



The Emergency Medicine Interest Group Guide Curriculum & Handbook

**First Edition
2024**

Michael DeFilippo, DO¹ | Lauren Diercks, MS-4² | Juliet Jacobson, MD¹
Ali Bonner, MD¹ | Brooke Wilson, MS-1² | Shan Modi, MD³

*With special thanks to Hamza Ijaz, MD⁴ and the SAEM RAMS Board of
Directors*

1: NewYork-Presbyterian - Columbia & Cornell Emergency Medicine Residency

2: UT Southwestern Medical School

3: Allegheny General Hospital

4: NewYork-Presbyterian - Cornell

Table of Contents

Welcome	2
Essential Functions of an EMIG	3
Recommended Leadership Structure	3
Clinical Exposure / Shadowing within Clinical EM	3
Research Opportunities	4
About the EMF EMIG Grant	5
Event Planning	5
Lunch and Learn Series	7
Trauma Basics and Introduction to the FAST Exam	8
Renal Emergencies	10
CardioPulmonary Emergencies	12
Gastrointestinal Emergencies	14
Endocrine Emergencies	15
Neurological Emergencies	16
Musculoskeletal Emergencies	17
Ob-Gyn Emergencies	18
Emergency Medical Services / Prehospital Medicine	20
Toxicology	21
Mental Health Emergencies	22
Panel Discussion: Fellowships in EM	25
Panel Discussion: Preparing for Interview Season	26
Panel Discussion: Post-Match M4 Panel	27
Workshops	28
Airway	29
Ultrasound	30
Vascular Access	31

Welcome

On behalf of the Society of Academic Emergency Medicine, we wanted to congratulate you on your leadership role for your Emergency Medicine Interest Group (EMIG)!

As leaders within the EMIG, you have the unique opportunity to guide and inspire medical students, encouraging them to explore and potentially commit to emergency medicine as their future profession. Your role, whether you have previous experience with EMIG or are new to it, is crucial in maintaining the group's dynamism and ensuring it remains a valuable resource for aspiring emergency physicians.

In the following pages, you'll find a curriculum designed to complement the preclinical M2 schedule, incorporating emergency medicine topics relevant to their current studies. This curriculum is flexible and can be adjusted to accommodate different block sequences. Notably, the curriculum includes an interview workshop scheduled for the Fall, specifically aimed at M4 students. While lesson plans are provided for each topic in the lunch and learn series with suggested topics for review, we encourage you to adapt and enhance these plans to better resonate with your audience. These plans are intended as a starting point to facilitate lecture planning and make the process more manageable. The content for workshops has evolved from previous versions of this handbook and may differ based on the availability of equipment.

Thank you for your commitment to educating future medical professionals in emergency medicine!

Essential Functions of an EMIG

Understanding the importance of a solid leadership structure within an EMIG is crucial, as it underpins the group's capacity to execute its core functions effectively. The following pages offer a detailed blueprint for leaders to establish robust shadowing programs in clinical emergency medicine, fostering a direct interface with the high-stakes environment where theory meets practice. Additionally, they provide a framework for linking members with valuable research opportunities, which are integral for the advancement of emergency medicine. Finally, guidance is given on orchestrating events and developing a clinical curriculum tailored to the interests and educational needs of medical students passionate about this specialty, ensuring a well-rounded exposure to the field. The guide below is divided into the following subsections:

1. **Recommended Leadership Structure**
2. **Clinical Exposure / Shadowing within Clinical EM**
3. **Research Opportunities**
4. **Events and Clinical Curriculum**

Recommended Leadership Structure

President: runs the meetings and sets the agenda and goals for the year; divides tasks and responsibilities while overseeing the overall function of the EMIG

Vice President: planning lectures, labs, and mentorship programs, coordinating logistics and communication (i.e. event emails)

Secretary/Treasurer: EMIG grant applications and oversight (eg, Emergency Medicine Foundation (EMF) grants, SAEM RAMS grants), oversees the budget and handles fundraising

(Optional) SIM Chair: organize SIM, or liaison with SIM club

(Optional) Ultrasound Chair: organize ultrasound practice, or liaison with ultrasound club

(Optional) Advocacy Chair: reaches out to local community organizations or clinicians with community connections, organizes educational events to understand community needs/resources

(Optional) Social Media Chair: manage email lists and social media venues such as Instagram, Twitter, Facebook, an EMIG website, and weblinks

Clinical Exposure / Shadowing within Clinical EM

You should discuss with your school's affiliated Department of Emergency Medicine on how to go about clinical shadowing in the Emergency Department. Due to individual variations within both hospital systems and medical schools, we recommend talking to prior class years or

current residents at your hospital's affiliated ED to get further direction and specific clarifications. Below, you will find information that should be shared with your EMIG members when they are shadowing in the emergency department.

1. *The expectations of shadowing.* It is important to set expectations for members on what expected behavior and responsibilities are for shadow shifts. Generally, we recommend arriving 5-10 minutes prior to the start of the shift so that members can observe hand off and get acquainted with their senior resident or attending. It is also important to include dress code requirements.
2. *Information on who they are shadowing.* If possible, try to include the resident or attending name for the shift they are shadowing on.
3. *Information on the department.* For new members who are shadowing for the first time, include directions to the ED (how to enter, where to find the physicians, and if possible a map/layout of the ED).
4. *Shift sign up mechanism.* Have a mechanism such as a sign up sheet (Google Forms or Sheets); we recommend shorter shifts (around 4 hours) given the heavy workload of medical school and so that more students could have opportunities for shifts.
5. *Feedback mechanism.* Have a mechanism for feedback to the EMIG leadership, such that both positive and negative experiences can be known to help future shadow shifts.

Below, you'll find an example email on introducing your members to available shift opportunities for shadowing.

Dear EMIG Members,

We are delighted to announce that shadowing opportunities are now available for you to experience our emergency departments. To participate, sign up for the available shifts at various times throughout the day, across different ED pods. Upon arrival at your designated pod—identified by letters (L, G, E, etc.) for Parkland and colors (Red, Blue, Purple, Ice, etc.) for CUH—please check in 5–10 minutes early to introduce yourself to the upper-level resident or attending at the computer stations. You can stay for as long or little as you want during the shift you signed up for.

