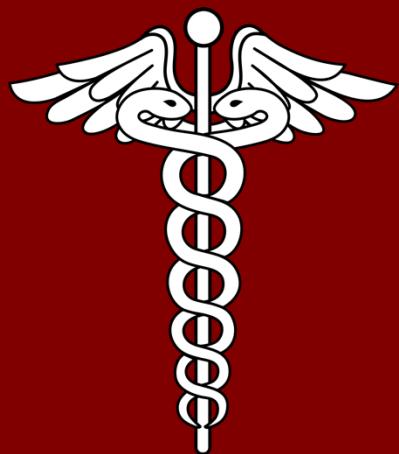

EMERGENCY DEPARTMENT HANDBOOK



2024-25

**Department of Emergency Medicine
Temple University Hospital**

DISCLAIMER

This handbook contains both clinical guidelines and departmental policies and procedures for use by Emergency Medicine providers* working at Temple University Hospital. This compilation has been approved by the ED Leadership Team and is designed to help clinicians enhance quality of care and patient safety as well as facilitate Emergency Department throughput.

The clinical guidelines contained within are intended to provide a standardized, evidence-based approach to the evaluation and management of patients presenting to the Emergency Department with specific medical conditions. While these guidelines can assist with clinical decision-making, they are not considered an all-inclusive list of diagnostic modalities and/or therapeutic interventions and do not supersede the provider's clinical judgment. The Emergency Medicine provider can determine applicability of these guidelines and utilize them on a case-by-case basis.

The policies and procedures contained within have been previously approved by the Department of Emergency Medicine and/or Temple University Hospital. Updated versions of these policies and procedures may have been created after the publication of this handbook and these newer versions would supersede the information contained herein.

The use of this handbook is restricted to Emergency Medicine providers working within the Emergency Departments of Temple University Hospital, Temple University Hospital-Episcopal Campus, and Temple University Hospital - Jeanes Campus. The Temple University Health System, Temple University Hospital, and Temple Faculty Physicians, are not responsible for the contents of this handbook nor can these entities be held liable for any adverse outcome related to information contained within this document.

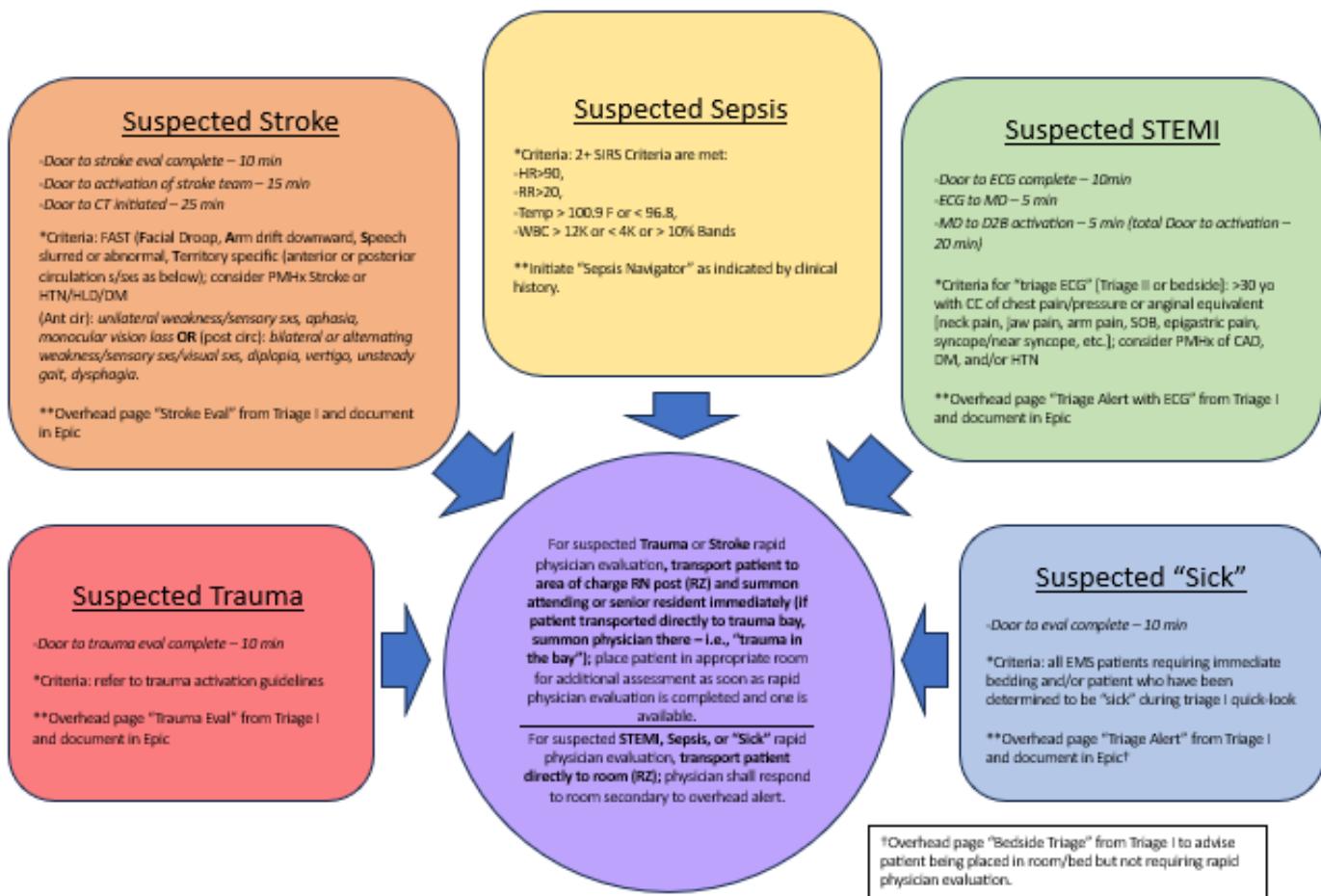
* The term "providers" includes attending EM physicians, EM residents, non-EM residents working in the ED, and advanced practice providers (APPs)

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TRIAGE I - EVALUATION AND ACTIVATION ALGORITHM



Revised Aug 2024

TRAUMA EVALUATION CRITERIA

Trauma Evaluation Criteria

A trauma evaluation should be called when there is a single or multisystem injury with concern for hemodynamic, neurologic, or vascular compromise OR if one of the following special circumstances is met:

- Pregnancy
- Auto vs. Pedestrian/Bicyclist
- Anticoagulation/Bleeding Disorder
- Motorcycle Accident
- EMS Trauma Transports boarded and collared

Patients presenting after the following generally DO NOT require trauma evaluation, unless they meet the above noted special circumstances

- Injury > 24 hours old
- MVC without roll-over, significant damage to the vehicle per EMS, death of a passenger in the vehicle, ejection from the vehicle, or loss of consciousness
- Fall from sitting, standing with GCS 15
- Head Injury without intoxication, altered mental status, loss of consciousness, suspicion of skull fracture
- Extremity Injury without suspicion of vascular or neurologic compromise

ANY patient that requires a trauma evaluation will NOT be sent back to the waiting room

STROKE EVALUATION CRITERIA

Stroke Evaluation Criteria

A stroke evaluation should be called when any one of the following new deficits are present, regardless of time of onset:

- Facial drooping
- Arm/leg weakness
- Speech difficulty

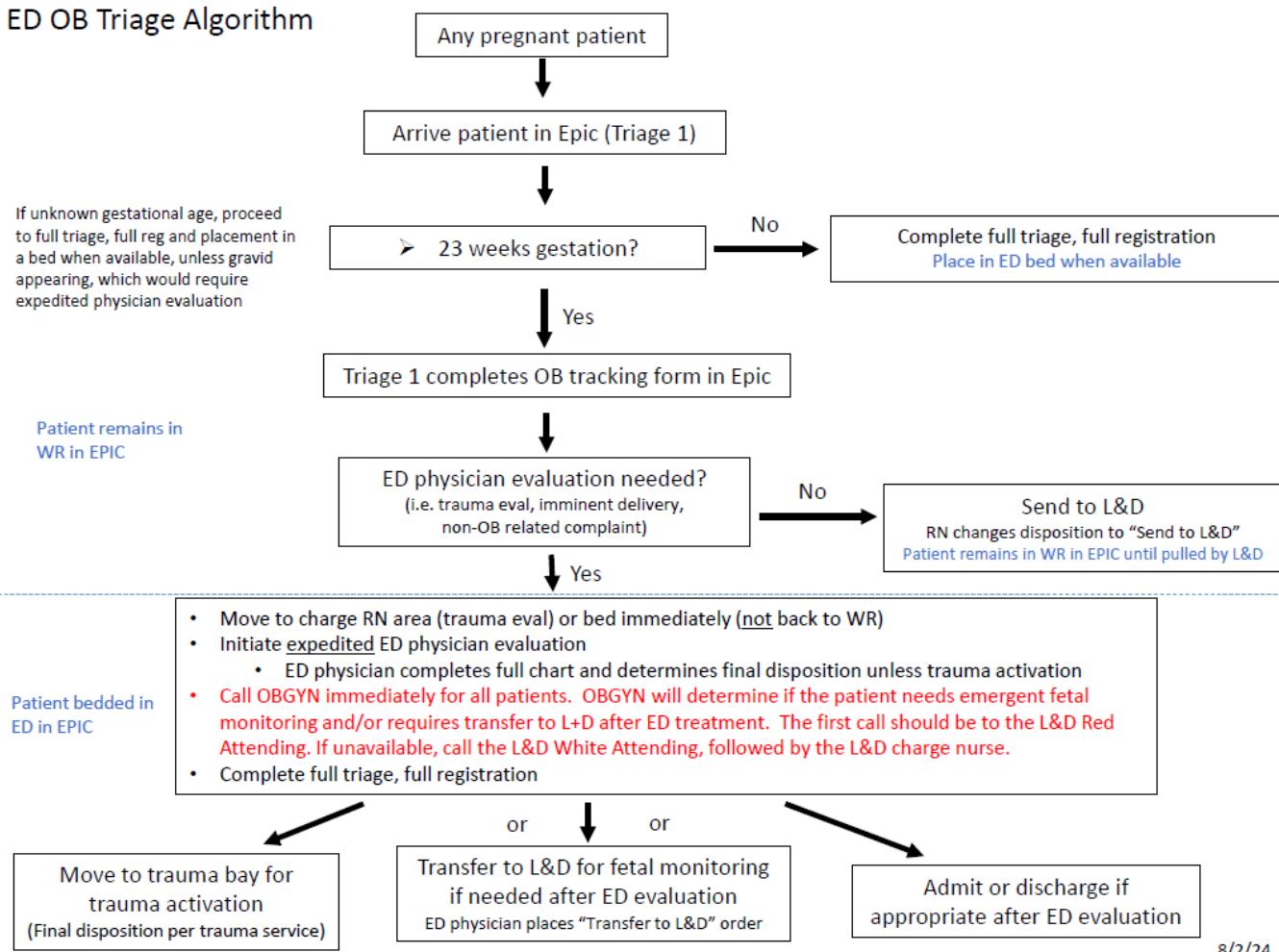
Additionally, patients with the following symptoms MAY require stroke evaluation if the onset was within 24 hours or upon awakening:

- Sudden confusion
- Vision change (especially double vision or loss)
- Unilateral numbness
- Vertigo, loss of balance or coordination, or difficulty walking
- Sudden severe headache with no known cause

ANY patient that requires a stroke evaluation will NOT be sent back to the waiting room

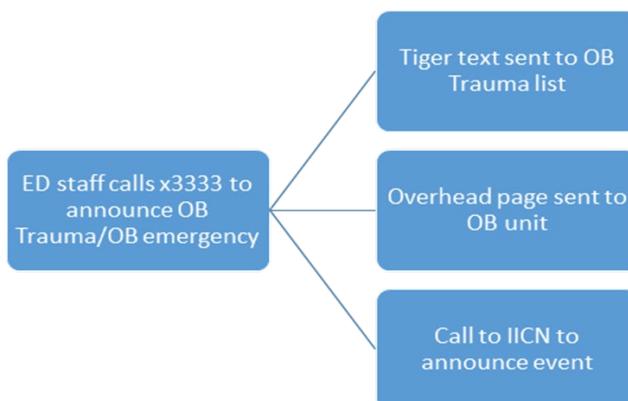
OB TRIAGE ALGORITHM

ED OB Triage Algorithm

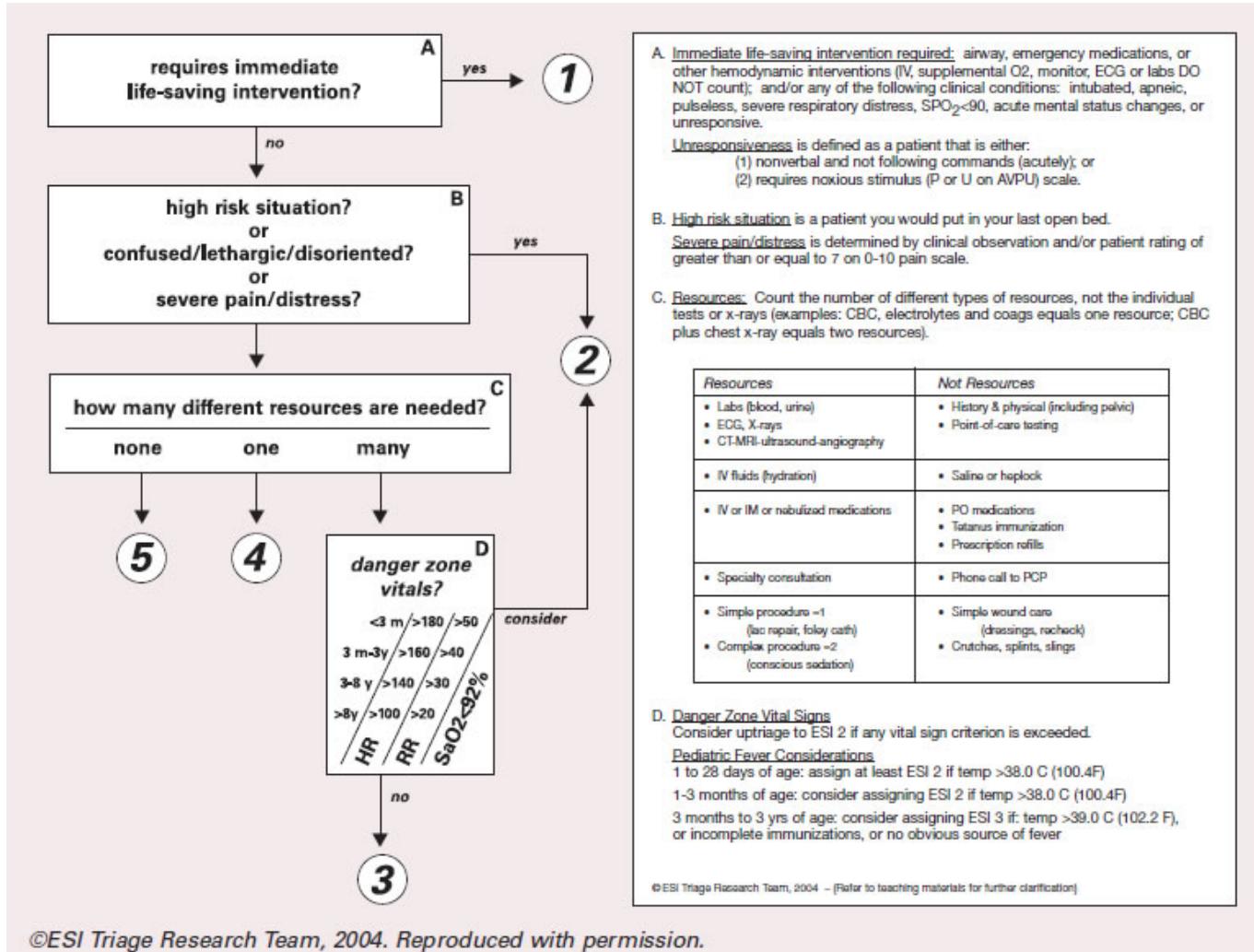


8/2/24

**** For any OB emergency (trauma or non-trauma) staff calls x3333 to announce an OB emergency ****



EMERGENCY SEVERITY INDEX (ESI)



©ESI Triage Research Team, 2004. Reproduced with permission.

Emergency Severity Index (ESI) Implementation Handbook, 2012 Edition

TUH ED BED UTILIZATION GUIDELINE

All treatment spaces will be utilized in the Red Zone and in the Yellow Zone 24 hours/day.

This includes hallway beds, room 31, and room 33 chairs. After 11p room 31 becomes overflow.

All treatment spaces will be utilized in the Green Zone from 8 AM until 11 PM Monday through Wednesday and from 9 AM until 9 PM Thursday through Sunday. Rooms 43-46 will be used for active treatment whenever there are at least two providers in the Green Zone; otherwise they will be used for overflow.

All treatment spaces will be utilized in Minor Care from 9 AM until 9 PM seven days a week.

A treatment space cannot be ‘closed’ during the hours above without the approval of ED leadership. The Charge Nurse will adjust assignments to maintain use of all treatment spaces per the ED Short Staffing Algorithm.

Always “pull until full” when treatment space is available within the department and complete the comprehensive Triage 2 assessment at the bedside.

- Front Charge, Triage RN(s) and PCT(s) should relocate to the main treatment area to assist with bedside triage until all beds are full.

Level 2 patients will be brought back from the waiting room immediately and bedded per the level 2 protocol.

- If a bed is not immediately available, level 2 patients should be placed at the “bus stop” and landed in the next available bed.

Level 3, 4, and 5 patients will be brought back in the order of acuity and placed in any treatment space in any zone regardless of age and provider staffing.

- Higher acuity patients will preferentially be placed in higher acuity beds.

Room 33 will be used preferentially for patients waiting for diagnostic results. Patients in other treatment spaces that can be moved to 33 should be proactively identified by the physicians and charge nurse.

Front Charge and Back Charge will work together to move patients out of the waiting room.

- Front Charge will focus on flow within the Yellow Zone, Green Zone, and Minor Care.
- Back Charge will focus on flow within the Red Zone.

*****Any deviations from this guideline must be approved by ED leadership *****

TUH ED SURGE PLAN

TUH Main ED

4.5.22

NORMAL STATUS (GREEN)	ESCALATION STATUS (YELLOW)	CRITICAL STATUS (RED)
	<p>All ED spaces full AND WR > 15, OR > 3 ESI 2 in WR >30mins, OR > 8 Admissions without beds assigned OR > 4 ICU admissions without beds assigned</p>	<p>All ED spaces full AND WR >30, or >5 ESI 2 in WR >30 mins, or >12 Admissions without beds assigned OR > 6 ICU admissions without beds assigned</p>
<p>Charge RN/ED Attending huddle q8hrs</p> <p>Charge Nurse:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ensure All Treatment Spaces Open: Use Short Staffing Algorithm <input type="checkbox"/> Pull to Full (no WR pts if beds open) <input type="checkbox"/> Pull all ESI 2 patients to rooms or Bus Stop <input type="checkbox"/> Ensure staging labs are ordered <p>ED Staff Nurses:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Move patients to Results Waiting Area or Discharge Lounge if appropriate <input type="checkbox"/> One call for report before patients go upstairs <p>ED Attendings</p> <ul style="list-style-type: none"> <input type="checkbox"/> Utilize alternative care pathways <input type="checkbox"/> Attending to Attending conversations to expedite care when needed <input type="checkbox"/> Trauma huddle to review trauma patients with LOS > 4 hours <p>ED Nurse Managers</p> <ul style="list-style-type: none"> <input type="checkbox"/> Attend AM Bed Huddle 	<p>*Ensure all steps in Green Status have been taken*</p> <p>Charge RN/ED Attending huddle q4hrs:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Review admitted patient needs – Can anyone discontinue telemetry or isolation? <ul style="list-style-type: none"> <input type="checkbox"/> Engage UBMD as needed <p>ED Attendings:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Call Radiology Attendings (##) for expedited reads on all studies that are critical to disposition <input type="checkbox"/> Call Trauma Attending for Pts w/ LOS >4hrs <input type="checkbox"/> If criteria above persist >30 mins, ED Divert x2hrs <input type="checkbox"/> Consider directing appropriate ICU admissions to Jeanes <p>ED Charge Nurse:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Call T3 to Expedite transfers to JC/EC <input type="checkbox"/> Assign pending transports to PCTs <input type="checkbox"/> Call Transport Supervisor for immediate movement of admitted patients <input type="checkbox"/> Call EVS Supervisor for additional personnel to ED to expedite ED bed turnover <input type="checkbox"/> Call Radiology managers to expedite ED imaging <input type="checkbox"/> Use half of minor care for holding admissions <input type="checkbox"/> If two providers are in minor care, one provider works out of staging room 	<p>*Ensure all steps in Green & Yellow Status have been taken*</p> <p>ED Attendings:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Divert x2 hrs <p>ED Charge Nurse:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Call PPC/Capacity Management Team to expedite bed assignment <ul style="list-style-type: none"> <input type="checkbox"/> At minimum, there should be an hourly update <input type="checkbox"/> Use half of minor care for admission holds <input type="checkbox"/> Use high green for admission holds <input type="checkbox"/> If two providers are in minor care, one provider works out of staging room <p>ED Nurse Manager:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Open IR as ED Overflow per IRAD-ED Algorithm <p>Capacity Management Team</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ensure all available inpatient spaces are being used <input type="checkbox"/> Call EVS supervisors for additional staff to expedite inpatient bed turnover <input type="checkbox"/> Call Transport Supervisor for immediate movement of admitted patients
<p>Escalate any delays per ED Escalation Algorithm</p> <p>Charge nurse → ANM/NM → Capacity Management Team</p> <p>ED Attending → MD/AMD → Capacity Management Team</p>		

NURSING PROTOCOL ORDERS

Triage or bedside nurse may select applicable order set in Epic

Bedside nurse will act on the orders

Physician will co-sign order placed by RN

Altered mental status >60 & unrelated to substance use

POCT glucose
EKG
IV saline lock (if in a treatment room)
CBC
CMP
Lactate
PT/PTT/INR (if on Coumadin or ESLD)
UA w/reflex to culture
Draw and hold blood cultures
CXR PA and lateral
NPO

Abdominal pain age >40

POCT glucose
POCT urinalysis
EKG
IV saline lock (if in a treatment room)
CBC
CMP
Lipase
PT/PTT/INR (if on Coumadin or ESLD)
NPO

Asthma/COPD age <50

Pulse oximetry, continuous
Ipratropium-albuterol (DUO-NEB) neb solution 3mL
Peak flow
Peak flow after 3rd neb treatment
Dexamethasone 16 mg PO
Albuterol neb solution 5mg q15min PRN wheezing

Asthma/COPD age >50

Pulse oximetry, continuous
Ipratropium-albuterol (DUO-NEB) neb solution 3mL
Peak flow
Peak flow after 3rd neb treatment
Prednisone 40 mg PO
Albuterol neb solution 5mg q15min PRN wheezing
EKG
IV saline lock (if in a treatment room)
CBC
BMP
Troponin
PT/PTT/INR (if on Coumadin or ESLD)
VBG
CXR PA and lateral

Chest pain age >45 OR any hx of DM, HTN, CAD, prior MI

POCT glucose
EKG
Repeat EKG in 2 hours
Cardiac monitor
IV saline lock (if in a treatment room)
CBC
BMP
Troponin
PT/PTT/INR (if on Coumadin or ESLD)
CXR PA and lateral
Aspirin 325 mg PO

Eye complaint

Assess and document visual acuity of left, right, & both eyes
Consult attending for Tetracaine & Fluorescein at bedside

Fever in immunocompromised patient (active cancer, transplant, ESRD, ESLD, AIDS)

POCT glucose
EKG
IV saline lock (if in a treatment room)
CBC
CMP
Lactate
PT/PTT/INR (if on Coumadin or ESLD)
UA
Urine culture
Draw and hold blood cultures
CXR PA and lateral
Acetaminophen 650 mg PO (oral temperature \geq 101 and no Acetaminophen allergy or ESLD)

GI bleed age >60 or with HR >110 or SBP <90

EKG
IV saline lock (if in a treatment room)
CBC
CMP
Type & screen
PT/PTT/INR (if on Coumadin or ESLD)

GI bleed age <60

CBC
POCT glucose
POCT urinalysis

NURSING PROTOCOL ORDERS (continued)

Hypoxia – Anyone with O₂ saturation <92% OR arriving by EMS on O₂

Oxygen therapy via nasal cannula to maintain saturation >92%

Suicide attempt by overdose

POCT glucose
EKG
Cardiac monitor
IV saline lock (if in a treatment room)
CBC
PT/PTT/INR (if on Coumadin or ESLD)
Salicylate level
Acetaminophen level
UDS
HCG quant (if female)
1:1 close observation

Needlestick/body fluid exposure in healthcare worker

HIV1/HIV2 antibody, P24 antigen
Hepatitis C antibody w/reflex to HCV RNA quant
Hepatitis B surface antibody quant
CBC
CMP
HCG quant (female patient)

Shortness of breath age >40 and/or with O₂ sat <92%

Oxygen therapy
EKG 12 lead
IV saline lock
CBC
BMP
VBG
Troponin
CXR PA and lateral

Syncope age <50

POCT glucose
EKG
Cardiac monitor

Syncope age >50

POCT glucose
EKG
Cardiac monitor
IV saline lock (if in a treatment room)
CBC
BMP
Troponin
PT/PTT/INR (if on Coumadin or ESLD)
CXR PA and lateral

In addition to presentation-specific protocols, the following orders may be entered and acted upon before a physician evaluates the patient.

- 1) Any female under the age of 55 will have a point-of-care urine pregnancy test ordered, performed and documented by protocol unless she has a prior total hysterectomy or tubal ligation.
- 2) Any patient with urinary symptoms will have a point-of-care urine dipstick ordered, performed and documented by protocol. All patients for whom urine samples are requested will be instructed on clean catch collection technique.
- 3) Any patient in whom an infection is suspected that is undergoing phlebotomy or IV placement will have blood cultures drawn and held by protocol.
- 4) Adult patients with non-traumatic chest pain or anginal equivalent (shortness of breath, neck pain, jaw pain, arm pain, epigastric pain, syncope or near-syncope) should have a 12 lead ECG within 10 minutes of arrival. Once a 12 lead ECG is completed, it will be reviewed immediately by an Emergency Department Attending Physician to screen for STEMI.

X-rays will be ordered by protocol for any patient presenting with deformity of an extremity. If there is any concern for vascular compromise, the nurse will request a physician evaluation

TRAUMA ACTIVATION CRITERIA

Updated May 2023

Category 1 Trauma Activation

Philadelphia Fire and Rescue trauma alerts and/or patients describing one of the following single or multisystem injuries with hemodynamic or neurological instability:

- Systolic blood pressure <90mm Hg (pediatric age-adjusted)
- Tachycardia >120 bpm (pediatric age-adjusted)
- Respiratory rate <10 or >29 or airway compromise (pediatric age-adjusted)
- GCS ≤ 13, or Motor ≤ 5
- Intubated after traumatic injury
- Lateralizing neurologic signs or traumatic paralysis
- All penetrating injuries to the head, neck, torso, groin, or extremity proximal to the elbow or knee
- All penetrating injuries to any extremity with suspicion of vascular compromise
- Pregnant trauma meeting Category 2 criteria
- Two or more Category 2 activation criteria
- Major amputation, degloving or mangled extremity
- Age >65 meeting Category 2 criteria
- Burns >20% BSA
- Transfer from another facility that is receiving blood to maintain vital signs
- Discretion of the attending emergency medicine physician

Category 2 Trauma Activation

In the absence of any Category 1 trauma activation criteria, the ED physician should initiate a Category 2 trauma activation based upon clinical information and mechanism of injury describing one of the following:

- Clinical evidence suggesting serious closed head injury
- Clinical evidence suggesting intra-abdominal injury
- Clinical evidence suggesting pelvic ring fractures
- Fracture of two or more proximal long bones (femur and/or humerus)
- Multiple rib fractures
- Bleeding disorder or patient on anti-coagulation
- Fatality of a passenger in the same vehicle
- Ejection from vehicle
- Motorcycle crash >20 mph or rider separation from motorcycle
- Auto vs Pedestrian/Bicyclist thrown, run over or with significant (>20mph) impact
- Fall >15 feet (adult) --- Child: Fall >10 feet or 3x the height of the child
- Discretion of the attending emergency medicine physician

All trauma patients transported by helicopter to TUH require trauma activation.
The level of activation (Cat 1 vs. Cat 2) should be determined as per the criteria above.

The Category 1 and 2 trauma activation criteria listed above are not meant to be inclusive. If the patient is deemed to have a significant injury, a Category 1 or 2 trauma can be initiated.

This process should also be utilized for all patients that are transferred to Temple University Hospital from any outside hospital

COMPLEX MEDICAL PATIENTS WITH TRAUMATIC INJURIES

Complex Medical Patients with Additional Traumatic Injuries

Goal

- 1) Improve patient care
- 2) Facilitate efficiency in patient disposition
- 3) Improve communication between services

Situation

- 1) Patient with both traumatic injuries and active medical conditions that will require admission to a medical service
- 2) These conditions are usually diagnosed/suspected at the time of the Trauma activation

Process

- 1) Patients should be identified as early as possible as likely fitting into this category
- 2) The decision to “de-traumatize” a patient should be based on an initial discussion between the Trauma and Emergency attendings
- 3) Trauma team will conduct the initial resuscitation and evaluation
 - a. The Trauma team attending or senior resident will provide the ED attending or designee an update of the patient’s evaluation and testing prior to the ED resuming patient care
- 4) After the initial evaluation, if no acute traumatic injuries requiring admission are identified but there is still a concern for a need for a medical admission:
 - a. At the time of transition back to the ED taking primary care of the patient a member of the Trauma team will sign out the patient to the ED attending
 - b. **The goal is to make this decision and sign out the patient in < 60 minutes**
 - c. If there is a disagreement this will be resolved in an attending-to-attending discussion
 - d. This is not to be used for patients that require admission/services due to social or psychiatric issues
- 5) The ED team will take over care of the patient, continue the medical work up and admit to the appropriate service and level of care once there is enough information to make this determination
- 6) The Trauma team will continue to follow the patient and within 24 hours place a note that includes a tertiary survey and final reads and recommendations regarding the patient’s traumatic injuries

TRAUMA CONSULT GUIDELINE

Updated August 2024

Trauma Consults

Patients with confirmed or suspected traumatic injuries with **hemodynamic, neurologic or vascular compromise** should always prompt **immediate trauma activation**. In the absence of these findings, there are instances in which the resources of trauma activation are not warranted, and trauma consultation may be considered:

Indications

Patient with delayed presentations

- Patients without any hemodynamic, neurologic or vascular compromise and not meeting any other Level 1 criteria, presenting to the ED **> 24 hours** after injury with significant traumatic findings identified during ED work-up.
- Any patient over 65 years old who meets the above consult criteria for delayed presentation may remain a consult (doesn't have to be made a level 1 due to age).

Patients known to the Trauma Service

- Patients who had been admitted to the Trauma Service within the prior 30 days
 - If the patient has an acute medical condition (e.g. UTI, non-surgical sepsis) but no emergent surgical needs, the patient may be admitted a medical service and a consult order will be placed to Trauma
 - If the patient may require any immediate or urgent surgical intervention, Trauma will be consulted prior to admission, to determine the most appropriate admitting service
- Patients presenting with an acute surgical issue (e.g. bowel obstruction) arising from a prior traumatic injury that was cared for by Temple Trauma

Podiatry Admissions

Trauma may be consulted by podiatry for isolated foot and ankle traumatic injuries requiring admission. Admission will go to the trauma attending

Ophthalmology Admissions

Trauma may be consulted by Ophthalmology or Emergency medicine for isolated ophthalmological injuries requiring admission. Admission will go to the trauma attending

Process

To request a Trauma Consult:

- Page the Trauma Chief on call, who will evaluate the patient within 30 minutes
- Place a consult order to Trauma Service in Epic

RAPID HEAD PROTOCOL

Objectives: (1) to expedite the care of patients who do not meet trauma activation criteria but may have isolated traumatic brain injury, with or without associated cervical spine injury. (2) to screen for trauma activation criteria by focusing the physicians' and nurses' efforts on a thorough clinical assessment and enlisting ancillary staff to expose, logroll, register, and transport the patient.

Inclusion Criteria	Exclusion Criteria
<p>Head injured patients who have CT imaging indications, but have a GCS of 14-15 and do not meet trauma activation criteria</p> <p>Patients with an unclear head injury history, but other factors exist that raise the ED physician's index of suspicion for intracranial hemorrhage. Examples include the intoxicated or elderly patient.</p>	<p>Patients meeting any Trauma Activation criteria (including GCS less than 14) *</p> <p>Patients with evidence on exam and/or mechanism to suggest serious multi-system injury</p> <p>*Limited chemical control of agitation is acceptable.</p>

Protocol:

1. Charge Nurse requests a Trauma Eval.
2. Attending or senior resident (PGY3 or PGY2 under attending supervision) assesses the patient and determines Rapid Head Team Protocol is appropriate (see inclusion/exclusion criteria).
3. Attending or senior resident may remain the primary provider for the patient, or may assign the case to another resident by verbal communication. If a PGY1 becomes the primary provider, the attending or senior resident will ensure that a thorough trauma assessment is performed. If there is concern for cervical spine injury, a cervical collar will be applied.
4. The attending or resident physician will perform a primary and secondary survey for trauma, place orders.
5. The charge nurse or desk PCT will call CT suite (2-4373) to inform of Rapid Head patient needing immediate imaging.
6. A designee, as determined by the charge nurse, will transport the patient to and from CT suite.
 - a. If it is likely the patient will require repeat doses of sedation, the physician and nurse will accompany the patient to CT suite.
7. Resident and attending physicians review CT scans.
8. If at any point in the patient's clinical assessment Trauma Activation criteria are met, a discussion with the ED Attending Physician will be had to determine further action.

ANTICOAGULATED PATIENTS: As of August 2019, trauma consultation is not routinely recommended for anticoagulated patients with no acute intracranial abnormalities on CT Head, regardless of INR or which anticoagulant they take. If the patient requires hospitalization, they may be cared for on a medicine/hospitalist team.

Canadian CT Head Rule

CT head is only required for minor head injury patients with any one of these findings:

High Risk (for Neurological Intervention)

1. GCS score < 15 at 2 hrs after injury
2. Suspected open or depressed skull fracture
3. Any sign of basal skull fracture*
4. Vomiting ≥ 2 episodes
5. Age ≥ 65 years

Medium Risk (for Brain Injury on CT)

6. Amnesia before impact ≥ 30 min
7. Dangerous mechanism ** (pedestrian, occupant ejected, fall from elevation)

*Signs of Basal Skull Fracture

- hemotympanum, 'raccoon' eyes, CSF otorrhea/rhinorrhea, Battle's sign

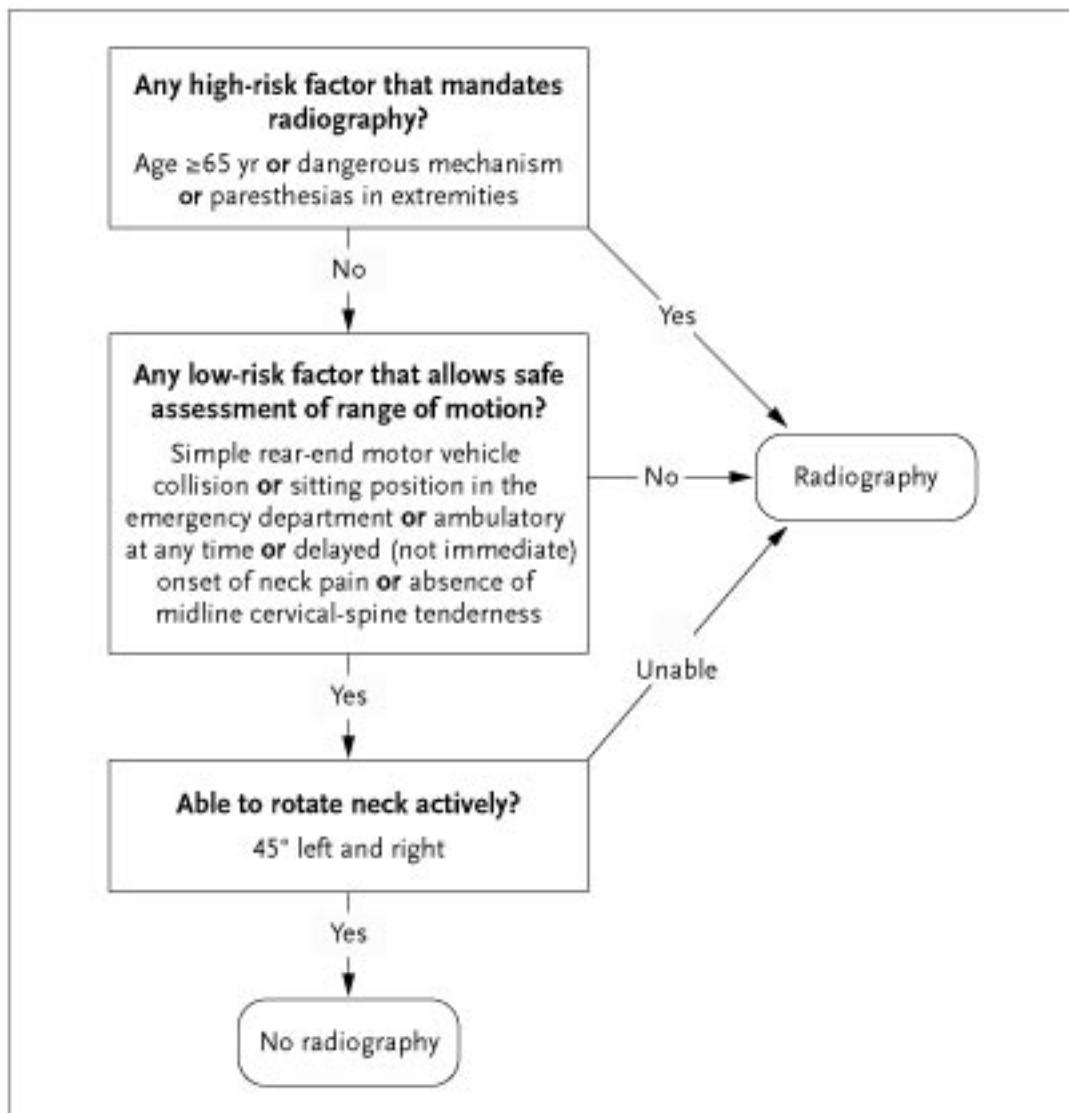
** Dangerous Mechanism

- pedestrian struck by vehicle
- occupant ejected from motor vehicle
- fall from elevation ≥ 3 feet or 5 stairs

Rule Not Applicable If:

- Non-trauma cases
- GCS < 13
- Age < 16 years
- Coumadin or bleeding disorder
- Obvious open skull fracture

CANADIAN C-SPINE RULE



For patients with trauma who are alert (as indicated by a score of 15 on the Glasgow Coma Scale) and in stable condition and in whom cervical-spine injury is a concern, the determination of risk factors guides the use of cervical-spine radiography.

A dangerous mechanism is considered to be a fall from an elevation ≥ 3 ft or 5 stairs; an axial load to the head (e.g., diving); a motor vehicle collision at high speed (>100 km/hr) or with rollover or ejection; a collision involving a motorized recreational vehicle; or a bicycle collision. A simple rear-end motor vehicle collision excludes being pushed into oncoming traffic, being hit by a bus or a large truck, a rollover, and being hit by a high-speed vehicle.

*Stiell IG, et al: The Canadian c-spine rule versus the NEXUS low-risk criteria in patients with trauma.
NEJM, 349(26):2510-2518, 2003*

FACIAL TRAUMA CONSULT GUIDELINE

Facial Trauma Emergencies (Facial Trauma Consult – ENT/OMFS/Plastic Surgery)

Diagnosis	Emergent Consult	Urgent Follow Up	Notes
Le Forte Fractures	-Type I/II -Type III = <u>Trauma Activation</u> (skull fracture)		-Type I: fracture line passes through the alveolar ridge, lateral nose and inferior wall of the maxillary sinus -Type II: fracture arch passes through the posterior alveolar ridge, lateral walls of maxillary sinuses, inferior orbital rim and nasal bones -Type III: transverse fracture line passes through nasofrontal suture, maxillo-frontal suture, orbital wall, and zygomatic arch/zygomaticofrontal suture
Nasal Fractures	-Nasal obstruction (excluding septal hematoma that can be drained) -Nasolacrimal system injury -Persistent epistaxis		-CSF Leak or other indication of extension to involve skull fracture should be activated as a trauma. -For discharged patients, include sinus precautions instructions.
Nasal Septal Hematoma	-Only if significant associated injuries.	-Can have patient follow up within 24 hours with ENT.	-Drain in ED, packing, antibiotics. -Include sinus precautions instructions.
Frontal Sinus Fracture	-Isolated anterior table fractures can be facial trauma consult -All others – <u>Trauma Activation</u> (likely intracranial extension)		
Palatal Fracture	-All.		
Temporomandibular Joint Dislocation (Jaw Dislocation)	-Associated Fracture. -Inability to reduce.		-If able to reduce in ED without consult, discharge with soft diet, mouth opening precautions (less than 2 cm for 2 weeks), support mouth when yawning, follow up in OMFS clinic.
Zygomaticomaxillary Fracture (Tripod)	-All.		-May need ophthalmology for concurrent orbital injury.
Mandibular Fracture	-Open fracture. -Displaced. -Impending airway compromise = <u>Trauma Activation</u> -High risk mechanism concerning for concurrent vascular injury (i.e. hit with bat, high fall) = <u>Trauma Activation</u>		
Dental Trauma		-Refer to OP Dental.	-Avulsed pediatric teeth should not be replaced.
Lip Laceration	-Consider consultation in the ED if significant tissue maceration, missing tissue, or other features that increase complexity and risk of poor cosmetic outcome.	-Refer to OP Plastics or OMFS if needed.	-Primary repair in ED with attention to Vermillion border alignment, can undergo delayed repair with Plastics.
Tongue Laceration	-Complete amputation.	-Refer to ENT or OMFS.	-Refer to Zurich Tongue Scheme for guideline on when to repair.
Auricular Hematoma		-Refer to ENT.	-Drain in ED with pressure dressing application/Bolster dressing (Aspiration can be performed up to 48 hours; I&D up to 7 days) -Antibiotic Rx for immunocompromised, cover pseudomonas.

FACIAL TRAUMA CONSULT GUIDELINE (continued)

Ophthalmologic Traumatic Emergencies (Ophthalmology Consult)

Diagnosis	Emergent Consult	Urgent Follow Up	Notes
Orbital Blowout Fracture	-Co-occurring emergent pathology. -Diplopia. -Visual Acuity change. Blurred Vision. -Entrapment (decreased ROM). -Enophthalmos > 2-3 mm (sunken eyeball).	-All others.	-If Facial Trauma Service requesting Ophthalmology consultation, consider timeline of surgical planning and consider arranging OP Ophthalmology Clinic visit in discussion with on-call resident.
Globe Rupture	-All.		-Apply eye shield.
Retrobulbar Hematoma	-All.		-Perform emergent lateral canthotomy if increased ocular pressure.
Eyelid Lacerations	-Lacerations through lid margin. -Ptosis. -Involving nasolacrimal system. -Fat protrusion. -High Complexity (i.e. partial avulsion/margins poorly re-align, unable to determine full extent of laceration, full thickness through the lid, at discretion of ED attending).		-Otherwise, ED repair with usual follow up.
Hyphema	-For Grade III/IV. -Increased IOP. -SCD/Trait, Bleeding Tendency, Anti-Coagulated. **Ophthalmology service would like phone call for all hyphema despite grade.	-Grade I/II.	Grade I: Less than 33% of anterior chamber volume. Grade II: 33-50% of anterior chamber volume. Grade III: >50% of anterior chamber volume. Grade IV: Total anterior chamber volume (Eightball). -Precautions on discharge to include HOB elevated, sinus precautions (i.e. sneeze mouth open, avoid blowing nose, etc). -Consider sending SCD testing if uncertain or high-risk population.
Traumatic Orbital Compartment Syndrome	-All. -Any injury requiring lateral canthotomy.		-Elevated IOP in setting of trauma (likely multifactorial).
Traumatic Retinal Detachment	-All.		
Vitreous Hemorrhage	-Associated globe injury. -Bleeding tendency or anti-coagulated.	-All others.	
Conjunctival/Scleral Laceration	-Only if associated globe injury or other injury requiring consultation.	-All others.	-Injury to the bulbar conjunctiva overlying the sclera. Usually associated with chemosis or subconjunctival hemorrhage.
Corneal Abrasion		-Most can follow up in clinic. If overlying pupil or change in VA without other associated injury, attempt 24-48 hour follow up.	-Ophthalmic drops to cover pseudomonas for contact lens wearers.
Foreign Body		-If unable to remove in ED, attempt 24-48 hours follow up.	-Rust ring can have delayed removal by Ophthalmology.

CRITICAL AIRWAY TEAM

The purpose of the Critical Airway Team (CAT) at Temple University Hospital is to reduce the risk of injury or death by managing difficult or potentially difficult airways with advanced techniques or surgical intervention.

- A. Examples of reasons for activation of a CAT include, but are not limited to:
1. Mechanical threats to the airway from:
 - a) Angioedema
 - b) Swelling from infection, hemorrhage or trauma
 - c) Distortion from trauma or prior surgery
 - d) An enlarged tongue
 2. Anatomical features creating a difficult airway
 - a) Extreme obesity
 - b) Facial and oropharyngeal malformations
 3. Known prior difficult airway
 4. Cervical spine pathology/injury
 - a) Patient in cervical collar
 - b) Patient in Halo device
 5. Inability to secure airway by traditional methods

PROCEDURE TO ACTIVATE

Any TUH physician (Attending, Fellow, or Resident), PA, CRNP or CRNA may activate the Critical Airway Team (CAT) in the Emergency Department by dialing **2-3333** and stating "Critical Airway Team Room XX Emergency Department".

Critical Airway Team Call Responders	
CAT Team	Supporting
Anesthesiology Attending	Patient's primary physician
Trauma Attending	Patient's primary RN
Anesthesiology Resident or CRNA assigned to carry emergency airway pager	Respiratory Therapist
Trauma Senior Resident	Pharmacist
ENT Chief Resident	Clinical Coordinator or Designee

The Anesthesiology Attending assumes role of Critical Airway Team Leader (the Trauma Attending or ED Attending assumes this role if an anesthesiologist is not available).

Team members must remain at the CAT site until the CAT Team Leader indicates that the presence of that Department is no longer required. The CAT Team Leader has sole authority to determine that the patient's airway is stable and secure.

PEDIATRIC HEAD INJURIES

Pediatric Minor Head Trauma

Inclusion criteria

1. Head injured patients who have CT imaging indications but have a GCS of 14-15 and do not meet Trauma Activation Criteria
2. Patient with or without head injury history less than 14 years of age that raise the ED physicians index of suspicion including the following:
 - a. Repeated persistent/progressive vomiting
 - b. Loss of consciousness
 - c. History of lethargy/irritability, now resolved
 - d. High force mechanism/fall onto hard surface
 - e. Hematoma, particularly if large and non-frontal
 - f. Unwitnessed trauma with possibility of significant mechanism
 - g. Signs of skull fracture
 - h. Bulging fontanelle
 - i. Suspicion of abuse
 - j. Underlying condition predisposing to intra-cranial hemorrhage (Von Willebrand's disease, Factor deficiency etc.)

*See PECARN algorithm (next page) for additional considerations

PEDIATRIC HEAD INJURIES (continued) - PECARN

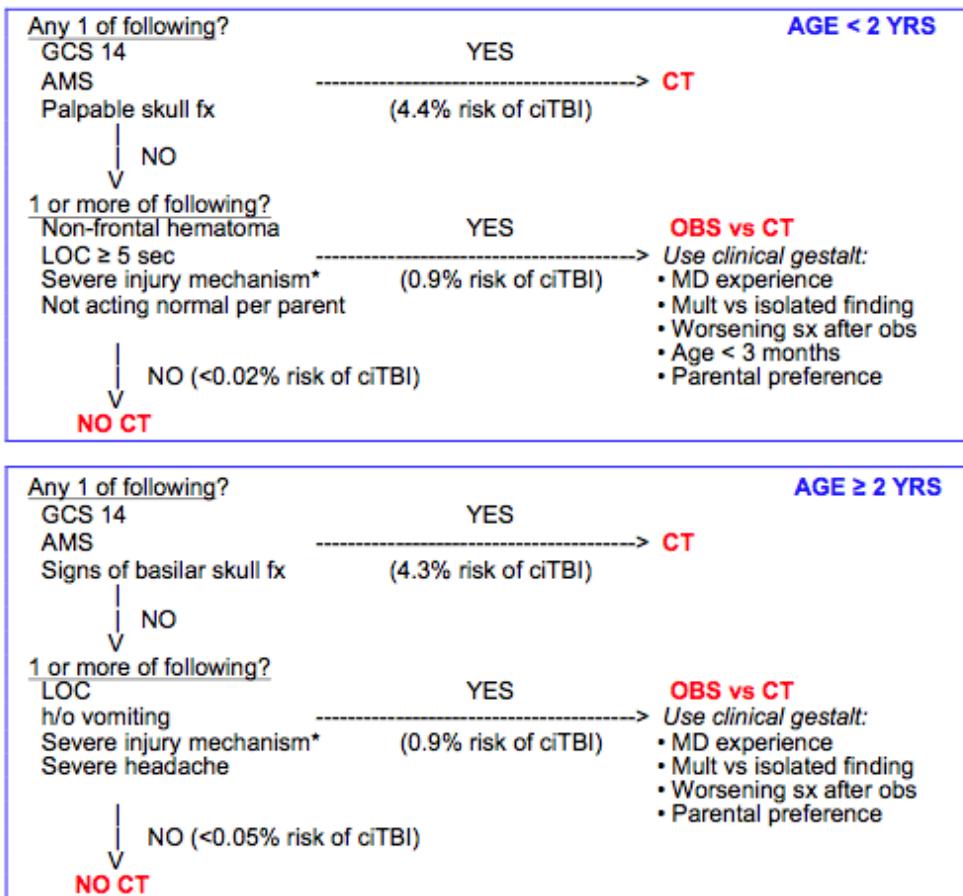
PEDIATRIC BLUNT HEAD TRAUMA

Kuppermann N et al. ID of children at very low risk of clinically-important brain injuries after head trauma: a prospective cohort study. *Lancet.* 2009 Oct 3;374(9696):1160-70.

Fact: Risk of CT-documented TBI in children GCS <14 = 20%

PECARN Study: (Pediatric Emergency Care Applied Research Network) Study

- * Derivation (n=33,785) and validation (n=8,627) of clinical decision rule for deciding who NOT to get head CT's for blunt head trauma.
- * Enrolled age<18 yr within 24 hrs of head trauma and GCS 14-15 in 25 EDs
- * Pre-defined "clinically important traumatic brain injury" (ciTBI) as:
 - Death from TBI
 - Neurosurgical intervention
 - Intubation >24 hrs duration
 - Hospital admission ≥2 nights
- * CT's obtained in 37% (derivation) and 35% (validation) of enrolled patients
- * Discharged patients' caregiver called at day #7 and #90 for f/u



* **Severe mechanism of mechanism:**

- MVC with patient ejection, death of another passenger, or rollover
- Pedestrian or bicyclist without helmet struck by a motorized vehicle
- Fall >3 ft (age<2 yr) or >5 ft (age ≥2 yr)
- Head struck by a high-impact object

PEDIATRIC RESOURCES

Resuscitation

ESI 1 and 2 pediatric patients, or any decompensating pediatric patient, should be moved to Room 3 (Resuscitation Bay). The Blue Side Attending will respond and assume responsibility for care. After stabilized, the patient may move to the most appropriate ED space as determined by Charge Nurse and EM Attending.

CHOP pathways

The CHOP clinical pathways are recommended as the primary resource to manage common pediatric complaints. The pathways are created, reviewed, and periodically updated by expert panels at CHOP to reflect current literature. The pathway library is open access and is located on the Dashboard Home in Epic or at <https://www.chop.edu/pathways-library/emergency>

Specialty consultation

A few CHOP pathways for common complaints (e.g., Chest Pain, Migraine, and Diabetes) include instances where a child may be discharged after discussion with a pediatric specialist. If this arises, simply call the St. Chris operator (215-427-5000) and ask them to contact the on-call specialty physician. If the child already follows with a CHOP specialist, you may call the CHOP operator (215-590-1000) to discuss the case with their on-call specialist.

