New York American College of Emergency Physicians

Empire State EPIC

PRESIDENT'S MESSAGE

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Chief Medical Officer
Staten Island University Hospital

Simply the Best

As 2022 rolled out, and 2023 moved in I was regularly reminded that you, the Emergency Physicians of New York, are simply amazing. You deserve a standing ovation for enduring so much in 2022. Emergency departments (EDs) throughout the state faced increased violence, staffing shortages, supply chain disruptions, medication shortages, unprecedented boarding, threats to the physician led team and burn-out. Many of these issues coalesced in our EDs in early 2023 amid the "tripledemic".

I recall watching the influenza cases rise in Australia back in the spring and mentally preparing for a now realized, unparalleled flu season here in the US. As the months passed and we entered the fall, enterovirus and rhinovirus activity was wreaking havoc in children, followed by RSV and flu, driving us into the tripledemic. It was of no help that rates of COVID remained persistently elevated throughout the state.

Like many, I listened to podcasts, read articles and waited with bated breath for experts to provide solutions to manage this chaos. Yet, no silver bullet was offered and we adjusted to another new normal. At the same time, I feel empowered by the post-pandemic ED, for we can take on any challenge with our enhanced nimbleness and ability to accommodate the needs of our evolving patient care paradigm.

Lessons learned from 2020 and 2021 stay with me. I have my surge plans at the ready. But it is a lot to ask of us to bob and weave with every punch. But we do. Emergency physicians are amazing in this willingness and desire to engage with whatever comes their way. This deserves special acknowledgement. You all show up and do what must be done. You prove over and again you are the safety net that protects our communities.

It is for these reasons that baseless threats to our specialty infuriate me. If ever there was an honorable, evidence-based specialty it is emergency medicine. Spreading misinformation about the safety of emergency care is dangerous and the potential deleterious consequences of eroding trust in the system that protects our most vulnerable populations 24/7/365 is unconscionable. So let it be said that New York ACEP stands proudly with National ACEP in pushing back against the AHRQ's flawed data and speaking to the harm that this their misguided decision could generate. And New York ACEP stands with you over your frustration felt during this difficult time.

The resilience an EM physician must assume to navigate their daily environment is unprecedented and we must take care of ourselves and each other. Wellness and self-care are essential. I leave you with these resources to help tackle the difficult times. Remember to take care of yourselves. You are heroes and we can't do it without you!

https://www.nyacep.org/practice-resources-2/resources/wellness
https://www.acep.org/life-as-a-physician/wellness/
https://www.mssny.org/learn/physician-wellness-library/

New York
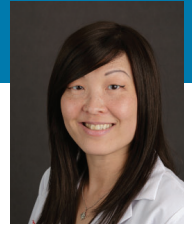AMERICAN COLLEGE OF
EMERGENCY PHYSICIANS

Scientific Assembly
July 11-13, 2023

**Sagamore Resort
on Lake George**

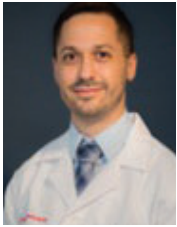Register online at
www.nyacep.org

SOUND ROUNDS

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First Trimester Live Intrauterine Pregnancy or Impending Decompensation?

Case: A 36-year-old female G5 P2022 at seven weeks six days gestation by last menstrual period with no other contributory past medical history presented to the emergency department (ED) with one day of vaginal spotting and mild pelvic discomfort. The patient had a positive home pregnancy test yesterday accompanied by light vaginal spotting but no brisk bleeding. Review of systems was significant for nausea without vomiting. There was no severe pain, diarrhea, constipation, blood in stool, dysuria, hematuria or new vaginal discharge. Obstetric history was significant for two normal spontaneous vaginal deliveries and two spontaneous abortions.

On exam, the patient appeared comfortable and in no acute distress. Her vital signs were BP 115/70, HR 94, RR 19, temperature of 36.3 ℃, and SpO2 of 98% on room air. Her abdominal exam revealed mild focal suprapubic tenderness to palpation. Her pelvic exam demonstrated a closed cervical os and no active vaginal bleeding.

A point-of-care transabdominal pelvic ultrasound was performed by the emergency physician to evaluate for an intrauterine pregnancy (Figure 1). The point-of-care ultrasound (POCUS) did not reveal an intrauterine (IUP), but an eccentric interstitial ectopic pregnancy. No free fluid was visualized in the pelvis at that time. Obstetrics was consulted and confirmed the interstitial ectopic pregnancy. The patient subsequently underwent emergent laparoscopy with right salpingectomy of the interstitial ectopic pregnancy and right cornual wedge resection. Patient's post-operative course remained uncomplicated and the patient was discharged home the same day.

Transabdominal Pelvic Ultrasound of First Trimester Pregnancy

Indications
- Abdominal pain
- Pelvic pain
- Syncope
- Vaginal bleeding

Equipment
Low frequency curvilinear transducer preferred, but phased array transducer is sufficient. In patients with little subcutaneous tissue, linear transducers may allow for better resolution of early gestational sac contents. *Refer to "Alternate Methods to Identify Early Intrauterine Pregnancy" in New York ACEP EPIC page 4 at* https://www.nyacep.org/images/EPIC/35-03-18.pdf *for additional details.*

Technique
Place the patient in a supine position. If possible, have the patient remain with a full bladder to improve ease of visualization and anatomic landmarks. Using appropriate draping, place the transducer in a transverse orientation with the transducer marker to the patient's right side. Fan or slide the transducer superior and inferior in the transverse orientation to evaluate the entire uterus, noting the location of the endometrial stripe. Next, refocus the field of view to evaluate the ovaries and the adnexa to assess for masses. Visualize the uterus in the sagittal plane, with the transducer marker towards the patient's head, fanning or sliding from left to right to evaluate the entire uterus. If visible, follow the fallopian tubes to evaluate each ovary in two planes. It may be difficult to visualize ovaries transabdominally, depending on the presence of bowel gas or the patient's body habitus.

IUP identification
IUP requires the presence of a gestational sac containing a yolk sac and/or fetal pole within the uterus.[1] Note any eccentricity in location of gestational sac relative to the endometrial stripe of the uterus. Measure the thinnest segment of endomyometrial mantle perpendicular relative to the gestational sac.[1]

Discussion
Ectopic pregnancy may present with a wide array of symptoms and chief concerns including vaginal bleeding, pelvic pain, lightheadedness or syncope. In the POCUS evaluation of first trimester pregnancy, in addition to assessing for the presence of an IUP, providers should be noting whether abdominal/pelvic free fluid is present. While trace pelvic free fluid can be physiologic in early pregnancy, more than 2-4 millimeters of free fluid[2] in the context of pelvic pain or vital sign abnormalities such as tachycardia or hypotension is highly suspicious for ruptured ectopic pregnancy. Significant free fluid in the context of non-visualized IUP warrants emergent obstetric consultation.[3,4,5,6] When ectopic pregnancies rupture, they can rapidly lead to intra-abdominal hemorrhage and hemorrhagic shock, requiring emergent operative intervention.[3] For these reasons, ectopic pregnancy represents a "cannot miss" diagnosis in the ED.

SOUND ROUNDS

Table 1 Ectopic Pregnancy Locations[12,13]

Ectopic Location	Frequency	Definition	US Considerations
Tubal: Isthmic Ampullary Fimbrial	93% 12% 70% 11%	Vast majority of ectopic pregnancies located at any point along the fallopian tube	May not be visualized with transabdominal scan depending on adnexal location
Interstitial	2-3%	Uncommon site located at the junction of the tube and the endometrium but not fully enclosed in the uterus	Measure the endomyometrial mantle and note eccentric location
Ovarian	3%	Implantation in ovary	May not be visualized with transabdominal scan depending on adnexal location
Abdominal	1%	Implantation anywhere in the abdominal cavity except the uterus or adnexa	May not be visualized at all depending on implantation location
Intramural	<1%	Implantation encapsulated within the myometrium	Exceedingly uncommon, requires specialist evaluation
Cesarian Scar	<1%	Implantation within scar tissue from Cesarian Section from prior pregnancy	Exceedingly uncommon, requires specialist evaluation
Cervical	<1%	Implantation inside endocervical canal	Exceedingly uncommon, requires specialist evaluation

Abbreviations: Ultrasound (US)

SOUND ROUNDS
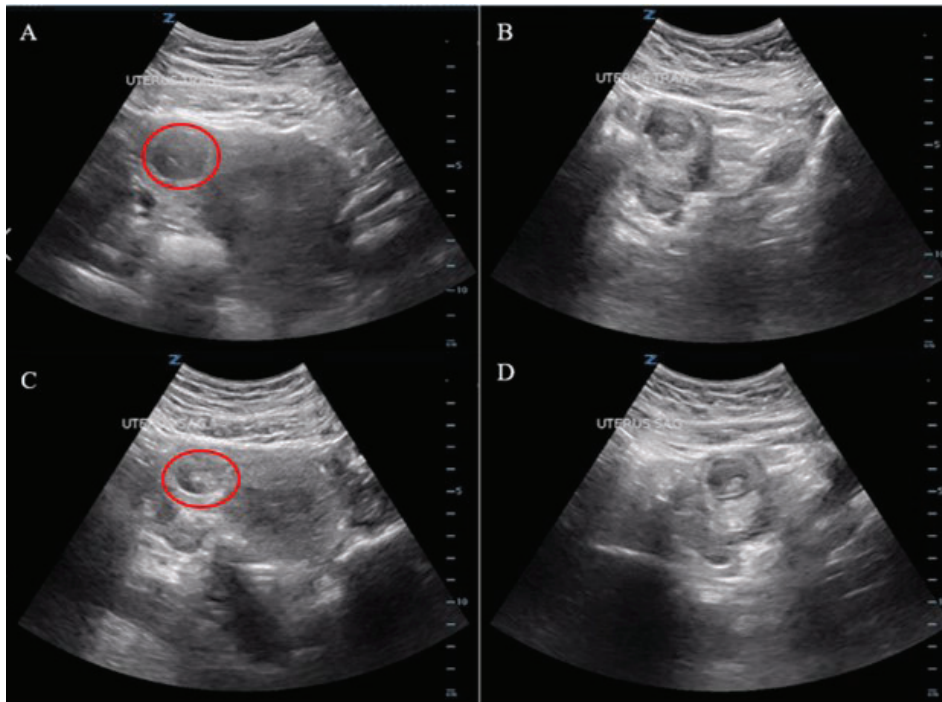
Figures 1A-1D. Transabdominal POCUS of Patient Case. Figures 1A and *1B* demonstrate two transverse views of the uterus and *Figures 1C* and *1D* show two sagittal views. *Figures 1A* and *1C* demonstrate the eccentric location of the gestation sac (red circle), and *Figures 1B* and *1D* show the greatest definition of the thin endomyometrial mantle, clearly less than 5mm.
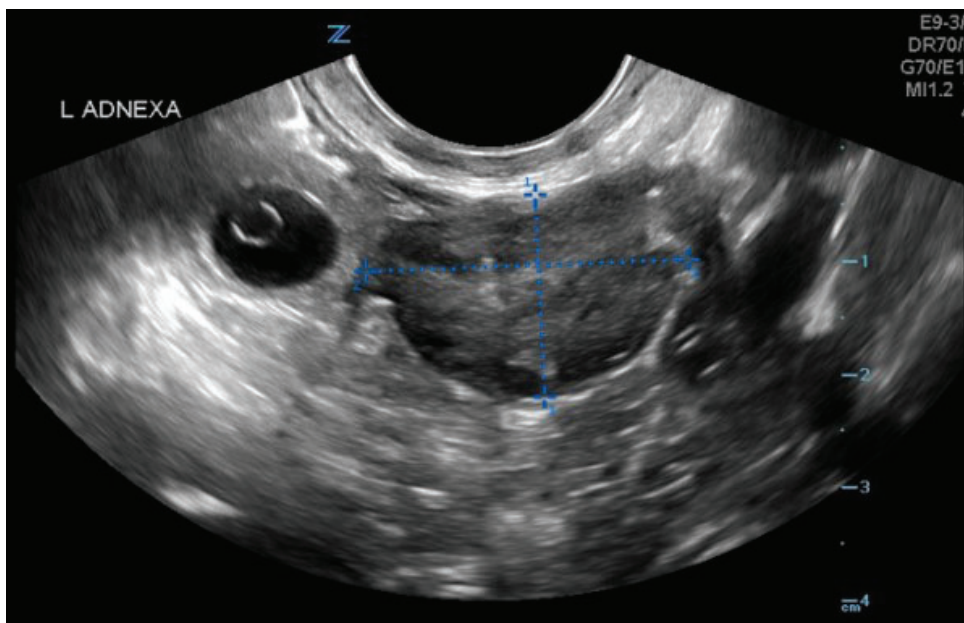

Figure 2. Endocavitary Ultrasound of a Tubal Ectopic Pregnancy. Note the adjacent ovary with short and long axis dimensions (dotted blue lines).

The most common type of ectopic pregnancy are tubal ectopic pregnancies (Table 1). A "tubal ring" sign may be visualized in the class tubal ectopic as an echogenic rim surrounding the hypoechoic gestational sac located in the adnexa (Figure 2). When color Doppler is placed on the "tubal ring," one will see the "ring of fire," referring to the increased vascular flow of the gestational sac embedded in the adnexa (Figure 3).[4]

The location of ectopic pregnancy as well as gestational duration are both important prognostic factors in determining likelihood of rupture as well as morbidity and mortality of the potential rupture.[5,7] Interstitial ectopic pregnancies are of particular concern because they can mimic intrauterine pregnancy leading to delay of diagnosis and increased risk of rupture and hemorrhage. Interstitial ectopic pregnancies occur when implantation occurs at the junction of fallopian tube and the uterus called the interstitium. Since the gestational sac is still partially enveloped by endometrium and myometrium, it can initially look like an IUP.[8] Due to the high vascularity of the interstitium, rupture of an ectopic pregnancy in this location is associated with high morbidity and mortality.[7,8]

To avoid missing interstitial ectopic pregnancies, a scoping review by Lewiss et al (2014) suggests looking for an eccentric location of the gestational sac and measurement of the endomyometrial mantle (EMM). Per the American College of Emergency Physicians (ACEP) Emergency Ultrasound Imaging Criteria Compendium, if a pregnancy is located less than five millimeters (mm) from the edge of the myometrium (myometrial mantle distance), it is highly suspicious for an interstitial ectopic. A location of less than 7mm from the edge of the myometrium is still considered suspicious and emergent obstetric evaluation should still be considered; however, there is still debate amongst experts about the upper limit of slightly suspicious distance.

