Medic One Doc Primer
Department of Emergency Medicine
University of Washington
Harborview Medical Center

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@UWashEM

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INTRODUCTION

Welcome to the Harborview Emergency Department! We love it here and hope you will too. The goal of this rotation is to gain an understanding of the prehospital system in Seattle, get experience managing undifferentiated critically ill patients, and expand your understanding of the flow of the emergency department. Please share your goals with your attendings too so we can help you get a robust experience. We hope that your experience here will be both educational and personally rewarding. You will be responsible for caring for some of the sickest patients in the WWAMI region. By working at Harborview, you are responsible to your community and you assume Harborview’s definite mission population, vulnerable in one way or another: by the severity of their medical needs; by lack of social or financial standing; by mental illness; or by cultural difference. Our goal, like your goal anywhere else in this hospital, is to provide the best and most compassionate care to every single patient who walks through the door, regardless of gender, race, sexual orientation, socioeconomic standing, disability, religion, or cultural background.

Please read this primer prior to your first shift and refer to it as needed throughout your rotation. Have a great month!

PEARLS TO MAKE YOU SUCCESSFUL

<table>
<thead>
<tr>
<th>Start of Shift</th>
<th>During Shift</th>
<th>Post-Shift</th>
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<tbody>
<tr>
<td>* Arrive 15 minutes early.</td>
<td>* Run the board frequently with your attending or EM R4 as well as the charge nurse.</td>
<td>* After sign out, stick around to help finish procedures or call consults.</td>
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<tr>
<td>* Introduce yourself to the attending &amp; EM R4.</td>
<td>* Know time sensitive activation criteria (stroke/STEMI/ECMO).</td>
<td>* Debrief with your attending or EM R4 to identify areas for improvement for your next shift.</td>
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<tr>
<td>* Use IPASS for sign out.</td>
<td>* Prior to medic arrivals, prepare your team, assign roles if CPR is in progress, anticipate patient needs.</td>
<td>* All documentation must be completed prior to leaving the hospital.</td>
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<td>* Ask clarifying questions during sign out.</td>
<td>* Perform closed loop communication with the RNs, update them on the plan and your decision making tree.</td>
<td>* Identify at least one topic you are going to read about after each shift.</td>
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<tr>
<td>* Meet and reassess all patients you received sign out on.</td>
<td>* If patient is unstable or behaviorally out of control, stay at the bedside until things have stabilized.</td>
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<tr>
<td></td>
<td>* Reassess patients frequently.</td>
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<td>* Stay organized - document to-do’s on the tracking shell for every patient.</td>
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<td></td>
<td>* Consider dispositions and barriers to dispositions early.</td>
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<td>* Answer medic one pages immediately.</td>
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<td>* Place all orders within the ED PowerPlans.</td>
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<td></td>
<td>* If you have a critically ill patient who needs an emergent scan, call or walk over to CT to ask the techs if they can prioritize the scan.</td>
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ED WORKFORCE

Teams: The medicine side of the ED is split into two teams: purple and gold. There will be one attending for each team. The teams help to identify which attending you should staff your patients with and where you should sit. You are welcome to pick up any patient in Blue, Green, resus 5, and the hallway beds (denoted PRN G or PRN B). Usually the Purple team is staffed with senior EM residents (R2s and above) except on Thursdays when they are in conference. The gold team consists of EM residents, visiting off-service residents and interns.

Attendings: There are two attendings on the medicine side of the ED at all times (Gold and Purple). Their shifts are 8 hours long and begin at 6 AM, 2 PM, and 10 PM. All ED patients must be staffed with the attending.

R4 Supervisors: These residents perform as junior attendings. Their responsibilities (staffing patients, supervising procedures) are similar to the EM attending with the exception of answering incoming transfer center phone calls. As supervisors, they typically work on the gold team.

Medic One Doc: This is an EM or IM R2 or more senior resident. This person holds the pagers for Medic One and Airlift Northwest. They are responsible for answering all pages, including radio and telephone calls. Residents in this role will hold two pagers and a radio. Medics and Airlift nurses will contact the Medic One Doc via phone or radio to tell them about patients they are evaluating in the field or are transporting from one facility to another. Their role is to provide medical control and approve and occasionally modify their plan of care and to alert the receiving hospital about the patient.

There is a medic one doc schedule that is taped to the wall near the attending computers. As medic one doc, you will carry the pagers and take all medic one calls. You do NOT necessarily have to take every patient who you take a call on. It is often appreciated to share those more critically ill patients with other co-residents, especially if you are already busy.

Keep an ear out for the overhead announcement “medics are through the door” so that you can meet the medic on arrival and listen to the report.

Charge Nurse: This is the RN who is responsible for overall ED flow amongst many other important tasks. Introduce yourself to this person at
the start of your shift and run the board with them regularly. It is important to notify them early of all admissions (admitting team, location and diagnosis).

**Nursing:** There is one nurse per zone (blue, green and trauma) plus a float nurse. Direct verbal communication with nursing is critical to excellent patient care. STAT nurses from within the hospital will arrive to assist with patient care during code activations (i.e. STEMI, Stroke, trauma) or for procedural sedations.

**Medical assistants (MAs):** There are two on the medicine side (one on the green side and on the blue side). They can draw blood (but not start IVs), perform EKGs, gather supplies, get warm blankets, do vital signs, and other patient oriented tasks.

**Social Workers:** They work closely as a liaison between the ED, families, patients, and social resources. Involve them early for any patients who may need immediate help with housing, transportation, substance abuse, mental health referrals, child protective services referrals, sexual assault nursing evaluations, filing police reports, or providing safe havens for domestic abuse survivors. For critically ill patients, they will accompany you to the family room to provide updates and answer questions after you leave. Social Work should be consulted on all patients who have been physically and/or sexually assaulted.

**Physical therapy:** A physical therapist is available in the ED during normal working hours to help with musculoskeletal complaints including back pain and neck strain. During after hours, place referrals in ORCA and put the printout in their basket at their desk.

**ED pharmacist:** We have a pharmacist in the ED in the evening hours for assistance with medication questions. They sit on the Green side but cover all areas of the ED. Pharmacist contact number: 948-9010.

**Medical students:** Medical students rotate on either the gold or purple teams. They report directly to the attending or R4, but they value any teaching that residents can give them. Our specific goals for them are (1) to be able to generate a broad differential, including life-threatening issues, for each patient, (2) to be able to manage 3 patients at a time.
Medic One Doc
Patient care begins when that ambulance arrives at the side of that sick patient. Early communication between paramedic and physician is essential. This ensures a mutual understanding of the magnitude of illness; the paramedic gains the support of a physician; the receiving hospital gains an element of anticipation; and the patient is delivered to a hospital that is prepared.

The telephone and radio calls with the Medics are monitored, recorded and undergo regular QA. It is therefore very important that you document these calls on the forms provided in the radio room, and sign for any medications given.

If you must leave the ED or will be sterile to perform a procedure hand off the pagers to your attending or another resident that has been trained to answer the radio. A schedule for who is responsible for carrying the pagers is posted at the purple resident’s desk.

Medic One System Operations
The Medic One resident helps first responders take care of some of the sickest patients in the region by linking paramedics and flight nurses to area hospitals. During his or her shift, the resident carries pagers for Medic One and Airlift Northwest and radio. When the pagers or the triage nurse over the radio (or overhead) call you the radio room, the resident will hear report from the first responders, provide feedback on assessment/plans, alert the staff at Harborview Medical Center (over the radio) or nearby hospitals (over the phone) about the patient’s imminent arrival, and receive report at the bedside when paramedics arrive to our facility.

How to Work the Radio Room

- Report to the radio room immediately if you receive a page or called over the radio by the triage nurse.
- The pager may read:
  - “M10” or “T10” meaning Medic 10 will call over the phone) or
  - “R16” meaning Medic 16 is waiting on the radio.
- Depending on what the pager reads (phone vs radio) (1) pick up the Medic One (or Airlift Northwest) phone once it rings OR (2) lift the
receiver of the radio labeled “MEDIC 1 SEATTLE FIRE” or “AIRLIFT”, wait 1 second, push button and speak into the radio, and release button to listen.

- Introduce yourself:
  - “Medic One Doc standing by for Medic 10.”
  - You may have to repeat yourself every 10 seconds or so on the radio until you have an answer.

- The unit will then ask, “How do you read?” Respond with “loud and clear,” “scratchy,” “broken,” etc.

- The unit will present the case, their plan, the destination hospital and an ETA. Take notes on the designated Medic One slips (make sure to print and sign your name and at the bottom if any medications are given)! It is important to know that patient and doctor names are not given over the radio as any member of the public can listen into these radio calls.

- EKGs performed in the field will appear on the screen in the radio room. Please print the EKG and attach it to the Medic One slip.

- Read back the information you received and approve (or modify) the plan.
  - Example: “I appreciate your history of an 50-year-old woman with severe dyspnea, hypoxemia, and altered mental status. I agree with your plan for IV furosemide and supplemental oxygen in addition to intubation with etomidate and succinylcholine if no improvement. I will inform Swedish First Hill of your arrival in 15 minutes.”

- When the unit responds, “Medic One clear for MEDCOM,” you can hang up the radio or phone.

- Alert the appropriate hospital of the incoming patient.
  - If coming to HMC: use the radio to provide a succinct report that include ETA, one liner of chief complaint, whether they are stable/unstable and intubated/not-intubated.
    - Example: “Attention charge, triage, and medicine team, in approximately 15 minutes, we will be receiving a 30-year-old man with altered mental status, hypotensive and tachycardic, intubated in the field, ETA 15 minutes”.
  - If going to another hospital, use the speed dial on the phones in the radio room to contact the destination hospital and give a brief report to the triage or charge nurse (include medic number, ETA, vitals, one-liner, and any meds given in field). You may need to fax them copies of any EKGs you received.

- If you need to get back in-touch with a unit who contacted you (i.e. you need to redirect them to a different hospital or need additional information), use the phone labeled “Seattle Fire Department-Direct Line to Dispatch.” It will ring automatically.

- When giving overhead radio pre-arrival announcements, please omit specifics (i.e. patient is a Seahawk football player,
gruesome details such as suicide, etc…) as the radios can be heard by everyone in the ED and these announcements can be disconcerting to other patients/visitors. If you need to tell the charge nurse or triage nurse something sensitive, tell them in person or call their cell phone.

Patients who are transferred to Harborview from other hospitals will be cleared through the transfer center and will be entered in First Net in yellow at the bottom of the tracking board.

**Paramedic Protocols**
The paramedics and flight nurses are often taking care of patients with limited information, difficult conditions, and significant time constraints. They see, hear, and experience situations in the field, which are critically important to the care of our patients and their input is invaluable. Their practice is driven by evidence-based protocols, including: Plan A1 Adult Cardiac Arrest (which does not follow AHA ACLS and is attached as an appendix), Plan A2 Trauma with signs of shock, Plan B All other problems requiring a call to Medical Control (that’s YOU!), and Plan C Disaster (which allows medics to function within their scope of practice without physician direction). If you feel uncomfortable with a proposed plan, please voice your concern, offer alternatives, and/or call your attending to the radio room (over the radio) for help. Do not divert medics from HMC.

**Paramedic Medications**
A list of the medications that the paramedics carry is listed at the end of this primer. Please review this list prior to your first shift.

**Surrounding Hospitals and Capabilities**
Adult and pediatric patients with substantial trauma are transported to Harborview Medical Center. Outside of burns and trauma, certain patients should only be transported to selected specialty hospitals capable of providing specific care needs. Hospital capabilities are listed at the end of this primer.
PATIENT MANAGEMENT

Consults
For any consult you need in the ED (with exception of PES) please call 4-7988. The operator will ask you for the patient’s MRN and your name. Once you have spoken to the consulting service, fire the consult icon on the track shell (see below). These are time stamped for QI purposes so please do NOT fire the consult button prior to speaking with the team. Once you have received the final recommendations from the consultant, click the (F) button to signify that the consult is finished.

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<td>Tgt gas, CT</td>
<td>XR</td>
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General Surgery: For patients who might need an operation or admission to surgery, call General Surgery Consults (an R3). You can often find him/her in the fishbowl seeing trauma patients.

Neurosurgery: If there is an acute time sensitive event such as herniation, call them directly on the “Type A herniation phone” (listed in your contacts on the ED iPhones).

Orthopedics: They also have a computer on the trauma side. Typically they want to be called once the imaging is done.

Certain consult services switch depending on the day, so when speaking with the operator, ask for who is covering.

Hand- Ortho/Plastics

Craniofacial- ENT/OMFS/plastics

Spine- Ortho/Neurosurgery

Ob/Gyn: Not in-house but on call for any Ob/Gyn problems. They must see any patient in active labor before being transferred to a hospital with
Labor and Delivery, usually UWMC or Swedish First Hill. They should also be consulted for any pregnant patient with major respiratory illness or influenza as the disease is potentially severe in these patients.

Psychiatry: Patients who need an emergent psychiatric evaluation (i.e., suicidal/homicidal, grave disability, etc) are evaluated by Psychiatric Emergency Services. Speak directly to the PES attending (4-3076) to do a “Doc to Doc.” Prior to transferring to the PES, their medical clearance must be completed and any IVs/Foleys need to be removed as these pose a safety hazard in the PES. If a patient is in restraints, restraints must be re-ordered every four hours.

For patients being admitted for medical illness who require psychiatric evaluation, we do not call psychiatry consults in the ED, rather the inpatient team should do that.

King county jail patients with psychiatric issues do not get transferred to PES. Once medically cleared and then transferred back to jail where the get their psychiatric care.

See “medical clearance for psych” below under Specific Medical Problems.

ADMISSIONS PROCESS

1) Place “ED decision to admit” order.
2) Speak to charge nurse to “blue sheet” the patient. These can both be done before you have signed out to the admitting team, so long as you have a fairly good idea of where the patient will go. It will help get the patient a bed faster to do these steps early.
3) Call 4-7988 and ask to page admitting service.
   a. If admitting to medicine floor, you will speak to triage hospitalist. They will accept the admission should tell you what team will be assigned.
4) Give signout to admitting team. Finish the phone call with “Thank you. I am going to place interim orders” for all patients going to the medicine floor or NCCS.
5) Order holding orders via ED interim orders powerplan ONLY for patients going to med floor or NCCS.

See appendix A for admission criteria for Cardiology vs Medicine, and Orthopedics vs. Medicine.
To discharge a patient, click on the “Discharge Process” white clipboard in your track shell toolbar. Include the diagnosis, any prescriptions the patient may need, patient education, follow-up, and ED disposition.

Print out the paperwork and give it to the nurse taking care of the patient.

Every patient **must** have the following at time of discharge:

1. Education about their diagnosis
   - If there is no appropriate instruction in FirstNet, look for some in Micromedex Aftercare instructions (link from Healthlinks) or patient education sections of MD Consult or UpToDate.
2. Explicit ER return precautions
3. A follow up plan
   - Most patients will be referred to their PCP.
   - If there is a specialty clinic you want them to be seen in (i.e. Neurology) document the clinic you recommend in FirstNet using the pencil icon next to “follow-up.”
   - If you want someone to follow up in primary care but they do not have one, refer them to the **Aftercare Clinic** for acute needs (suture removal, lab re-checks, specific radiology studies, hypertension, or new-onset diabetes). Go speak to the registration staff at the Back Desk and they will schedule Aftercare appointments for you.
   - You can also provide a list of community clinics in First net to help the patient establish long term primary care.
   - Make sure the follow-up in FirstNet matches what you document in your note.

**Follow-Up Box During the Discharge Process**

You will notice during the discharge a box that reads “ED REVIEW NEEDED”. Most of the time you will click “no.” However, click “yes” if there is a specific SIMPLE test that needs follow up by one of our ED Resource Nurses. This should only be used for tests that have not resulted prior to the patient’s discharge (e.g., HIV testing, GC/Chlamydia PCR, urine cultures, wound cultures) except for blood cultures (which will be flagged by the lab). Patients that have had more nuanced ID testing
(ie: malaria/leptospirosis/lyme's) or drug levels checked, should have follow up arranged with their PCP. If they don’t have a PCP, arrange an After Care appointment for them.

Please make sure there is an accurate contact number for patient if you are requesting follow up. If your patient is homeless and doesn’t have a phone, ask them what’s the best way to contact them. (ie: DESC shelter, UGM, Day Rest, via a case manager, their Methadone Clinic.) Write this information in the follow up box.

This box **SHOULD NOT** be used for things like “obtain a primary care provider” “arrange aftercare” or “follow up pregnancy/troponin/d-dimer/etc” or other high risk test results.
Specialty clinic referrals

Fill out the “UW Medicine referral request” form for all clinic referrals such as neurology, dermatology, etc. This form is not necessary for Aftercare and primary care). Place the form in the basket near the nursing computer. Please also give the patient the clinic phone number in the discharge instructions.

Discharge Medications

You can give the patient a hardcopy of the prescription, and they can fill it at the outpatient pharmacy at Harborview (8:30am-7pm M-F, 9am-4:30pm Sat) or their own pharmacy.

You can also fax and then tube the prescription down to the pharmacy-tube station #331 (after writing “send to ED” on the paper). A great example would be sending a naloxone prescription down to the pharmacy so that a patient with opioid overdose can leave the ED with the medication and teaching. The pharmacists will send the prescription back up to the ED. