reference

Coker TJ, Dierfeldt DM. Acute bacterial prostatitis: diagnosis and management. *Am Fam Physician*. 2016;93(2):114-20. [+](#)

## TOXICOLOGY Q&A



# The Grim Reaper

by JASON B. HACK, MD, FACEP

**QUESTION:** What fiery ingredient brings tears to your eyes and irritation upon exposure?

**ANSWER** on page 18

# By the Numbers

## MALARIA

**SYMPTOMS**  
**FEVER**  
**CHILLS**  
**HEADACHE**  
**NAUSEA**

**VECTOR**   
**ANOPHELES**  
**MOSQUITOES**

## EPIDEMIOLOGY

**ACQUIRED**  
**85%**  
in Africa

**>90**  
countries reported

**GLOBAL**  
**INFECTIONS**  
**228**  
**MILLION**  
**WORLDWIDE**  
**DEATHS**  
**405,000**  
in 2018

**IN THE U.S.**  
**2,000**  
Cases

Source: Tan K, Abanyie F. Centers for Disease Control and Prevention. Malaria CDC yellow book 2024. Available at: <https://wwwnc.cdc.gov/travel/yellowbook/2024/infections-diseases/malaria>. Updated May 1, 2023. Accessed March 1, 2024.



# RESIDENCY SPOTLIGHT

## UNIVERSITY OF CINCINNATI COLLEGE OF MEDICINE

**Location:** Cincinnati, OH

**Social media:** @TamingtheSRU

**Year founded:** 1970

**Number of residents:** 56 (14 per class)

**Program length:** 4 years

### What Does Your Program Offer That Residents Can't Get Anywhere Else?

Our residency has three very unique characteristics. First, we have a graduated responsibility model at our primary academic site designed to consolidate learning procedural (R2), resuscitation (R3), and supervisory skills (R4), so that residents get a lot of reps of each in a defined period so as to build muscle memory and to allow residents to incorporate recent feedback. Residents still get procedural and resuscitative experiences through all four years at our community sites, but the graduated responsibility model really reinforces the learning of those critical skill sets. Alumni feedback routinely states, "whatever you do, do not get rid of the graduated responsibility model."

Second, we also incorporate leadership development into our curriculum as this is one of our core values as a training program. We believe leadership development is critical to being a well-trained emergency physician and all residents get some element of intentional



R1 and R4 Class during Camp B Pod (ABOVE), R2 Class (TOP RIGHT), R3 Class (BOTTOM RIGHT)

leadership development no matter what their potential career path may be.

Lastly, our residency program is well integrated into our Helicopter EMS (HEMS) transport program Air Care. Unlike many other residency programs with HEMS experience and exposure, all of our residents serve as members of the flight team and the majority of air care flights in the greater Cincinnati region carry a resident-nurse flight team.

### What Are Some Fun Activities Residents Like to Partake in Or Recently Participated in?

Like many programs, our residents appreciate being outdoors and do a lot of hiking

and climbing. We have a lot of great hiking within a day's drive of Cincinnati, including Red River Gorge, which is also one of the best climbing spots in the country. Many of our residents also enjoy running and biking in Cincinnati's nationally recognized park system or along its extensive bike trails. Our Wellness Committee also organizes a lot of social events to include "Wellness Wednesdays" (typically post-Grand Rounds workouts), group trivia nights, canoeing/paddle boarding, helipad yoga, faculty-resident kickball, and various theme parties. The Wellness Committee also sponsors various interest groups, with topics such as running, book club, "The Batchelor," Peloton, new



restaurants, events and concerts, and even dog walking or dog sitting.

### How Should Potential Applicants Learn More About Your Program?

We would highly encourage applicants to follow us on social media, but they can also check out our department's website at <https://med.uc.edu/depart/emergency-medicine/home> (you can find more residency-specific links in the drop-down menu on the left side of the page).

—Erin McDonough, MD, FACEP, Residency Program Director and Professor of Emergency Medicine at the University of Cincinnati College of Medicine



## SPLIT DECISION?

## NOT EVEN CLOSE

9 out of 10 providers surveyed chose the T-RING as their preferred digit tourniquet.

### T-RING™ ADVANTAGES

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- RISK MANAGEMENT** Applies the safest pressure of all methods & allows better exams
- SIMPLICITY** One-Size-Fits-All
- VERSATILITY** Able to stretch and apply over more severe injuries
- NERVE EXAM** 2 Point Discriminator for Digital Nerve Exam



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# ACEP4U: Driving Impact Through Committee Work

## COMMITTEES DRIVE EMERGENCY MEDICINE WORK PROJECTS, APPLICATIONS OPEN

**By** serving on an ACEP committee, members can have a direct impact the work important to all emergency physicians. If you're passionate about a topic or niche within the specialty, getting involved with committee work in that area allows you to join forces with other professionals to multiply your impact.

Any ACEP member, including resident members, can apply to be on a committee. This year, committee terms begin at ACEP24, Sept. 29–Oct. 2, in Las Vegas.

If you are interested in volunteering for a national committee, visit [acep.org/committees](http://acep.org/committees) for more information and to fill out the application. The deadline to apply is May 15.

What have some of the committees been up to this year?

### Coding and Nomenclature Advisory

The purpose of this Committee is to identify and analyze Medicare, Medicaid, and private payer claims processing policies that deviate from current procedural terminology (CPT) principles and/or documentation guidelines and recommend strategic solutions.

Recent activity includes:

- Track payer issues such as denials, rates, appeals, and pay for performance.
- Track activity related to the 2023 CPT documentation guideline changes.
- Monitor the Recovery Audit Contractor (RAC), and other audit activities, and react appropriately to issues affecting emergency medicine. Monitor changes in facility reimbursement.
- Represent ACEP interests at the AMA CPT Editorial Panel and WHO ICD-10 Coordination and Maintenance Committees.
- Identify and develop educational materials such as articles, webinars, and Frequently Asked Questions (FAQs) to provide members with up-to-date information that will facilitate an effective balance between optimal coding and compliance. Check out these resources at [acep.org/reimbursement-faqs](http://acep.org/reimbursement-faqs).

### Clinical Policies

The Clinical Policies Committee currently has 12 clinical policies in development. ACEP has also partnered with the Society of Post-Acute and Long-Term Care Medicine (AMD) to draft guidance on asymptomatic hypertension in nursing home residents and planning documents for emergency department (ED) nursing home telehealth. A few recent highlights include:

- The clinical policy on the management of severe agitation was published in the January 2024 issue of the *Annals of Emergency Medicine*.
- A consensus guideline on the management of corneal abrasions, which involved several members of the Clinical Policies Committee, was posted online in the *Annals of Emergency Medicine* on Feb. 6, 2024.
- A revised clinical policy on seizures will be

considered by the ACEP Board of Directors in April.

Clinical policies expected to be submitted to the ACEP Board of Directors by the end of 2024 include blunt trauma, asymptomatic hypertension, thrombolytics, carbon monoxide poisoning, and airway management.

### International Emergency Medicine

- Co-hosted a Virtual Ambassador Conference in February with the International EM Section
- Reviewing an ACEP policy about “International Development & Promotion of Emergency Medicine”
- Working to increase international attendance at ACEP24
- Working with international societies to support their efforts to build EM as a specialty around the world
- Volunteers are attending several international conferences to build goodwill and promote the ACEP brand (including ICEM24 in Taiwan, EUSEM Congress 2024 in Copenhagen, ESEM24 in Dubai and ACEM in Botswana)

### Membership Committee

- Working on possible new membership models for the ACEP Board of Directors to consider, including options for attendings in the first few years post-residency.
- Helping to educate section leaders on their responsibilities and how to increase engagement.
- Developing new ways to recognize leaders for their tenure and volunteer contributions.

### Pediatric Emergency Medicine

The Committee works on objectives and topics related to pediatric emergency medicine and the care of pediatric patients. They ensure ACEP is involved and represented in national efforts to improve the emergency care of children. Some of the topics and objectives they are currently working on include:

- Participation and support in the National Pediatric Readiness Project and the national Pediatric Readiness Guideline.
- Development of information papers on multiple topics such as opioid use disorder, acute overdose, agitation, and suicidal ideation.

### Public Health Committee

This Committee works to examine and analyze the role of emergency medicine in public health and to make recommendations to the ACEP Board of Directors in such areas as health promotion, prevention and management of infectious diseases, and the prevention and control of violence and injuries.

Committee members are working on a diverse array of objectives, including:

- Creation of several policy statements related to firearms, reproductive health services and climate change.

- Development of resources including information papers and smart phrases.

### Reimbursement

This Committee’s purpose is to identify and analyze the governmental reimbursement environment as it pertains to emergency medicine and assist in positioning the College appropriately on issues of importance.

Recent activity includes:

- Identify and analyze reimbursement challenges that impact emergency medicine and recommend strategic solutions by monitoring government and commercial payer claims activity including ongoing implementation of the *No Surprises Act*.
- Continue to represent ACEP interests at the AMA RBRVS Update Committee (RUC) to ensure our services are appropriately valued.
- Ongoing development of educational materials such as articles, webinars, and frequently asked questions (FAQs) to provide members with practical information on developing reimbursement trends. Develop specific content for residents and young physicians. Read more at [acep.org/reimbursement](http://acep.org/reimbursement).
- Develop a strategy for emergency medicine to be represented in alternate payment models, including episodes and population health, to prepare for the transition from fee-for-service reimbursement to value-based reimbursement. Look for a breakout session at LAC!
- Monitor Medicaid reforms at the state level and provide resources as appropriate. Monitor the impact of reimbursement changes in rural areas.

### State Legislative and Regulatory Committee

- Examining the concerns our members have interacting with law enforcement in the emergency department and how ACEP can work together with policing organizations to find solutions.
- Identifying ways in which emergency physicians are put in harm’s way and how emergency physicians can work more safely and effectively to stem violence and provide a safer environment for our members to work.

### Well-Being

The primary focus of the Well-Being Committee, which often works closely with ACEP’s Wellness Section, is to address the tough issues that hinder wellness and career satisfaction for emergency physicians, using evidence-based tactics to solve these challenges and support well workplaces.

Examples this year include:

- Published ACEP’s new wellness guidebook, “From Self to System—Being Well in Emergency Medicine,” which offers in-depth solutions to many systemic issues plaguing emergency physicians.
- Hosted a series of “Reinvigorating Emer-

### ACEP’S 31 COMMITTEES

1. Academic Affairs
2. Audit
3. Awards
4. Bylaws
5. Bylaws Interpretation
6. Clinical Emergency Data Registry
7. Clinical Policies
8. Clinical Resources Review
9. Coding & Nomenclature Advisory
10. Communications
11. Compensation
12. Disaster Preparedness & Response
13. Diversity, Equity, and Inclusion
14. Education
15. EMS
16. EM Practice
17. Ethics
18. Federal Government Affairs
19. Finance
20. Health Innovation Technology
21. International Emergency Medicine
22. Medical-Legal
23. Membership
24. National Chapter Relations
25. Pediatric Emergency Medicine
26. Public Health & Injury Prevention
27. Quality & Patient Safety
28. Reimbursement
29. Research
30. State Legislative/Regulatory
31. Well-Being

gency Medicine” webinars, funded in part by a cooperative agreement with the Centers for Disease Control and Prevention. These on-demand courses feature experts who discuss systemic transformation toward workplace well-being, burnout and compassion fatigue, second victim syndrome, and narrative medicine.

- Solicit nominations and recommend a recipient for the Emergency Medicine Wellness Center of Excellence Award, which recognizes an emergency medicine group, department, or clinical site that incorporates wellness and resilience on an institutional level. ➕





Benjamin Aiwonodagbon - University of Pittsburgh Medical Center



Justine Wang - Harbor UCLA Medical Center



Alexandra Sappington - Louisiana State University (New Orleans) pictured with her fiancée David Cooper, who matched in a surgery residency at Johns Hopkins

PHOTOS COURTESY OF MATCHING RESIDENTS.