One additional differential is a cornual pregnancy from an interstitial ectopic pregnancy. A cornual pregnancy is defined as an intrauterine pregnancy implanted in the upper portions of an anatomically variant uterus such as a horned, bicornate or septated uterus.[7,10,11] Given the location of implantation and uterine anatomic variance, they may mimic the eccentric location of
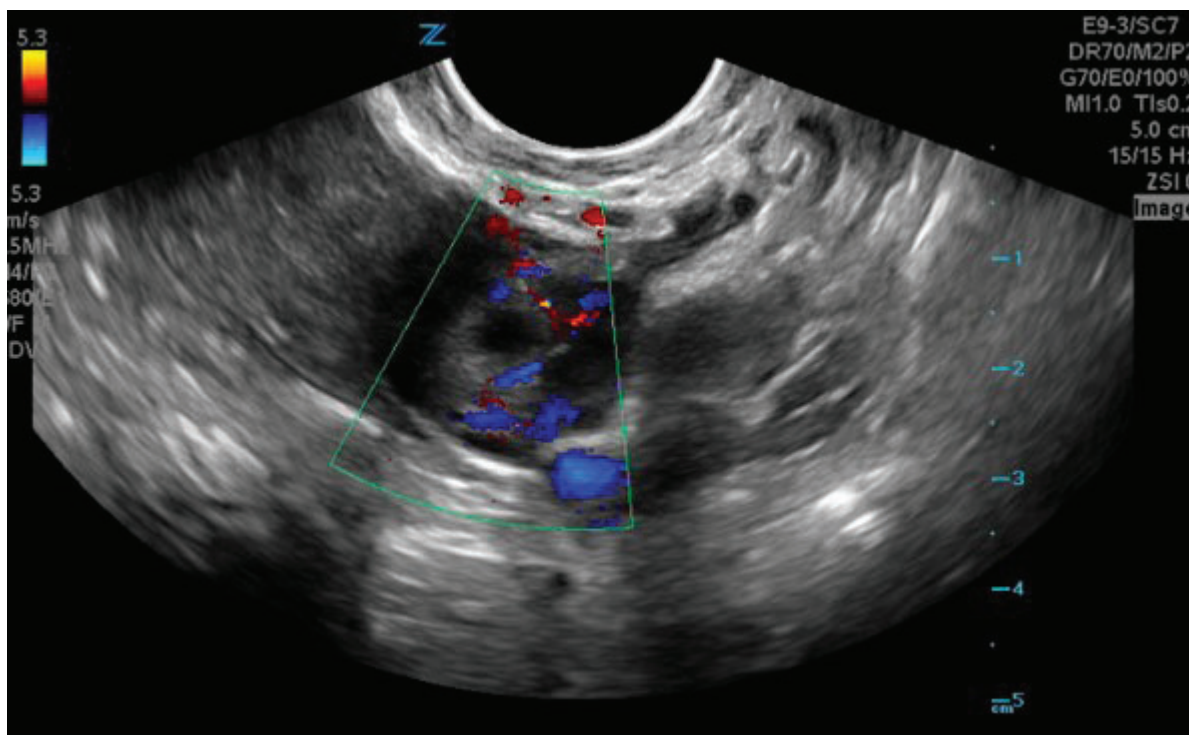
Figure 3. "Ring of Fire" sign. Note the increased vascular flow visualized with color Doppler of the gestational sac.

the gestational sac within the myometrium and may appear quite similar to an interstitial ectopic pregnancy. Much of the literature also uses the two terms interchangeably, but they have notably different prognoses and management. While cornual pregnancies have slightly higher risk of pregnancy complications, they are not considered ectopic and may develop to full term and deliver without complication.[7,10,11] It is therefore vital the two be differentiated while counseling the patient on management and obstetrics involvement.

In the patient case described above, bedside transabdominal POCUS was used to identify an eccentric peri-uterine location with an endomyometrial mantle distance visualized as clearly less than 5mm. Prompt obstetric consultation for the interstitial ectopic allowed for expedited management prior to rupture and allowed for an uncomplicated course and optimal prognosis.

References

1. Noble, V., & Nelson, B. First trimester ultrasound. In: Manual of Emergency and Critical Care Ultrasound (pp. 91-114). Cambridge: Cambridge University Press. 2011. doi:10.1017/CBO9780511734281.005

2. Hussain ZJ, Figueroa R, Budorick NE. How much free fluid can a pregnant patient have? Assessment of pelvic free fluid in pregnant patients without antecedent trauma. J Trauma. 2011;70(6):1420-1423. doi:10.1097/TA.0b013e3181edc4fe

3. Heaton HA. Ectopic Pregnancy and Emergencies in the First 20 Weeks of Pregnancy. In: Tintinalli JE, Ma O, Yealy DM, Meckler GD, Stapczynski J, Cline DM, Thomas SH. eds. Tintinalli›s Emergency Medicine: A Comprehensive Study Guide, 9e. McGraw Hill; 2020.

4. Wang, RC. Knight, RS. Practical Guide to Emergency Ultrasound, 2e. Chapter 15: First Trimester Pregnancy.

5. Levine D. Ectopic Pregnancy. Radiology. 2007;245(2):385-97. doi:10.1148/radiol.2452061031

6. Durham B, Lane B, Burbridge L, et al. Pelvic ultrasound performed by emergency physicians for the detection of ectopic pregnancy in complicated first-trimester pregnancies. Ann Emerg Med. 1997;29(3):338–347.

7. Lewiss RE, Shaukat NM, Saul T. The endomyometrial thickness measurement for abnormal implantation evaluation by pelvic sonography. J Ultrasound Med. 2014 Jul;33(7):1143-6. doi: 10.7863/ultra.33.7.1143. PMID: 24958399.

8. Moawad NS, Mahajan ST, Moniz MH, Taylor SE, Hurd WW. Current diagnosis and treatment of interstitial pregnancy. Am J Obstet Gynecol 2010; 202:15–29.

9. American College of Emergency Physicians. Emergency ultrasound imaging criteria compendium. American College of Emergency Physicians. Ann Emerg Med. 2006 Oct;48(4):487-510. doi: 10.1016/j.annemergmed.2006.07.946. PMID: 16997700.

10. Malinowski A, Bates SK. Semantics and pitfalls in the diagnosis of cornual/interstitial pregnancy. Fertil Steril 2006; 86:1764.e11–1764.e14.

11. Ash A, Ko P, Dewar C, Raio C. Eccentrically located intrauterine pregnancy misdiagnosed as interstitial ectopic pregnancy. Ann Emerg Med 2010; 56:684–686.

12. Bouyer J, Coste J, Fernandez H, Pouly JL, Job-Spira N. Sites of ectopic pregnancy: a 10 year population-based study of 1800 cases. Hum Reprod. 2002 Dec;17(12):3224-30. doi: 10.1093/humrep/17.12.3224. PMID: 12456628.

13. Cunningham, F. Gary, et al. Williams Obstetrics (23rd Edition), McGraw-Hill Professional Publishing, 2010. ProQuest Ebook Central.

PRACTICE MANAGEMENT

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To Start, What is a "Supply Chain"?

Thank you to Dr. John D'Angelo, Senior Vice President, Regional Executive Director & Chief, Integrated Operations at Northwell Health and Dr. Jeffrey Rabrich, Senior Vice President, ENVISION Health Services for their discussions and contributions to this piece.

John K. D'Angelo, MD FACEP

Jeffrey S. Rabrich, DO FACEP FAEMS

I have heard the words "supply chain" used more often over the past three years than I did cumulatively over the past thirty years. The onset of the COVID-19 pandemic and the subsequent surges and recovery periods have brought to the forefront numerous opportunities that exist in every aspect of society and in our most basic needs: shelter, food and health.

A supply chain is a network of individuals, organizations, resources, activities and technology that lead to the creation, sale and distribution of a product to an end user.

While we know that a shortage of people (workers/staff) available to produce goods/services is intimately linked to this, I will not be peeking into that Pandora's box, as it could take a book rather than a two-page article.

Access to medical care is a key part of maintaining health. Dr. John D'Angelo says that 'providing medical care requires people, space and everything else. That everything else is the supply chain.'

Supply shortages or modifications affect Emergency Medicine (EM) more significantly than any other specialty. The need for acute hospitalization often begins with care initiated in the Emergency Department (ED) regardless of the specific specialty that will continue that care. While specific product shortages such as IV contrast, chest tubes or medications may affect radiology, trauma surgery or cardiology, any and all of these items will affect the care provided by EM.

Some of shortages we have encountered over the past three years include personal protective equipment (PPE), ventilators, IV contrast, IV sedatives, amoxicillin/other antibiotics and most recently Tamiflu & antipyretics.

What determines which products/goods are part of your supply chain?

There are numerous considerations but first and foremost is, does a need exist? Is the product needed to provide adequate/standard level of care to the patient?

Another factor in making a decision is cost comparisons, including discounts for scale among similar products. Although two products may both be used to provide adequate care to patients, one may offer price advantages for an organization, like a health care enterprise, with numerous hospitals and outpatient centers, if purchased in large scale.

Flexibility of production and distribution in the amount required is also a major consideration: does the supplier have the ability to rapidly produce and ship items to match the organization's needs?

An additional aspect some organizations may consider is best practice versus standard of care. While two products meet the standard, is one brand considered superior within the industry?

Last, but not least, how does the satisfaction of the end user compare? Could a physician/nurse/technician easily learn to use an alternate item/product and feel confident? Would the end user prefer, or at least be satisfied with this product over other substitutes?

What are reasons the effects of the recent supply chain challenges have been abated in EM?

Dr. D'Angelo says 'it's in the DNA of our specialty.' We come to work not knowing what that next shift will hold. We are flexible, resourceful and ready to face challenges with a positive attitude. We provide care under any and all conditions.

Dr. Rabrich shares that 'EM has always embraced evidence-based-medicine.' We question if we are doing things simply because it's the way it's been done versus asking if the testing/treatment is actually providing a benefit to the patient. These questions arise more often when we are faced with a challenge that conflicts with the best or standard practice. An example of this is the usage of IV contrast in the majority of abdominal CT scans: are there instances when it would be acceptable to not use contrast and would it affect the patient outcome? This practice was explored and the status quo challenged by EM when faced with a contrast shortage.

Dr. D'Angelo points to 'the integration of healthcare systems as a major driving force to the success of the healthcare industry in dealing with supply chain challenges.' This allows for negotiating with vendors and suppliers from a position of strength and allows for resources to be equitably shared-moved to where they are most needed. This can also be extended into space-capacity challenges. This was demonstrated by Northwell's movement of admitted patients from their hospitals that had reached capacity to others with capacity availability during the COVID-19 surges.

EM physician and nurse leaders advance to hospital leadership roles, having a "seat at

the table" and participating in supply chain decisions is not coincidental and should not be minimized. The ED is not only the front door to care but is also a focal point of engagement with any and all departments and support services within an institution. Dr. Rabrich says, 'The involvement of emergency medicine leaders in having a voice in making these decision helps us, the institution and our patients.'

With every change in supplies, medications or equipment, due to shortages or upgrades-enhancement, there is a need to effectively communicate the changes with the end users (physicians/nurses/technicians) and to efficiently provide in-service, education and training for the safe and effective use of those products. Diversified communication strategies are a

definitive strength of our specialty and have had tremendous impacts on our resiliency in providing care under the less-than-ideal conditions. Whether mask-mask (formerly face-face) in huddles at every shift change, emails, podcasts, texts, department webpages or numerous other modalities, we share the information with the entire team and put it into practice.

What further enhancements are still needed for us to improve in pivoting with supply chain challenges?

The most important thing we can do is continue to ask for increased end user clinician input into supply chain decisions. A clinical background in providing care to patients has no substitute and those opinions should be part of

decisions.

Dr. Rabrich adds, 'The production of intravenous fluid primarily in Puerto Rico and surgical masks in China both led to significant impacts on heathcare delivery.' Redundancy and diversification of production and delivery channels is needed more than ever.

Greater collaboration between healthcare systems within regions as well as nationally sharing resources was proposed in New York during the first peak of COVID-19 and that practice needs to be embraced to be effectively implemented. There is more than enough sickness to go around among all the health care systems that serve our population.

Thank you.

2023 New York ACEP Virtual Advocacy Day
March 9, 2023 - 10:30 am - 4:00 pm
More Information   Register Here

To Prevent Getting Very Sick From COVID, Timing Is Everything

WE CAN DO THIS

American College of Emergency Physicians®
ADVANCING EMERGENCY CARE
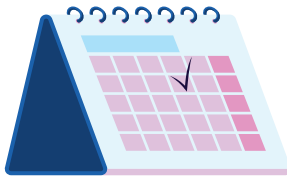
Staying up to date with your COVID vaccine is the best way to protect yourself from getting very sick from COVID. But the FDA has authorized or approved treatments to help prevent severe illness in people who are more likely than others to get very sick from COVID despite vaccination.

You're more likely to get very sick from COVID if any of these apply to you:

- You're 50 or older
- You have a compromised or weakened immune system
- You have one or more health issues, such as severe asthma; diabetes; obesity; or chronic heart, lung, or kidney conditions

WINDOW FOR STARTING ANTIVIRAL PILLS

Day 1 COVID symptoms start	Day 2	Day 3	Day 4	Day 5	Day 6 Too late to start treatment

WINDOW FOR STARTING ANTIVIRAL INFUSION

Day 1 COVID symptoms start	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8 Too late to start treatment

For any of the treatments to work, you must begin taking them within days of when your COVID symptoms start.

Even if your symptoms are mild, treating your COVID early with medicine prescribed by a doctor or other authorized health care provider can make your infection less severe and help keep you out of the hospital. **It could save your life.**

Learn more at cdc.gov/covidtreatment

Content last reviewed: January 12, 2023

Call for Board and Councillor Nominations

Councillor Nominations

Active members of New York ACEP interested in serving as a New York ACEP Councillor are encouraged to submit their nominations to the 2023 Nominating Committee for consideration as the committee develops the slate of candidates.

Councillors with Terms Ending in 2023

Brahim Ardolic, MD FACEP
Joseph Basile, MD MBA FACEP
Kirby P. Black, MD FACEP
Erik Blutinger, MD MSc
Lauren J. Curato, DO FACEP
Sanjey Gupta, MD FACEP

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Livia M. Santiago-Rosado, MD FACEP
L. Carlos Zapata, MD FACEP

Councillors With Terms Ending in 2024

Nicole Berwald, MD FACEP
Robert M. Bramante, MD FACEP
Arlene Chung, MD FACEP
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Joshua B. Moskovitz, MD MBA MPH FACEP
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Jeffrey S. Rabrich, DO FACEP
Virgil W. Smaltz, MD MPA FACEP
Jeffrey J. Thompson, MD FACEP
Peter Viccellio, MD FACEP
Two Resident Councillors to be Appointed by the President

The Board of Directors will elect Councillors at the Thursday, July 13, 2023 Board meeting at the Sagamore Resort. Members interested in representing New York ACEP at the ACEP Annual Council Meeting (October 7-8, 2023 in Philadelphia) should submit a nomination form and their CV to New York ACEP. New York ACEP will be represented by 30 Councillors at the 2023 ACEP Council meeting.

Board Nominations

Active members of New York ACEP who meet the criteria and are interested in serving on the Board of Directors are encouraged to submit their nominations to the 2023 Nominating Committee for considerations as the Committee develops the slate of candidates.

Four directors will be elected by the membership through a proxy ballot distributed at least 30 days prior to the annual membership meeting. The annual membership meeting will be held Wednesday, July 12, 2023 at the Sagamore Resort on Lake George.

Board Members with Terms Ending in 2023

Open Board Position
Bernard P. Chang, MD PhD FACEP
Abbas Husain, MD FACEP

Livia M. Santiago-Rosado, MD FACEP
Kaushal Shah, MD FACEP

Interested candidates should review the Criteria for New York ACEP Board Nomination, Board Member Duties and Responsibilities and send a completed nomination form along with a copy of their CV to New York ACEP by April 3, 2023. Self nomination and nominations of colleagues are accepted. To request the policies and nomination form, contact New York ACEP at (585) 872-2417 or by email at nyacep@nyacep.org.

Successful nominees will be notified by May 8, 2023. Board candidates are required to submit background information on their professional career, a photograph and answer questions posed to all board candidates. Candidates will have approximately two weeks to submit material.

Nomination Deadline: April 3, 2023

EDUCATION

Devjani Das, MD FACEP
Director, Emergency Medicine Clerkship
Director, Undergraduate Point-of-Care Ultrasound Medical Education
Associate Professor of Emergency Medicine, Columbia University Vagelos College of Physicians and Surgeons

Guest Author
Maria Tran, DO, PGY2 Resident
St. John's Riverside Hospital

Guest Author
Mary McLean, MD
Assistant Program Director
St. John's Riverside Hospital

Bioethics, Capacity and Relationships: Who Makes the Decision?