Warm regards,
EMIG Leadership Team

Research Opportunities

EMIGs are an invaluable resource for keeping medical students informed about research and grant funding opportunities. For example, leaders within EMIGs can actively pursue options such as the EMF EMIG grant, which is specifically designed to support EMIGs with upwards of \$500 available for a wide array of opportunities (see more information below). Additionally, EMIGs play a crucial role in disseminating information to their members through list serves, ensuring timely updates on opportunities like the EMF Medical Student Grants, SAEM committee applications, SAEM award nominations, and openings on the RAMS Board.

Below is an example of how to keep research opportunities in the department organized and available:

Faculty Member	Interests	Current Projects	Oppertunities
Dr. R	Ultrasound	landmark vs ultrasound	ultrasounders
	Stroke	tPA differents in language	chart review
	Operations	Modeling patienet satisfaction	write up
Dr. B	EMS	Wilderness EMS systems	data collection
	Social EM	Stroke screening process for language	chart review, write up
		Social EM resident cirriculum	
Dr. C	Global Health	Stop the bleed program in Mexico	data collection
	Operations	Suture cart remodeling QI project	data collection
	Critical Care	Pressure injuries in ICU	submit IRB

About the EMF EMIG Grant

SAEM Emergency Medicine Foundation (EMF) EMIG Grant is awarded to several EMIGs to fund a specific EMIG project. The grant is for \$500. To apply you will need a faculty advisor and personal CV. The stated goals of the grant are to promote growth of EM education at the student level, to identify new education methods, and support EMIGs. Project importance, educational objectives, and methods will be addressed in separate questions of 250 words or less each. The project should fit with the SAEM mission which is “to lead the advancement of academic EM through education, research, and professional development.” As with any grant, the applicant must also address the target audience, time commitment, and roles of the team. Expected expenses and administrative support are also required. The application is due at the end of January and the duration of the award is July to June. The applications are reviewed by clerkship directors at CDEM. Successful past projects have involved one day events to enhance learning in EMS, wilderness, ultrasound, ect. It is imperative to have faculty support in the grant writing process and to allow ample time to plan the project, write, and submit the grant. EMIG leadership should start thinking of ideas early in the summer of their term in order to submit by January. Please search online for the SAEM EMF EMIG Grant to get the most up-to-date link on SAEM’s website.

Event Planning

Below you will find a sample of EMIG events and reminder emails. EMF grants are typically due in January. The Medical Student Ambassador program provides a complimentary pass to the SAEM annual conference, complete with mentorship and networking events. Additionally, students gain the experience of facilitating seminars and poster sessions during this conference. The SAEM annual meeting in May, along with regional meetings, offer chances for abstract submission throughout the year. The EMIG can help students get these opportunities by

sending reminder emails about when to start planning for abstract submission and connecting students to research mentors.

	MS1	MS2	MS3	MS4
January	EMIG Medical Student Grant Due			
	EMF EMIG grant due			
	MSA applications due			
	EM Content Related to Course			
February	Identify Research Mentor			
March	EMIG Officer Transition Month			
	Register for SAEM			
	EKGs			
April				Post Match Panel
	EMIG Officer: prepare speaker bank, plan calendar			
	Plan for SAEM Abstract and EMF Grants			
May				
June				Update list serve (without MS4)
July	Update list serve (with MS1)			Applications/Interviews
August	Shadowing Starts			
September	Thinking about EMF/EMIG Grant			
October	SAEM Committee Sign ups, RAMS Board Nominations, Award Nominations			
November	Away application Information			
	SAEM Abstracts Open			
December		MS3 aways		

Lunch and Learn Series

We propose the "Lunch and Learn" series as a pivotal element of an Emergency Medicine Interest Group, offering monthly hour-long lectures that integrate emergency medicine principles with the core subjects taught in the M1/M2 curriculum. This approach ensures relevance and applicability for attendees, primarily M1s and M2s, as their senior counterparts are typically engaged in rotations and unavailable during the lunch hour (12-1 PM). Our curriculum includes special topics such as fellowship insights, interactions with residents, and discussions on subspecialties within emergency medicine such as EMS, aside from the regular schedule. Within this handbook, you will find outlines for major topics to cover within each section, based on the organ system to help follow the medical school curriculum.

Attendance: The responsibility of promoting these lectures and managing attendance falls to the EMIG Medical Student Officers. It is important to collaborate closely with them to schedule sessions outside of the students' examination periods. To maintain an effective learning environment and encourage active participation, we cap attendance at 25 participants for in-person sessions. This limit is waived for lectures hosted on WebEx or similar platforms.

Catering: Funding for event catering is primarily sourced from the College of Medicine's allocated budget for student groups. Should there be difficulties in securing these funds, consider asking your Department of Emergency Medicine occasionally to contribute. For assistance in this matter, please reach out to the EMIG faculty advisor to explore funding possibilities on an event-by-event basis.

Lecturer Guidelines: We recommend that each session be facilitated by both a senior and a junior resident to offer a broad perspective on the topics covered. Faculty participation is highly encouraged and valued. All lecturers should record these presentations in their CVs as an important contribution to medical education.

Example Monthly Schedule:

August: Introduction to Emergency Medicine (Resident Panel)

September: Essentials of Trauma and Cardiology; Introduction to the FAST Exam

October: Management of Renal Emergencies in the ED; Renal Ultrasound || Special: Mock Interview Workshop for M4s

November: Fellowship Opportunities Discussion || Airway Management Workshop

December: Casual Meet-and-Greet with Residents (Off-site Event)

January: EMS / Prehospital Medicine

February: Focus on Musculoskeletal and Sports Medicine || Hands-on Suture Lab

March: Handling Endocrine Emergencies || Vascular Access Techniques Workshop

April: Navigating Abdominal Emergencies; Gallbladder Ultrasound Techniques

May: Deep Dive into Toxicology || Comprehensive Ultrasound Workshop

This curriculum is designed to enhance the medical students' understanding and interest in emergency medicine through practical knowledge and hands-on experiences.

Trauma Basics and Introduction to the FAST Exam

A. Vital Signs in Trauma

- a. Review normal vital signs and how they compare to the different stages of shock
 - i. Class I through IV shock
 - ii. Always assume hypovolemic shock secondary to hemorrhage in trauma
- b. Overview of the shock index
 - i. $SI = HR / SBP$
 - ii. Normal shock index is 0.5 - 0.7
 - iii. If >1 there is concern for occult shock, need for transfusion, and/or operative management

B. The Primary and Secondary Survey in Trauma

- a. Review how trauma is run at your institution's emergency departments
 - i. How are traumas activated?
 - ii. Where do the residents and medical students go during a trauma?
- b. Review the primary survey
 - i. *In each subsection of the primary survey, discuss different types of emergencies that could arise and how to approach them immediately; emphasize that if you recognize a problem during the primary survey you stop and immediately manage it before continuing forward in the survey*
 - ii. Airway: Is it clear? Is there food in the mouth? Is there blood in there? How to decide to intubate or not; what we use to intubate (eg, in-line intubation for patients with suspected cervical injury)
 - iii. Breathing: How to improve oxygen saturation - nasal cannula vs non-rebreather vs bag valve mask; What is a pneumothorax or hemothorax and how to look for them (do we need a chest tube?); how intubation can lead to R mainstem intubation and decreased breath sounds to L Lung
 - iv. Circulation: checking for pulses in the carotid and femoral regions; distal pulses via the radial and DP
 - v. Disability: What is a GCS and how to calculate it?
 - vi. Exposure: Looking for all other injuries, undressing patients completely, turning them over. If in hemorrhagic shock, where is the bleeding? Where can a patient bleed out where we can't see? (Chest, abdomen, pelvis, thigh)
- c. Review the secondary survey
 - i. HEENT: evaluate for lacerations, hematomas, stability of the midface, hemotympanum, nasal septal hematoma, CSF rhinorrhea, battle signs / racoon eyes, evaluate for ocular injuries
 - ii. Neck: evaluate for hematomas, tracheal deviation, subcutaneous emphysema, cervical step-offs or crepitus
 - iii. Chest: bilateral chest rise and fall, significant skin findings (ecchymosis, abrasions), palpate for crepitus or subcutaneous emphysema

- iv. Abdomen: significant skin findings, focal tenderness, peritonitis
- v. Pelvis: stability of pelvis (have only one person evaluate; multiple people re-examining the pelvis can cause significant injury)
- vi. Perineum: significant skin findings, urethral injuries (bleeding, deformity)
- vii. Extremities: evaluate for obvious deformities, compartments, bony tenderness, range of motion
- viii. Back: run the entire spine for tenderness or abnormalities, significant skin findings

C. The Focused Assessment with Sonography for Trauma (FAST) Exam

- a. Discuss the utility of the FAST exam in trauma
- b. Discuss the different views
 - i. RUQ: hepatorenal / Morrison's Pouch (most dependent)
 - ii. LUQ: splenorenal
 - iii. Cardiac: subxiphoid vs parasternal long axis
 - 1. Pericardial fat pad vs pericardial effusion
 - iv. Pelvic

D. Cases

- a. Case 1
 - i. 30 y/o male in an MVC that is GCS 14 and complaining of chest pain and abdominal pain. Seatbelt sign present.
 - 1. Initial vitals: Pulse 110; BP 94/60; O2: 95% on RA; RR: 22
 - 2. Pertinent findings: positive FAST exam with fluid in Morrison's pouch
 - 3. We recommend this case for early preclinical students to learn the background of simulation and to run through the primary and secondary survey. Allow the medical students to perform a FAST exam and recognize when a patient requires OR versus being stable enough to go to CT
- b. Case 2
 - i. 23 y/o male in a motorcycle crash; GCS 3; Bruising to chest and back and legs
 - 1. Initial vitals: Pulse 140; BP 70/40; O2: 85% on room air; RR 30
 - 2. Pertinent findings: pericardial effusion secondary to LV wall laceration
 - 3. We recommend this case for more advanced students who know the primary and secondary survey. The primary goal for this case is to begin to teach management skills during a resuscitation: recognizing hypovolemic shock via elevated shock index and administering blood, recognition of pericardial effusion, dispositioning to the OR

Renal Emergencies

A. Common Renal Pathologies

a. Nephrolithiasis

- i. Common symptoms and signs of nephrolithiasis
- ii. How to make the diagnosis
 1. Role of the urinalysis
 2. When to get imaging
 - a. Role of bedside point-of-care ultrasound
 - b. CT
- iii. Management of nephrolithiasis
 1. Medical Management
 - a. IVF, Analgesia, alpha-1 blockers (tamsulosin)
 2. Surgical Management
 - a. When does it become surgical?
 - b. Management of infected renal stones

b. Pyelonephritis

- i. Common symptoms and signs of pyelonephritis
- ii. How to make the diagnosis
- iii. Management of pyelonephritis in the ED
 1. How to determine discharge versus admission?
 2. Antibiotic choices
- iv. Complications of pyelonephritis (urosepsis, acute kidney injury)

c. Acute Kidney Injury

- i. Common symptoms and signs of acute kidney injury
- ii. How to make the diagnosis of AKI in the ED
 1. Differentiating pre-renal, intrarenal, and post-renal AKI
- iii. Management of AKI

B. Non-Renal Pathologies Associated with Renal Issues

a. Rhabdomyolysis

- i. History should make you suspicious for this diagnosis
 1. Crush injuries, strenuous exercise (marathoners), falls with prolonged downtime, intoxication, medications
- ii. Common symptoms and signs of rhabdomyolysis
- iii. Management of rhabdomyolysis

b. Trauma

- i. Overview of ureter injuries
- ii. Overview of renal injuries
 1. Non-operative management
 - a. Grade 1 (cortex contusion) v Grade 2 (cortex laceration)
 2. Possible operative management
 - a. Grade 3 (corticomedullary junction laceration) v Grade 4 (collecting system laceration)
 3. Operative management

- a. Grade 5 (shattered kidney, thrombosis of renal artery, avulsion of hilum)

- c. Autoimmune Diseases (eg Lupus)

C. Dialysis

- a. What are the common types of dialysis you will interact with in the ED
 - i. Peritoneal, Hemodialysis
- b. Overview of dialysis related emergencies
 - i. "Missed HD"
 - 1. Management of hyperkalemia in the HD patient
 - 2. Management of fluid overload in the HD patient
 - 3. How to recognize who needs emergent HD
 - a. Acidosis
 - b. Electrolyte abnormalities with AKI
 - c. Intoxication (eg, acute aspirin toxicity)
 - d. Overload (fluid)
 - e. Uremia
 - 4. How to place an emergent dialysis catheter ("trialysis catheter")
 - ii. Thrombosed AV-fistula
 - iii. Peritonitis
 - 1. How to obtain peritoneal fluid from a patient on peritoneal dialysis
 - iv. Peridialytic-hypotension