## MATCH | CONTINUED FROM PAGE 1

ly every spot filled. In 2021, when emergency physicians were hailed as health care heroes in the wake of the COVID-19 pandemic, EM applicants reached a peak of more than 4,300. But in 2022, the number of EM-bound students sharply dropped. With more than 700 fewer applicants, the 2022 Match saw 219 unfilled spots across 69 programs. The 2023 cycle continued the downward trend with a continued but smaller drop in EM-bound applicants, and an even larger rise in unfilled spots, which shocked the EM community; some even questioned its future.<sup>1</sup>

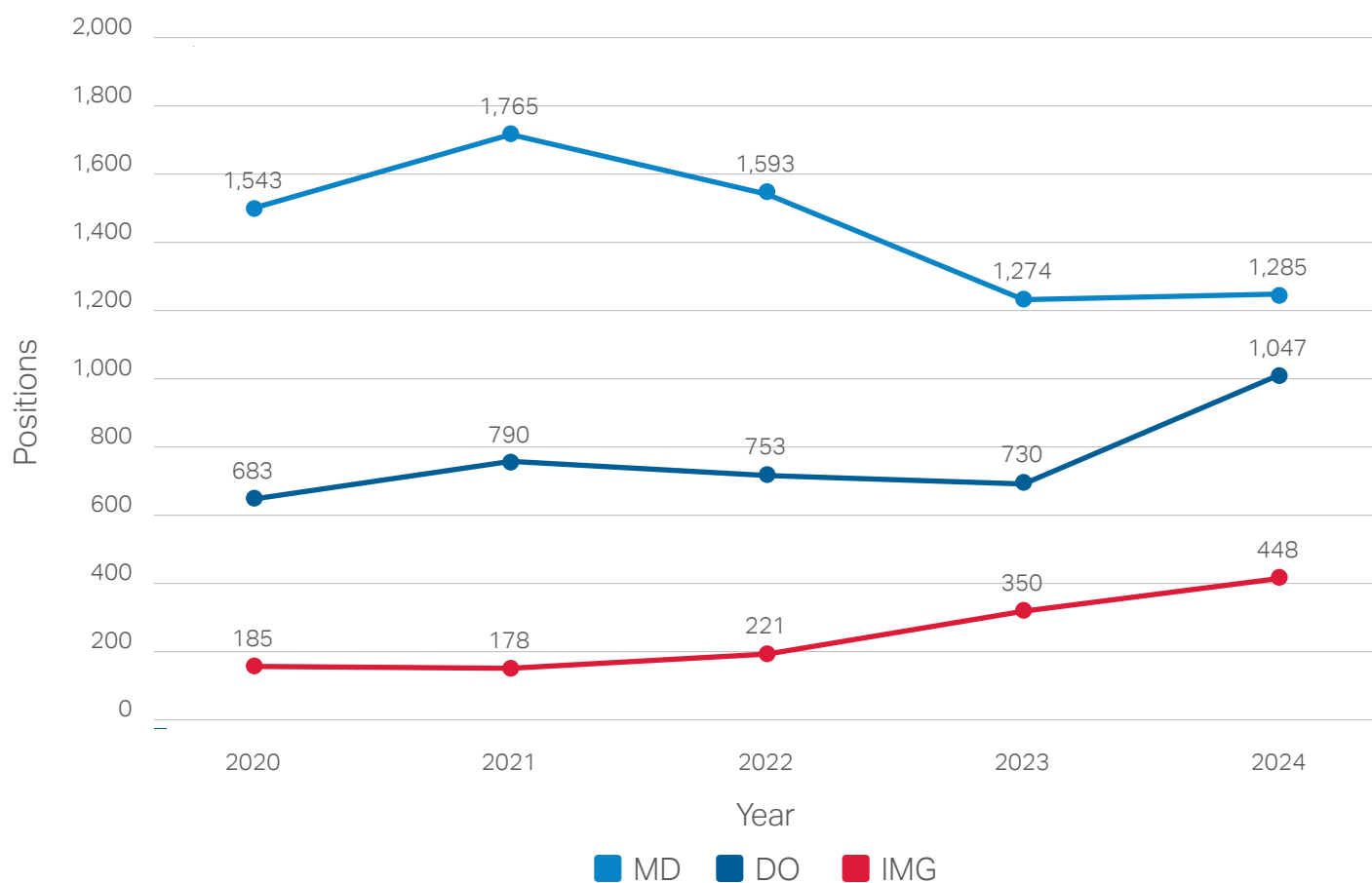
The 2024 cycle marked the greatest number of students applying to emergency medicine, according to preliminary data from ERAS. More than 4,400 applicants signed up for emergency medicine this year—nearly 1,200 more EM applicants than the previous year and with nearly double the amount of international medical graduate (IMG) applicants. While emergency medicine’s Match rates have not returned to pre-COVID numbers, it certainly is a sign of renewed interest in the field.

“We are very encouraged that the interest in EM has seen a rebound over the last year,” said Chinmay Patel, DO, the emergency medicine clerkship director at the Burnett School of Medicine at Texas Christian University. “The increase in EM interest mirrors what anecdotally many residency programs around the country experienced this interview season with increased applications.”

The increase in number of applicants and subsequent Match has been mostly driven by an increase in osteopathic and IMG applicants. The results of the 2024 Match showed that 35 percent of EM positions were filled by osteopathic students and 15 percent by international medical students and graduates. Natalie Zink, a graduating medical student at the Medical College of Georgia, said she anticipated the increased competition in emergency medicine this year, but it did not deter her decision. Although applicants from allopathic U.S. schools like Ms. Zink remained relatively flat, competition from osteopathic students and international graduates contributed to the rebound.

“After such a tough year last year, I as-

### EM Positions, 2020-2024



sumed there would be a large rebound. EM is a very welcoming specialty where many types of people fit - our strength is in our motley crew,” Zink said. “EM is the only specialty that allows me the depth and breadth of pathophysiology, plus the added flexibility of fellowship training. There is no recipe for a perfect career; you have to follow your passions.”

Many applicants, like Nsikak Daniel who graduated medical school in St. Lucia, felt like they would never have a chance at matching in EM were excited at the opportunity to be given a chance. At ACEP’s Scientific Assembly in Philadelphia last October, Dr. Daniel had no plans to participate in the 2024 Match. She doubted she could earn a spot in an emergency medicine residency program in the United States.

There were financial limitations. She wasn’t personally impressed with her U.S. Medical Licensing Exam test scores. And she thought there would be steep competition from U.S.-based students. But a sponsor she found at ACEP’s annual meeting encouraged her to continue her dream of practicing emergency medicine.

Following ACEP24, “I bought my ERAS token, prepared my entire application in less than two weeks, including my personal statement and letters of recommendation, and submitted to 47 programs,” she said. “The next few weeks, I received eight interview offers and now, so help me God, I matched into EM! It has been a rollercoaster ride but personally, I think it makes this latest achievement all the more worth it.”

Dr. Daniel, who graduated medical school in 2022, is just one of 2,891 applicants who matched into emergency medicine in the 2024 Match program this spring.

“Our residency program leadership was very deliberate with recruitment, interviewing, and ranking as were many other programs,” said Annahieta Kalantari, DO, vice chair of education at the Penn State Health Milton S Hershey Medical Center. “They spent hundreds of hours finding the right candidates for our rank list.”

Many experts have noted that top grades and board scores do not always predict who will become the best emergency physicians. There are a number of emergency medicine leaders who have said that they themselves were just average students. Identifying future





Natalie Zink - University of Chicago



Meg Hayslip - Carolinas Medical Center



Rebekah Samuels - University of Louisville

residents who fit the mission and values of a program and have genuine interest in serving that specific patient population is also an important part of a successful Match.

The concept of “program signaling” was introduced by ERAS two years ago to further this aim and is a way for applicants to show interest in programs before applying. Signals serve as a way for an applicant to indicate to a select few programs that they are highly interested. This year, applicants to EM could signal up to seven residency programs when submitting applications. On average, 13 percent of a program’s applicants used a signal when applying to the program. Preliminary 2024 ERAS data showed applicants to EM who used a signal received an interview offer roughly 55 percent of the time compared to 28 percent for those who did not signal the program.<sup>2</sup> Program directors can use applicant signals in various ways in order to focus their efforts on those most interested in their programs and, hopefully, this leads to a successful match.

Benjamin Aiwonodagbon, MD, MPH, knew EM would be competitive this year, but for him, “it was EM or nothing.” He feels that the increase in IMG residents will positively impact the future of EM in meaningful ways. “Data has shown that the more diversity in a team or organization, the better the outcome,” he said. “When a managing team mirrors the patient population, the better the health outcomes for such patients.”

Dr. Aiwonodagbon added that the influx of IMG applicants to U.S. residency programs might be beneficial to workforce distribution challenges, noting that some visa sponsorships require board-certified physicians to practice in rural, under-served communities. Additionally, the impact could transcend the United States and have a global influence. “The more IMG EM physicians we have in the future, the better for global EM and EM health systems in developing countries,” he said. “EM is the missing piece of health care in most sub-Saharan African countries, for example. I, for one, would love to contribute to building EM in my home country Nigeria in the future.”

While the 2024 Match numbers paint an optimistic picture, many of the factors that led to the 2023 drop off have not changed. Hospital boarding, workforce concerns, economic

challenges, ED violence, corporatization of the practice of medicine, and payer and governmental administrative burdens still continue to plague emergency physicians. These systemic challenges require continued efforts to improve conditions for emergency physicians and their patients.

“I don’t think a few setbacks are going to deter what an ED represents at its core—humanity,” said Sreenidhi Vanyaa Manian, another student who successfully matched. “Only time will tell how everything works out but as long as people who are passionate about EM comprise it, I am not worried about the future of the specialty.”

*This article updates a previous online post on March 15, 2024. Nsikak Daniel, was incorrectly identified as a medical student in the prior version. She has already graduated medical school. +*



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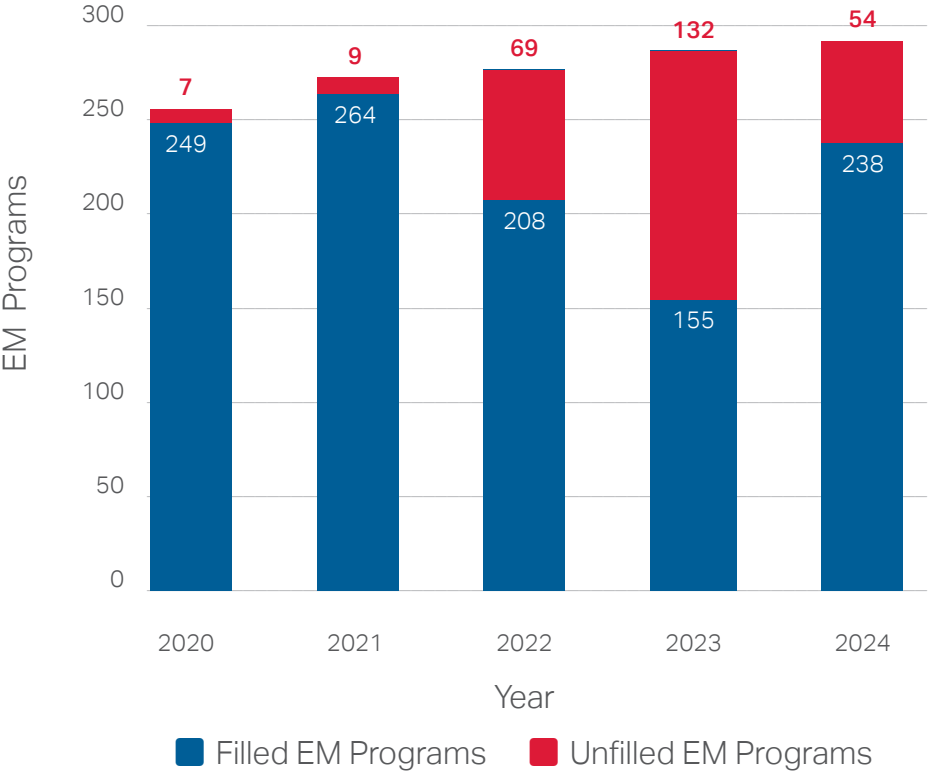


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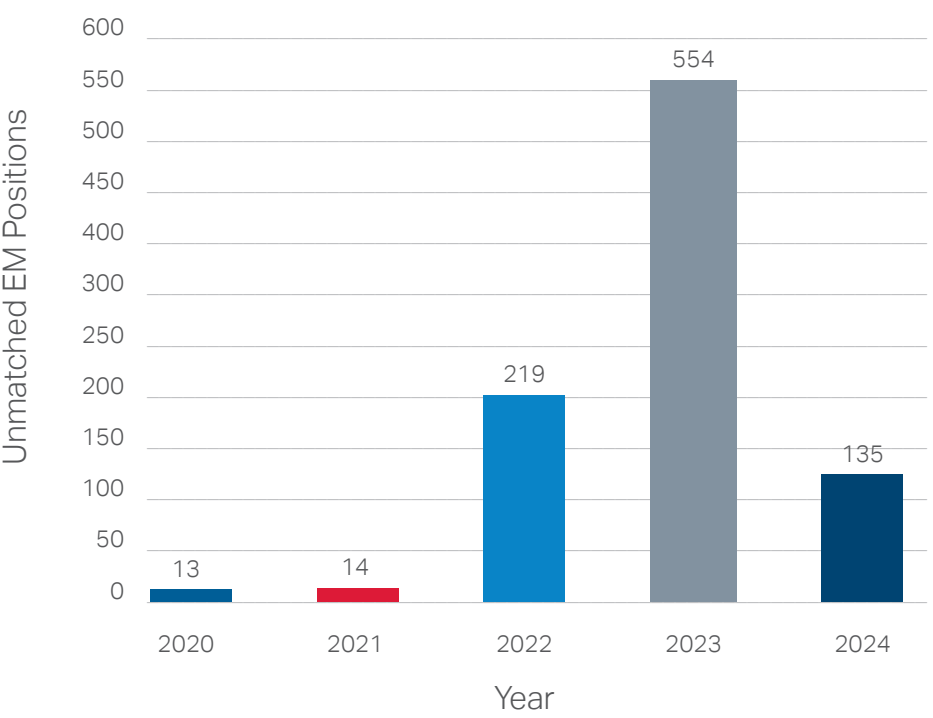
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EM Programs, 2020-2024



Unmatched EM Positions, 2020-2024





# Hey, Doc! I'm Dizzy

## How not to miss posterior circulation stroke

by CHUCK PILCHER, MD, FACEP; AND  
TONY DAJER, MD, FACEP

Posterior circulation strokes make up 20 percent of all strokes but account for 40 percent of stroke misdiagnoses.<sup>1</sup> Vertigo and dizziness are often the hallmarks, but distinguishing a central (brain) from a peripheral (vestibular) etiology is difficult. Dizziness is especially tricky, with up to 40 percent of strokes presenting with dizziness being missed.<sup>2</sup> Vertebral artery dissection (VAD) is notoriously elusive, producing anatomically scattered symptoms that may stutter for days.<sup>3</sup>

### Case 1: Posterior Stroke Presenting as Food Poisoning

A 42-year-old man presents to the emergency department (ED) with sudden onset of severe vertigo, headache, nausea, and vomiting after eating Italian food. His blood pressure is 190 over 115. On exam he is in moderate distress, is pressing his eyes shut, and has horizontal nystagmus (not further characterized by the emergency physician). His neurological exam is described as normal, but gait and truncal ataxia are not tested. He is assumed to have benign positional vertigo, is treated with IV Reglan, Benadryl, and Valium, but is not improved two hours later. A neurologist is consulted and a CT shows a large left cerebellar infarct. Craniotomy is ultimately required to relieve brainstem compression.

### Case 2: Posterior Stroke Presenting as Intoxication or Malingering

A 62-year-old man awakens from sleep with a headache, trouble speaking, and inability to move his arms or legs, all witnessed by his partner. Symptoms last 10-15 minutes. On

arrival in the ED, symptoms have resolved except for the headache. His neurological exam on arrival is documented as normal. Although his ETOH or blood alcohol level is zero, the consulting neurologist concludes that the patient's symptoms are likely related to drinking wine the night before. At shift change the oncoming emergency physician re-evaluates the patient and notes direction-changing horizontal nystagmus. MRI/MRA reveals a right VAD. The patient is anti-coagulated and does well.

### Takeaways

Nystagmus can be complex; its presence in a patient with any neuro symptoms should raise the possibility of a posterior circulation stroke. If nystagmus is the sole finding, we teach that the only potentially "benign" form is horizontal, unidirectional and extinguishable.<sup>1</sup>

Gait is key. If unable to test gait, check truncal ataxia by sitting the patient up.

VADs are notoriously difficult to diagnose. Symptoms, it is worth repeating, may be scattered, non-anatomic and stutter for days. Worse, odd symptoms like transient quadriplegia or phonation difficulty may be ascribed to malingering or intoxication. Posterior circulation strokes, especially VADs, may manifest with only a single neurological abnormality, so a thorough neurologic exam is critical.

Bilateral symptoms are more frequent in posterior circulation strokes and can be deceptive.<sup>2</sup> Vertigo (or "dizziness") plus *any other symptom*, e.g., headache, diplopia, numbness or motor weakness raises concern for posterior CVA. While vertigo, headache, neck pain and nausea are common, they are rarely all present.<sup>2</sup>

Benign positional vertigo or labyrinthitis should only cause vertigo without other neurological signs or symptoms. Speech abnormalities are not limited to anterior circulation strokes. In the setting of vertigo or dizziness, speech must be carefully tested. Accepting basic conversation as normal is inadequate.

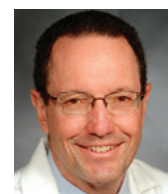
"Dizziness" as a chief complaint at triage may not find its way into physician notes. Such a vague sensation may get lost in the shuffle of repeated interviews. Always consider dizziness a vertigo equivalent. Think twice before attributing a patient's symptoms to "Italian food" or "a few drinks." Humans have usually just eaten something or had "a few beers."

The gold standard for distinguishing a central versus peripheral etiology is possibly the HINTS exam (Head Impulse, Nystagmus, Test of Skew).<sup>1</sup> Unfortunately, patients who most need this might not be able to tolerate it. For such patients, we adopted a rapid, easily tolerated version of the HINTS exam. Its elements include:

1. Eyes: Nystagmus (if horizontal, is it direction-changing?), pupillary response (Horner syndrome), visual fields and skew.
2. Finger-to-nose/heel-shin tests: (basic tests of cerebellar function)
3. Speech: Cerebellar scanning, aka "staccato speech" e.g., phrases like "British Constitution" will sound like "Brit-tish const-ti-tu-tution."<sup>4</sup> If in Spanish try, "Todos tenemos talento."
4. Gait or truncal ataxia: sit up on stretcher or exam table if too uncomfortable to walk.
5. Sensory: Test symmetry of light touch perception. Asymmetry may reveal lateral medullary syndrome (Wallenberg).

### Conclusion

We have never reviewed a missed posterior circulation stroke where all elements of neurological exam were documented. Diagnosis of posterior circulation stroke requires an astute clinician who performs and documents an detailed neurologic examination. +



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staying on track. The result was surprisingly good; the program omitted nonmedical information and provided a succinct non-judgmental history. I tried it next at work, with less success. I found that the generic AI scribe didn't have as much detail as I would have wanted in some areas. It also included certain information that was extraneous or worded in a way that I did not appreciate, such as describing all pain as "severe." I ended up spending more time editing the document than it would have taken to just come up with my own history via dictation.

So, for now, I'm not switching over. But I am impressed. I don't doubt that AI will continue to improve, and there might be a day where AI could replace traditional ED scribes.

The profession of scribing dates to Mesopotamia and the beginnings of human civilization. Scribes have been essential throughout history in keeping a variety of documents, including historical records, legal codes, copying manuscripts, and texts. This isn't the first time where scribes' jobs have been challenged by modern inventions. The advent of the printing press 585 years ago caused a significant decrease in the prominence and use of scribes. However, in the past several years with the release of the electronic medical record, there has been a boom in the use of medical scribes to help with the burden of increased clinical documentation.

The American College of Medical Scribes estimated an increase in 80,000 scribes between 2015 and 2020.<sup>1</sup> Medical scribes have been shown to be beneficial to emergency physicians in terms of billing and coding, physician satisfaction, improved documentation in the emergency department, and patient volume.<sup>2,3</sup> Surveyed ED scribes have also described benefits of experiencing being a scribe in terms of mentorship, increased clinical experience and medical knowledge, and improved chances of getting into medical school.<sup>4</sup>

### A Personal History

I became an ED scribe my senior year of college while applying to medical school. Using a generic AI scribe has made me reflect on my time as an ED scribe and what a great influence that experience had in my overall decision to pursue emergency medicine. I first fell in love with the undifferentiated patient and the scope and excitement of emergency medicine when I was a scribe. I found role models and mentorship from the attendings I scribed for and made connections that have lasted throughout my career.

Would I have even gone into emergency medicine if I hadn't had the opportunity to be exposed to the ED as a scribe? Probably not. My emergency medicine rotation wasn't until my fourth year after sub-internship applications were due. According to the Association of American Medical Colleges (AAMC), in 2019 only 61 percent of medical schools required emergency medicine as a core clerkship. Unless we provide medical students with early exposure to emergency medicine, they might not realize that emergency medicine is their calling.

I have reviewed hundreds of emergency medicine residency applications and personal statements over the past few years. This experience leads me to believe that early ex-



posure to emergency medicine through experiences such as EMS and ED scribing may play a crucial role in recruiting talented individuals to pursue emergency medicine. In the 2022 Match, emergency medicine residency programs were rocked by an unprecedented 219 unmatched positions; nearly one-quarter of programs were impacted before the SOAP. This trend worsened in 2023 with initially 554 unfilled positions prior to the SOAP.<sup>5</sup> The decline in applications to emergency medicine programs is already concerning. Transitioning to AI scribes could potentially impact the pipeline of future applicants and further exacerbate the challenges faced by emergency medicine residency programs in filling their positions.

I worry that transitioning to AI and away

from scribes, who have traditionally been pre-medical students looking to enhance their resumes to improve their chance of gaining acceptance to medical school, will influence future applications and interest of those ultimately wanting to apply to emergency medicine in a time when applications to emergency medicine are tenuous. Although I see the potential in AI scribes for ED documentation and expect that their use will become more widespread, I think our specialty should consider the broader implications and how AI might impact the pipeline of future applicants to emergency medicine. Strategies and pipeline programs may need to be developed to make sure that medical students continue to have early opportunities to gain exposure and mentorship in emergency medicine. +



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"A New Spin" is the personal perspective of the author and does not represent an official position of *ACEP Now* or ACEP.





# Sugar, It's Goin' Down

## A case of toxic hypoglycemic syndrome

by ANDREW FRANCO, MD; BRIANNA TAYLOR

An 18-year-old woman presented to the emergency department (ED) with symptoms of nausea, vomiting, diarrhea, and abdominal pain. She reported that these symptoms started two days prior, shortly after consuming a fruit known as ackee. Since the onset of illness, she had been unable to tolerate any oral intake. Before arriving at our ED, the patient sought care at an urgent care clinic, where she was prescribed ondansetron without improvement.

Upon physical examination, the patient was noted to have dry mucous membranes. Abdominal exam was benign. Most pertinently, her point of care glucose was 24 mg/dL.