A Bioethics Case Study

An 80 year-old male with recent skilled nursing facility admission after a devastating stroke (with resultant quadriplegia and cognitive disability, trach'ed and PEG'ed) is brought in by ambulance for abdominal pain and distention. His blood pressure is 60/30, a tender pulsatile mass is noted on physical exam and a large amount of abdominal free fluid is apparent on the FAST exam. He does not have decision making capacity and has no designated heath care proxy, but his wife comes to the emergency department (ED) minutes after him and is at the bedside. You brief her on the patient's diagnosis of ruptured abdominal aortic aneurysm (AAA) and discuss the poor prognosis. She solemnly explains that back when her husband was perfectly healthy, he said that in case of a medical emergency, he would not want any heroic or painful measures to keep him alive, even central line placement; he would prefer to simply be kept comfortable and allowed to pass away. You prepare to admit the patient to the floor without plans for surgery or painful procedures.

Minutes later, the patient's son calls the ED. He says for as long as he can remember, his father always talked about wanting all life-sustaining measures in any medical scenario, no matter the prognosis, including both painful and costly measures. The son expresses concern the patient's wife has only known him for nine months and may be lying about his wishes to get his inheritance faster. The son is 60-years-old, has known his father for his whole life and tells you his father would want a central line, pressors and surgery to try and fix the AAA.

In medicine, hard decisions are made and more often than not, it is difficult to distinguish who is making these decisions. When does a patient have the capacity to make their own decisions?

Capacity generally needs to meet four criteria: 1) Understanding, 2) Appreciation, 3) Reasoning and 4) Expression of choice.[1] These criteria have been established by case law and legal reviews. The *understanding* refers to the ability to acknowledge the gravity of a situation. *Appreciation* is the patient's ability to relate the information to themselves. *Reasoning* refers to the patient's ability to logically deduce and compare situations. *Expression of choice* refers to the patient's ability to express their decision about a situation.[2] Individuals that may not meet these criteria are those who have developmental disabilities, mental illnesses or someone who has lost their decision- making capacity due to illness.

If a patient does not meet these requirements, who makes the decision? It depends on the situation. Under New York State law, the decision-making responsibility lies in the hands of the health care proxy (HCP), who is defined as the individual trusted to make medical decisions to the best of the patient's wishes. The HCP is someone who was appointed by the patient to make the decisions for the patient when the patient does not have capacity. The HCP and patient fill out a form that is witnessed by two adults and ideally given to the doctor, hospital where the patient is receiving care or is on the person of the patient and/or HCP. In New York State, there cannot be more than one primary HCP appointed, but a patient can have both a primary and an alternate HCP. The alternate HCP receives decision-making responsibility if the primary HCP is unable to make decisions upon the patient's behalf.[3]

What if a HCP was not designated before a crucial medical decision needs to be made? The Family Health Care Decisions Act (FHCDA) created in 2012 gives family members or close friends the ability to act as a health care surrogate or representative.[4] The difference between a HCP and surrogate is that the surrogate only has the authority to act if the patient is in a hospital or nursing home or if the decision is about withholding or withdrawing life-sustaining treatment and transitioning to hospice care.

Who takes priority on a surrogate list? The highest priority is the spouse if not legally separated from the patient or the domestic partner. In New York State, a domestic partner is defined as someone who is in a long-term, committed relationship, has been in the relationship for at least six months, can provide documentation they live together and are financially interdependent.[5] The next in line in order of priority is a son/daughter (required to be 18 or older), a parent, a sibling, then a close friend.[6]

What is the difference between a HCP form and a Medical Orders for Life sustaining treatment (MOLST) form? A MOLST form represents the patient's wishes. It is commonly used for patients with chronic or advanced illnesses who may pass away within a few years, need long term care or request to avoid life sustaining treatment. A MOLST is ideally completed with the patient, health care provider and HCP. A MOLST can be completed for Do Not Resuscitate (DNR) or Do Not Intubate (DNI) orders in the community setting.[7] A MOLST should be transported with the patient as they transition to different healthcare settings. A very crucial fact to remember is that the MOLST cannot be overturned by the HCP if the patient has lost decision-making capacity regarding DNR/DNI wishes.[8]

Case Wrap-Up

You consult your hospital's on-call Ethics Committee contact to discuss emergently so you can make the best care decision for the patient that also reflects their true wishes. You express concern the wife has only known the patient for nine months and has a vastly different impression of the patient's wishes than the son, who has known him for 60 years. The Ethics Committee does some digging and research. They remind you despite the short time the patient and his wife have been in a relationship, they qualify as domestic partners having lived together for just over the six-month minimum to qualify as a surrogate in New York State. To provide further reassurance, they inform you the patient had a conversation about their specific wishes at a neighboring hospital one year ago. Records indicate at that time, the patient essentially expressed he would never want heroic or painful life-sustaining interventions in a medical emergency with a poor prognosis. He is admitted to the floor and kept very comfortable.

This is indeed a difficult scenario, but it is one emergency physicians may encounter. The first thing to remember is you do not need to be alone in navigating conflicts like these. The Joint Commission requires hospitals to have a mechanism for addressing such ethical issues in providing patient care,[9] which most often comes in the form of an Ethics Committee with contacts available for consultation. Secondly, it is important for emergency physicians to know the priority order for surrogate decision makers in emergency situations where the patient lacks decision-making capacity and has no MOLST or designated HCP. Remember that legally, the order from highest to lowest is spouse-offspring-parent-sibling-close friend.

References

1. Appelbaum PS, Grisso T. Assessing patients' capacities to consent to treatment. N Engl J Med. 1988 Dec 22;319(25):1635-8. doi: 10.1056/NEJM198812223192504. Erratum in: N Engl J Med 1989 Mar 16;320(11):748. PMID: 3200278.

2. Palmer BW, Harmell AL. Assessment of Healthcare Decision-making Capacity. Arch Clin Neuropsychol. 2016 Sep;31(6):530-40. doi: 10.1093/arclin/acw051. Epub 2016 Aug 22. PMID: 27551024; PMCID: PMC5007079.

3. NYS Department of Health. Health Care Proxy: Appointing Your Health Care Agent New York State. Health Care Proxy. https://www.health.ny.gov/publications/1430.pdf. Published February 2010. Accessed December 22, 2022.

4. Gottfried RN. New York's Health Care Proxy Law & Family Health Care Decisions Act. https://assembly.state.ny.us/member_files/075/20110719/. Published February 2010. Accessed December 20, 2022.

5. New York Power Authority. Domestic Partner Guide. Health & Wellness. https://www.nypa.gov/-/media/nypa/documents/document-library/benefits/health-and-wellness/domestic-partner-guide-final.pdf . Published September 2021. Accessed December 20, 2022.

6. New York Department of Health. Deciding About Health Care: A Guide For Patients And Families. https://www.health.ny.gov/publications/1503.pdf. Published February 2018. Accessed November 2022, 2022.

7. New York State Department of Health. Medical Orders for Life-Sustaining Treatment (MOLST). https://www.health.ny.gov/professionals/patients/patient_rights/molst/. Published December 2020. Accessed December 20, 2022.

8. Authority of a Health Care Agent & Surrogate. MOLST: Medical Orders For Life-Sustaining Treatment. https://molst.org/how-to-complete-a-molst/ethical-legal-requirements/authority-of-a-health-care-agent-surrogate/. Published January 2022. Accessed December 20, 2022.

9. Joint Commission on Accreditation of Healthcare Organizations: Accreditation Manual for Hospitals. 1992 Oakbrook Terrace, IL, Joint Commission on Accreditation of Healthcare Organizations. Accessed January 1, 2023.
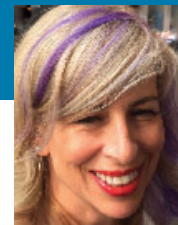
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Machine Learning and Artificial Intelligence in Emergency Medicine

What is AI & ML?

Artificial intelligence (AI) is an overarching term used to describe a system that simulates intelligence with limited intervention.[1] Machine learning (ML) is a subset of AI used to describe systems that gradually improve their function based upon incoming data.[2] ML can further be broken down into supervised and unsupervised. Both types must first be trained using data sets. Supervised ML requires human intervention to define features of the data from which it can then produce an outcome.[3] Unsupervised ML does not require the data to contain defined features but instead discovers previously unrecognized connections.[3] ML being applied to medicine has become more and more of a possibility due to the increase in data attained from the electronic health record (EHR) and the growing power of computers.[2]

Big Data

Big Data has been defined by three different variables: volume, velocity and variety. However, over the years has grown to a point where sample size is approaching the overall size of the population.[4] Research performed using Big Data has advantages, which include more efficient hypothesis testing, much greater sample size and the ability to detect smaller signals than traditional researching methods. Big Data is especially important for AI and ML. Indeed, it has been cited as one of the most crucial ingredients for success.[5]

Where Does Machine Learning Stand Outside of EM?

The utility of ML and AI is currently being evaluated in many specialties in medicine. Two specialties, Radiology and Dermatology, have some already measured studies and applications. Radiology and Dermatology are not the only two fields using AI and ML; specialties such as cardiology can use ML algorithms for interpretation of EKGs to decrease cognitive load of physicians which will reduce human errors.

Radiology

Recent improvement in image acquisition and standardization of the medical image have made utilization of ML and deep learning feasible[6] and it doesn't necessarily relate solely to the interpretation of the image. Deep Convolutional Neural Networks have been used to reduce noise and therefore decrease the time necessary to acquire a MRI of sufficient quality.[7] This is particularly important in strokes given that time is brain, and the ischemic brain is aging at an estimated 3.6 years per hour prior to treatment.[8] Therefore, reduced time in the MRI may lead to improvement in patient outcomes.

Another significant delay in time to treatment for strokes is access to a radiologist. There are several additional areas of focus being studied that use ML to detect Large Vessel Occlusion (LVO) and determine the infarct core, both with an area under the curve (AUC) of 0.88-0.90.[9] Another study achieved an AUC of 0.941 with a sensitivity of 96.87% and specificity of 74.32% when using two radiologists as the gold standard.[10] Furthermore, the time from data transmission to production of results was 158 seconds on average. The sensitivity is comparable to neuroradiologists, who have a sensitivity of 89-98%, however, the specificity is lower than that of neuroradiologists who achieve 95-98% specificity.[10] Given the high sensitivity but low specificity compared to neuroradiologists, the authors argue that ML could serve as a screening test to triage which patients require a closer look by the neuroradiologist. Therefore, instead of replacing neuroradiologists, the technology is augmenting and facilitating their work.[10]

The implications for Emergency Medicine are multifactorial. Making use of ML to screen for LVOs could allow mobilization of resources prior to return of the official read. In remote areas where a neuroradiologist is not available around the clock, a preliminary read by a ML algorithm can allow providers to initiate transfer and reduce times to thrombectomy and improve patient outcomes.

Dermatology

ML has been applied to distinguishing ma-

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lignant melanoma from nevi and performed similarly to Dermatologists and better than Primary Care Providers. While the power of ML is significant, it is dependent upon the quality of image provided. Pictures gathered from Apple iPhone 6s performed best, followed by DSLR cameras, then Galaxy S6.[11] It should be noted that distinguishing melanoma from benign is a binary decision tree and therefore the differential should be expanded to better simulate a clinical environment where a broader range of potential pathologies exist.

A deep learning algorithm was developed to identify 12 different skin pathologies: basal cell carcinoma (BCC), squamous cell carcinoma, seborrheic keratosis, malignant melanoma, melanocytic nevus, lentigo, pyogenic granuloma, hemangioma, dermatofibroma and wart. The algorithm was trained using a predominantly Asian dataset but applied to images from Edinburgh and locations in Asia. It performed well in identifying all pathologies, with an average AUC of 0.89 and range of 0.96 to 0.83.[12] However, there were differences in performance between races. The AUC values from the Edinburgh dataset were slightly lower, most notably in BCC and melanoma (AUC of 0.90 vs 0.96 for BCC and 0.88 vs 0.96 for melanoma). This may be related to a couple of different factors. There are different phenotypical presentations of BCC in Asian and Caucasian populations.[13] Therefore, an algorithm trained using predominantly Asian images would be expected to underperform in Caucasian populations and vice versa. Indeed, when the pilot study did not include the Atlas dataset in the training phase, performance was worse. The Atlas dataset is predominantly Caucasian images and 40% BCC. Once the Atlas dataset was included, the Edinburgh AUC for BCC improved from 0.78 in the pilot study to 0.90. This bias due to low exposure to different races was reflected in the accuracy of the Korean dermatologist as well, who had a sensitivity of less than 40% for BCC and melanocytic nevi in the Edinburgh dataset.[12]

Emergency departments (EDs) are not the primary site for identification of malignant skin pathologies, however, it does highlight weaknesses of ML. First and foremost, an algorithm is only as good as the inputs. If there is insufficient data to cover the breadth of a diverse population and the potential pathological permutations, then diagnostic accuracy will suffer. This is one of the most significant ways

Big Data is critical for ML's success.

Additionally, it is difficult to externally verify the results of the studies since algorithms are not typically provided publicly. When algorithms are made public, they can fall short of the initially touted results. The aforementioned study from Han et al[12] published their algorithm and allowed Navarrete-Dechent et al[14] to verify the results. However, it resulted in demonstrating several weaknesses in the program.

Navarrete-Dechent et al used the provided algorithm to identify 100 Caucasian skin malignancies and it underperformed compared to the reported results.[14] This emphasizes the need for a diverse and large data source when developing ML algorithms. Navarrete-Dechent et al also slightly altered the pictures by zooming in, changing contrast or brightness or rotating the picture and found that it altered the results.[14] This further emphasizes the importance of the quality of the data and it's generalizability.

Potential for Machine Learning in Emergency Medicine

Emergency medicine is no exception as a field that can benefit greatly from AI and ML.[19] The following describes overarching areas in which it can be proven beneficial, but i**t is to be noted this is a preliminary overview and not exhaustive by any means.**

Triage in the Emergency Department

There are several methods of triaging patients in the ED, one being the Emergency Severity Index (ESI). The ESI was initially designed by, and now widely used by, American emergency medicine physicians. The ESI focuses on level of acuity and sending patients to the appropriate setting in a timely fashion.[15]

ESI has been shown to underperform when compared to ML in measures including admissions, critical care requirements and mortality.[16,17] One advantage of utilizing ML in triage is the quantity of data available from previous interactions with the healthcare system. ML algorithms have been designed to take advantage of medication lists, medical history, laboratory findings, imaging frequency, as well as demographics and triage vitals.[17]

Hong et al developed three algorithms to predict patient admission: logistic regression (LR), gradient boosting (XGBoost) and deep neural networks (DNN).[18] Each algorithm was trained using three different datasets: only information collected at triage; only historical data, which included imaging, labs and EKGs

but excluded chief complaint and triage evaluation; and a dataset that included the full range of data. These three different datasets were then used to train the different ML algorithms. As the graph below indicates, the data set using only triage or only history performed similarly while every algorithm performed significantly better when given access to the full dataset.

While predicting patient admission may not directly improve patient care in the ED, forewarning of impending admission could allow for resources to be properly mobilized. Enhanced coordination that ensures room availability, facilitates handoffs and makes transport more accessible would decrease the prevalence of boarders in the ED and improve patient experience.

Improving Emergency Department Operations

The dynamic nature of the ED makes it difficult to properly allocate resources in a manner that reduces cost and time and simultaneously improves provider efficiency, resource utilization and resource management.[20] Boonstra and Laven (2022) recently performed a systemic literature review focusing on how AI can improve ED operations.[21] The authors selected 34 papers written in the past five years pertaining to the subject matter and concluded that although AI in EM is fairly new, it has the potential to perform at the skill level and higher than humans which can support EM in various stages of operation. The articles included in the literature review were coded and found that ML algorithms can address the following in EM: (1) improving patient outcomes by reducing morbidity and mortality, reducing length of stay and improving patient satisfaction; (2) speeding patient throughput to increase flow and reduce overcrowding in EDs; (3) predicting serious adverse events in patients to prevent deterioration of patient condition; (4) improving ED triage to identify and predict serious adverse outcomes; (5) aiding clinical decisions based on statistical predictions to improve healthcare delivery; and (6) improving resource allocation to EDs based on demand and patient population.[21] This review brings to light the effectiveness of AI in reducing increasing burdens on the ED from both an operational and clinical standpoint.