Regarding consultations at Temple, the following services generally do come to the TUH ED to see pediatric patients: orthopedics, ENT, ophthalmology, oral surgery, and GYN. Services that generally do not come to the TUH ED to see pediatric patients include general surgery, urology, neurology, and neurosurgery. That said, you can always reach out to the attending covering our specialty services at TUH and ask for help; if they are unable to help, you can either call the SCHC operator (above) or arrange transfer to St. Chris.

Admission to TUH

Some pediatric patients can be admitted to Temple. Please see the age policy for admission which notes which services will accept pediatric patients and their respective age cutoffs.

Transfers

ED-to-ED transfers and admissions to St. Chris should go through the St. Chris transfer center (215-427-6900). With ED to ED transfers and floor admissions, you will be asked to provide clinical information to their intake nurse and then wait to hear back regarding the actual transfer to the ED or inpatient bed (you should not expect to speak to a physician). With PICU admissions you will be asked to speak to the on-call ICU doc to discuss the case before it is accepted to the unit.

Cultures pending

There are instances on certain CHOP pathways (e.g., Febrile infant, Cystitis) where a child can be discharged with cultures pending. These results will be routed to the Admin Resident via our existing process. As with any patient discharged with pending results, please be sure to obtain, confirm, and document a working phone number for these patients.

Follow up

For patients who will be discharged from TUH and require follow up with a primary care provider or a specialist, you can call 215-427-3782 to arrange for a follow up appointment at St. Chris.

PEDIATRIC CRISIS REFERRAL PROCESS

Physician referral procedure

- If you wish to refer a patient to the Philadelphia Children's Crisis Response Center (PCCRC), please contact the PCCRC at **215-878-2600**
- Fax the available clinical information, including any testing or interventions performed for medical clearance. Clinical information should preferably be faxed beforehand for our physician to review, or you could request to speak to the physician to determine if further information or workup is needed. Our fax numbers are 215-991-0539 or 215-581-5474
- When you call, please have the following information available:
 - Presenting Problem
 - Patient Legal Status (i.e., Voluntary vs. 302)
 - Name and contact information of patient's legal guardian. A parent/guardian must accompany any child **under 14** unless they are being transferred on a 302. In that case, efforts made by the ED to contact the guardian prior to transfer must be documented
 - Clinical information, including any testing or interventions performed for medical clearance
 - Vital signs must be within normal parameters based on age and/or medical history
- Based on clinical presentation the PCCRC physician may request further diagnostic testing, observation or medical interventions including but not limited to UDS, HCG, EKG, blood glucose, anticonvulsant levels, Covid-19 test, and any other test pertinent for medical clearance
- The PCCRC may request that further clinical information (e.g. toxicology input) or documents (e.g. 302) be faxed for review. Please do not consider patient to be accepted or transfer until the doctor officially agrees
- When the PCCRC accepts the patient, the ED nurse must call a report into the PCCRC nurse
- The referring facility must also arrange transportation
- Assuming the PCCRC has capacity to receive new patients, we will accept any patient deemed to be medically stable for transfer by both the referring facility, and PCCRC medical staff

CSU referrals:

- If a Psychiatric Evaluation has occurred, and the patient has been recommended for our Crisis Stabilization Unit, and a stay on the Unit has been pre-authorized by Community Behavioral Health for days on the Crisis Stabilization Unit, please follow the following procedures:
 - Call PCCRC at 215-878-2600 to make the referral
 - Fax clinical information
 - Set up transportation upon acceptance by PCCRC physician

PEDIATRIC ULTRASOUND CAPABILITY BY CAMPUS

Pediatric Ultrasound Capability by Campus

Temple Main Campus

- Renal US (any age)
- Bladder US (any age)
- Complete abdomen US (any age)
- Soft tissues US for abscess/collection (any age)
- Transabdominal female pelvis (any age)
- Scrotal US (age >2)

Temple Episcopal Campus

- Soft tissues US for abscess/collection (any age)
- Scrotal US (age >2)

Temple Jeanes Campus

- Soft tissues US for abscess/collection (any age)
- Scrotal US (age >2)

* Renal, bladder, complete abdomen, and transabdominal female pelvic ultrasounds may be available at Jeanes and Episcopal campuses on select older pediatric patients - please discuss with radiology prior to ordering.

CHEST PAIN – INITIAL MANAGEMENT

All patients with non-traumatic chest pain or anginal equivalent should have a 12 lead ECG within 10 minutes of arrival. Once a 12 lead ECG is completed, it needs to be reviewed immediately by an Emergency Department Attending Physician unless the computerized reading is “Normal sinus rhythm, Normal ECG”.

If the machine says this ...



**Normal sinus rhythm
Normal ECG**

Then an attending does *not*
need to sign the EKG.
(for patients at least 18 years-old)

All other EKGs still need to be signed as before.

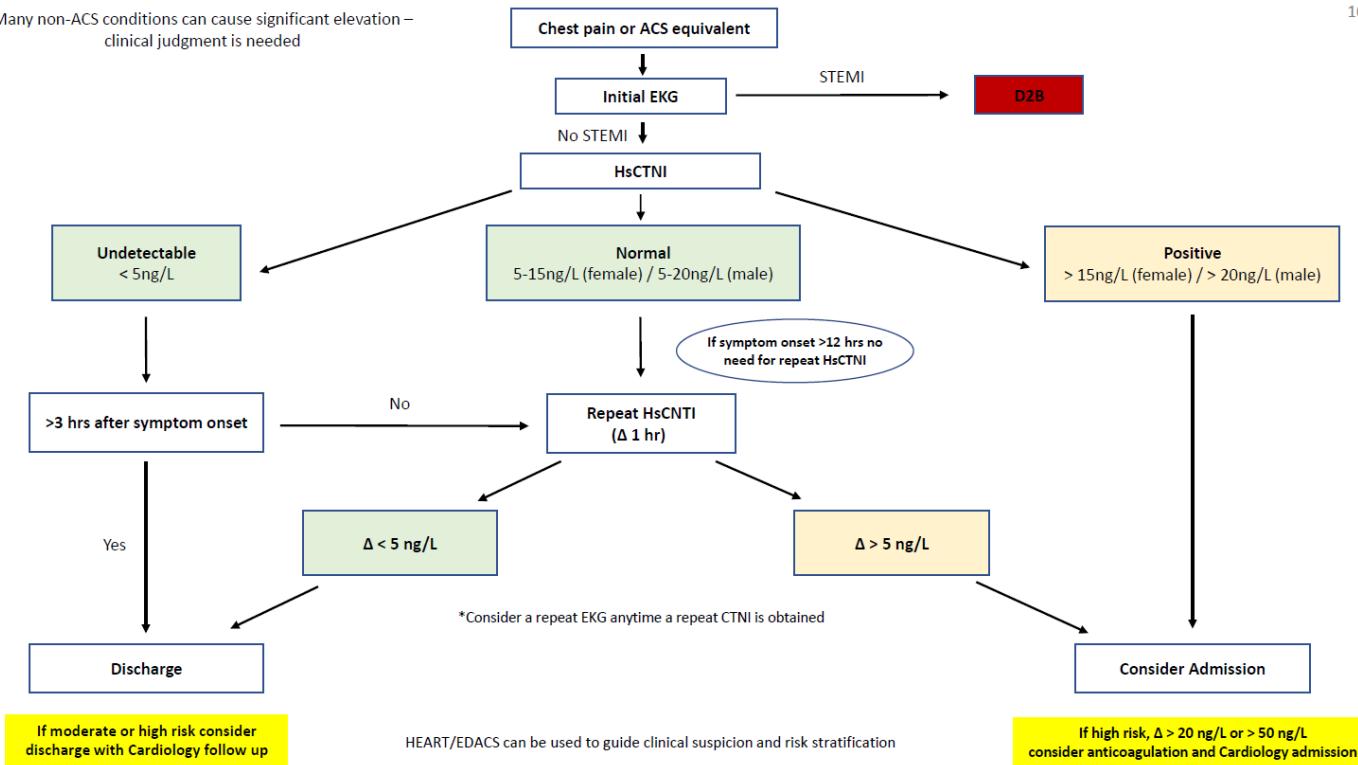
TUH ED EKG Policy, Approved March 2018

The primary intent of this review is to screen for STEMI. See D2B activation algorithm for STEMI criteria and activation process.

CHEST PAIN – ALGORITHM

Many non-ACS conditions can cause significant elevation – clinical judgment is needed

10/23



- **Undetectable:** <5 ng/L (female and male)
 - Candidates for discharge after single troponin
- **Normal but detectable:** ≤ 15 ng/L (female) or ≤ 20 ng/L (male)
 - 50% of healthy people fall into this range
 - Below the 99th percentile so likely still negative
 - Need second troponin to fully rule out unless symptom onset >12 hours
- **Positive:** >15 ng/L (female) or >20 ng/L (male)

*Consider other etiologies such as aortic dissection and pulmonary embolus

*Consider serial EKGs if the patient is ill-appearing or has worsening pain

CHEST PAIN – RISK STRATIFICATION

Risk stratification of CP patients using Heart score/ TIMI

Heart score:		
History	Highly suspicious	2
	Moderately suspicious	1
	Slightly suspicious	0
ECG	ST depression	2
	Non-specific	1
	Normal	0
Age	>65	2
	45-65	1
	<45	0
Risk Factors	> 3 or known CAD	2
	1-2	1
	None	0
Troponin	> 3x the normal limit	2
	1-3x the normal limit	0
	Normal	1

HEART<3 considered low risk –

MACE in next 6 weeks 0.9-1.7%; for score 7-10 MACE 50-65%

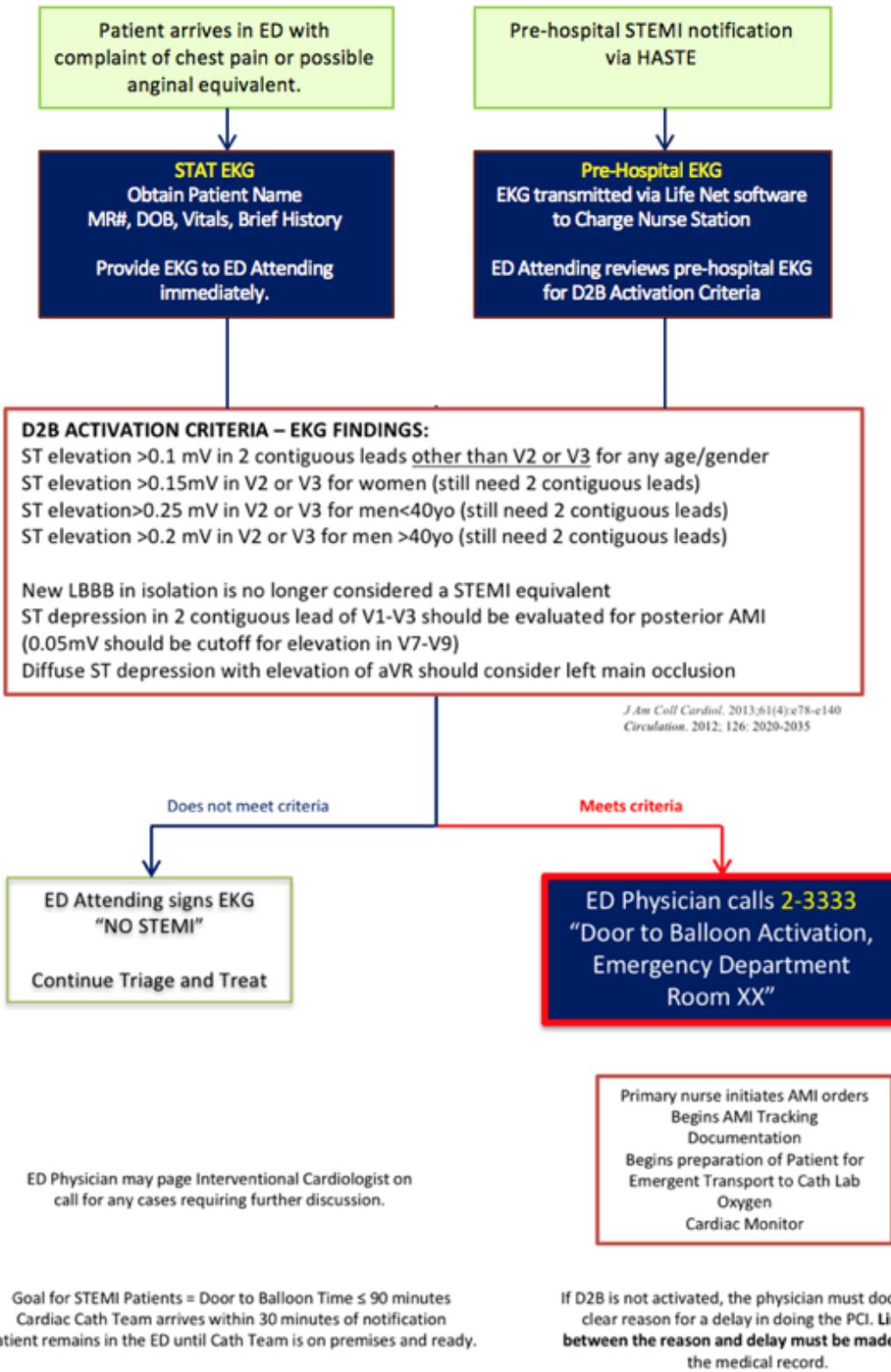
TIMI risk score for UA/NSTEMI:

Age > 65	+1
3 risk factors (family history of CAD, HTN, HLD, DM, current smoker)	+1
Known CAD	+1
Aspirin use in last 7 days	+1
Angina > 2 times in past 24 hours	+1
ECG with ST changes > 0.5 mm	+1
Positive troponin	+1

TIMI 0/1 low risk for ACS-

Risk of negative outcome over 14 days including death,
new/recurrent MI, need for urgent revascularization <5%

DOOR-TO-BALLOON (D2B) ACTIVATION



D2B SCENARIOS

3/1/24

STEMI EKG with concerning clinical picture

D2B Activated

ED Attending sends picture of EKG to Interventional Cardiology (IC) Attending

Cardiology Fellow responds and documents outcome

Not STE EKG but concerning clinical picture

ED Attending calls CCU Attending and sends picture of EKG

CCU Attending discusses with Cardiology Fellow about activating Urgent Cath Lab Case

CCU Attending or Fellow calls IC Attending who must agree to activate

If not activated, Cardiology Fellow to perform consult

STE EKG but not concerning clinical picture

ED Attending calls IC Attending and sends picture of EKG

Joint decision about activating D2B

If not activated, Cardiology Fellow to perform consult

Pre-Hospital STEMI HASTE

EKG Available to ED Attending and consistent with STEMI

D2B Activated

ED Attending sends picture of EKG to IC Attending

Cardiology Fellow responds and documents outcome

Pre-Hospital STEMI HASTE

EKG Available and not consistent with STEMI

D2B not activated

EKG repeated upon arrival to ED

Pre-Hospital STEMI HASTE

EKG not available

D2B Activated

EKG Repeated upon arrival to ED

ED Attending sends picture of ED EKG to IC Attending

Joint decision about continuing D2B activation

If D2B cancelled, Cardiology Fellow to perform consult

*If for any scenario, Cardiology does not answer within five minutes, the ED Attending should activate the D2B

*Activations should be made via the emergency line (2-3333)

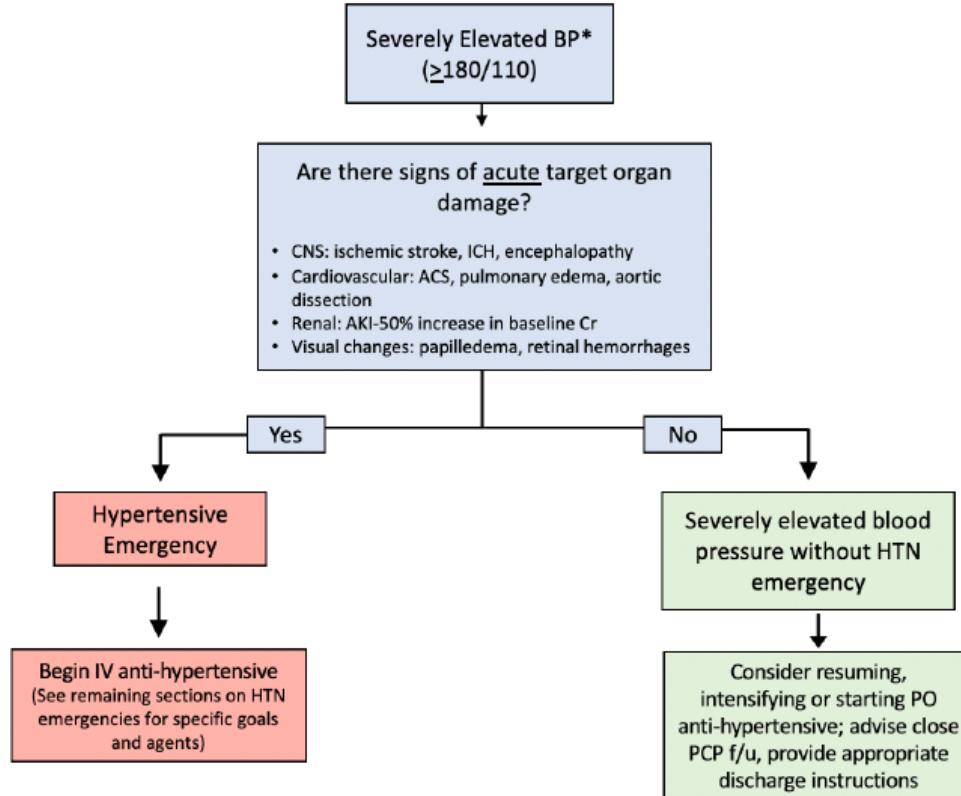
*Calls should be made via T3

*EKGs should be transmitted via Haiku, with the patient attached (if known)

*When available, the current EKG should be promptly compared to a prior EKG before proceeding

*Any post arrest patient should follow the appropriate pathway, based on the post-arrest EKG

MANAGEMENT OF HYPERTENSION



*There is no consensus on what constitutes severely elevated BP; $>180/110$ is most commonly cited in the literature

Adapted from Whelton PK, et al. 2017 High Blood Pressure Clinical Practice Guideline

**** See Epic dashboard link for complete HTN management guideline ****

MANAGEMENT OF HYPERTENSION (continued)

Anti-hypertensive Agents for Hypertensive Emergency						
	Agent	Mechanism	Dose	Pharmacokinetics	Contraindications/ Cautions	First Line Indications
DHP- CCB	Clevudipine	Afterload reduction	1-21 mg/hr Adjust by 1-5 mg/hr Q3-5 min	Onset: 90 sec Duration: 5-15 min	- Contraindicated in soybean or egg allergy, pathologic HLD, severe aortic stenosis - Caution in CHF	CNS Emergencies Aortic Dissection after BB
	Nicardipine	Afterload reduction	2.5-15 mg/hr Adjust by 2.5 mg q5-15 min If titration is rapid, consider dose reduction to 5 mg/hr once desired BP is achieved	Onset: 5-15 min Duration: 5 min-4 hrs	- Contraindicated in severe aortic stenosis - Caution in CHF - Titrate slowly with renal or hepatic impairment	CNS Emergencies
BB	Esmolol	Selective beta-1 blocker; HR reduction	Bolus: 500 mcg/kg IVP over 1 min; Drip: 50-300mcg/kg/min Adjust by 50 mcg/kg/min q5min, must rebolus prior to each uptitration	Onset: 1 min Duration: 10-20 min	- Contraindicated in severe bradycardia, 2nd or 3rd degree heart block, decompensated CHF, cocaine intoxication	Aortic Dissection when combined w/ vasodilator
	Labetalol	Alpha-1 and non-selective BB; HR and afterload reduction	Bolus: 10-20 mg IVP over 1-2 min Repeat 10-80 mg q10min, max total 300 mg; Drip: 0.5-6 mg/min; Adjust by 0.5mg/min q15 min	Onset: 2-5 min Duration: 3-18 hrs (dose dependent)	- Contraindicated in severe bradycardia, 2nd or 3rd degree AV block, decompensated CHF, asthma/ COPD, cocaine intoxication	Aortic Dissection CNS Emergencies Pregnancy
Vaso-dilators	Nitroglycerin	Preload reduction, afterload reduction at higher doses	0.4 mg SL q1-5 min	Onset: 1-3 min Duration: 20-30min	- Contraindicated in PDE-5 inhibitor use - Caution in preload dependent conditions: RV failure, pulm HTN, HOCM, severe aortic stenosis - Avoid in increased ICP	Acute Pulmonary Edema Acute Coronary Syndrome
	Sublingual		Start 5-400 mcg/min Adjust by 10 mcg/min q5min; Start at 80-100 mcg/min for pulm edema	Onset: 2-5 min Duration: 5-10 min		
	Intravenous		0.1-10 mcg/kg/min Adjust by 0.5 mcg/kg/min q5min	Onset: immediate Duration: 1-2 min		
	Nitroprusside	Preload and afterload reduction	10-20 mg IV q20 min 10-40 mg IM q4-6hr	Onset: IV 10-20 min IM 10-40 min Duration: IV 1-4 hrs IM 4-6 hr	- Contraindicated in PDE-5 inhibitor use - Caution in renal and hepatic impairment - CN toxicity w/ prolonged infusion or higher doses-use lowest dose possible and for shortest time - Avoid in increased ICP - May cause rapid hypotension	Aortic Dissection after BB
	Hydralazine	Afterload reduction	10-20 mg IV q20 min 10-40 mg IM q4-6hr	Onset: IV 10-20 min IM 10-40 min Duration: IV 1-4 hrs IM 4-6 hr	- Avoid in HTN emergency due to unpredictable and prolonged effects - Can lead to reflex tachycardia - Increased ICP	Pregnancy otherwise not first line agent

MANAGEMENT OF HYPERTENSION (continued)

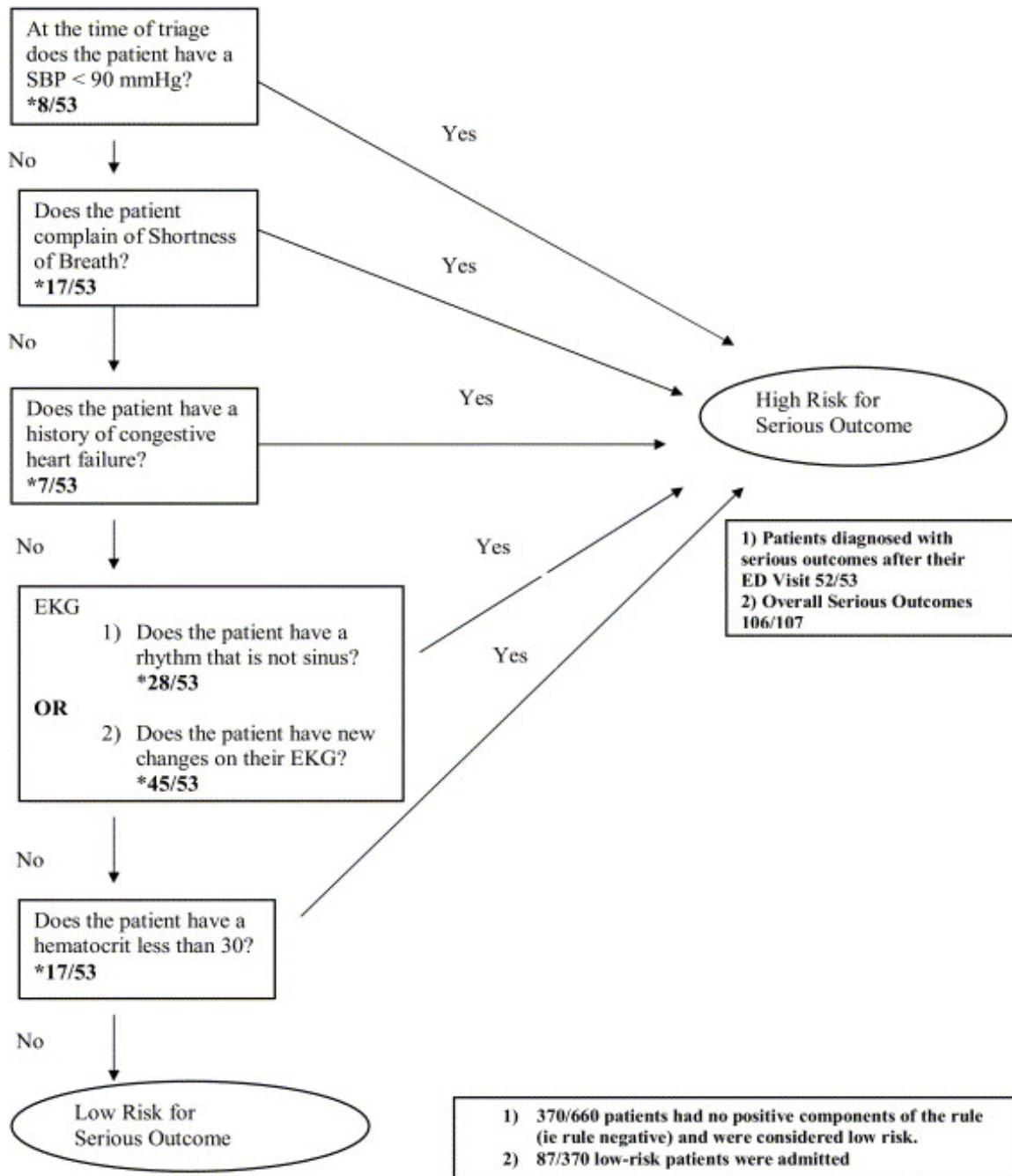
Anti-hypertensive Agents for Hypertensive Emergency						
ACEi	Enalaprilat		1.25 mg IVP q6hr 0.625 mg if on diuretics can repeat after 1hr x 1 if BP response not adequate	Onset: 15 min; Peak: 2-4 hrs Duration: 6-12 hrs	- Contraindicated in renal artery stenosis, hx ACE angioedema -May cause unpredictable drop in BP in high renin states and volume depletion -Caution in aortic stenosis, coronary or cerebral ischemia, due to possible unpredictable hypotension -Avoid in renal impairment	Not first line agents
	Captopril	Preload and afterload reduction	12.5-25 mg PO	Onset: 5-10 min Peak: 30 min Duration: 4-6 hrs		

Severely Elevated Blood Pressure WITHOUT Symptoms of Hypertensive Emergency	
Patients with repeated BP measurements $\geq 180/110$ during ED stay who do not have evidence of acute target organ dysfunction	
Approach: Gradual reduction in BP over several days to normal; avoid large drops in BP which could lead to coronary or cerebral ischemia; consider starting or resuming PO med in the ED and recommend close outpatient follow-up	
Goals: <ol style="list-style-type: none"> 1. Ensure proper sized BP cuff, treat pain, nausea etc. and then repeat the BP measurement 2. If patient has missed doses of home anti-hypertensive, administer home agent 3. If patient has taken the home anti-hypertensive, can increase the dose, or add an additional agent 4. If patient is not on an anti-hypertensive, consider starting PO agent from the list below in the ED; prescribe at discharge 5. BP reduction is not necessary prior to discharge 6. Provide appropriate discharge advice and encourage follow-up 	

Selected Oral Antihypertensive Agents					
Class	Agent	Dose		Comments	Specific Indications
DHP-CCB	Amlodipine	Starting	2.5-5mg daily	-Avoid as first line in HFrEF, but can be added if additional medications are required to control BP	
		Range	2.5-10mg daily		
	Nifedipine ER	Starting	30mg daily		
		Range	30-60mg daily		
Thiazide or Thiazide-like Diuretics	Chlorthalidone	Starting	12.5-25mg daily	-Chlorthalidone preferred based on proven reduction in CVD -Avoid in pts with hx of gout	
		Range	12.5-100mg daily		
	HCTZ	Starting	12.5-25mg daily		
		Range	12.5-50mg daily		

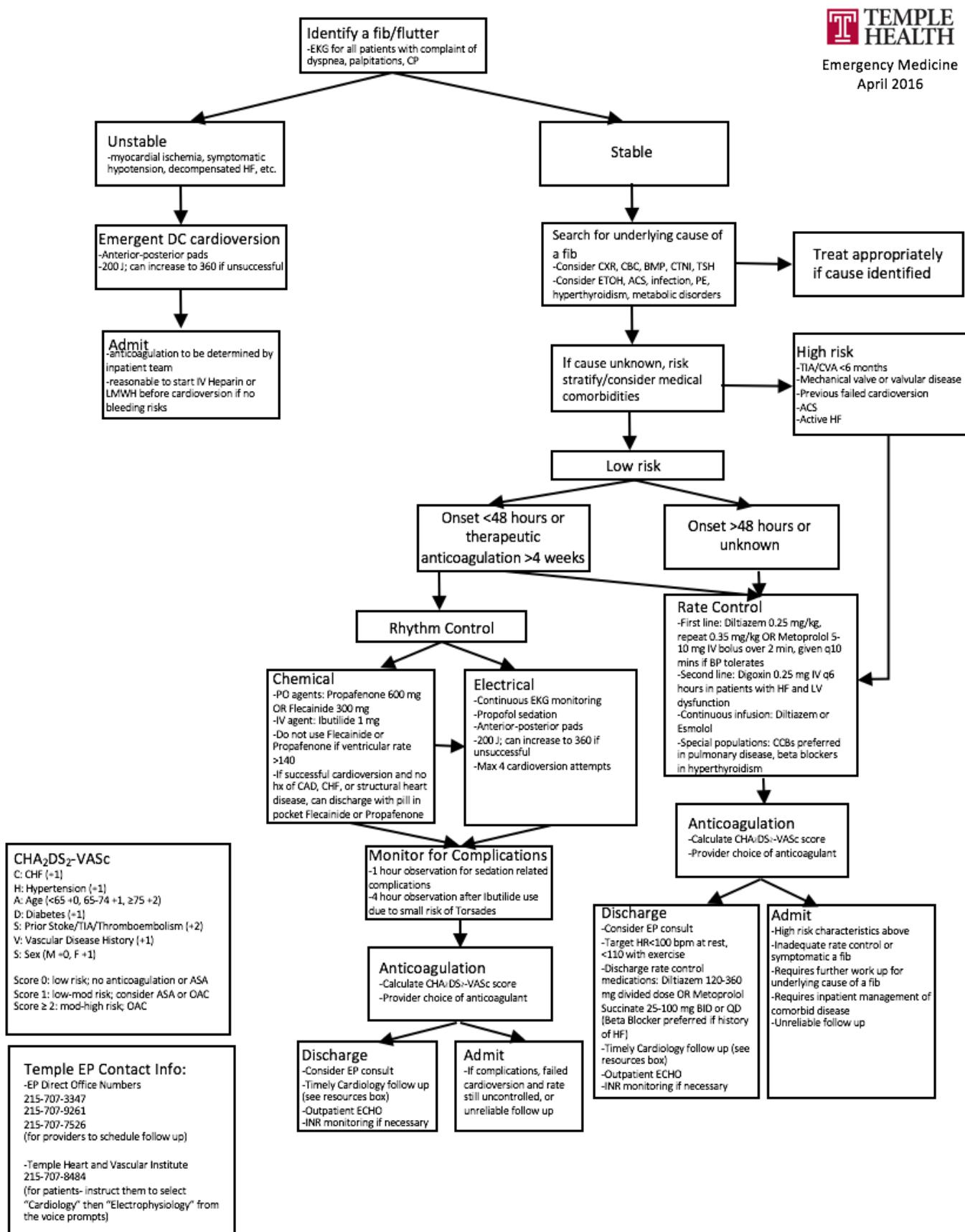
CEP: K. McHugh / D. Karras 2021

SAN FRANCISCO SYNCOPES RULE



*Quinn JV, et al: Derivation of the San Francisco Syncope Rule to predict patients with short-term serious outcomes.
Ann Emerg Med, 43:224-242, 2004.*

ATRIAL FIBRILLATION



AORTIC AND VASCULAR EMERGENCIES

Cardiovascular (CV) surgery and Vascular surgery should be contacted via T3 for all aortic and vascular emergencies (Type A dissections, complicated Type B dissections, leaking AAA, etc.)

If a CV or Vascular emergency patient presents directly to one of the TUH EDs you should call T3 (2-0923) and they will patch you through to the appropriate on-call surgeon.

If an outside facility calls wanting to transfer a CV or Vascular emergency patient expect T3 to patch in the appropriate on-call surgeon and plan on discussing whether or not the patient should come to the TUH ED or go directly to the OR.

The T3 process is:



- If patient being referred from outside facility, TUH ED attending physician shall perform usual clinical and EMTALA screening, and if appropriate, tentatively accept patient pending final approval by CV or Vascular surgery on-call (AMION)
- If patient presenting to TUH EDs or is located on TUH inpatient unit, TUH ED or inpatient attending physician shall contact T3C3 @[2-0923](tel:2-0923)

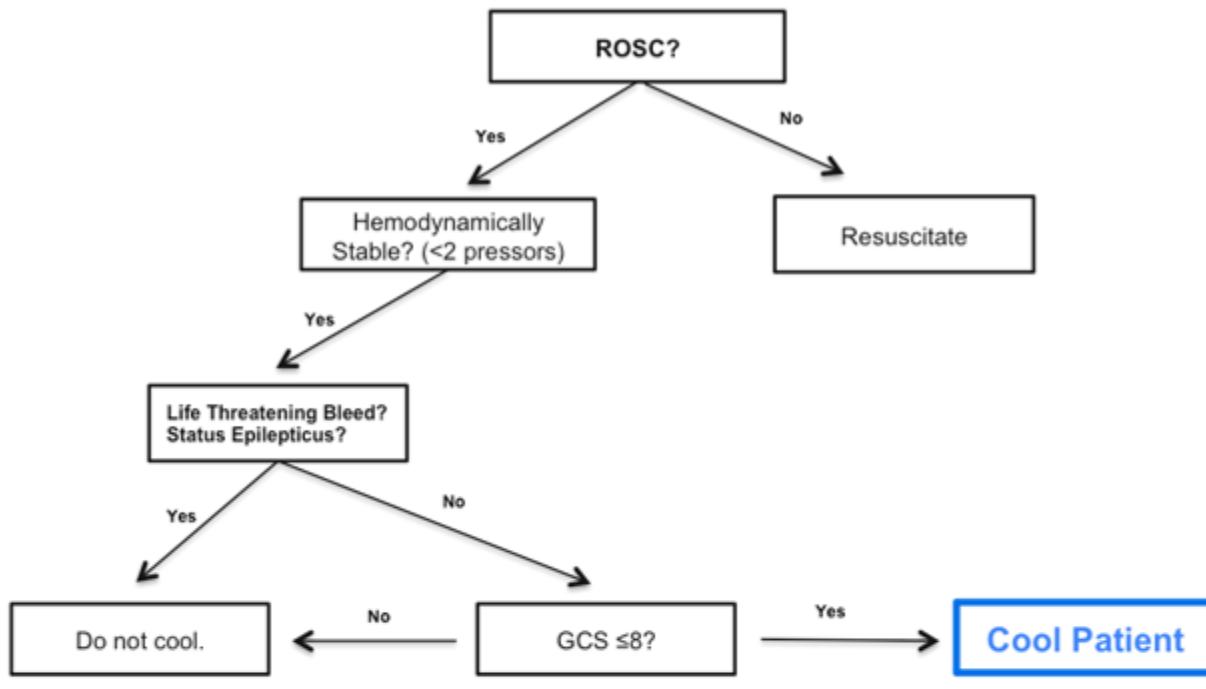


- T3C3 MSC shall begin to mobilize air or ground transport team (place aircraft on standby, send alert to ground clinicians, etc.) if patient at referring facility
- T3C3 MSC shall initiate conference call between referring physician, TUH ED attending physician and CV or Vascular surgery attending on-call (AMION) if patient at referring facility
- T3C3 shall initiate conference call between TUH ED attending physician or inpatient attending physician and CV or Vascular surgery attending on-call (AMION) if patient presenting to TUH EDs or is located on TUH inpatient unit

If you need to consult CV or Vascular surgery for any other reason you should contact them via T3. Keep in mind the CV surgery service can handle most vascular cases as well so if you're unable to get in touch with someone from Vascular you can reach out to the CV surgery service.

TARGETED TEMPERATURE MANAGEMENT (HYPOTHERMIA)

TARGETED TEMPERATURE MANAGEMENT (TTM)



Indications

- Post cardiac arrest (ALL Rhythms)
- Overdose patients post ROSC
- <6hrs from ROSC
- Comatose (GCS <8)
- ALMOST EVERYONE POST ROSC!

Contraindications

- Life Threatening Intracranial Bleed
- Bleeding from a non-compressible site
- Traumatic cause of arrest
- MAP ≤ 65 on multiple vasopressors
- Septic shock (relative contraindication)
- Pregnancy (relative- call OB)
- Recent major surgery (relative)

For shivering:

- All Patients: Acetaminophen 650mg q6 per OGT, Buspirone 30mg per OGT q8hr
- Mild: Fentanyl Drip (start at 50mcg/hr)
- Moderate: Precedex or Propofol drip
- Severe: Consider Cisatracurium drip

Helpful Tips

- Safe to Induce with Cold Saline up to 30cc/kg - patient will auto-diurese this
- Use Cooling blankets, direct on skin
- Temperature sensing Foley
- There will be a 20-minute lag with temperature sensing Foley
- Goal 34-36 °C
- DO NOT assume patient deterioration from TTM
- Replete K, Magnesium

ECMO GUIDELINE

Indications

Indications for Veno-Arterial (VA) ECMO

1. Acute myocardial infarction-cardiogenic shock without other organ failure
2. Primary graft dysfunction following heart or heart/lung transplant
3. Acute myocarditis
4. Post-cardiotomy shock – failure to wean from CPB
5. Pulmonary embolism with cardiogenic shock
6. First (1st) presentation cardiomyopathy including peripartum cardiomyopathy
7. In-hospital cardiac arrest – ECMO commencement within 30 minutes with initial rhythm VF/VT/PEA
8. Out-of-hospital cardiac arrest
 - a. witnessed arrest with chest compressions initiated within 10 minutes of arrest
 - b. time of arrival to Temple ED and ECMO consult call less than 30 minutes from onset of arrest
 - c. ECMO commencement within 60 minutes of initial arrest
 - d. Initial rhythm of VF/VT
9. Chronic cardiomyopathy with acute heart failure – patient must be suitable candidate for VAD or heart transplant
10. Ischemic cardiogenic shock without other chronic organ failure
11. No known contraindications for heart transplant patient with chronic rejection and end stage heart failure – patient must be suitable candidate for VAD or re-transplantation

Indications for Veno-Venous (VV) ECMO

1. Severe hypoxic respiratory failure, refractory therapy
 - a. PaO₂/FiO₂ ratio < 100 on FiO₂ ≥ 90%
 - b. Inability to safely ventilate patient with plateau pressure below 30cm H₂O pressure despite low tidal volume ventilator strategy.
 - c. potentially reversible cause of respiratory failure in opinion of ICU attending and cardiac surgery attending inserting ECMO.
2. Severe hypercapnic respiratory failure
 - a. pH < 7.25 due to respiratory acidosis despite maximal mechanical ventilation
3. Bridge to lung transplantation:
 - a. As above on case-by-case basis for pre and post-transplant
4. Following burn and inhalation injury
 - a. PF ratio < 60 or PF ratio <100 with PaCO₂ 100mg for > 1 hr despite rescue therapy AND
 - i. Severe inhalation injury
 - ii. ARDS
 - iii. Severe pneumonia
 - iv. Severe pulmonary contusion
 - v. Aspiration syndromes
 - b. Progressive decline in cardiopulmonary status refractory to prone positioning therapy

ECMO GUIDELINE (continued)

Contraindications

ALL ECMO	
Parameter	Contraindication
Age >80	Absolute
Age 70-80	Relative
Malignancy – Metastatic malignancy with poor prognosis	Absolute
Presence of other severe chronic organ failure	Relative
Severe brain injury (neurotrauma, stroke, cerebral embolism, refractory seizures)	Absolute
Septic shock	Relative
Recurrent cardiac arrest without return to baseline mental status	Absolute
VV ECMO	
Relative contraindication to full anti-coagulation (i.e. active GI hemorrhage, severe thrombocytopenia)	Absolute
Septic shock with either multisystem organ failure or more than one pressor required to maintain MAP > 60	Absolute
Multisystem organ failure	Absolute
Malignancy undergoing treatment	Relative
Immunocompromise (ie HIV, hematologic malignancies, solid organ transplantation outside of specific pre and post lung transplant indications)	Relative
>7 days of invasive mechanical ventilation	Relative
Age > 70 in pre-transplant	Relative
VA ECMO	
Cardiogenic shock and 2 or more of the following: Lactate >15, AST or ALT > 2000, INR > 4 (not on Coumadin), Anuria > 4 hours, mottling, peripheral purpura	Absolute
Unwitnessed cardiac arrest or cardiac arrest with initial rhythm of asystole or prolonged CPR (> 30min) ro ROSC or ECMO commencement	Absolute
Moderate to severe aortic or mitral valve regurgitation	Relative
Aortic dissection	Relative
Contraindication to anticoagulation	Relative
Obesity, difficult vascular access (BMI > 35 peripheral access, BMI > 45 central access)	Relative

*No known contraindications if ECMO being used as a bridge to transplant or heart/lung transplant; patient must then meet criteria for transplant or VAD

ECMO GUIDELINE (continued)

Contraindications (cont).

VA ECMO During a Code Event	
Parameter	Contraindication
Age > 80	Absolute
Active malignancy with poor prognosis	Absolute
Irreversible or significant pre-existing neurologic injury (active intracranial bleed, severe dementia, neurotrauma, stroke, cerebral embolism, refractory seizures)	Absolute
Hemorrhagic, hypovolemic, or septic shock	Absolute
Multisystem organ failure as evidenced by 2 or more of the following: Lactate > 15 AST or ALT > 2000 or INR > 4 (not on Coumadin); refractory to medical management Anuria > 4 hours Microcirculatory failure as evidenced by mottling or peripheral purpura	Absolute
Recurrent cardiac arrest without return of baseline mental status	Absolute
Failure to achieve return of spontaneous circulation (ROSC)	Absolute
Prolonged CPR (>30min)	Absolute
Age 70-80 years	Relative
ROSC timing of > 30 minutes or multiple codes	Relative
Unknown down time	Relative
Obesity, difficult vascular access (BMI > 35 peripheral access, BMI > 45 central access)	Relative
VA or VV ECMO Following a Burn or Inhalation Injury	
Parameter	Contraindication
Age > 70 or Baux Score > 125	Relative
Burn TBSA > 50%	Relative
Severe Brain Injury	Absolute
Chronic severe pulmonary hypertension	Relative
Active malignancy, graft vs host disease or significant immunosuppression	Relative
Advanced liver disease Childs class C not undergoing transplant	Relative
VV ECMO Following a Burn or Inhalation Injury	
Severe right or left heart failure (LVEF < 25%)	Absolute
Recurrent cardiac arrest without return of baseline mental status	Absolute

Patients with a clearly identified and potentially reversible cause of cardiac arrest should be referred for VA ECMO during a code event. When in doubt, refer early.

Referral is via attending to attending call from ED to Cardiovascular Surgery on Call, listed in Amion as:
Cardiovascular Surgery on Call: ECMO Shock Team CV Surgery 7a-7a

ECMO GUIDELINE (continued)

Additional Considerations for the Primary Team when initiating ECMO

- Reserve at least one groin for the sole purpose of peripheral VA ECMO cannulation
- If VA ECMO is initiated, Targeted Temperature Management should be initiated, unless contraindicated
- Automatic Palliative Care consultation should be placed for anyone emergently placed on VA ECMO during a code

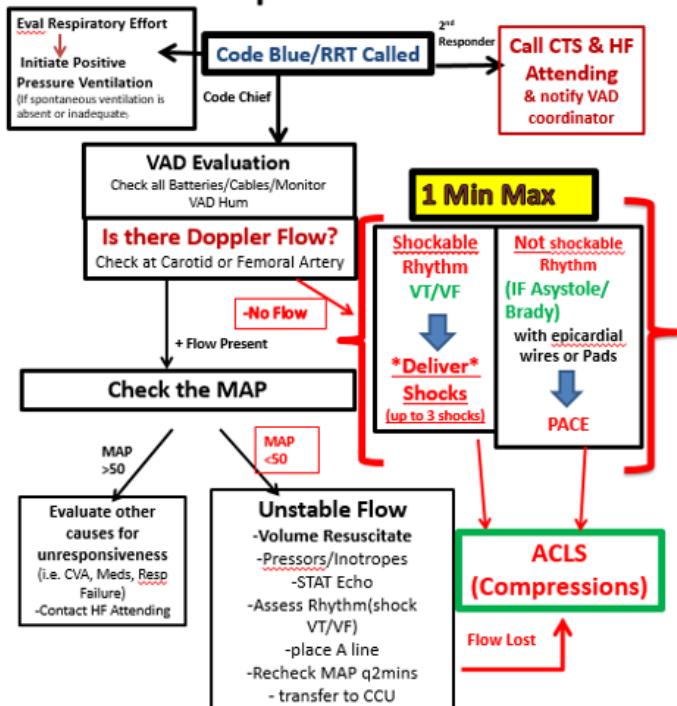
Process for ECMO consultation and cannulation at TUH-Jeanes Campus and TUH-Episcopal Campus

1. A patient in the critical care unit or emergency department at TUH-JC or the emergency department at TUH-EC is identified for ECMO
2. Call is made to the cardiothoracic surgeon on call for ECMO
3. Consultation is performed
4. The patient is determined to need transfer to TUH-MC
5. Temple Transport Center is called to arrange the transport of the patient to TUH-MC
6. Once the team (CT surgeon and perfusionist) arrives at the sending campus, they may begin cannulation of ECMO and immediately transfer to TUH-MC with T3

LVAD GUIDELINE

VAD ACLS PROTOCOL

The Unresponsive VAD Patient



Never delay CPR >1min if No Flow

Applies to: Heartmate II Heartware
Does Not Apply: Syncardia

E. Hamad. Updated 8.2023

Please send all comments/ edits to:
Eman.hamad@tuhs.temple.edu

ACLS Differences for VAD Patients:

1. Patient may be pulseless but may still be alive
2. Blood pressures are taken by doppler and manual cuff

How To Check VAD flow:

- 1.) Apply ultrasound contact gel to carotid or femoral area.
- 2.) Place Doppler on Carotid or femoral area.
- 3.) Turn on Doppler.
- 4.) Move Doppler into place until you can hear flow/pulse.

To Check Blood Pressure in a VAD patient:

- 1.) Locate the brachial or radial artery with the with Doppler flow probe.
- 2.) Inflate manual blood pressure cuff to a pressure to 120mm/Hg or higher until you no longer hear flow/pulse.
- 3.) Slowly deflate the cuff, allowing the manometer to fall slowly.
- 4.) Note the numeric number at which the flow/pulse is audible with the Doppler. This will be noted as the mean Arterial blood pressure (MAP). Document the blood pressure for example 60/Doppler.

- When a VAD patient presents to the ED:
 - Call the VAD coordinator immediately
 - **24 hour VAD EMERGENCY LINE: 267-838-1914 (call, do not text!)**
 - Patrice Schneider, CRNP 267-559-0308 (lead VAD coordinator)
 - On call VAD coordinator can also be found in AMION or in Epic on call finder
 - Complete full set of vitals including doppler blood pressure (**MAP goal 60-80**)
 - Assess patient using VAD ABC's
 - **A – Auscultate the Pump**
 - **B – Batteries charged?**
 - **C – Check Connections and Controller parameters**
 - **D – Dressing and Driveline C/D/I?**
 - Send stat labs CBC, CMP, LDH, MAG, INR
 - **VAD patients cannot have a MRI**
 - **Do NOT disconnect any cables from patient or their equipment**
 - Patients requiring admission MUST be admitted to 7 West, 7 East, or CICU

BOLUS DOSE EPINEPHRINE

Safe Preparation of Bolus-Dose Epinephrine (10mcg/mL)

Epinephrine

alpha and Beta-1/Beta-2 Agonist; Inopressor
Side Effects: Tachycardia, Hypertension

Onset: <1 minute

Duration: ~5 minutes

Dose: 0.5-2.0mL (5-20mcg) every 3-5 minutes



Push 1mL saline
out of the flush



Pull 1mL of Epinephrine
from 'Code Dose'
Epinephrine syringe



Watch the video
via the QR code.



Pull a small amount of
air into your syringe so
you can properly mix
by shaking vigorously.

Supplies:



Label the syringe
with the provided
stickers (included
on the code cart).

This Instruction card exists to promote safe preparation of a medication by a medical provider who has been trained to do so. If you have not been trained to prepare this medication, a trained medical provider should be directly supervising you. Verbally Verify with your team every time: Right Medication, Right Dose, Right patient.

Bolus Dose Epinephrine: Safe Preparation and Administration

Indication: Temporizing measure for hypotension

Dose: 5mcg-20mcg every 3-5 minutes (avoid pushing full syringe – 100mcg). For prolonged hypotension, consider starting continuous infusion at similar rate to push dose administration.

Preparation: ED provider or ED pharmacist

Administration: ED provider or ED RN at direction of provider. Less experienced providers should seek out a more experienced colleague to verify proper preparation and administration.

Appropriate access: Administration via CVC or extra-long ultrasound guided IV in a vessel at the antecubital fossa or more proximal is ideal. Use largest vein available due to risk of extravasation. Peripheral administration is safe short term.

Epinephrine has α - and β - adrenergic activity. It will likely cause tachycardia in addition to vasoconstriction.
Consider another vasopressor if significant tachycardia or any tachyarrhythmia.

ALWAYS label your syringe immediately to avoid accidental administration of other substances
DO NOT push boluses from the code cart syringe (1mg/10mL)

PERIPHERAL VASOPRESSOR GUIDELINE

TUH ED Peripheral Vasopressor Guideline

1. Vasopressors must be administered in the most proximal and superficial vein possible. Ideally, above the level of the AC fossa.
2. Ultra-long catheters are preferred over shorter catheters. Any catheter used must be 20 gauge IV or larger.
3. Consider placement of a CVC line prior to ED departure in discussion with the accepting ICU team.
4. The most dilute concentration of chosen vasopressor must be used.
5. Frequent periodic site assessments should be done, as per nursing protocol, to evaluate for extravasation.
6. Extravasation protocol must be followed if extravasation is noted.

Recommendations explained:

1. **Use proximal veins:** Large veins allow for larger gauge IVs and the chance of piercing the back-wall of the vessel is lower. The ideal site is antecubital fossa or higher, the more superficial the better so that extravasation would be more easily noticed. Ultrasound guided placement is superior if the user is experienced, however also acceptable would be an experienced nurse placing a superficial IV that she or he is confident is a quality IV (draws back blood, little to no difficulty in placing, no back-walling).
2. **Catheter type/size:** Ultra-long Catheter (6.35cm), 20 gauge or larger. Recent data suggests that an ultrasound guided IV's dwell time is directly proportional to the length of the catheter⁸. A 20 gauge or larger superficial IV of standard length placed by an experienced nurse or provider would also be acceptable.
3. **Limit infusion time:** Consideration should be made for placement of a CVC line in discussion with the accepting ICU team.
4. **Use lowest concentration of Norepinephrine** available. If an extravasation event occurs, this will minimize the adverse effects.
5. **Have a site re-assessment plan:** The site should be examined shortly after the infusion is started and periodically after to evaluate for signs of extravasation.
6. **Extravasation protocol:** If extravasation occurs, stop the infusion immediately and change it to a different line. The catheter should be left in place in order to pull back any norepinephrine from the area of extravasation.

Extravasation Protocol:

- Phentolamine should be ordered immediately and administered as follows:
 - Two 5mg vials of Phentolamine (total 10mg), diluted in 10mL of 0.9% NaCl
 - Inject 5mL through catheter
 - Inject remaining 5mL in the subcutaneous tissue (around the area of blanching)
 - If absolutely necessary, Nitroglycerin paste can be substituted for Phentolamine but this is a less desirable substitution. 1 in of paste can be applied around the extravasation site.
 - Elevate the extremity after administration and apply a warm compress

CEP: J. Sowick / M. DeAngelis 2021

PNEUMONIA - ADMISSION DECISION ALGORITHM

Hospital Admission Decision

- Severity-of-illness scores, such as the **CURB-65 criteria** (confusion, uremia, respiratory rate, low blood pressure, age 65 years or greater), or prognostic models, such as the **Pneumonia Severity Index (PSI)**, can be used to identify patients with CAP who may be candidates for outpatient treatment. (*Strong recommendation; level I evidence*)
- Objective criteria or scores should always be supplemented with physician determination of subjective factors, including the ability to safely and reliably take oral medication and the availability of outpatient support resources. (*Strong recommendation; level II evidence*)
- For patients with CURB-65 scores ≥ 2 , more-intensive treatment (i.e., hospitalization or, where appropriate and available, intensive in-home health care services) is usually warranted. (*Moderate recommendation; level III evidence*)

<u>Pt. Characteristics</u>	<u>Points</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #cccccc; text-align: center; padding: 2px;">Risk Category</th><th style="background-color: #cccccc; text-align: center; padding: 2px;">PSI Score</th><th style="background-color: #cccccc; text-align: center; padding: 2px;">Disposition</th></tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 2px;">Class I*</td><td style="text-align: center; padding: 2px;">---</td><td style="text-align: center; padding: 2px;">Outpatient</td></tr> <tr> <td style="text-align: center; padding: 2px;">Class II</td><td style="text-align: center; padding: 2px;"><u>≤ 70</u></td><td style="text-align: center; padding: 2px;">Outpatient</td></tr> <tr> <td style="text-align: center; padding: 2px;">Class III</td><td style="text-align: center; padding: 2px;"><u>71-90</u></td><td style="text-align: center; padding: 2px;">Inpatient (short stay)</td></tr> <tr> <td style="text-align: center; padding: 2px;">Class IV</td><td style="text-align: center; padding: 2px;"><u>91-130</u></td><td style="text-align: center; padding: 2px;">Inpatient (floor)</td></tr> <tr> <td style="text-align: center; padding: 2px;">Class V</td><td style="text-align: center; padding: 2px;"><u>>130</u></td><td style="text-align: center; padding: 2px;">Inpatient (T/C ICU)</td></tr> </tbody> </table>	Risk Category	PSI Score	Disposition	Class I*	---	Outpatient	Class II	<u>≤ 70</u>	Outpatient	Class III	<u>71-90</u>	Inpatient (short stay)	Class IV	<u>91-130</u>	Inpatient (floor)	Class V	<u>>130</u>	Inpatient (T/C ICU)
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Class V	<u>>130</u>	Inpatient (T/C ICU)																		
Age=male	Age(yrs)																			
Age=female	Age(yrs) – 10																			
Nursing home resident	+10																			
Comorbid Illnesses																				
Neoplastic disease	+30																			
Hepatic disease	+20																			
Congestive heart failure	+10																			
Cerebrovascular disease	+10																			
Renal disease	+10																			
Physical Exam Findings																				
Altered mental status	+20																			
Respiratory rate $\geq 30/\text{min}$	+20																			
SBP<90mmHg	+20																			
Temp $<35\text{ C}$ or $>40\text{ C}$	+15																			
Pulse $\geq 125/\text{min}$	+10																			
Laboratory Results																				
pH <7.35	+30																			
BUN $>30\text{mg/L}$	+20																			
Sodium $<130\text{mEq/L}$	+20																			
Glucose $>250\text{mg/L}$	+10																			
Hematocrit <30	+10																			
pO ₂ ,60mmHg	+10																			
Pleural effusion	+10																			
Exceptions to PSI Scoring System:																				
Immunocompromised patients																				
Recently hospitalized patients																				
Alcohol intoxication																				
Social circumstances																				
- Homelessness																				
- Inability to obtain medication																				
- Absence of follow-up care																				
- Inadequate social support																				
Oxygen saturation $<90\%$ (may be an independent indicator for admission)																				

IDSA/ATS Guidelines for CAP in Adults.
CID, 44(S27-72), 2007.

Pulmonary Embolism Rule-Out Criteria

Age < 50
HR < 100 <i>(must be throughout ED stay)</i>
O ₂ sat on room air >94%
No prior history of DVT/PE
No recent trauma or surgery (≤ 4 weeks; did not require general anesthesia)
No hemoptysis
No exogenous estrogen
No clinical signs suggesting DVT

- Should only be used in low suspicion setting
- **All 8 criteria must be met.** In this setting with all criteria met the likelihood of VTE is <2%

Kline JA, et al: Prospective multicenter evaluation of the pulmonary embolism rule-out criteria.
J Thromb Haemost, 6(5):772-80, 2008.

PULMONARY EMBOLISM - WELLS

Clinical Criteria

- All patients with signs and symptoms suggestive for pulmonary embolism (PE) should have clinical probability assessed and documented

Wells Criteria for Identifying Pretest Probability of PE

Signs/Symptoms		Points	
Suspected DVT		3.0	
An alternative diagnosis is less likely than PE		3.0	
Heart rate > 100 beats per minute		1.5	
Immobilization ≥ 3 days or surgery within previous 4 weeks		1.5	
Previous DVT or PE		1.5	
Hemoptysis		1.0	
Malignancy (active treatment, treated in past 6 months, or palliative)		1.0	
Score Range	Mean of PE Probability	% Pts w/ Score	Risk
< 2 pts	3.6 %	40 %	Low
2 – 6 pts	20.5 %	53 %	Moderate
> 6 pts	66.7 %	7 %	High

D-dimer Testing in the ED

- D-dimer is to be considered only following assessment of clinical probability.
- Assay helps to exclude the diagnosis of VTE in **low-moderate risk patients** only. D-dimer should not be used in patients with high clinical probability of VTE.
- D-dimer has a high sensitivity but poor specificity (very high NPV).
- A negative D-dimer alone is sufficient to rule out VTE in low risk patients.
- A positive D-dimer means the usual work-up should proceed.
- D-dimer is invalid in patients taking heparin, warfarin, and anti-platelet agents (other than ASA).
- D-dimer should not be the initial tube post-phlebotomy (even a slight amount of tissue in the tube can cause a false positive result).

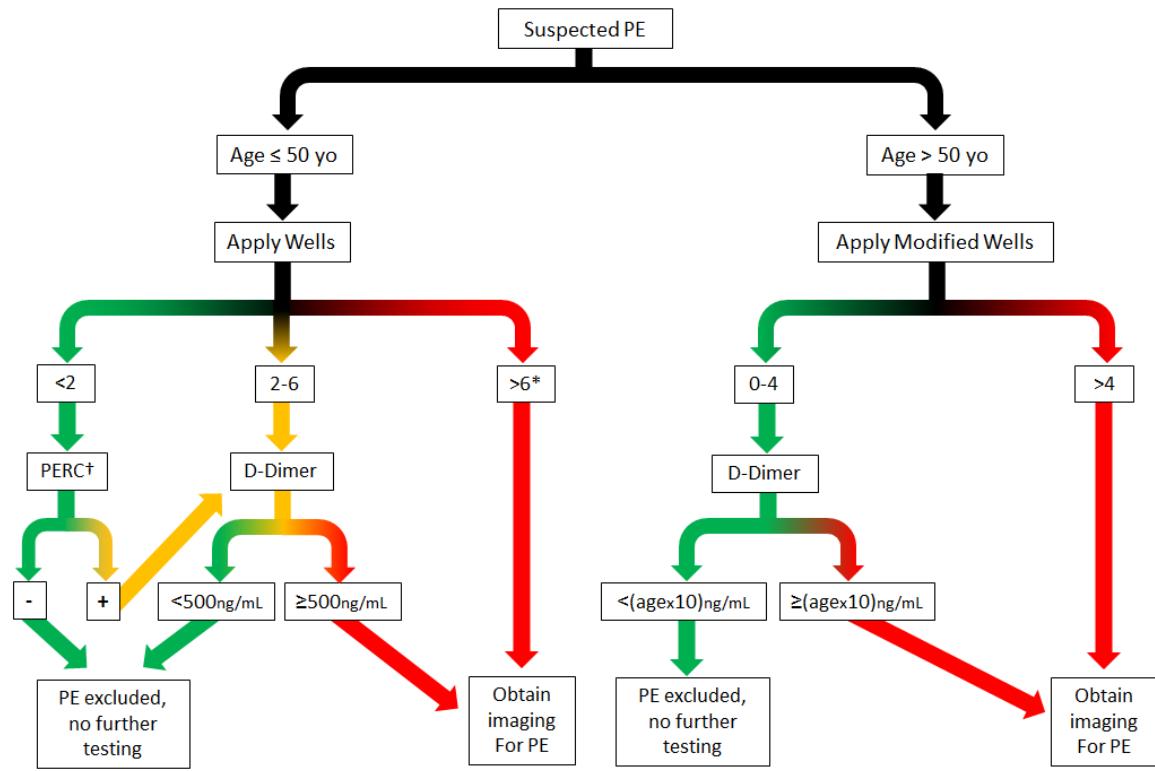
Imaging for Pulmonary Embolism (PE)

- CTA is the recommended initial imaging modality for non-massive PE.
- A negative CTA (read by the Attending Radiologist) excludes the need for further ED PE investigation.
- VQ scanning may be used as an alternative initial imaging study provided:
 - CXR is normal
 - No significant concurrent cardiopulmonary disease
 - A non-diagnostic study is always followed by further imaging
- When VQ scanning is normal, PE is reliably excluded.

Wells PS, et al: Derivation of a simple clinical model to categorize patients probability of pulmonary embolism: increasing the models utility with the SimpliRED D-dimer. Thromb Haemost, 83(3):416-20, 2000.

AGE ADJUSTED D-DIMER ALGORITHM (TUH AND EH)

TUH and EH Diagnostic Algorithm for Pulmonary Embolism Application of Wells Score, PERC, and Age Adjusted D-dimer



*Can consider empiric CT imaging for PE based on Wells score >4 if utilizing modified wells scoring system:

Wells 0-4 (PE Unlikely->proceed to D-dimer testing)

Wells >4 (PE Likely-> proceed to CT imaging)

Note that the PERC criteria CANNOT be applied if using the modified wells

†PERC criteria considered negative if all 8 low risk criteria are met

Age-Adjusted D-Dimer:

- Must apply the two-tiered Wells scoring system to determine risk of PE
 - 0-4 (PE Unlikely) vs. >4 (PE Likely)
- Threshold calculation: (age x 10) ng/mL
 - E.g. in a patient 56 yo, a D-dimer test is considered POSITIVE if ≥560 ng/mL
- EXCLUSION criteria for use:
 - Age ≤50 yo
 - Pregnancy
 - Currently receiving anticoagulation treatment (initiated >24 hours before testing)
 - Life expectancy <3 months
- Note caution in that the majority of studies in the literature excluded patients where CTA was “contraindicated” (including allergy to contrast and creatinine clearance <30mL/min). Therefore, the data is limited in this subgroup. Please refer to the below section of the TUH handbook on our CT protocols
 - Renal Function Before IV Contrast
 - Allergy Prep Before IV Contrast
- Note studies were performed prior to COVID-19 pandemic, and results cannot be generalizable to populations with +COVID-19

DIAGNOSTIC ALGORITHM FOR EVALUATION OF PULMONARY EMBOLISM

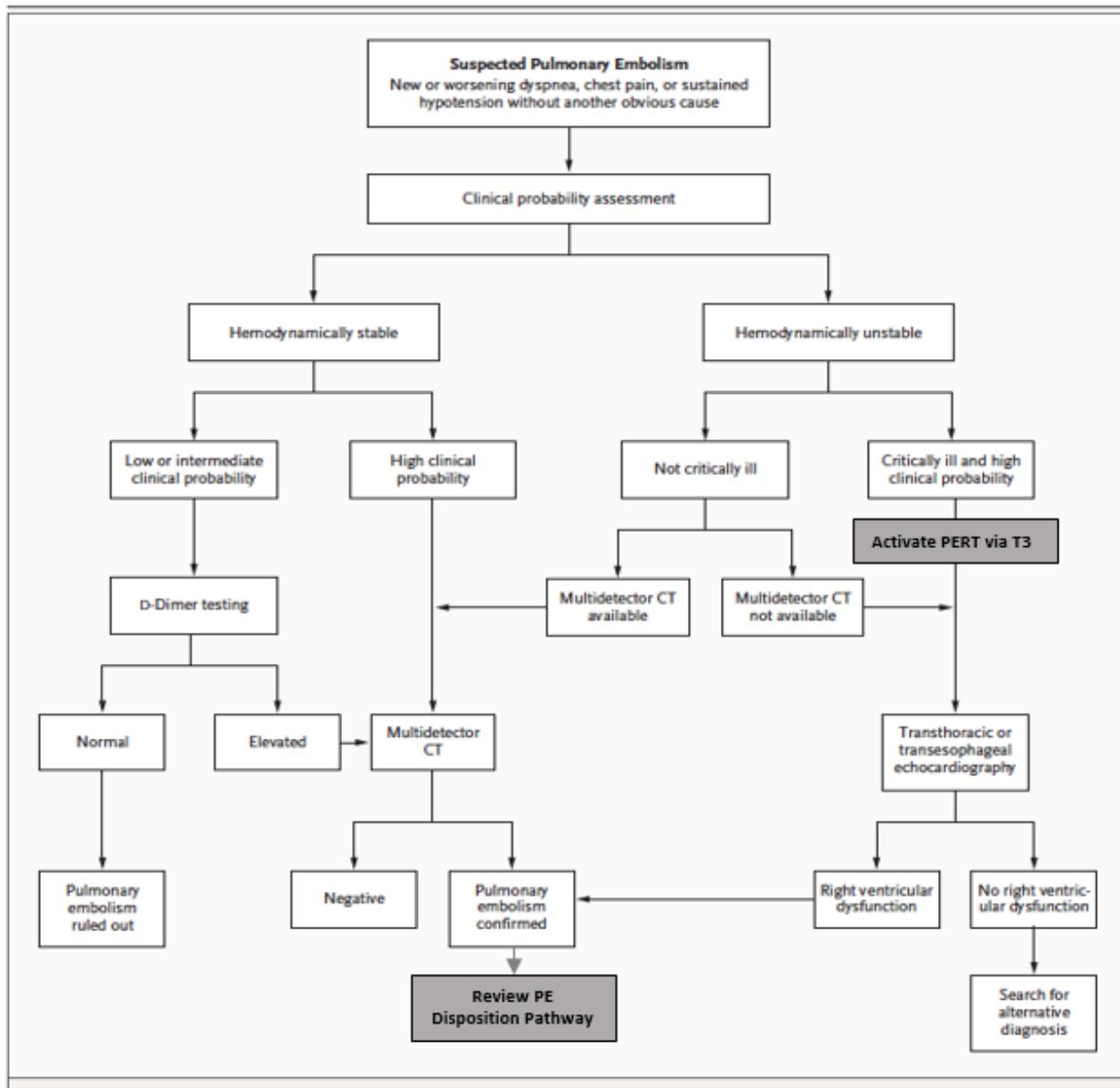
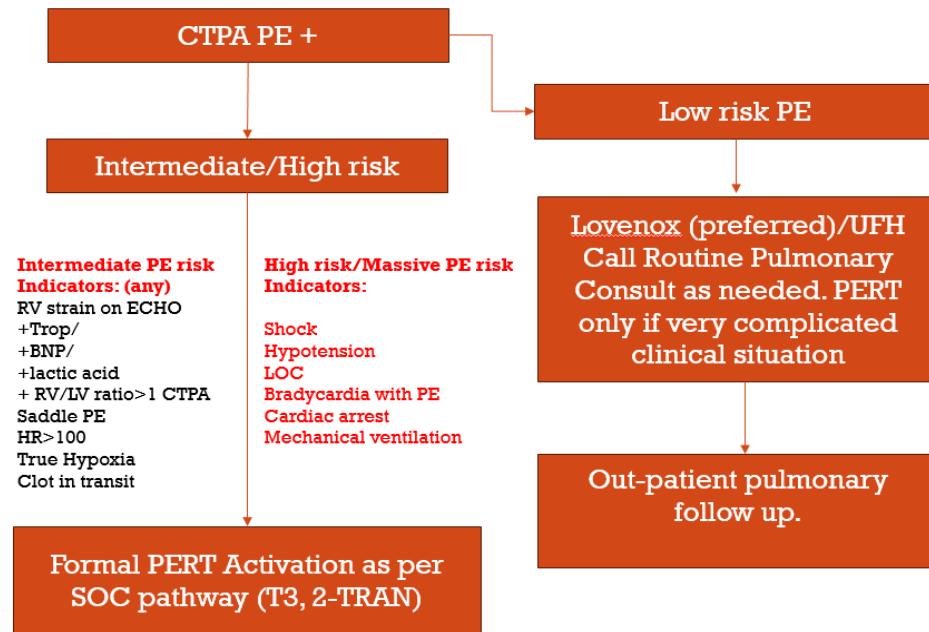


Figure 1. Diagnostic Workup for Pulmonary Embolism.

The initial assessment of the clinical probability of pulmonary embolism is based on either clinical judgment or clinical decision rules (Wells and revised Geneva scores).^{3,4} Patients are considered to be hemodynamically unstable if they are in shock or have a systolic blood pressure of less than 90 mm Hg or a drop in pressure of more than 40 mm Hg for more than 15 minutes (in the absence of new-onset arrhythmia, hypovolemia, and sepsis). In cases in which multidetector CT is not available or in patients with renal failure or allergy to contrast dye, the use of ventilation-perfusion scanning is an alternative. In patients with a high clinical probability and an elevated D-dimer level but with negative findings on multidetector CT, venous ultrasonography should be considered. Among critically ill patients with right ventricular dysfunction, thrombolysis is an option; multidetector CT should be performed when the patient's condition has been stabilized if doubts remain about clinical management. In patients who are candidates for percutaneous embolectomy, conventional pulmonary angiography can be performed to confirm the diagnosis of pulmonary embolism immediately before the procedure, after the finding of right ventricular dysfunction.

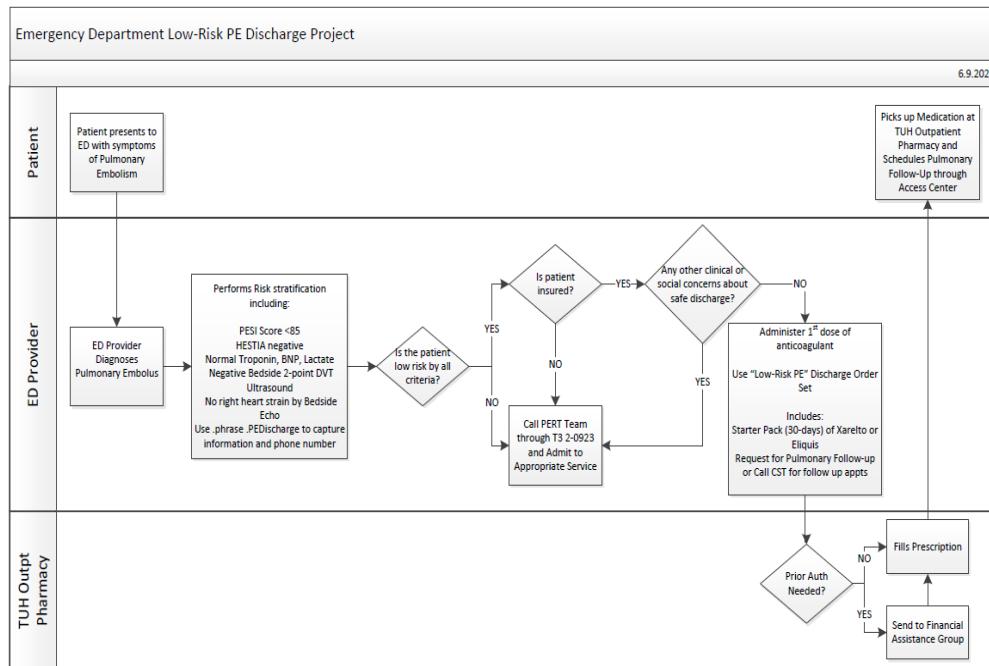
PE DISPOSITION PATHWAYS

Admission Pathway (Activate PERT only if intermediate/high risk)



**** PE Response Team (PERT) - 2-0923**

Discharge Pathway (Consider if low risk AND otherwise safe discharge)

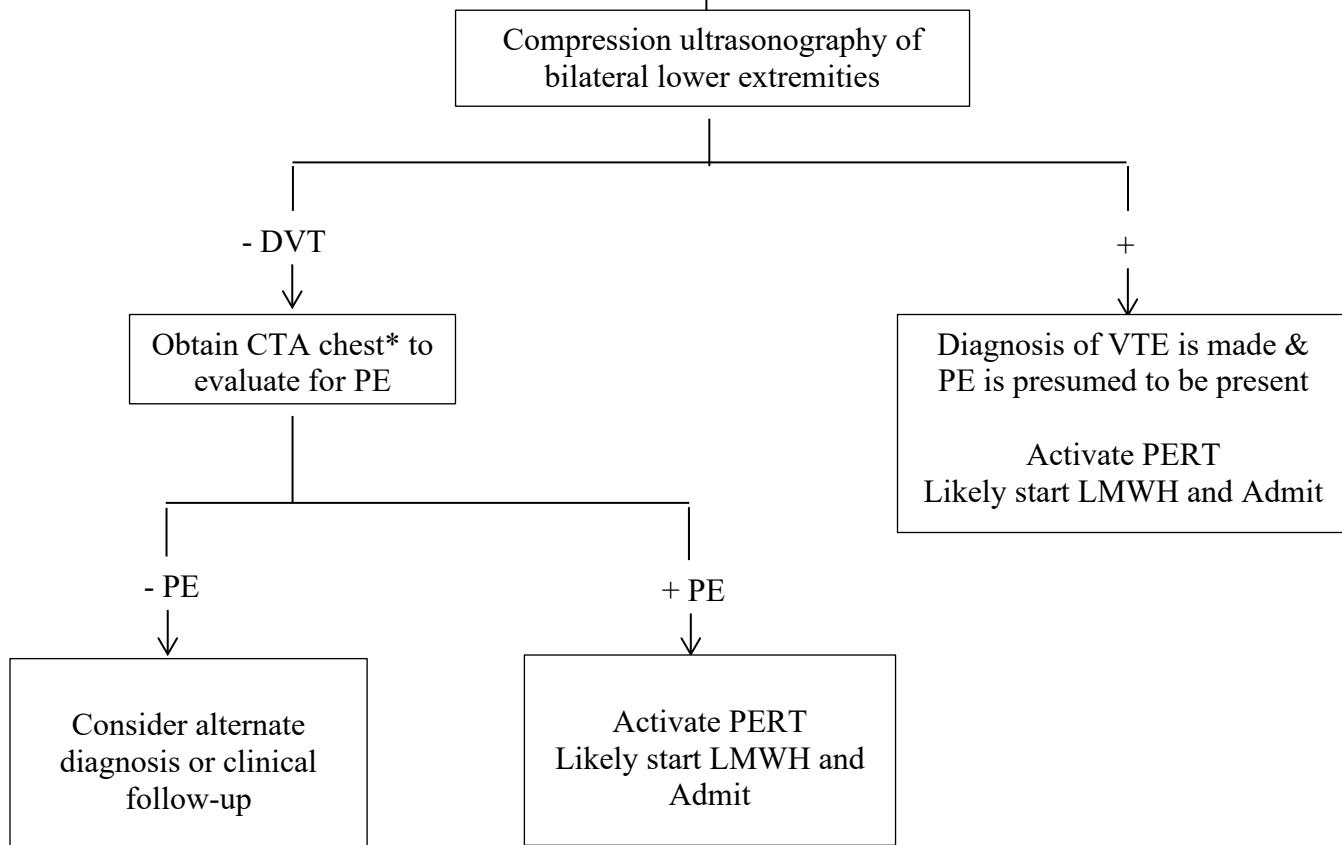


CEP: M. Wolf / S. Huo / D. del Portal 2021

PE WORKUP IN PREGNANT PATIENTS

Clinical features suggestive of Pulmonary Embolus in a patient with a confirmed pregnancy

(D-dimer is not recommended as a diagnostic tool in the diagnosis of PE in pregnancy per most expert guidelines. However, if the clinician considers the patient to be low risk in the 1st trimester, this can be considered on an individualized basis. *This test should not, however, be required prior to the completion of a radiographic study.*)

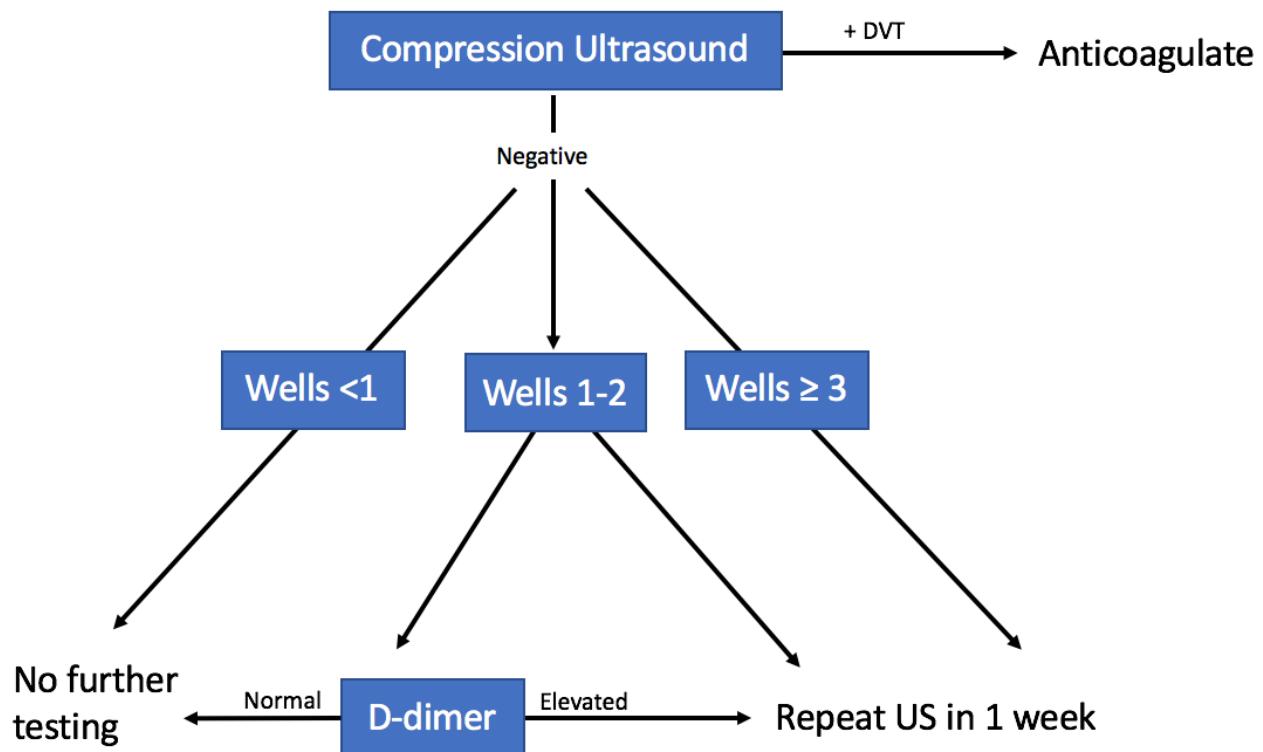


* Alternatively, a CXR can be obtained, and if normal, a perfusion-only portion of a VQ scan can be performed. VQ scanning delivers a higher dose of radiation to the fetus than does CTA; perfusion scanning alone will reduce the radiation exposure. However, the radiation dose delivered to mothers is higher with CTA. A disadvantage of the VQ scan is that if indeterminate, the patient will then have to undergo repeat imaging with CTA.

Because obtaining a VQ scan is not always available at TUH, it has not been included in the algorithm. However, the clinician may choose to have such a discussion with the radiologist on call.

DEEP VENOUS THROMBOSIS

SUSPECTED DVT ALGORITHM



Wells Score for DVT

Active Cancer	+1
Bedridden (>3 days) or major surgery in past 4 weeks	+1
Calf swelling >3cm compared to other leg	+1
Entire leg swollen	+1
Pitting edema, greater in symptomatic leg	+1
Localized tenderness along deep venous system	+1
Collateral (non-varicose) superficial veins present	+1
Paralysis, paresis or recent plaster immobilization of leg	+1
Previously documented DVT	+1
Alternate diagnosis to DVT as likely or more likely	- 2

Treatment Options

- First Proximal DVT (provoked or unprovoked) without h/o cancer- oral anticoagulant alone (dabigatran, rivaroxaban, apixaban) preferred (over vitamin K antagonist or LMWH) for 3 months
- Proximal DVT with cancer (1st clot)- LMWH preferred to DOAC or VKA for 3 months
- In patient with second unprovoked DVT, extended anticoagulant therapy (no stop date) with DOAC is recommended (if normal renal function)
- In patients with recurrent DVT on VKA or DOAC, switch to LMWH for one month and reassess
- In patients with recurrent DVT on LMWH, increase current dose for one month and reassess

ABNORMAL INR ON WARFARIN

Revised 12/4/2019

Condition	Treatment Recommendation*
INR above therapeutic range but < 4.5 <u>AND</u> no bleeding	Hold or decrease Warfarin dose
INR \geq 4.5 but \leq 10 <u>AND</u> no bleeding	Hold Warfarin dose +/- give vitamin K 2.5 mg orally
INR > 10 <u>AND</u> no bleeding	Hold Warfarin dose AND give vitamin K 2.5-5 mg orally
INR above therapeutic range <u>AND</u> minor bleeding	Hold Warfarin dose +/- give vitamin K 2.5-5 mg orally
Major bleeding* or Life-threatening bleeding (required blood transfusion of two or more units within 24 hours; bleeding in body cavity; intracranial or retroperitoneal; or bleeding that led to a hemoglobin level decrease of \geq 2g/dl)	Hold Warfarin AND give vitamin K 5-10 mg by slow IV infusion (30 min) +/- four-factor PCC IV infusion

* If continuing Warfarin therapy is required resume Warfarin at a lower dose once the INR is therapeutic

Vitamin K (phytonadione)

- The preferred route of administration is ORALLY unless the patient presents with severe bleeding.
- Vitamin K can be administered subcutaneously if patient unable to take PO and not severely bleeding. Subcutaneous absorption of vitamin K is erratic, therefore oral (peak effect ~24hrs) or IV (peak effect ~12hrs) are preferred.
- After oral administration: repeat treatment after 24-48 hours as needed.
- IV administration: 10 mg in 50ml 0.9% NSS infused over 30 minutes (maximum rate = 1mg/min). After IV administration: may repeat treatment every 12 hours as needed. During infusion, monitor for symptoms of anaphylactoid reaction.

Four-Factor PCC (Kcentra®)

- Contains heparin. Do not administer to patients with known heparin-induced thrombocytopenia.
- Dose is based on patient's pre-treatment INR level and actual body weight.
- Maximum dosing weight is 100Kg. For patients >100Kg, do not exceed maximum dose.
- Use the actual potency (units/mL) on vial when calculating dose.
- Administer at a rate of 0.12 mL/Kg/min up to a maximum rate of 8.4mL/min.
- Repeat INR 15-60 mins after PCC infusion in complete, then every 6-8hrs for 24-48hrs.
- Repeat dosing with this product is not recommended.

REVERSAL OF TISSUE-SPECIFIC/DIRECT ORAL ANTICOAGULANTS (DOACs)

	Direct Thrombin Inhibitor	Xa Inhibitors
Drug	Dabigatran (Pradaxa)	<u>Half Life¹</u> 12-17 hrs
Recommended Management		
Minor Bleeding	Determine timing of last dose, delay next dose or discontinue use	Determine timing of last dose, delay next dose or discontinue use
Moderate Bleeding	<ul style="list-style-type: none"> + Discontinue use + Supportive care – IV access, hemodynamic support + Identify bleeding source, mechanical compression, consider surgical intervention + Consider activated charcoal if last dose was within 2 hours.² + Laboratory analysis to include: aPTT, creatinine. Consider Thrombin Time³. + Hematology consult 	<ul style="list-style-type: none"> + Discontinue use + Supportive care – IV access, hemodynamic support + Identify bleeding source, mechanical compression, consider surgical intervention + Consider activated charcoal if last dose was within 2 hours.² + Laboratory analysis to include: PT, creatinine. Consider chromogenic anti-factor Xa assay.⁵ + Hematology consult
Major Bleeding ³	All of the above, plus: <ul style="list-style-type: none"> + Consider Idarucizumab (two 50-mL bolus infusions each of 2.5g within 15 minutes) if available <i>OR</i> Hemodialysis⁴ + Consider TXA + Admit to ICU 	All of the above, plus: <ul style="list-style-type: none"> + Consider PCC - 50 units/kg IV infusion or Andexxa⁶ + Consider TXA + Admit to ICU

1. All oral anticoagulants are renally cleared. All half-lives may be prolonged in elderly patients or those with renal insufficiency. Assessment of renal function should be considered in patients presenting with hemorrhage on oral anticoagulants.
2. There is no clinical data to support use of oral activated charcoal. However, manufacturer package inserts state to consider activated charcoal if last dose was ingested within 2hrs for Dabigatran, 3hrs for Apixaban, and 8hrs for Rivaroxaban. The package insert for Edoxaban does not mention charcoal.
3. **Major bleeding defined as any of the following: requires blood transfusion of two or more units within 24 hours; bleeding in body cavity; intracranial or retroperitoneal bleeding; or bleeding that leads to a hemoglobin level decrease of ≥2 g/dl**
4. Idarucizumab and hemodialysis have each been shown to rapidly clear free Dabigatran levels in serum, though neither has definitively shown a decrease in time to hemostasis. No other reversal therapies (e.g. PCC, aPCC) have shown impact on coagulation parameters in patients on Dabigatran.
5. Chromogenic Anti-Factor Xa assay has 2-5 day turnaround time and should only be ordered in consultation with Hematologist.
6. See full policy for Andexxa restriction criteria at TUH

TRANEXAMIC ACID (TXA)

Proposed Guidelines for TXA Administration

The decision of whether to administer TXA in a Trauma patient will be made in conjunction with the Trauma Attending. This is meant to serve as a reference to facilitate the discussion between the ED and Trauma team regarding indications and contraindications.

Inclusion Criteria

- flight team and T3 transfers
- within 1-3 hours of presentation
- high injury severity score (see below)
- significant bleeding, defined as tachycardia >110 bpm, SBP <90 mmHg or both
- bleeding not amenable to tourniquets and external control

Exclusion Criteria

- patients requiring immediate OR intervention
- patients requiring >2 units PRBC's
- patient's presenting after 3 hours
- hemorrhage amenable to control outside of OR – response to initial fluid bolus

Dosing

- 1 gram bolus over 10 minutes, followed by 1 gram infusion over 8 hours

Injury Severity Score; ISS			
Region	Injury Description	AIS	Square Top Three
Head & Neck	Cerebral Contusion	3	9
Face	No Injury	0	
Chest	Flail Chest	4	16
Abdomen	Minor Contusion of Liver Complex Rupture Spleen	2 5	25
Extremity	Fractured femur	3	
External	No Injury	0	
Injury Severity Score:			50
AIS Score	Injury	ISS	
1	Minor	1-8	Minor
2	Moderate	9-15	Moderate
3	Serious	16-24	Serious
4	Severe	25-49	Severe
5	Critical	50-74	Critical
6	Survivable	75	Maximum



Tranexamic Acid (TXA) Info Sheet



What is tranexamic acid (TXA)?

Tranexamic acid is an antifibrinolytic. TXA inhibits fibrinolysis (the breakdown of blood clots) by inhibiting the activation of plasminogen or plasmin. Plasmin causes the breakdown of fibrin, a protein that acts like a framework for blood clots. By decreasing plasmin activity, stable clots can form. TXA is most commonly used to treat bleeding related to trauma, surgery, and hemophilia but it has also been used to prevent localized bleeding (epistaxis, dental procedures, etc.)

Who might be a candidate for TXA therapy in the ED?

- Trauma patients at risk for significant bleeding
- Patients with localized bleeding uncontrolled by conventional methods**

How is tranexamic acid administered to trauma patients?

- IV Bolus: 1 gram bolus given over 10 min
Followed by
- IV Infusion: 1 gram infused over 8 hours

How is tranexamic acid administered topically to control localized bleeding?**

- Gauze can be soaked with the IV formulation of TXA (approximately 5mL or 500mg)
- The gauze can be applied directly to the site of bleeding
 - Some studies have shown decreased bleeding within 10 minutes

How do I order TXA?

- Type in “tranex” to find the order in EPIC

Where to get tranexamic acid in the TUH ED?

- TXA is now stocked in the trauma bay pyxis
- It is supplied as a 1gram/ 10 mL vial or ampule that can be diluted in either D5W or NS

The CRASH-2 trial

Published in 2010, this study was conducted at 274 hospitals in 40 countries; it included 20,211 adult trauma patients with or at risk for significant bleeding. The study found a significant decrease in the risk of death due to bleeding associated with the administration of TXA.

- A (2011) subgroup analysis of this trial showed more benefit with earlier administration
 - Benefit was seen up to 3 hours after injury (most benefit was seen within 1 hour)
 - Administration > than 3 hours after injury was associated with increased risk of death

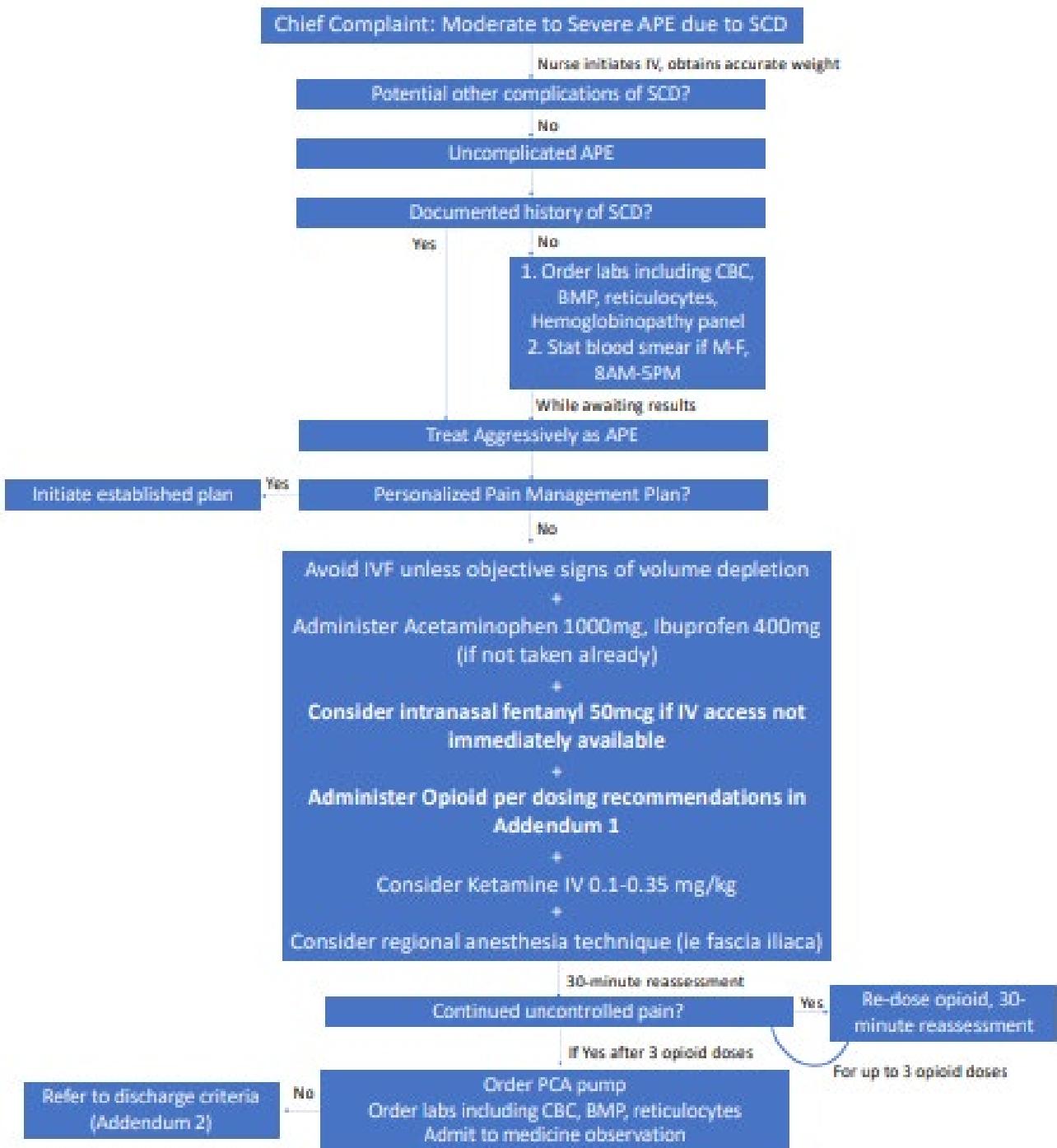
For more information see:

- Tranexamic Acid entry on Lexicomp Online
- Tranexamic Acid package insert from APP Pharmaceuticals, LLC (available on dailymed.nlm.nih.gov)
- Effects of tranexamic acid on death, vascular occlusive events, and blood transfusions in trauma patients with significant hemorrhage (CRASH-2): a randomized, placebo-controlled trial. Lancet. June, 2010.
- Zahed R, Moharamzadeh P, Alizadeharasi S, Ghasemi A, Saeedi M. A new and rapid method for epistaxis treatment using injectable form of tranexamic acid topically: a randomized controlled trial. Am J Emerg Med. 2013;31(9):1389-1392.

**- Topical administration is not a P&T approved indication at TUH

A. Blome / E. Yeh / T. Bryan CEP 2018

MANAGEMENT OF ACUTE PAIN EPISODES IN SICKLE CELL DISEASE



MANAGEMENT OF ACUTE PAIN EPISODES IN SICKLE CELL DISEASE (continued)

Notes

- This guideline is intended for any patient with SCD, with uncomplicated APE, who reports moderate to severe levels of pain.
 - This guideline is not intended for patients who report mild pain.
 - Pain severity per this guideline is based on patient report, rather than numeric pain scale report or provider interpretation of pain level.
- Labs may be considered on patient presentation based on provider discretion.

Addendum 1: Suggested Opioid Dosing

- Opioid Naïve dosing
 - First dose:
 - Morphine IV 0.1-0.15 mg/kg
OR
 - Hydromorphone IV 0.01-0.02 mg/kg
 - Escalate subsequent doses as needed
- Opioid tolerant dosing
 - First dose: calculate MMEs based on patient's typical opioid use, then reduce dose by 25% for cross-tolerance
 - Escalate subsequent doses as needed
- Initial Dilaudid PCA settings for patients with opioid tolerance
 - Bolus: 0.5mg q6 minutes
 - Basal: 1mg/hr
 - 4h lockout: 24mg
 - While titrating PCA, can provide IV opioid boluses as well for pain control

Addendum 2: Discharge Criteria and Instructions

- Patient appropriate for discharge if:
 - Tolerating PO
 - Discussion held with patient to confirm acceptable level of pain control for discharge
 - No red flags
- Follow up: If patient has no primary care provider for SCD, may follow up with TUH Hematology within 7 days
 - Can send Epic message to RN Kyle McMichael to facilitate scheduling
- Analgesia:
 - Check PDMP
 - If no other Rx filled in past 7d, consider providing prescription for short course opioid

Addendum 3: Red Flags suggesting diagnosis other than Uncomplicated Acute Pain Episode

- | | |
|---|---|
| <ul style="list-style-type: none">• T>38C or <36C• HR>90• RR>20• SpO₂ <95%• Shortness of breath• Chest pain• Altered mental status• Focal neurologic deficit | <ul style="list-style-type: none">• Severe headache• Priapism• Pregnancy• Abdominal pain• Vomiting• Vision changes• Jaundice• Pain atypical of patient's APE |
|---|---|

DIABETIC KETOACIDOSIS

Taken from: TUH-ADMIN-MM-950.8616

Diabetic Ketoacidosis (DKA) and Hyperosmolar Hyperglycemic State (HHS) Guidelines (10/2013)

It is expected that moderate to severe DKA and HHS patients will be managed in a critical care setting. If the primary service has accepted a mild DKA patient to a non-critical care setting, the patient may be managed with a subcutaneous insulin regimen.

Patient Selection/Diagnosis Guide*

	DKA	HHS
Blood glucose	> 250 mg/dl	> 600 mg/dl
Arterial pH	< 7.3	> 7.3
Urine ketone	Positive	Small
Serum ketone	Positive	Small
Effective serum osmolality**	Variable	> 320 mOsm/kg
Anion gap (AG)***	> 10-12	Variable

*DKA/HHS is a clinical diagnosis including, but not limited to, consideration of these factors

** Osmolality $2[\text{measured Na}^+ (\text{mEq/l})] + \text{glucose} (\text{mg/dl})/18$

*** Corrected AG = AG + [2.5 x (4 - albumin)]

	Mild DKA	Moderate to Severe DKA
Blood glucose	> 250 mg/dl	> 250 mg/dl
Arterial pH	≥ 7.25	≤ 7.24
Urine ketone	Positive	Positive
Serum ketone	Positive	Positive
Effective serum osmolality**	Variable	Variable
Anion gap (AG)***	> 10	> 12

Goals

Goals of treatment include correction of: volume deficit, ketosis/acidosis, hyperglycemia, electrolyte imbalances, and identification of precipitating events.

Laboratory data

Initial evaluation of patients with suspected DKA should generally include the following:

- Basic metabolic panel, phosphate, magnesium
- Glycosylated hemoglobin (HbA1C, if not checked in previous 2 months)
- Complete blood count
- Beta-hydroxybutyrate
- Urinalysis
- Arterial blood gas
- Blood glucose q1-2 hour (Every hour for patients in moderate to severe DKA)
- Cardiac enzymes, EKG
- Consider chest x-ray

DIABETIC KETOACIDOSIS (continued)

Management of moderate to severe DKA in a critical care setting:

Intravenous fluid (IVF) and insulin therapy

See attachment

Potassium

Serum goal: 4-5 mEq/L

*Not applicable for patients with renal dysfunction ($\text{CrCl} < 30 \text{ ml/min}$)

Serum K+	Total Replacement Dose
< 3.3 mEq/L	HOLD INSULIN 1-2 hours and give 20-30 mEq/hr until $K+ > 3.3 \text{ mEq/L}$
3.3 – 5.2 mEq/L	Give 20 mEq IV, then 20 – 30 mEq K+ in each liter of fluid to keep K+ between 4-5 mEq/L
> 5.2 mEq/L	Do not give K+ and check K+ again in 2 hours

Sodium bicarbonate

1. Sodium bicarbonate should be given if the arterial pH is < 7.0 (note that data is limited).
2. Concerns associated with bicarbonate administration include: hypokalemia, diminished tissue oxygen uptake, and cerebral edema.

Suggested criteria for resolution of DKA:

- Calculated anion gap < 12 mEq/L
- BG < 200 to 250
- Serum bicarbonate > 15 mEq/L
- Venous pH > 7.3

Transition to subcutaneous insulin*:

After resolution of DKA and when patient is able to eat, refer to guideline for transition of IV to SC insulin available on FormChecker using most recent 6 hour interval dose on insulin infusion. In general, the total daily dose of insulin is divided 50% basal insulin and 50% rapid-acting insulin. **Continue IV insulin infusion for 1-2 hours after basal SC insulin administered.**

Alternative Strategies:

1. Diabetic patients receiving insulin at home: Restart home dose if known control of diabetes ($A1C < 8\%$ with minimal hypoglycemia)
2. Insulin-naïve: 0.5 to 0.8 units/kg/day: 50% basal insulin and 50% rapid-acting insulin with meals

*Consider endocrine consult

DIABETIC KETOACIDOSIS (continued)

Fingerstick blood glucose monitoring:

1. Check FSBG every hour while on infusion. Once stable (3 consecutive values in target range), then may reduce to every 2 hours.
2. Resume every hour monitoring if any of the following apply, must be continued until patient is stable:
 - a. Change in insulin infusion rate
 - b. Any significant changes in clinical condition
 - c. Change in steroids, vasopressors, dialysis, or CVVHD status
 - d. Initiation, cessation, or rate change of nutritional support (TPN, PPN, tube feedings, diet, etc.)
3. Source of specimen collection (A-line, finger stick) should be documented in flow sheet and subsequent samples should be collected from same source.

Hypoglycemia

1. If BG < 50 mg/dL: **Discontinue insulin infusion.** Administer 1 ampule (25 g) of Dextrose 50% IV and recheck BG every 15 minutes until BG > 90 mg/dL. Then recheck BG every hour; when BG > 120 mg/dL, wait 30 minutes and restart insulin infusion at 50% of most recent rate.
2. If BG 50 – 74 mg/dL: **Discontinue insulin infusion** if symptomatic or unable to assess. Administer 1/2 ampule (12.5 g) Dextrose 50% IV and recheck BG every 15 minutes until BG > 90 mg/dL. Then recheck BG every hour; when BG > 120 mg/dL, wait 30 minutes and restart insulin infusion at 75% of most recent rate.
3. If BG 75 – 99 mg/dL: **Discontinue insulin infusion** if symptomatic or unable to assess. Recheck BG every 15 minutes until BG remains > 90 mg/dL. Then recheck BG every hour; when BG > 120 mg/dL, wait 30 minutes and restart insulin infusion at 75% of most recent rate.

Management of mild DKA in a non-critical care setting with subcutaneous insulin:

Insulin therapy

A subcutaneous regimen may be used for patients in mild DKA.

Initial therapy (preferably in emergency department):

1. Administer regular insulin IVP 0.1 unit/kg (0.05 unit/kg if CrCl < 30 ml/min) x 1
 - + Insulin lispro subcutaneous 0.1 unit/kg (0.05 unit/kg if CrCl < 30 ml/min) x 1
 - + Insulin glargine subcutaneous 0.3 unit/kg (0.05 unit/kg if CrCl < 30 ml/min) x 1

Ongoing insulin therapy:

1. Insulin lispro subcutaneous 0.1 unit/kg (0.05 unit/kg if CrCl < 30 ml/min) q 4 hours until resolution of DKA. If DKA unresolved after 12 hours, consider other causes of acidosis.
2. Insulin glargine subcutaneous 0.3 unit/kg (0.05 unit/kg if CrCl < 30 ml/min) q24 hours beginning 24 hours after first dose.
3. When DKA resolved, divide 24 hour total insulin requirement to 50% basal insulin and 50% rapid acting insulin divided TID.

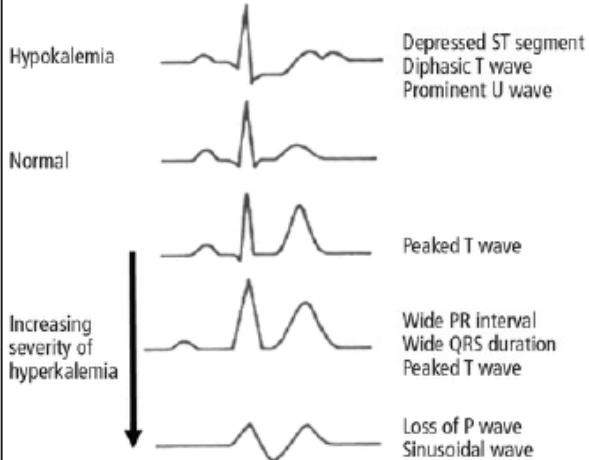
ADULT HYPERKALEMIA MANAGEMENT

*Do not use this guideline or order set if the patient is suspected to have DKA
Before initiating treatment, consider if the elevated potassium is a spurious value
If there are EKG changes, then treat as severe hyperkalemia regardless of potassium level*

BACKGROUND

There is general consensus that clinical signs and symptoms of hyperkalemia or significant EKG changes warrant early and aggressive therapy as ECG changes are associated with mortality.¹⁻²

“Classic EKG” Changes in Hyperkalemia³



Symptomatic Hyperkalemia³ Related to Poor Neuromuscular Transmission

- Neuromuscular Weakness
- Paralysis
- Sensory Changes
- Paresthesias

EKG Pearls^{2-5,7-8}

- Hyperkalemia has been known to cause almost any dysrhythmia.
- Other findings: Regular and/or irregular bradycardias, wide/narrow tachycardias, new fascicular or bundle branch blocks, and ST segment changes
- Sinus or junctional bradycardia may be the only EKG manifestation of hyperkalemia
- Plasma potassium concentration often correlates poorly with cardiac manifestations
- The EKG alone is unreliable for the diagnosis and severity categorization of hyperkalemia

UNIVERSAL ACTIONS:

- * Avoid administration of patient medications that can worsen hyperkalemia
- * Ensure adequate urine output (if able to produce urine)
 - Can provide IVF resuscitation in those that can tolerate volume
 - Preferred fluid is Lactated Ringers, as NS can exacerbate hyperkalemia. Consider isotonic bicarb in the setting of metabolic acidosis.⁶

Orders:

- Baseline POCT Blood Glucose if BMP reading > 2 hours (at time of the blood draw)
 - *If SEVERE: POCT BG timed to be collected baseline, 30 minutes, 1 hour, 3 hours after insulin administration*
- Continuous cardiac monitoring
- 12-lead EKG (if not already obtained)
- Repeat BMP @ 2 hours if pursuing pharmacologic management

ADULT HYPERKALEMIA MANAGEMENT (continued)

MILD TO MODERATE HYPERKALEMIA

(5.5-6.5 mEq/L, asymptomatic, and without EKG Changes)

Patients with mild to moderate hyperkalemia may respond to diminished potassium intake and removal of potassium sparing medications. Do not necessarily need aggressive ED management. Patients with neuromuscular weakness, paralysis, or EKG changes or are at risk for ongoing hyperkalemia should be treated as severe hyperkalemia.⁵

SEVERE HYPERKALEMIA

(>6.5 mEq/L, EKG changes, or symptomatic hyperkalemia)

Order Inpatient Consult to Nephrology: Remember that we have different nephrology groups at Temple. Call the right group to avoid multiple phone calls. Can be found on Amion.

INITIATE PHARMACOLOGIC THERAPY!

PART 1: Membrane Stabilization

Calcium Gluconate

- a. Agent: 10% Calcium Gluconate
- b. Dose: 2 g IV Push over 2-5 minutes
- c. Frequency: As needed if EKG changes present or at request of provider
- d. Repeat EKG after administration of calcium

Calcium Chloride (Code/Peri-Arrest)

- a. Agent: 10% calcium chloride
- b. Dose: 1 g IV Push
- c. Frequency: As needed if EKG changes present or at request of provider
- d. Repeat EKG after administration of calcium

Note: Calcium chloride contains 3 times the elemental calcium as calcium gluconate. As a result, it can be corrosive to peripheral vessels and may cause necrosis if extravasation occurs; Therefore, central line administration is preferred. Peripheral IV administration may be used in cardiac arrest. Calcium gluconate is generally preferred for most patients^{2,7,8}

PART 2: Intracellular Potassium Shifting

Insulin

**Does the patient have CKD, ESRD, AKI or BG less than 100 mg/dL?*⁹⁻¹⁰*

YES

Agent: Insulin (REGULAR)
Route: IV bolus
Dose: 5 units
Frequency: Once

NO

Agent: Insulin (REGULAR)
Route: IV bolus
Dose: 0.1 units/kg;
Maximum dose of 10 units
Frequency: Once

ADULT HYPERKALEMIA MANAGEMENT (continued)

Dextrose	Order Hypoglycemia Protocol ^{2,7,8,10} (Adapted from Multiple Sources)	
<i>POCT BG timed to be collected baseline, 30 minutes, 1 hour, 3 hours, 6 hours, 12 hours after insulin administration.^a</i>		
Baseline BG POCT ≥ 200mg/dL	Baseline BG POCT 100 - 200 mg/dL	Baseline BG POCT <100 mg/dL
Dextrose administration is <u>not</u> required if baseline BG POCT ≥ 200 mg/dL Administer insulin (REGULAR) IV	Agent: Dextrose 50% ^b Route IV to be administered over 5 minutes; Should be administered at the same time as insulin Dose: 25 grams (50mL) Frequency: Once	Agent Dextrose 50% ^b Route IV to be administered over 5 minutes; Should be administered at the same time as insulin Dose: 50 grams (100mL) Frequency: Once

^aIf patient develops BG below 70 mg/dL during the glucose monitoring period, then follow corrective steps for hypoglycemia, giving 25g or 50g of D50W as needed or PO glucose (juice) if able to tolerate PO.

^bIf a patient can tolerate or requires additional volume, then a 250 ml bolus of Dextrose 10% could be utilized instead of D50W. D10W has the advantages of causing less rebound hypoglycemia and less irritation of veins with similar efficacy.¹¹

Albuterol	<i>B-agonists should NOT be used as mono-therapy and insulin/glucose be given first.⁷ Note that this dose is much larger than the dose used in Asthma.</i>	Agent: Albuterol 0.083% Route: Nebulized Dose: 20 mg Frequency: Once
Sodium Bicarbonate	<i>Consider only for patients with non-anion gap metabolic acidosis, ie: RTAs; NOT ROUTINE USE ^{2,7,8}</i>	Agent Sodium bicarb 150mEq/1000mL Route: IV Dose: 250mL/hr Frequency: Continuous Duration: 4 hours

PART 3: Potassium Elimination

Furosemide	Lokelma	Dialysis
<i>Can pair with IVF administration (Lactated Ringers) to those who are able to urinate and can tolerate additional volume.^{2,7,8} If the patient is unable to produce urine, avoid diuretics and use Lokelma only.</i>	<i>Reserve for patients not receiving emergent dialysis</i>	<i>The definitive treatment for hyperkalemia in patients unable to excrete potassium</i>
Agent Furosemide Route: IV push Dose: 80-160 mg (can increase or those with prior diuretic use) Frequency: Once	Agent: Lokelma (Sodium Zirconium Cyclosilicate) Route: Oral Dose: 10 g Frequency: Once (q8hr inpatient)	<u>Dialysis Locations</u> ED RZ 12&13, YZ 29&30 TUH ICUs Inpatient dialysis unit <i>Remember that we have different nephrology groups at Temple!</i>

GASTROPARESIS

Memo To: Emergency Medicine faculty and residents

From: Robert McNamara, M.D.
Chair, Department of Emergency Medicine

Henry Parkman, M.D., Division of Gastroenterology

Date: September 20, 2012

Re: Treatment guidelines for Gastroparesis patients

The following do not supersede clinical judgment regarding individual patient care decisions.

General Principles:

1. The use of narcotic analgesics in a patient with gastroparesis is discouraged as the use of such agents may worsen the disease by causing decreased motility. The pathophysiology of this condition does not generally include severe pain requiring narcotic analgesics.
2. Patients suspected of having dependence on narcotic agents should be referred for detoxification when medically stable.

Guidelines:

1. Narcotic pain medication should be used in gastroparesis if there is a clear indication such as:
 - a. Suspected peritonitis, documented bowel obstruction or pancreatitis
 - b. Another co-existing condition requiring narcotic analgesics
2. Management of the patient should include correction of fluid and electrolyte disturbances and the use of anti-emetics or pro-motility agents.
 - a. Admission is indicated if the patient cannot tolerate oral sustenance
3. If a patient is suspected of having dependence on narcotic agents, they should be counseled and offered a detoxification at the CRC or given a list of outpatient resources for the same. Case management may be of assistance in this matter.
4. Patients with cycling vomiting syndrome are often treated with anti-emetics and will occasionally need narcotic analgesics to break the cycle.
5. Patients on chronic narcotic medications should obtain refills from their outpatient provider.

ESOPHAGEAL FOREIGN BODIES

Consensus Policy Statement

Stephen J. Heller MD, MPH, Director, Gastrointestinal Endoscopy

Cecilia Schmalbach MD, MSc, FACS Chair, Otolaryngology-Head and Neck Surgery

Ahmed Soliman MD, Director, Voice Airway and Swallowing Center

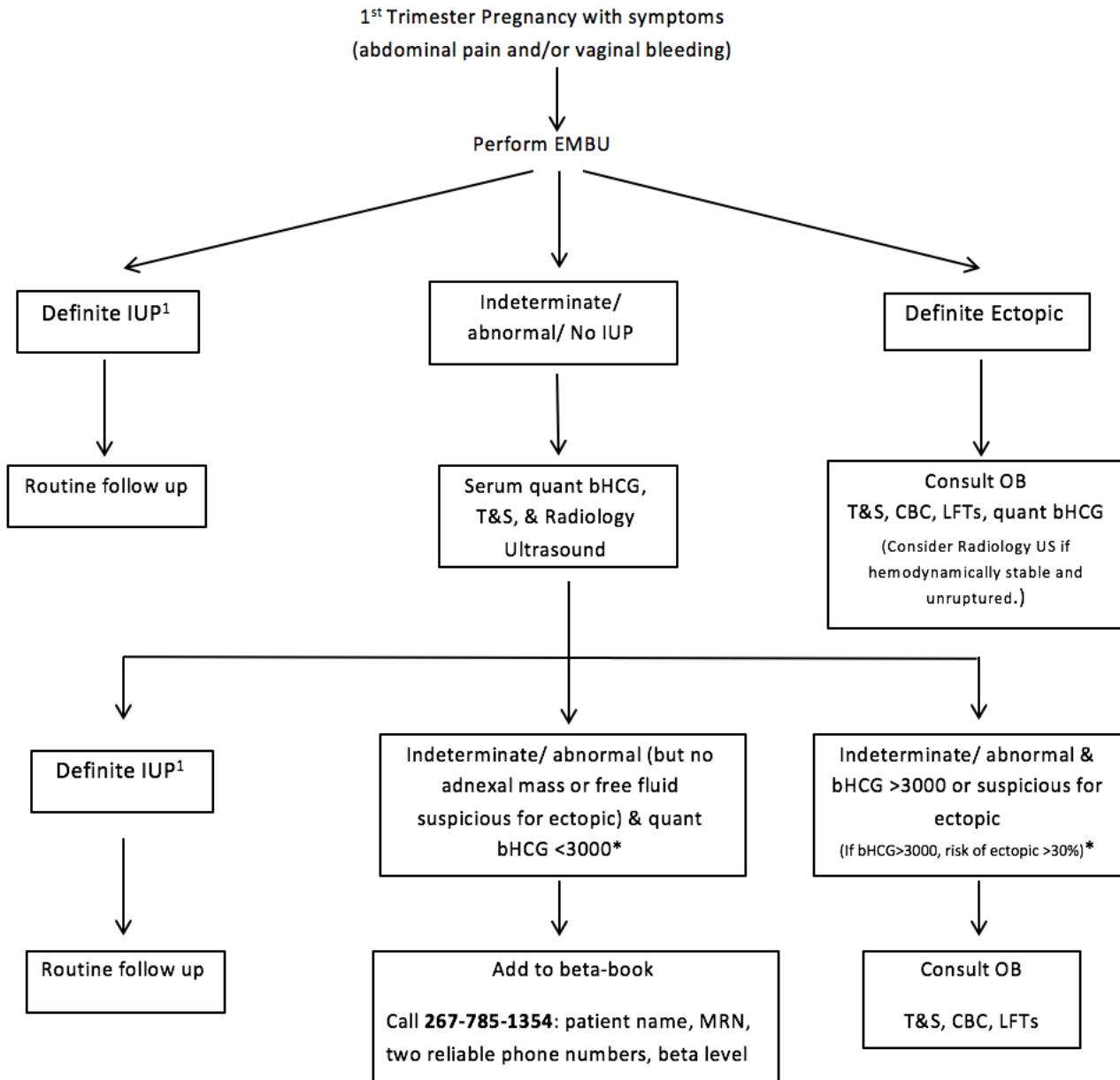
Joseph Friedberg MD, Thoracic Surgeon-in-Chief

In order to assure prompt, safe, and efficacious care of patients with esophageal foreign bodies, we have agreed to the following principles and procedures, which reflect a consensus approach to the management of these individuals.

- (1) The initial workup of all patients arriving through the Emergency Department (ED), whether as walk-ins to the TUH ED or through transfer from an outside ED to the TUH ED, will be managed by Gastroenterology (GI). The ED physician is instructed to contact the GI fellow on-call to initiate the patient's evaluation and treatment.
- (2) The removal of most foreign bodies will be managed by GI using flexible endoscopy. In those cases, in which the GI attending physician feels that rigid endoscopy is required for safe removal, such as in cases that are in the proximal esophagus, where GI has been unsuccessful in retrieving the foreign object, or if the object presents with respiratory symptoms, the GI attending physician will contact the Otolaryngology-Head & Neck Surgery attending physician on call for assistance.
- (3) The Otolaryngology-Head & Neck Surgery service will manage all patients when the GI attending advises that such management represents the safest and most appropriate care for the patient.
- (4) Any patient requiring TUH admission who presents through the TUH ED will be admitted to the managing service (GI or Otolaryngology-Head & Neck Surgery)
- (5) Any patient requiring TUH admission that is being transferred directly from an inpatient floor at another hospital will be accepted by the managing service (GI or Otolaryngology- Head & Neck Surgery)
- (6) Any patient requiring ICU admission, such as those who are critically ill or those with the high suspicion of an esophageal perforation, will be admitted to the ICU by the Thoracic Surgery. These patients can be admitted and co-managed by Otolaryngology or GI where appropriate.
- (7) Calls requesting transfer of patients through the Temple Transport Team (T3) will be directed to the GI attending on call to determine appropriateness of transfer. The GI Attending will contact the Otolaryngology- Head & Neck Surgery attending on call if they determine that the patient is better managed by Otolaryngology.
- (8) Consistent with TUP and TUH policies, all patients being referred for evaluation and treatment of esophageal foreign bodies will be accepted for transfer to TUH by whichever physician is contacted, and the services will work together to assure prompt and appropriate care.
- (9) The GI, Otolaryngology, and Thoracic Surgery services pledge to interact cooperatively and seamlessly to care for patients with esophageal foreign bodies.

Updated 9/2023

1st TRIMESTER PREGNANCY WITH PAIN OR BLEEDING



¹Definite IUP: Gestational sac containing either a yolk sac or a fetal pole with FHT within the endometrium.

*bHCG discriminatory zones & repeat bHCG in 48 hours based on the following reference: Doubilet, PM, et al. "Diagnostic Criteria for Nonviable Pregnancy Early in the First Trimester." *N Engl J Med* 2013; 369: 1443-1451. With a single measurement of a beta-hCG <3000, the presumptive treatment for an ectopic pregnancy should not be performed in order to avoid the risk of interrupting a viable intrauterine pregnancy. Many cases terminated a possibly viable pregnancy when the hcg cut off was <2000. Additionally, "the hcg levels in viable intrauterine pregnancies, nonviable intrauterine pregnancies, and ectopic pregnancies have considerable overlap, so a single hcg measurement does not distinguish reliably among them." "The progression of hcg values over a period of 48 hours provides valuable information for diagnostic and therapeutic decision making."

RH IMMUNE GLOBULIN TESTING GUIDELINES

Rh Immune Globulin (RhoGAM®) Recommendations

- The longstanding recommendation to administer Rh immune globulin (RhoGAM®) to Rh negative women who experience first trimester bleeding is based on expert opinion (not evidence-based).
- *Hannafin et al, 2006* performed an extensive literature search (MEDLINE 1966-2005, Cochrane Central Register for Controlled Trials, EMBASE 1990-2005, and associated references) in order to determine whether or not clinical evidence exists to support the administration of Rh immune globulin to Rh negative women with first trimester bleeding.
- Although the evidence is limited (22 articles with one double-blind randomized controlled trial and one retrospective case-control trial), the review yielded only one case of maternal sensitization following first trimester bleeding (with a questionable causal relationship).
- Based on the available literature and the overall lack of clearly documented adverse outcomes from withholding Rh immune globulin in the setting of first trimester bleeding, a recommended practice guideline is:

-
- **NO Type & screen/RhoGAM® administration**
 - All women with a positive β-HCG who present with vaginal bleeding with an EGA <12 weeks and an ultrasound-confirmed IUP
 - **Type & screen → if Rh negative, then give RhoGAM® 300 mcg IM**
 - All women with a positive β-HCG who present with vaginal bleeding in the setting of:
 - An active miscarriage
 - An ectopic or heterotopic pregnancy
 - Recent trauma
 - An EGA >12 weeks or an unknown EGA (i.e., age cannot be verified via ultrasound)
-

HYPEREMESIS/NAUSEA AND VOMITING IN PREGNANCY

Background

- Nausea and vomiting is very common in early pregnancy. Severe vomiting resulting in dehydration and weight loss is termed hyperemesis gravidarum and occurs infrequently
- The complete absence of emesis should not be an expectation
- Outpatient treatment is preferred with a combination of oral medications and/or suppositories and non-pharmacologic interventions (see table below)
- There has been controversy involving the use of Ondansetron (Zofran) so it is not a preferred first line agent and should only be used in patients unresponsive to all other therapies

Objective

- To identify pregnant patients who require ED intervention and ultimately to identify those who require inpatient admission

Starting Point

- Pregnant patient < 20 weeks gestational age
- Pregnant patients reporting the inability to tolerate liquids (this does not include milk or orange juice which are not recommended in patients with nausea)

Step 1 – Evaluation

1. Is patient actively vomiting in the ED?
 2. Does patient have objective signs of dehydration/starvation (urine specific gravity >1.020 AND large ketones)?
- ** If NO to 1 AND 2 then no further intervention. Discharge with outpatient therapy
** If YES to 1 OR 2 then place IV, send BMP, and proceed to treatment

Step 2 – Treatment

1. Hydrate with D5NS (up to 2 liters). Add 20 mEq KCL if patient found to be hypokalemic
2. Pharmacologic treatments
 - a. First line - Diphenhydramine 25-50 mg IV
 - b. Second line - Metoclopramide 10 mg IV
 - c. Third line - Zofran 4-8 mg IV (only if IVF and initial IV medications are ineffective; should make every attempt to avoid in patients <10 weeks pregnant)
3. Can add H2 blocker (Famotidine) as adjunctive treatment
4. Attempt trial of neutral liquids (i.e. ginger ale)

Indications for admission to OBGYN:

- Documented failure of appropriate outpatient therapy with significant weight loss (15 lbs)
- Significant hypokalemia ($K < 3.0$ or EKG changes)
- Patient unable to tolerate neutral liquids despite 2 L IVF hydration and multiple pharmacological treatments

HYPEREMESIS/NAUSEA AND VOMITING IN PREGNANCY (continued)

Table – Outpatient Therapy

- Pharmacologic treatments

For all patients:

- Doxylamine 12.5 mg PO q 6 hr AND
 - Pyridoxine (Vit B6) 25 mg PO q6 hr
- OR
- Doxylamine 10 mg/Pyridoxine 10 mg combo (Diclegis) 1-2 tabs PO q day
(Please note: most insurance carriers do not cover)

Additional treatments may include:

- Promethazine (Phenergan) suppository 12.5- 25 mg PR q 6 hr
- Zofran ODT 8 mg PO q 8 hr

- Complementary/alternative therapies

- Ginger capsules 250 mg PO TID
- Ginger tea
- Wrist acupressure (Sea Bands)

- General recommendations

- Electrolyte sports drinks (Gatorade, etc.)
- Small continuous sips
- Small continuous snacks (saltines, potato chips)
- Minimize full meals

PYELONEPHRITIS IN PREGNANCY

Background

- Urinary tract infections are common in pregnant women and the incidence of pyelonephritis is higher than in the general population. If untreated pyelonephritis has been associated with an increased risk of preterm birth and perinatal mortality
- It is normal to have some white blood cells in the urine during pregnancy as there is vaginal leukorrhea so obtaining a clean urine sample is essential to making an accurate diagnosis
- Rarely a patient can have a kidney infection without pyuria because of an obstructing stone; however, this diagnosis should not be considered without documented evidence of obstruction on imaging studies
- Not all pregnant patients with suspected pyelonephritis need to be treated as an inpatient. Discharging a patient home after a single dose of a parenteral antibiotics followed by a course of oral antibiotics may be appropriate under certain circumstances

Objective

- To accurately identify pyelonephritis in pregnant patients
- To identify pregnant patients at increased risk for morbidity with outpatient management

Starting Point

- Pregnant patient <20 weeks gestational age
- Pregnant patient with suspected upper urinary tract infection (fever, flank pain, nausea, vomiting, and/or costovertebral angle tenderness). Symptoms of cystitis are not always present
- Pregnant patient with untreated or suboptimally treated bacturia by recent urine culture

Evaluation

- Collect clean catch mid-stream urine sample and send for formal urinalysis with microscopy
 - Findings consistent with a kidney infection include:
 - Pyuria ≥ 10 leukocytes/microL
 - White blood cell casts (highly suggests upper tract infection)
 - Urine with a moderate or large number of epithelial cells should be considered contaminated and a repeat urine sample should be obtained via straight catheterization. This is necessary to exclude a vaginal source for any white blood cells in the urine

PYELONEPHRITIS IN PREGNANCY (continued)

Criteria for Admission (any one of the following)

- Patient unable to tolerate oral intake after treatment with anti-emetics
- Failed outpatient therapy
- Temperature >100.5°F (38°C) or <96.8°F (36°C)
- SIRS in pregnancy (see table below)

Table - SIRS in Pregnancy

Two or more of the following:

- HR >100 bpm
- RR >20 breaths/min
- PaCO₂ <32 mmHg (if obtained)
- WBC >12,000 or <4,000 or >10% bands
- Hyperglycemia >120 in absence of diabetes or gestational diabetes

Treatment

If the clinical evaluation and urinalysis are c/w pyelonephritis:

- Administer IV antibiotics
 - Ceftriaxone 1g (unless culture available or contraindication)
 - If PCN allergy – Aztreonam 1 g

** Additional urine for culture should be obtained via straight catheterization

If the patient does not meet admission criteria:

- Administer a single dose of IV antibiotics (as noted above)
- Discharge home on 7 day course of an oral antibiotic
 - Cephalexin 500 QID OR
 - Ampicillin 500 QID OR
 - If PCN allergy
 - <14 weeks – Nitrofurantoin ER (Macrobid) 100mg BID
 - >14 weeks – Bactrim DS BID
- Other considerations
 - Tylenol #3 if patient has significant CVA tenderness
 - Anti-emetics if patient has significant nausea (avoid Zofran in first trimester)
- Confirm urine culture sent prior to discharge for follow up purposes

FETAL DEATH GUIDELINE

** This guideline does not apply to a live birth that expires in the ED **
Any live birth (heart beat or respiratory effort in the ED) requires its own Epic chart.

Scenario 1:

Fetus delivered pre-hospital (OB/GYN not involved) → ED physician completes below process

Scenario 2

OB/GYN resident involved in delivery or shortly thereafter → OB/GYN resident completes below process (when the mother is admitted to their service and/or they deliver the fetus)

Process for disposition of remains:

* Obtain "Fetal Death Packet" from unit clerk

* Provider measures **foot length from back of heel to tip of great toe**

A. Foot Length < 18.2 mm

1. Place fetal remains in white plastic specimen container
 - a. Affix a label with mother's information to container
 - b. Order 'Pathology Fresh' in Epic and indicate "Products of Conception"
2. Transport specimen container and attached order to pathology

Do NOT complete Certificate of Fetal Death or Consent to Relinquish Remains

Do NOT use manila tags, shroud, or brown bag

B. Foot Length ≥ 18.2 mm

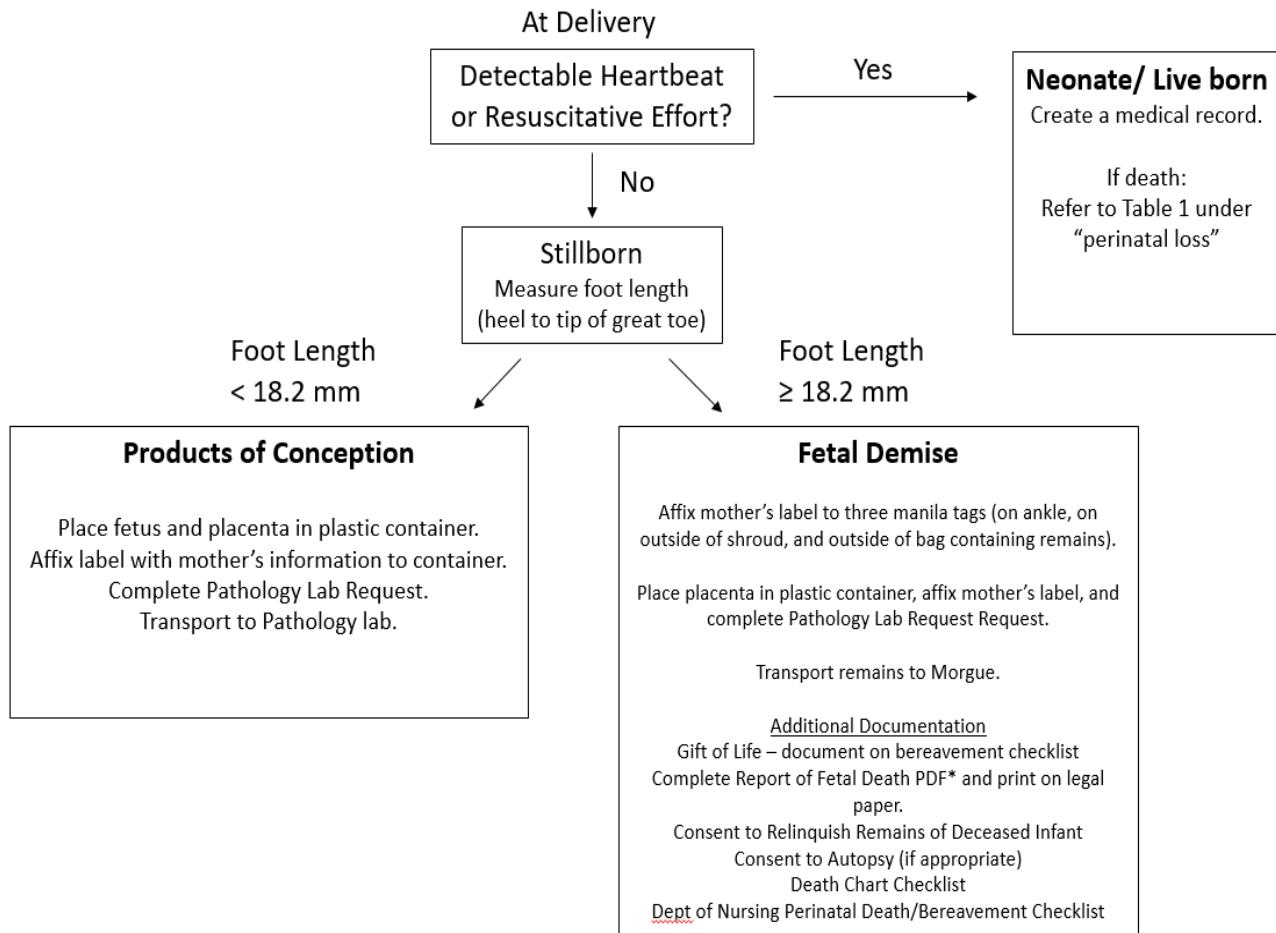
To be completed by physician:

1. Complete Certificate of Fetal Death
2. Complete Consent to Relinquish Remains
3. Place placenta in white plastic specimen container
 - a. Affix label with mother's information to container
 - b. Order 'Pathology Fresh' in Epic (under Specimen Source, note "Placenta")

To be completed by nurse:

1. Complete all three (3) manila tags with the following information:
 - a. Mother's patient label
 - b. Date and time of fetal death
 - c. Foot length
 - d. Gender
2. Secure tag #1 to ankle of fetus
3. Wrap fetus in shroud
4. Secure tag #2 to outside of shroud
5. Place shroud (containing fetus) in brown bag
6. Secure tag #3 to outside of brown bag
7. Transport brown bag and completed paperwork to morgue *within two (2) hours of delivery*
8. Transport specimen container with placenta and attached order to pathology
9. Call Gift of Life to report fetal death

FETAL DEATH GUIDELINE (continued)



Fetal Death Certificate:

- Report of Fetal Death PDF must be both completed and printed on the computer labeled Fetal Death in the hallway behind Room 4
- It cannot be saved and emailed, and only that printer can do legal size
- Complete all the fields
- Non-compliant submissions will be rejected by Medical Records

FETAL DEATH GUIDELINE (continued)

CATEGORY	REQUIRED PAPERWORK	REQUIRED ACTION
Products of conception - (Stillborn fetus with a foot length measuring less than 18.2mm at time of expulsion from the uterus.)	<ul style="list-style-type: none"> Accessioned as surgical specimen and handled as a routine case in the Pathology Laboratory. A properly completed Pathology Lab request form (Examination of Tissue or Cell Block) (See Attachment G) 	<ul style="list-style-type: none"> Place surgical specimen (fetus and placenta) in plastic container Affix a label with the mother's information to the container Transport to Pathology Lab
Fetal Demise Stillborn - fetus with a foot length measuring 18.2 mm or greater at time of expulsion from the uterus.)	<ul style="list-style-type: none"> Document contact with Gift of Life on Bereavement Checklist Report of Fetal Death Attachment A Consent to Relinquish Remains of Deceased Infant Attachment E Consent to Autopsy Attachment C Death Chart Checklist Dept. of Nursing Perinatal Death/Bereavement Checklist <p>A properly completed Pathology Lab request (Examination of Tissue or Cell Block) for PLACENTA (not fetus) (See copy of form in attachments)</p>	<ul style="list-style-type: none"> Prepare and wrap the fetus properly and affix a label with the mother's information to the three manila tags. Place tags as follows: <ul style="list-style-type: none"> On the ankle of the fetus On the outside of the shroud On the outside of the bag containing the fetus Transport the remains to the Morgue Place the placenta in a plastic container. Affix a label with the mother's information to the outside of the container. Transport placenta to Pathology Lab with completed Pathology Lab request
Perinatal Loss- Loss of pregnancy or death of a neonate before 28 days of life.	<ul style="list-style-type: none"> Document contact with Gift of Life on Bereavement Checklist Certificate of Death Attachment B Consents to Relinquish Remains of Deceased Infant Attachment E To be signed by the mother, both parents, or father as listed on the Birth Certificate or Certificate of Death form Consent to Autopsy (if applicable) Attachment C Death Chart Checklist Dept. of Nursing Perinatal Death/Bereavement Checklist 	<ul style="list-style-type: none"> Prepare and wrap the fetus properly and affix a label with the mother's information to the three manila tags. Place tags as follows: <ul style="list-style-type: none"> On the ankle of the infant On the outside of the shroud On the outside of the bag containing the infant Transport the remains to the Morgue Place the placenta in a plastic container.
		<ul style="list-style-type: none"> Affix a label with the mother's information to the outside of the container. Transport placenta to Pathology Lab with completed Pathology Lab request

Reference: TUH INC-ADMIN-950.2087

PREGNANT PATIENT TRANSFERS

To: ED Faculty

From: Mike DeAngelis, MD
Vice Chair of Clinical Affairs, Department of Emergency Medicine

RE: Acceptance of Pregnant Patients to Temple University Hospital

Date: May 13, 2020

If an outside ED calls Temple University Hospital requesting a pregnant patient be transferred because they cannot provide the necessary services in their facility, acceptance and transfer will be coordinated via the Temple Transport Team (T3).

For pregnant patients >20 weeks gestational age, T3 will call the L&D attending on call for acceptance. If T3 is unable to contact the L&D attending they will call a Temple ED attending who will ALWAYS accept the patient to L&D on their behalf. After accepting the transfer, the Temple ED attending will notify obstetrics by calling the L&D unit at 215-707-4696.

For pregnant patients <20 weeks gestational age, T3 will call a Temple ED attending for their acceptance and arrange transfer to the Temple ED for further evaluation.

Regardless of the patient's gestational age, ALL pregnant patients with traumatic injuries or non-obstetric emergencies will be transferred to the Temple ED for further evaluation. Upon arrival appropriate consultations will be obtained to include obstetrical consultation if the patient is >20 weeks gestational age.

The above process is applicable to the Episcopal and Jeanes campuses of Temple University Hospital.

CC: Robert McNamara, MD
Chair, Department of Emergency Medicine

PREGNANT PATIENT ADMISSIONS

Memo To: EM, IM and ObGyn faculty and residents

Date: Created 9/16/2016; Reviewed Sept 2023

From: Joseph Cheung, M.D., Chair, Department of Internal Medicine
Amy Goldberg, M.D., Chair, Department of Surgery
Enrique Hernandez, M.D., Chair, Department of Obstetrics and Gynecology
Robert McNamara, M.D., Chair, Department of Emergency Medicine

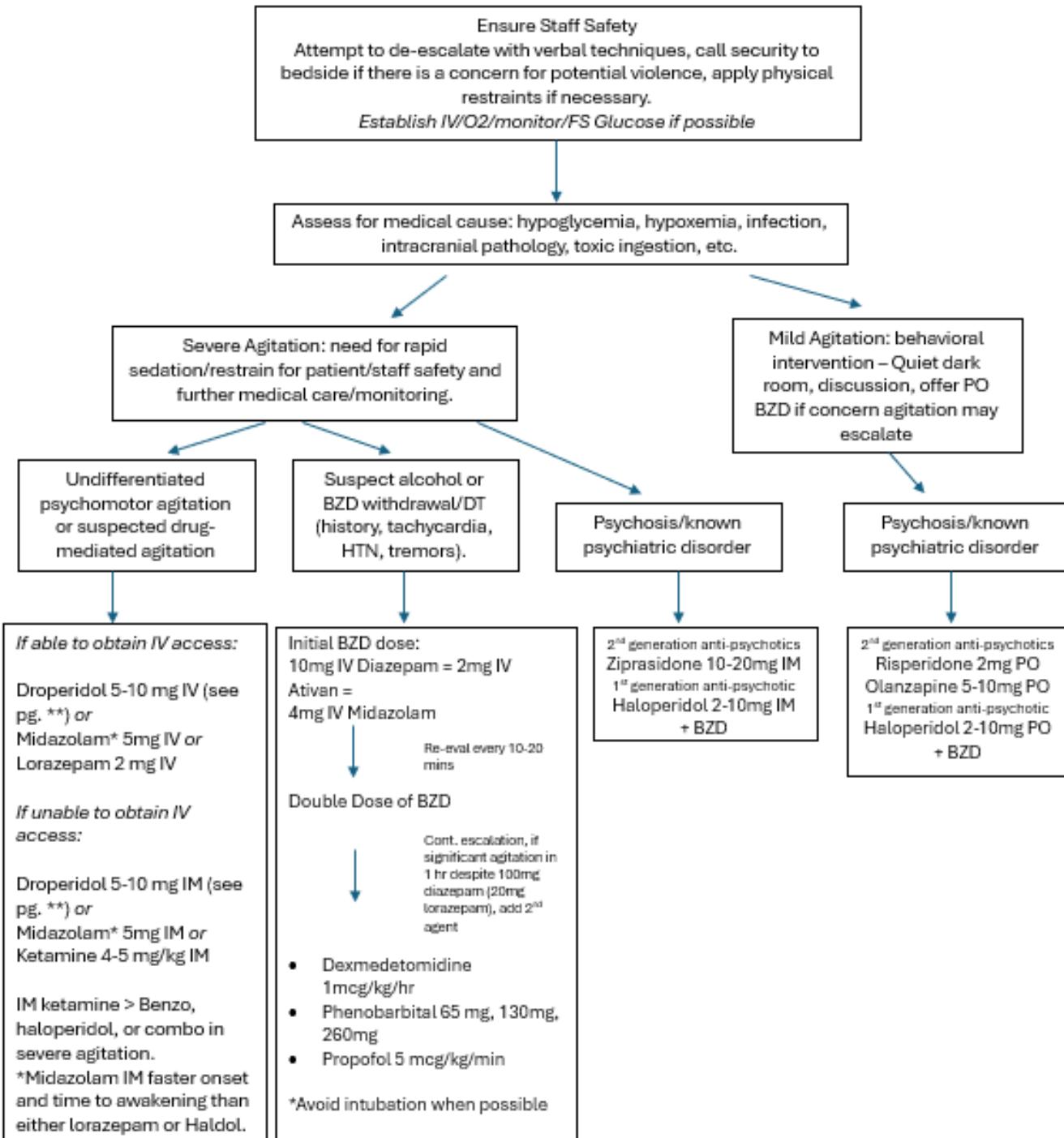
The respective departments have agreed to the following admission guideline. As a guideline, these do not supersede clinical judgment regarding individual patient care decisions.

General principles: Definitive evidence of pregnancy includes a positive urine or blood test. An ultrasound is not necessary to confirm pregnancy; such studies should be ordered when there is a clinical indication for this study. The EM attending according to hospital policy 950.2056 is fully authorized to admit the patient to the service they consider most appropriate for the patient's medical needs.

Guideline:

1. **Pregnant patients with a viable fetus (= or >23 weeks) are to be admitted to Obstetrics unless they require admission to the Medical ICU, SICU or CICU.**
2. **Pregnant patients with a non-viable fetus (<23 weeks) are to be admitted to the medical or surgical service the EM attending believes best suits the patient's medical needs. (see below specialty service created examples)**
3. **Consultations (timing depends on clinical need):**
 - a. Pregnant patients admitted to a non-OB service should have a formal MFM consultation.
 - b. Patients admitted to the MFM service will have formal medical consultation at the discretion of the admitting OB team.
 - c. Consultants must place a daily note on the patient's chart until the consulting service has formally ended its involvement in the care and has signed off (as required by the Attending Progress Note Policy TUH-ADMIN 950.2100).
4. **Examples of conditions that may warrant specialty service admission at < 23 weeks**
 - a. **Cardiology/Heart Failure** - Patients can be admitted to the Cardiology service (CICU, Pavilion Cardiology, Pavilion Heart Failure) with OB consultation when the primary disorder or reason for admission is the following:
 - i. Congenital heart disease complications
 - ii. Severe pulmonary arterial hypertension
 - iii. Clinically relevant valvular heart disease
 - iv. Acute Coronary Syndromes including STEMI (chest pain, ECG changes, biomarker elevation)
 - v. Cardiomyopathy with decompensated congestive heart failure
 - vi. Documented dysrhythmias with hemodynamic compromise
 - b. **Nephrology** – Patients can be admitted to the renal service (Medicine Yellow) with OB consultation where the primary disorder or reason for admission is the following:
 - i. Dialysis management and/or dialysis-related complications
 - ii. Abdominal solid organ transplantation management
 - iii. Severe hypertension in the presence of pre-existing kidney disease including isolated proteinuria
 - iv. Active or evolving glomerulonephritis
 - c. **Hepatology**: Patients can be admitted to the Hepatology Service (Medicine Green) with OB consultation where the primary reason for admission is one of the following:
 - i. History of Liver Transplantation
 - ii. Elevated ALT and AST > 10 times the ULN (Upper Limit of Normal)
 - iii. Acute Hepatitis B
 - iv. Acute Hepatitis C
 - v. Decompensated Liver Cirrhosis

MANAGEMENT OF AGITATION/EXCITED DELIRIUM



- Once staff and patient safety have been achieved, assess medical causes of agitation:
 - Hypoglycemia, Hypoxemia, Toxicome/poisonings, intracranial pathology/trauma
- All chemically sedated patients should have an IV and cardiorespiratory monitoring (incl. temp) with frequent re-evaluation for need for further sedation and for complications of chemical sedation.
- Check QTc if repeating doses of antipsychotics
- Check pH, CK, and use IV fluid resuscitation in the case of significant pre-hospital or hospital struggle

MANAGEMENT OF AGITATION/EXCITED DELIRIUM (continued)

Benzodiazepines and Antipsychotics

Medication	Rec Dose [§]	Onset of action	Half Life	Contraindications	Adverse Effects
Risperidone	2mg PO	1 hr	~20 hours	H/o long QT or on QT prolonging medications	QT prolongation, headache
Olanzapine	5-10mg PO (10mg IM)*	6 hr 15-45 min	~30 hours		EPS, headache, dizziness, orthostatic hypotension
Haloperidol	2-10mg PO 2-10mg IM 2-5mg IV	30-60 min 30-60 min 5 min	~40 hours	Agitated delirium 2/2 overdose or withdrawal H/o long QT or on QT prolonging medications	QT prolongation, EPS
Ziprasidone	10-20mg IM	10-20 min	2-5 hours	H/o long QT or on QT prolonging medications, recent MI, uncompensated HF	long QT (rare), EPS, headache, dizziness, nausea
Midazolam	5-10mg IM ^B 5mg IV	IM 5-15 min IV 3-5 min	2 hours	Acute narrow-angle glaucoma	Resp depression, sedation
Lorazepam	2mg PO 1-2mg IM/IV ^B	20-30 min IV 2-3min, IM 20-30 min	6-8 hours	Acute narrow-angle glaucoma, resp insufficiency	

[§]Consider halving most doses in geriatric patients

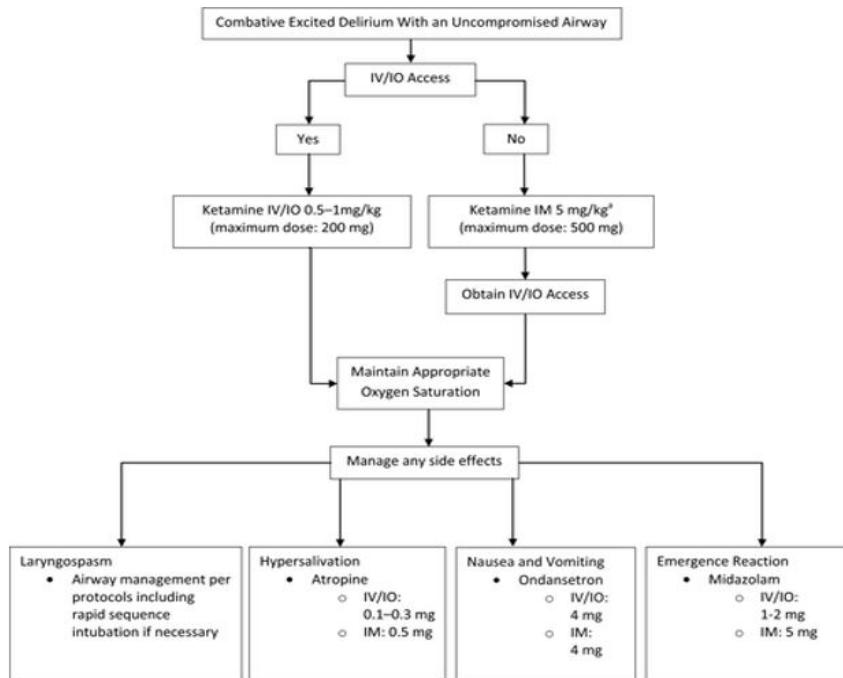
*Not yet available on TUH formulary

Ketamine

Dosage	Onset of action	Half life/Duration of action	Contraindications ^E	Adverse Effects
4-5mg/kg IM ^{DEG}	5 minutes ^E	20-30 minutes ^E	Absolute: Schizophrenia Relative: CV disease, asthma, ↑ ICP, glaucoma	Transient HTN, tachycardia, laryospasm, resp depression, emesis, hypersalivation, recovery agitation
0.5-1mg/kg IV (initial, +0.5mg/kg increments PRN) ^{EG}	1 minute	5-10inutes		

- D. Ketamine for Rapid Sedation of Agitated Patients in the Prehospital and Emergency Department Settings: A Systematic Review and Proportional Meta-Analysis. Mankowitz, Scott L. et al. *Journal of Emergency Medicine*, 2018 Volume 55 , Issue 5 , 670 – 681. **Ketamine IM achieved adequate sedation in ~7 minutes, intubation rate 30% (in ED) when given by EMS, 1.8% when given by ED physicians**
- E. Green, S.M., Roback, M.G., Kennedy, R.M., Krauss, B. Clinical practice guideline for emergency department ketamine dissociative sedation: 2011 update. *Ann Emerg Med*. 2011;57:449–461. **Good summary of ketamine in procedural sedation**
- F. Riddell, J., Tran, A., Bengamin, R., & Hendey, G. (2017). Ketamine as a first-line treatment for severely agitated emergency department patients. *The American Journal of Emergency Medicine*, 35(7), 1000-1004. **Observational, ketamine > benzo, Haldol, and Haldol +benzo**
- G. Scheppke KA, Braghiroli J, Shalaby M, et al. Prehospital Use of IM Ketamine for Sedation of Violent and Agitated Patients. *West J of Emerg Med*. 2014;15(7):736-741 **50/52 pts successfully sedated with 4mg/kg IM ketamine by EMS**
- H. Le Cong M, Gynther B, Hunter E, et al. Ketamine sedation for patients with acute agitation and psychiatric illness requiring aeromedical retrieval. *Emerg Med J*. 2012;29:335-337. **IV ketamine safe and effective in observational study with agitated patient during aero transport**
- I. Heydari F, Gholamian A, Zamani M, Majidinejad S. Effect of Intramuscular Ketamine versus Haloperidol on Short-Term Control of Severe Agitated Patients in Emergency Department; A Randomized Clinical Trial. *Bull Emerg Trauma*. 2018;6(4):292-299. **Iranian ED study showing IM ketamine 4mg/kg > IM Haldol 5mg in severe agitation**

MANAGEMENT OF AGITATION/EXCITED DELIRIUM (continued)



Proposed algorithm from pharmacology review article below:

Ketamine for the Acute Management of Excited Delirium and Agitation in the Prehospital Setting. **Linder, Lauren M.; Ross, Clint A.; Weant, Kyle A.**

Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy, January 2018, Vol.38(1), pp.139-151

Delirium Tremens/Alcohol Withdrawal

- J. Gold JA, Rimal B, Nolan A, et al. A strategy of escalating doses of benzodiazepines and phenobarbital administration reduces the need for mechanical ventilation in delirium tremens. *Crit Care Med.* 2007;35:724-730. **Escalating doses benzo + phenobarb if needed decreased rate of intubation in ICU-level alcohol withdrawal**
- K. Schmidt, K. J., Doshi, M. R., Holzhausen, J. M., Natavio, A., Cadiz, M., & Winegardner, J. E. (2016). Treatment of Severe Alcohol Withdrawal. *Annals of Pharmacotherapy*, 50(5), 389–401. <https://doi.org/10.1177/1060028016629161>

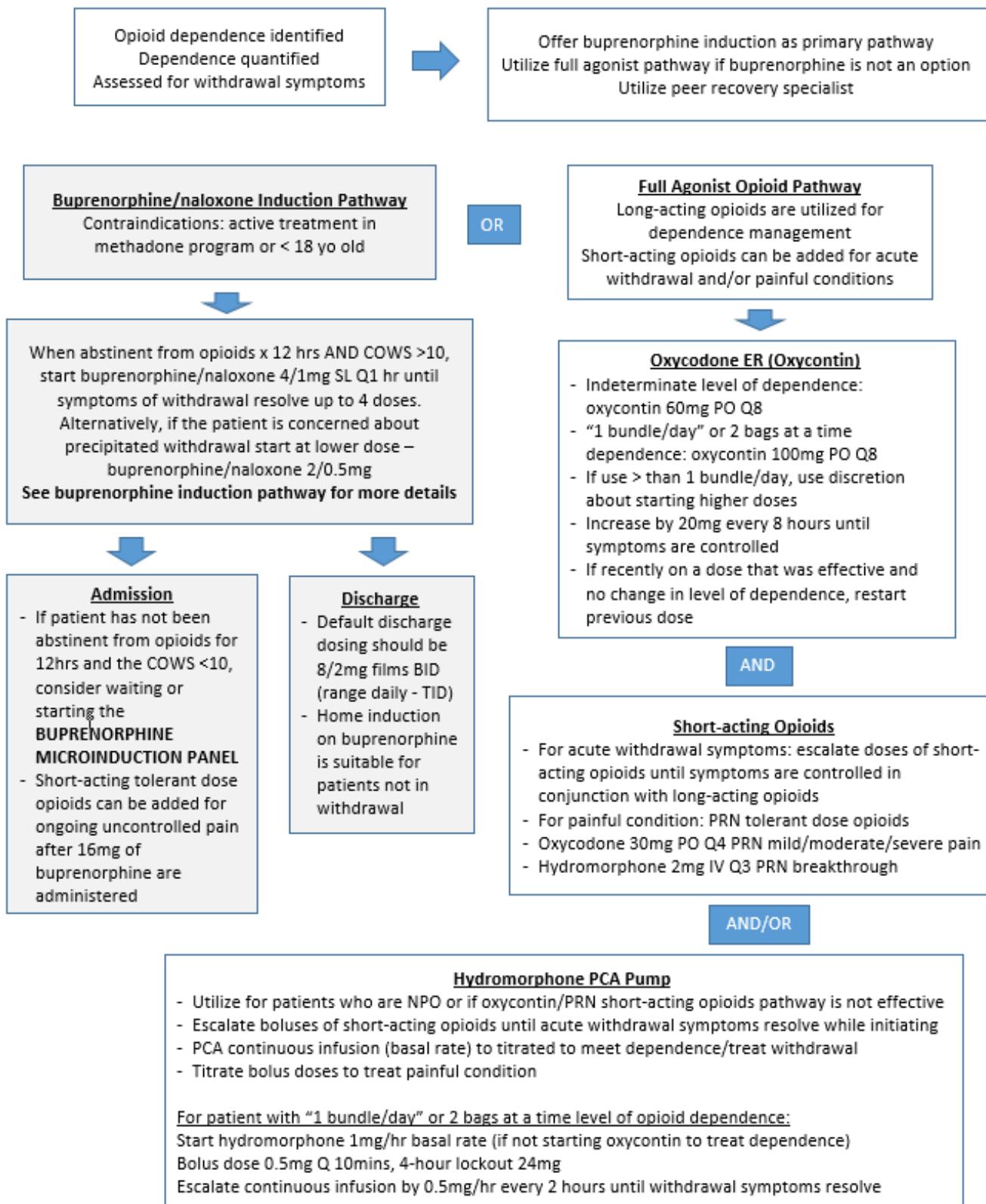
Table 3. Pharmacological Properties of Benzodiazepines Used in Alcohol Withdrawal.²⁴

Drug	Routes of Administration	Onset of Action (minutes)	po Dosing Range	Intermittent IV Dosing Range	t _{1/2} (hours)	Metabolism
Chlordiazepoxide	PO, IV, IM	Oral: 30-120	Initial: 50-100 mg; repeat as necessary, up to 300 mg per 24 hours	N/A	10 ± 3.4	Hepatic (active)
Diazepam	PO, IV, IM, rectal	IV: 2-5	10 mg, 3-4 Times during the first 24 hours; then, 5 mg, 3-4 times daily as needed	5-10 mg Every 10-15 minutes	43 ± 13	Hepatic (active)
Lorazepam	PO, IV, IM	IV: 15-20	2-4 mg Every 1 hour as needed (symptom triggered)	1-4 mg Every 5-15 minutes	14 ± 5	Hepatic (inactive)
Oxazepam	PO	120-180	15-30 mg 3-4 Times/d	N/A	8 ± 2.4	Hepatic (inactive)

Abbreviation: PO, by mouth; IV, intravenous; IM, intramuscularly.

- L. Awissi DK, Lebrun G, Coursin DB, Riker RR, Skrobik Y. Alcohol withdrawal and delirium tremens in the critically ill: a systematic review and commentary. *Intensive Care Med.* 2013; 39(1):16-30. **Shorter intubation times with Dex, no change in LOS, reduction in 12hr and 24hr benzo use**
- M. Rayner SG, Weinert CR, Peng H, Jepsen S, Broccard AF; Study Institution. Dexmedetomidine as adjunct treatment for severe alcohol withdrawal in the ICU. *Ann Intensive Care.* 2012;2(1):12. **Decreased score of alcohol withdrawal, increase in hypotension and bradycardia**

OPIOID USE DISORDER – MEDICATION FOR OPIOID USE DISORDER (MOUD)



Updated March, 2023

OPIOID USE DISORDER – MEDICATION FOR OPIOID USE DISORDER (MOUD) CONT'D

Full Agonist Opioid Pathway Continued...

Methadone

For patients enrolled in a methadone treatment program:

The provider should confirm the dose with the clinic prior to administering in the ED. If the outpatient methadone dose is unable to be verified in a timely manner (e.g. after hours, clinic is closed, holiday) and there is medical need to administer methadone (e.g. opioid withdrawal), the provider can give methadone 30mg as a temporizing dose. If there is reasonable information that confirms the current dose of methadone (e.g. recent admission), it is acceptable to provide the unconfirmed dose for up to 48hrs until the dose is able to be verified.

For patient not enrolled in a methadone treatment program:

The decision to start methadone for admitted patients should be left to the admitting team and/or addiction medicine as starting methadone highly regulated and has implications in dispo planning. For patients with a discharge dispo that request linkage to care to a methadone treatment program, it is reasonable to provide methadone 30mg for acute opioid withdrawal symptoms and document dosing on discharge paper work. Please utilize the peer recovery specialist and/or SW to obtain a next day intake at a local methadone clinic

Adjunctive Medications

Acetaminophen/NSAID

Ondansetron 4mg PO/IV PRN vomiting

Loperamide 2-4mg PO PRN diarrhea

Gabapentin 300mg

Clonidine 0.1mg

Hydroxyzine 25-50mg PO PRN anxiety

Clonazepam 1-2mg PO PRN anxiety

Lorazepam 0.5-2mg IV PRN acute agitation

Local Methadone Clinics:

DBHIDS MAT Provider List: https://dbhids.org/wp-content/uploads/2021/09/How-to-Access-Treatment-and-MAT-List_Summer-2021.pdf

ADDICTION MEDICINE AND HEALTH ADVOCATES (AMHA) 928 MARKET ST, 19107 215-923-4202

THE CONSORTIUM 451 S. UNIVERSITY AVE, 19104 215-596-8000

JEVS HUMAN SERVICES - ACT I 5820 OLD YORK ROAD, 19141 215-276-8400

JEVS HUMAN SERVICES - ACT II 1745 N. 4TH ST, 19122 215-236-0100

JOHN F. KENNEDY BEHAVIORAL HEALTH CENTER (JFK) 907 N. BROAD ST, 19123 215-567-2469

KENSINGTON HOSPITAL 136 DIAMOND ST, 19122 215-426-8100

KIRKBRIDE CENTER 1119 N. 49th, 19139 215-471-2815

NORTH PHILA HEALTH SYSTEM - GOLDMAN CLINIC 801 W. GIRARD AVE, 19122 215-787-2000

NET CENTERS 2205 BRIDGE ST, 19137 215-286-5490

NET CENTERS 7520 STATE ROAD, 19136 215-831-6024

SOAR CORP 9150 MARSHALL ST, SUITE 2, 19114 215-464-4450

THOMAS JEFFERSON UNIVERSITY FAMILY CENTER* 1233 LOCUST ST, SUITE 201, 19107 215-955-8577

Updated March, 2023

OPIOD USE DISORDER – BUPRENORPHINE INDUCTION PATHWAY

Diagnosis of Opioid Use Disorder
Patient interested in starting buprenorphine maintenance

Contraindications: active in a methadone maintenance program or <18 years old
Pregnancy: Preferred medication is buprenorphine monoproduct (Subutex) but buprenorphine/naloxone is not contraindicated. Consult MFM for inductions



When abstinent from opioids x 12 hrs and COWS >10,
Start buprenorphine/naloxone 4/1mg SL Q1 until symptoms of withdrawal resolve up to 4 doses (typically requires 2-3 doses)
If history of precipitated withdrawal, consider using a lower starting dose (2/0.5mg film) and escalating

For patients with an admission dispo:

- Withhold opioids and order buprenorphine/naloxone 4/1mg film SL Q2 PRN withdrawal x 4 doses to start 12hrs after last opioid
or
- Order **BUPRENORPHINE MICROINDUCTION PANEL**

For patients with a discharge dispo:

- Prescribe buprenorphine/naloxone and instruction patient on home induction
- Arrange appointment at TRUST Clinic

At discharge:

- Arrange appointment at TRUST Clinic or other buprenorphine provider
 - Utilize peer recovery specialist when possible (on AMION under TOXICOLOGY)
 - During weekday daytime hours call TUH Scheduling at x7376 to make appointment
 - Provide patients with TRUST Clinic phone number: 215-707-1122
- Prescribe buprenorphine/naloxone (Check PDMP for active prescriptions)
 - ePrescribe 8/2mg film SL BID (range: daily – TID) to bridge to first appointment (or default 10 days if unable to secure appointment)
- Dispense naloxone

For patients with recurrent visits for buprenorphine/naloxone refills:

- Use clinical discretion when prescribing
- Arrange appointment with buprenorphine provider prior to discharge when possible
- Offer dose administration of a buprenorphine/naloxone in the ED

OPIOID USE DISORDER – DISCHARGE RESOURCES

Temple Peer Recovery Specialists

Beckie: 267-951-8626 (Lead CRS)
Lauren: 267-739-8118 (Temple Main ED)
Eric: 215-388-2604 (Temple Episcopal)

TRUST Clinic Follow-Up Information:

Call 215-707-1122 to make an appointment

TRUST Clinic Family & Community Medicine Office:

1316 W Ontario St
Jones Hall, 1st Floor
Philadelphia, PA 19140

TRUST Clinic General Internal Medicine Office:

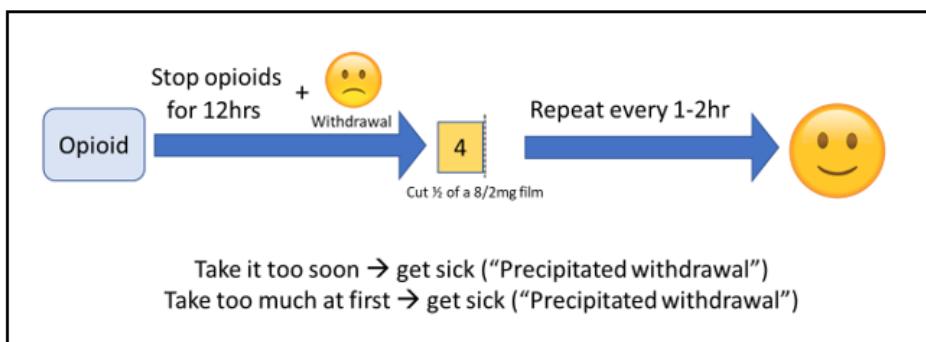
3322 N Broad St
Medical Office Building, 1st Floor
Philadelphia, PA 19140

Begin the Turn (mobile unit)

Tuesdays 9am-12pm: F & Allegheny Streets
Wednesdays & Thursdays 9a-12pm: Ruth & Somerset Streets
Program Coordinator: 267-838-0248

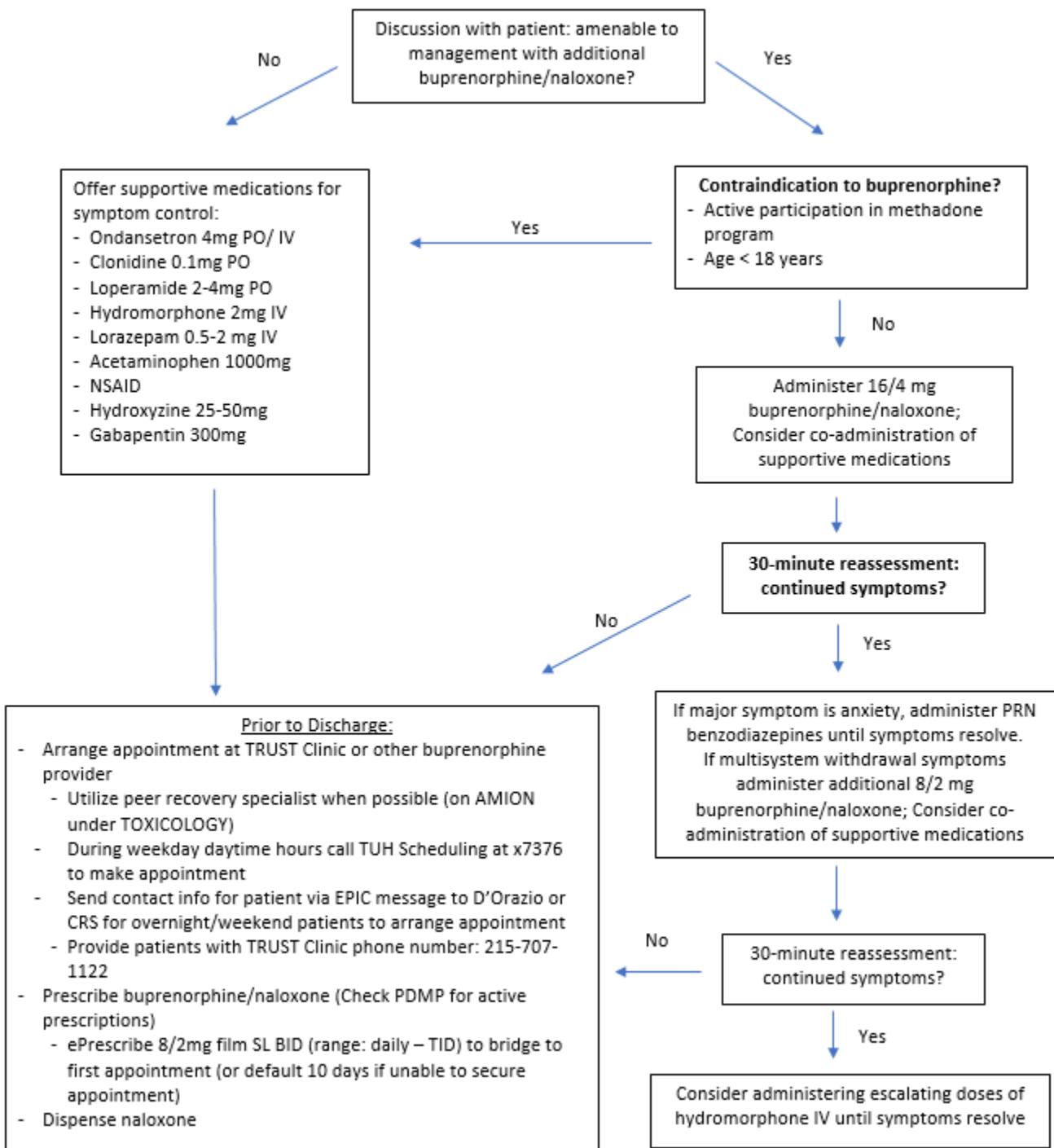
Buprenorphine (Suboxone) home induction:

When abstinent from opioids x 12 hrs and having significant symptoms of withdrawal, start with 4mg of buprenorphine (typically ½ of an 8/2mg film). Repeat every 1-2 hrs until symptoms of withdrawal resolve. If concerned about precipitated withdrawal, start with a lower dose.



Updated March, 2023

OPIOID USE DISORDER – MANAGEMENT OF PRECIPITATED WITHDRAWAL



Updated March, 2023

OPIOID PRESCRIBING GUIDELINE

Temple University Physicians ED Pain Treatment Guidelines

Background: Prescription drug abuse has become an issue of national importance as the number of deaths from prescription opioids now exceeds those caused by heroin and cocaine combined. In order to help stem this epidemic there has been a call for more judicious prescribing on the part of physicians. (1)

Objective: To appropriately relieve pain for patients and attempt to identify those who may be abusing or addicted to opioids and refer them for special assistance.

Guidelines for treating non-cancer pain:

1. Opioid analgesics may be appropriate for acute illness or injury when less addictive therapies such as NSAIDs or acetaminophen are contraindicated or deemed inadequate to reasonably control pain.
 - a. Physicians should prescribe the least addictive medications that are expected to provide appropriate analgesia. When appropriate, the physicians should consider prescribing Schedule III or Schedule IV drugs instead of Schedule II drugs (see table).
 - b. Emergency physicians should not prescribe long acting opioids such as oxycontin, extended release morphine or methadone.
2. Discharge prescriptions are limited to the amount needed until follow up and should not exceed 7 days worth.
3. The patient should not receive opioid prescriptions from multiple doctors. Emergency physicians should not prescribe additional opioids for a condition previously treated in our ED, in another ED or by another physician.
4. Emergency physicians should not replace lost or stolen prescriptions for controlled substances.
5. Emergency physicians should not prescribe opioids to patients who have run out of pain medications. Refills are to be arranged with the primary or specialty prescribing physician.
6. Opioids are discouraged for dental and back pain, whether acute or chronic.
 - a. Non-opioid alternatives such as dental block or NSAIDs may be offered.
7. Opioids should not be used to treat migraines, gastroparesis, or chronic abdominal/pelvic pain.
8. Patients with chronic non-cancer pain should not receive injections of opioid analgesics in the ED.
9. Physicians may consider drug screening as needed to guide treatment decisions.
10. Patients with suspected addictive behavior may be referred to the CRC or other detoxification resources.

Reference:

- (1) Alexander GC, Kruszewski, SP, Webster DW. Rethinking opioid prescribing to protect patient safety and public health. JAMA 2012;308:1865-66.

OPIOID PRESCRIBING GUIDELINE (continued)

Opioids by DEA Drug Schedule

<i>DEA Schedule</i>	<i>Potential for Abuse/Dependence</i>	<i>Drugs</i>
Schedule II	High potential for abuse Severe psychological/physical dependence	Hydromorphone (Dilaudid) Oxycodone (Percocet) Hydrocodone (Vicodin) Fentanyl
Schedule III	Lower potential for abuse than I or II Moderate to low physical dependence High psychological dependence	Tylenol with Codeine (Tylenol #3)
Schedule IV	Lower potential for abuse (relative to III)	Tramadol (Ultram)

ANTIMICROBIAL RECOMMENDATIONS – INPATIENT

TUH-Inc. Empiric Antimicrobial Therapy Recommendations for Common Infections in Hospitalized Adults

These guidelines are consensus recommendations from Infectious Disease and the Antimicrobial Stewardship Subcommittee.

This document is intended as a guideline only & should NOT replace sound clinical judgment.

Pneumonia (PNA)				
Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
Community Acquired Pneumonia (CAP)	<u>Ceftriaxone</u> IV (1st) OR <u>Ampicillin-sulbactam</u> IV (1st) (preferred if aspiration related empyema or lung abscess suspected)	<u>Ceftriaxone</u> IV (1st) ADD <u>Metronidazole</u> IV/PO if: Aspiration related empyema or lung abscess suspected	<u>Levofloxacin</u> IV/PO (1st)	5 days
	PLUS <u>Azithromycin</u> IV/PO <u>Doxycycline</u> IV/PO if contraindication to azithromycin)	PLUS <u>Azithromycin</u> IV/PO <u>Doxycycline</u> IV/PO if contraindication to azithromycin)	ADD <u>Vancomycin</u> IV if: <ul style="list-style-type: none"> • ICU admission • History of MRSA in the last 12months • Suspected lung abscess, empyema, or septic emboli • Influenza diagnosis in the last 14d ADD <u>Aztreonam</u> IV if: <ul style="list-style-type: none"> • ICU admission ADD <u>Metronidazole</u> IV/PO If: Aspiration related empyema or lung abscess suspected	Longer duration may be needed if: <ul style="list-style-type: none"> • Severe CAP • Empyema • Complicated by extra-pulmonary infection Discontinue azithromycin at 5 days regardless of the total antibiotic duration (Due to prolonged half-life, it will stay in the system beyond 5 days).
CAP w/ risk factors for Pseudomonas or other multidrug resistant organisms	<u>Cefepime</u> IV (1st) OR <u>Piperacillin-tazobactam</u> IV (1st) (Preferred in aspiration related empyema or lung abscess suspected)	<u>Cefepime</u> IV (1st)	<u>Levofloxacin</u> IV/PO (1st)	7 days
Hospital acquired pneumonia (HAP)	PLUS <u>Azithromycin</u> IV/PO <u>Doxycycline</u> IV/PO if contraindication to azithromycin)	ADD <u>Metronidazole</u> IV/PO if: Aspiration related empyema or lung abscess suspected	<u>Aztreonam</u> IV (1st)	
Ventilator associated pneumonia (VAP)	Risk factors to consider: <ul style="list-style-type: none"> • Bronchiectasis • Structural lung disease with chronic steroid use • IV antibiotic use within last 90 days • Mechanical ventilation/Tracheostomy • Immunocompromised ADD <u>vancomycin</u> IV if:	PLUS <u>Azithromycin</u> IV/PO <u>Doxycycline</u> IV/PO if contraindication to azithromycin)	<u>Levofloxacin</u> IV/PO (1st)	
	<ul style="list-style-type: none"> • HAP/VAP • ICU admission • History of MRSA in the last 12months • Suspected lung abscess, empyema, or septic emboli • Influenza diagnosis in the last 14d Consider Tobramycin IV** if:	ADD <u>vancomycin</u> IV if:	<u>Aztreonam</u> IV (1st)	
	<ul style="list-style-type: none"> • Septic shock **5mg/kg (IBW) x 1 dose, or 2mg/kg (IBW) if HD or CrCl <20	<ul style="list-style-type: none"> • HAP/VAP • ICU admission • History of MRSA in the last 12months • Suspected lung abscess, empyema, or septic emboli • Influenza diagnosis in the last 14d Consider Tobramycin IV** if:	<u>Metronidazole</u> IV/PO If:	
		<ul style="list-style-type: none"> • Septic shock Consider Tobramycin IV** if:	<ul style="list-style-type: none"> • Aspiration related empyema or lung abscess suspected Consider Tobramycin IV** if:	
			<ul style="list-style-type: none"> • Septic shock 	

*Discuss empiric regimen with ID if patient has a history of organisms that are resistant to the recommended empiric regimen (e.g. Carbapenem resistant Enterobacteriaceae or Pseudomonas that is only sensitive to aminoglycosides).

ANTIMICROBIAL RECOMMENDATIONS – INPATIENT (continued)

Urinary Tract Infections (UTI)

Pyuria on urinalysis (UA) alone is not an indication for antibiotic therapy. Always assess for symptoms (urinary symptoms, fever, hemodynamic instability) unless pregnant, planned urologic procedure, recent kidney transplant, neutropenia.

Obtain UA with reflex to urine culture (Ucx) prior to antibiotic initiation whenever possible.

(1st) Indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures.

Review patient's microbiology history within the last 12 months*	<u>NO Penicillin (PCN) ALLERGY</u>	<u>Mild to moderate PCN allergy</u> <u>Rash, itching</u> <u>Unknown reaction (>10yrs)</u> <u>Intolerance</u>	<u>Severe PCN Allergy</u> <u>Anaphylaxis in the last 10yrs</u> <u>Stevens-Johnson syndrome (SJS)/DRESS</u>	<u>Expected Duration</u> Consider ID consult if no clinical improvement past the expected duration
Cystitis Urinary symptoms only!! (no fever or other systemic signs/symptoms suggestive of upper tract infection) NOTE: Cefazolin MIC ≤16 is considered susceptible to cefazolin and can also be used as a surrogate to predict results for the oral agents such as cefpodoxime and cephalexin, when used for therapy of cystitis due to <i>E. coli</i> , <i>K. pneumoniae</i> , and <i>P. mirabilis</i> .	<u>Nitrofurantoin</u> PO OR <u>Fosfomycin</u> PO OR <u>Trimethoprim/sulfamethoxazole</u> PO (TMP/SMX) If the above preferred regimen is contraindicated: <u>Cephalexin</u> PO OR <u>Cefpodoxime</u> PO OR <u>Cefazolin</u> IV	<u>Nitrofurantoin</u> PO OR <u>Fosfomycin</u> PO OR <u>Trimethoprim/sulfamethoxazole</u> PO (TMP/SMX) If the above preferred regimen is contraindicated: <u>Cefpodoxime</u> PO OR <u>Cefazolin</u> IV	<u>Nitrofurantoin</u> PO OR <u>Fosfomycin</u> PO OR <u>TMP/SMX</u> PO OR If unable to take po: <u>Ciprofloxacin</u> IV OR Discuss with ID if alternative regimen needed.	1-5 days Nitrofurantoin: 5 days TMP/SMX: 3 days Fosfomycin: 1 day Cefazolin: 3-5 days Cephalexin/Cefpodoxime: 5-7 days In patients with functional or structural GU abnormalities, duration of therapy for UTI is not well established. Duration will vary based on the clinical response and successful modification of the predisposing factor. In most cases, 7 days of therapy is sufficient.
Catheter-associated UTI (Foley, nephrostomy, supra-pubic catheter, stent etc.) Patient is stable with no evidence of upper tract disease Remove or replace catheter prior to UA/Ucx collection & initiation of antibiotic therapy whenever feasible	Observation off antibiotic and await culture results. OR <u>Fosfomycin</u> PO OR <u>Ceftriaxone</u> IV Consider <u>ertapenem</u> IV If: <ul style="list-style-type: none">History of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. or other cephalosporin resistant gram-negative organism in the last 12 months	Observation off antibiotic and await culture results. OR <u>Fosfomycin</u> PO OR <u>Ceftriaxone</u> IV Consider <u>ertapenem</u> IV If: <ul style="list-style-type: none">History of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. or other cephalosporin resistant gram-negative organism in the last 12 months	Observation off antibiotic and await culture results. OR <u>Fosfomycin</u> PO OR Ciprofloxacin <u>IV/PO</u>	7-14 days
Catheter-associated UTI (Foley, nephrostomy, supra-pubic catheter, stent etc.) Patient with sepsis and/or with evidence of upper tract disease: Remove or replace catheter prior to UA/Ucx collection & initiation of antibiotic therapy whenever feasible	<u>Piperacillin-tazobactam</u> IV OR <u>Cefepime</u> IV Consider <u>meropenem</u> IV if: <ul style="list-style-type: none">History of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. or other cephalosporin resistant gram-negative organism in the last 12 monthsSeptic shock	<u>Cefepime</u> IV Consider <u>meropenem</u> IV if: <ul style="list-style-type: none">History of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. or other cephalosporin resistant gram-negative organism in the last 12 monthsSeptic shock	<u>Aztreonam</u> IV PLUS <u>Vancomycin</u> IV If history of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. in the last 12 months or septic shock: <ul style="list-style-type: none">History of severe IgE mediated PCN reactions: Benefit of using carbapenem should be weighed in this setting.History of non-IgE mediated PCN reactions (SJS/DRESS): discuss with ID	

ANTIMICROBIAL RECOMMENDATIONS – INPATIENT (continued)

Febrile UTI, Pyelonephritis <u>Community-acquired</u>	<u>Ceftriaxone</u> IV Consider <u>ertapenem</u> IV If: <ul style="list-style-type: none"> • History of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock 	<u>Ceftriaxone</u> IV Consider <u>ertapenem</u> IV If: <ul style="list-style-type: none"> • History of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock 	<u>Aztreonam</u> IV PLUS <u>Vancomycin</u> IV If history of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. in the last 12 months or septic shock: <ul style="list-style-type: none"> • History of severe IgE mediated PCN reactions: Benefit of using carbapenem should be weighed in this setting. • History of non-IgE mediated PCN reactions (SJS/DRESS): discuss with ID 	7-14 days
Febrile UTI, Pyelonephritis <u>Hospital-acquired (>48 hrs after admission)</u>	<u>Piperacillin-tazobactam</u> IV OR <u>Cefepime</u> IV Consider <u>meropenem</u> IV if: <ul style="list-style-type: none"> • History of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock 	<u>Cefepime</u> IV Consider <u>meropenem</u> IV if: <ul style="list-style-type: none"> • History of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock 		

Intra-abdominal Infection				
(1 st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures				
Review patient's microbiology history within the last 12 months*	<u>NO Penicillin (PCN) ALLERGY</u>	<u>Mild to moderate PCN allergy</u> Rash, itching Unknown reaction (>10yrs) Intolerance	<u>Severe PCN Allergy</u> Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	<u>Expected Duration</u> Consider ID consult if no clinical improvement past the expected duration
Community Acquired	<u>Ceftriaxone</u> IV (1 st) PLUS <u>Metronidazole</u> IV/PO OR <u>Piperacillin-tazobactam</u> IV	<u>Ceftriaxone</u> IV (1 st) PLUS <u>Metronidazole</u> IV/PO	<u>Aztreonam</u> IV (1 st) PLUS <u>Metronidazole</u> IV/PO PLUS <u>Vancomycin</u> IV	
Healthcare associated: <ul style="list-style-type: none"> • Recent IV antibiotics • Intra-abdominal surgery in the last year 	<u>Piperacillin-tazobactam</u> IV (1 st) OR <u>Cefepime</u> IV (1 st) PLUS <u>Metronidazole</u> IV/PO Consider <u>meropenem</u> IV if: <ul style="list-style-type: none"> • History of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock ADD <u>Vancomycin</u> IV if: <ul style="list-style-type: none"> • Severe sepsis or Septic shock AND • History of enterococcus*** ***Replace vanco with <u>daptomycin</u> IV if history of VRE in past 12 months	<u>Cefepime</u> IV (1 st) PLUS <u>Metronidazole</u> IV/PO Consider <u>meropenem</u> IV if: <ul style="list-style-type: none"> • History of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. or other cephalosporin resistant gram-negative organism in the last 12 months • Septic shock ADD <u>Vancomycin</u> IV if: <ul style="list-style-type: none"> • Severe sepsis or Septic shock AND • History of enterococcus*** ***Replace vanco with <u>daptomycin</u> IV if history of VRE in past 12 months	<u>Levofloxacin</u> IV/PO (1 st) OR <u>Aztreonam</u> IV (1 st) – preferred if critically ill PLUS <u>Metronidazole</u> IV/PO ADD <u>Vancomycin</u> IV if: <ul style="list-style-type: none"> • Aztreonam is selected OR • Severe sepsis or Septic shock AND • History of enterococcus*** ***Replace vanco with <u>daptomycin</u> IV if history of VRE in past 12 months If history of <u>ESBL E. coli</u> or <u>Klebsiella</u> spp. in the last 12 months or septic shock: <ul style="list-style-type: none"> • History of severe IgE mediated PCN reactions: Benefit of using carbapenem should be weighed. • History of non-IgE mediated PCN reactions (SJS/DRESS): discuss with ID 	4 days after source control ID consult recommended in patients who are hemodynamically unstable or have difficult to achieve source control

ANTIMICROBIAL RECOMMENDATIONS – INPATIENT (continued)

Skin and Soft Tissue Infection (SSTI)				
Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
Non-purulent (non-severe) cellulitis Patients without systemic signs/symptoms of infection	<u>Cephalexin</u> PO OR <u>Clindamycin</u> IV/PO OR <u>Cefazolin</u> IV	Clindamycin <u>IV/PO</u> OR <u>Cefazolin</u> IV	<u>Vancomycin</u> IV OR Clindamycin <u>IV/PO</u>	5-7 days
Purulent (non-severe) cellulitis Patients without systemic signs/symptoms of infection	<u>TMP/SMX</u> PO OR <u>Doxycycline</u> IV/PO OR <u>Vancomycin</u> IV	<u>TMP/SMX</u> PO OR <u>Doxycycline</u> IV/PO OR <u>Vancomycin</u> IV	<u>TMP/SMX</u> PO OR <u>Doxycycline</u> IV/PO OR <u>Vancomycin</u> IV	5-7 days If I&D of abscess is performed, count 5-7d from source control
Severe sepsis patient with SSTI	<u>Ceftriaxone</u> IV (1st) PLUS <u>Vancomycin</u> IV Consider <u>Cefepime</u> IV if: • immunocompromised host <u>For vancomycin allergy:</u> <u>Linezolid</u> IV/PO OR <u>Daptomycin</u> IV	<u>Ceftriaxone</u> IV (1st) PLUS <u>Vancomycin</u> IV Consider <u>Cefepime</u> IV if: • immunocompromised host <u>For vancomycin allergy:</u> <u>Linezolid</u> IV/PO OR <u>Daptomycin</u> IV	<u>Vancomycin</u> IV (1st) PLUS <u>Aztreonam</u> IV <u>For vancomycin allergy:</u> <u>Linezolid</u> IV/PO OR <u>Daptomycin</u> IV	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.
Necrotizing SSTI (NSTI) Highly recommend ID consult for severe NSTI	<u>Piperacillin-tazobactam</u> IV (1st) PLUS <u>Clindamycin</u> IV/PO PLUS <u>Vancomycin</u> IV	<u>Cefepime</u> IV (1st) PLUS <u>Metronidazole</u> IV/PO_PLUS <u>Linezolid</u> IV/PO OR <u>Cefepime</u> IV (1st) PLUS <u>Metronidazole</u> IV/PO_PLUS <u>Vancomycin</u> IV PLUS <u>Clindamycin</u> IV/PO	<u>Aztreonam</u> IV (1st) PLUS <u>Linezolid</u> IV/PO PLUS <u>Metronidazole</u> IV/PO If patient in septic shock or with hx of SJS/DRESS: <u>Vancomycin</u> IV (1st) AND CONSULT INFECTIOUS DISEASES for guidance on gram negative coverage	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.
Diabetic Wound Patients with diabetes who have cellulitis but NO open wound should be managed as outlined above for Skin/Soft Tissue Infection Patients with NO systemic signs/symptoms of infection & pending biopsy, consider monitor off antibiotic until biopsy.	<u>Ceftriaxone</u> IV (1st) PLUS <u>Vancomycin</u> IV If ≥2 SIRS+: <u>Piperacillin-tazobactam</u> IV (1st) PLUS <u>Vancomycin</u> IV	<u>Ceftriaxone</u> IV (1st) PLUS <u>Vancomycin</u> IV If ≥2 SIRS+: <u>Cefepime</u> IV (1st) PLUS <u>Vancomycin</u> IV PLUS <u>Metronidazole</u> IV/PO	<u>Vancomycin</u> IV (1st) PLUS <u>Aztreonam</u> IV PLUS <u>Metronidazole</u> IV/PO If patient in septic shock or with hx of SJS/DRESS: <u>Vancomycin</u> IV (1st) AND CONSULT INFECTIOUS DISEASES for guidance on gram negative coverage	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.

*Discuss empiric regimen with ID if patient has a history of organisms that are resistant to the recommended empiric regimen (e.g. Carbapenem resistant Enterobacteriaceae or Pseudomonas that is only sensitive to aminoglycosides).

ANTIMICROBIAL RECOMMENDATIONS – INPATIENT (continued)

Septic arthritis Collection of synovial fluid gram stain and cultures should occur prior to the administration of antibiotics. Therapy should be tailored based on gram stain, culture, and sensitivities. (1 st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures				
Review patient's microbiology history within the last 12 months*	<u>NO Penicillin (PCN) ALLERGY</u>	<u>Mild to moderate PCN allergy</u> Rash, itching Unknown reaction (>10yrs) Intolerance	<u>Severe PCN Allergy</u> Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	<u>Expected Duration</u> Consider ID consult if no clinical improvement past the expected duration
Atraumatic bacterial arthritis See below if persons who injects drugs (PWID), severe sepsis or septic shock	<u>Vancomycin</u> IV (1 st) <u>For vancomycin allergy:</u> <u>Linezolid</u> IV/PO OR <u>Daptomycin</u> IV	<u>Vancomycin</u> IV (1 st) <u>For vancomycin allergy:</u> <u>Linezolid</u> IV/PO OR <u>Daptomycin</u> IV	<u>Vancomycin</u> IV (1 st) <u>For vancomycin allergy:</u> <u>Linezolid</u> IV/PO OR <u>Daptomycin</u> IV	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.
Traumatic bacterial arthritis PWID Severe sepsis or septic shock	<u>Ceftriaxone</u> IV (1 st) PLUS <u>Vancomycin</u> IV	<u>Ceftriaxone</u> IV (1 st) PLUS <u>Vancomycin</u> IV	<u>Aztreonam</u> IV (1 st) PLUS <u>Vancomycin</u> IV	
Immunocompromised patients Prosthetic joint infection	<u>Cefepime</u> IV (1 st) PLUS <u>Vancomycin</u> IV	<u>Cefepime</u> IV (1 st) PLUS <u>Vancomycin</u> IV	<u>Aztreonam</u> IV (1 st) PLUS <u>Vancomycin</u> IV	

Meningitis Strongly encourage urgent lumbar puncture (LP), however antibiotics should NOT be withheld (1 st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures				
Review patient's microbiology history within the last 12 months*	<u>NO Penicillin (PCN) ALLERGY</u>	<u>Mild to moderate PCN allergy</u> Rash, itching Unknown reaction (>10yrs) Intolerance	<u>Severe PCN Allergy</u> Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	<u>Expected Duration</u> Consider ID consult if no clinical improvement past the expected duration
Community acquired Consider adding dexamethasone 0.15mg/kg IV with the first dose administered 10-20 minutes before, or at least concomitant with, the first dose of antimicrobial therapy in adults with suspected or proven pneumococcal meningitis <u>ID consult highly recommended for the management of meningitis</u>	<u>Ceftriaxone</u> IV (1 st) PLUS <u>Vancomycin</u> IV ADD <u>ampicillin</u> IV for listeria if <ul style="list-style-type: none">If >50 years oldHistory of transplant, HIV and other immunocompromised patient <u>For vancomycin allergy:</u> Initiate ceftriaxone as above AND <u>CONSULT INFECTIOUS DISEASES</u> Consider <u>acyclovir</u> IV based on clinical presentation and CSF results.	<u>Ceftriaxone</u> IV (1 st) PLUS <u>Vancomycin</u> IV ADD <u>TMP/SMX</u> IV for listeria if <ul style="list-style-type: none">If >50 years oldHistory of transplant, HIV and other immunocompromised patient <u>If listeria coverage needed, and TMP/SMX contraindicated:</u> <u>Meropenem</u> IV PLUS <u>Vancomycin</u> <u>For vancomycin allergy:</u> Initiate ceftriaxone as above AND <u>CONSULT INFECTIOUS DISEASES</u> Consider <u>acyclovir</u> IV based on clinical presentation and CSF results.	Patients without hx of SJS/DRESS: <u>Meropenem</u> IV (1 st) PLUS <u>Vancomycin</u> IV <u>AND CONSULT INFECTIOUS DISEASES</u> Patients with hx of SJS/DRESS: <u>Vancomycin</u> IV (1 st) PLUS <u>Ciprofloxacin</u> IV ADD <u>TMP/SMX</u> IV for listeria if <ul style="list-style-type: none">If >50 years oldHistory of transplant, HIV and other immunocompromised patientCiprofloxacin is used <u>AND CONSULT INFECTIOUS DISEASES</u> <u>For vancomycin allergy:</u> Initiate meropenem or ciprofloxacin as above AND <u>CONSULT INFECTIOUS DISEASES</u> Consider <u>acyclovir</u> IV based on clinical presentation and CSF results.	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.
Healthcare associated/Ventriculitis	<u>Cefepime</u> IV (1 st) PLUS <u>Vancomycin</u> IV <u>For vancomycin allergy:</u> Initiate cefepime as above AND <u>CONSULT INFECTIOUS DISEASES</u>	<u>Cefepime</u> IV (1 st) PLUS <u>Vancomycin</u> IV <u>For vancomycin allergy:</u> Initiate cefepime as above AND <u>CONSULT INFECTIOUS DISEASES</u>	<u>Aztreonam</u> IV (1 st) PLUS <u>Vancomycin</u> IV <u>AND CONSULT INFECTIOUS DISEASES</u> <u>For vancomycin allergy:</u> Initiate aztreonam as above AND <u>CONSULT INFECTIOUS DISEASES</u>	

ANTIMICROBIAL RECOMMENDATIONS – INPATIENT (continued)

Neutropenic fever				
(1 st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures				
Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
Absolute Neutrophil Count (ANC) of less than 500, or an expectation that the ANC will drop below 500 within 48 hours	<u>Cefepime</u> IV (1 st) Consider <u>Vancomycin</u> IV if: <ul style="list-style-type: none"> Suspicion of PNA, SSTI, line infection Hemodynamic instability History of MRSA infection Consider Tobramycin IV if: <ul style="list-style-type: none"> Septic shock 5mg/kg (IBW) x 1 dose, or 2mg/kg (IBW) if HD or CrCl <20 Consider: <u>metronidazole</u> IV/PO if perirectal pain/evidence of infection	<u>Cefepime</u> IV (1 st) Consider <u>Vancomycin</u> IV if: <ul style="list-style-type: none"> Suspicion of PNA, SSTI, line infection Hemodynamic instability History of MRSA infection Consider Tobramycin IV if: <ul style="list-style-type: none"> Septic shock 5mg/kg (IBW) x 1 dose, or 2mg/kg (IBW) if HD or CrCl <20 Consider: <u>metronidazole</u> IV/PO if perirectal pain/evidence of infection	<u>Aztreonam</u> IV (1 st) PLUS <u>Vancomycin</u> IV Consider Tobramycin IV if: <ul style="list-style-type: none"> Septic shock 5mg/kg (IBW) x 1 dose, or 2mg/kg (IBW) if HD or CrCl <20 Consider: <u>metronidazole</u> IV/PO if perirectal pain/evidence of infection If history of ESBL <i>E. coli</i> or <i>Klebsiella</i> spp. in the last 12 months or septic shock: <ul style="list-style-type: none"> History of severe IgE mediated PCN reactions: Benefit of using carbapenem should be weighed in this setting. History of non-IgE mediated PCN reactions (SJS/DRESS): discuss with ID 	Duration depends on the infectious source and ANC recovery. Please consult infectious diseases if assistance needed.

Central Line Infection				
Consider removal of lines whenever feasible				
(1 st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures				
Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
PICC lines, Ports, HD catheters Keep in mind other sources of infection and review those guidelines in order to provide the best empirical therapy	<u>Cefepime</u> IV (1 st) OR <u>Piperacillin-tazobactam</u> IV (1 st) PLUS <u>Vancomycin</u> IV Consider <u>Micafungin</u> IV if the patient receives TPN via central line for >7days.	<u>Cefepime</u> IV (1 st) PLUS <u>Vancomycin</u> IV Consider <u>Micafungin</u> IV if the patient receives TPN via central line for >7days.	<u>Aztreonam</u> IV (1 st) PLUS <u>Vancomycin</u> IV Consider <u>Micafungin</u> IV if the patient receives TPN via central line for >7days.	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.

Unknown Source of Infection				
(1 st) indicates the medication that should be given first by nursing staff to be compliant with sepsis core measures				
Review patient's microbiology history within the last 12 months*	NO Penicillin (PCN) ALLERGY	Mild to moderate PCN allergy Rash, itching Unknown reaction (>10yrs) Intolerance	Severe PCN Allergy Anaphylaxis in the last 10yrs Stevens-Johnson syndrome (SJS)/DRESS	Expected Duration Consider ID consult if no clinical improvement past the expected duration
Unknown source	<u>Cefepime</u> IV (1 st) PLUS <u>Metronidazole</u> IV/PO OR <u>Piperacillin-tazobactam</u> IV (1 st) PLUS <u>Vancomycin</u> IV Consider Tobramycin IV** if: <ul style="list-style-type: none"> Septic shock **5mg/kg (IBW) x 1 dose, or 2mg/kg (IBW) if HD or CrCl <20	<u>Cefepime</u> IV (1 st) PLUS <u>Metronidazole</u> IV/PO PLUS <u>Vancomycin</u> IV Consider Tobramycin IV** if: <ul style="list-style-type: none"> Septic shock 	<u>Aztreonam</u> IV (1 st) PLUS <u>Vancomycin</u> IV PLUS <u>Metronidazole</u> IV/PO Consider Tobramycin IV** if: <ul style="list-style-type: none"> Septic shock 	Duration depends on the causative pathogen and clinical scenario. Please consult infectious diseases if assistance needed.

ANTIMICROBIAL RECOMMENDATIONS – INPATIENT (continued)

Vancomycin loading Dose (The first dose, to achieve rapid attainment of therapeutic levels)

- In seriously ill patients and chronic hemodialysis patients, give a loading dose of 25mg/kg (Max 2gm using ACTUAL body weight) (Table.1).

Table.1 Suggested loading dose based on weight

Weight	Loading Dose	Infusion Time
25-35 kg	750 mg	60 minutes
36-45 kg	1000 mg	60 minutes
46-55 kg	1250 mg	90 minutes
56-65 kg	1500 mg	90 minutes
66-75 kg	1750 mg	120 minutes
>75 kg	2000mg	120 minutes

Appendix A: Antibiotics and Sepsis Compliance

Adequate monotherapy: should be administered FIRST

- Ampicillin/sulbactam
- Cefepime
- Cefotaxime
- Ceftaroline
- Ceftazidime
- Ceftazidime/avibactam
- Ceftriaxone
- Ertapenem
- Imipenem/Cilastatin
- Levofloxacin
- Meropenem
- Moxifloxacin
- Piperacillin/tazobactam
- Ticarcillin/clavulanate

Medications not compliant with monotherapy:

Appropriate gram positive coverage must also be given if the following antibiotics are ordered**:

- Aztreonam
- Ciprofloxacin
- Gentamicin
- Tobramycin

Appropriate gram negative coverage must be given with:

- Daptomycin
- Linezolid
- Vancomycin

**the addition of metronidazole to gram negative coverage does not meet sepsis core measures. (must include gram positive coverage)

ANTIMICROBIAL RECOMMENDATIONS - OUTPATIENT

Skin and Soft Tissue Infections (SSTIs)					
	Drug	Dose	Duration	Comments	
SSTI – Purulent (Moderate)					
	Doxycycline [¥] (\$\$) <u>OR</u>	100 mg PO BID	5-7 days	- Mild: I&D only	
	TMP/SMX ⁺ (\$)	1-2 DS tabs PO BID	5-7 days		
SSTI - Nonpurulent (Mild)					
1 st Line	Penicillin VK (\$) <u>OR</u>	250-500 mg PO Q6H	5 days	- Clindamycin susceptibility <70% per antibiogram - Consider addition of agents with activity against MRSA for patients with penetrating trauma (especially IVDU), or concurrent MRSA infection elsewhere	
	Cephalexin ⁺ (\$\$)	500 mg PO Q6H	5 days		
Alternative	Clindamycin (\$\$)	300-450 mg PO Q6H	5 days		
Diabetic Foot (Mild)					
MSSA	Amoxicillin/clavulanate ⁺ (\$\$) <u>OR</u>	875/125 mg PO BID	7-14 days	- SMX/TMP does not have good coverage of strep organisms - Duration may extend to 4 weeks if slow resolution	
	Cephalexin ⁺ (\$)	500 mg PO Q6H	7-14 days		
MRSA	Doxycycline (\$\$) <u>OR</u>	100 mg PO BID	7-14 days		
	SMX/TMP ⁺ (\$)	1 DS tab PO BID	7-14 days		
Human or Animal Bite					
1 st Line	Amoxicillin/clavulanate ⁺ (\$\$)	875/125mg PO BID	3-5 days	- Prophylaxis therapy for 3-5 days in the following: (a) immunocompromised, (b) asplenic, (c) edema of the affected area, (d) moderate to severe injuries, especially to hand or face, (e) injuries that may have penetrated the periosteum or joint capsule	
Alternatives	ONE of the following:				
	Ciprofloxacin ⁺ (\$)	500 mg PO BID	3-5 days		
	Doxycycline [¥] (\$)	100 mg PO BID	3-5 days		
	TMP/SMX ⁺ (\$)	1-2 DS tabs PO BID	3-5 days		
	PLUS ONE of the following:				
	Clindamycin (\$\$)	300 mg PO TID	3-5 days		
	Metronidazole (\$)	250-500 mg PO TID	3-5 days		
Herpes Zoster: Shingles					
	Acyclovir ⁺ (\$\$) <u>OR</u>	800 mg PO 5x/day	7-10 days		
	Valacyclovir ⁺ (\$\$\$)	1000 mg PO TID	7-10 days		

⁺ Renal dose adjustments required

[¥] Doxycycline Monohydrate is better tolerated and cheaper of the 2 salts for the most common insurers

\$ Relative cost to alternatives. Reference GoodRx or Lexicomp for cost estimates as these can change

ANTIMICROBIAL RECOMMENDATIONS – OUTPATIENT (continued)

Ears/Nose/Throat Infections

	Drug	Dose	Duration	Comments
Group A Streptococcal Pharyngitis				
1 st Line	Penicillin VK (\$) OR	500 mg PO BID	10 days	
	Amoxicillin ⁺ (\$)	1000 mg PO daily or 500mg PO BID	10 days	
Alternatives	Cephalexin ⁺ (\$\$) OR	500 mg PO BID	10 days	
	Azithromycin (\$\$)	500 mg PO daily	3 days	
		500 mg PO x 1, 250 mg PO daily days 2-5	5 days	
Community Acquired Pneumonia (CAP) without MRSA or Pseudomonas risk factors				
1 st Line	Amoxicillin ⁺ (\$) OR	1000 mg PO TID	5 days	<ul style="list-style-type: none"> - Amoxicillin preferred over macrolides due to local resistance
	Doxycycline [¥] (\$\$)	100 mg PO BID	5 days	
Alternative	Azithromycin (\$\$)	500 mg PO x 1, 250 mg PO daily days 2-5	5 days	<ul style="list-style-type: none"> - Risk factors for MRSA or Pseudomonas: recent hospitalization and IV abx in the last 90 days
CAP + presence of significant comorbidities				
	ONE of the following:			<ul style="list-style-type: none"> - Comorbidities: chronic heart, lung, liver or renal disease, diabetes mellitus, alcoholism, malignancies, asplenia - Cefuroxime is non-formulary at TUH
	Amoxicillin/clavulanate ⁺ (\$)	875/125 mg PO BID	5 days	
	Cefuroxime ⁺ (\$\$)	500 mg PO BID	5 days	
	Cefpodoxime ⁺ (\$\$)	200 mg PO BID	5 days	
	PLUS ONE of the following:			
	Doxycycline [¥] (\$\$)	100 mg PO BID	5 days	
	Azithromycin (\$\$)	500 mg PO x 1, 250 mg PO daily days 2-5	5 days	
	Alternative regimen:			
	Levofloxacin ^{+\$\$\$}	750 mg PO daily	5 days	
Otitis Media				
1 st Line	Amoxicillin ⁺ (\$)	80-90 mg/kg/day divided in 2 doses (max 875 mg BID)	5-7 days	<ul style="list-style-type: none"> - Patients that have received antibiotics within the past 30 days or have concurrent conjunctivitis should be started on beta-lactamase combination or cephalosporin
	Amoxicillin/clavulanate ^{+\$\$}	90 mg/kg/day divided in 2 doses (max 875/125 mg BID)	5-7 days	
Alternatives	Cefuroxime ^{+\$\$\$}	30 mg/kg/day divided in 2 dose (max 500 mg BID)	5-7 days	

⁺ Renal dose adjustments required

[¥] Doxycycline Monohydrate is better tolerated and cheaper of the 2 salts for the most common insurers

\$ Relative cost to alternatives. Reference GoodRx or Lexicomp for cost estimates as these can change

ANTIMICROBIAL RECOMMENDATIONS – OUTPATIENT (continued)

Urinary Tract Infections				
	Drug	Dose	Duration	Comments
Uncomplicated Cystitis				
Order of Preference	Nitrofurantoin** (\$\$)	100 mg PO BID	5 days	<ul style="list-style-type: none"> - Agents listed in preference by susceptibilities to E coli in per TUH antibiogram - Nitrofurantoin contraindicated in CrCl < 60 mL/min (elderly; < 30 mL/min per Beer's Criteria)
	Amoxicillin/clavulanate+(\$\$)	500/125 mg PO BID	5-7 days	
	Cephalexin+ (\$)	500 mg PO BID	5-7 days	
	Ciprofloxacin+ (\$)	250 mg PO BID	3 days	
	TMP/SMX+ (\$)	1 DS tab PO BID	3 days	
Complicated Cystitis/Uncomplicated Pyelonephritis				
1 st Line	Ciprofloxacin+ (\$) <u>OR</u>	500 mg PO BID	5 days	<ul style="list-style-type: none"> - Can give one-time dose of Ceftriaxone 1 g while in ED in addition to these regimens - If an indwelling catheter has been in place for > 2 weeks at the onset of UTI, the catheter should be replaced & obtain urine cx from new catheter
	Levofloxacin+ (\$\$) <u>OR</u>	750 mg PO daily	5 days	
	Cephalexin+ (\$\$) <u>OR</u>	500 mg PO QID	7-10 days	
	Cefdinir+ (\$\$)	300mg PO BID	7-10 days	
Alt.	Amoxicillin/clavulanate+ (\$\$)	875/125 mg PO BID	10 days	
	TMP/SMX+(\$)	1 DS tab PO BID	7-10 days	
Pregnancy: UTI or asymptomatic bacteruria				
	Nitrofurantoin (\$\$) <u>OR</u>	100 mg PO BID	5 days	<ul style="list-style-type: none"> - Nitrofurantoin contraindicated if CrCl < 60 mL/min - Obtain urine culture if >10 WBCs and/or bacteria noted on UA
	Cephalexin+ (\$) <u>OR</u>	500 mg PO BID	7 days	
	Amoxicillin+ (\$) <u>OR</u>	500 mg PO TID	7 days	
	Amoxicillin/clavulanate+ (\$\$)	500/125 mg PO BID	7 days	
Acute Prostatitis: High risk of STD				
	Ceftriaxone <u>PLUS</u>	250 mg IM once	One dose	
	Doxycycline ^Y (\$\$)	100 mg PO BID	10 days	
Acute Prostatitis: Low risk of STD				
	Ciprofloxacin+ (\$) <u>OR</u>	500-750 mg PO daily	10-14 days	
	Levofloxacin+(\$\$) <u>OR</u>	500-750 mg PO daily	10-14 days	
	TMP/SMX+ (\$)	1 DS tab PO BID	10-14 days	
Chronic Prostatitis				
	Ciprofloxacin+ (\$) <u>OR</u>	500 mg PO BID	6-12 weeks	
	TMP/SMX+ (S)	1 DS tab PO BID	6-12 weeks	

^{*} Renal dose adjustments required

^Y Doxycycline Monohydrate is better tolerated and cheaper of the 2 salts for the most common insurers

\$ Relative cost to alternatives. Reference GoodRx or Lexicomp for cost estimates as these can change

ANTIMICROBIAL RECOMMENDATIONS – OUTPATIENT (continued)

Sexually Transmitted Infections (STIs)				
	Drug	Dose	Duration	Comments
Bacterial Vaginosis				
1 st Line	Metronidazole (\$) OR	500 mg PO BID	7 days	- Treatment is recommended in all symptomatic pregnant women
	Metronidazole 0.75% gel (\$\$\$)	One full applicator PV QHS	5 days	
	Clindamycin (\$\$)	300 mg PO BID	7 days	
Genital Herpes (First Occurrence)				
	Acyclovir ⁺ (\$\$) OR	400 mg PO TID	7-10 days	
	Valacyclovir ⁺ (\$\$\$)	1 g PO BID	7-10 days	
Genital Herpes (Recurrent Episode OR Episodic therapy)				
	Acyclovir ⁺ (\$\$) OR	400 mg PO TID	5 days	- Initiation within 1 day of lesion onset or during prodrome
		800 mg PO TID	2 days	
	Valacyclovir ⁺ (\$\$\$)	1 g PO BID	5 days	
		500 mg PO BID	3 days	
Chlamydia				
	Azithromycin (\$) OR	1 g PO once	Once	- Avoid use of Doxycycline in pregnancy (if treating empirically, cover for both Chlamydia and Gonorrhea)
	Doxycycline [¥] (\$) OR	100 mg PO BID	7 days	
	Levofloxacin ⁺ (\$\$)	500 mg PO daily	7 days	
Gonorrhea				
	Ceftriaxone* PLUS	500 mg IM once >150 kg: 1 g IM once	Once	- Per 2020 CDC update, Doxycycline preferred. You may consider Azithromycin if compliance or access is a concern
	Doxycycline [¥] (\$) OR	100 mg PO BID	7 days	
	Azithromycin (\$)	1 g PO once	Once	
Trichomoniasis				
	Metronidazole (\$) OR	2 g PO once	Once	
	Metronidazole (\$\$)	500 mg PO BID	7 days	
Pelvic Inflammatory Disease (PID)				
	Ceftriaxone* PLUS	250 mg IM once	Once	- Adding Metronidazole will also effectively treat Bacterial Vaginosis, which is frequently associated with PID
	Doxycycline [¥] (\$\$)	100 mg PO BID	14 days	
	+/-			
	Metronidazole (\$\$)	500 mg PO BID	14 days	

* Patients with documented true allergy to Cephalosporins can receive Gentamicin 240 mg IM

⁺ Renal dose adjustments required

[¥] Doxycycline Monohydrate is better tolerated and cheaper of the 2 salts for the most common insurers

\$ Relative cost to alternatives. Reference GoodRx or Lexicomp for cost estimates as these can change

ANTIMICROBIAL RECOMMENDATIONS – OUTPATIENT (continued)

Sexually Transmitted Infections (continued)					
	Drug	Dose	Duration	Comments	
Syphilis (primary, secondary, or early latent <1 year)					
	Penicillin G Benzathine <u>OR</u>	2.4 mU IM once	Once	Caution: Penicillin G Benzathine and Penicillin G Procaine are <u>not</u> interchangeable	
	Doxycycline [¶] (\$\$)	100 mg PO BID	14 days		
Syphilis (late latent >1 year, unknown latency, or tertiary)					
	Penicillin G Benzathine <u>OR</u>	2.4 mU IM weekly	3 doses (3 weeks)		
	Doxycycline [¶] (\$\$)	100 mg PO BID	28 days		
Urethritis (non-gonococcal)					
	Azithromycin (\$) <u>OR</u>	1 g PO once	Once		
	Doxycycline (\$) <u>OR</u>	100 mg BID	7 days		
	Levofloxacin [†] (\$\$)	500 mg PO daily	7 days		
Urethritis (persistent or recurrent)					
	Initially treated with Doxycycline:				
	Azithromycin (\$)	1 g PO once	Once		
	Initially treated with Azithromycin:				
	Moxifloxacin (\$\$)	400 mg daily	7 days		
Acute Epididymitis					
	Ceftriaxone*	250 mg IM once	Once		
	<u>PLUS:</u>				
	Levofloxacin (\$\$)	500 mg PO daily	10 days		

* Patients with documented true allergy to Cephalosporins can receive Gentamicin 240 mg IM

† Renal dose adjustments required

¶ Doxycycline Monohydrate is better tolerated and cheaper of the 2 salts for the most common insurers

\$ Relative cost to alternatives. Reference GoodRx or Lexicomp for cost estimates as these can change

ANTIMICROBIAL RECOMMENDATIONS – OUTPATIENT (continued)

GI Infections					
	Drug	Dose	Duration	Comments	
Diverticulitis (mild)					
1 st Line	Amoxicillin/clavulanate ⁺ (\$) OR	875/125 mg PO BID	7-10 days	- Treatment is recommended in all symptomatic pregnant women	
	Ciprofloxacin ⁺ (\$)	500 mg BID	7-10 days		
Alternative regimen:					
	TMP/SMX ⁺ (\$)	1 DS tab PO BID	7-10 days		
PLUS:					
	Metronidazole (\$\$)	500 mg PO TID	7-10 days		
Clostridium difficile (initial episode, non-severe)					
1 st Line	Vancomycin (\$\$\$) OR	125 mg PO Q6H	10 days	- Avoid anti-motility agents (such as Loperamide) which decrease elimination of toxins	
	Fidaxomicin (\$\$\$\$\$)	200 mg PO BID	10 days		
	Metronidazole (\$\$)	500 mg PO TID	10 days		
Clostridium difficile (first recurrence)					
If Fidaxomicin or Metronidazole used for first episode:				- Patients with >1 recurrence or severe infection should be admitted for management	
Vancomycin (\$\$\$)		125 mg PO Q6H	10 days		
If Vancomycin used for first episode:					
Fidaxomicin (\$\$\$\$\$)		200 mg PO BID	10 days		

⁺ Renal dose adjustments required

\$ Relative cost to alternatives. Reference GoodRx or Lexicomp for cost estimates as these can change

SEPSIS CORE MEASURES

Core Measure: Sepsis



Updated Feb 2019

≥ 2 SIRS CRITERIA + **INFECTION**

ACUTE ORGAN DYSFUNCTION or HYPOTENSION

- Temp > 100.9 or < 96.8
- HR > 90
- RR > 20
- WBC > 12K or < 4K or >10% Bands

- Charting of any confirmed infection OR suspected infection
"Possible infection"
"Suspect infection"
"Rule out infection"
OR
 Provider orders antibiotics

- Creatinine > 2.0 or urine output < 0.5 ml/kg/hr x 2 hrs
- Total bilirubin ≥ 2mg/dL
- Platelets < 100K
- INR > 1.5 or aPTT > 60 seconds
- Lactate > 2 mmol/L
- New mechanical ventilation (BiPAP/CPAP) or ventilator

HYPOTENSION

- ANY SBP < 90 or MAP < 65
- Or, SBP drop > 40 mmHg

The following all count as "Infectious Dx":

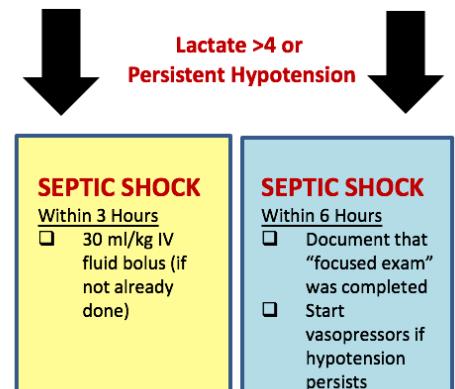
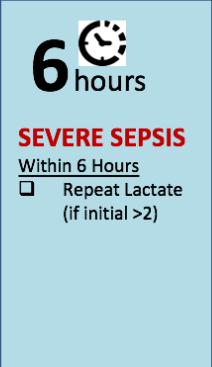
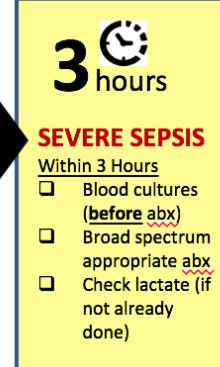
- Appendicitis
- Cholecystitis
- Diverticulitis
- Perf Bowel
- Purulence
- Pus
- Necrosis
- Gangrene,
- PID, UTI, COPD

Documentation

- If you write "sepsis" or "severe sepsis" or "septic shock" and later determine that it has been ruled out, remember to document that it was not present

Remember to document:

- If organ dysfunction is not NEW (e.g., baseline chronic kidney disease)
- If lactate is elevated with an alternate explanation (e.g., seizure)
- If IV fluids are not administered due to a contraindication (e.g., CHF, ESRD)



Core Measures requires that all patients with SEVERE SEPSIS or SEPTIC SHOCK receive BROAD-SPECTRUM antibiotics. So what qualifies as BROAD SPECTRUM?

Monotherapy

Meropenem	
Ceftazidime	
Ceftriaxone	(Rocephin)
Cefepime	(Maxipime)
Ceftaroline fosamil	
Levofloxacin	(Levaquin)
Ampicillin/sulbactam	(Unasyn)
Piperacillin/tazobactam	(Zosyn)

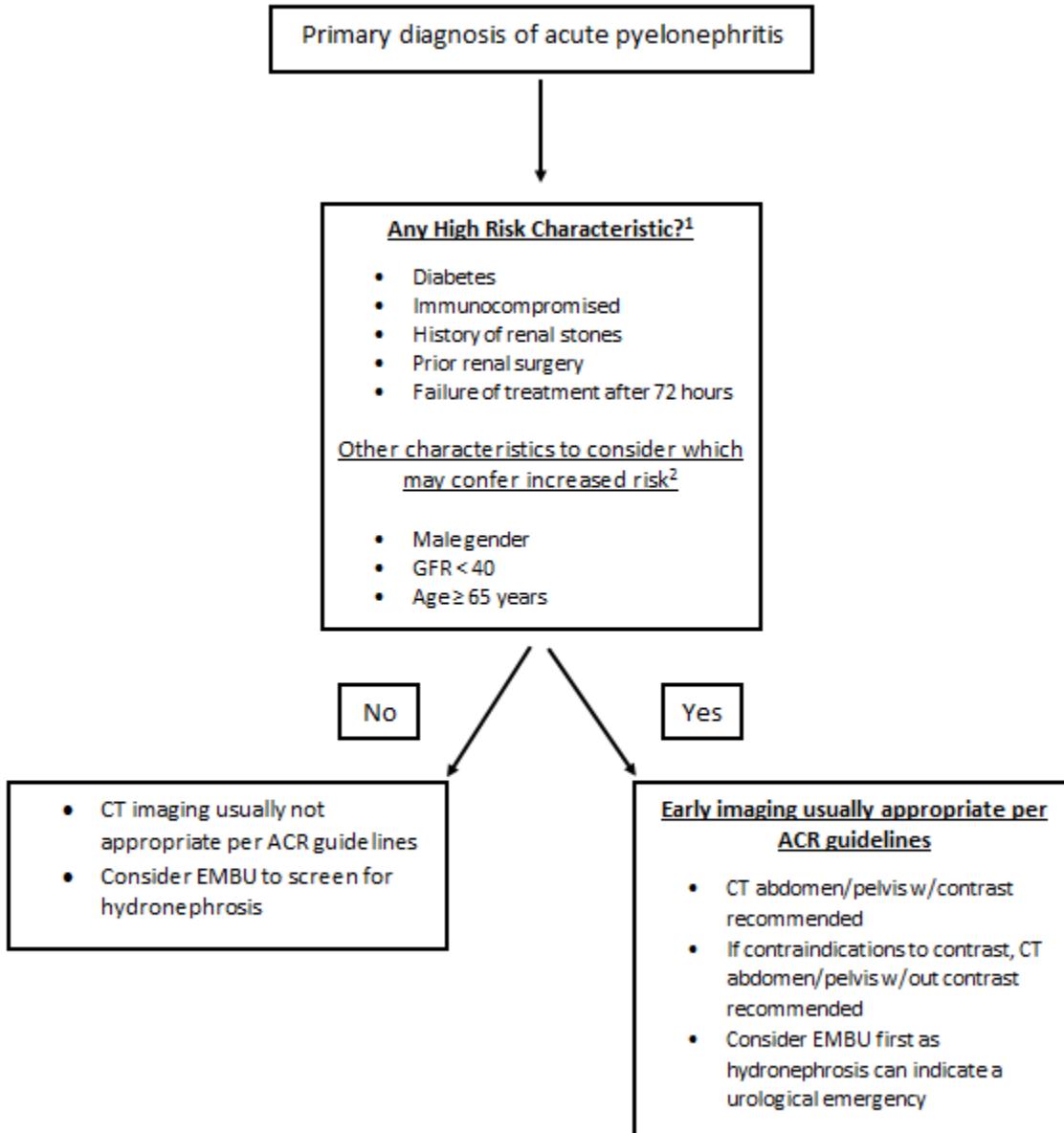
Combination Therapy

- Aminoglycosides (Gentamicin, Tobramycin, Amikacin)
- OR
- Aztreonam
- OR
- Ciprofloxacin



- Cephalosporins (1st/2nd Generation) OR
- Clindamycin OR
- Daptomycin OR
- Linezolid OR
- Macrolides (Azithromycin) OR
- Vancomycin

IMAGING IN PYELONEPHRITIS

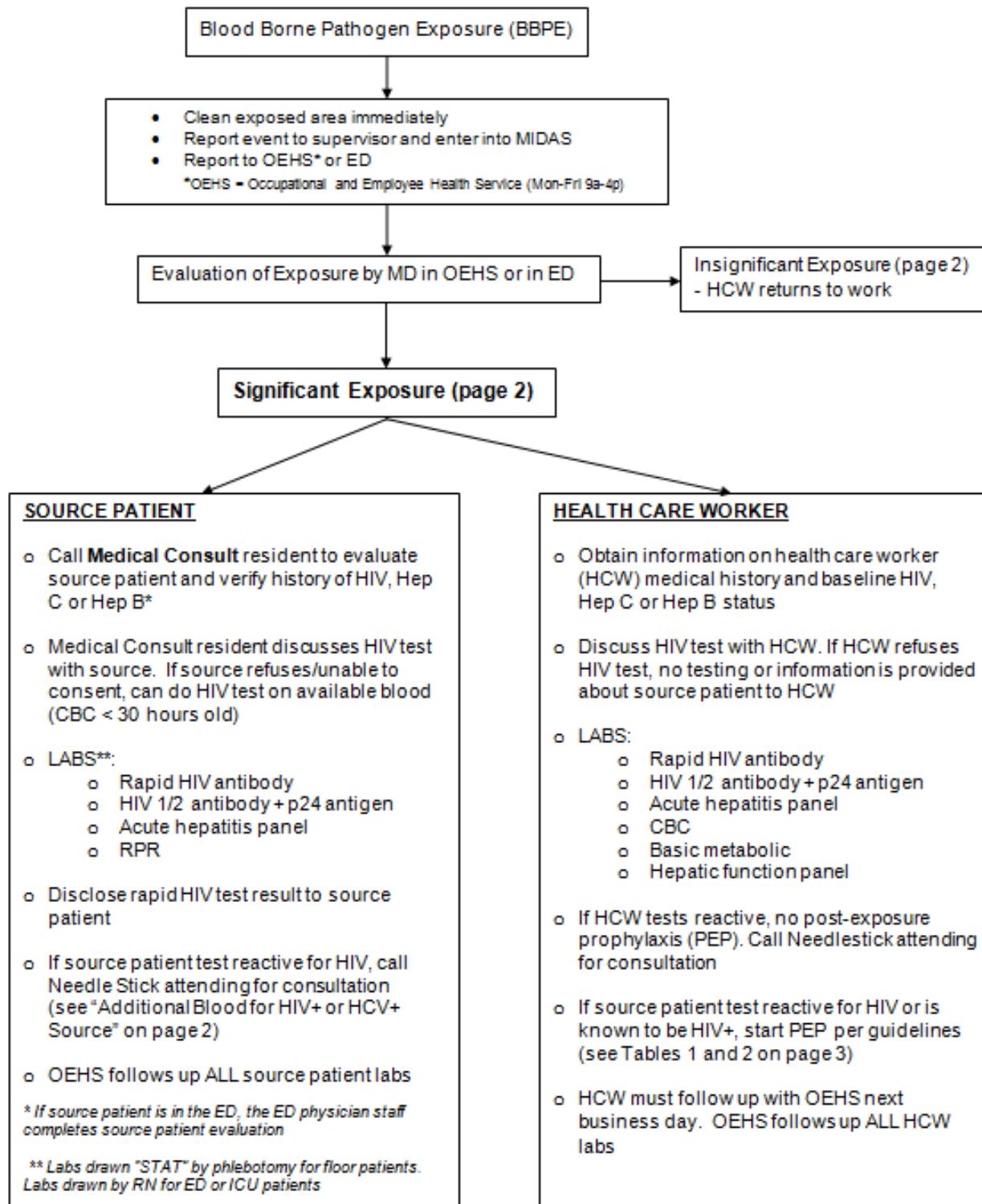


¹ High risk characteristics are based on ACR Appropriateness Criteria

² These characteristics are not found in ACR guidelines but are suggested in other literature

NEEDLESTICK

Pathway for Health Care Worker (HCW) Exposures



Medical/Dental/Nursing Students who present to the Emergency Department after a needlestick exposure should follow the same pathway as employees with the exception that these students should follow up with Student Health Services rather than Occupational Health (see below).

NEEDLESTICK (continued)

Significant Occupational Risk Exposure

- Percutaneous injury (i.e. needlestick or cut with a sharp object) OR contact of mucous membrane or non-intact skin with:
 - Blood, tissue, OR other body fluids that are potentially Infectious: semen, vaginal secretions, CSF, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid
- Body fluids that are NOT considered Infectious unless they are visibly bloody:
 - Feces, nasal secretions, saliva, sputum, sweat, tears, urine, vomitus

Factors associated with increased risk:

- Visible contamination of device (such as needle) with patient's blood
- Needle having been placed directly into vein or artery
- Hollow-bore (vs. solid) needle
- Deep injury
- Source patient with terminal illness
- High viral load (not established in occupational exposure)

Additional Blood for HIV+ or HCV+ Source

- **Source patient known to be HIV+**
 - Draw HIV RNA PCR quantitative (viral Load) (2 purple)
 - Draw HIV-1 Genotype (resistance test) (2 purple)
- **Source patient known to be Hepatitis C antibody +**
 - Draw HCV PCR quantitative (viral load) (2 purple)

Post-Exposure Prophylaxis (PEP)

- Truvada [Emtricitabine 200 mg (FTC) and Tenofovir 300 mg (TDF)];
 - Dose – 1 tablet once daily
- Isentress 400 mg
 - Dose – 1 tablet twice daily
- Give HCW a 3-day supply from Pyxis and Rx for 1 month if source patient HIV+ or unable to determine source patient HIV status

Contact Information for Needle Stick Attending, HIV Program, and OEHS

- **Needlestick Attending:** AMION under Infectious Disease
 - **HIV Program:**
 - Princess Graham, Administrator
 - Call for appointments/referrals
 - Ellen Tedaldi, MD, Director
 - **Occupational and Employee Health Service (OEHS)**
- | | |
|----------------------------------|--------------|
| ○ Princess Graham, Administrator | 215-707-2401 |
| ○ Ellen Tedaldi, MD, Director | 267-563-1570 |
| 215-707-8150 | |

Student In-House Health Services

Basic health care for students is available through the Student Health Services office at Temple University Health Sciences Center, located in the Student Faculty Center at Broad and Ontario Streets. The service is designed to offer students easily accessible care at low costs. Routine appointments, same-day care and referrals for specialty care are available.

Student Health Services Staff: Dorrit Sterner MD; John Thomas RN (215) 707-4088

RABIES

TABLE 3. Rabies postexposure prophylaxis (PEP) schedule — United States, 2010

Vaccination status	Intervention	Regimen*
Not previously vaccinated	Wound cleansing	All PEP should begin with immediate thorough cleansing of all wounds with soap and water. If available, a virucidal agent (e.g., povidine-iodine solution) should be used to irrigate the wounds.
	Human rabies immune globulin (HRIG)	Administer 20 IU/kg body weight. If anatomically feasible, the full dose should be infiltrated around and into the wound(s), and any remaining volume should be administered at an anatomical site (intramuscular [IM]) distant from vaccine administration. Also, HRIG should not be administered in the same syringe as vaccine. Because RIG might partially suppress active production of rabies virus antibody, no more than the recommended dose should be administered.
	Vaccine	Human diploid cell vaccine (HDCV) or purified chick embryo cell vaccine (PCECV) 1.0 mL, IM (deltoid area [†]), 1 each on days 0, [‡] 3, 7 and 14. [¶]
Previously vaccinated**	Wound cleansing	All PEP should begin with immediate thorough cleansing of all wounds with soap and water. If available, a virucidal agent such as povidine-iodine solution should be used to irrigate the wounds.
	HRIG	HRIG should not be administered.
	Vaccine	HDCV or PCECV 1.0 mL, IM (deltoid area [†]), 1 each on days 0 [§] and 3.

* These regimens are applicable for persons in all age groups, including children.

† The deltoid area is the only acceptable site of vaccination for adults and older children. For younger children, the outer aspect of the thigh may be used. Vaccine should never be administered in the gluteal area.

‡ Day 0 is the day dose 1 of vaccine is administered.

¶ For persons with immunosuppression, rabies PEP should be administered using all 5 doses of vaccine on days 0, 3, 7, 14, and 28.

** Any person with a history of pre-exposure vaccination with HDCV, PCECV, or rabies vaccine adsorbed (RVA); prior PEP with HDCV, PCECV or RVA; or previous vaccination with any other type of rabies vaccine and a documented history of antibody response to the prior vaccination.

CSF ANALYSIS - RESULT INTERPRETATION

Cerebrospinal fluid testing for the diagnosis of central nervous system infection

TYPICAL CSF FINDINGS IN BACTERIAL AND VIRAL MENINGITIDES				
CSF Parameter	Bacterial Meningitis	Viral Meningitis	Fungal Meningitis	Tuberculous Meningitis
Opening pressure (mm H ₂ O)	>180	Often normal	Variable	>180
WBC count (cells/mm ³)	1,000-10,000 Median: 1195 Range: <100-20,000	<300 Median: 100 Range: 100-1,000	20-500 Variable, dependent upon fungus	50-500 Median: 200 Range: <50-4,000
Neutrophils (%)	>80	<20	Usually <50	20
Protein (mg/dL)	100-500	Often normal	Elevated	150-200
Glucose (mg/dL)	<40	>40	Usually <40	<40
Gram stain (% positive)	60-90	Negative	Negative	37-87 (AFB smear)
Culture (% positive)	70-85	50	25-50	52-83

Reference: Zunt JR - Neurol Clin - 1999 Nov; 17(4): 675-89

SYNOVIAL FLUID ANALYSIS - RESULT INTERPRETATION

SYNOVIAL FLUID ANALYSIS

Condition	Appearance	WBC's/mm	% PMN's	Glucose: % Serum Level	Crystals Under Polarized Light
Normal	Clear	<200	<25	95-100	none
Non-inflammatory (e.g. DJD)	Clear	<400	<25	95-100	none
Acute Gout	Turbid	2000-5000	>75	80-100	negative birefringence; needle-like crystals
Pseudogout	Turbid	5000-50,000	>75	80-1000	positive birefringence; rhomboid crystals
Septic Arthritis	Purulent/turbid	>50,000	>75	<50	none
Inflammatory (e.g. Rheumatoid arthritis)	Turbid	5000-50,000	50-75	approx 75	none

Reference: Clinical Procedures in Emergency Medicine, Roberts, et. al. 2nd Ed.

Harrison's Principles of Internal Medicine, 14th Ed.

SYNOVIAL FLUID TUBES (order set plus crystals)

Joint Fluid: PURPLE

Aerobic Smear/Culture: RED

Crystal: DARK GREEN

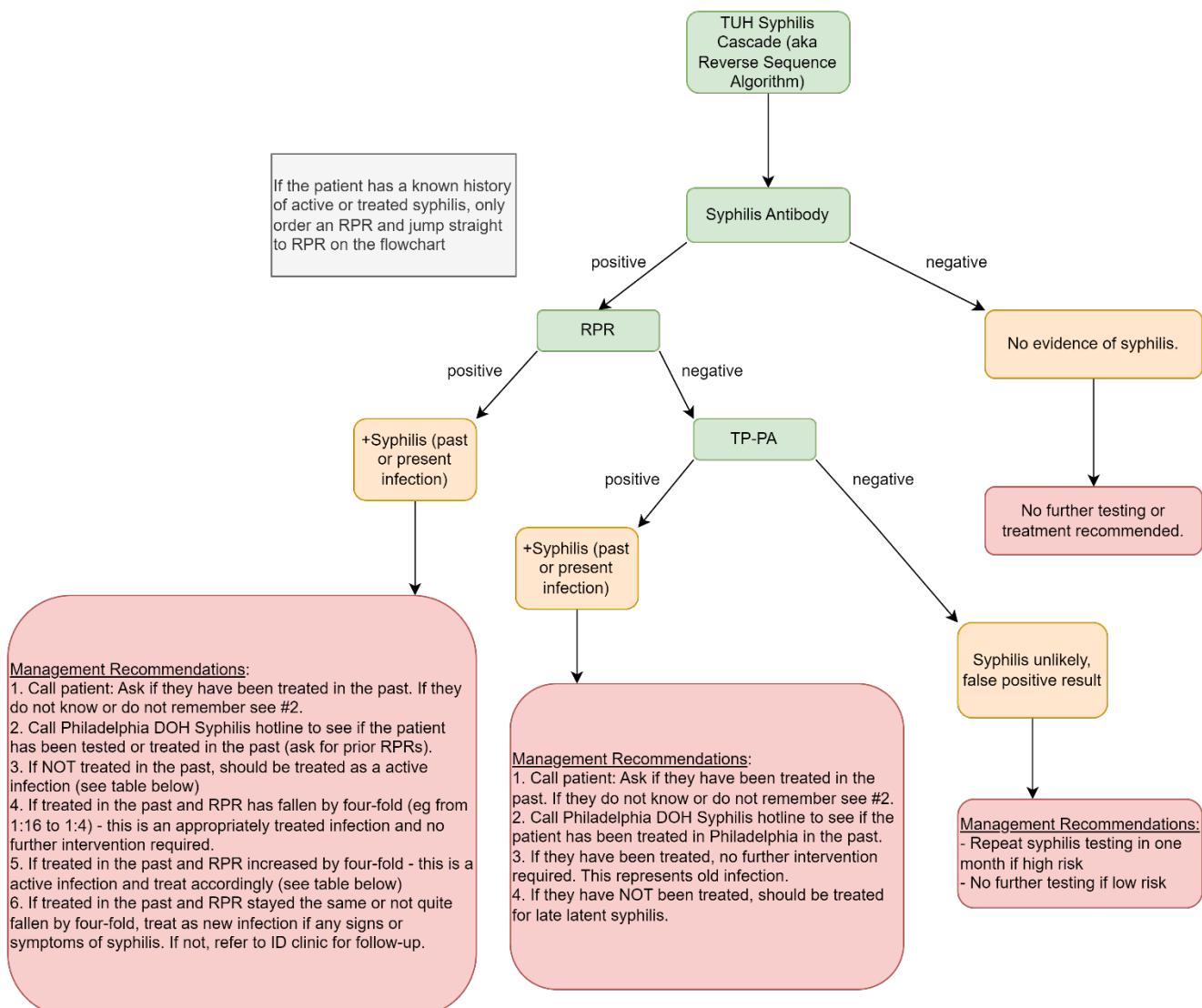
Aspirate Culture: RED

Gram Stain: RED

SYPHILIS TESTING AND MANAGEMENT

At TUH, there are three parts to our "syphilis antibody cascading reflex":

1. **Syphilis Antibody:** Treponemal test that tests antibodies specific to *Treponema pallidum*.
 - a. This serves as the screening and is the first result that comes back.
 - b. If negative, you can say the patient is negative for syphilis and no further testing is recommended.
 - c. If positive, it reflexes to an RPR and TP-PA (see below)
2. **Rapid Plasma Reagins (RPR):** If the initial syphilis antibody is positive, an RPR is performed. It is a common, non-treponemal serologic test for syphilis that detects nonspecific anticardiolipin antibodies.
 - a. It is important to note, if the patient has a known history of active or treated syphilis, you can just order an RPR (since we know they will be antibody positive already)
3. ***T. pallidum* particle agglutination (TP-PA):** If the RPR is negative, a TP-PA is performed. This test measures antibodies directed against *T. pallidum* antigens by enzyme immunoassay immunofluorescence.



SYPHILIS TESTING AND MANAGEMENT (continued)

Syphilis Ab	RPR	TPPA	Interpretation	Next Steps
Negative	Negative	Negative	1. Negative 2. False negative in early infection	Repeat in 1 month if high risk Empirically treat if known contact
Positive	Negative	Negative	1. False positive	Repeat in 1 month if high risk
Positive	Negative	Positive	1. Previously treated syphilis 2. Late latent syphilis	Treated with PCN x 3 if not previously treated
Positive	Positive	Positive	1. Active infection 2. Previously treated infection	If treated, look at prior RPRs for appropriate decline

Table 1: Credit to Dr. Stephanie Spivack.

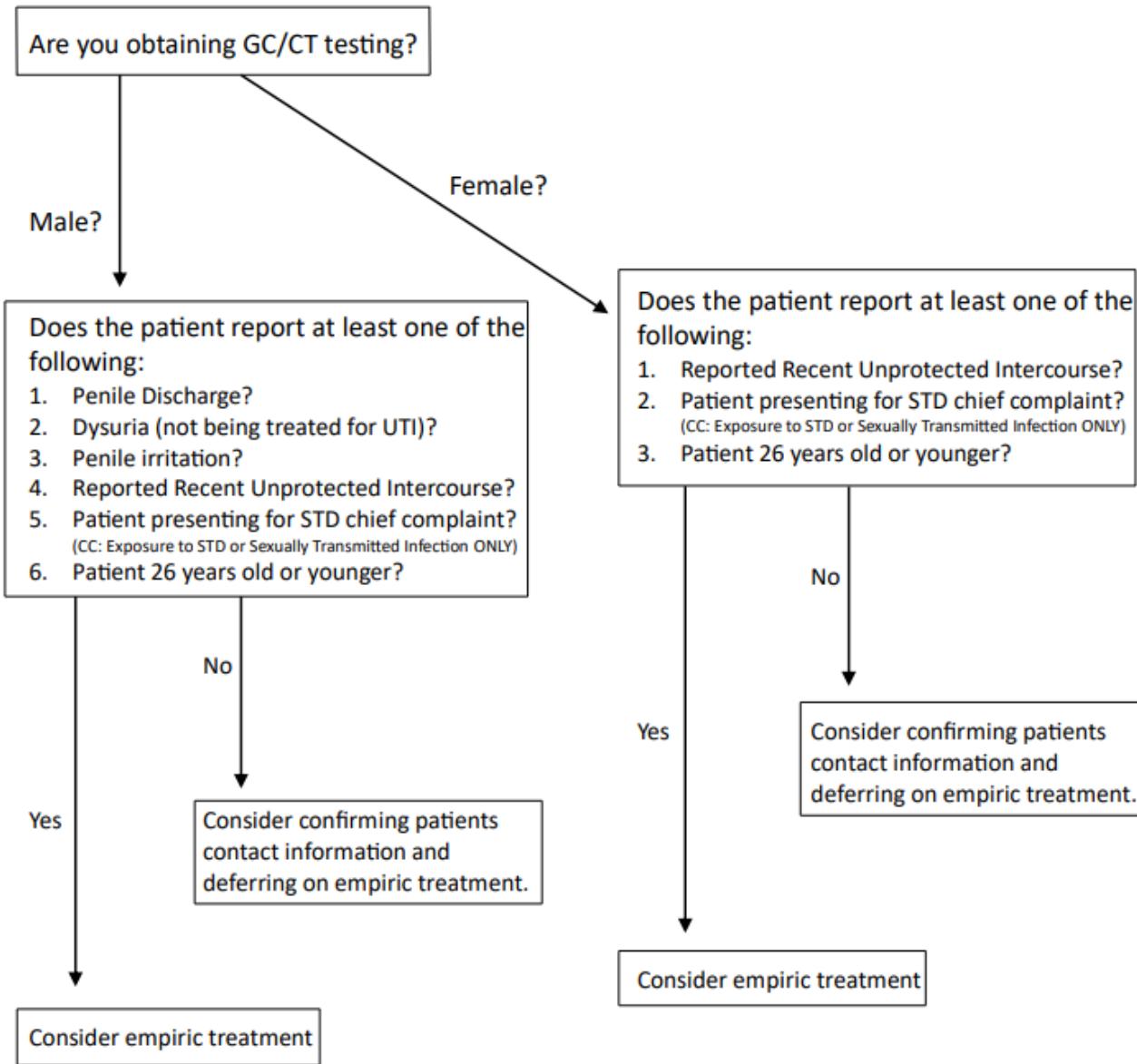
Treatment

Disease Stage	Definition	Preferred Treatment	Alternative Treatment
Primary	Clinical symptoms (chancre, regional LAD) +/- serology	Benz PCN 2.4 million units IM x1	Doxycycline 100mg BID x14d
Secondary	Clinical symptoms (rash, disseminated lymphadenopathy) + serology	Benz PCN 2.4 million units IM x1	Doxycycline 100mg BID x14d
Early latent	Positive lab findings but no symptoms, negative testing less than 1 year ago	Benz PCN 2.4 million units IM x1	Doxycycline 100mg BID x14d
Late latent	Positive lab findings with no symptoms, negative testing more than 1 year ago or no prior testing	Benz PCN 2.4 million units IM qWeekly x3	Doxycycline 100mg BID x28d
Tertiary	Clinical symptoms (cardiovascular or gummatous disease) + serology	Benz PCN 2.4 million units IM qWeekly x3	Consult with ID physician recommended
Neurosyphilis	Clinical symptoms (vision changes, eye pain, hearing loss, tinnitus, meningovascular sequelae) + serology	IV PCN G 18-24 million units daily x10-14d	Consult with ID physician recommended

Additional Resources:

1. Philadelphia Department of Health Syphilis Hotline: 215-685-6737, 215-685-6585, jamesj.williams@phila.gov
2. On-Call ID Fellow: Can be found on Amion
3. TUH ID Outpatient Scheduling: 215-707-1982 (p), 215-707-4414 (f)

GONORRHEA AND CHLAMYDIA TREATMENT ALGORITHM



Risk Factors NOT associated with increased risk:

1. Dyspareunia
2. Pelvic Exam + Discharge
3. Testicular Symptoms
4. Female with Dysuria
5. Vaginal Irritation
6. Female with Reported Discharge
7. Reported Odor

Risk Factors not assessed here:

1. Multiple Partners
2. New Partners

GONORRHEA AND CHLAMYDIA TREATMENT ALGORITHM (continued)

Inclusion Criteria: Patients with GC/Chlamydia Testing Sent from a TUH-HS ED.

Exclusion Criteria: Patient with GC/Chlamydia Testing Sent by Inpatient Team after Admission.

Notes:

- Chief complaint criteria ONLY applies to patients with triage chief complaint of "STD Exposure" or "Sexually Transmitted Disease" – other symptomatic complaints (such as "testicular pain", "vaginal discharge", etc.) do not qualify for this criterion.
- Penile irritation includes any reported penile discomfort or pain that is reported.
- Testicular symptoms were analyzed with respect to any reported pain and/or swelling, acute or chronic. Ultrasound imaging results were not taken into account and imaging findings should guide clinical decision-making separately.
- Imaging findings for other STI-related diagnoses were also not evaluated here and should guide clinical decision-making separately.

Additional Considerations:

Consider referring patients to Philadelphia's STI-specific Health District 1 for follow up or future STI testing services. The following information can be added to Disposition paperwork:

Location	Address	Phone	Walk-in hours
STD clinic at Health Center 1	1930 S. Broad St., 2nd floor, 19145	(215) 685-6570	M: 7:45 a.m. – 7 p.m. Tu – F: 7:45 a.m. – 4 p.m.*

* On the first Wednesday of each month, the clinic at Health Center 1 opens at 1 p.m.

**First Come, First Serve model – Clinic will often reach capacity about 30 minutes prior to scheduled close.

***They cannot currently test for Mycoplasma Genitalium, but offer an empiric treatment approach for select patients with persistent symptoms and negative GC/Chlamydia testing.

ACUTE STROKE – EMERGENCY EVALUATION AND MANAGEMENT



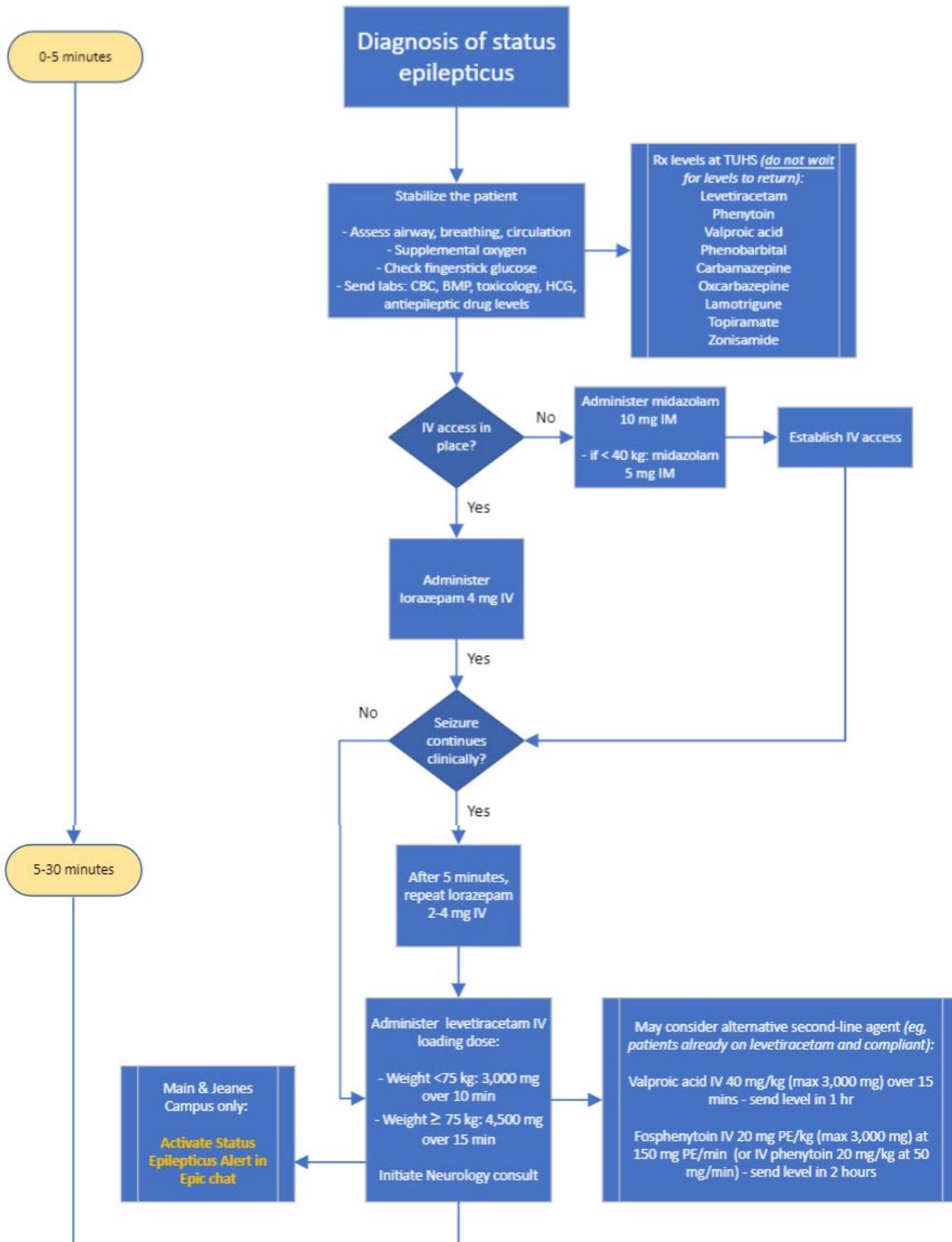
- **Triage.** Activate Stroke Alert with EMS pre-alert for stroke or FAST+ on arrival (**FAST** = Facial drooping, Arm/leg weakness, Speech Difficulty or other symptoms concerning for acute stroke (i.e. acute weakness, speech difficulty, numbness, vision loss, dizziness, loss of coordination/difficulty walking) and symptom onset less than 24 hours or on wake-up). Call 2-3333 to activate, specify "ED Alert Direct to CT." Register patient and place bracelet.
 - ❖ Bring patient to the Joint Evaluation Team area (charge nurse station).
 - ❖ Nurse and Desk Tech
 - ❖ Obtain VS
 - ❖ Obtain POC glucose
 - ❖ Obtain family contact info from EMS if available
 - ❖ Nurse and Desk Tech obtain lifepack monitor from Bay 2, stroke stretcher, WOW and bring to CT.
 - ❖ EM Resident/Attending
 - ❖ Assess airway, breathing, circulation
 - If unstable abort direct to CT, room patient, and resuscitate
 - ❖ Perform brief stroke exam (<https://www.youtube.com/watch?v=GB2U8baZUCE>)
 - Determine if VAN =Visual CN defect, Aphasia, or Neglect)
 - ❖ Control BP if >220/120
 - ❖ Place orders for NCCT, CTA Head and Neck and CT Perfusion Head
 - ❖ Transport to CT - EM gives report to Neuro, helps manage pt in CT
- **Patient transferred to CT asap.**
 - ❖ CT Tech performs NCCT
 - ❖ Nurse and Tech place patient on ED stretcher to obtain weight, place transport monitor, place appropriate IV if not already done (18g standard or 22d BD Nexiva-Diffusics), collect and send CBC, BMP, coags, T&S, HCG (if appropriate)
 - ❖ Neurology and EM during and after NCCT
 - ❖ Determine eligibility for thrombolysis, mechanical thrombectomy.
 - Neurology performs NIHSS
 - Obtain hx from pt, family, and chart on key questions:
 - What was the time of onset? Use time last known well when the time of onset unknown or a wake-up stroke.
 - Review inclusion/exclusion checklist
 - Head trauma, surgery within past 3 months?
 - Is there baseline disability, able to walk and attend to bodily needs without assistance?
 - Renal disease? Check recent creatinine, consider use of iStat Cr
 - Bleeding risk? On anticoagulant? Check for a recent platelet count, INR if on warfarin.
 - ❖ Neuro and Radiology review NCCT
 - ❖ Review NCCT in consideration of thrombolysis and/or for alternative diagnosis
 - ❖ **TNK Treatment decision** – if appropriate, physician orders drug, pharmacy prepares, physician administers TNK immediately after NCCT in eligible patients.
 - ❖ Neuro and EM confer regarding treatment plans
 - ❖ CT Tech performs CTA head and neck and CT Perfusion if indicated
 - ❖ Neuro, Radiology and NSG review CTA for LVO, transfer to IR if LVO stroke

Transport to ED or IR for non-vital assessments (eg EKG, temp, and CXR) and EVT

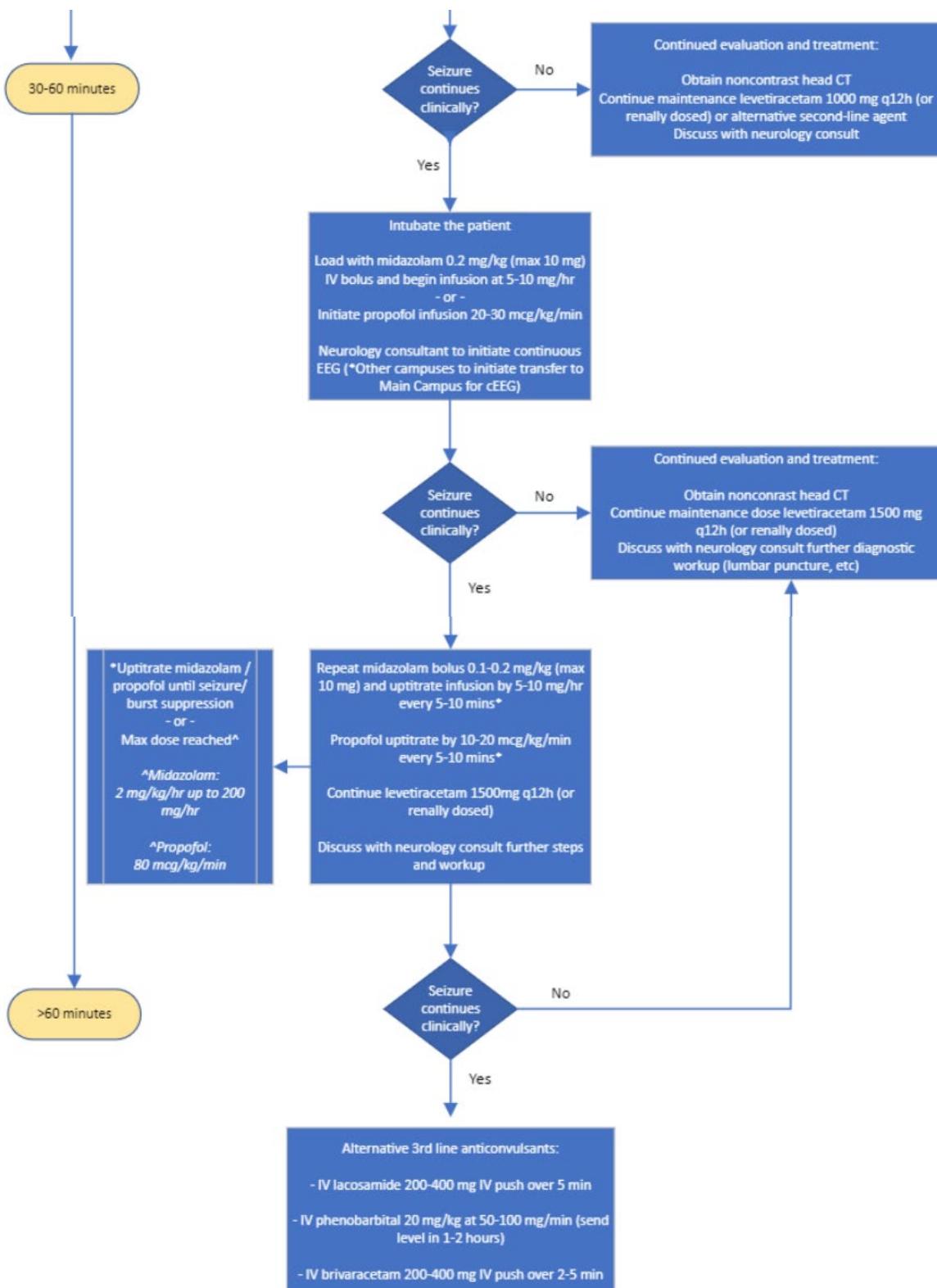
This document is designed to serve as a guideline and is not meant to be a strict procedure.

Deviation from the treatment decisions established by this guideline are allowed, as deemed medically appropriate by the treating physician, in order to optimize care for an individual patient and to best utilize the stroke expertise of the treating physicians, given the rapidly changing science of acute stroke care.

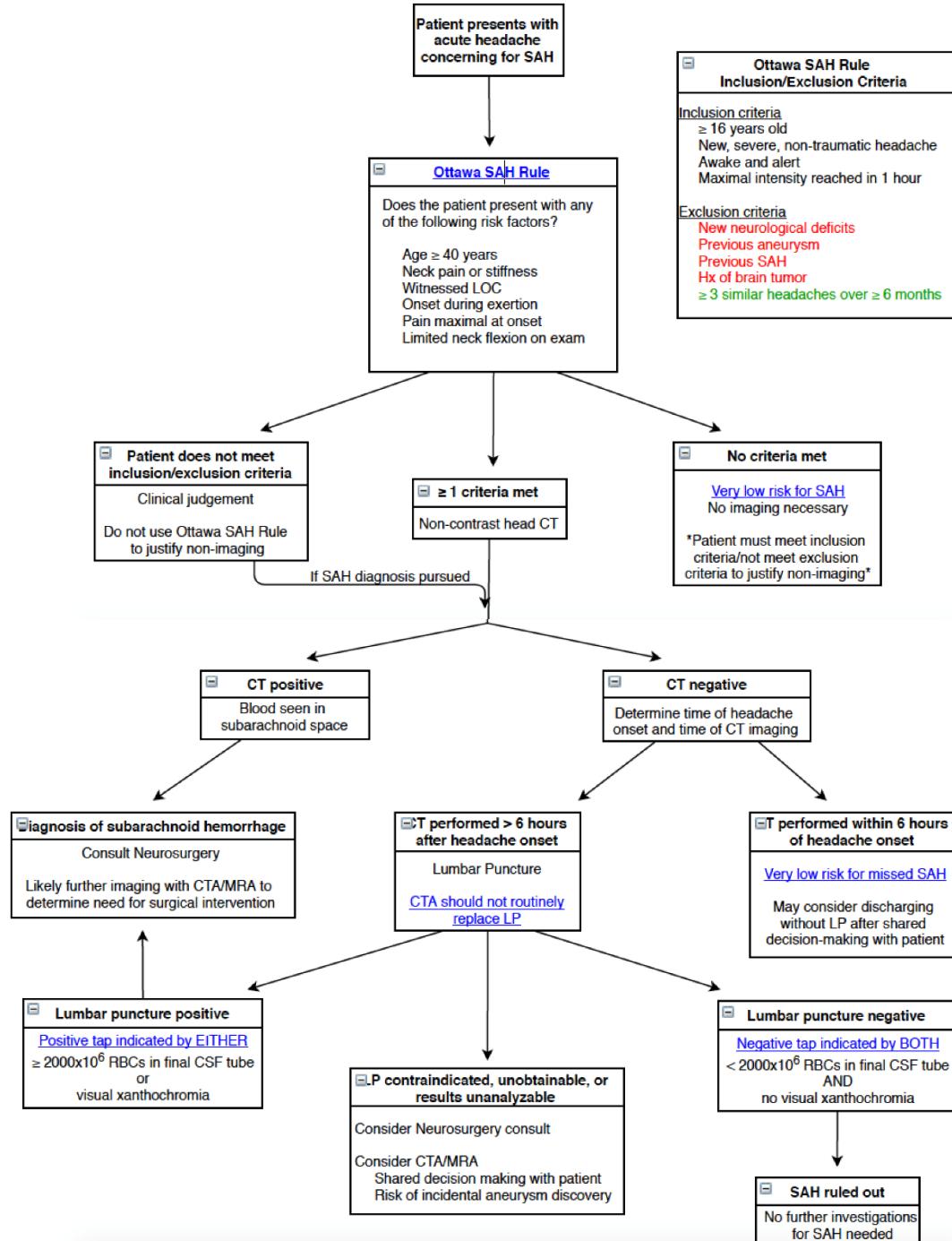
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STATUS EPILEPTICUS



SUBARACHNOID HEMORRHAGE ALGORITHM



See below and next page for further information on blue text above.

[Link to “Ottawa SAH Rule”](#)

The Ottawa SAH guidelines were developed from a cohort of 2131 patients with acute headaches concerning for subarachnoid hemorrhage. The purpose of the study was to derive a clinical decision rule to help providers determine when the diagnosis of acute SAH needs to be pursued. Multiple data points such as patient risk factors and signs/symptoms upon

Daves / Healy / Z Repanshek CEP 2016

SUBARACHNOID HEMORRHAGE ALGORITHM (continued)

presentation were collected for each patient. The patients' headaches were then investigated as per standard of care, and a subset were diagnosed with SAH. The results were then analyzed and the study identified six characteristics of the patients' presentations that were concerning for SAH – in the study population, each patient diagnosed with a SAH had at least one of the six characteristics. These characteristics became the Ottawa SAH Rule, which suggests that an appropriate patient (meeting inclusion/exclusion criteria) not demonstrating any of the six characteristics is unlikely to have a SAH and does not need further investigation for this headache etiology.

Source: Perry JJ, Stiell IG, Sivilotti ML, et al. Clinical decision rules to rule out subarachnoid hemorrhage for acute headache. JAMA. 2013;310:1248-1255

[Link to “No imaging necessary”](#)

In the derivation cohort of 2131 patients, the Ottawa SAH Rule was 100% sensitive and 15.3% specific for identifying SAH, essentially ‘ruling out’ the diagnosis of SAH in patients who do not meet at least one of these criteria. However, these findings have not yet been validated in a separate trial outside of the derivation population.

[Link to “Very low risk for missed SAH”](#)

In this prospective cohort study, 3132 patients were evaluated for SAH as per standard of care. Overall, 240 (7.7%) were diagnosed with SAH. Overall, CT imaging was found to have a 92.9% sensitivity (89.0-95.5%) for SAH. However, when these results were divided according to how soon after headache onset the CT imaging was obtained, CT imaging performed less than 6hrs after headache onset had a 100% (97-100% CI) sensitivity, while sensitivity decreased to 85.7% (78.3-90.9%) if head CT was performed more than 6 hours after headache onset. The conclusion was that a normal CT can exclude the diagnosis of SAH in patients who receive imaging within 6 hours of headache onset without requiring a follow-up LP.

Source: Perry JJ, Stiell IG, Sivilotti ML, et al. Sensitivity of computed tomography performed within six hours of onset of headache for diagnosis of subarachnoid haemorrhage: prospective cohort study. BMJ. 2011;343:d4277

[Link to “Positive tap indicated by EITHER” and “Negative tap indicated by BOTH”](#)

This was a prospective study of 1739 patients who underwent lumbar punctures to evaluate for SAH after receiving negative head CTs. The goal of the study was to determine which LP results are suggestive of aneurysmal SAH, and which can be attributed to a traumatic tap or possibly non-aneurysmal SAH, which does not require surgical intervention and has an excellent prognosis. 36.9% of the LPs performed were positive for $>1 \times 10^6$ RBCs in final tube and/or visual xanthochromia; however, only 15 (0.9%) patients were found to have SAH due to aneurysm, resulting in many false positives. When $\geq 2000 \times 10^6$ RBCs OR visual xanthochromia was used to define a positive LP result, these criteria had 100% sensitivity and 91.2% specificity for SAH. The conclusion was that the presence of $< 2000 \times 10^6$ RBCs in the final CSF tube and no visual xanthochromia excluded the diagnosis of aneurysmal SAH.

Source: Perry JJ, Alyahya B, Sivilotti ML, et al. Differentiation between traumatic tap and aneurysmal subarachnoid hemorrhage: prospective cohort study. BMJ. 2015;350:h568

[Link to “CTA should not routinely replace LP”](#)

Cerebral aneurysms exist in approximately 2% of the population. While CT followed by CTA effectively rules out aneurysmal subarachnoid hemorrhage, the undifferentiated use of CTA in acute headache risks identifying incidental aneurysms unrelated to the patient's headache which could prompt inappropriate hospitalization and unnecessary treatment or surgical procedures. CTA may be an appropriate next-step for patients in whom LP is contraindicated, unobtainable, or refused, if the pretest probability of an acute SAH is great enough to outweigh the risk of incidental aneurysm discovery.

Carstairs SD, et al. Computed tomographic angiography for the evaluation of aneurysmal subarachnoid hemorrhage. Academic Emergency Medicine. 2006 May;13(5):486-92.

McCormack RF and Hutson A. Can computed tomography angiography of the brain replace lumbar puncture in the evaluation of acute-onset headache after a negative noncontrast cranial computed tomography scan? Academic Emergency Medicine. 2010 Apr;17(4):444-51

Meurer W, Walsh B, and Rosenbaum S. CTA of the Brain Is a Reasonable Option to Consider to Help Rule out Subarachnoid Hemorrhage in Select Patients. AAEM Clinical Practice Committee Statement. 12 Dec 2014.

LUMBAR PUNCTURE IN ANTICOAGULATED PATIENTS

Recommended Guidelines for Performing Spinal Procedures in Anticoagulated Patients

- **Warfarin** - Discontinue chronic warfarin therapy 4–5 days before spinal procedure and evaluate INR. INR should be within the normal range at time of procedure to ensure adequate levels of all vitamin K-dependent factors.
- **Direct Oral Anticoagulants (DOACs)** – Delay LP minimum of one day from last administration (3 days if abnormal renal function).
- **Antiplatelet medications** - No contraindications with aspirin or NSAIDs. Thienopyridine derivatives (clopidogrel and ticlopidine) should be discontinued 7 days and 14 days, respectively, prior to procedure.
- **GP IIb/IIIa inhibitors** - should be discontinued to allow recovery of platelet function prior to procedure (8 hours for tirofiban and eptifibatide, 24–48 hours for abciximab).
- **Thrombolytics/fibrinolytics** - There are no available data to suggest a safe interval between procedure and initiation or discontinuation of these medications. Follow fibrinogen level and observe for signs of neural compression.
- **LMWH** - Delay procedure at least 12 hours from the last dose of thromboprophylaxis LMWH dose. For “treatment” dosing of LMWH, at least 24 hours should elapse prior to procedure. LMWH should not be administered within 24 hours after the procedure.
- **Unfractionated SQ heparin** - There are no contraindications to neuraxial procedure if total daily dose is less than 10,000 units. For higher dosing regimens, manage according to intravenous heparin guidelines.
- **Unfractionated IV heparin** - Delay spinal puncture 2–4 hours after last dose, document normal aPTT. Heparin may be restarted 1 hour following procedure.

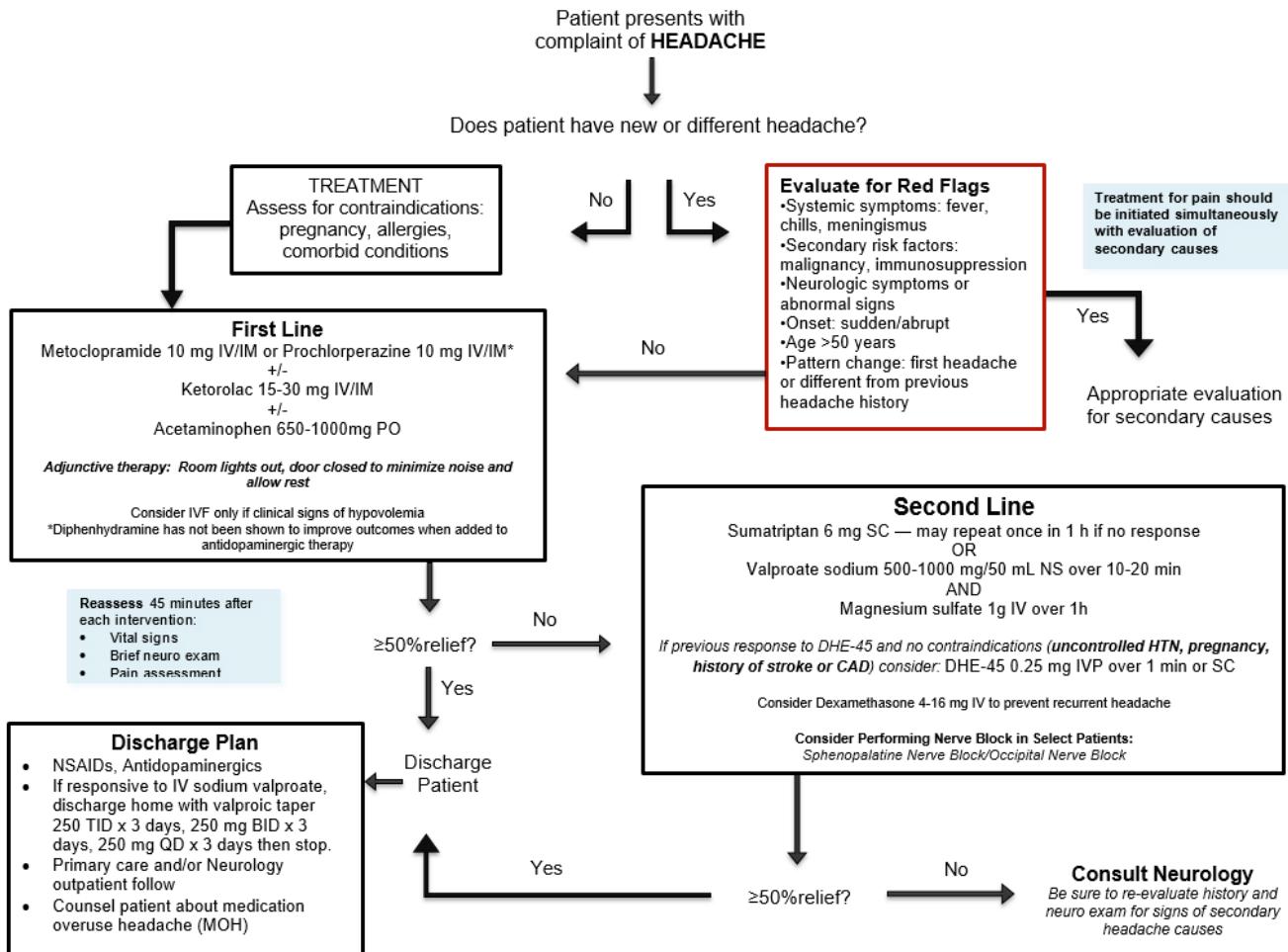
Note - NSAIDs indicates nonsteroidal antiinflammatory drugs; GP IIb/IIIa, platelet glycoprotein receptor IIb/IIIa inhibitors; INR, international normalized ratio; LMWH, low-molecular-weight heparin; aPTT, activated partial thromboplastin time. *Adapted from:* Horlocker TT, Wedel DJ, Benzon H, et al. **Regional anesthesia in the anticoagulated patient: defining the risks (the second ASRA Consensus Conference on Neuraxial Anesthesia and Anticoagulation).** Reg Anesth Pain Med 2003;28:172–97.

Notes from the text

- 1) Okay to LP if on NSAIDs, aspirin, or aspirin / dipyridamole (*Aggrenox*).
- 2) An abnormal INR is >1.2.
- 3) Beware patients coming to us from long-term care facilities or from home with skilled nursing – they may be on LMWH for thromboprophylaxis, or SQ UFH for the same. The above guideline says okay to LP if total daily dose of UFH <10,000 units is with regard to SQ UFH. Many of these folks are on LMWH.
- 4) Those on heparin > 4 days need a platelet count (HIT).
- 5) LMWH has a long half-life, and is not reversed by protamine.
- 6) Remember severe liver disease may lead to elevated INRs, low platelet counts.
- 7) Remember, LPs are important but never a "must-do-now" procedure. Verify the medication history first, and be sure to touch base on this information when handing-off (i.e., signing-out an LP).

HEADACHE MANAGEMENT

ED Management of Headache Algorithm



References

- Ahmed ZA, Nacopoulos DA, John S, Papesh N, Levine D, Bamford CC. An algorithm for opioid and barbiturate reduction in the acute management of headache in the emergency department. *Headache*. 2017; 57: 71- 79.
- Friedman, B.W. (2017). Managing Migraine. *Annals of Emergency Medicine*, 69(2), 202–207.
- Orr, S.L. et al. (2016). Management of Adults With Acute Migraine in the Emergency Department: The American Headache Society Evidence Assessment of Parenteral Pharmacotherapies. *The Journal of Head and Face Pain*, 56(6), 911-940.
- Rozen, T. (2015). Emergency Department and Inpatient Management of Status Migrainosus and Intractable Headache. *Continuum*, 21(4), 1004–1017.
- [5. https://www.acip.org/patient-care/clinical-policies/headache/](https://www.acip.org/patient-care/clinical-policies/headache/)
- [6. https://www.mississippiheadachecenter.com/ed/](https://www.mississippiheadachecenter.com/ed/)
- [7. https://www.emra.org/books/pain-management/migraine/](https://www.emra.org/books/pain-management/migraine/)

CEP E. Peoples / Z. Repanshek 2021

ORTHOPEDIC CONSULTATION GUIDELINE

Guideline for when to consult Orthopedic Surgery in the ED for common injuries

A. General Reasons for Ortho Consult

1. Any neurovascular compromise (pre or post reduction)
2. Open fracture (except distal phalanx)
3. Significant deformity/angulation
4. Irreducible dislocation, relocation unstable
5. Risk for compartment syndrome
6. Tenting/blanching of skin
7. Physician judgment/ patient unable to ambulate or do ADLs

B. Specific Areas: infections, unusual fractures not addressed here

1. Shoulder/clavicle/AC joint: sling +/-swath: no consult needed
2. Humeral shaft – sugar tong splint, no consult
3. Elbow – sling +/- splint
Consults: Displaced olecranon fracture, angulated supracondylar fracture
4. Forearm: long arm splint
Consults: Galeazzi's, Monteggia fracture
5. Wrist/Hand – splint/buddy tape
Consult: Scaphoid fx, reverse distal radius angulation > 5 degrees, wrist dislocation
6. Hip/pelvis/femur: Consult all except muscular avulsion fractures, isolated ramus
7. Knee: splint/immobilizer/ace +/- crutches
Consult:
 - a) Suspected knee dislocation/recurvatum > 15°
 - b) Tibial plateau or patellar fracture displaced > 3 millimeters
 - c) Patellar tendon rupture
8. Tibia/Fibula: Consult if concern for compartment syndrome
9. Foot/ ankle: splint/shoe/ace +/-crutches
Consult:
 - a) Trimalleolar/bimalleolar
 - b) Calcaneal fracture
 - c) Lisfranc injury or mid-foot fracture
 - d) Achilles tendon rupture

SPINAL EPIDURAL ABSCESS GUIDELINE

Memo To: EM, IM and Neurosurgery/Orthopedic faculty and residents

From: Robert McNamara, M.D.
Chair, Department of Emergency Medicine
Christopher Loftus, MD
Chair, Department of Neurosurgery
Darilyn Moyer, MD
Vice Chair of Education, Department of Medicine
Assistant Dean for Medical Education
Joseph Thoder, MD
Chair, Department of Orthopedics

Re: Guidelines for Spinal Epidural Abscess (SEA)

The respective departments have agreed to the following admission guidelines. As guidelines, these do not supersede clinical judgment regarding individual patient care decisions.

General Principles:

1. MRI is the study of choice for the diagnosis of SEA and should be obtained as soon as possible
2. Vancomycin should be strongly considered if this diagnosis is entertained

Guidelines:

1. Admission decisions:

- a. Patients with SEA should be admitted to the Spine service (Neurosurgery or Orthopedics, refer to call schedule) unless they are a candidate for conservative management (see below) or have substantial other medical problems that in the opinion of the EM attending would best be handled in the MRICU with Spine service consultation.
- b. Patients admitted to Medicine with SEA should be placed in the MRICU for careful monitoring

2. Conservative therapy:

- a. Only indicated if the following apply:
 - i. No neurologic deficit present
 - ii. Patient or legal guardian refuses surgery
 - iii. Patient deemed an unacceptable surgical risk
- b. Admission to the MRICU with hourly neurologic checks with immediate surgical intervention for any development of neurologic compromise
- c. IR should be consulted for possible urgent aspiration of the abscess

OTTAWA KNEE RULES

A knee x-ray examination is only required for acute knee injury patients with one or more of these findings related to age, tenderness, or function:

- Aged 55 years or older
- or
- Tenderness at head of fibula
- or
- Isolated tenderness of patella*
- or
- Inability to flex to 90°
- or
- Inability to bear weight both immediately and in the emergency department (four steps)†

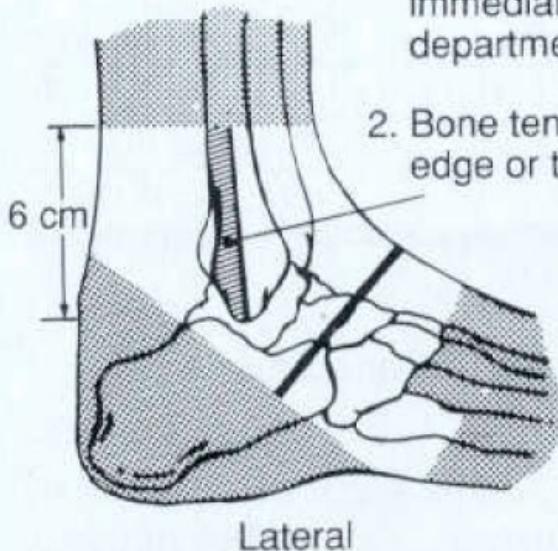
*No bone tenderness of knee other than patella.

†Unable to transfer weight twice onto each lower limb regardless of limping.

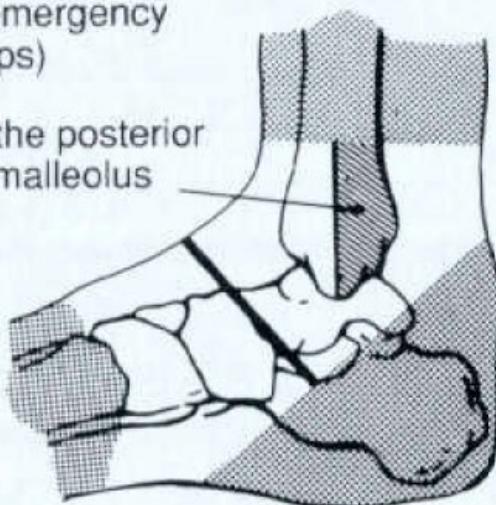
OTTAWA ANKLE RULES

An ankle x-ray series is only necessary if there is pain near the malleoli and any of these findings:

1. Inability to bear weight both immediately and in emergency department (four steps)
or
2. Bone tenderness at the posterior edge or tip of either malleolus



Lateral

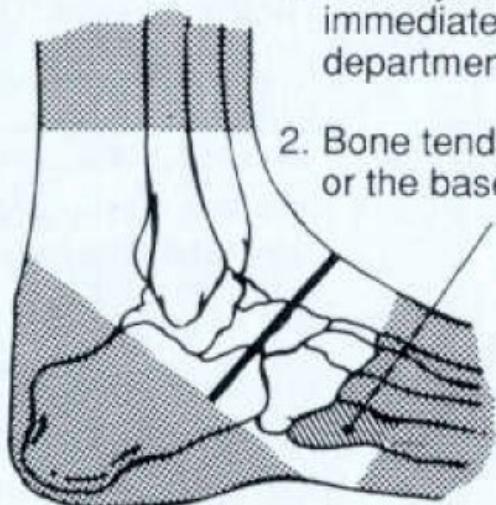


Medial

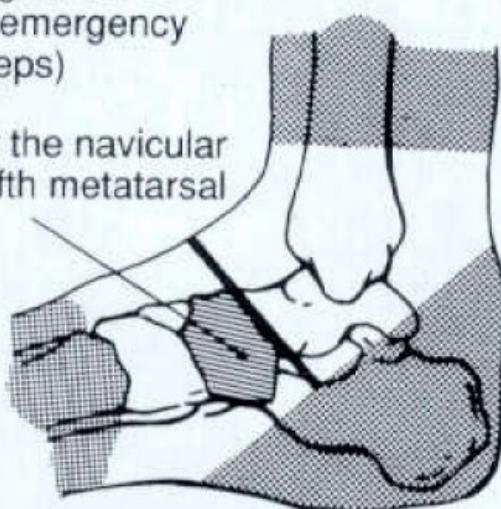
OTTAWA FOOT RULES

A foot x-ray series is only necessary if there is pain in the midfoot and any of these findings:

1. Inability to bear weight both immediately and in emergency department (four steps)
or
2. Bone tenderness at the navicular or the base of the fifth metatarsal



Lateral



Medial

OPEN FRACTURE MANAGEMENT

TUH Open Long Bone Fracture Management Protocol

- Time until antibiotics in the setting of open long bone fractures has been shown to have more of an impact on outcomes and post operative complications than washout in the operating room
- Does not apply to open fractures of hand, foot, skull, facial bones, or torso
- Identify open fractures expeditiously, including gunshot (ballistic) wounds
- Assign Gustilo Anderson Classification to long bone fractures
- Administer antibiotics immediately, within 1 hour of arrival
- Open fractures can often be diagnosed clinically, and antibiotics can be given empirically, if unclear recommend calling x-ray for expedited plain films
- For patients with open long bone fractures who are activated as traumas, antibiotics should be given in the trauma bay whenever possible to meet this timing goal

TUH Open Fracture Antibiotic Management Protocol for Long Bones

Gustilo Anderson Classification	Description	Antibiotic Choice	If Severe Penicillin Allergy
Type I	minimal soft tissue damage, not soiled or contaminated, wound <1cm	Cefazolin 2g IV now and q8 x 3	Clindamycin 900mg IV now and q8 x 3
Type II	wound 1-10cm, moderate soft tissue damage, moderate contamination	Cefazolin 2g IV now and q8 x 3	Clindamycin 900mg IV now and q8 x 3
Type III	usually >10cm, extensive soft tissue damage, severe contamination, periosteal stripping	Ceftriaxone 2g IV now and q24 until 24 hrs AND Vancomycin 1g IV now and q12 x 2 or until 24 hrs after wound closure	Aztreonam 2g IV now and q8 x 3 total doses AND Vancomycin 1 g IV now and q12 x 2 total doses or until 24 hours after wound closure

Initial Management after Antibiotics:

- Immediate irrigation at bedside with normal saline
 - 3-9 L of normal saline
 - Low pressure with gravity for all cases
- Application of saline soaked gauze and splint
- Operative irrigation and debridement within 24 hours of initial injury
 - Administer Tetanus toxoid if immunization status is unclear or absent
 - Additional Antibiotics required for the following circumstances:
 - Freshwater – fluoroquinolone
 - Saltwater – doxycycline
 - Fecal/Barnyard contamination – high dose penicillin

**Doses and regimens are adjusted based on patient weight and allergies when indicated

KETAMINE FOR ANALGESIA

Indications

- Ketamine can be considered for analgesia in adult patients with GCS >13 in moderate to severe pain

Relative Contraindications

- Penetrating eye injury
- Traumatic brain injury
- Uncontrolled hypertension
- Advanced coronary artery disease
- Schizophrenia

Ketamine dosing for Analgesia (not procedural sedation)

1. Without IV/IO Access - Ketamine 0.4 to 1 mg/kg IM (maximum 50 mg per dose)
 - Upon reassessment by an Emergency Medicine physician, the dose may be repeated every 2 hours as necessary to control severe pain
2. IV or IO Access Obtained - Ketamine 0.2 mg/kg IV/IO (maximum 20 mg per dose)
 - Should be diluted in 100mL normal saline and infused over 15 minutes
 - Upon reassessment by an Emergency Medicine physician, the dose may be repeated every 2 hours as necessary to control severe pain

Ketamine Dosing Summary for Analgesia

0.4 to 1 mg/kg IM

or

0.2 mg/kg infused over 15 minutes

Interactive Monitoring

- Close observation of airway and respirations during administration by RN, PA/NP or Physician is recommended as laryngospasm, emesis, and transient apnea has been documented with rapid IV administration; therefore, slow IV push and close observation for 10 minutes post administration is recommended.
- As the dose-related effect of Ketamine transitions from analgesia to anesthesia, nystagmus emerges as a side effect of Ketamine; therefore, development of nystagmus may serve as an indicator for the upper limit for analgesia dosing.

Mechanical Monitoring

- Pulse and respiratory rate should all be monitored throughout administration and periodically thereafter to ensure analgesia, and not anesthesia, has been appropriately reached.
- Blood pressure measurement after the initial value is not necessary.

Antiemetics may be given prophylactically as the incidence of emesis may be as high as 8.4%

Excerpted from:

TUH-ADMIN-MM-950.8620 Ketamine for Analgesia Guidelines
(*ED use only; full updated policy online in SharePoint*)

INTRANASAL MIDAZOLAM AND FENTANYL FOR ANXIOLYSIS AND ANALGESIA

SCOPE

This guideline shall apply to Temple University Hospital (TUH), Temple University Hospital – Episcopal Campus (TUH-EC), Temple University Hospital- Jeanes Campus (TUH-JC)

PURPOSE

To provide guidance for the use of fentanyl **OR** midazolam intranasally as an alternative form of analgesia/anxiolysis for patients in the Emergency Department. Fentanyl and midazolam should **NOT** be administered together for the purpose of anxiolysis/analgesia.

CONTRAINDICATIONS

1. Patients < 1 year of age
2. Patients with known fentanyl or midazolam hypersensitivity
3. Patients with impairment of consciousness, or who are intoxicated with drugs or alcohol
4. Length of procedure > 30-45 minutes or need for moderate/deep sedation
5. Known or suspected difficult airway
6. Nasal trauma, epistaxis or bilaterally occluded nasal passage

EQUIPMENT

1. Syringe
2. Mucosal atomizer device

Medication	IN Midazolam	IN Fentanyl
Primary use	Anxiolysis	Analgesia
Initial dose	0.4 mg/kg/dose (max initial dose 10 mg) Rounded to nearest 0.5 mg	1-2 mcg/kg/dose (max initial dose 100 mcg) Rounded to nearest 5 mcg
Additional doses Frequency: to be given no sooner than 10 minutes after initial dose After 2nd dose, if further analgesia or sedation is required, review and consider alternative or additional analgesia	0.2 mg/kg/dose Rounded to nearest 0.5 mg	1 mcg/kg/dose Rounded to nearest 5 mcg
Onset (minutes)	5-10	5-10
Duration (minutes)	30-60	30-60
Concentration	5 mg/mL	50 mcg/mL

INTRANASAL MIDAZOLAM AND FENTANYL FOR ANXIOLYSIS AND ANALGESIA (cont'd)

Administration	<p>To be administered by physician</p> <p>Using a 3 mL syringe draw up volume required for dose plus priming of the atomizer (dose volume + 0.1 mL), attach atomizer and push 0.1mL through the atomizer prior to administering the dose to avoid the dose being trapped in the atomizer dead space.</p> <p>Place atomizer into one nostril and administer approximately half the volume, pushing briskly on the plunger to ensure atomization. Switch to the other nostril and administer the remaining volume. The atomizer does not need to be re-primed between nostrils.</p> <p>A maximum volume of 1 mL may be given per nostril.</p>	
Considerations	<p>Paradoxical reaction is rare, but more common in infants and toddlers</p> <p>Treatment of overdose includes:</p> <ul style="list-style-type: none"> • Airway support and oxygen • Consider Flumazenil <ul style="list-style-type: none"> • Flumazenil should be used with caution in patients taking benzodiazepines chronically • IV Flumazenil: Initial dose: 0.01 mg/kg (maximum dose: 0.2 mg) given over 15 seconds; may repeat 0.01 mg/kg (maximum dose: 0.2 mg) after 45 seconds, and then every minute to a maximum total cumulative dose of 0.05 mg/kg or 1 mg, whichever is lower 	<p>Greater risk of respiratory depression when combined with benzodiazepine use</p> <p>Treatment of overdose includes:</p> <ul style="list-style-type: none"> • Airway support and oxygen • Consider Naloxone 0.1 mg/kg (or initial bolus of 0.4 mg repeated as needed)

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GUIDELINE FOR DROPERIDOL USE IN THE ED

Dosing Guidelines

Nausea/Vomiting ^{1,2,3}	Agitation* ^{4,5}	Headache ^{6,7,8}
1.25 - 2.5 mg IM or IV ⁺ Additional doses every 30 minutes as needed	5 - 10 mg IM or IV Additional doses every 5-10 minutes per physician discretion	2.5 mg IM or IV Additional doses every 30 minutes as needed

Max cumulative dose = 20 mg per episode (Higher doses have not been well studied in the emergency department)

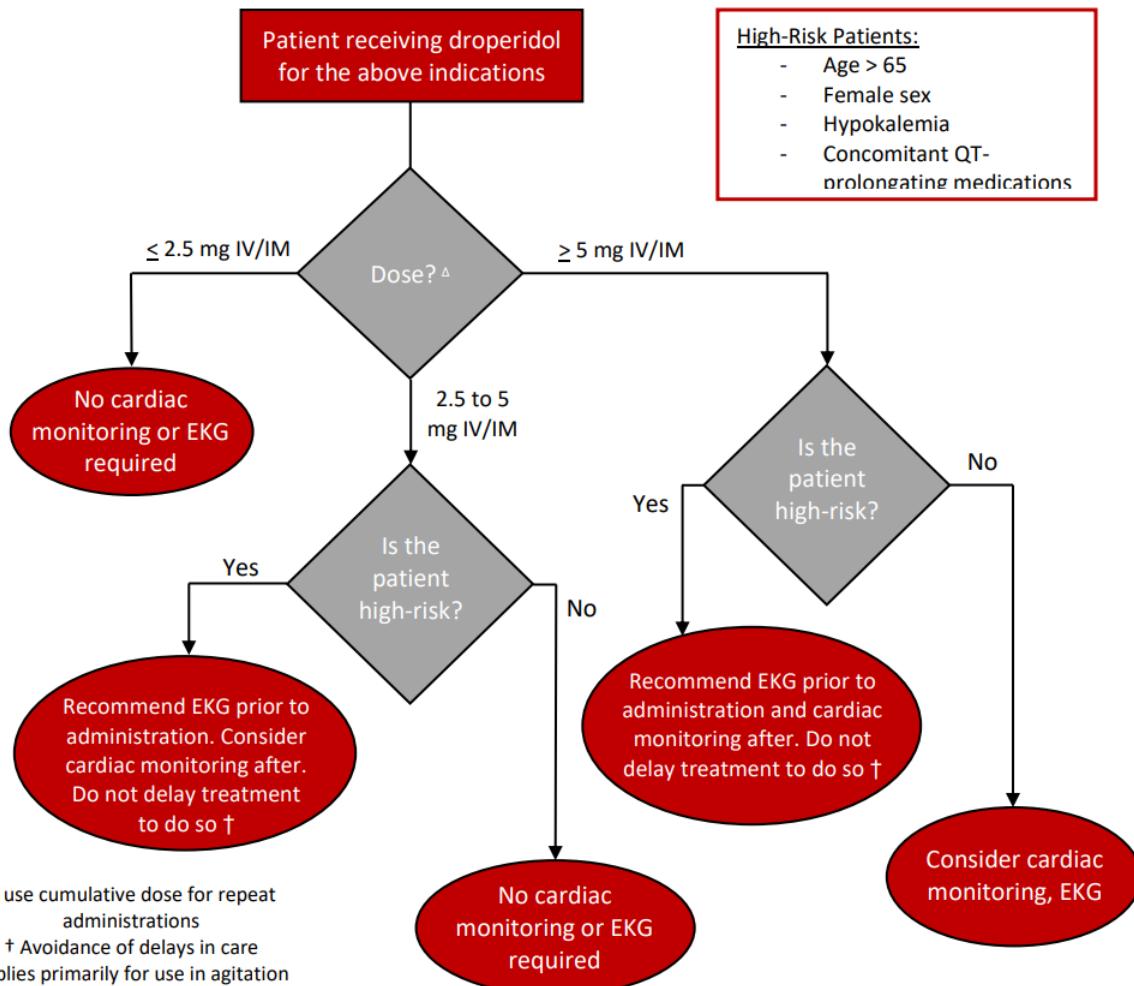
Off label use for agitation, ^{}Off label dose (doses < 2.5 mg)

Monitoring Guidelines

- EKG prior to administration showing a prolonged QTc should prompt consideration of different medication.
- Cardiac monitoring should be continued for a minimum of 30 minutes after administration.⁹

Additional Considerations

- Recommend avoiding use in patients with known QT prolongation or recent EKG showing QT prolongation if other non-QT prolonging medications are available as effective alternatives.
- Maximum QT prolongation effects appear to occur within 30 minutes of administration.
- QT prolonging effects are dose dependent.⁹
- Can consider combining 5 mg of droperidol with 2 to 5 mg of midazolam as an initial dose for agitation.



GUIDELINE FOR DROPERIDOL USE IN THE ED (continued)

Droperidol Guidelines – More Information

Pharmacokinetics

Onset of action: 3 to 10 minutes
Peak Effect: 30 minutes
Expected duration of effects: 2-4 hours

Mechanism of Action

Dopamine antagonist, alpha-adrenergic blockade, peripheral vascular dilation
QT-prolongation: affects potassium efflux during the repolarization stage (phase 3) of the action potential

AAEM Position Statement, 2015¹⁰

1. Droperidol is an effective medication in the treatment of nausea, headache, and agitation.
2. The FDA boxed warning is not supported by the literature for doses < 2.5 mg.
3. We do not recommend mandating an electrocardiogram (EKG) or telemetry monitoring for doses < 2.5 mg given either IM or IV.
4. Intramuscular doses of up to 10 mg of droperidol appear to be as safe and as effective as other medications used for sedation of agitated patients

ACEP Policy Statement, 2021¹¹

"The FDA agrees that current literature does not support mandating a prior electrocardiogram or telemetry monitoring for doses <2.5 mg given intravenously. There should be no restrictions for use of droperidol at higher doses in the ED provided cardiac monitoring is available soon after IV administration for high risk patients: age ≥65 years, female sex, hypokalemia, or concomitant QT prolongation medications... we recommend that physicians and prehospital personnel continue to use droperidol at even higher doses [for agitation], starting initially at 5-10 mg IM or IV given studied doses up to 20 mg, regardless of initial monitoring capability or EKG."

Boxed Warning

WARNING
Cases of QT prolongation and/or torsade de pointes have been reported in patients receiving Inapsine at doses at or below recommended doses. Some cases have occurred in patients with no known risk factors for QT prolongation and some cases have been fatal.

Due to its potential for serious proarrhythmic effects and death, INAPSINE should be reserved for use in the treatment of patients who fail to show an acceptable response to other adequate treatments, either because of insufficient effectiveness or the inability to achieve an effective dose due to intolerable adverse effects from those drugs (see WARNINGS, ADVERSE REACTIONS, CONTRAINDICATIONS, AND PRECAUTIONS).

Cases of QT prolongation and serious arrhythmias (e.g., torsade de pointes) have been reported in patients treated with INAPSINE. Based on these reports, all patients should undergo a **12-lead ECG prior to administration of INAPSINE** to determine if a prolonged QT interval (i.e., QTc greater than 440 msec for males or 450 msec for females) is present. If there is a prolonged QT interval, INAPSINE should NOT be administered. For patients in whom the potential benefit of INAPSINE treatment is felt to outweigh the risks of potentially serious arrhythmias, ECG monitoring should be performed prior to treatment and continued for 2-3 hours after completing treatment to monitor for arrhythmias.

INAPSINE is contraindicated in patients with known or suspected QT prolongation, including patients with congenital long QT syndrome. INAPSINE should be administered with extreme caution to patients who may be at risk for development of prolonged QT syndrome (e.g., congestive heart failure, bradycardia, use of a diuretic, cardiac hypertrophy, hypokalemia, hypomagnesemia, or administration of other drugs known to increase the QT interval). Other risk factors may include age over 65 years, alcohol abuse, and use of agents such as benzodiazepines, volatile anesthetics, and IV opiates. Droperidol should be initiated at a low dose and adjusted upward, with caution, as needed to achieve the desired effect.

Boxed Warning Specifics

97 cases of cardiac symptoms were found in the 277 adverse event cases reported to the FDA since 1961, many of which were duplicates, leaving 65 unique entries. There were 11 cases of torsades, with 5 deaths, 4 of which occurred abroad in patients receiving 600 mg IV. Of the 6 who survived, 1 case involved a patient receiving 600 mg IV and 4 received between 2.5 and 25 mg. Most cases involving doses under 25 mg were in patients with cardiovascular comorbidities and/or additional QT prolonging medications. 43 of these 97 submissions via MedWatch were filed on the same day.¹²

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FROSTBITE TRIAGE GUIDELINE

- 1) Patients that are < 24 hours from initiation of rewarming of frostbite and have not had rewarming/refreezing (freeze thaw cycles) injury might be amenable to TPA therapy.
 - a. Evaluate contraindications for TPA. If they qualify for TPA Consult Burn Surgery. TPA can be administered in an ICU setting.
 - b. Sometimes early amputation may be performed after SPECT CT, avoiding wait for the wounds to demarcate.
 - c. Patients with frost bite above the ankles, consult Burn for any likely BKA.
- 2) Patients with Frostbite are often complex with underlying medical conditions and ongoing social determinants of health challenges.
 - a. These patients are frequently admitted to the medical service with appropriate consultation. This will usually include:
 - b. Frostbite below the ankles, Consult Podiatric Medicine
 - c. Proximal to the ankles consult Burn
 - d. Upper extremities are managed by both Burn and Hand surgery.
 - i. Consult Burn first but Hand service will likely be involved if the frostbite extends proximal to the MCP's.
- 3) Soft tissue infection, necrotizing fasciitis and wet gangrene, even if caused by frostbite, need to be treated as the surgical emergency it is. Call ACS or Podiatry for urgent clearance of infection.
- 4) In the ED rewarming should begin as soon as possible!
 - a. A hot water bath, at 40 °C, is the preferred method of rewarming the frostbitten extremity
 - b. If a hot water bath is not available alternatives include:
 - i. The hot/ cold water blanket device we use for post code TTM, aka Stryker device set to 40°C
 - ii. The bear huger blanket set to 40° C wrapped around the frostbitten extremity and then a plastic sheet or garbage bag over that to keep the heat in.

PALLIATIVE CARE

Manage Distressful Symptoms

SYMPTOM	DRUG TO CONSIDER	DOSE	TIPS
Pain	Opioids [dose conversion]	10-20% of current total daily dose for breakthrough	After 1 st dose - for moderate pain, increase 50% - for severe pain, increase 100%.
Nausea/ Vomiting	Haldol	0.5-2mg IV or PO	Prolongs QT → check EKG
Dyspnea	Morphine	2-4mg IV or 10mg PO	Unlikely to depress respiratory drive at this dose
	Ativan	0.5-1mg IV or PO	Second line, may worsen delirium
Delirium	Haldol	0.5-2mg IV or PO	Search for underlying cause.
Terminal secretions	Glycopyrrolate	0.1mg IV or 0.2mg PO	Reduces respiratory gurgling
	Atropine 1% ophthalmic gtt	1-2 drops sublingual	

Equianalgesic Dosing of Narcotics

Opioid agonist	Oral/rectal mg	IV/SC mg	IV to PO
Morphine	30	10	3
Oxycodone	20	N/A	
Hydromorphone	7.5	1.5	5
Codeine	200	120 (IM)	
Hydrocodone	30	N/A	N/A
Oxymorphone	10	1	
Fentanyl ¹	N/A	100mcgr single dose	
Methadone ²	1-20	1-10	1.5
Codeine	200	130	1.5

Remember:

Palliative Care Order Set in Epic to help with symptomatic management

Palliative Care Consult:
Call (215) 581-2057

- Call the number 24/7 to speak with a clinician
- Place Palliative Care Consult order in Epic
- Philadelphia Hospice can be dispatched to the ED at any time if a patient is a candidate for inpatient hospice
- 9 AM-5 PM, Monday-Friday a clinician or chaplain from the Palliative Care team will be available to come to the ER to assist with goals of care discussions, management and disposition questions

The Goals of Care (GOC) Procedure

The Five Minute ED Goals of Care Conversation

Minute 1-2	<ul style="list-style-type: none"> - Elicit patient understanding of underlying illness and today's acute change - If available, build off previous advance directives or documented conversations - Acquire sense of patient's values and character (to help frame prognosis and priorities for intervention) - Name and validate observed goals, hopes, fears, and expectations
Minute 3-4	<ul style="list-style-type: none"> - Discuss treatment options using reflected language - Continually re-center on patient's (not family's) wishes and values - Recommend a course of action, avoiding impartiality when prognosis is dire
Minute 5	<ul style="list-style-type: none"> - Summarize and map out next steps - Introduce broader team of ED resources (e.g. observation unit, chaplain, social work)

AGE PARAMETERS FOR ADMISSIONS

Department	Age Parameter(s)
In-patient Including TUH-EC Behavioral Health and Crisis Response Center	-18 years old and above unless stated below
Emergency Department	-Birth and above
Outpatient Procedures	-15 years old and above -13 and 14 years old if weight \geq 100 lbs (45.4 kgs)
Elective Surgery	-18 years old and above unless stated below
Shriner's Patients (TUH-MC)	-Birth and above
Emergency Surgical Cases (TUH-JC)	-15 years old if weight \geq 100 lbs (45.4 kgs) and cleared by CMO/CEO/CNO/anesthesia/surgery
Burn Service (TUH-MC)	-15 years old and above and \geq 100 lbs (45.4 kgs)
Trauma Service (TUH-MC)	-15 years old and above -13 and 14 years old if weight \geq 100 lbs (45.4 kgs)
Breast Surgery (TUH-MC, TUH-JC)	-15 years old and \geq 100 lbs (45.4 kgs)
Obstetrics (TUH-MC)	-Any pregnant female, regardless of age
Gynecology (TUH-MC)	-13 years old and above if weight \geq 100 lbs (45.4 kgs)
Urological Surgery (TUH-MC)	-15 years old and above -13 and 14 years old if weight \geq 100 lbs (45.4 kgs)
Oral Maxilla Facial Surgery (TUH-MC)	-15 years old and above
Sports Medicine (TUH-MC, TUH-JC)	-15 years old and \geq 100 lbs (45.4 kgs)
Podiatry (TUH-MC, TUH-JC)	-15 years old and \geq 100 lbs (45.4 kgs) -Must have Trauma/Internal Medicine/Hospitalist attending for 15 to 17 years old
Interventional Radiology (TUH-MC)	-15 years old and above
Gastroenterology, Motility (TUH-MC)	-15 years old and above
Intensive Care Nursery	-Birth and above
General Nursery (TUH-MC)	
Dermatology (TUH-MC)	-Birth and above

Adapted from TUH INC ADMIN 950.1047

MEDICINE SUBSPECIALTY ADMISSIONS

The following criteria were agreed upon by section chiefs of the sub-specialty services. If patients meet the below criteria, they should be accepted by the service without debate, so long as there are available beds and service is not capped. You may also discuss other patients you feel are appropriate for sub-specialty service on a case-by-case basis.

Heart Failure *Call Heart Failure attending via T3 (2-4778)*

- As of 8/15/24, the heart failure service should be called for patients meeting the following criteria:
 - All heart transplant, LVAD, or inotrope-dependent patients regardless of admitting diagnosis
 - Patients known to HF service being admitted with HF exacerbation
 - Any HF patient with high clinical risk (hypoxia, BP <90 or HR>100, anuric/no response to treatment, significant arrhythmia)
 - Patients known to pulmonary hypertension clinic or requiring IV pulmonary vasodilators
 - Patients with a new cardiomyopathy (including peri-partum)

Pulmonary (Med Blue, Pulm 1, Pulm 2) *Call Med Blue attending via T3 (2-0923)*

- As of 4/18/19, the pulmonary service should be called for patients meeting the following criteria:
 - All established* Temple Pulmonary patients regardless of the admitting diagnosis or level of care except in those cases where another specialty service should clearly manage the patient's care
 - Patients with the following diagnoses meeting inpatient level of care, whether an established patient or not:
 - Asthma or COPD exacerbation
 - Pneumonia
 - Pulmonary Embolism (initial call to PERT)
 - Hx of ILD, sarcoidosis, pulmonary vasculitis
 - Spontaneous pneumothorax
 - Severe hypoxia
 - BIPAP if meet criteria for floor

Pulmonary Transplant *Call Lung Transplant attending via T3 (2-0923)*

- As of 4/18/19, the pulmonary service should be called for patients meeting the following criteria:
 - All TUH lung transplant patients

*Established means seen by pulmonary service within the past 6 months

MEDICINE SUBSPECIALTY ADMISSIONS (continued)

General Nephrology (Med Yellow) *Call Med Yellow attending via Amion*

- As of 1/31/22, the general nephrology service (med yellow) should be called for patients meeting the following criteria:

- CKD 4/5 needing initiation of dialysis
- All PD and home hemodialysis patients
- HD vascular access infections
- Glomerulonephritis patients, including those from Temple Lupus Clinic
- Post kidney transplant > 1 month with a non-surgical issue
- Any patient the attending feels would be better managed by primary Nephrology service or who may have a high educational value for the medical resident

NOT criteria for med yellow:

- Vascular access dysfunction who otherwise would be on the surgical/vascular service
- Acute kidney stone pain
- Non-kidney solid organ transplants
- Patients managed by Clinical Nephrology Associates or other non-Temple practices
- Any patient deemed as inappropriate for this service by the Nephrology attending

Transplant Nephrology *Call Transplant Renal fellow via Amion*

- As of 11/4/19, the general nephrology service should be called for patients meeting the following criteria

- Post kidney or pancreas transplant > 1 month and < 3 years (unless otherwise dictated by AOT surgeon)
- Anti-Rejection Therapy
- Illness that threatens the health of the kidney or pancreas transplant (e.g AKI, infection)
- Other illness where specific benefit is indicated by Primary Temple Transplant Nephrologist

Hepatology

- As of 8/13/19, the hepatology service is no longer primarily accepting patients.

ICU ADMISSIONS

ICU Admission Procedures

ICU admissions are generally discussions between EM and ICU attendings. Admissions are directed to the appropriate ICU based on clinical discretion, augmented by some subspecialty criteria.

Surgical ICU (SICU, BICU, NSICU) and NICU admissions generally occur after consultation of the admitting service in the ED. Admissions to the MRICU and CICU, however, do not typically require consultation. Admissions to those services are initiated by a call from the ED attending to either the MRICU or CICU attending.

If there is a borderline case in which the ED attending is unsure if MRICU or CICU would be best to admit to, T3 can assist by facilitating a 3-way call in which both ICU attendings on the line for a group discussion.

Alternatively, if you call an ICU for admission, and that service feels another ICU would be a better option, T3 will keep the first ICU attending on the line while they connect you with the second for a group discussion.

ICU Transitions of Care

After discussion and acceptance of the case between the EM physician and the ICU attending, an admission order is placed.

The admitting critical care team will evaluate the patient as soon as possible after admission orders are placed, but not longer than 2 hours, and place orders upon assessment while in the ED.

Responsibility for the patient is officially transitioned to the ICU team once any of the following occurs:

- the patient is evaluated by the admitting team;
- orders are placed by the admitting team; or
- the patient leaves the Emergency Department to inpatient destination.

If after that transition a patient boarding in the emergency department decompensates requiring immediate attention, limited interventions such as CPR, airway management, or ordering of time-critical medications may be performed by the EM team and communicated to the admitting team.

Patients admitted from the ED to a different campus are primarily managed by the emergency medicine provider team until they depart for that campus.

RESPIRATORY ICU VS. STEPDOWN UNIT CRITERIA

ICU Respiratory Criteria

- Full mechanical ventilatory support (unless chronically ventilated with stable settings)
- Continuous noninvasive ventilation for initial treatment of Acute Respiratory Failure
- Intermittent noninvasive ventilation with pH less than 7.25 and/or underlying mental status of concern (i.e., patient not adequately alert and capable of adhering to therapy)
- Noninvasive positive pressure ventilation in first 24hrs after an extubation for acute hypercapnic respiratory failure or acute decompensated heart failure
- Positive pressure ventilation with a tracheostomy tube and:
 - not weaning at least 30 minutes a day OR
 - on >50% FiO₂ or PEEP >8 OR
 - not awake/alert

Respiratory Stepdown Unit (6E) Criteria

- Continuous or q2hr nebulized bronchodilator therapy
- Chest physiotherapy/advanced pulmonary toilet
- High-flow nasal cannula, stable vitals, <=50% or 50 liter flow
- Intermittent noninvasive ventilation
 - pH ≥ 7.25 (venous ≥ 7.20) with improving clinical status
- Positive pressure ventilation with a tracheostomy tube and:
 - weaning at least 30 minutes a day AND
 - on ≤ 50% FiO₂ and PEEP ≤ 8 AND
 - Acceptable mental status per clinical judgment
- Patient receiving chest physiotherapy (e.g., alert/awake and comfortable with use of smart vest, incentive spirometry, flutter valve, or Cough Assist machine as needed)
- Chronically on ventilator with stable settings and hemodynamics
- Custodial ventilation for patients (e.g., coming from/going to transfer to skilled levels of care)

CHEST PAIN ADMISSIONS

The patient that is called in for a non-CCU admission for chest pain has already been determined by the ED team to meet eligibility for a non-CCU admission based upon the EKG reading and clinical assessment. The initial EKG is an able predictor of patient outcome and allows determination of where the patient should be admitted. According to Lee and Goldman (NEJM 342:1187-1195), if the EKG does not show substantial ischemic changes not known to be old and there are no other high risk clinical features (ex. SBP < 100, rales, major dysrhythmia), intensive care unit admission is not warranted. A table from this article confirming this is attached.

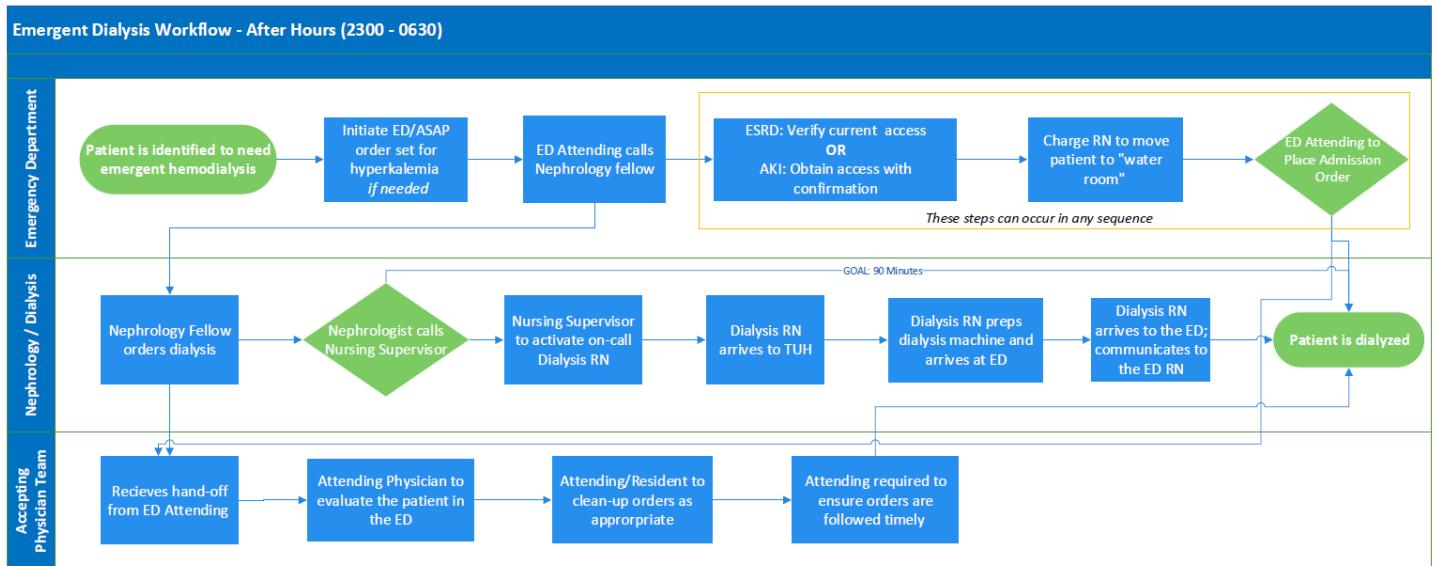
At TUH, the presence of a positive cardiac marker is not an automatic cause for a CCU admission. A new positive cardiac marker is a critical value result called by the lab immediately to the treatment team. In practice, given the time delay between the admit order and patient transfer to a bed, these markers generally become available while the patient is still in the ED. There is no reason for a delay in identifying an attending for a telemetry admission for these patients. The vast majority will have negative markers and those that turn out to have positive markers can receive a cardiology consult with their disposition changed if deemed necessary.

NEJM 342:1193

TABLE 3. RECOMMENDED STRATEGIES FOR DETERMINING WHERE TO ADMIT PATIENTS WITH ACUTE CHEST PAIN FOR THE TREATMENT OF ONGOING, LIFE-THREATENING CONDITIONS.

LOCATION	INDICATION
Intensive care unit	One of the following: Substantial ischemic electrocardiographic changes in two or more leads that are not known to be old: ST-segment elevation ≥ 1 mm or Q waves of 0.04 sec or more ST-segment depression ≥ 1 mm or T-wave inversion consistent with presence of ischemia Any two of the following conditions, with or without substantial electrocardiographic changes: Coronary artery disease known to be unstable (in terms of frequency, duration, intensity, or failure to respond to usual measures) Systolic blood pressure < 100 mm Hg Serious new arrhythmias (new-onset atrial fibrillation, atrial flutter, sustained supraventricular tachycardia, second-degree or complete heart block, or sustained or recurrent ventricular arrhythmias) Rales above the bases
Intermediate-care unit	Any of the following conditions but meeting no criteria for intensive care: Coronary artery disease known to be unstable Systolic blood pressure < 110 mm Hg Rales above the bases Major arrhythmias (new-onset atrial fibrillation, atrial flutter, sustained supraventricular tachycardia, second-degree or complete heart block, or sustained or recurrent ventricular arrhythmias) New onset of typical ischemic heart disease that meets the clinical criteria for unstable angina and that occurs at rest or with minimal exertion
Evaluation or observation unit	New-onset symptoms that may be consistent with ischemic heart disease but are not associated with electrocardiographic changes or a convincing diagnosis of unstable ischemic heart disease at rest or with minimal exertion Known coronary artery disease whose presentation does not suggest a true worsening but for which further observation is thought to be beneficial
Evaluation or observation unit	New-onset symptoms that may be consistent with ischemic heart disease but are not associated with electrocardiographic changes or a convincing diagnosis of unstable ischemic heart disease at rest or with minimal exertion Known coronary artery disease whose presentation does not suggest a true worsening but for which further observation is thought to be beneficial
Home with office follow-up in 7 to 10 days to determine whether further testing is needed	Other conditions

EMERGENT DIALYSIS WORKFLOW



A swim lane diagram provides clarity and accountability by task owner. Interpret a swim lane diagram as steps can occur simultaneously, rather than linearly.

Last updated: 2/15/2024

ESPERANZA PATIENTS

- Esperanza patients admitted from the Temple ED or Episcopal ED should be preferentially placed on the Esperanza Service at TUH MC
 - Select TUH-MC only in the admission order
 - Jeanes ED patients are not expected to be transferred to the MC for admission to the Esperanza Service
- Esperanza patients should be able to communicate that they get care at the Esperanza Clinic. You can also identify these patients if you switch to the inpatient context where there is a light blue banner on the “Summary” tab that identifies these patients as Esperanza
- If you have specific questions regarding Esperanza patients while on shift, you can contact the Esperanza attending on-call listed in Amion (search “Esperanza”)
 - The following doctors can be reached via Epic chat: Rita Ramos, Daria Chacon, Kristopher Ahn, and Timothy Johnston
- To arrange follow-up from the ED, you can call the Esperanza Clinic directly at 215-302-3600. You can also contact the Esperanza attending on call who may be able to assist. The Esperanza Clinic address, phone number, etc. should be populated in the disposition follow-up section

NEUROSURGERY ADMISSIONS

Created 1/7/15, Reviewed 9/2023

Memo To: EM, Neurology and Neurosurgery faculty and residents

From: Robert McNamara, M.D.
Chair, Department of Emergency Medicine

Michael Weaver, M.D.
Chair, Department of Neurosurgery

Paul Katz, M.D.
Chair, Department of Neurology

Re: Intracranial bleed admission to the Neurosurgery service

The respective departments have agreed to the following procedure.
(Applicable hospital policy: 950.272 ED Admission Process)

Procedure:

1. Patients with a non-traumatic intracranial bleed including SAH will be admitted to the Neurosurgical ICU on 3 Boyer on the Neurosurgery service. The EM physician will place an admission order and ensure that the Neurosurgery resident is aware of the admission.

Patients with a traumatic bleed are to be evaluated by the trauma service in the current fashion

ORTHOPEDICS ADMISSIONS

MEMORANDUM OF UNDERSTANDING

RE: Patient Admissions to the Orthopedic Service from the Emergency Department

Agreed to by:

Joseph Cheung, M.D.
Chairman, Medicine

Robert M. McNamara, M.D.
Chairman, Emergency Medicine

Pekka Mooar, M.D.
Interim Chairman, Orthopedics

Created May 2015; Reviewed Sept 2023

Medical Stability is determined by the Emergency Medicine Attending using the following guidelines.

Medical Stability Criteria:

- 1) Isolated Orthopedic Event. No new medical/trauma issues (i.e. change in mental status, syncope, active infection unrelated to orthopedic injury site)
- 2) No pre-existing medical conditions that pose a high potential for medical instability (i.e. oxygen dependent COPD, ESRD, uncontrolled IDDM, or severely immunocompromised: ANC < 500, CD-4 < 200, etc.)
- 3) Patients with geriatric hip fracture are a category of patients who are more likely to have medical comorbidity and be appropriate for admission to the medical service. Patients with hip fracture and the following conditions (systolic congestive heart failure, severe coronary artery disease or active angina, valvular heart disease, fracture caused by syncope, active delirium, new or active malignancy, fracture in a patient on hospice) should be admitted to the internal medicine service with orthopedic consultation. Patients with geriatric hip fracture without the above-mentioned conditions can be admitted to the orthopedic service with medicine consult.

Short term changes in otherwise stable medical problems directly related to the traumatic injury do not warrant medicine admission. (i.e. hypertension or hyperglycemia secondary to the acute orthopedic stressor can be managed on orthopedics upon stabilization.)

The Emergency Medicine attending declares the patient:

Medically Stable for an Orthopedic Service, and assigns the patient to the orthopedic attending on call and notifies the orthopedic resident that an admission is in the Emergency Department.

or

Medically Unstable for an Orthopedic Service, and follows the standard medicine admission pathway, plus contacts the orthopedic resident that a consult is in the Emergency Department.

The expectation is communication within a suitable timeframe (by 8 am or by 8pm depending on the time of the admission) between the internal medicine attending and orthopedic attending, regardless of admission service.

This does not preempt later patient transfer after admission if patient conditions change.

COMPARTMENT SYNDROME CONSULTATIONS

Consultation Guideline for Acute Compartment Syndrome of the Extremities

General Principles

- Acute compartment syndrome (ACS) is a surgical emergency. Immediate surgical consultation should be obtained whenever ACS is suspected based upon the patient's risk factors and clinical findings. Extremity fasciotomy is the only recognized treatment of ACS. Whenever possible, pressure measurements should be obtained by the surgeon who will perform fasciotomy.

Temple ED

- Fracture related
 - Upper and lower extremity – Consult Orthopedic Surgery
 - Hand – Consult Orthopedic Surgery or Plastic Surgery per call schedule
- Non-fracture related
 - Upper extremity – Consult Orthopedic Surgery
 - Hand – Consult Orthopedic Surgery or Plastic Surgery per call schedule
 - Lower extremity – Consult General Surgery (staffed by Trauma attending)
 - If secondary to acute arterial occlusion or phlegmasia cerulean dolens – Consult Vascular Surgery

Jeanes ED

- Fracture related
 - Upper and lower extremity – Consult Orthopedic Surgery
- Non-fracture related
 - Upper and lower extremity – Consult Orthopedic Surgery
 - If secondary to acute arterial occlusion or phlegmasia cerulean dolens – Consult Vascular Surgery
- For hand cases, if a hand surgeon is not available then transfer to Temple ED for Orthopedic Surgery or Plastic Surgery consultation per call schedule

Episcopal ED

- Transfer to Temple ED and follow Temple ED consultation guideline as noted above

NECROTIZING SOFT TISSUE INFECTION CONSULTATION GUIDELINE

Based on anatomic involvement, the following consultants should receive timely consultation for surgical management of necrotizing soft tissue infection (NSTI) in conjunction with broad spectrum antibiotic treatment, fluid resuscitation, and other necessary emergency department care.

For Xylazine-related wounds, please reference the ED Xylazine Soft Tissue Infection pathway. However, if there is concern for underlying NSTI, please consult accordingly.

For each listed area, ALL listed consultants should be contacted. If overlapping areas are involved, ALL consultants from each area should be contacted.

Face:

- General Surgery
- Plastic Surgery

Neck:

- General Surgery
- ENT

Chest Wall (including upper back):

- General Surgery
- Cardiothoracic Surgery

Abdominal Wall (including lower back or buttock/gluteal):

- General Surgery

Perineum:

- *Male*: General surgery + Urology
- *Female*: General surgery + Gynecology

Upper Extremity:

- *Above elbow*: General surgery, +/- Orthopedic surgery per General Surgery
- *Below elbow*: Orthopedic surgery

Lower Extremity Involvement:

- *Above knee*: General surgery, +/- Orthopedic surgery per General Surgery
- *Below knee*: Orthopedic surgery, Vascular surgery, Podiatry
- *Below ankle*: Podiatry and Vascular Surgery

Updated Dec. 2023

HAND INFECTION ADMISSIONS

MEMORANDUM OF UNDERSTANDING

Created 5/2020; Reviewed Sept 2023

RE: Admissions of a patient with hand infection(s)

Agreed to by:

Amy Goldberg, MD, Thomas Fekete, MD, Eric Kropf, MD, Robert McNamara, MD
Chairs of Surgery, Medicine, Orthopedics and Emergency Medicine

Guideline: Medically stable patients with hand infections requiring surgical intervention will be admitted to the covering surgical service (Orthopedic or Plastic Surgery) unless the Emergency Medicine Attending believes the patient would be best served with admission to a medical service.

Medical Stability Criteria:

- 4) No unstable medical issues (ex. change in mental status, syncope, active infection unrelated to the hand)
- 5) No pre-existing medical conditions that pose a high potential for medical instability (ex. oxygen dependent COPD, ESRD, uncontrolled IDDM, or severely immunocompromised: ANC < 500, CD4 < 200, etc.)

Medicine and addiction medicine consultations are available for management of prior medical conditions and substance use related issues. This agreement does not preempt later patient transfer after admission if the condition of the patient changes.

UROLOGY ADMISSIONS

Memo To: EM and Urology faculty and residents

From: Robert McNamara, M.D.
Chair, Department of Emergency Medicine

Jack Mydlo, M.D.
Chair, Department of Urology

Darilyn Moyer, M.D.
Vice Chair for Education, Department of Medicine

Re: Admission guidelines for Urology service revised 3/2009; reviewed Sept 2023

The respective departments have agreed to the following admission guidelines. As guidelines, these do not supersede clinical judgment regarding individual patient care decisions.

General Principles:

1. If a urology patient has significant medical issues that cannot be effectively managed by the medicine consult service that patient would be best served by admission to Medicine with a Urology consult. (Examples would include patients with urologic infections who are toxic or have immunologic compromise.)
2. When the need for admission is unclear, consultation will be sought. Episcopal site patients needing consultation will be transferred to the TUH main ED.
3. Patients likely needing urgent operative intervention (ex. Testicular torsion) from the Episcopal site will be transferred to the TUH main ED.
4. When admitting a patient for a urologic infection obtain and send cultures prior to initiation of antibiotic therapy
5. Complications of urologic surgery and procedures should be admitted to urology.

Guidelines:

1. **Urolithiasis:** Admission is appropriate in the following circumstances
 - a. Suspected pyonephrosis: obstruction with infection. In females, perform straight catheterization, do not use clean catch specimens to make this determination. The need for urgent drainage should be discussed with urology. Patients with suspicion of sepsis should be admitted to medicine with consideration for the RICU
 - b. Solitary kidney with high grade obstruction
 - c. Intractable pain or the inability to tolerate liquids after reasonable pharmacologic intervention in the emergency department.
2. **Epididymitis:**
 - a. Admit to urology if intractable pain or unable to comply with oral antibiotic therapy
 - b. Admit to medicine with urology consult if immunologic compromise or toxic in appearance
3. **Hematuria:**
 - a. Admit if requires blood transfusion or continuous irrigation

BURN ADMISSIONS

Burn Center Admission Guidelines (ABA criteria) are as follows:

- Partial thickness (2nd degree) burns greater than 10% total body surface area (TBSA)
- Burns that involve the face, hands, feet, genitalia, perineum, or major joints.
- Any Full thickness (3rd degree) burns in any age group.
- Electrical burns, including lightning injury.
- Chemical burns.
- Inhalation injury.
- Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality.
- Any patient with burns and concomitant trauma (such as fractures) in which the burn injury poses the greatest risk of morbidity or mortality. In such cases, if the trauma poses the greater immediate risk, the patient may be initially stabilized in a trauma center before being transferred to a burn unit.
- Burned children in hospitals without qualified personnel or equipment for the care of children.
- Burn injury in patients who will require special social, emotional, or rehabilitative intervention.

ED to ED referral, elicit following for decision making:

- **% TBSA burn** - 2nd and 3rd only (areas of 1st degree burn= sunburn, are not part of TBSA calculation)
- **Mechanism** - scald, flame, electrical, friction, chemical
- **Depth** - blisters need to be unroofed to assess partial or full thickness
- **Body parts involved** - faces, hands, overlying joints, sensitive areas should be admitted
- Pertinent PMHx
- Mechanism as a determination of likely burn severity
- Concern for inhalation injury
- Special circumstances that warrant admission even if small burns:
 - Diabetic feet
 - Circumferential burns
 - Elderly
 - Ability to follow up
- Electrical injury
 - Contact with <1000 V, without EKG changes or LOC, no cutaneous burns may discharge home
 - Contact with >1000 V should admit for 24 hr observation on telemetry
- Uncomfortable provider - Anyone can come to the ED for evaluation vs. direct admit to burn unit.

Criteria for outpatient management:

- Ability to perform daily wound care at home on oral pain medications that are safe doses for home use. **Initial wound care - SSD is always OK**
- Pain control on PO narcotics, if IV is needed in ED, they should admit under OBS, and try wound care next day on PO meds.
- Ability to perform ADLs and any ROM (range of motion) or PT/OT associated with the burn injury. Do not immobilize. No crutches for lower extremity burns.
- Any size 1st degree burn= sunburn level. Blisters should be unroofed- revealing 2nd or 3rd degree burn.
 - Exception- 1st degree burns from Hydrofluoric Acid. They may benefit from Ca+ treatment.

*Have a low threshold to consult the Burn team, as there is benefit both from a wound care standpoint and better addressing of follow-up needs.

CONSULTANTS POLICY

NUMBER: 950.2056

TITLE: *EMERGENCY DEPARTMENT ADMISSION PROCESS: GUIDELINES FOR HOUSE STAFF CONSULTANTS*

EFFECTIVE DATE: 6/00

LAST REVIEWED: 7/7/20

LAST REVISED: 6/25/13

PURPOSE

This policy and procedure delineates the processes necessary for the smooth and effective flow of patients from the Emergency Department throughout the Hospital.

POLICY

It is the policy of Temple University Hospital that patients presenting to the Emergency Room will receive prompt and thorough clinical attention and that the needs and wishes of the patient and family will be met inasmuch as is practically possible. To that end, the following procedures have been promulgated via the Medical Executive Committee to ensure an efficient provision of care for all emergent/urgent patients.

SCOPE AND RESPONSIBILITIES

1. This policy and procedure will be distributed all hospital personnel via the Administrative Policy and Procedure Manual and to all attending Physicians and House Staff via Department distribution. This policy and procedure will also be included in the Administrative policy and Procedure Manual for House Staff.
2. It is the responsibility of each individual consultant, regardless of department or section, to adhere to the procedures contained herein and to ensure that the policy of the institution is maintained at all times.

PROCEDURES

1. The Emergency Medicine Attending Physician will admit patients to the service they consider most appropriate for the patient's medical needs. If a concern arises after the admission over the appropriateness of the selected service or of the need for admission, the involved service can transfer the patient to another service or discharge the patient to home. Consultations will be obtained by the Emergency Department Attending Physician when the need for the admission or the best service to care for the patient is unclear.
2. Consultants, regardless of department or section, must respond to Emergency Department request for consultation within thirty (30) minutes of receiving the request for consultation.
3. All initial consultations in the Emergency Department are to be performed by a resident above the PGI (intern) level.
4. Consultations must not be delayed pending the results of laboratory and other testing.
5. If the consulting team concludes that the patient does not need admission, requires continued work-up in the Emergency Department, or that another service should admit the patient, the Emergency Department Attending Physician must agree to the prescribed course of action or plan of care.
6. Unresolved issues will be solved by direct communication between the Emergency Department Attending Physician and the consulting service's Attending Physician who is either in-house or on-call.
7. The consulting service's Attending Physician may be required to personally evaluate the patient in the Emergency Department when issues are not resolved in a timely fashion.
8. Any concerns related to inappropriate admissions will be directed to the Chief Medical Officer who will review the matter with the involved services.

SURGICAL CONSULTATIONS

Memo To: EM and Surgical faculty and residents

From: Robert McNamara, M.D.
Chair, Department of Emergency Medicine

Amy Goldberg, M.D.
Dean, Lewis Katz School of Medicine at Temple University

Re: Surgical Consultations

The respective departments have agreed to the following consultation guidelines. As guidelines, these do not supersede clinical judgment regarding individual patient care decisions.

General Principles:

1. All patients who come to the ED (TUH, EH, JH) after recent surgery need to have direct ED attending-to-on-call-surgical-service-attending phone contact to directly discuss the case.
2. This can be in addition to resident-to-resident consultation conversations and is not restricted to these time periods (i.e., attending-to-attending conversations are encouraged beyond these dates, as necessary).

Guidelines:

- Recent surgery is defined as follows:
 - POD # 30 or less: CT surgery cases
 - POD #7 or less: all other surgical services

March 2021

TELEMETRY INDICATIONS

Class I: High Risk

Class II: Moderate Risk

Class III: Low Risk

INITIATION CRITERIA (CLASS)	DISCONTINUATION CRITERIA
Critically Ill/Diagnosis Based	
ICU Care (I)	Downgrade or clinical judgement
Resuscitation from cardiac arrest (I)	Clinical judgement
STEMI or ACS (I)	No recurrent chest pain Hemodynamically stable
Chest pain syndrome/rule out MI (III)	Clinical judgement
Myocarditis or pericarditis (II)	Symptom resolution
Acute CVA (II)	48 hours without unstable arrhythmia
Acute HF/pulmonary edema (II)	48 hours without arrhythmia
Receiving IV inotropic agents (I)	Discontinuation of therapy
Respiratory failure with RR > 30, BiPAP, change in mental status. FIO2 >50%, requires frequent suctioning (I)	Improvement of respiratory status
Drug overdose/intoxication of an agent with arrhythmogenic potential (I)	Clinical improvement Appropriate serum drug clearance

Arrhythmia	
Syncope of unknown cause or suspected arrhythmia (II)	24 hours without unstable arrhythmia
Presence of high 2 nd or 3 rd degree AV block (I)	Pacemaker implantation
Presence of ventricular arrhythmias (I)	Clinical judgement
Initiation or dose change of QT prolonging medication, particularly antiarrhythmic medication (II)	QTc not prolonged
Prolonged QT interval >500msec (II)	QTC not prolonged ICD in place
New onset atrial fibrillation/flutter (II)	48-hours without arrhythmia
Uncontrolled chronic atrial fibrillation/flutter (II)	48-hours without arrhythmia
Symptomatic sinus bradycardia or junctional rhythm without AV block (II)	48-hours without arrhythmia
Severe electrolyte disturbance (II)	Electrolytes within normal range

TELEMETRY INDICATIONS (Continued) and TELEMETRY EXCLUSIONS

Pre-Operative	
Pre-operative for cardiac surgery or coronary revascularization during this admission (I)	Procedure performed
Post-Operative	
Cardiac surgery during this admission, including heart transplant (I)	Clinical judgement
Percutaneous coronary revascularization (III)	No recurrent chest pain Uncomplicated procedure Hemodynamically stable
Permanent pacemaker or ICD implantation (III)	Uncomplicated procedure Hemodynamically stable
Catheter ablation (III)	Uncomplicated procedure No ongoing arrhythmias
Thoracic surgery or complex major surgery (II)	Clinical judgement
Non-complex major surgery (III)	Clinical judgement
Cardiac Devices	
Use of wearable defibrillator (I)	Clinical judgement
Temporary pacing system in place (I)	Permanent pacemaker implantation
Suspected pacemaker or ICD malfunction (I)	Clinical judgement

EXCLUSION CRITERIA	
Diagnosis Based	
DNR or comfort care and absence of arrhythmias that cause discomfort	
Syncope with clear non-arrhythmic/non-cardiac etiology	
Respiratory disease without heart disease, not meeting criteria for telemetry	
Arrythmia	
Asymptomatic sinus bradycardia	
Chronic persistent atrial fibrillation with controlled average heart rate < 100 bpm	
Asymptomatic ventricular ectopy unrelated to indication for hospitalization	
Pre/Post Operative	
Uncomplicated non-major surgery with low risk for arrhythmia	
Routine diagnostic cardiac catheterization without intervention or indication for revascularization	
Cardiac Devices	
Presence of pacemaker or ICD without arrhythmias or suspicion of device malfunction	

Excerpted from TUH_INC-Admin 950.2026

PROCEDURE CONSENT

The following chart outlines recommendations on consent type to be obtained according to planned procedure. The recommendations are under the assumption that the patient is in immediately stable condition and the patient or their healthcare proxy demonstrates decision-making capacity and is available to discuss the planned procedure. These recommendations are not to apply in the setting of an emergent scenario in which the process of obtaining consent could create a delay in care, posing immediate risk to the patient. The ultimate decision with respect to consent type obtained is at the discretion of the attending emergency medicine physician and may vary from this guideline based on clinical circumstances. This list is not necessarily comprehensive and some procedures performed by emergency medicine physicians may not be listed.

Legend:

WC = Written consent = iMed (or other) consent form signed by patient or representative and document in procedure note.

VA = Verbal assent = Documentation of assent in procedure note.

EC = Emergent Consent. = Documentation of emergent consent in procedure note.

Procedure Name	Consent Type Recommended	Notes
ABG Sampling	VA	
Abscess I&D	VA	
Arterial Line	WC	
Arthrocentesis	WC	
Blakemore Tube Placement	EC	
Cardioversion, electrical	WC	
Central Line	WC	
Cricothyrotomy / Needle Cricothyrotomy	EC	
Compartment Pressure Measurement	VA	
Conscious Sedation	WC	
Dislocation Reduction without conscious sedation	VA	
ED Thoracotomy	EC	
Feeding gastrostomy tube exchange / replacement	VA	
Foreign Body Removal	VA	-Consider WC for more invasive procedure, such as vaginal or rectal FB.
Fracture Reduction	VA	
Hemorrhoid I&D	WC	
Intubation, emergent	EC	
Intubation, urgent	VA	
Intubation, elective	WC	
IO Line	EC	-Pediatric (VA from parents if non-life threatening)
Laceration Repair	VA	
Lateral Canthotomy	VA	

Lumbar Puncture	WC	
Nasogastric tube placement	VA	
Nail Removal	VA	
Nail Trehphination	VA	
Nerve Block	VA	-WC for fascia iliaca, serratus anterior, or supraclavicular.
Paracentesis	WC	
Pericardiocentesis	WC	-EC for code scenario.
Perimortem C-section	EC	
Priapism Drainage	WC	
Suprapubic Catheter Exchange	VA	
Suprapubic Catheter Placement	WC	
Splinting	VA	
Thoracentesis	WC	
Thoracostomy	WC	
Transcutaneous Pacing	VA	
Transvenous Pacing	WC	
Trigger Point Injection	VA	
Umbilical artery and vein catheterization	EC	
Urinary Catheter Placement	VA	
Vaginal delivery of a baby	VA	
Venous Cutdown	EC	

EMERGENT FOLLOW-UPS

Any study that requires emergent follow up should be performed by the attending on duty. Studies that require emergent follow up are positive blood cultures and critical radiology results (as defined in the policy). The remainder of critical labs that result on patients who leave from the waiting room are to be followed up by the charge nurse, who has an escalation pathway.

To document the follow-up on emergent results, or on non-emergent results of your choice, complete the following steps:

1. Call the patient using the contact numbers listed in EPIC to attempt to contact them and alert them of the result
2. Access the patient's chart
3. Find the "Rad/Lab Discrepancy" tab, which may be listed under the down arrow on the far right if you do not use it often



4. Complete the form by clicking the appropriate boxes and add further details as needed using the comments boxes to the left of the buttons. Clicking the "certified letter" button triggers that the letter will be sent behind the scenes.

A screenshot of the Radiology Discrepancy/Lab Result form. It includes fields for Study Type (X-ray, CT, Ultrasound, MRI, Other(Rads), Lab Result), Comment (Blood Cx, CXR-Nodule, Missed Fracture, Renal Cyst, Hepatic Cyst, Other(Rad), Lab Result), Loop Closure (Loop Closed - Finding and Plan Communicated, Unable to contact patient - Certified letter sent), Contact Person (Patient, Spouse/Significant Other, Parent, Guardian, Primary Care Provider, Inpatient Care Team, Other), Action(s) (Continue current management, Not clinically relevant, Return to ED immediately, Return to ED for re-evaluation, F/U with PCP, F/U with specialist, Outpatient CT, Outpatient MRI, Other), and a Certified Letter checkbox (Despite repeated efforts, we were not able to contact the patient or guardian. A certified letter will be sent.).

5. To make sure that what you documented on this form makes it into the Epic notes that can be read by others, you need to create an addendum note, and this information will automatically be imported.

A screenshot of the EPIC ED Addendum note creation interface. On the left, there is a sidebar with options like Assessment, My Note, Complete Chart, TX Team, LOS/Reminders, Provider Notes, Procedure Notes, Attestation Note, and Chart is Complete. The 'ED Addendum' section is highlighted with a red box. Below it, there are buttons for ED Addendum, T3 Follow-Up, New Reading, and T3 Follow-Up. The main area shows a 'My Note' section with tabs for ED Note after TOC, Addendum, Provider of Record, and Rad Discrepancy. The 'Rad Discrepancy' tab is active, displaying a grid with columns for Study Type, X-ray, CXR-Nodule, Contact Person, Patient, Will F/U with PCP, Response, and Action(s). A note in the grid states: 'Alerted of additional finding(s) F/U with PCP/Outpatient CT.'

6. Sign the addendum note
7. This will link to the ED encounter from which the critical result originated and be viewable in EPIC.

EMS DIVERSION POLICY

(EXCERPTED – see full policy on SharePoint)

Number: TUH INC-ADMIN-950.2012

Title: EMERGENCY DEPARTMENT: PATIENT DIVERSION POLICY

Effective Date: 04/1988

Last Revised: 02/04/2020

Last Reviewed: 02/04/2020

References: Philadelphia Emergency Medical Services Reference Manual, 01/1979, revised 08/1982

The Joint Commission, Assessment of Patients, and Provision of Care

TUH INC-ADMIN-950.2011-Operating Room Closure to Trauma

Attachments: None

SCOPE

This policy shall apply to Temple University Hospital, Inc. (TUH), including TUH-Main Campus (TUH-MC), TUH –Episcopal Campus (TUH-EC), TUH-Northeastern Campus (TUH-NEC), The Endoscopy Center at TUH-Northeastern Campus (TUH-NEC-Endo), and TUH-Jeanes Campus (TUH-JC).

PURPOSE

To establish a policy and procedure for identifying the circumstances under which the Emergency Department may divert arrival of patients via fire/police rescue vehicles.

It is the purpose of this policy and procedure to outline those situations when admissions to the Emergency Department may be diverted.

DEFINITIONS

A. Emergency Department Diversion Critical/and Non-Critical: Occasions when Temple University Hospital, Inc. notifies Philadelphia Police and Fire Rescue and identified ambulance services that the Emergency Department is unable to care for either critical or non-critical patients or both, without compromising the care of other seriously ill patients already under treatment in the Emergency Department.

B. Emergency Department Divisions Trauma: (Refer to policy number TUH INC-ADMIN-950.2011-Operating Room Closure for Trauma)

RESPONSIBILITIES

A. This policy and procedure is to be distributed to the Emergency Department, Nursing Department, Administration, Risk Management, Medical Staff, and House Staff.

B. Monday through Friday during regular hours of business the Vice President of Emergency Services (or designee during off hours) is responsible for ensuring that the steps listed in this procedure are completed prior to diversion. On off-shifts and weekends the ED charge nurse on duty is responsible for ensuring that the steps listed in this procedure are completed prior to diversion.

1. The decision to go on divert will be made by the Physician Director of the Emergency Department or the ED physician on duty in collaboration with the Vice President of Emergency Services or designee on off hours and Charge Nurse.

2. The Emergency Department is responsible for maintaining an accurate log at all times when admissions to the Department have been diverted.

EMS DIVERSION POLICY (continued)

PROCEDURES

A. The Emergency Department Attending Physician, Vice President of Emergency Services (or designee), Charge Nurse on duty, will use the below criteria as a **guideline** in determining the decision to divert.

1. TUH-MC Six critical care patients in the Emergency Department and no Hospital inpatient intensive care beds available within one hour of decision to admit.
 - a. TUH-EC – Four critical care patients in the Emergency Department and no transport available in two hours.
 - b. TUH-JC – Two critical care patients in the Emergency Department and no available bed greater than two hours.
2. Any number of critical care patients requiring admission who are refused by the ICU services due to capping or other issues. In addition to diversion, attempts will be made to transfer these patients to a suitable facility.
3. Admission volume at TUH-Main Campus is fifteen total patients without Hospital beds available within one hour of decision to admit. **This number is a guideline and not rigid as conditions and patient types may allow for safe operation or more admissions.**
 - a. TUH-EC – *eight* total patients without hospital beds available within two hours of decision to admit.
 - b. TUH-JC - *six* total patients without hospital beds available within two hours of decision to admit.
4. When admission volume is less than *fifteen* and ICU admission is less than *six*, the decision to request diversion status will be collaborated between the decision to request diversion status will be collaborated between the Emergency Department Attending and the Emergency Department Charge Nurse, Vice President of Emergency Services (or designee) involvement.
 - a. The census and acuity of the patients in the Emergency Department will be factored into the discussion / decision including the number of triaged patients waiting to be seen.
5. Diversion due to influx of excessive patients: In the event that multiple emergent patients present to the Emergency Department at one time, it may be necessary to divert in order to evaluate and stabilize patients (i.e., train, bus, subway accident, multiple trauma patients or other emergency situation).
6. Diversion due to maximum capacity: After review of the patients in the ED and those in the waiting room, it may be determined that maximum capacity has been reached and diversion necessary despite fewer actual admissions as outlined above.

EMS DIVERSION POLICY (continued)

PROCEDURES

B. To determine the need to divert, the diversion guidelines must be met. After determining guidelines / criteria met, the Emergency Department Attending Physician/Charge RN, and Nursing Leadership is responsible for ensuring completion of the following duties:

1. Contact the Fire Communications Center at (215)-686-1377, and identified private ambulance services to inform them that the Emergency Department is diverted to critical care and/or non-critical care and for what length of time (up to 2 hours may be requested).

On off-shift and weekends, the Clinical Coordinator will be notified of the divert status. The unit clerk will enter the information of Diversion into the EMR; this will trigger a “Divert Notification” e-mail alert to appropriate parties.

2. ED Nursing Leadership along with the Clinical Coordinator on off-shift and weekends will assess / manage patient throughput within the ED and hospital.

3. The Emergency Department Attending Physician / Charge RN must assess the need to remain on diversion a maximum of every two hours and to advise of the recommendation that the Emergency Department remain on divert status.

- a. If determination has been made to remain on divert status, the Emergency Department Attending Physician/Charge RN will direct the unit clerk to contact the Fire Communications Center, **(215) 686-1377**, and identified private ambulance services to inform them that the Emergency Department is diverted to critical care and/or non-critical care.

- b. As soon as the restriction is lifted, the Fire Communications Center must be notified.

- c. The Emergency Department is responsible for maintaining an accurate log at all times when admissions to the department have been diverted.

EXTERNAL DISASTER - MCI PLAN

Quick Guide for the Incident Commander Mass Casualty Incidents

Emergency Plan for Mass Casualty Incidents	
Who May Implement:	The following positions have the authority, in this order, to act as the Incident Commander: <ol style="list-style-type: none"> 1. Chief Executive Officer/Attending Emergency Physician 2. Administrator –On- Call 3. Clinical Coordinators, Nursing. 4. Emergency Program Managers 5. Environment of Care Officer 6. Safety Officer 7. Most senior staff representative located on site at the hospital
What circumstances warrant a: “Code White – Level 1” being implemented by the ED Attending?	<ul style="list-style-type: none"> • Upon alert of a possible disaster by HASTE, Knowledge Center, or TUPD • When victims are few in number follow the established pre-hospital and in-hospital plans.
Code White – Level 2	<ul style="list-style-type: none"> • When victim numbers exceeds the capability of the ED’s response. • When victim needs exceeds the ED’s resources
Code White – Level 3	<ul style="list-style-type: none"> • When staff is needed to stay until further notice • When victim numbers exceeds the capability of TUH’s response. • When victim needs exceeds TUH’s resources
Code White – Level 4	<ul style="list-style-type: none"> • When ALL hospital staff is needed to stay and all staff is needed to report to work • When victim numbers exceeds the capability of TUH’s response. • When victim needs exceeds TUH’s resources

EXPLANATION: In a mass casualty incident the maximum number of injured survivors seeking emergency care defines the limits of the demand for Emergency Department care and capacity. The number of injured victims received depends on:

- the number of immediately surviving injured
- hospital proximity to the site of the incident
- primary distribution of casualties to the hospital
- the number of emergency departments available

DEFINITIONS:

Multiple Casualties: When the numbers of patients do not exceed the medical resources available.

Mass Casualty Incident: An event quantitatively to qualitatively exceed the ability of the receiving hospitals to treat the casualties involved. A significant event has occurred that requires scene and casualty management.

Hazardous Materials: Biohazards/Dirty bombs may or may not be detected or recognized at first, so all blast-related events suspected or known to be intentional should be handled as if hazardous material is involved.

Victim Injuries: Injuries include: soft tissue, orthopedic, ocular, minor burns, and possible other require sufficient supplies and medications, i.e. analgesics, antibiotics, tetanus, etc.

Decontamination: Removing or neutralizing contaminants. Contaminants are chemical, biological or radiological. Why: Prevent worsening of problem, removes toxic agent from the victim, prevents contamination of staff and facility. When: Anytime one suspects contamination; material is visible, victims complains of pain, odor, etc, victim

Quick Guide for the Incident Commander

INITIAL SIZE-UP (Immediate Actions)

INITIAL RISK ASSESSMENT

ESTABLISH COMMAND STRUCTURE

CREATE INCIDENT ACTION PLAN (IAP)

- **What is the event that is occurring?**
- **What information was provided to you?** Initial notification may be through Juvare, HASTE (in ED), phone call, mass communication message, or overhead announcement
- **What is the size and scope?**
 1. Estimated number of patients
 2. Acuity of patients
 3. Is there an ED surge
 4. Does this event affect the rest of the hospital?
- If it is a high impact event, you may want to **call a code white** to notify leadership of the situation. Dial 2-4545 (page operator) to call the appropriate code
- **Contact the Administrator on Call**
 1. Dial 2-4545 (page operator) to reach the AOC
~~OR~~
 2. Use AMION

- Does the situation present you with a **security threat**?
 - Notify TUPD and Allied Universal by calling 1-1234
- Is there a **chemical/biological/radioactive risk**? If there is,
 - Notify Environmental Health and Radiation Safety person on call. Dial 2-4545
- Are there any **immediate patient safety risks**?
- Are there any immediate safety risks to staff?
 1. Protective clothing and equipment
 2. Personnel accountability
 3. Continuous risk management

- Establish Command. If the event is first noticed in the ED, the ED attending physician becomes the incident commander.
- The responsibility of the Incident Commander can be transferred to other qualified members of leadership if available
- **Incident Commander Order of Succession**
 1. Chief Executive Officer or Attending Emergency Physician
 2. **Administrator – On – Call**
 3. Clinical Coordinators, Nursing
 4. Emergency Program Managers
 5. Safety Officer
 6. Most senior staff representative
- **Read the incident Commander job Action Sheet.**

- Things to consider when creating an Incident Action
- Incident goals (where the response system wants to be at the end of response)
 - Operational period objectives (major areas that must be addressed in the specified operational period to achieve the goals or control objectives)
 - Response strategies (priorities and the general approach to accomplish the objectives)
 - Response tactics (methods developed by Operations to achieve the objectives)
 - Organization list with ICS chart showing primary roles and relationships
 - Assignment list with specific tasks
 - Critical situation updates and assessments
 - Composite resource status updates
 - Health and safety plan (to prevent responder injury or illness)
 - Communications plan (how functional areas can exchange information)
 - Logistics plan (e.g., procedures to support Operations with equipment, supplies, etc.)
 - Responder medical plan (providing direction for care to responders)
 - Incident map (i.e., map of incident scene)
 - Additional component plans, as indicated by the incident.

Quick Guide for the Incident Commander

Clear the ED and House

In the ED, Clear as many patients as possible by

- Discharging patients
- Moving admitted patients to floors (assign the clinical coordinators to help with this)

For In House space:

- If the size and scope of the incident warrants, these duties may be delegated to someone, such as the Director of Nursing on Call or clinical coordinators
- Cancel elective surgery cases
- Clear recovery room of patients
- Evaluate patients in ICU's for possible transfer out
- ED resuscitation area should be prepared to receive most critically injured victims

Other things to think about:

- Suspend visiting hours
- Cancel elective and outpatient procedures

Prepare for Victims

Secure the ED. Call security at 1-1234 to alert them of the need for increased security or a lockdown of the area

Set up ED Triage area:

- Triage patients in ED entrance overhang
- Triage patients using Emergency Security Index (ESI) as scale for triage
- Patients with ESI < 4 will be sent to ED
- Patients with ESI of 4 or 5 will be sent to an alternate treatment site (if necessary to open alternate treatment site)

Alternate Treatment Site

- In a large scale mass casualty incident, establishing and alternate treatment site will help decompress the ED. Send walking wounded or “green” patients to this area
- The alternate treatment site for TUH is classroom A in the Rock Pavilion Basement.
- Classroom B will serve as the waiting room for the alternate site.

Alternate Treatment Sites – section XI.B of the

Emergency Operations Plan

Triage/ Patient Tracking- section VII of the

Emergency Operations Plan

Decon

If the event involved a chemical spill, biological agents, or radiological agents, decontamination may be necessary:

- The Decontamination Plan is in the end of the EOP for reference

Big ticket items:

- Secure the facility. Make sure no contaminated patients come in the main entrances of the hospital. Make sure they are directed to the ED
- Secure the decontamination area
- Have the Facilities Department put up the decon tent (if more than what the decon shower can handle) on Ontario St, TUPD/security must close Ontario ST, reroute ambulances (without contaminated patients) to the Tioga Street hospital entrance
- Establish a decontamination unit leader to:
 - Ready the decontamination area
 - Assemble decon team
 - Manage operations

SEXUAL ASSAULT

TUH Department of Emergency Medicine Policies and Procedures

NUMBER: 10753.100

TITLE: Management of Victims of Suspected Sexual Assault

EFFECTIVE DATE: 3/1/2018, Reviewed 10/1/19

PROCEDURE:

1. When a patient identifies themselves as a possible sexual assault victim during standard ED triage processes, the triage nurse will enter the patient as special handling. The appropriate ESI level will be assigned and the patient will be placed in an appropriate treatment space. The Triage Nurse will call 911 and inform the operator that there is a victim of a sexual assault in the ED and inform him/her of the location (if known) where the assault took place.
2. A medical screening evaluation (MSE) will be completed to determine if the patient has an emergent medical condition.
 - a. Medical examinations and laboratory or diagnostic tests may be conducted to ensure the health, safety and welfare of the victim, or which may be used as evidence in a criminal proceeding against a person accused of the sexual assault, or both.
3. If the patient has an emergent medical condition and will be admitted, the following will occur:
 - a. The Philadelphia Sexual Assault Response Center (215-685-3251) will be contacted to arrange for a SANE nurse to come to the hospital to conduct an examination.
4. If the patient will be discharged either after treatment for an emergent medical condition or after determination that they do not have an emergent medical condition, the following will occur:
 - a. Complete a sexual assault exam using the PA Department of Health approved rape kit if the patient consents to forensic examination;
 - b. Perform HIV testing, if the patient consents to such testing;
 - c. Administer prophylaxis against pregnancy and STDs;
 - d. Provide counseling and referrals as indicated; and
 - e. Complete and scan documentation (see full policy on SharePoint) into the EMR.

If the patient is medically stable and consents, they can be transferred to SVU (Special Victims Unit) by police for examination. They must be offered the sexual assault examination in the ED if that is their preference.

5. Special Considerations:

- a. If transferring the patient for forensic sexual assault examination, it is best to keep patient clothed, and critical body parts should not be washed or wiped. If it is necessary to undress the patient, refer to full policy on SharePoint for procedures.
- b. Patients under the age of eighteen (18) will undergo the same triage and medical screening workflow, and will be referred to an appropriate children's hospital. If condition warrants stabilization, this will be completed before transfer.
- c. Patients who are positive for pregnancy will undergo the same triage and medical screening workflow, and obstetrical services may be consulted, if indicated. If a condition warrants stabilization, this will be completed before transfer.

ASSESSMENT OF RENAL FUNCTION BEFORE THE USE OF IV CONTRAST

ED Guideline for the Assessment of Renal Function before the use of Intravenous Contrast for Emergency CT

Background

- Contrast-induced acute kidney injury (CI-AKI) is a theoretical risk in patients receiving IV contrast and has not been consistently distinguished from contrast-associated kidney injury (CA-AKI). The greatest risk factor for CI-AKI is thought to be pre-existing renal dysfunction. Using recommendations from the American College of Radiology Contrast Manual¹ and Consensus Statements from the American College of Radiology and the National Kidney Foundation², the following is a guideline for which patients need an assessment of renal function using estimated glomerular filtration rate (eGFR) prior to IV contrast administration. There is little evidence that IV contrast material is an independent risk factor for acute kidney injury in patients with eGFR >30 mL/min.

Evaluation

- Suggested list of risk factors that may warrant renal function assessment prior to administration of contrast:
 - Personal history of renal disease*
 - History of diabetes mellitus (optional)
 - Metformin or metformin-containing drug combinations

* Dialysis-dependent patients with end stage renal failure do not require eGFR measurement prior to IV contrast administration

****Patients without a history of renal disease, diabetes, or metformin use do not require assessment of renal function prior to IV contrast administration****

- For patients who meet criteria for renal function assessment prior to emergency CT, eGFR < 30 mL/min may be used to identify patients with increased risk of CA-AKI

**** Because contrast-enhanced CT offers superior diagnostic performance compared to unenhanced CT, the benefits of administering contrast material must be weighed with the risks on an individual patient basis ****

¹American College of Radiology, Committee on Drugs and Contrast Media (2015). *ACR Manual on Contrast Media (Version 10)*. “Patient Selection and Preparation Strategies.” (33-41)

²Davenport MS, Perazella MA, Yee J, et al. Use of Intravenous Iodinated Contrast Media in Patients with Kidney Disease: Consensus Statements from the American College of Radiology and the National Kidney Foundation. *Radiology*. 2020;294(3):660-668. doi:10.1148/radiol.2019192094

ALLERGY PREP BEFORE THE USE OF IV CONTRAST

ED Guideline for the Pre-medication of at Risk Patients before Emergent CT Imaging with IV Contrast¹

Background

- Allergic-like reactions to modern iodinated and gadolinium-based contrast medium are uncommon (0.01%-0.6%).
- A history of a prior allergic reaction to contrast media is associated with an up to five-fold increased likelihood of a subsequent reaction. Cross reactivity to other allergens including shellfish and seafood is now known to be an unreliable predictor of reaction to contrast media.
- A history of asthma has been shown to increase the likelihood of an allergic-like contrast reaction.
- To minimize acute allergic reactions from IV contrast agents, those patients who are at risk for such reactions should be identified and appropriately pre-medicated.
- Methylprednisolone targets the specific cells thought to propagate these anaphylactoid reactions, and begins to reduce their numbers in the circulation as quickly as one hour after administration. Supplemental administration of Diphenhydramine reduces allergic symptoms including urticaria and respiratory distress.

Evaluation

- Who needs pre-medication?
 - Individuals with a history of a prior anaphylactoid reaction to IV contrast media manifested by:
 - Flushing, itching, hives
 - Throat swelling, hoarseness, wheezing
 - Hypotension
- Who does NOT need pre-medication?
 - Individuals with reported shellfish or seafood allergy

Protocol

- At least 1 hour prior to CT scan:
 - 40 mg Methylprednisolone (Solu-Medrol) IV
 - Repeat doses should be administered every 4 hours until contrast administration
 - 50 mg Diphenhydramine (Benadryl) IV

¹American College of Radiology, Committee on Drugs and Contrast Media. (2015). *ACR Manual on Contrast Media (Version 10)*. "Patient Selection and Preparation Strategies." (5-15)

E&M CODING GUIDELINE

The E/M coding changes introduced these 3 elements to medical decision making:

- Number and complexity of problems (diagnoses) addressed
- Amount and/or complexity of data to be reviewed and analyzed
- Risk of complications and/or morbidity or mortality

There are 4 levels of MDM: straightforward, low, moderate, and high. The table below summarizes the AMA's scoring system for MDM as it pertains to ED visits.

To qualify for a particular level of MDM, two of the three elements for that level of MDM must be met or exceeded.

Code	MDM Level	Number and Complexity of Problems Addressed	Amount and/or Complexity of Data to be Reviewed and Analyzed	Risk of Complications and/or Morbidity or Mortality of Patient Management
99202 99212	Straight forward	Minimal <ul style="list-style-type: none"> • 1 self-limited or minor problem 	Minimal or none	Minimal risk of morbidity from additional diagnostic testing or treatment
99203 99213	Low	Low <ul style="list-style-type: none"> • 2 or more self-limited or minor problems; OR • 1 stable chronic illness; OR • 1 acute, uncomplicated illness or injury; OR • 1 stable acute illness; OR • 1 acute, uncomplicated illness or injury requiring hospital inpatient or observation level of care 	Limited - must meet the requirements of at least 1 of 2 categories <ul style="list-style-type: none"> • CATEGORY 1: Tests and documents <ul style="list-style-type: none"> Any combination of 2 from the following: <ul style="list-style-type: none"> ○ Review of prior external note(s) from each unique source; ○ Review of the result(s) of each unique test; ○ Ordering of each unique test; OR • CATEGORY 2: Assessment requiring an independent historian(s) 	Low risk of morbidity from additional diagnostic testing or treatment
99204 99214	Moderate	Moderate <ul style="list-style-type: none"> • 1 or more chronic illnesses with exacerbation, progression, or side effects of treatment; OR • 2 or more stable, chronic illnesses; OR • 1 undiagnosed new problem with uncertain prognosis; OR • 1 acute illness with systemic symptoms; OR • 1 acute, complicated injury 	Moderate - must meet the requirements of at least 1 of 3 categories <ul style="list-style-type: none"> • CATEGORY 1: Tests, documents, or independent historian(s) <ul style="list-style-type: none"> Any combination of 3 from the following: <ul style="list-style-type: none"> ○ Review of prior external note(s) from each unique source; ○ Review of the result(s) of each unique test; ○ Ordering of each unique test; ○ Assessment requiring an independent historian(s); OR • CATEGORY 2: Independent interpretation of tests <ul style="list-style-type: none"> ○ Independent interpretation of a test performed by another physician/other qualified health care professional (not separately reported); OR • CATEGORY 3: Discussion of management or test interpretation <ul style="list-style-type: none"> ○ Discussion of management or test interpretation with external physician/other qualified health care professional/appropriate source (not separately reported) 	Moderate risk of morbidity from additional diagnostic testing or treatment <i>Examples only:</i> <ul style="list-style-type: none"> • Prescription drug management • Decision regarding minor surgery with identified patient or procedure risk factors • Decision regarding elective major surgery without identified patient or procedure risk factors • Diagnosis or treatment significantly limited by social determinants of health
99205 99215	High	High <ul style="list-style-type: none"> • 1 or more chronic illnesses with severe exacerbation, progression, or side effects of treatment; OR • 1 acute or chronic illness or injury that poses a threat to life or bodily function 	Extensive - must meet the requirements of at least 2 of the 3 categories in the "Moderate" cell	High risk of morbidity from additional diagnostic testing or treatment <i>Examples only:</i> <ul style="list-style-type: none"> • Drug therapy requiring intensive monitoring for toxicity • Decision regarding elective major surgery with identified patient or procedure risk factors • Decision regarding emergency major surgery • Decision regarding hospitalization or escalation of hospital level care • Decision not to resuscitate or to de-escalate care because of poor prognosis • Parenteral controlled substances

UNAPPROVED ABBREVIATIONS

Do NOT use this Abbreviation:	Instead Write This:
MS	Mental Status, Multiple Sclerosis, Morphine Sulfate, Musculoskeletal
QD	Every Day, Once Daily
QOD	Every Other Day
U	Unit(s)
IU	International Unit
MGS04	Magnesium Sulfate
MS04	Morphine Sulfate
MTX	Methotrexate
OXY	Oxycodone, Oxycontin, Oxytocin
1.0 gm -Trailing Zero	1 gm
.5 ml -Naked Decimal Point	0.5ml
ARA-A	Vidarabine
ARA-C	Cytarabine

SUPPLIES/EQUIPMENT

For any issues with ED supplies or equipment please email
EDSupplyRequest@tuhs.onmicrosoft.com.

BIOMED: 2-3303

EKG machines, cardiac monitors/cables, rolling stand equipment (GlideScope, C-MAC, slit lamp), NPL, tonopen, microscopes

CSR (CENTRAL SUPPLY ROOM): 2-3573

All supplies in the clean utility rooms in the Yellow or Red Zone and the Orthopedic closet in the Red Zone

FACILITIES: 2-4702

Plumbing, building structure, locksmith, adult ED dedicated GM (general mechanic), electrical, flooring, doors, etc.

HELP DESK: 2-7008

Computers, printers, specimen label/bar code printers, and any application issues
Have your TU-ID number ready

LANGUAGE LINE PHONES:

During normal business hours call: **2-1234**

After hours, weekends and holidays, call the Nursing Supervisor on call at **2-4545**

LAB:

Glucometers, chargers/cradles for meters

Normal business hours: Joe Rudic at **267-970-1796**

Holidays, weekends and nights: Dr. Khan at **267-908-2114**

TELECOM: 4-HELP

Telephone or telephone line issues

TVR Communications: 2-5157 (you will be automatically redirected to their 800#)

For any issues with the TVs and handheld remote controls/speakers

SURVEY READINESS

DECON SCENARIO: BIO/CHEM/RAD		PHYSICIAN CONSULTS/CONFLICTS
<ul style="list-style-type: none"> • Keep patient out of ED • Prepare Decon room, follow process posted in room • Call Environmental Health & Safety (2-2520) • >10 patients call disaster, have Decon tent erected • Chemical exposure: MSDS online and in admissions office • Major Decon: Philly EMS Hazmat 		<ul style="list-style-type: none"> • 30 minute rule • Bump to Attending, Chair, CMO quickly • Make sure they discuss with their Attending
DISASTER/FIRE/THREATS		PROCEDURES – UNIVERSAL PROTOCOL
<ul style="list-style-type: none"> • Activate disaster system via page operator • ED Attending is initial Incident Commander • Locate bin with vests, role checklist in disaster boxes • EOC classroom A, manpower pool in Erny Auditorium • Notify security (1-1234) for control, lockdown 		<ul style="list-style-type: none"> • Attending aware • Consent for all major (LP, Central Line) • Fill out Conscious Sedation Flow Sheet • Time Out: Correct patient, correct side, correct procedure
ENVIRONMENT		RECORDS: BE LEGIBLE!
<ul style="list-style-type: none"> • No food/drink • Neat desk • Spills/mess: Environmental Services → 2-3110 		<ul style="list-style-type: none"> • Print name or beeper • No MSO4, MGSO4, qd • No inflammatory comments
MEDICATIONS		RESTRAINTS
<ul style="list-style-type: none"> • If verbal order given in an emergency, place order in Epic ASAP • Label all syringes with meds • Confiscate all if suicide risk • Lock up or discard all meds • Call 2-ADRS if reaction • Reconcile new meds with home meds 		<ul style="list-style-type: none"> • Verbal de-escalation attempted, document specific threat to safety • Must order in Epic • Document face-to-face reassessment by physician within 1 hr • Least restrictive, 4 hour limit
PAIN		RISK
<ul style="list-style-type: none"> • Document it (see Triage Scale) • Deal with it • Determine & document response • Can you try non-opioids first? 		<ul style="list-style-type: none"> • Reports to (2-4444) • Upset patients sue
TESTS		TESTS
		<ul style="list-style-type: none"> • Critical Results: Write it down, read it back • Enter all radiology reads • Attending must interpret EKG and write on EKG • No outpatient blood cultures
HANDWASHING		HANDWASHING
		<ul style="list-style-type: none"> • FOAM/WASH IN – FOAM/WASH OUT

MEDS/DRIPS REFERENCE

	Drug	Bolus[†]	Drip[†]	Indication
Neuro	Fosphenytoin	20 mg/kg (max rate: 150 mg/min)	—	Status epilepticus
	Levetiracetam	20-60 mg/kg (max: 4,500 mg)	—	Status epilepticus
	Lorazepam	0.1 mg/kg IV/IM (max: 4 mg/dose)*	0.5-7 mg/hr (↑↓ 1 mg/hr q15min)	Status epilepticus ETOH withdrawal
	Phenobarbital	20 mg/kg (rate: 50-100 mg/min)	—	Status epilepticus
	Phenytoin	20 mg/kg (max rate: 50 mg/min)	—	Status epilepticus
	Mannitol	0.5-2 gm/kg q4hr over 10-15min	—	ICP reduction
	Valproic Acid	40 mg/kg (max: 3,000 mg)	—	Status epilepticus
Analgesia and Sedation	3% NaCl	7.5g (250mL) over 15-30min	0.1-1 mL/kg/hr (max 70 mL/hr)	ICP reduction
	Dexmedetomidine	—	0.1-1.5 mcg/kg/hr (↑↓ 0.2 mcg/kg/hr q30min)	Sedation
	Fentanyl	0.5-1 mcg/kg IV/IM	25-200 mcg/hr** (↑↓ 25 mcg/hr q10min)	Analgesia/sedation
	Ketamine	Pain: 0.15-0.3 mg/kg IV (max:20mg) <u>0.4-1 mg/kg IM (max:50mg)</u>	0.1 – 3 mg/kg/hour (↑↓ 0.25-0.5 mg/kg/hour) q5-10min	Analgesia/sedation
	Midazolam	<u>Sed: 0.01-0.05 mg/kg IV</u> Sz: 0.2 mg/kg IV/IM	0.5-14 mg/hr (↑↓ 1 mg/hr q10min)	Sedation/status epilepticus
	Propofol	1 mg/kg; may repeat with 0.5 mg/kg	5-80 mcg/kg/min min: 30 mcg/kg/min for sz (↑↓ 10 mcg/kg/min q5min)	Sedation/status epilepticus
	Etomidate	0.3 mg/kg	—	Induction
RSI	Ketamine	1-2 mg/kg	—	Induction
	Succinylcholine	1.5 mg/kg	—	Paralysis
	Rocuronium	1 mg/kg	—	Paralysis
	Vecuronium	0.1 mg/kg	0.8-1.7 mcg/kg/min (↑↓ 25% q1hr)	Paralysis
	Naloxone	0.4-2 mg q2min IV/IM/IN (w/no response max: 10mg)	2/3 of effective reversal dose/hour	Opioid reversal
Antidotes	Neostigmine	0.03-0.07 mg/kg (max: 5 mg) Consider giving concurrent atropine or glycopyrrrolate	—	NMB reversal

*Doses exceeding the maximum dose require ED/ICU attending approval

†All doses are intended for adult patients and given IV unless otherwise stated

Updated 10/23

MEDS/DRIPS REFERENCE (continued)

	Drug	Bolus[†]	Drip[†]	Indication
Inotropes/Vasopressors	Dobutamine	—	2.5-20 mcg/kg/min (↑↓ 2.5 mcg/kg/min q10min)	Inotrope
	Dopamine	—	5-10 mcg/kg/min (cardiac, β) 10-20 mcg/kg/min (vasoconstriction, α) (↑↓ 2.5 mcg/kg/min q5min)	Vasopressor/ inotrope
	Epinephrine	<u>ACLS: 1 mg IVP q3-5min</u> Anaphylaxis:0.3-0.5 mg IM	1-30 mcg/min IV ** (↑↓ 2 mcg/min q2-3min)	Vasopressor/ inotrope
	Milrinone	—	0.1-0.75 mcg/kg/min (↑↓ 0.1 mcg/kg/min q2hr)	Inotrope
	Norepinephrine	—	1-90 mcg/min ** (↑↓ 5 mcg/min q2-3min)	Vasopressor
	Phenylephrine	—	25-300 mcg/min (↑↓ 25 mcg/min q2-3min)	Vasopressor
	Vasopressin	—	0.02-0.04 units/min (↑↓ 0.02 units/min q5min)	Vasopressor
Cardiac	Amiodarone	<u>150 mg over 15 min</u> ACLS: 300 mg IVP (repeat 150 mg x1)	Then 1 mg/min x 6hr, then 0.5 mg/min x 18hr	Antiarrhythmic
	Clevidipine	—	1-21 mg/hr (↑↓ 1-5 mg/hr q3-5min)	Vasodilator
	Diltiazem	0.25 mg/kg over 2min; repeat 0.35 mg/kg	5-15 mg/h IV (↑↓ 5 mg/hr q15 min)	Rate control
	Esmolol	500 mcg/kg IVP over 1 min	50-300 mcg/kg/min (↑↓ 50 mcg/kg/min q5min)	Rate control
	Isoproterenol	—	1-10 mcg/min (↑↓ 1 mcg/min q10min)	Bradycardia
	Labetalol	10-20 mg IVP over 1-2 min Repeat 10-80 mg q10min, max 300 mg	0.5-6 mg/min up to total 300mg (↑↓ 0.5 mg/min q15min)	Rate control HTN
	Lidocaine	1-1.5 mg/kg IVP may repeat 0.5-0.75 mg/kg q5-10min(max: 3 mg/kg)	1-4 mg/min	Antiarrhythmic
	Nicardipine	—	2.5-15 mg/hr IV (↑↓ 2.5 mg/hr q15 min)	Vasodilator
	Nitroglycerin	Up to 2000 mcg IVP q3-5min (can give SL)	5-200 mcg/min (↑↓ 10 mcg/min q5min)	Vasodilator
	Nitroprusside	—	0.1-10 mcg/kg/min (↑↓ 0.5 mcg/kg/min q5min)	Vasodilator
	Procainamide	100 mg slow IVP q5min OR max 17 mg/kg (20-50 mg/min) until controlled, hypotension, OR QRS widens >50%	1-4 mg/min	Antiarrhythmic