### Brief History of Toxic Hypoglycemic Syndrome

Ackee, the national fruit of Jamaica, is a dietary staple; however, consuming unripe ackee can lead to Toxic Hypoglycemic Syndrome (THS), also known as Jamaican Vomiting Syndrome. THS is generally characterized by the acute onset of profuse vomiting within six to 48 hours of ingestion of the unripe ackee, with subsequent hypoglycemia.<sup>1</sup> In severe cases altered mental status, seizures, coma, or even death have been observed.<sup>2</sup> The persistent consumption of ackee has been shown to cause acute liver injury, however, abstaining from eating the fruit can lead to improvement in liver health.<sup>3</sup> Additionally, it has been demonstrated that ackee toxicity is dose-dependent; individuals who consume multiple unripe fruits or ackee seeds tend to develop more severe symptoms. Similarly, death is more prevalent in children with Toxic Hypoglycemic Syndrome compared to adults.<sup>1</sup> An estimated 5000 fatalities were attributed to what was then called Jamaican Vomiting Syndrome between 1886 and 1950.<sup>4</sup> The association between ackee ingestion and the illness was initially recognized in 1875 and officially documented in 1904.<sup>5</sup> Despite being endemic to Jamaica, cases of THS have been reported across the world, with the first case in the United States documented in 1993.<sup>6</sup>

The aril (flesh), rind, and seeds of ackee contain heat-stable hypoglycin A and hypoglycin B. The fully ripened aril is the only edible portion of the fruit, as concentration of these toxins drastically decreases in the flesh of ripened ackee fruit. It's crucial to note that the seeds and the rind of ackee should never be consumed, as they contain toxic levels of hypoglycin, even when the fruit is ripe. Studies indicate that THS is primarily caused by the toxin hypoglycin A. While the mechanism of hypoglycin A is not thoroughly understood, research demonstrates that its metabolism leads to the production of methylene cyclopropyl acetic acid (MCPA-CoA), which inhibits long-chain fatty acid beta-oxidation and ultimately causes depletion of glycogen stores.<sup>7</sup>

As hypoglycin A is a heat-stable toxin, cooking unripe ackee does not decrease its toxicity. Due to concerns regarding THS, the import of ackee fruit was outlawed in 1972, but since 2000 canned exports have been allowed by certain "green listed" manufacturers by the Federal Drug Administration.<sup>8</sup>

### Diagnosis and Treatment

Food poisoning may result in a similar clinical manifestation as Toxic Hypoglycemic Syndrome. THS should be considered in individuals of Jamaican descent or in individuals who recently visited Jamaica, and of course in anyone who reports gastroenteritis symptoms after ingesting ackee. Workup should include blood glucose, serum electrolytes, liver function tests, and urinalysis.<sup>9</sup> Initial treatment should focus on rapid correction of blood sugar via intravenous and oral dextrose, with close monitoring for recurrent hypoglycemia. Other support-



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ive care includes rehydration with intravenous fluids and antiemetics. Activated charcoal could be considered if presenting immediately after ingestion.

### Case Resolution

During further inquiry, the patient mentioned consuming all four pieces of the fruit but denied ingesting any seeds. She specified that the fruit was canned, but brought illicitly by a family member into the country.

The rest of her workup was notable for hypokalemia of 3.3 mmol/L. Other lab work was unremarkable, including creatinine and liver function tests. Her blood sugar improved after IV dextrose bolus and infusion. Poison control was consulted, and they concurred with the diagnosis of THS. Under their recommendation, the patient was admitted to the hospital for observation on an intravenous dextrose infusion. The next day she tolerated oral intake, her blood sugar was maintained, and she was discharged with instructions to monitor her glucose levels at home. +



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### KEY POINTS

- Toxic Hypoglycemic Syndrome should be considered in individuals with symptoms of gastroenteritis in individuals who recently visited Jamaica.
- A thorough toxicological history is critical in cases of suspected Toxic Hypoglycemic Syndrome, as toxicity is dependent on quantity and parts of the fruit ingested, time since ingestion, and means of preparation.
- Treatment should include close monitoring of blood glucose levels, with intravenous dextrose administration as needed.

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# Targeted Temperature Management

Is the science cooling?

by WILLIAM REIS, MD, MS; BENJAMIN ABELLA, MD, MPHIL, FACEP

**P**ost-arrest patients with more significant reperfusion injury (for example, Pittsburgh Cardiac Arrest Category (PCAC) greater than or equal to 3, revised post-Cardiac Arrest Syndrome for Therapeutic hypothermia score (rCAST) greater than 6, evidence of shock, and/or longer arrest times) may benefit from mild hypothermia to 33 degrees Celsius, while less severe post-arrest patients may benefit from fever prevention at less than 37.5 degrees Celsius.

## How Did We Get Here?

Targeted temperature management (TTM) for patients following cardiac arrest resuscitation has gone through several dosing iterations in the past two decades. Early work on TTM in 2002 showed benefit to cooling to 33 degrees Celsius, which subsequently influenced international resuscitation guidelines to recommend mild hypothermia at 32 degrees to 34 degrees Celsius in 2005.<sup>1,2</sup> However, the European TTM1 trial in 2013 showed similar outcomes for those cooled to 33 degrees Celsius compared to 36 degrees Celsius, leading to a 2015 AHA class I recommendation of “cooling between 32 degrees Celsius-36 degrees Celsius.”<sup>3,4</sup> The Hyperion trial in 2019 demonstrated that TTM at 33 degrees Celsius was efficacious for non-shockable rhythms, reinforcing the guidelines recommendation for post-arrest TTM.<sup>5,6</sup>

In 2021, the TTM2 trial was published. TTM2 was a multicenter, randomized trial that enrolled 1850 OHCA patients and randomized them to 33 degrees Celsius or normothermia. Patients were maintained at their assigned target temperatures for 28 hours and then maintained at normothermia less than 37.5 degrees Celsius for 72 hours. Outcomes, including survival at 6 months and neurologic outcome, between the two groups were not clinically or statistically different, but the hypothermia group had a higher incidence of hemodynamically compromising arrhythmias (24 percent versus 17 percent in the normothermia group; RR 1.45 (1.21–1.75)).

The TTM2 trial, while rigorously performed, has important limitations to generalizability for the US patient population. TTM2 primarily enrolled patients in Northern Europe and thus had a number of characteristics not seen in the U.S. As seen in Table 1, the TTM2 population had markedly more favorable prevalence of positive prognosticators of arrest, compared to an American population from the same year.<sup>7</sup> TTM2 is generally interpreted as favoring normothermia for post-arrest care, but the question is whether this trial is broadly applicable to many countries with less developed community CPR involvement.

## Current International Resuscitation Recommendations

In August 2023, the American Heart Association and the International Liaison Committee on Resuscitation published a scientific advisory

that derived three conclusions.<sup>8,9</sup> First, based on TTM2, they recommend that cooling OHCA patients of cardiac or unknown cause, excluding those with unwitnessed asystole, to less than 37.5 degrees Celsius “is a reasonable and evidence-based approach.” Second, as TTM2 did not address in-hospital cardiac arrest or OHCA of noncardiac (other medical) cause, the guidelines remain essentially equivocal as to “whether some of these patients might benefit from temperature control at temperatures between 33 degrees C and 37.5 degrees C.” Finally, the guidelines support active temperature management’s (though not *necessarily* hypothermia) role in improving post-arrest outcomes. This is best demonstrated by the TTM2 data showing that 46 percent of patients in the normothermia group required active cooling, on top of pharmacological antipyresis.

## Recent Clinical Evidence on Post-Arrest TTM

The accumulated post-arrest care literature makes clear that careful fever avoidance following resuscitation is essential. But the question remains, is there ever an explicit indication for hypothermia to 33 degrees Celsius, based on the earlier trials and the strong laboratory evidence supporting this more aggressive form of temperature control? Growing evidence suggests that there may be utility for TTM in the sicker phenotype of arrest patients. Several recent studies yield insights into this hypothesis:

In a single site retrospective cohort study, Callaway et al demonstrated that TTM efficacy may be impacted by arrest severity.<sup>10</sup> In this observational study of 911 American post-arrest patients, sicker patients (PCAC greater than or equal to 3) had improved outcomes when treated at 33 degrees Celsius while less sick patients (PCAC less than or equal to 2) had better outcomes when treated at 36 degrees Celsius. This finding is consistent with the large animal model literature on post-arrest TTM, where a dose effect relationship of TTM is related to arrest model severity.

In a multisite retrospective cohort study, a study by Nishikimi, et al., adds to the hypothesis that TTM efficacy is dependent on arrest severity.<sup>11</sup> Similar to the Callaway study, this study of 1,111 Japanese patients replicated the finding that low-severity post-arrest patients did not benefit from hypothermia while patients with moderate-severity arrests significantly benefited from hypothermia. Adding nuance, this study also showed that the highest-severity arrests did not benefit from hypothermia. While TTM may attenuate injury, it does not reverse it, so it is unsurprising to discover a profoundly injured subset of patients who do not benefit from TTM. In summary, this study shows that there is a subset of post-arrest patients who experience neither too much, nor too little injury and are therefore disposed to benefit from expeditious hypothermic intervention.

Several studies have shown that after TTM1 (2013), in cases where hospitals changed post-



arrest temperature targets from 33 degrees Celsius to 36 degrees Celsius, patients had an concomitant increase in fever, poor neurological outcomes and increased mortality.<sup>12-13</sup> These are challenging studies to draw definitive conclusions from, however they suggest that some of these post-TTM1 patients who were cooled to 36 degrees Celsius did worse, supporting the notion that there exists a subset of patients who benefit from cooling to 33 degrees Celsius.

There is a current vigorous debate regarding post-arrest TTM. Who should receive it? At what dose? For how long? There are a number of trials in progress that may help address these questions; notably, ICECAP, IH-TTM, and PRINCESS-2, each focusing on different aspects of TTM dosing and timing. Until then, we propose that it's worth considering mild hypothermia (33 degrees Celsius) in our sickest post-arrest patients, while avoiding fever in every patient resuscitated from cardiac arrest. +



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Table 1: Comparison of the TTM2 population to 2021 CARES population (and one other source, as annotated)

	TTM2 POPULATION	US CARES 2021 POPULATION
Witnessed Arrest	91.5 percent	49.6 percent
Initially Shockable Rhythm	67.4 percent	16.0 percent
Bystander CPR	79.9 percent	41.5 percent
STEMI as Etiology	40.2 percent	4.6 percent

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# SENDING HOME TRAUMATIC ICH FROM THE ED

Should you do it?

by BRUCE LO, MD, MBA, FACEP; GREG WEINGART, MD, FACEP; GRACE GARTMAN, MD

A 39-year-old male presents to your emergency department (ED) with complaints of a headache after a roll-over motor vehicle accident. He was a restrained driver traveling 65 miles per hour on the highway when he lost control in the rain, hit a guardrail, and had a brief loss of consciousness. His only medical history is hypertension and does not take any anticoagulation. He has a normal neurological exam with a glasgow coma scale (GCS) of 15. Due to the mechanism of injury, a head CT was obtained. The patient was found to have a small intraparenchymal hemorrhage. Neurosurgery was consulted at the regional trauma center where the consultant recommended observing the patient in the ED with a repeat head CT in six hours. Should you do it or should you look for another transferring facility?

### Background

Patients who are found to have traumatic intracranial hemorrhages (tICHs) are frequently transferred for neurosurgical evaluation.<sup>1,2</sup> Patients with isolated mild tICH typically do not experience neurological deterioration nor undergo neurosurgical intervention. The vast majority of mild tICH patients can be discharged within 24 hours including from the ED.<sup>1</sup> Transferring these patients can lead to unnecessary costs, strain on the health care system, and inconvenience to patients and families who have to travel far distances without accruing any added benefit. Unnecessary transfers can also worsen bed shortages, lead to emergency department crowding, and worsen hospital boarding at trauma centers. This ultimately delays care for other patients who may benefit from a transfer. Recent studies have started to look at identifying patients with an isolated tICH who do not need intensive monitoring or intervention and could be discharged from the ED after a short period of observation.

### Evidence

Several tools have been evaluated to risk stratify patients with mild tICHs for deterioration and neurosurgical intervention. The first is the Brain Injury Guidelines (BIG), which looked at various factors to risk stratify patients into three categories (See Table). In their multi-center validation study of 2033 patients, they found that patients who were classified as BIG 1 and BIG 2 (around 30 percent of all patients) had zero TBI-related post-discharge ED visits or 30-day readmissions. BIG 1 patients (around 15 percent of patients) also did not require repeat neuroimaging or neurosurgical consultation. They were discharged from the ED after only six hours of observation.<sup>3</sup>

The SafeSDH tool defined low risk patients as those who had none of the following: taking anticoagulation or clopidogrel, more than one discrete type of hematoma, subdural hematoma (SDH) greater than 5 mm, midline shift, and GCS less than 14. The primary composite outcome included not only the need for neurosurgical intervention (both immediate and delayed), but also any neurological decline and death. In a validation study of 753 patients at 6 hospitals (including both trauma and non-trauma centers), 21.5 percent of patients were deemed low risk. Sensitivity of the tool was 99 percent and a negative predictive value of 0.03. Only two cases fell out due to neurological decline which were felt to be related to medical reasons and not from the SDH. Repeat neuroimaging showed no change in the size of the SDH and no neurosurgical intervention was required.<sup>1</sup>

### How to Implement

Other studies utilizing ED observation pathways have been shown to safely discharge patients home without the need for an admission to the hospital.<sup>4,5</sup> Multidisciplinary teams involving neurosurgery, trauma, and emergency medicine can cre-



Table. Brain Injury Guidelines (BIG).

Variables	BIG 1	BIG 2	BIG 3
Neuro Exam	Normal	Normal	Abnormal
Intoxication	No	No/Yes	No/Yes
Coumadin/Aspirin/Plavix	No	No	Yes
Skull Fracture	No	Non-displaced	Displaced
Subdural Hematoma	<= 4mm	5-7 mm	> 7 mm
Epidural Hematoma	<= 4mm	5-7 mm	> 7 mm
Subarachnoid Hemorrhage	Trace	Localized	Scattered
Intraparenchymal hemorrhage	<= 4mm, 1 location	3-7 mm, 2 locations	> 7 mm, multiple locations
Intraventricular hemorrhage	No	No	Yes

ate pathways for isolated tICH that do not require admission or transfer. A phased approach can be used starting with a protocol like BIG and having neurosurgery review images for all patients with tICH. In the authors' experience of more than 120 patients at several community sites, no unexpected adverse outcomes have been seen over the last two years. While local validation is important, safely reducing unnecessary transfers and admissions can not only reduce costs and inconvenience to the patient, it also helps referral centers that struggle with capacity.

### Conclusion

You decided to take the consultant's recommendation and while waiting for the repeat CT, read this *ACEP Now* article on the practicality of discharging tICH from the ED. Six hours later, the repeat CT head showed no difference in the size of the hemorrhage. Your patient's neurologic exam remained unchanged. After discussing with neurosurgery again, they recommended discharge and you felt comfortable and in agreement. +



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# A Rare Congenital Heart Anomaly

## Acute proximal LAD myocardial infarction in a patient with dextrocardia

by HEAVEEN AHDI, MD; PATRICE BARISH, MD

**A** 59-year-old male with a past medical history of a repaired ventricular septal defect (VSD), dextrocardia, hypertension, hyperlipidemia, and current smoker presented to the emergency department (ED). This patient had known coronary artery disease (CAD), and previously required drug eluting stents to the obtuse marginal and diagonal arteries. The patient expressed epigastric pain, nausea, and fatigue followed by non-exertional, constant right-sided chest pain with radiation to his right arm.

The patient initially presented to an outside ED and was subsequently transferred to our facility for continuity of care. Patient had stable vital signs with an oral temperature of 36.4 degrees Celsius, heart rate of 91, blood pressure of 118 over 76, respiratory rate of 23, and pulse ox of 96 percent on room air. He was asymptomatic upon presentation.

A traditional, left-sided EKG was initially obtained, which demonstrated inverted P waves in lead I, deep Q waves in lead V1, negative QRS complex in V1, and RBBB. It was immediately discerned that the patient had dextrocardia from previous records, and an EKG for dextrocardia was obtained,

The second EKG was concerning for STEMI in the precordial leads (see figure 1). The patient's first and second troponins from the outside hospital were less than 0.01 ng/mL. The third troponin at our facility resulted as greater than 50.00 ng/mL. The patient was started on IV heparin and immediately taken for cardiac catheterization.

In the cath lab, the patient was found to have evidence of a proximal thrombus and significant stenosis of the LAD (see figure 2). He underwent successful revascularization and stenting of the proximal to mid LAD.

### Discussion

Dextrocardia is a rare congenital anomaly where the heart is intrinsically positioned in the right hemithorax with the apex pointing towards the right caudal position.<sup>1</sup> It has a prevalence of 0.01 percent.<sup>1</sup> Dextrocardia can be associated with an overall situs inversus, where all internal organs are in the reversed position or be limited to situs ambiguus, where only some organs are in the reversed.<sup>1</sup>

Despite the rarity of dextrocardia, coronary artery disease can occur with a similar frequency to that of the general population.<sup>3</sup> Coronary artery disease in a patient with Dextrocardia can present with particular findings on a traditional left-sided EKG that raise suspicion for this anomaly. However, there may be diagnostic dilemmas if these findings are not immediately recognized. This delay in recognition can result in the inadvertent underdiagnosis of STEMI. Thus, it is important to recognize dextrocardia and adjust our diagnostic tools appropriately.

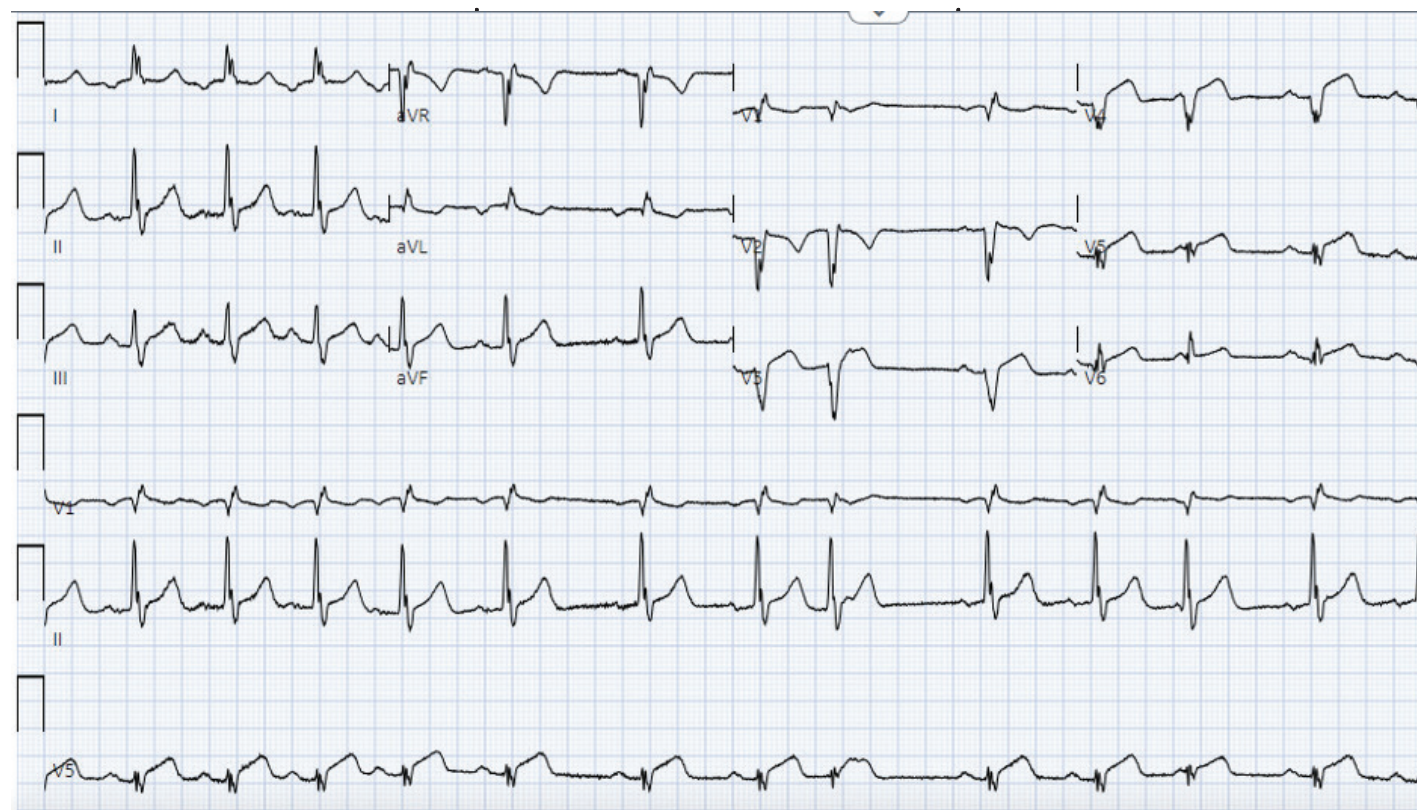


Figure 1: EKG for Dextrocardia showing STEMI.

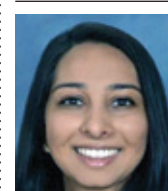


Figure 2: Cardiac cath.

Dextrocardia with STEMI is a rare clinical presentation that presents with both diagnostic and technical challenges. A literature search through PubMed yielded fewer than 80 case reports of this presentation. Further, patients with dextrocardia may have atypical presentations of STEMI. Dextrocardia can have features of right axis deviation, positive QRS complexes (upright P and T waves) in aVR, negative P and T waves and QRS complexes in lead I, and absent R wave progression in the precordial leads with dominant S waves.<sup>4</sup> In cases of dextrocardia, precordial leads should be placed in a mirror image on the right side of the chest, as is done for a right-sided EKG, with the additional reversal of the right and left limb leads.<sup>4</sup>

Symptoms of acute coronary syndrome classically present on the left chest wall, however, our patient's pain was all localized to the right side of the chest, which has been described with other cases of dextrocardia.<sup>5</sup>

The patient's initial left-sided EKG did not demonstrate concerning ST segment changes. However, the patient had known dextrocardia based on documented medical history and was confirmed with a recent chest x-ray. Upon the prompt reversal of EKG leads for dextrocardia, the patient was found to have an obvious STEMI in the precordial leads. The patient was then emergently taken for cardiac catheterization. It is important to discern cardiac anomalies, such as dextrocardia, early in a patient's clinical presentation, as it can significantly impact the timely interpretation of EKGs and the appropriate management of the patient's care. +



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**DR. BARISH** has been a clinical emergency physician for 37 years and the system professor at William Beaumont Oakland University medical school.

### KEY POINTS

- Dextrocardia has a prevalence of 0.01 percent, but coronary artery disease can occur at the same frequency as within the general population
- An EKG for dextrocardia requires precordial leads to be placed in the mirror positioning on the right side of the chest, with the addition of limb lead reversal
- Patients with dextrocardia and cardiac chest pain may have atypical presentations, such as chest pain across the right side of their chest

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# Screening for AAA

A new quality measure seeks to catch AAAs before they pop

by SANDRA M. SCHNEIDER, MD, FACEP

An abdominal aortic aneurysm (AAA) develops with age, occurring primarily in those older than 55 years. Risk factors include smoking, hypertension, male sex, atherosclerotic disease, and family history of AAA. Although AAA is less common in women, rupture is more common.<sup>1</sup> Most aneurysms are less than 4 cm, with the normal diameter of the aorta less than 3cm. When the aneurysm is greater than 5 cm, there is a risk of a rupture, which increases with increased aortic diameter.