D. Renal Ultrasound

- a. Demonstration of the different renal and bladder ultrasound views
- b. Demonstrate how to obtain bladder volume
- c. Demonstrate how to evaluate for hydronephrosis

CardioPulmonary Emergencies

These can be split up into two separate lectures, but given there is a lot of overlap, both cardiac and pulmonary emergencies are included in one subsection

Cardiac Emergencies

A. Overview of ECG in Chest Pain

- a. Determining rhythm, rate, and axis
- b. Recognizing STEMI

B. Overview of High-Acuity Cardiac Emergencies in the ED

a. Acute Coronary Syndrome

- i. Discuss the different etiologies of ACS: Angina, Unstable Angina, NSTEMI, STEMI
- ii. Discuss shift in mindset from STEMI/NSTEMI to OMI/NOMI
 1. OMI Manifesto
- iii. Making the diagnosis in the emergency department
 1. ECG
 2. Troponin
- iv. Management of ACS
 1. When to discharge (HEART Score / rapid cardiology follow up)
 2. Management of stable angina in the ED
 3. Management of unstable angina / NSTEMI
 - a. Antiplatelet, Heparin, Nitroglycerin
 4. Management of STEMI
 - a. Thrombolytics, PCI

b. Aortic Dissection

- i. Discuss the different etiologies: Type A vs Type B
 1. Discuss pericardial tamponade while discussing Type A dissection
- ii. How to diagnose aortic dissection in the ED
 1. CTA
 2. Ultrasound
- iii. Management of Type A and Type B dissections
 1. Blood pressure target goals
 2. Medication management (role of beta blockers to decrease shear forces)

c. Pneumothorax

- i. Recognizing a tension pneumothorax
 1. Management of tension pneumothorax
- ii. Other types of pneumothoraces in the ED
 1. When to observe with supplemental oxygen
 2. When to place a chest tube

d. Esophageal Rupture

- i. Mallory-Weiss Tear vs Boerhaave's

e. Pulmonary Embolism

- i. Subsegmental vs Non-massive vs Submassive vs Massive
 - ii. Risk Stratification Tools (PERC, Wells, YEARS Algorithm)
 - f. Heart Failure
 - i. How to diagnose heart failure in the ED
 - ii. Determining your mental heuristic for heart failure management (“right” vs “left” heart failure)
 - iii. Management of SCAPE
 - iv. Management of mild to moderate heart failure exacerbations in the ED
 - 1. When to just give diuretic vs diuretic and nitro vs NIPPV
 - g. Pericarditis
 - i. Overview of types of pericarditis
 - 1. Differentiating pericarditis from myocarditis
 - ii. Common exam findings in pericarditis
 - 1. ECG findings
 - 2. Ultrasound findings
 - iii. Management of pericarditis
- C. Overview of High-Acuity Pulmonary Emergencies in the ED**
- a. Overview of oxygenation management in the emergency setting
 - i. Nasal cannula vs Non-rebreather vs NIPPV (CPAP/BiPAP) vs high-flow vs Intubation
 - ii. VBG vs ABG
 - b. Asthma / Reactive Airway Disease
 - i. Management of asthma exacerbation
 - ii. Utilization of peak flow
 - iii. When to utilize NIPPV
 - iv. Pearls for the intubated asthmatic patient
 - c. Chronic Obstructive Pulmonary Disease (COPD)
 - i. Management of COPD
 - ii. When to administer prophylactic antibiotics
 - iii. Role of NIPPV in COPD
 - d. Pneumonia
 - i. Determining outpatient vs inpatient treatment (PSI/PORT Score; CURB-65)
 - ii. Community vs Hospital Acquired vs Ventilator Acquired
 - 1. Outpatient antibiotic regimen
 - 2. Inpatient antibiotic regimen
 - iii. Non-bacterial pneumonia
 - 1. Viral, Fungal, Special Populations (HIV/AIDS)
 - e. Anaphylaxis
 - i. Differentiating allergic reaction from anaphylaxis
 - ii. Management of allergic reaction
 - iii. Management of anaphylaxis

Gastrointestinal Emergencies

A. Overview of the Abdominal History and Physical

- a. How to perform an abdominal exam (with focus on high-yield findings)
 - i. Murphy's, Psoas, Obturator, Rovsing
- b. Difference between pain (subjective) and tenderness (objective)
- c. Forming a differential diagnosis based on location of symptoms and findings

B. Pathologies of the Biliary System

- a. Cholecystitis
 - i. Review difference between biliary colic and cholecystitis
- b. Choledocholithiasis
- c. Cholangitis
 - i. Review common clinical presentation of cholangitis
 1. Charcot's Triad, Reynold's Pentad
- d. Pancreatitis
 - i. Review common causes of pancreatitis
 - ii. Review discharge versus admission criteria

C. Pathologies of the Spleen

- a. Trauma
 - i. Grading of splenic injury
- b. Splenic Infarction (eg, Sickle Cell)
 - i. Management including role of anticoagulation if needed

D. Pathologies of the GI Tract

- a. Appendicitis
 - i. Discuss emerging literature on non-operative (delayed operative) management versus admission for operative management
- b. Bowel Obstruction
 - i. Discuss ED management of bowel obstruction
- c. Diverticulitis
 - i. Discuss emerging literature on antibiotic versus no antibiotic management
- d. Mesenteric Ischemia
 - i. Discuss risk factors for mesenteric ischemia
 - ii. Discuss the role of CT Angiography versus CTAP with IV contrast
- e. Peptic Ulcer Disease
- f. Gastrointestinal Bleed
 - i. Upper GIB: peptic ulcer disease, esophageal ulcer, mallory-weiss tear, varices, malignancy
 - ii. Lower GIB: diverticulosis, colitis, IBD, brisk UGIB, hemorrhoids, malignancy
 - iii. Management of massive GI bleed
 1. Massive Transfusion Protocol
 2. Role of the Blakemore tube