Reduction of Human Errors and Improving Diagnostic Accuracy

Fractures remain one of the most frequent diagnoses susceptible to human error, with an

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estimation as high 80% of misdiagnoses or missed fractures in the ED itself.[22] Fractures are commonly misdiagnosed in the ED due to physician fatigue, misinterpretation of x-rays and lack of radiology consultation available for second opinion, amongst many other reasons.[23] Misdiagnosing fractures affects the patient by delaying treatment and being put at risk for long-term disability by compromising full recovery of function. To address the issue of human errors and in an effort to improve diagnostic accuracy in the ED, deep neural networks have been deployed to detect and localize fractures in radiographs in the ED with the intent achieving diagnostic accuracy comparable to that of senior sub-specialized orthopedic surgeons.[24] The study yielded promising results by improving both the specificity and sensitivity of fracture diagnoses by EM physicians with the use of the ML model from 87.4% unaided to 94.1% aided and 82.7% unaided to 92.5% aided, respectively. The ROC curves achieved an AUC of 0.967 and 0.957, further reinforcing the high level of agreement between the ML model and senior expertise.[24] By employing the use of ML models as such in the ED, there is potential to reduce human error and improve diagnostic accuracy to ultimately improve patient outcomes and provider efficiency.

Imaging in the ED is common, with most patients requiring some form of emergency imaging to diagnose and treat life-threating conditions. Due to the fast-paced nature of the ED, physicians must be able to provide a quick and accurate diagnosis based on emergency imaging results, oftentimes without the consult of a radiologist, leading to increased stress in the work environment and vulnerability to misdiagnoses.[25] Imaging is frequently used in the ED in the case of hip fractures, with over 250,000 incidences occurring each year in the US.[26] Early diagnosis and treatment are important for preserving function and quality of life for patients with hip fractures and delaying treatment can lead to poor prognosis. Currently, frontal pelvic radiographs are a commonly used tool to diagnose hip fractures however, have been reported to have a misdiagnosis rate of up to 14%.[26] ML models have been developed to aid physicians improve diagnostic accuracy in traumatic injuries which can be applied to emergency settings. Cheng et al developed a fracture diagnosis algorithm using deep convoluted neural networks and compared the model's accuracy to that of physicians.[26] When diagnosing hip fractures, non-specialized

physicians achieved a sensitivity ranging from 84% to 100% and a specificity ranging from 46% to 94%. In contrast, the model achieved a sensitivity of 98%, specificity of 84%. The accuracy was 91% and the AUC was 0.98 with a false negative rate of only 2%.[26] The results of this study support the notion that ML models have the potential to reduce misdiagnosis rates by improving sensitivity and specificity of diagnoses with high accuracy. This can improve patient outcomes by eliminating interpretation errors amongst providers, providing early diagnoses for early treatment and reducing cost by eliminating the need for further imaging and testing.

Identifying Appropriate Admissions with Clinical Phenotyping and Risk Stratification

Predicting short and long-term outcomes of acute heart failure in the ED has always been a challenging feat, especially considering more than 80% of acute heart failure (AHF) visits eventually result in hospital admission.[27] This increasing hospitalization rate is contributing significantly to hospital costs and is coupled with the increase in AHF related mortality rates. Although various risk stratification models have been developed in an effort to safely reduce hospital admission rates, ML learning models in addition to risk stratification calculators have the potential of increasing predictive accuracy of short-term outcomes of AHF patients in the ED to further reduce unnecessary hospital admissions.[28] Sax et al compared four ML models (lasso, decision tree, random forest and XGBoost) to the logistic regression model created with 71 variables to determine if ML improved sensitivity, specificity, negative and/or positive predictive values and/or likelihood ratios when predicting adverse event risk associated with AHF in the ED to reduce admission rates.[28] When using the ML models, there was a modest improvement in AUC from 0.76 to 0.81 from using logistic regression alone. Two of the models, random forest and XGBoost, outperformed the logistic regression, with XGBoost being the highest performing model with an AUC of 0.85. Especially in the higher risk group, XGBoost aptly increased positive predictive value to identify patients at high risk for an adverse event in the ED as opposed to logistic regression alone.[28] This study presents a novel approach to stratifying risk of AHF patients in the ED and contributes a potentially useful tool in a physicians' toolbox to use when

determining patient-specific short and long-term risk of discharge. Supplementing ML with risk stratification tools allows physicians to curate their decision-making capacity to prevent serious adverse outcomes and make appropriate disposition decisions.

Conclusion

Artificial Intelligence and Machine Learning have immense potential in improving emergency care, especially in remote and under-resourced areas. The specific emerging role of ML is in preliminary radiology reads, preliminary evaluation of skin rashes, triage, improvement in ED throughput, enabling risk stratification and discharge planning from the ED. ML can also decrease translation time of research from bench to practice. We are currently in the infancy stage of ML and as ML depends on large datasets and Big Data, EM is just beginning to use Big Data and as datasets are trained, we expect to see an exponential growth in this area in the next decade. **Artificial Intelligence and Machine Learning are new areas of education, training and research, with direct implications to clinical practice**. If used appropriately, AI and ML has potential to enable practice of precision medicine.

References

1. Hamet P, Tremblay J. Artificial intelligence in medicine. Metabolism. 2017;69:S36-S40. doi:10.1016/j.metabol.2017.01.011

2. Lee S, Lam SH, Hernandes Rocha TA, et al. Machine Learning and Precision Medicine in Emergency Medicine: The Basics. Cureus. 2021;13(9). doi:10.7759/cureus.17636

3. Baştanlar Y, Özuysal M. Introduction to machine learning. Methods Mol Biol. 2014;1107:105-128. doi:10.1007/978-1-62703-748-8_7

4. Wong HT, Yin Q, Guo YQ, Murray K, Zhou DH, Slade D. Big data as a new approach in emergency medicine research. J Acute Dis. 2015;4(3):178-179. doi:10.1016/j.joad.2015.04.003

5. Mayer-Schönberger V, Ingelsson E. Big Data and medicine: a big deal? J Intern Med. 2018;283(5):418-429. doi:10.1111/joim.12721

6. Rogers W, Seetha ST, Refaee TAG, et al. Radiomics: From qualitative to quantitative imaging. Br J Radiol. 2020;93(1108). doi:10.1259/bjr.20190948

7. Yoon J, Gong E, Chatnuntawech I, et al. Quantitative susceptibility mapping using deep neural network: QSMnet. Neuroimage. 2018;179:199-206. doi:10.1016/j.neuroimage.2018.06.030

8. Saver JL. Time is brain - Quantified. Stroke.

2006;37(1):263-266. doi:10.1161/01.STR.0000196957.55928.ab

9. Shlobin NA, Baig AA, Waqas M, et al. Artificial Intelligence for Large-Vessel Occlusion Stroke: A Systematic Review. World Neurosurg. 2022;159:207-220.e1. doi:10.1016/j.wneu.2021.12.004

10. Amukotuwa SA, Straka M, Dehkharghani S, Bammer R. Fast automatic detection of large vessel occlusions on CT angiography. Stroke. 2019;50(12):3431-3438. doi:10.1161/STROKEAHA.119.027076

11. Chan S, Reddy V, Myers B, Thibodeaux Q, Brownstone N, Liao W. Machine Learning in Dermatology: Current Applications, Opportunities, and Limitations. Dermatol Ther (Heidelb). 2020;10(3):365-386. doi:10.1007/s13555-020-00372-0

12. Han SS, Kim MS, Lim W, Park GH, Park I, Chang SE. Classification of the Clinical Images for Benign and Malignant Cutaneous Tumors Using a Deep Learning Algorithm. J Invest Dermatol. 2018;138(7):1529-1538. doi:10.1016/j.jid.2018.01.028

13. Kim GK, Del Rosso JQ. Skin cancer in Asians part 1: Nonmelanoma skin cancer. J Clin Aesthet Dermatol. 2009;2(8):39-42. Accessed October 21, 2022. /pmc/articles/PMC2923966/

14. Navarrete-Dechent C, Dusza SW, Liopyris K, Marghoob AA, Halpern AC, Marchetti MA. Automated Dermatological Diagnosis: Hype or Reality? J Invest Dermatol. 2018;138(10):2277-2279. doi:10.1016/j.jid.2018.04.040

15. Shelton R. ESI. Nurs Crit Care. 2010;5(6):34-37. doi:10.1097/01.CCN.0000387134.06278.2d

16. Sánchez-Salmerón R, Gómez-Urquiza JL, Albendín-García L, et al. Machine learning methods applied to triage in emergency services: A systematic review. Int Emerg Nurs. 2022;60:101109. doi:10.1016/j.ienj.2021.101109

17. Fernandes M, Vieira SM, Leite F, Palos C, Finkelstein S, Sousa JMC. Clinical Decision Support Systems for Triage in the Emergency Department using Intelligent Systems: a Review. Artif Intell Med. 2020;102:101762. doi:10.1016/j.artmed.2019.101762

18. Hong WS, Haimovich AD, Taylor RA. Predicting hospital admission at emergency department triage using machine learning. Dong Q, ed. PLoS One. 2018;13(7):e0201016. doi:10.1371/journal.pone.0201016

19. Mueller, B., Kinoshita, T., Peebles, A., Graber, M.A. and Lee, S. (2022), Artificial intelligence and machine learning in emergency medicine: a narrative review. Acute Med Surg, 9: e740. https://doi.org/10.1002/ams2.740

20. Yosef Berlyand, Ali S. Raja, Stephen C. Dorner, Anand M. Prabhakar, Jonathan D. Sonis, Ravi V. Gottumukkala, Marc David Succi, Brian J. Yun, How artificial intelligence could transform emergency department operations, The American Journal of Emergency Medicine, Volume 36, Issue 8, 2018, Pages 1515-1517, ISSN 0735-6757, https://doi.org/10.1016/j.ajem.2018.01.017.

21. Boonstra A, Laven M. Influence of artificial intelligence on the work design of emergency department clinicians a systematic literature review. BMC Health Serv Res. 2022 May 18;22(1):669. doi: 10.1186/s12913-022-08070-7. PMID: 35585603; PMCID: PMC9118875.

22. Guly HR. Diagnostic errors in an accident and emergency department. Emerg Med J. 2001 Jul;18(4):263-9. doi: 10.1136/emj.18.4.263. PMID: 11435359; PMCID: PMC1725632.

23. Hallas, P., Ellingsen, T. Errors in fracture diagnoses in the emergency department – characteristics of patients and diurnal variation. BMC Emerg Med 6, 4 (2006). https://doi.org/10.1186/1471-227X-6-4

24. Lindsey, R., Daluiski, A., Chopra, S., Potter, H. Deep neural network improves fracture detection by clinicians. PNAS. 2018 Sept; 115(45): 11591-11596. https://doi.org/10.1073/pnas.1806905115

25. Cellina M, Cè M, Irmici G, Ascenti V, Caloro E, Bianchi L, Pellegrino G, D'Amico N, Papa S, Carrafiello G. Artificial Intelligence in Emergency Radiology: Where Are We Going? Diagnostics. 2022; 12(12):3223. https://doi.org/10.3390/diagnostics12123223

26. Cheng CT, Ho TY, Lee TY, Chang CC, Chou CC, Chen CC, Chung IF, Liao CH. Application of a deep learning algorithm for detection and visualization of hip fractures on plain pelvic radiographs. Eur Radiol. 2019 Oct;29(10):5469-5477. doi: 10.1007/s00330-019-06167-y. Epub 2019 Apr 1. PMID: 30937588; PMCID: PMC6717182.

27. Alan B. Storrow, Cathy A. Jenkins, Wesley H. Self, Pauline T. Alexander, Tyler W. Barrett, Jin H. Han, Candace D. McNaughton, Benjamin S. Heavrin, Mihai Gheorghiade, Sean P. Collins, The Burden of Acute Heart Failure on U.S. Emergency Departments, JACC: Heart Failure, Volume 2, Issue 3, 2014, Pages 269-277, ISSN 2213-1779, https://doi.org/10.1016/j.jchf.2014.01.006.

28. Dana R. Sax, Dustin G. Mark, Jie Huang, Oleg Sofrygin, Jamal S. Rana, Sean P. Collins, Alan B. Storrow, Dandan Liu, Mary E. Reed, Use of Machine Learning to Develop a Risk-Stratification Tool for Emergency Department Patients With Acute Heart Failure, Annals of Emergency Medicine, Volume 77, Issue 2, 2021, Pages 237-248, ISSN 0196-0644, https://doi.org/10.1016/j.annemergmed.2020.09.436.
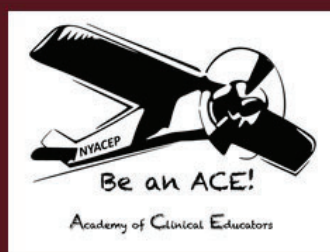
ASK THE EXPERTS

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I had the honor of interviewing my colleague Joshua Lynch, DO FACEP who founded the MATTERS Network in 2018 to help address the opioid crisis in New York State. Dr. Lynch serves as an Associate Professor of Addiction and Emergency Medicine at the Jacobs School of Medicine and practices in Buffalo, New York. The program has continued to expand throughout New York and neighboring states in 2023.

In January, 2023, the Mainstreaming Addiction Treatment (MAT) Act was signed into law by President Biden and eliminates the X waiver. In addition, this bill removes the limitations on the number of patients a provider could treat with buprenorphine/naloxone at any time. This makes it easier for all emergency medicine physicians to initiate treatment of patients with opioid use disorder, especially those who present to the Emergency Department (ED) in acute withdrawal.

Why did you start the MATTERS program?

Working as an emergency physician, caring for patients with addiction and mental health issues is part of our job every day. Unfortunately, these diseases often don't have a clear treatment path. For a patient with chest pain, the assessment and treatment process is usually straightforward. For patients with opioid use disorder, the treatment plan is often challenging. Working through a patient's varying levels of motivation, finding appropriate treatments in the ED and linking patients to a rock-solid follow up appointment are usually all complicated. Addiction is often a disease process that has been placed on the back burner. This is exactly why we started MATTERS. Finding community treatment organizations willing to take patients as they are was surprisingly easy! Leveraging these partnerships is what led to the MATTERS Network being available across New York State.

What is the MATTERS Network?

The MATTERS Network is collection of resources to initiate care, increase access to buprenorphine and officially link patients to appropriate treatment at community-based organizations through an electronic platform. We currently have 185 clinics we can refer patients to across New York State so they can find help closest to their home. We are also linked with over 1,000 pharmacies. Patients can receive medication vouchers that cover up to a 14-day supply of buprenorphine/naloxone prescriptions for uninsured patients. Patients can also be offered transportation to and from their first clinic appointment through our partnership with Uber Health. They also have the option to be linked with local peer support.

What are the goals of the MATTERS Network?

Our initial concept was simple. The first goal was to reduce unnecessary controlled substance prescribing in the ED. We would provide access to medication assisted treatment in the ED in hospital settings. At discharge, we would provide rapid access to follow-up with a substance use disorder treatment facility.

Where does funding for this program come from?

We have worked hard to obtain outside funding for this program. We currently receive support from: New York State Office of Addiction Services and Supports, John R. Oishei Foundation, Erie County Department of Health, New York State Department of Health, Substance Abuse and Mental Health Services Administration, NIH HEAL Initiative: HEALing Communities study and the Bureau of Justice Assistance: US Department of Justice.