The classic triad of abdominal pain, hypotension and pulsatile abdominal mass is present in less than 25 percent of patients.<sup>2</sup> Patients can present with back pain, or with focal neurologic signs such as numbness of the lower extremity. A pulsatile abdominal mass may be difficult to assess in patients with a higher BMI. About 35 percent of individuals with rAAA will die at home.<sup>3</sup> The majority of those who arrive to the emergency department (ED) live for 2 hours or more, leaving a small window for surgical intervention.<sup>4</sup> Depending on the study, rAAA is missed in 16-62 percent of cases.<sup>5</sup> Untreated, nearly all patients die. The diagnosis is confirmed with bedside ultrasound (US) or CT. Bedside US can confirm the presence of AAA, but visualization of the actual rupture may be more difficult because most AAAs rupture into the retroperitoneal space. CT is more definitive but can take more time.

Recently, ACEP received a grant from the Gordon and Betty Moore Foundation to create a quality measure to improve the diagnostic accuracy of rAAA in patients. This measure has been approved by CMS and will be available for reporting soon. To meet the measure, and get credit for MIPS, all patients 55 years and older who present with new acute abdominal or back pain and hypotension (systolic BP less than 90mm Hg) must have an US or CT performed in the ED. Exceptions to this measure are patients who have been screened for an abdominal aortic aneurysm in the past, or have had a CT or US of the abdomen in the prior five years (for those 55-65 years old) or older than 65 years who demonstrate a normal size aorta. Other exceptions are patient refusal, patient death or immediate transfer to the operating room. It is hoped that more emergency physicians will use point of care bedside US, which can be performed more rapidly than a CT. Ultrasound of the aorta is a core competency of emergency physicians, but resources such as Sonoguide are available for a refresher at [acep.org/sonoguide](http://acep.org/sonoguide).

This measure has an additional advantage of increasing the number of patients screened for an abdominal aortic aneurysm. Screening (usually by US but can be by CT/MRI) is recommended by the United States Preventive Services Task Force (USPSTF) one time for men aged 65-75 who have ever smoked and should be considered in men aged 65-75 who never smoked, especially if there is a family history. The USPSTF is less clear on women, but screening can be considered in women aged 65-75 who have ever smoked.<sup>6</sup> The Society for Vascular Surgery agrees with the one-time screening of men

Figure 1: Measure to improve diagnostic accuracy in patients with ruptured abdominal aortic aneurysm

Initial Population	All emergency department visits for patients aged 55 years and older coming to the ED with acute onset abdominal pain or back pain with hypotension.
Denominator	Same as initial population
Denominator Exclusions	None
Numerator	ED visits for whom a POC ultrasound performed, or CT scan was ordered/performed
Numerator Exclusions	Not applicable
Denominator Exceptions	Patients' refusal, patient expired, US/CT done in last one year (55-65) or after 65, previously screened for AAA, transferred to operating room.

aged 65-75 who have ever smoked but also recommends screening men 55 and older (one time) who have a family history of AAA, and women 65 and older with a family history of AAA.<sup>7</sup> They recommend consideration of screening women over 65 years with a significant smoking history.

rAAA is a rare entity, however screening identifies individuals at risk and allows for monitoring of smaller AAAs, and elective repair of larger AAAs to avoid rupture. Elective repair carries a much lower mortality/morbidity risk than emergency repair, even when the latter is performed using an endovascular technique. However, nationally just 40 percent of patients are screened. Patients in lower resourced and socioeconomic areas are less likely to be screened.<sup>8</sup> +




**DR. SCHNEIDER** currently is the Senior Vice President for Clinical Affairs at ACEP and adjunct professor of emergency medicine at the University of Pittsburgh.

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# Recognition and Treatment of TTP

by DR. MATTHEW TURNER, MD;  
DR. ERICA BATES, MD

A 33-year-old woman presents with confusion, abdominal pain, and fever. Her vital signs are:

- Blood pressure of 118 over 93
- Heart rate of 120
- Respiratory rate of 18

She has a history of lupus. CBC shows a thrombocytopenia of  $27 \times 10^9/L$  platelets.

What is the best management of this condition?

For six decades, the pentad of fever, thrombocytopenia, hemolytic anemia, renal injury, and neurological manifestations has remained the classic clinical diagnostic criteria for Thrombotic Thrombocytopenic Purpura (TTP).<sup>1</sup> Unfortunately, fewer than 10 percent of patients present with this constellation of symptoms. Although the treatment of TTP has improved significantly over the past 30 years, the disease still has a dangerously high mortality rate of approximately 20 percent. Most of these deaths can be attributed to a delay in diagnosis.<sup>2</sup>

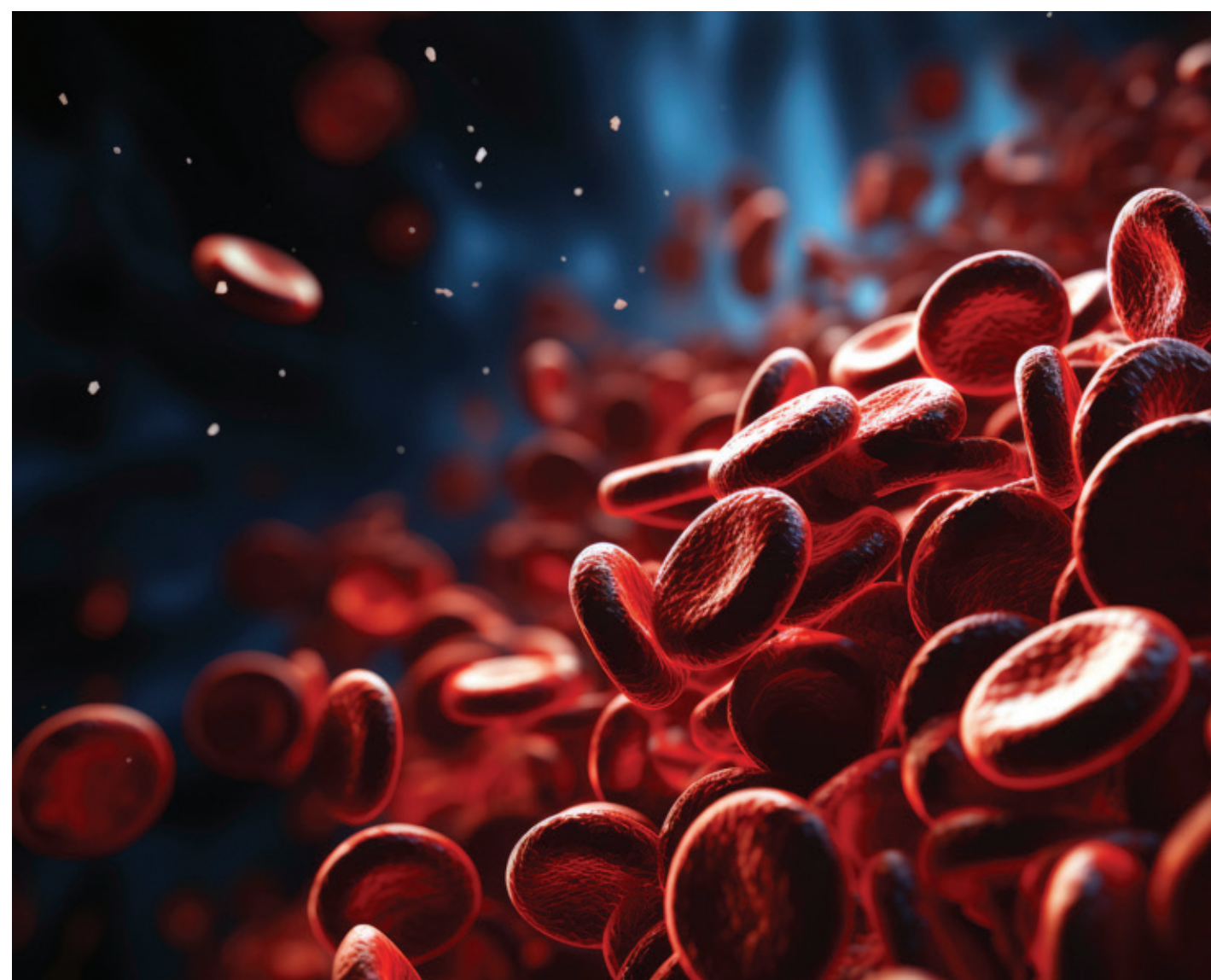
TTP often presents abruptly, and most patients that develop it first visit the emergency department (ED) as their symptoms worsen. It is thus imperative that emergency physicians be able to recognize and properly treat this disease, especially in the absence of its classical presentation.<sup>3</sup>

In TTP, patients undergo microangiopathic hemolytic anemia that leads to severe thrombocytopenia and, in severe cases, organ dysfunction. The disease may be congenital (cTTP) or immune-mediated (iTTP). The vast majority of cases are immune-mediated, with 90 percent presenting in adulthood, typically with a first incidence between 30-50 years of age.<sup>4</sup> Women have a two to three times increased risk, and African-American patients have an eight-fold increased risk compared to the general population.<sup>1</sup> Both cTTP and iTTP are caused by a deficiency in ADAMTS13, an enzyme that regulates Von Willebrand Factor (VWF) multimers. When severe ADAMTS13 deficiency—less than 10 percent—is present, there is no regulated proteolysis of VWF, directly leading to uncontrolled platelet adhesion and aggregation. In TTP, this ultimately manifests as microvascular thrombosis, endothelial damage, and organ dysfunction.<sup>1</sup> iTTP is primarily due to acquired anti-ADAMTS13 antibodies, which can be either inhibitory via neutralization of the proteolytic function of ADAMTS13 or non-inhibitory, accelerating the clearance of ADAMTS13 from the circulatory system. Even relatively small amounts of anti-ADAMTS13 autoantibodies can lead to TTP.<sup>1</sup>

Primary iTTP has no defined cause, but secondary iTTP has been associated with a number of etiologies, including pregnancy, autoimmune disorders, HIV infection, malignancy and iatrogenic medications.<sup>4</sup>

## Diagnosis

Fewer than 10 percent of patients with TTP present with the classical clinical pentad of fever, microangiopathic hemolytic anemia, thrombocytopenia, neurological deficits, and renal insufficiency.<sup>1</sup> However, many clinical features are common: more than 60 percent of patients present with a degree of neurological involvement, ranging from confusion to stroke and coma.<sup>1</sup> 35 percent of patients present with gastrointestinal symptoms secondary to ischemic microthrombi.<sup>1</sup> 25 percent of patients may pre-



STOCKADOBECOM

sent with evidence of myocardial ischemia, including abnormal ECGs and elevated troponin levels.<sup>1</sup> Laboratory testing will show significant thrombocytopenia (below  $30 \times 10^9/L$ ), in addition to markers of hemolysis such as erythrocyte fragmentation and elevated LDH.<sup>1</sup>

Pregnant patients are particularly vulnerable to misdiagnosis of TTP in the ED. One 2009 study of four tertiary hospitals found that emergency physicians often misdiagnosed this presentation in pregnant women as “panic attack, domestic violence, or gastroenteritis.”<sup>5</sup> Pregnant women comprise up to seven percent of TTP/Hemolytic Uremic Syndrome (HUS) patients. When thrombocytopenia is found in pregnant patients, clinicians should have a high degree of suspicion for TTP in addition to HELLP Syndrome, eclampsia, and HUS.<sup>5</sup>

Testing for TTP should include a CBC, CMP, blood smear, coagulation panel, fibrinogen, D-Dimer, LDH, troponin, HIV PCR, urinalysis, Coomb’s testing and ECG.<sup>4</sup> ADAMTS13 level can be considered to assist the inpatient team. In TTP, Coomb’s testing will be negative, and the coagulation panel will typically not be significantly deranged. In the long term, the mechanism of ADAMTS13 deficiency should be determined—whether due to inhibitory or non-inhibitory autoantibodies, or due to the hereditary form of the disease. The labs that assess this, such as the FRETs-VWF73-based assay, take several days to result and are best pursued in an inpatient setting.<sup>7</sup> Given the prolonged time that these labs may take to result, clinicians may consider using the PLASMIC score to aid in predicting the likelihood of TTP. One point is given for platelet count less than 30,000, presence of hemolysis, mean corpuscular volume less than 90 fL, INR less

than 1.5, creatinine less than 2.0 mg/dL, absence of cancer, and the absence of solid organ or stem cell transplant. A PLASMIC score higher than 5 suggests a high probability of TTP, with a sensitivity of approximately 99 percent and a specificity of 57 percent.<sup>6</sup>

## Management

TTP’s mortality ranges from 4 to 31 percent, but the disease is associated with multiple comorbidities, including hypertension, major depressive disorder, and cognitive abnormalities. Thus, early management is essential for patient outcomes.<sup>4</sup> Early hematology consultation should be obtained when TTP is suspected.

Therapeutic plasma exchange (TPE) with fresh frozen plasma (FFP) is the first-line treatment, by simultaneously supplying fresh ADAMTS13 and removing anti-ADAMTS13 autoantibodies. Delays in this treatment are directly correlated with increases in patient mortality.<sup>1</sup> The International Society of Thrombosis and Haemostasis also recommends corticosteroids in addition to TPE, given their possible mortality benefit.<sup>7</sup> High dose pulse steroids, such as methylprednisolone 10 mg/kg/day for 3 days, or an oral prednisone taper may be used.<sup>1</sup> Rituximab may be given as well, largely due to prevention of relapse.<sup>7</sup> Caplacizumab, a new medication that targets the A1 domain of VWF and prevents platelet aggregation has shown remarkable efficacy in improving clinical outcomes and reducing patient mortality and risk of relapse.<sup>7,8</sup> Much like TPE and steroids, earlier treatment with caplacizumab is associated with improved patient outcomes.<sup>8</sup>

One third of TTP patients will experience a relapse within 30 days of initial treatment.<sup>4</sup> Se-

rial ADAMTS13 activity should be monitored monthly for 3 months, every 3 months for 1 year, and then every 6-12 months thereafter.<sup>1</sup> +



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# Toxicology Q&A Answer

QUESTION ON PAGE 3

## ANSWER: Hot Peppers and Chilis

“How bad could it be?” was the last thought before I took a small bite of the Carolina Reaper pepper I had grown in my (toxicology-required) garden. “Am I going to die?” was the next thought as I swigged milk to extinguish the blowtorch in my mouth, mopped sweat off my forehead, tried not to retch, and rethought recent life-choices.

### The Chili Pepper

Chili peppers (*Capsicum* species; Greek *Kapto*, “to bite”) are thought to have been domesticated in central and south America in about 10,000 BCE. There are five primary species used commercially and are upright annual shrubs with dark green ovoid leaves that produce small white to yellow flowers that develop into round or elongated fruits. Because of the heat sensation they provide, they feature prominently as a key food ingredient in Latin American, African, and Asian cuisines. India and China are primary suppliers of chilies in the world.

### Taxonomy

The chili pepper plants belong to the family Solanaceae which includes the genus *Solanum* (nightshade, tomato, potato); *Nicotiana* (belladonna, jimsonweed, tobacco); and *Capsicum* (including hot peppers and bell).

### Nomenclature

The basic references to this plant are confusing and include “peppers” and “chili” (also spelled chile or chilli). Chili peppers are not actually ‘peppers’ (e.g., black pepper (*Piper nigrum*), which are berries that contain spicy piperine) but are the fruits of capsicum plants (originating from Central and South Americas and contain capsaicin). The misattribution began when they were brought back to Spain in the 15th century by Christopher Columbus from the West, and he called them ‘peppers’ because of its similar effects on his tongue and the name stuck.<sup>1</sup> Adding more confusion, some countries refer to these fruits as ‘peppers’ when they are fresh and ‘chilies’ when they are dried.

Carolina Reaper, under whose effects I was suffering, is a cultivar of (*Capsicum chinense*) and was declared in 2013 to be the hottest chili pepper in the world with greater than 1.6 million Scoville units. It was developed by Ed Currie (founder of Puckerbutt Pepper Co.), who considers hot pepper cultivation one of his life’s goals and a factor in his sobriety from a substance use disorder—in part because of capsaicin’s induction of endorphin release.

### Toxin

Chili peppers’ pungency (spicy heat) when ingested or applied topically is due to capsaicin (8-methyl-N-vanillyl-6-nonenamide, (C<sub>18</sub>H<sub>27</sub>NO<sub>3</sub>)) and several related chemicals, as a group called capsaicinoids. Humans perceive each capsaicinoid differently. Nordihydrocapsaicin’s sensation is described as “warm” and “least irritating,” which recedes rapidly; capsaicin and dihydrocapsaicin are described as “irritating,” and produce heat in the mouth, palate, and throat; and homodihydrocapsaicin is described as very “irritating,



The Carolina Reaper pepper I grew in my garden.

### HOW HOT?

Wilbur Lincoln Scoville (1865–1942) created the “Scoville Organoleptic Test” or Scoville scale to measure degree of ‘hot’ in chili peppers in 1912. It used five human test subjects who tasted hot pepper extracts sequentially diluted with sugar water to determine when the spiciness disappeared—the hotter the pepper yields, a larger volume dilution needed and accordingly higher Scoville heat units.

Today, high-performance liquid chromatography is used to more accurately determine capsaicinoid concentration.

harsh, and very sharp,” affecting the back of the mouth and throat which comes on slowly and lasts a long time. Combinations of these toxins produce different heat profiles of different chilis.<sup>2</sup>

The concentration of these chemicals determines degree of the sensation and depends not only on the kind of chili, but on other factors including what part of the fruit you eat—the hottest part is the placenta (white part in the middle), followed by the flesh (exocarp, mesocarp, endocarp) and the seeds; fruit maturity and water content of the chili also affect pungency (unripe—dried).

In nature, the capsaicin is primarily used by the plant for defense to inhibit herbivorous mammals from eating it—the spice does not affect birds who eat the fruit and spread the seeds.

### Mechanism of Action

Capsaicinoids are irritants and inflammatory molecules that interact with transient receptor potential vanilloid 1 (TRPV1) that reside on the ends of nociceptive A-delta and C- sensory fibers. These receptors are activated by capsaicinoids, noxious heat (greater than 109.4 degrees Fahrenheit), caustics (low pH), and voltage—causing a Ca<sup>++</sup> and Na<sup>+</sup> action potential influx that confers the sensation of pain and burning to the brain. They are found in large numbers in the mouth, throat, and stomach, as well as throughout the body.<sup>3</sup>

### Sensation, Not Taste

Capsaicin and the capsaicinoids are not detected by our taste buds and have no flavor—not salt, bitter, sweet, sour, or umami. They create a chemesthesis stimulus we interpret as “spiciness,” which is a multimodal somat-

ic sensation (not just taste, olfaction, pain, temperature, or itch). The resultant “heat” we feel after exposure is not thermally hot (a thermometer in my scorched mouth would read normal), but a result of the cross-stimulation of these vanilloid molecules binding to a thermal receptor—the sensory experience transmitted centrally is interpreted as ‘burning.’<sup>4</sup>

Despite not being a taste, a five part standardized lexicon for chili pepper hotness exists:<sup>1</sup>

- Development (how fast it comes on)
- Duration (how long the burn lasts)
- Location (where in mouth/throat)
- Feeling (“sharp” vs. “flat” heat)
- Intensity (analytically measured heat level)

Capsaicin has a unique attribute among natural irritants—the excitation it evokes is followed by a period of decline or cessation in sensory transmission (called defunctionalization) for a variety of other stimuli. This attribute is exploited by frequent eaters of spicy foods (they don’t feel it as much as novices), and pharmaceutical products.<sup>5</sup>

### Human Effects

The human response to capsaicin exposure ranges from enhancing food enjoyment to uncomfortable to unbearable depending on the dose of exposure and resultant receptor agonism. Oral exposure creates a spicy burning sensation (or pungency) in the mouth that can extend to the throat and stomach (and eventually the rectum—“*fire tuchus*”). This is frequently accompanied by diaphoresis, facial flushing, lacrimation, and rhinorrhea. Higher dose exposures to the irritant can result in nausea, vomiting, chest, and abdominal pain.

Topical exposures to the skin can cause



Close-up of the Carolina Reaper pepper.

burning sensation, erythema, and transient numbness; high dose exposure to the hands while cooking has a well-described syndrome of ‘Hunan hand’ which presents with severe pain in the fingers after chopping chili peppers.<sup>6</sup> Inadvertent exposure to the eyes can result in severe pain, lacrimation, visual blurring, conjunctival injection, lid swelling; corneal injuries are possible.

Capsaicin pepper exposures send about 300-350 people to the hospital annually.<sup>7</sup> Boerhaave syndrome was described in a 47-year-old man after eating ghost pepper.<sup>8</sup> Seizures and thunderclap headache from reversible cerebral vasoconstriction syndrome have been reported.<sup>8,9</sup> There is one case of a 17-year-old who died from acute cerebellar stroke after participating in the “One Chip Challenge” (eating a capsaicin infused food chip as a game) that prompted Hershey Co. to recall the product.<sup>11</sup> Pepper spray (oleoresin capsicum) is also used by law enforcement (and others) as non-lethal means of defense and results in about 600 hospital visits annually after exposure with eyes being most common site of injury.<sup>7,12</sup>

### Medical Uses of Capsaicin

It is used primarily for control pain with application of capsaicin containing compounds. The purported effect is an overstimulation of the pain fibers that eventually become transiently unresponsive. Capsaicin is used in alternative or adjunctive medicine for many maladies including—Topically: uremic pruritus, post-herpetic neuralgia, osteoarthritis pain, cannabinoid induced hyperemesis; intravesical instillation: overactive bladder syndrome; intranasal capsaicin spray for rhinitis; oral rinses for burning mouth syndrome, among others.<sup>13</sup>





Cross-section of the Carolina Reaper pepper.



A Jalapeno pepper.



A Habanero pepper.

Antidote

Treatment is generally supportive with copious irrigation for dilution as a mainstay. For ingestions there are many suggested techniques to assist with severe burning oral and throat pain. Effective agents include: milk and dairy products, which contain casein that works to breaks down capsaicin (found in whole, skim milk, ice cream), high sugar drinks (Kool Aid), and cooling the mouth with cold drink or ice.

Topical exposures (pepper sprays, etc.) should be washed off the face using copious water (adding mild dish detergent may help). Ocular exposures are managed with contact lens removal and application of topical anesthetic, flushing eyes with water or saline for at least 15 minutes. Referral for ophthalmology for patients with signs of corneal damage. The airway should be evaluated for bronchospasm and swelling, with supplementary oxygen or inhaled bronchodilators given if necessary.

After experiencing a burning mouth (that interestingly felt worse when I exhaled and improved when I inhaled), drenching scalp sweat, rhinorrhea, forearm piloerection, that lasted for about one hour, the sensation began to abate. Using the proposed lexicon, I would rate the experience as follows:

- Development: 8 seconds of peace before agony arrived
- Duration: 45-60 minutes
- Location: it was unescapably everywhere
- Feeling: very very sharp heat
- Intensity: the hottest pepper in the world—I agree. +



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# ACEP Rejects “Excited Delirium”

## The College performs a cognitive autopsy on a controversial term

by CARMEN LEE, MD, MAS

By late 1988, 11 Black women had been found dead in the same area of Miami with low levels of cocaine in their blood. Forensic pathologist Dr. Charles Wetli of the University of Miami had conducted autopsies that he said, “conclusively showed that they have not been murdered.”<sup>1,2</sup> He attributed their deaths to a female-specific manifestation of the mysterious phenomenon he had identified in men who had also died after consuming less-than-lethal amounts of cocaine. Antoinette Burns was the twelfth victim, a 14-year-old girl without any evidence of cocaine consumption at all. At the urging of her family and later the police, these autopsies were reexamined and eventually reclassified as homicides attributed to a single serial killer, responsible for as many as 32 murders in the area.<sup>3,4</sup>

Dr. Wetli was referring to his and a colleague’s publication of a case report, in 1981, and a seven-case series in 1985 describing the novel “excited delirium syndrome” in individuals under the influence of cocaine, “a medical emergency but with a psychiatric presentation.”<sup>5,6</sup> Of the seven, all had been restrained, six by police, and four had been hog-tied or hobbled in a prone position. All seven had died without an “anatomic cause of death,” leaving the reader to infer that the cause had been delirium itself.

It was shortly after these case series that Dr. Wetli, serving as deputy chief medical examiner in Miami, first began attributing the deaths of sex workers to excited delirium in 1986. “For some reason the male of the species becomes psychotic and the female of the species dies in relation to sex” after using cocaine, he said in an interview in the *Miami Herald* at the time, and speculated that this could be due to genetic traits that were more common in certain populations.<sup>7</sup>

In the decades since, excited delirium has come to be a frequently-cited cause of death for individuals dying in custody or during altercations with law enforcement. This is despite never being identified by a formal diagnostic framework, such as the diagnostic and statistical manual of mental disorders (DSM) or the international classification of diseases (ICD), as a valid diagnostic entity.

In 2009, the Excited Delirium Task Force convened by an ACEP Council resolution authored a white paper that endorsed the existence of excited delirium syndrome and made recommendations for identifying and managing it clinically.<sup>8,9</sup> According to Dr. Fabrice Czarnecki, one of the members of the original task force, the use of a term borrowed from law enforcement was deliberate. “Excited delirium is a term that has been with the cops for 40 or 50 years,” he said. “My goal in joining the working group was, we don’t want people to die in the street. I personally don’t want people to



die in police custody. I want to be involved in training cops to recognize the signs of a medical emergency.”

In a comprehensive review of the history of this term, Bhatia, et al. writing for the advocacy organization Physicians for Human Rights note that “there is no clear or consistent definition, established etiology, or known underlying pathophysiology.”<sup>12</sup> They also summarize literature showing that it was identified as the cause of death in over one out of every six deaths in police custody in Texas, that 62 percent of deaths attributed to excited delirium in Florida involved the use of force by law enforcement, and that from the period 2010-2020, deaths in custody attributed to excited delirium were predominantly made up of people of color.

In October 2023, the ACEP Council and the Board of Directors issued statements withdrawing support for the 2009 white paper and affirming that that the term “excited delirium should not be used among the wider medical and public health community, law enforcement organizations, and ACEP members acting as expert witnesses testifying in relevant civil or criminal litigation.”<sup>10</sup> This shift followed publication of a new 2021 position paper adopted by the Council and authored by a new task force convened to reexamine the issue. This more recent work uses the DSM-derived “hyperactive delirium with severe agitation” to highlight that patients with a variety of underlying causes of

delirium may be “at high risk of direct physical trauma, not only unintentional harm from trauma such as falls, but also the metabolic stress that may result from physical restraint that may be required to facilitate the safety of the patient, bystanders, and responding professionals.”<sup>11</sup>

ACEP followed several other professional organizations in revoking formal support for “excited delirium,” including the National Association of Medical Examiners<sup>12</sup> and the American College of Medical Toxicology.<sup>13</sup> To examine the death of Elijah McClain, in which excited delirium was ruled as the cause of death and in which two paramedics and a police officer have been convicted of homicide, the Colorado Department of Public Health and the Environment appointed an independent review committee on emergency use of ketamine.<sup>14</sup> In recommending the rejection of excited delirium as a diagnosis, they identified the lack of clear criteria and the biased racial associations with some of the features often attributed to the syndrome, such as “hyper aggression,” “increased strength,” and “police noncompliance.”<sup>15</sup>

In refocusing on the clinical relevance of hyperactive delirium as a secondary syndrome with underlying primary causes, the 2021 ACEP position paper also walked away from its use as a postmortem diagnostic entity.<sup>11</sup> “The 2021 report strives to highlight that ‘excited delirium with severe agitation’ is not a diagnosis in the living or the deceased,” ex-

plained Dr. Jeffrey Goodloe, who serves as an EMS Chief Medical Officer, ACEP Board member, and one of the authors of this recent work. “The terminology change is very purposeful to get everyone focused on the medical needs of these patients and not trapped in debates about older semantics. It’s important that we focus quickly and intently on stabilizing these patients, especially in the out of hospital environment, so that we can safely get them to an emergency department.”

This move is a recognition that “excited delirium,” as a syndrome whose description originated in forensics and law enforcement and never achieved clear diagnostic criteria, may have been a flawed guideline for clinical decision-making. Refocusing on the widely recognized diagnostic entity of hyperactive delirium may be an important way to restate the relevance of these symptoms in guiding law enforcement and clinical interventions on behalf of the patient.

Another author of the 2009 white paper, who spoke with *ACEP Now* on the condition of anonymity due to ongoing work in the carceral health community, confirmed that communicating with law enforcement about the safety of these patients was a primary motivator of the original work. “The White Paper was never intended to somehow justify in-custody deaths but rather to confirm that there was risk for these individuals and to increase awareness of the vulnerability of this population.”



Despite attempted outreach to each member of the 2009 task force, only Dr. Czarnecki agreed to speak on the record, with several citing the controversy with which their work is now viewed. “Do I think it was successful? No,” Dr. Czarnecki reflected when asked about his goal of improving safety for delirious patients in contact with law enforcement. “The case that always bothers me is that of George Floyd. Look at the loss of life and all the consequences. If the cops had just heard him say he was short of breath, and had responded to that and had just sat him up, called an ambulance and sat him up, you and I would never have heard of the case.”

The expansion of excited delirium from a description of behaviors into a cause of death also raises questions about the role of scientific review. Much of the evidence cited in the white paper and in subsequent literature establishing the diagnosis of excited delirium and exploring its pathology came from only a few individual authors, many of them also authors of the 2009 white paper.<sup>9,16</sup> For example, in a 2011 review article looking at the evidence for excited delirium, 34 percent of the citations were authored by at least one of the excited delirium task force members or Dr. Wetli himself.<sup>17</sup>

There continues to be ongoing controversy over whether and to what extent positional asphyxia offers an alternate explanation for many of the deaths attributed to excited delirium. Small physiologic studies, involving healthy volunteers not in a state of physical or emotional agitation, have provided limited evidence both for and against hemodynamic

changes that could contribute to death in a prone or restrained position.<sup>18-21</sup>

In a recent systematic review, Strömmer, et al.<sup>22</sup> systematically identified arguably all 168 cases of either excited delirium or agitated delirium described in the literature. Sixty-two percent of these were fatal, and the authors found that a diagnosis of excited delirium was nearly 10 times as likely to be applied in cases that were fatalities and nearly five times as likely in those that involved aggressive restraint such as hobbling and physical force. Aggressive restraint was itself also strongly associated with fatality (OR 7.4). Given that this review included most, if not all, of the evidence used previously to justify excited delirium as a fatal clinical entity, the authors conclude that “there is no evidence to support [excited delirium] as a cause of death in the absence of restraint.” With restraints employed in 90 percent of deaths where these diagnoses were applied, “when death has occurred in an aggressively restrained individual who fits the profile ... restraint-related asphyxia must be considered as a cause of the death.”

The 2023 ACEP statement reiterates that there are valid concerns related to hyperactivity and delirium in the setting of emergency assessment and treatment. It also recognizes that these concerns affect not just emergency physicians but many important partners in these settings, including first responders and law enforcement. The complex history of the terminology used to identify and respond to these agitated patients illustrates the power of ACEP to shape national dialogue. This organizational shift represents an opportunity

to reflect on the real-world consequences of that influence, and on the responsibility that comes with it. +

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# Bougie: First Pass or Rescue Device?

## Role of the bougie in airway management

by CATHERINE A. MARCO, MD, FACEP

**A** 68-year-old man presents to the emergency department (ED) with altered mental status and fever. Vital signs on arrival are:

- Temperature: 38.8 degrees celcius
- Heart rate: 128
- Blood pressure: 74 over 48
- Respiratory rate: 10
- Oxygen saturation: 77 percent

Physical examination was notable for lethargy and confusion. He has an absent gag reflex. He has a Class I Mallampati view and lung sounds were diminished in all fields.

### How Should His Airway Be Managed?

A study in the February issue of *Annals* conducted a meta-analysis of 18 studies and concluded that bougie use was associated with increased first-attempt intubation success.<sup>1</sup> The highest point estimate favoring the use of a bougie was in the subgroup of patients with Cormack-Lehane grade III or IV (only epiglottis seen or neither glottis or epiglottis seen on direct laryngoscopy). The authors conclude, “despite the certainty of evidence being low, these data suggest that a bougie should probably be used first and not as a rescue device.”

### Is the Evidence from This Research Sufficient to Change Practice?

Some important limitations of this analysis should be recognized. The 18 studies represent a diverse group of patients and study design; 12 of the studies were randomized controlled trials. There was no analysis of operator experience or expertise. Only 60 percent of subjects underwent direct laryngoscopy, the only technique to which the Cormack-Lehane CL classification technically applies. The study found a mean increase in time to intubation of 13 seconds in the ED setting. Finally, the authors note that intubation-related injuries may be more common in those intubated with a bougie. These limitations are sufficient to question the recommendation to use a bougie as first line airway management.

For patients requiring emergency airway management, the use of a bougie is an impor-



tant technique. Previous studies have demonstrated the success rate of using a bougie; however, there are conflicting reports about its success as a first pass technique. Most patients (95 percent) have a CL grade 1 or 2a view, and will likely be a successful first pass intubation.<sup>2</sup> A study published in *JAMA* in 2018 found that among patients with a difficult airway characteristic, bougie use resulted in higher first attempt intubation success (96 percent), compared to endotracheal tube with stylet (82 percent).<sup>3</sup> Other studies have found that bougie use does not improve first attempt success rate.<sup>4,5</sup> A recent study found that among 1102 critically ill adults, successful intubation on the first attempt was 80.4 percent with use of a bougie and 83.0 percent with use of an endotracheal tube with stylet, a difference that was not statistically significant.<sup>6</sup> A study found that if a difficult airway is anticipated and a hyperangulated video laryngoscope is used, the first attempt success rate is higher when a bougie is used, compared with stylet.<sup>7</sup> How then do we interpret these conflicting reports in the literature?

Use of a bougie has several important advantages, including improved visibility compared to ETT without bougie, and tactile

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confirmation of endotracheal placement.<sup>7</sup> However, the bougie should not be used as a substitute for proper laryngoscopy technique.

As with any procedural device, operator expertise is an important component of its successful use. Some argue that bougie should be used routinely to improve success rate. Others argue that routine use may subject patients to unnecessary airway trauma or intubation delays. Ultimately, the existing literature does not yet provide a clear resolution to this question.

### Case Resolution

For this case, endotracheal intubation is indicated. In the setting of normal anatomy with Mallampati Class I view, intubation with video

laryngoscopy is appropriate. If the Cormack-Lehane classification is unexpectedly III or IV, the use of a bougie may be appropriate to facilitate endotracheal intubation. Having a bougie readily available with the usual airway equipment may expedite airway management.

### Disclaimer

This is not an exhaustive review of airway management, but a commentary on a recent article published in *Annals of Emergency Medicine*. Readers should consult authoritative sources for in depth recommendations for airway management. +

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