Endocrine Emergencies

A. Diabetes-Related Emergencies

- a. Diabetic Ketoacidosis (DKA)
 - i. Pathology of development of DKA
 - ii. Prevalence of DKA in Type 1 vs Type 2 diabetes
 - iii. Making the diagnosis of DKA
 - iv. Management of DKA
 1. Importance of the anion gap
 2. Role of insulin drip
 3. Monitoring electrolytes and fluid levels in DKA resuscitation
 - a. Discuss interaction with potassium and insulin
 - b. Discuss sodium and hyperglycemia
- b. Hyperosmolar Hyperglycemic State (HHS)
 - i. Pathology of HHS
 - ii. Making the diagnosis of HHS
 1. Differentiating HHS from DKA
 - iii. Management of HHS

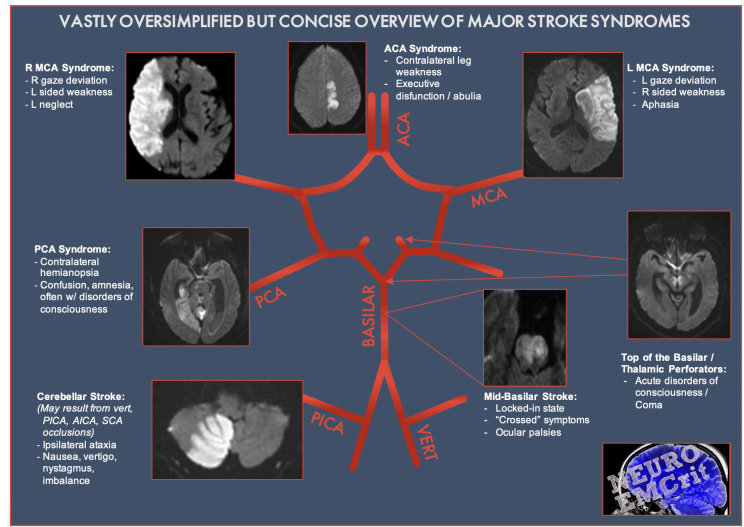
B. Thyroid-Related Emergencies

- a. Thyroid Storm
 - i. Common symptoms and signs of thyroid storm
 1. Classic Triad: hyperthermia, tachycardia, altered mental status
 - ii. Diagnosing thyroid storm in the emergency department
 - iii. Management of thyroid storm
 1. Step 1: treat increased sympathetic response (beta blocker)
 2. Step 2: stop thyroid hormone synthesis (PTU v Methimazole; potassium iodide)
 3. Step 3: treat adrenal insufficiency (dexamethasone, hydrocortisone)
- b. Myxedema Coma
 - i. Common symptoms of myxedema coma
 - ii. Diagnosing myxedema coma in the emergency department
 - iii. Management of myxedema coma
 1. Role of intubation for respiratory depression
 2. Thyroid replacement with T4 and T3
 3. Role of steroids for concomitant adrenal insufficiency

Neurological Emergencies

A. Overview of Neuroanatomy and the ED Neurological Exam

- a. Review relevant neuroanatomy for the emergency physician
 - i. Focus on anatomy relevant to the presentation being given (eg, if primarily reviewing strokes, focus on pathology-based anatomy similar to the picture attached from NeuroEMCrit)
- b. Overview of the neurological exam for the ED physician



B. Acute Ischemic Stroke

- a. Stroke assessment tools
 - i. NIHSS
 - ii. Discuss poor sensitivity of most assessment tools for posterior circulation stroke
- b. TIA vs CVA
 - i. ACA, MCA, PCA, basilar artery, superior cerebellar artery, AICA, PICA, internal capsule / lacunar infarcts, clumsy hand syndrome, hand knob stroke
- c. Management of suspected CVA
 - i. Role of the non-contrast CTH
 - ii. Role of CTA, CT Perfusion, MRI, MRA
 - iii. Tissue plasminogen factor indications
 - iv. Mechanical thrombectomy indications (discuss
- d. Differentiating ischemic stroke from stroke mimics (Bell's palsy, Todd's paralysis)

C. Hemorrhagic Stroke (Non-Traumatic)

- a. Identification of different types of brain hemorrhage: subdural, epidural, subarachnoid, HTN-related, aneurysmal, amyloid
- b. Management of different types of hemorrhagic stroke
 - i. Blood pressure management differences between spontaneous v aneurysmal v coagulopathic bleeds (when to do reversal?)

Musculoskeletal Emergencies

A. Basic Musculoskeletal History and Examination

- a. Obtaining a history
 - i. Red flag back pain questions (eg, incontinence, urinary retention, leg weakness)
- b. Physical Exam (back, shoulder, extremities, hand)

B. Overview of Common and High-Acuity Musculoskeletal Emergencies

- a. Non-traumatic Back Pain
 - i. Overview of causes and basic management of non-traumatic back pain (most common cause of ED visits in the US)
 - ii. Role of plane films and imaging in non-traumatic back pain
 - 1. When to and when to NOT get imaging
- b. Cauda Equina Syndrome
 - i. Identification and management
- c. Compartment Syndrome
 - i. Diagnosis and emergent management of compartment syndrome
 - 1. Spontaneous vs iatrogenic (eg, post-splinting)
 - ii. How to measure compartment pressures
- d. Septic Arthritis
 - i. Identification and management
 - ii. Septic arthritis in a prosthetic joint
- e. Acute Limb Ischemia
 - i. Identification and management
- f. High Yield Fractures and Dislocations (can break off into a splint session)
 - i. How to emergently reduce a dislocated extremity (eg, pulseless fractured extremity)
 - ii. Shoulder Dislocation and Techniques
 - 1. Anterior, Posterior, Inferior
 - 2. Different types of shoulder reduction techniques
 - iii. Distal Radius Fracture (Sugar Tong Splint)
 - iv. Humerus Fracture (Sling or Coaptation Splint)
 - v. Femur Fracture (Explanation of skeletal traction)
 - vi. Tib/Fib Fractures (Stirrup; Posterior Long Leg Splint)
 - vii. Ankle Fractures

C. Overview of Musculoskeletal Imaging Techniques

- a. How to read an X-ray to identify fractures or dislocations
- b. Regional nerve blocks

Ob-Gyn Emergencies

A. Non-Pregnancy Related Ob-Gyn Emergencies

a. Ovarian Torsion

- i. Review high yield history for ovarian torsion
 - 1.
- ii. Diagnosis and management of ovarian torsion
- iii. Discuss the role of ultrasound in diagnosis of ovarian torsion
 1. Review image interpretation
 2. Discuss how negative imaging does not exclude ovarian torsion (intermittent torsion)

b. Non-Pregnant Vaginal Bleeding

- i. Review high yield history for non-pregnant vaginal bleeding
 1. Nature of the bleeding (eg, frequency, duration), changes in bowel or bladder function, new headache or neurological complaints, family history of coagulopathies
- ii. Diagnosis and management of non-pregnant vaginal bleeding
 1. PALM-COEIN
- iii. Discuss the role of ultrasound
 1. Utilized to evaluate for patients with painful or hemodynamically significant bleeding

c. Pelvic Inflammatory Disease

- i. Review high yield history for PID
 1. *High yield risk factors*: multiple sexual partners, no use of contraception, menstruating
 2. Diagnostic Criteria: uterine or adnexal tenderness *and* cervical motion tenderness
- ii. Review different management guidelines in regards to outpatient versus inpatient antibiotic therapies

B. Pregnancy-Related Ob-Gyn Emergencies

a. Ectopic Pregnancy

- i. Review high yield history for ectopic pregnancy
- ii. Review the use of ultrasound in aiding the diagnosis of ectopic pregnancy
 1. Discuss how to identify an intrauterine pregnancy on ultrasound
 - a. Define gestational sac, yolk sac, and the discriminatory zone
- iii. Discuss the management of stable versus unstable ectopic pregnancy

b. Preeclampsia / Eclampsia / HELLP Syndrome

- i. Review diagnostic criteria for preeclampsia, eclampsia, and HELLP syndrome
 1. Thought to be along a spectrum of disease; can occur after 20 weeks and upwards of 6 weeks postpartum
 2. Preeclampsia: BP >140/90, edema, proteinuria
 3. Eclampsia: preeclampsia with seizures

4. HELLP Syndrome: hemolysis, elevated liver enzymes, and low platelets
- ii. Review management of preeclampsia, eclampsia, and HELLP syndrome

Emergency Medical Services / Prehospital Medicine

A. Overview of the Emergency Medical Services system

- a. Give preference to your local layout as EMS systems vary widely in the US
- b. Go over differentiation of BLS vs ALS
- c. When to use Ground vs Air Transport

B. Overview of the Role of an EMS Physician

- a. Medical Control
 - i. Online versus Offline
 - ii. Medical control calls
 - 1. How to best handle a med control call
- b. Prehospital physician response
- c. Preferably have an EMS fellow or EMS physician discuss the day-to-day operations of an EMS physician, pros and cons

C. Subspecialties and Innovations in EMS

- a. Mobile Stroke Units
- b. Out-of-Hospital ECMO
- c. Community Paramedicine
- d. Street Medicine
- e. Tactical Medicine

Toxicology

Due to the varied nature of toxicological emergencies, we highlighted select topics of presentation.

A. Acetaminophen Toxicity

- a. Review stages of acetaminophen toxicity
 - i. 0-24 Hours: preclinical; mild nausea, vomiting
 - ii. 24-72 Hours: hepatotoxicity; RUQ abdominal pain, elevated LFTs
 - iii. 72-96 Hours: hepatic failure with encephalopathy
 - iv. >96 Hours: survival or death
- b. Review treatment modalities
 - i. N-acetylcysteine (NAC)
 1. Mechanism of action
 2. Rumack-Matthew Nomogram
 - ii. King's College Criteria

B. Salicylate Toxicity

- a. Review clinical signs and symptoms associated with salicylate toxicity
 - i. Mild (<150 mg/kg)
 - ii. Moderate (150-300 mg/kg)
 - iii. Severe (>300 mg/kg)
- b. Review how to diagnose salicylate toxicity
 - i. ASA level
 - ii. Blood gas
- c. Review management of salicylate toxicity
 - i. When to and when to NOT intubate
 - ii. Role of GI decontamination
 - iii. Alkalinization of plasma and urine
 - iv. Role of dialysis

C. Beta Blocker Toxicity

- a. Review how to differentiate beta blocker versus calcium channel blocker toxicity
 - i. Clinically may be extremely difficult to distinguish
- b. Management of beta blocker toxicity
 - i. Role of GI decontamination
 - ii. Role of
 1. Glucagon
 2. Calcium
 3. High-dose insulin and glucose
 4. Vasopressors
 5. Intralipid therapy
 6. ECMO

Mental Health Emergencies

A. Overview of the Psychiatric Examination in the Emergency Department

- a. Safety is number one - make sure you are conducting the exam in a safe place for both you and the patient
- b. Enquire about past psychiatric hospitalizations, suicide attempts, presence of suicidal or homicidal thoughts or plans, auditory or visual hallucinations, and if there is an existing safety support network for the patient (family, friends, home life)
- c. Performing an assessment of suicide risk (Table 1)
- d. Enquire about weapons access as that is an independent risk factor for completed suicide
- e. Evaluate for Underlying Organic or Reversible Causes of Psychiatric Pathology
 - i. Substance-induced, Toxidromes (sympathomimetics, serotonin syndrome), hypoglycemia, thyroid pathology, Cushing's disease, CVA/TIA, intracranial trauma, infectious etiologies (HIV, syphilis, meningitis/encephalitis), neoplasm (intracranial mass, hypercalcemia), degenerative neurological diseases (Alzheimer's, CJD, Parkinson's)

Risk Factors for Suicide
<ul style="list-style-type: none">• Suicidal ideation• Plan for committing suicide (especially if it is lethal)• Psychosocial stressors• Previous suicide attempts• Presence of hopelessness• Presence of psychosis• Family history of suicide or mental illness• Physical illness• Adolescents or the Elderly• Male gender• Caucasian or American Indian• Cognitive features• Childhood traumas• Current psychiatric diagnoses• History of depression or personality disorder• History of substance use disorders

B. Management of Psychiatric Diseases in the Emergency Department

a. General

- i. Psychiatric Clearance Labs
 - 1. No data-driven consensus but generally used to screen for organic causes of pathology if patient is first time presenting with new psychiatric symptoms
- ii. ECG - a majority of psychiatric pharmacotherapy can prolong QTc

b. When to Hold and When Not to Hold

- i. Discuss your local laws about when a patient can and CANNOT be held against their will due to certain psychiatric conditions (suicidality, homicidality, etc)
- ii. Review the four domains of capacity and how to determine if a patient has capacity
 - 1. **Communication of Choice:** Ability to communicate a choice when presented with options
 - 2. **Understanding:** Ability to state the meaning of relevant information and why a clinician may be making certain recommendations

3. **Appreciation:** Ability to explain how information applies specifically to oneself
4. **Reasoning:** Ability to infer consequences of choices such as accepting or declining a recommended treatment

C. Management of the Acutely Psychotic or Agitated Patient

- a. Verbal De-escalation Techniques
 - i. If verbal de-escalation techniques do not work, proceed with medication management
 - ii. Sedation-related adverse events are common, upwards of 16% of patients experience in the ED who receive (commonly hypoxia, airway obstruction, QTc prolongation, bradycardia, hypotension) → should always be placed on a monitor (ideally with ETCO₂) if sedated
- b. First Generation Antipsychotics
 - i. Review indications, mechanism of action, and side-effects of the common first generation antipsychotics used in clinical practice
 1. Haldol
 2. Droperidol
- c. Second Generation Antipsychotics
 - i. Review indications, mechanism of action, and side-effects of the common second generation antipsychotics used in clinical practice
 1. Olanzapine
 2. Ziprasidone
 3. Risperidone
 - ii. Overall have similar efficacy to first generation antipsychotics, but less risk of QTc prolongation, less sedation, and fewer extrapyramidal side effects
- d. Benzodiazepines
 - i. Review indications, mechanism of action, and side-effects of the common benzodiazepines used in clinical practice
 1. Midazolam
 2. Lorazepam
 - ii. The “5&5” or “5&2”
 1. Benzodiazepine and neuroleptic combination has proven to be safe and effective
- e. Physical Restraints
 - i. Utilized in approximately half of acutely agitated patients
 - ii. High adverse risk rate → rhabdomyolysis, asphyxiation, strangulation, limb ischemia
 - iii. Recommend no longer than 4 hours

D. Special Populations

- a. The Elderly
 - i. 40% of elderly patients in the ED have some element of altered mental status

- ii. Of those, 25% have an element of delirium → ⅓ of those have agitated delirium
 - iii. Increased risk of medication interacts due to polypharmacy (many of which prolong QTc)
 - iv. Antipsychotic solo administration is preferred still
 - v. Benzodiazepines associated with poor outcomes → Beers criteria
 - vi. Consider half of typical dosing for antipsychotic medications as there is high likelihood of decreased metabolism → increased serum drug life
- b. Pediatric Patients
- i. Additional differential to consider in addition to the normal adult things is dehydration as that is a primary cause of agitation in pediatrics
 - ii. Prioritize PO administration first, then IV, then IM
 - iii. Consider using home psychiatric medication if they're already on one (ie, an additional half or full dose of their home antipsychotic)
 - iv. Benadryl is preferred, as most parents are comfortable with the medication and it works well in anxiety-predominant agitation and in those with no psychiatric history.
 - 1. Caution in use with children with developmental disability → high rate of paradoxical reaction
 - v. If delirium or psychosis is suspected, SGA are preferred
 - 1. Risperidone has the best evidence (but only available PO)
 - 2. Of IM medications, olanzapine is preferred
 - 3. Ziprasidone should be avoided in children due to risk of paradoxical agitation
- c. Pregnant Patients
- i. Risperidone is preferred as it has no known teratogenic effects
 - ii. Haldol can be used, but is associated with fetal limb defects (seen only in long term use of the drug)
 - iii. Benzodiazepines also associated with cleft lip and malformations, but only if taken long term (especially in first trimester) → safe in the acute setting
 - iv. Olanzapine and Ziprasidone → extremely limited data regarding use in pregnant, recommended to avoid
 - v. Physical restraints have been noted to cause IVC compression and should be avoided if possible → if needed, place left lateral decubitus

Panel Discussion: Fellowships in EM

Below please find some recommended / popular EM subspecialties for a fellowships in EM panel

- Administration/ED Operations
 - Speaker(s):
- Critical Care Medicine
 - Speaker(s):
- Emergency Medicine Service (EMS) / Prehospital Medicine
 - Speaker(s):
- Global Health/International Emergency Medicine
 - Speaker(s):
- Social Emergency Medicine
 - Speaker(s):
- Medical Education
 - Speaker(s):
- Pediatric Emergency Medicine
 - Speaker(s):
- Simulation
 - Speaker(s):
- Sports Medicine
 - Speaker(s):
- Toxicology
 - Speaker(s):
- Wilderness Medicine
 - Speaker(s):
- Ultrasound
 - Speaker(s):

Suggested questions are:

1. Why did you choose your subspecialty?
2. What is the average day like in your subspecialty?
3. What makes a strong applicant to your subspecialty?
4. What is the fellowship experience in your subspecialty like?
5. How do you integrate what you learned in your subspecialty to every day EM work?

Panel Discussion: Preparing for Interview Season

We recommend utilizing residency program leadership (program directors, associate program directors, chief residents) as well as current residents to create a panel to help prospective applicants to prepare for the interview season.

Additionally, we recommend having a mixed set-up of both structured and unstructured question and answer. Most panel discussions are 1 hour, so we recommend 30 minutes for structured questions (can be collected beforehand and the most common can be asked, or your group that is coordinating the panel can ask common interview questions from the bank below); the following 30 minutes can be open Q&A by your audience.

Suggested questions are:

1. What makes an applicant competitive for emergency medicine residency?
2. What attributes are typically seen in successful applicants for the EM residency match?
3. What are some interview red flags or things to avoid during the interview season?
4. What advice would you give to someone trying to select which residency program is right for them?

Panel Discussion: Post-Match M4 Panel

The purpose of this event is to share pearls and pitfalls of the match process from people who have just gone through it. Feel free to open this up to specific questions by people from your school.

Suggested questions are:

1. How did you pick your aways?
2. What made your aways similar or different to our home ED?
3. How did you find housing and how much did it cost?
4. What questions did you get asked on your interview?
5. What aspects of your application did the programs ask you the most about?
6. How should we schedule MS4 year?
7. When did you do most of your interviews?

Workshops

On the following pages, you will find suggested templates and guides for running workshops designed for medical students with interest within Emergency Medicine.

Airway

Objectives:

1. Discuss the indications for intubation and steps of the intubation sequence.
2. Provide a review of relevant airway anatomy.
3. Practice one- and two-rescuer bagging technique, use of airway adjuncts (oral/nasal airways, extraglottic devices). Could add discussion/demonstration of BiPAP here as well.
4. Perform direct and video laryngoscopy on mannequin.

Schedule:

1. *Lecture:* Discuss indications for intubation. Provide a review of relevant airway anatomy. Briefly discuss the 7Ps and the universal airway algorithm – 20 minutes.
2. *BVM/Adjuncts:* Practice correct one- and two-rescuer bagging technique, use of airway adjuncts (oral/nasal airways) and extraglottic devices. Discuss advantages/disadvantages of the King/LMA and when one would use them. There will be two stations running simultaneously – 20 minutes.
3. *Direct laryngoscopy:* Allow students to attempt the intubation sequence. There will be two stations running simultaneously – 20 minutes.

	1300-1320	1325-1345	1350-1410
A	Lecture	Intubation	BVM/Adjuncts
B		Intubation	BVM/Adjuncts
C		BVM/Adjuncts	Intubation
D		BVM/Adjuncts	Intubation

Personnel:

1. *Coordinators:* EMIG leadership. One of the medical student EMIG chairs will be the student go-to.
2. *Instructors:* Five total residents. One senior resident will give the lecture. One resident for each of the four stations (BVM/Adjuncts x 2, DL x 2).
3. *Students:* The workshop can accommodate up to 60 students over three 75-minute sessions. There will be 20 students per session. Lecture will be with everyone together. Each session will be subdivided into groups of 5 for the skills stations.

Equipment:

1. *Lecture:* One mannequin for demonstration on intubation set-up (NRB, Yankauer, BVM, ETT with stylet, laryngoscope, trach tie).
2. *BVM/Adjuncts:* Two mannequins. BVM x 2, OPA x 2, NPA x 4. King 4, I-LMA 4 (may pass King and I-Gel between stations).
3. *Direct laryngoscopy:* Two mannequins. Mac x 2, Miller x 2. 2 ETTs with stylet x 2. BVM x 2. Bougie x 2. Trach tie x 2.
 - a. Berci-Kaplan and C-MAC for video demonstration and video attempts.

Ultrasound

Objectives:

1. Discuss how ultrasound works (i.e. physics) and provide a brief primer on how to work the ultrasound machine.
2. Provide short case scenarios for the use of ultrasound in the ED with exemplar abnormal scans.
3. Practice the FAST exam and cardiac ultrasound on a live model.

Schedule:

1. *Lecture:* Introduction to the basic principles of ultrasound. We will briefly cover relevant physics and anatomy, how to operate the Titan, and common uses for ultrasound. – 15 minutes, all 20 students.
2. *FAST:* Indications for FAST, resident demonstration. Each student will get to practice scanning. Consider including lung ultrasound for pneumothorax if time allows. Show examples of positive scans as time allows. – 15 minutes, 2 groups of 5 students
3. *Cardiac:* Indications for cardiac ultrasound. Demonstration by well-versed resident or ultrasound technician. Each student will get to practice scanning. Show examples of abnormal scans as time allows. – 15 minutes, 2 groups of 5 students

	1300-1315	1320-1335	1340-1355
A	Lecture	FAST	Cardiac
B		FAST	Cardiac
C		Cardiac	FAST
D		Cardiac	FAST

Personnel:

1. *Coordinators:* EMIG leadership. One of the medical student EMIG chairs will be the student go-to.
2. *Instructors:* 1 resident to give lecture. 2 residents/techs for FAST. 2 residents/techs for cardiac. Will need 2 bodies for FAST, 2 bodies for cardiac.
3. *Students:* 60 students split up over three 60 minute sessions. There will be 20 students per session. All students sit through the lecture together, then they will be divided into groups for practice.

Equipment:

1. Ultrasound machines: 4 (2 for FAST, 2 for cardiac)
 - a. Contact ultrasound faculty to coordinate availability with ultrasounds ideally 2-4 weeks before the workshop.
2. Towels
3. Gel
4. Examples of positive scans: FAST – positive hepatorenal, splenorenal, bladder. Cardiac – positive effusion, RV dilation

Vascular Access

Objectives:

1. Practice antecubital IV placement on mannequins. Find veins on a partner.
2. Introduce intraosseous access by comparing to IV access, place IOs on trainers.
3. Discuss and practice ultrasound-guided peripheral or central access.
4. Demonstrate subclavian central line placement with discussion of Seldinger technique.

Schedule:

1. *Peripheral IV access – 45min:* Groups of 10 (two groups of 5 combined) will go to the sim lab and place peripheral IVs on simulation arms. They will practice finding veins on a partner but will not stick them.
2. *Ultrasound-guided peripheral & IO access – 20min:* Introduce the vascular probe. Illustrate antecubital anatomy on ultrasound. Attempt to cannulate a model (gel phantom mold or ultrasound-compatible femoral vein trainer). Discuss interosseous lines and the relative advantages of certain IO sites followed by practice on tibial/humeral IO trainers in addition to raw eggs (to simulate pediatric bones).
3. *Central access – 20min:* Discuss indications for central access, potential anatomic sites, and the relative advantages/disadvantages of each. The instructor will demonstrate line placement on either the subclavian or femoral mannequin.

	1400-1420	1420-1440	1445-1505	1505-1525
A	Central	US/IO	Peripheral	
B	US/IO	Central		
C	Peripheral		Central	US/IO
D			US/IO	Central

Personnel:

1. *Coordinators:* EMIG leadership. One of the medical student EMIG chairs will be the student go-to.
2. *Instructors:* 2 for peripheral IVs. 2 for ultrasound guided peripherals and IO access. 1 resident for central access. Total of 5 per session.
3. *Students:* Maximum of 60 can sign up. There will be 20 students per 90min session.

Equipment:

1. *Peripheral IV access:* 140 peripheral IVs (20g - Each student gets two tries). 80 IV start kits (with the tourniquet, tegaderm etc). 80 blue caps. 80 saline flushes. 80 extra alcohol wipes. Gloves and hand sanitizer.
2. *Intraosseous access:* 2 EZ-IOs. 10 standard IO needles (to replace what we use). Demo tibia.
Ultrasound-guided peripheral access: One 10cc syringe with needle. One gel phantom and/or ultrasound-compatible femoral trainer. One ultrasound machine with gel. Gloves.
3. *Central access:* One triple lumen trays for demonstration. Extra wires (they tend to kink). One translucent subclavian central line trainer.