How does telemedicine play a role in opioid addiction treatment?

The MATTERS Network is partnered with two virtual EDs to streamline rapid access to care for patients experiencing opioid and substance use disorders. Through this partnership, patients can be evaluated, treated and then connected to an outpatient treatment organization across New York State. Patients can request an appointment through our website. I would urge any physicians who may feel uncomfortable initiating medication assisted treatment to inform patients of this option if they feel they may benefit from buprenorphine/naloxone therapy. Our website also offers "Resources by Region" at https://mattersnetwork.org/community-resources.

How does a hospital or first responder agency join the Network?

It is very easy! Just visit our website and fill out the contact us form. In most cases we can onboard a new hospital in a few days. You can also download the free MATTERS app from the Apple App store or Google Play!

What other initiatives has the MATTERS Network supported?

Patients can request free fentanyl test strips and become proficient with their use through our user guide. Patients can also receive Narcan and participate in the New York State syringe exchange programs. We have also worked to inform the community of new dangers including Xylazine, an animal tranquilizer that increases risk for opioid overdoses and cannot be reversed with Naloxone.

What information should I be providing to patients?

We have created several resource documents for patients, first responders and health care professionals. Some examples are shown below.

Additional prescriber information can be found on the ACEP BUPE website https://www.acep.org/patient-care/bupe/ and emPOC app available exclusively to ACEP members.

Do you have a protocol I can refer to as a new prescriber?

STARTING BUPRENORPHINE AT HOME

You have been prescribed buprenorphine/naloxone, also known as Suboxone. You will have received a prescription that will last you several days. If you don't have an appointment already, you will be contacted by a clinic for follow up appointments.

WAIT TO TAKE YOUR FIRST DOSE

You should be in withdrawal before taking your first dose of buprenorphine. If you take your first dose too soon, you increase the chance of having intense withdrawal symptoms. Stop all opioids 12-36 hours before starting. You will feel lousy, like you have the flu. This is normal.

BEFORE YOU TAKE YOUR FIRST DOSE, YOU SHOULD HAVE AT LEAST THREE OF THE FOLLOWING:

- Bodywide aches or joint pain
- Can't sit still, very restless
- Twitching, tremors, shaking
- Enlarged pupils
- Shaking chills or sweating
- Heavy yawning
- Runny nose
- Goose bumps
- Stomach cramps, nausea, vomiting, or diarrhea
- Anxiety or irritability

DAILY BUPRENORPHINE DOSING

First dose: Place the 8mg film of buprenorphine under your tongue for 15 minutes. Do not swallow it.

If you don't feel better after 1 hour, place another 8mg under your tongue.

Otherwise, you may take the next dose of buprenorphine when you start to feel withdrawal as long as you are not sleepy.

MAXIMUM DAILY DOSE IS 16MG

If you don't feel better after 6 hours from taking the daily maximum of 16 mg of this treatment program, you may need to have another telemedicine evaluation or go to the local ER.

AVOID DRIVING OR OPERATING HEAVY MACHINERY UNTIL YOU KNOW HOW BUPRENORPHINE AFFECTS YOU

If you feel sleepy after taking an 8mg dose of buprenorphine, try taking half of the 8mg film instead of the full film, which would be a 4mg dose.

8 MG → **4 MG 4 MG** → **4 MG**

8 MG Dose → You can cut full film in half → 4 MG Dose

MATTERS
Medication for Addiction Treatment & Electronic Referrals

Initial Patient Assessment
- If inadequate withdrawal, buprenorphine may precipitate more several withdrawal
- Score on clinical opiate withdrawal scale COWS should be ≥8, the higher the better

Acute Withdrawal? (COWS should be ≥8) *Consider complicating factors

— Yes → **Buprenorphine/naloxone 8 MG SL NOW**
- If borderline/inconsistent withdrawal symptoms, dose 2-4 mg every 1-2h

— No:
- Consensus treatment of Buprenorphine Precipitated Withdrawal (BPW) is higher dose of buprenorphine: 8mg SL every 1-2 hours to a maximum 32 mg
- Alternative is to switch to non-opioid Rx

Symptoms Improved?

No → **If minimally improved, likely inadequate dose of bup. If worsened by bup, may be buprenorphine precipitated withdrawal (BPW)**

*Bup can cause nausea- If primary symptom is nausea, treat with ondansetron 8 mg

Yes → **Second dose of buprenorphine Target day #1 total dose ≥ 16mg**

Skip to RX and referral

Provide 8/2 mg. BID SL buprenorphine/naloxone RX for 14 days
A 14 DAY RX ALLOWS FOR CLINIC FLEXIBILITY AND DECREASES LIKELIHOOD OF MEDICATION LAPSE

Referral Process
Refer to outpatient addiction treatment using the MATTERS platform

Garnet Health Medical Center

Demographics

Program Director: Dulaya Santikul, DO, FACOEP

Program Coordinator: Emilia Martinez

Hospital Capabilities:

Total Number of EM Residents: 18

Residents Train Each Year: 6

Inagural Resident Class Year: 2015

Fellowships Offered: None

Benefits Offered: ROSH Review, Membership Dues Coverage, Lab Coat(s), Dental Insurance, Health Insurance, Vision Insurance, Professional Liability Coverage

Other Benefits: Meal stipend, housing for outside rotations, free parking

Website Link: www.garnethealth.org/medical-education/emergency-medicine-residency

Twitter Link:

Instagram Link: middletowngem

What are you most proud of with your program? We are most proud of our graduates! They have gone on to fellowship, attending physician roles in rural, suburban, and urban settings, and ED and EMS administrative positions across the country, from Massachusetts to California. They call, text, and email constantly, excited by a recent case, and thankful for the training they received at Garnet.

What Makes Your Program an Excellent Place to Complete a Residency? We have enthusiastic faculty with a variety of subspecialty interests and expertise including EMS, administration, toxicology, simulation, research, and finance. We provide a supportive family atmosphere where we offer an individualized approach to learning and personal and professional development, and are able to accomplish this due to our small program size. We do this in a high-acuity, high-volume emergency department, that treats a variety of pathology and a diverse patient population. Previous rotators and residents have cited these qualities as our greatest strengths, as well as the ability to gain early autonomy as a resident and work one-on-one with faculty attending physicians every shift, from the first day as an intern.

NEW YORK ACEP
American College of Emergency Physicians
ADVANCING EMERGENCY CARE

2023 Scientific Assembly Research Forum
Call for Abstracts

The New York American College of Emergency Physicians is now accepting abstracts for review for oral and poster presentation at the 2023 Scientific Assembly, July 11-13, at the Sagamore Resort on Lake George in Bolton Landing, New York.

The **Research Forum**, including both oral and poster presentations, will be held Tuesday, July 11 at 1:30 pm. This forum is designed to feature and foster resident and faculty research. Topics may address the broad range of emergency medicine practice and educational development. Preference will be given to work completed at the time of submission. Authors and institutions should not be identified in any way on the page containing the abstract.

Abstract submissions must be submitted online here and must include the following subsections, Title, Objectives, Methods (include design, setting, type of participants), Results and Conclusion. The abstract should be written in complete sentences using grammatically correct English. Spell out all abbreviations on first usage. Abstracts are limited to 3,000 characters (excluding spaces). Accepted abstracts will be published as received; no copy editing will be done.

Illustrations are discouraged; however, if critical, one (1) small table may be included. Figures, tables and photos must be black and white with a resolution of at least 300 dpi. Note: tables, figures and illustrations will be considerably reduced when published causing loss of detail. Please consider this when determining whether to include these. The online submission form identifies all information required for each submission.

Case Reports/Series are not accepted.

Although we are interested in original work, consideration will be given to abstracts presented at other conferences (SAEM, ACEP), as long as a manuscript has not been published at time of submission.

Oral presentations will be allocated 10 minutes followed by 5 minutes of Q&A. Twenty-four poster presentations will be allocated 5 minutes followed by 3 minutes of Q&A. All presenters (oral or poster) are expected to have had a significant role in the execution and report preparation of the project being presented.

About the Process: There will be a blind review of all abstracts. Notification letters will be sent April 24, 2023. We regret we cannot give notification information by telephone.

Submission Deadline: April 1, 2023

PEDIATRICS

Geoff W. Jara-Almonte, MD
Associate Residency Director, Department of Emergency Medicine
Icahn School of Medicine at Mount Sinai

Pediatric Hypothermic Cardiac Arrest

In general, out-of-hospital cardiac arrest – pediatric or adult – is associated with dismal outcomes. However, there are specific situations in which good aggressive resuscitative care can make a tremendous difference and one of those is arrest due to accidental hypothermia. Consider the case of a Polish toddler who was presumed to have wandered out of the house in the middle of the night while temperatures were as low as -7C. He was found several hours later wearing only his pajama top and in cardiac arrest. He was evacuated to a referral center specializing in treating profound hypothermia where his core temperature was measured as low as 11.8C. He was placed on an ECMO circuit and rewarmed over several hours, eventually going on to make a full neurological recovery. The total downtime for the patient is unknown, but at least two hours elapsed before first responder arrival and ECMO initiation.[1]

As a resident training in Minnesota a similar case occurred when a car carrying several children ranging from infant to school-aged crashed into an icy lake and became submerged. The children were brought to the emergency department (ED) all in cardiac arrest. ECMO was not available, so all children were re-warmed with thoracic lavage, and after a prolonged effort, three regained spontaneous circulation and ultimately made a good recovery.

While hypothermic arrest is intuitively associated with northern climes, frozen lakes and mountain recreation, the truth is the combination of environmental factors that could result in critical hypothermia is present throughout the continental US. Therefore, emergency providers should be prepared – both cognitively and emotionally – to provide a prolonged and aggressive resuscitation attempt for children who suffer cardiac arrest due to accidental hypothermia. Publication bias not-with-standing, the literature that describes our clinical experience with hypothermic arrest victims supports three important conclusions: patients can survive prolonged periods of cardiac arrest, patients can survive deeply hypothermic temperatures and the majority of patients who do survive have minimal or no disability.

Accidental Hypothermia

Accidental hypothermia occurs when heat loss exceeds endogenous heat production. Due to their larger surface-area to volume ratio, immature behavioral response to cold and other social and environmental factors, children have unique risks of accidental hypothermia as compared to adults. Treatment guidelines are based primarily upon clinical experience, extrapolation from non-human studies and first principles. Pediatric-specific recommendations are lacking.

There are several grading scales used to risk stratify hypothermic patients (Table 1). Practically speaking both clinical presentation or temperature reading may be misleading in isolation and it is important to consider the whole clinical context. If there is one temperature to keep in mind it is 30C as primary hypothermic cardiac arrest is unlikely at warmer temperatures and there is increasing risk of cardiac arrest at temperatures below this level.

Table 1

Swiss Model of Hypothermia Staging[2]		
HTI (Mild)	Normal level of consciousness with shivering	32C – 35C
HT2 (Moderate)	Impaired consciousness without shivering	28C – 32C
HT3 (Severe)	Unconsciousness	25C – 28C
HT4 (Profound)	Apparent Death	< 24C
HT5 (Death due to Hypothermia)	Irreversible death due to hypothermia	< 13.7C
Wilderness Medical Society[3]		
Mild	Normal mental status, shivering, but not functioning normally	32C – 35C
Moderate	Abnormal mental status with shivering or abnormal mental status without shivering but conscious	28C – 32C
Severe / Profound	Unconscious	<28C
Modified Swiss System[4]		
Stage 1	Alert (from AVPU Scale)	Low risk of cardiac arrest
Stage 2	Verbal (from AVPU Scale)	Moderate risk of cardiac arrest
Stage 3	Painful or Unconscious (from AVPU Scale) with vital signs	High risk of cardiac arrest
Stage 4	Unconscious (from AVPU Scale) and no detectable vital signs	Hypothermic cardiac arrest

Rewarming in Cardiac Arrest

For the remainder of this article, we will focus on patients with severe or profound hypothermia in circulatory arrest being cared for in an emergency department. The mainstay of treatment for these patients is aggressive rewarming and this will be the focus of the discussion. Field management and transport considerations, management of hypothermia in the patient with a perfusing rhythm and modifications to standard PALS and ACLS protocols such as limited attempts at defibrillation avoidance of epinephrine are beyond the scope of this discussion.

Extracorporeal Rewarming

Most case reports demonstrating the possibility of excellent clinical outcomes have utilized extracorporeal rewarming with cardio-pulmonary bypass (CBP) or veno-arterio extracorporeal membrane oxygenation circuits (VA-ECMO) to rewarm patients. This clinical experience has demonstrated the rapidity with which euthermia can be achieved via extracorporeal rewarming. In the case above, for example, the patient was warmed from 11.8C to 29C in 70 minutes. AHA guidelines recommend extracorporeal rewarming as the gold standard when available.[5] European guidelines recommend field triage of patients with cardiac arrest presumed to due to hypothermia to an ECMO center.[6] In addition to ECMO, hemodialysis is an option for extracorporeal rewarming for those patients who are not in cardiac arrest.

It is worth noting much of this literature comes from Europe and specifically health systems that have established centers prepared to rapidly initiate extracorporeal life support in hypothermic arrest victims. Extrapolating this clinical experience to the United States may be fraught, as such clear referral mechanisms and specialized hypothermia centers are lacking. Arranging transfer of a critically ill patient in cardiac arrest for the purpose of extracorporeal life support and rewarming is not standard practice for most emergency providers. Having contacted potential referral centers and discussed indications and mechanisms for transfer ahead of time may expedite the process if and when such a case occurs.

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Two groups have attempted to define clinical decision rules to identify patients likely to benefit from extracorporeal rewarming. Pasquier et al derived the HOPE rule based on records from 286 patients with hypothermic cardiac arrest who underwent extracorporeal rewarming. It can be accessed at http://www.hypothermiascore.org/.[7] It is not clear how many pediatric patients were included in this cohort, but the median age was 35 with the lower end of the IQR at 16 years, so it may not be applicable to younger patients. Saczkowski at al used a similar methodology with a cohort of 658 patients to derive the ICE survival score; again, the median age of the cohort was 36 with the lower end of the IQR at 22 years.[8]

Non-Extracorporeal Rewarming

In patients in whom extracorporeal rewarming is not possible, a variety of techniques have been described. One single-institution study identified 17 different combinations of rewarming techniques utilized in 106 patients with moderate to profound hypothermia, including 22 cardiac arrest patients. This suggests that a degree of therapeutic equipoise exists when considering non-extracorporeal rewarming techniques and it would behoove the emergency provider to be familiar with multiple options as the optimal choice may vary based upon patient factors, resource availability and technical skill.[9]

Warm Fluid Lavage

Lavage of body cavities with warmed saline is a second-line method for active internal rewarming but is the one most readily available to emergency clinicians if ECMO is not an option. Thoracic, peritoneal, gastric and bladder irrigation have all been described. Due to the invasive nature of thoracic and peritoneal lavage, it may be reasonable to defer rewarming via these techniques until it has been determined extracorporeal techniques will not be available, as ECMO does require anticoagulation.

Thoracic lavage can be accomplished by placement of a thoracostomy catheter and instilling warm saline into the thoracic cavity. This has the theoretical advantage of rapidly rewarming the great vessels and heart. The classically described technique is to place bilateral anterior thoracostomy catheters in the mid-clavicular line at the second intercostal space and bilateral lateral catheters in the mid-axillary line at the fifth intercostal space. The lateral catheter should be directed inferio-posteriorly, as would be done for evacuation of a pleural effusion. Warmed saline may be instilled through the anterior catheter and suctioned through the lateral catheter. Effective rewarming utilizing only a single thoracostomy catheter with intermittent instillation and drainage of lavage fluid has also been reported.

Placement of thoracostomy catheters, particularly anteriorly, is technically challenging with ongoing CPR, it may be reasonable to pause compressions for catheter placement. In patients with severe and profound hypothermia, good neurological recovery has been observed with intermittent CPR. Small bore catheters may be used however, it is probably preferable to utilize an open surgical approach to thoracostomy placement as opposed to a Seldinger technique as the absence of air or fluid between the lung parenchyma and parietal pleura may lead to inadvertent placement of the catheter within the lung parenchyma with a Seldinger approach.

The logistics of actually warming and administering saline may be complicated. Use of a rapid fluid warmer / infuser such as the Level 1 or Belmont provide one convenient solution, however there may be limitations to infusion rate at the upper-end of the temperature spectrum. In addition, this requires the use of a thoracostomy catheter with a Leuer-lock compatible end or the use of a christmas-tree to Leuer-lock adapter to connect the thoracostomy drain to the fluid warmer tubing. Ensuring availability of equipment and having a plan in place ahead of time may minimize the delay to rewarming. Others have described use of a catheter tipped syringe to instill warm fluid directly in the end of the chest tube. Other options that have been described for warming fluids include maintaining a supply of pre-warmed bags of crystalloid, microwave warming and use of warmed tap water.

Peritoneal lavage may be accomplished by performing a mini-laparotomy incision and placement of small catheter akin to performing a diagnostic peritoneal lavage. Options for instilling warmed saline are similar to thoracic lavage above. In general, this will require surgical consultation to gain access to the peritoneal cavity.

Bladder lavage may be accomplished via placement of a three-way foley catheter and continuous irrigation or use of a regular foley and intermittent instillation and drainage of warmed fluid. Gastric lavage may be accomplished by placement of an orogastric or nasogastric tube and intermittent instillation and drainage of warmed water.

Intravascular Rewarming

Intravascular heat exchange catheters initially designed to facilitate therapeutic hypothermia in post-cardiac arrest patients may also be used for active internal rewarming of hypothermic patients. These catheters utilize a central venous catheter that contains balloons which may be filled with warmed fluid once connected to an external warming system. The system uses a countercurrent head exchange system to warm or cool central venous blood. In one retrospective review use of such a system achieved rates of rewarming (1.2 C/hr) similar to that of more invasive techniques such as thoracic lavage.[10] If available, such a system may replace or augment thoracic lavage with the advantage of being less resource-intensive and lower-risk to patients and providers. The size of the catheters limit their use in smaller children, but may be an option for adolescent patients.

Ancillary Techniques

Use of warmed IV fluids and warm-air ventilation have also been reported, however are generally considered insufficient to achieve adequate rewarming for the patient in cardiac arrest when used in isolation.

Conclusion

Hypothermic cardiac arrest is an infrequent emergency, but one which the pediatric emergency provider must be prepared to manage. It is a rare situation in our specialty in which aggressive resuscitative care may be reasonably expected to reverse a seemingly dismal condition. The most important things that a provider can do for these patients is try hard and prepare ahead of time. Providing optimal therapy – whether by referring the patient to an ECMO center or providing aggressive active internal rewarming – requires complex coordination of health system resources, performance of unfamiliar procedures and the ability to harness the efforts of a large team of providers. Planning strategies to accomplish the

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goals ahead of time can maximize a child's chances of survival.

References

1. Mroczek, Tomasz, Marcin Gladki, and Janusz Skalski. "Successful resuscitation from accidental hypothermia of 11.8° C: where is the lower bound for human beings?." *European Journal of Cardio-Thoracic Surgery* 58.5 (2020): 1091-1092.

2. Strapazzon, Giacomo, et al. "International Commission for Mountain Emergency Medicine Consensus Guidelines for on-site management and transport of patients in canyoning incidents." *Wilderness & Environmental Medicine* 29.2 (2018): 252-265.

3. Dow, Jennifer, et al. "Wilderness medical society clinical practice guidelines for the out-of-hospital evaluation and treatment of accidental hypothermia: 2019 update." *Wilderness & environmental medicine* 30.4 (2019): S47-S69.

4. Musi, Martin E., et al. "Clinical staging of accidental hypothermia: the revised Swiss system: recommendation of the International Commission for mountain emergency medicine (ICAR MedCom)." *Resuscitation* 162 (2021): 182-187.

5. Vanden Hoek, Terry L., et al. "Part 12: cardiac arrest in special situations: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care." *Circulation* 122.18_suppl_3 (2010): S829-S861.

6. Lott, Carsten, et al. "European Resuscitation Council Guidelines 2021: cardiac arrest in special circumstances." *Resuscitation* 161 (2021): 152-219.

7. Pasquier, Mathieu, et al. "Hypothermia outcome prediction after extracorporeal life support for hypothermic cardiac arrest patients: the HOPE score." *Resuscitation* 126 (2018): 58-64.

8. Saczkowski, Richard S., et al. "Prediction and risk stratification of survival in accidental hypothermia requiring extracorporeal life support: an individual patient data meta-analysis." *Resuscitation* 127 (2018): 51-57.

9. Klein, Lauren R., et al. "Endovascular rewarming in the emergency department for moderate to severe accidental hypothermia." *The American journal of emergency medicine* 35.11 (2017): 1624-1629.

10. Klein, Lauren R., et al. "Endovascular rewarming in the emergency department for moderate to severe accidental hypothermia." *The American journal of emergency medicine* 35.11 (2017): 1624-1629.

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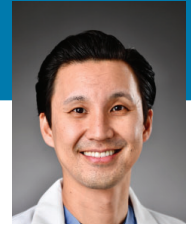
Conceptualizing a Team Based Approach for Boarding Psychiatric Patients in the Emergency Department

Behavioral and psychiatric complaints make up a significant proportion of patients cared for in the Emergency Department (ED) nationwide. Recent work found ED visits related to psychiatric complaints increased over 15% between 2007-2011.[1] Many of these psychiatric complaints, such as suicidal ideation or severe depressive/anxiety episodes, may necessitate inpatient psychiatric hospitalization for further specialized care and treatment. Like many of our other patients, psychiatric patients in the ED may face a prolonged stay in the ED while awaiting inpatient beds. Psychiatric patients face a number of unique challenges in the ED setting that may make them at elevated risk for adverse outcomes during their acute care. Patients with psychiatric chief complaints are two times more likely to require inpatient admission and also experience significant lengths of stay. One study found patients with psychiatric complaints had a mean length of stay in the ED of 16.5 hours and over 21.5 hours for those needing transfer to another institution for inpatient care.[2, 3] Patients with severe depression or other mood disorders may also be at increased risk for possible self-injury or harm in the ED while awaiting further psychiatric care. For the practicing emergency physician tasked with managing multiple critically ill patients, what are some approaches that can help support these patients and ensure smooth transitions of care?

Interdisciplinary approaches with mental health specialists may lead to improved safety outcomes and also enhance the experience of patients with psychiatric complaints. In this recent work by a multi-specialty team composed of Emergency Physicians, Psychiatrists, Security, Hospital Administration and Nurses,[4] a comprehensive safety program was crafted with the aim of reducing adverse events such as events of attempted self-harm. The protocol was an iterative process, involving a diverse group of stakeholders from clinicians to security staff and hospital legal counsel. The group first reviewed all historical incidents of self-harm reported in their ED prior to the implementation of their program and identified a series of areas for potential intervention. This included: safe bathrooms, number/training of patient observers, management of personal belongings, clothing search/removal and additional enhanced protocols for high-risk patients. Based on these initial qualitative approaches, the team implemented a comprehensive multi-level care approach for their psychiatric patients. The approach attempted a balance of patient safety while also recognizing and focusing on patient experience. For example, details such as making shatterproof fixtures and removal of wastebasket liners to minimize ligature risks focused on the prevention of potential tools for self-injury while additional training for patient observers was done to help find the balance between patient visualization in the bathroom while being minimally intrusive. For some of the most high-risk patients (identified by factors such as repeated episode of self-harm), patients underwent enhanced procedures including 1:1 observation, possible additional search of the patient and/or belongings and expedited psychiatry consultation. Following the implementation of this protocol,

the authors reported a reduction in episodes of attempted self-arm with half the number of cases reported compared to the year prior (1.33 per 1,000 at risk patients compared to 2.95 per 1,000 at risk patients the year before the program).

While this project was a quality/operations program in a high-volume ED with a large number of psychiatric patients, given the relative rarity of self-harm in the ED setting, the study may not be powered (e.g. large enough to detect a statistical change) for us to make definitive conclusions about the efficacy of their specific intervention. Also, many EDs may not have access to 24-hour inhouse psychiatric consultation or liaison on site, making some of the interventions proposed difficult in other care practice settings. However, this study represents an important contribution to our understanding of management strategies for the boarding psychiatric patient. Some of the broad takeaways from this study may be applicable to a wide breadth of practice settings. First, similar to the adage of scene safety when assessing the field for EMS providers, emergency providers should consider and mitigate any potential opportunities for self-harm or harm to others for patients with acute psychiatric illness. Additionally, early coordination and conversation with mental health specialists is important, particularly as the search for placement for psychiatric patients requiring inpatient psychiatric hospitalization may be a prolonged process. Lastly, as for all of our patients, treating and addressing our patients with acute psychiatric illness with compassion and respect is vital; while patient satisfaction data was not collected in this study, future work involving all key stakeholders, including the patients themselves, can help shed light on what aspects of the acute care experience can help enhance and minimize the adverse behavioral outcomes in the emergent setting.

Behavioral and psychiatric emergencies continue to represent some of the most challenging clinical cases. A multidisciplinary approach focused on patient safety and harm reduction, represents a promising and innovative approach that can lead to improved patient care, positive health outcomes and ensure the safety of this vulnerable group of patients.

References

1. Weiss AJ, Barrett ML, Heslin KC, Stocks C. Trends in emergency department visits involving mental and substance use disorders, 2006–2013: statistical brief# 216. 2017.
2. Owens PL, Mutter R, Stocks C. Mental health and substance abuse-related emergency department visits among adults, 2007: statistical brief# 92. 2011.
3. Pearlmutter MD, Dwyer KH, Burke LG, Rathlev N, Maranda L, Volturo G. Analysis of emergency department length of stay for mental health patients at ten Massachusetts emergency departments. *Annals of emergency medicine.* 2017;70:193-202. e116.
4. Donovan AL, Aaronson EL, Black L, et al. Keeping patients at risk for self-harm safe in the emergency department: a protocolized approach. *The Joint Commission Journal on Quality and Patient Safety.* 2021;47:23-30.

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Making Sense of Your Board Certification (and Recertification) Requirements

As we closed out 2022, I was reminded every year around this time, physicians reach out for help clarifying their board certification or recertification requirements. There seems to be a lot of confusion around this area, so I think this would a good time to give everyone a primer on the topic and hopefully get a head start on your requirements. This article is going to address certification by American Board of Emergency Medicine (ABEM) and their recent changes.[1] We can devote a future article on ABOEM certification.

Becoming Board Certified

Part One: The Application. During your final year of EM residency, you will be able to apply for initial certification. This simply means you fill out an application on the ABEM website and pay $420. Typically, this application is available starting in April. The cost of this application doubles in September, so be sure to complete this application as soon as possible. Most of you will need to submit your application by October 14, 2023. If you do not complete the application in this window, you will be considered late and will have additional certification requirements to complete. Note this application and fee is the first required step to board certification and is NOT the same as applying to take the exam, that comes next. *Pro-tip: some senior residents use left-over residency/educational funds to pay for this, so think about that when you plan on your spending for the year.*

Part Two: The Qualifying Exam. Once you complete residency, your program director (PD) will certify to ABEM you graduated and are eligible to take the EM qualifying exam (i.e. written exam). In order to take the exam you must hold a valid medical license or be enrolled in a fellowship program. Once ABEM has approved your application (see Part One above) and your PD verifies your training, you can pay $960 and register for the exam. The qualifying exam is being offered October 30 - November 4, 2023. Again, don't be late registering, not only will you have difficulty finding a time and date that works for you, but the exam fee doubles. The exam is 305 questions, taken at a Pearson Vue center over eight hours. Make sure you review the content, format and instructions on the ABEM website. You should expect to get your exam results within 90 days.

For the 2022 written exam the overall pass rate was 88%, with a pass rate of 91% for first-time takers. The passing score was 77 on this exam. It should be noted this pass rate ~90% is very similar to the pass rate over the last four decades. In the past, ABEM has published exam pass rates which indicate that delaying the exam one year from graduation showed a decrease pass rate to 85% and delaying two years from graduation showed a decrease to 81%. As senior residents and new graduates are making plans for the first year, they should strongly consider this data.[2]

Part Three: The Oral Exam. Once you pass the qualifying exam, you are now ready to register for the oral exam and pay a $1,255 fee. As with Parts 1-2, ensure you register within the window to avoid significant late fees. The oral exam is given for one week in May, September, and December and you will be assigned one of those weeks once you register. The oral exam will continue to be administered virtually, consisting of seven cases, six single patient cases and one structured interview case, all lasting 15 minutes each. You should receive your score within 90 days and once you pass you are officially recognized as a Board Certified Emergency Physician.

Board Recertification

The process of maintaining your board certification has changed significantly over the last few years. The most important piece of advice I can give is to log onto the ABEM online portal where you will find a personalized list of the specific requirements you need to complete. If you want a general idea without logging in check their requirements page.[3] The biggest change is that there is NO more written exam for recertification. The second major change is that the continuing certification cycle is now five years (not 10 years). *Note that depending on when your completed your current certification, you may have slightly different requirements. See your ABEM Portal for your individual requirements*

Here is what you need to do:

Pay the fee of $300/year to maintain your certification. This fee covers the cost of the MYEMcert modules. You can also pay a lump sum for the five years ($1,500) rather than paying annually.

Complete four MYEMCert online modules in the five years. These are open book, online quizzes of 50 questions. You have four hours to complete a module and they can be paused. There are currently eight modules to pick from. The content is 80% from the module topic + 20% key EM advances. The key advances don't necessarily have anything to do with the specific module topic.[4] You can find the key advances on the ABEM website, which will help you answer those questions. You will get your score immediately upon completing the module.

Improvement in Medical Practice (IMP) - Every clinically active physician must complete one patient care practice improvement (PI) activity in five years. The activity you choose must measure a minimum of 10 patients with a condition/situation, compare it to a standard, implement a PI plan and re-measure. There is a long list of examples on the ABEM website,[5] but every department in the US is involved in a variety of PI activities around things such as throughput metrics, sepsis, stroke, trauma, patient satisfaction, patient safety, etc.. Just reach out to your ED Director and ask about what you can work on. You are required to indicate what you worked on and name someone that can verify that work. About 5% of the time ABEM will reach out to that person to verify your PI activity. Neither yourself, nor your verifier needs to show the specific work that was done.

You must attest to compliance with

ABEM's Policy on Medical Licensure and ABEM's Code of Professionalism.[6]

LLSA (Lifelong Learning and Self-Assessment) is an open book exam based on a set of readings. For those in a 10-year re-certification cycle, you needed to complete four tests in the first five years. Going forward, LLSA will no longer be required as part of this new recertification program. Again, see your portal page to determine your LLSA requirement.

You must typically complete all these activities by December 31 of the year your recertification expires. No matter what date you have completed all of the tasks, you will automatically be re-certified January 1. If you complete your requirements in June, you will see no change in status until the following January. You will be able to see your updated status on the ABEM website and you will be sent your physical certificate in the mail in January.

A last few notes:

Board Eligibility – If you complete EM residency and have a valid medical license (or in fellowship), ABEM considers you Board Eligible for five years. In order to extend eligibility, you must complete the qualifying exam plus some additional requirements. If you do not become board certified after this second period, you need to apply for a special program to become eligible again. Reach out to ABEM to discuss your specific situation.

Fellowship Graduates – There are different rules and requirements regarding certification and recertification for subspecialties. Check with the appropriate certifying board for information about your subspecialty certification.

CME – You can obtain 60 CME credits for successfully passing the oral exams for free if you agree to allow your contact information to be shared with the AMA. You can also obtain CME credits for completed LLSA and MYEM-Cert modules. The cost is $30 per module (for varying amounts of credit).

I hope you found this helpful and gives you some incentive to tackle your requirements as early as possible in the year. Happy New Year and good luck.

References

1. https://www.abem.org/public/
2. https://www.annemergmed.com/article/S0196-0644(13)00890-1/fulltext
3. https://www.abem.org/public/stay-certified/cert-requirements
4. https://www.abem.org/public/stay-certified/my-emcert/key-advances
5. https://www.abem.org/public/stay-certified/improvement-in-medical-practice-(imp)/acceptable-types-of-pi-activities
6. https://www.abem.org/public/docs/default-source/policies-faqs/abem-code-of-profes-

2023 VIRTUAL MEDICAL STUDENT SYMPOSIUM

April 5, 2023 | 6:00 - 9:00 pm

REGISTER NOW > Registration is FREE (pre-registration is required).

This evening program highlights critical issues for medical students considering a career in emergency medicine. Presentations include insights into:
- How to Nail Down Your EM Audition Rotations (How to Present a Patient to an Attending)
- Great Resources to Use in the ED (i.e., apps)
- What to Look for in a Program
- How to Ace the EM Interview

6:00 - 7:20 pm : General Session
7:20 - 7:30 pm : Break
7:30 - 9:00 pm : Residency Fair Q&A

NEW YORK STATE OF MIND

Theodore J. Gaeta, DO MPH FACEP
Residency Program Director
NewYork-Presbyterian Brooklyn Methodist Hospital

Emergency Medicine Residents' Perceptions of Working and Training in a Pandemic Epicenter: A Qualitative Analysis

Aurrecoechea A, Kadakia N, Pandya JV, Murphy MJ, Smith TY; SUNY Downstate Health Sciences University, Department of Emergency Medicine, Brooklyn; West J Emerg Med; 2022 Dec 30.

INTRODUCTION: We sought to describe the range of emergency medicine (EM) resident physicians' perceptions and experiences of working and training during the initial coronavirus 2019 (COVID-19) pandemic surge at two, large-volume, urban training hospitals in Brooklyn, New York.

METHODS: A total of 25 EM resident physicians who worked at either of two large emergency departments (ED) from March 15-April 11, 2020 participated in semi-structured interviews conducted in July and August 2020. Interviews were conducted by the authors who were also emergency medicine resident physicians working in the ED during this time. We asked open-ended questions to residents about their experiences and emotions at work and outside of work, including their relationship with co-workers, patients, and their community. The interviews were audio-recorded and transcribed. We then conducted a thematic analysis to identify, classify, and define themes from interview transcripts. Iterative commonalities and differences between interview response themes were grouped to create a broadly applicable narrative of the residents' perceptions and experiences of working and training during this initial wave of a novel pandemic. Interviewees also responded to a demographics survey.

RESULTS: Study participants described four major aspects of their perceptions and experiences of working and training during the stated time, including emotional challenges such as anxiety and feeling underappreciated; protective thoughts, including camaraderie, and sense of duty; workplace challenges such as limited knowledge surrounding COVID-19 and a higher volume of acute patients; and adaptive strategies including increased communication with ED administrators.

CONCLUSION: Emergency medicine residents have a unique perspective and were key frontline hospital responders during a prolonged disaster and mass triage event within a local health system. Considering the chronic case and mortality fluctuations and new variants of COVID-19, as well as the anticipation of future infectious disease pandemics, we believe it is important for key decision-makers in resident education, hospital administration, and all levels of public health management to inform themselves about residents' emotional and workplace challenges when establishing hospital and residency program disaster protocols.

Hip Effusions or Iliopsoas Hematomas on Ultrasound in Identifying Hip Fractures in the Emergency Department

Cohen A, Li T, Greco J, Stankard B, Mingione P, Huang V, Gold A, Zarider N, Nutovits A, Nelson M; Department of Emergency Medicine, North Shore University Hospital, Manhasset; Am J Emerg Med; 2022 Dec 1;64:129-136.

OBJECTIVE: We evaluated the sensitivity, specificity, predictive values, and likelihood ratios of hip effusion and/or iliopsoas hematoma on point-of-care ultrasound (POCUS) performed by ultrasound fellows and fellowship trained emergency providers to identify hip fractures in emergency department (ED) patients with a high suspicion of hip fracture.

METHODS: This was a prospective observational study of a convenience sample of patients with high suspicion of hip fracture at two academic EDs between 2018 and 2021. Patients with negative x-rays who did not receive further imaging with magnetic resonance imaging (MRI) or computed tomography (CT) were excluded. Sonographers were blinded to clinical data and ED imaging results. At the primary site, eight ultrasound fellows and four emergency ultrasound fellowship-trained emergency providers performed the ultrasonographic examinations. At the secondary site, two ultrasound fellows, four emergency ultrasound-fellowship trained physicians, and one sports medicine fellowship-trained emergency provider performed the ultrasonographic examinations. A positive ultrasound was defined as either the presence of a hip effusion or iliopsoas hematoma on the affected extremity. The primary outcome measures were sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (LR+), and negative likelihood ratio (LR-) of POCUS findings for identification of a hip fracture compared with a ranked composite reference standard consisting of x-ray, CT, or magnetic resonance imaging (MRI); the highest-level test performed for each patient was used for comparison.

RESULTS: Among 213 patients analyzed, all 213 received an x-ray, 116 received a CT scan, and 14 received an MRI; 113/213 x-rays (53.1%), 35/116 CT scans (30.2%), and 7/14 MRIs (50.0%) were positive for a hip fracture. A total of 123 patients were diagnosed with a hip fracture (57.7%). There were 13 false negative x-ray results. Overall, compared with the reference standard of x-ray, CT, or MRI, POCUS had a sensitivity of 97% (95% CI: 94%, 100%), specificity of 70% (95% CI: 61%, 79%), PPV of 82% (95% CI: 75%, 88%), and NPV of 94% (95% CI: 88%, 100%) in the identification of hip fractures; with a positive likelihood ratio of 3.22 (95% CI: 2.35, 4.43) and negative likelihood ratio of 0.05 (95% CI: 0.02, 0.12).

CONCLUSION: In a convenience sample of ED patients with high clinical suspicion for hip fracture, the presence of a hip effusion and/or iliopsoas hematoma on POCUS performed by expert emergency ultrasonographers showed high sensitivity in diagnosing patients with a hip fracture.

Perceptions of the Healthcare System Among Black Men with Previously Undiagnosed Diabetes and Prediabetes

Rony M, Quintero-Arias C, Osorio M, Ararso Y, Norman EM, Ravenell JE, Wall SP, Lee DC; Department of Emergency Medicine, NYU School of Medicine, New York; J Racial Ethn Health Disparities; 2022 Dec 15.

OBJECTIVE: Given the significant disparities in diabetes burden and access to care, this study uses qualitative interviews of Black men having HbA1c levels consistent with previously undiagnosed diabetes or prediabetes to understand their perceptions of the healthcare system.

RESEARCH DESIGN AND METHODS: We recruited Black men from Black-owned

barbershops in Brooklyn, NY, who were screened using point-of-care HbA1c tests. Among those with HbA1c levels within pre-diabetes or diabetes thresholds, qualitative interviews were conducted to uncover prevalent themes related to their overall health status, health behaviors, utilization of healthcare services, and experiences with the healthcare system. We used a theoretical framework from the William and Mohammed medical mistrust model to guide our qualitative analysis.

RESULTS: Fifty-two Black men without a prior history of diabetes and an HbA1c reading at or above 5.7% were interviewed. Many participants stated that their health was in good condition. Some participants expressed being surprised by their abnormal HbA1c reading because it was not previously mentioned by their healthcare providers. Furthermore, many of our participants shared recent examples of negative interactions with physicians when describing their experiences with the healthcare system. Finally, several participants cited a preference for incorporating non-pharmaceutical options in their diabetes management plans.

CONCLUSION: To help alleviate the disparity in diabetes burden among Black men, healthcare providers should take a more active role in recognizing and addressing their own implicit biases, engage in understanding the specific healthcare needs and expectations of each patient, and consider emphasizing non-medication approaches to improve glycemic control.

Factors Influencing the Conduction of Confidential Conversations with Adolescents in the Emergency Department: A Multi-Center, Qualitative Analysis

Chernick LS, Bugaighis M, Britton L, Cruz AT, Goyal MK, Minstry RD, Reed JL, Bakken S, Santelli J, Dayan PS; Department of Emergency Medicine, Columbia University Irving Medical Center, New York; Acad Emerg Med; 2022 Dec 8.

BACKGROUND: Health care professionals (HCPs) in the emergency department (ED) frequently must decide whether to conduct or forego confidential conversations with adolescent patients about sensitive topics, such as those related to mental health, substance use, and sexual and reproductive health. The objective of this multi-center qualitative analysis was to identify factors that influence

the conduct of confidential conversations with adolescent patients in the ED.

METHODS: In this qualitative study, we conducted semi-structured interviews of ED HCPs from five academic, pediatric EDs in distinct geographic regions. We purposively sampled HCPs across gender, professional title, and professional experience. We used the Theoretical Domains Framework (TDF) to develop an interview guide to assess individual and system-level factors affecting HCP behavior regarding the conduct of confidential conversations with adolescents. Enrollment continued until we reached saturation. Interviews were recorded, transcribed, and coded by three investigators based on thematic analysis. We used the coded transcripts to collaboratively generate belief statements, which are first-person statements that reflect shared perspectives.

RESULTS: We conducted 38 interviews (18 physicians, 11 registered nurses, five nurse practitioners and four physician assistants). We generated 17 belief statements across nine TDF domains. Predominant influences on having confidential conversations included self-efficacy in speaking with adolescents alone, wanting to address sexual health complaints, maintaining patient flow, experiencing parental resistance and limited space, and having inadequate resources to address patient concerns and personal preconceptions about patients. Perspectives divided between wanting to provide focused medical care related only to their chief complaint versus self-identifying as a holistic medical HCP.

CONCLUSION: The factors influencing the conduct of confidential conversations included multiple TDF domains, elucidating how numerous intersecting factors influence whether ED HCPs address sensitive adolescent health needs. These data suggest methods to enhance and facilitate confidential conversations when deemed appropriate in the care of adolescents in the ED.

Reducing Unnecessary 'Admission' Chest X-rays: An Initiative to Minimize Low-Value Care

Iyeke L, Moss R, Hall R, Wang J, Sandhu L, Appold B, Kalontar E, Menoudakos D, Ramnarine M, LaVine SP, Ahn S, Richman M; Emergency Department, Northwell Health Long Island Jewish Medical Center; Cureus; 2022 Oct 1;14(10):e29817.

INTRODUCTION: Internal medicine admission services often request a baseline admission chest X-ray (CXR) for patients already admitted to the emergency department (ED) and who are waiting for inpatient beds, despite rarely providing clinical value. Adverse consequences of such CXRs include unnecessary radiation exposure, cost, time, and false positives, which can trigger a diagnostic cascade. Extraneous CXRs performed on already-admitted ED patients can delay inpatient transfer, thereby increasing boarding and crowding, which in turn may affect mortality and satisfaction. In 2016, our ED and internal medicine hospitalist services implemented guidelines (reflecting those of the American College of Radiology) to reduce unnecessary admission CXRs. All relevant providers were educated on the guideline. The primary aim of this study was to determine if there were changes in the percentage of patients with pre-admission and admission CXRs following guideline implementation. Our secondary aim was to determine which patient characteristics predict getting a CXR.

METHODS: All ED and internal medicine hospitalist providers were educated once about the guideline. We performed a retrospective analysis of pre- vs. post-guideline data. Patients were included if admitted to the internal medicine service during those timeframes with an admission diagnosis unrelated to the cardiac or pulmonary systems. A CXR performed during ED evaluation prior to the admission disposition time was recorded as "pre-admission," and if performed after disposition time it was recorded as "admission." A CXR was "unwarranted" if the admission diagnosis did not suggest a CXR was necessary. The numerator was the number of unnecessary admission CXRs ordered on patients with diagnoses unrelated to the cardiac or pulmonary systems (minus those with a pre-admission CXR); the denominator was the number of such admissions (minus those with a pre-admission CXR). Variables of interest that might influence whether a CXR was ordered were age, gender, respiratory rate ≥ 20, cardiac- or pulmonary-related chief complaint, ED diagnosis category, or past medical history.

RESULTS: Among admitted patients with diagnoses that did not suggest a CXR was warranted, there was no change in the percentage of admission CXRs (21.7% to 25.6%, p =

0.2678), whereas the percentage with pre-admission CXRs decreased (66.6% to 60.7%, p = 0.0152). This decrease was driven by fewer CXRs being performed on patients whose chief complaint did not suggest one was indicated (p = .0121). In multivariate analysis, risk factors for an unwarranted CXR were age >40 (risk ratio (RR) = 2.9) and past medical history of cardiovascular disease (e.g., myocardial infarction, atrial fibrillation), renal disease, or hyperkalemia.

CONCLUSION: This educational initiative was not associated with the intended decrease in ordering unwarranted admission CXRs among ED boarding patients, though there was an unanticipated decrease in pre-admission CXRs. This decrease was driven by fewer CXRs being performed on patients whose chief complaint did not suggest one was indicated. Organizations interested in reducing processes with little clinical value might adopt a similar program while emphasizing the lack of benefit to admitted patients through iterative educational programs on hospital admitting services.

Emergency and Post-Emergency Care of Older Adults With Alzheimer's Disease/Alzheimer's Disease Related Dementias

Hill JD, Schmucker AM, Siman N, Goldfeld KS, Cuthel AM, Chodosh J, Bouillon-Minois JB, Grudzen CR; Ronald O. Perelman Department of Emergency Medicine, New York University Grossman School of Medicine, New York; J Am Geriatr Soc; 2022 Sep;70(9):2582-2591.

BACKGROUND: The emergency department (ED) is a critical juncture in the care of persons living with dementia (PLwD), as they have a high rate of hospital admission, ED revisits and subsequent inpatient stays. We examine ED disposition of PLwD compared with older adults with non-dementia chronic disease as well as healthcare utilization and survival.

METHODS: Medicare claims data were used to identify community-dwelling older adults 66+ years old from 34 hospitals with either Alzheimer's disease/Alzheimer's disease related dementias (AD/ADRD) or a non-AD/ADRD chronic condition between January 1, 2014, and December 31, 2018. We compared ED disposition at the index visit, as well as healthcare utilization and mortality in the 12 months following an index ED visit, and adjusted for age, gender, and risk of mortality.

RESULTS: There were 29,626 patients in the AD/ADRD sample, and 317,046 in the comparison sample. The AD/ADRD sample was older (82.4 years old [SD: 8.2] vs. 76.0 years old [SD: 7.7]) and had more female patients (59.9% vs. 54.7%). The AD/ADRD sample was more likely to experience ED disposition to acute care (OR 1.039, p < 0.001, 95% CI 1.029-1.050), to have an ED revisit (OR 1.077, p < 0.001, 95% CI 1.066-1.087), and an inpatient stay in the subsequent 12 months (OR 1.085, p < 0.001, 95% CI 1.075-1.095). ED disposition to hospice was low in both samples (0.2%). AD/ADRD patients had a higher risk of mortality (OR 1.099, p < 0.001, 95% CI 1.091-1.107) and high short-term mortality (31.9% within 12 months) than those without AD/ADRD (15.3% within 12 months).

CONCLUSIONS: PLwD who visit the ED have high short-term mortality. Despite this, disposition to acute care, ED revisits, and inpatient stays, rather than hospice, remain the predominant mode of care delivery. Transition directly from the ED to hospice for PLwD is rare.

2023 New Speaker Forum

New York American College of Emergency Physicians

Open to Attendings
Deadline: March 17, 2023
Presentation Date: Tuesday, July 11 at 4:30 pm
The Sagamore Resort

Calendar

February 2023

8   Education Committee Conference Call, 2:45 pm
8   Professional Development Conference Call, 3:30 pm
8   Academy of Clinical Educators Zoom Meeting; 4:30 pm
9   Practice Management Conference Call, 1:00 pm
15   Government Affairs Conference Call, 11:00 am
15   Emergency Medicine Resident Committee Conference Call, 2:00 pm
15   Research Committee Conference Call, 3:00 pm
16   EMS Committee Conference Call, 2:30 pm
17   Board of Directors Conference Call; 12 pm-1:30 pm

March 2023

8   Education Committee Conference Call, 2:45 pm
8   Professional Development Conference Call, 3:30 pm
8   Academy of Clinical Educators Zoom Meeting; 4:30 pm
9   Virtual Advocacy Day, 10:30 am - 4 pm
15   Government Affairs Conference Call, 11:00 am
15   Emergency Medicine Resident Committee Conference Call, 2:00 pm
15   Research Committee Conference Call, 3:00 pm
16   Practice Management Committee Call, 1:00 pm
16   EMS Committee Conference Call, 2:30 pm

April 2023

1   2023 Research Forum Abstract Submission Deadline
5   Medical Student Symposium
12   Education Committee Conference Call, 2:45 pm
12   Professional Development Conference Call, 3:30 pm
13   Practice Management Conference Call, 1:00 pm
19   Government Affairs Conference Call, 11:00 am
19   Emergency Medicine Resident Committee Conference Call, 2:00 pm
19   Research Committee Conference Call, 3:00 pm
20   EMS Committee Conference Call, 2:30 pm

May 2023

4   Board of Directors Meeting, New York City - 1:30 pm - 5:30 pm
5   ED Practice Innovations Coference - 8:30 am - 3 pm
10   Education Committee Conference Call, 2:45 pm
10   Professional Development Conference Call, 3:30 pm
11   Practice Management Conference Call, 1:00 pm
17   Government Affairs Conference Call, 11:00 am
17   Emergency Medicine Resident Committee Conference Call, 2:00 pm
17   Research Committee Conference Call, 3:00 pm
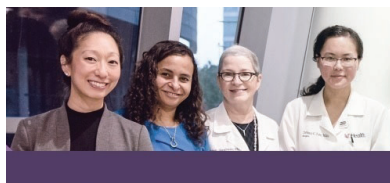18   EMS Committee Conference Call, 2:30 pm

NEW YORK ACEP
American College of Emergency Physicians
ADVANCING EMERGENCY CARE

Save the Dates

Emergency Medicine Resident Career Day

Get ready for everything that comes next and gain insight into life after residency.

Wednesday, August 2
8:00 am - 12:30 pm
New York Academy of Medicine
FREE to Residents

2023 Research Conference

2023 Research Conference

Wednesday, November 1
8:00 am - 12:00 pm
Location: TBD
FREE to Residents

Albert Einstein / Jacobi + Montefiore

Demographics

Hospital/Institution: Albert Einstein / Jacobi + Montefiore

Program Director: Michael Jones, MD

Program Coordinator: Belinda Tavarez

Program Coordinator E-mail Address: btavarez@montefiore.org

Hospital Capabilities: STEMI, Stroke, Trauma

Total Number of EM Residents: 84

Residents Train Each Year: 21

Inagural Resident Class Year: 1975

Fellowships Offered: Emergency Ultrasound, Clinical Research (plus Masters Degree), Pediatrics, Simulation Education

Benefits Offered: ROSH Review, Lab Coat(s), In-House On-Call Meals, Discounted Housing, Dental Insurance, Health Insurance, Vision Insurance, Life Insurance, Travel Insurance, Disability Insurance, Professional Liability Coverage

Other Benefits: CME fund, CIR member, one conference per year

Website Link: jacobiem.org

Twitter Link: @Jacobi_EM

Instagram Link: jacobimonteem

Most Unique Program Feature: The Bronx! Perhaps the most underprivileged, underserved community in the country. It provides a unique environment to practice and learn in an austere setting with a diverse community. The trauma and critical care cases are unparalleled throughout the country -- and our residents ability to manage and care for our patients is an incredible privilege.

Favorite Program Aspect: The people! Not just the residents and faculty but the amazingly diverse and resilient community of The Bronx and everyone dedicated to their care and well being!

Program is Known For: Training some of the most competent clinicians in the country!

What are You Most Proud of? Our graduates! So many of them come to The Bronx to learn to be excellent emergency physicians and to work in a community desperately in need. And after four years of rigorous training, they all continue to practice emergency medicine in similar safety-net systems, whether here in The Bronx or elsewhere in the US or world.

What Makes Your Program an Excellent Place to Complete a Residency? Residency is not easy -- it will likely be one of the most difficult and grueling experiences of your life no matter where you train. At Jacobi and Montefiore, you will work hard to become the best emergency physician in the country and will work with like-minded individuals who care deeply about access to emergency care, health equity, diversity in the work environment, and our patients. And the proof is in our alumni -- over 600 of the nation's best trained emergency physician clinicians, educators, and leaders!

2023 Scientific Assembly Research Forum
Call for Visual Diagnosis Images

The New York American College of Emergency Physicians is now accepting image case reports for presentation at the 2023 Scientific Assembly, July 11-13, at the Sagamore Resort on Lake George in Bolton Landing, New York.

Guidelines. Clinical or Radiological Images will be accepted. Submissions may include up to two figures. The case report and discussion should not exceed 300 words. Images should either be (1) rare, (2) offer new insight into a known disease, or (3) a classic image that has not previously been reported. Please limit to four references. Please adhere to your local institution's guidelines for the audiovisual recording of patients.

Structure of the Case Report.
- Title
- Authors and affiliations
- Case Report
  - Limit to several sentences on how the patient presented
- Discussion should include the following (as applicable)
  - Define the pathology and describe the findings (if it is a radiographic image)
  - Overview (background, pathophysiology, etiology, epidemiology)
  - Usual presentation (History and Physical)
  - Differential Diagnosis
  - Workup
  - Treatment
- Why is it important for an emergency physician to be familiar with this diagnosis?
- Images should be submitted as a separate file
  - 300 dpi resolution

About the Process. There will be a blind review of all abstracts. Notification letters will be sent on April 24, 2023. We regret we cannot give notification information by telephone. Ten images will be displayed during the Assembly.

Submission Deadline: April 1, 2023

Keith E. Grams, MD FACEP
Chair, Emergency Medicine, Rochester Regional Health

Quality Assurance Committee "Protection"

Disclaimer - I am not a lawyer. I am just a paranoid, emergency medicine physician. The following is a personal interpretation of some recent clarifications regarding the protection of quality assurance process. Please be sure to contact your local legal representation to ensure your process is meeting the needs of your team.

Over the years, I have developed a better understanding and appreciation for the quality assurance (QA) process. After going through my own stages of grief/acceptance, I was able to observe the way the QA process can help provide better care of our patients. Even so, I vividly remember my first experience with QA. As my first case came under review, it was incredibly anxiety provoking and my initial response was just a pure, defensive posture. It wasn't until later I recognized some of the opportunities surrounding the patient care, illuminating ways I could improve moving forward.

Over the years I have witnessed a number of services that actively avoid the QA process or dilute the procedure to such a degree yielding minimal impact. Might I suggest our reluctance to review our performance of patience care is likely a factor in the profound delay from accepted literature into general practice. I imagine we can recall an example of an updated practice, pattern or algorithm that seems to take months (if not years) to permeate throughout your group. Sometimes it's not until you see the opportunity with your care – standing in that painful spotlight – that you finally make the change. It's your own personal example that finally drives the point home, resulting in your updated practice.

Up until last spring, I always thought the QA process was protected and allowed the educational component without the fear of future medical malpractice risk. Unfortunately, I was incorrect as there is a significant caveat to consider.

We all know public health law requires the hospital to establish a quality assurance process (Public Health Law § 2805-j). This public health law does provide <u>certain</u> protection from disclosure of the process' records, statements and findings. Additionally, education law also shields potential future disclosure of these meetings and findings (Education Law § 6527(3)). It also shields the attendees' com-ments during the QA process.

Now the update – the part I had incorrect

Unfortunately, there is an identical exception in both laws that has been clarified over the last year. A physician/provider/nurse who is party to a future action may not be protected during committee review. Their statements and their written documentation during the peer review are potentially open for future disclosure. In this case, if a future defendant made statements during the meeting, these statements are now discoverable in that future medical malpractice lawsuit. Ultimately, the hospital would be required to disclose statements made by the future defendant, even though they were made within the process of quality assurance. There still is general protection of the committee attendees' statements and they cannot be required to testify at a later point.

And now for the whopper...

If the QA committee minutes do not clearly identify the source of the statements within the minutes, those statements are potentially discoverable. This is especially true if the future defendant was part of the committee's attendance, as it could be argued later the plaintiff might have been the author of the statement. With this clarification, the notes/minutes of the meeting need to be incredibly specific. It appears we need formal documentation of each comment and the author of that comment. Obviously a much larger administrative burden to record this detail, though necessary to ensure all comments are attributable to a "non-defendant" attendee.

Making the change – a real life example

Over a decade ago, we implemented a 72-hour return review. A primary driver of this review was the observation of continued antiquated practices as well as the slow adoption of best practice recommendations. For example, I'd wager we all recall sitting in a didactic lecture listening to the recommendation to always include a discharge re-examination for any patient presenting with abdominal pain. We all likely nodded in agreement with that recommendation, though many of us didn't necessarily adopt that procedure. It wasn't until seeing your own case under review you noted the forgotten repeat abdominal exam documentation. Once that happens once or twice, you make a change. At the start of the 72-hour review, it was commonplace to see the repeat exam missing. After working the process over the years, the follow-up documentation is nearly always present.

Many departments track their 72-hour return rate, though that doesn't uncover potential issues. We were able to implement a layered process in the review of every 72-hour return. The first layer involves a spreadsheet review comparing the diagnosis on the first and second visit. For the overwhelming majority of cases, the return visit is understandable and doesn't require any further evaluation. At times there is enough of a question between the visits that requires a second layer review. We circulate the first and second case to a group of volunteers that review it for any issues. Our basic instruction to the reviewer – would you feel comfortable defending the documentation on the first case. If there is a concern noted, then the case is forwarded for committee review. The committee meets monthly, reviewing the chart and providing feedback if needed.

With the protection limits noted above we will be altering our process. Moving forward, we will be excusing the provider involved in the care of the patient during the committee review. Comments made by the committee will be recorded appropriately, with attribution of each "author". Written communication of opportunities can then be communicated to the provider (as this is still protected information). Of note, if the provider responds to the committee's comments, then that is potentially discoverable at a later point. (Yes, this is making my head spin as well).

Perhaps some future day this will change. I'm envious of the Federal Aviation Administration's process that not only encourages the reporting of an error or potential error, it also provides some protection to the reporter. Unfortunately, that isn't the case in medicine and likely results in the reluctance to report.

Regardless, this is the current state. If you already have a process in place that addresses these items, well done. If not, perhaps consider meeting as a leadership team to assure all are aware of the above details. It may also be helpful to meet with your legal team to ensure your interpretations match. That way you ensure a process that helps provide better patient care, but also takes care of your team in the future.

Arlene Chung, MD MACM FACEP
Associate Professor of Clinical Emergency Medicine; Residency Director; Medical Education Division Director; Deparment of Emergency Medicine, Maimonides Medical Center

Stacey Frisch, MD
Medical Education Fellow
Assistant Professor of Clinical Emergency Medicine
Maimonides Medical Center

A Pregnant Pause: A Push to Adopt Pregnancy-Friendly Shift Schedules

The decision to become a physician is life-changing. While many medical students understand the responsibility that comes with caring for the health of others, the implication for their own health often remains unconsidered. Women today represent more than half of medical school matriculants and the overwhelming majority of these women are of childbearing age. Many of these women have chosen to delay having children in order to pursue their dream of becoming a doctor. However, data shows physicians are at increased risk for miscarriage compared to the general population. The miscarriage rate for physicians has been estimated to be as high as 51%, compared to a rate of 26% in the general population.[1-2] It is unclear whether women entering medical school have been fully informed of these risks.

In addition, emergency medicine is a physically demanding specialty. Data shows night shifts are associated with increased early spontaneous pregnancy loss.[3] Physically demanding work is significantly associated with preterm birth, babies who are small for gestational age and hypertension or preeclampsia.[4] Prolonged standing, shift and night work and high cumulative work fatigue are also associated with preterm birth.[4] Perhaps not surprisingly, the percentage of female emergency medicine residents has remained steadily below half, most recently cited at 37%.[5]

It is worth noting much of the data related to pregnancy and miscarriage in physicians was published over 20 years ago. Today, there is still little regulation surrounding shift work and pregnancy. Although large certifying and accrediting bodies such as the American Board of Emergency Physicians and the Accreditation Council of Graduate Medical Education have made strides toward inclusive policies surrounding parental leave, there have been few acknowledgements of the physical demands of pregnancy and risks of an adverse outcome.

Several barriers to the adoption of pregnancy-friendly shift scheduling exist. In the first trimester, women may be reluctant to disclose an early pregnancy. In the third trimester, women may be concerned about perceptions related to their commitment to the workplace or fear opting into easier schedules at the expense of shortening their eventual maternity leave. For resident physicians still in training, pregnant women may worry about the impact of any special or ad hoc accommodations on their fellow residents. Adoption of relevant policies and transparent scheduling can mitigate many of these barriers and encourage women to come forward earlier in their pregnancies, thus reducing the risk of miscarriage or other adverse health related outcomes.

In an ACEP NOW article from 2019, Drs. Larisa Coldebella and Alicia Pilarski laid out some best practice recommendations for clinical scheduling during pregnancy.[6] Physicians should be given the opportunity for the following options with the understanding that none should take the place of the pregnant physician's preference:

- First-trimester pregnant physicians (12 weeks or fewer) and third-trimester pregnant physicians (28 weeks or more) have the option to opt out of night shifts.
- In the event of staffing shortages, pregnant physicians in the third trimester have the option to remain exempt from mandatory addition of clinical hours (i.e., mandatory overtime).
- Scheduling for pregnant physicians in the third trimester should prioritize easily cancellable/coverable shifts to minimize departmental disruption in the event of medical necessity or early delivery.

The time is now for us to adopt clinical scheduling that supports healthy pregnancies and healthy coworkers. We dedicate our lives to caring for our patients; now we need to care for each other.

References

1. CMAJ 2019 November 4;191:E1229-30. doi: 10.1503/cmaj.1095821
2. Dugas C, Slane VH. Miscarriage. 2022 Jun 27. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan–. PMID: 30422585.
3. Stocker LJ, Macklon NS, Cheong YC, et al. Influence of shift work on early reproductive outcomes: a systematic review and meta-analysis. Obstet Gynecol. 2014;124(1):99-110.
4. Mozurkewich EL, Luke B, Avni M, et al. Working conditions and adverse pregnancy outcome: a meta-analysis. Obstet Gynecol. 2000;95(4):623-635.
5. Mannix, A., Parsons, M., Krzyzaniak, S. M., Black, L. P., Alvarez, A., Mody, S., & Gottlieb, M. (2020). Emergency medicine gender in resident leadership study (em girls): The gender distribution among chief residents. *AEM Education and Training*, 4(3), 262–265. https://doi.org/10.1002/aet2.10436
6. Coldebella, L., & Pilarski, A. (2020, January 10). *Best-practice recommendations for clinical scheduling during pregnancy*. ACEP Now. Retrieved January 12, 2023, from https://www.acepnow.com/article/best-practice-recommendations-for-clinical-scheduling-during-pregnancy/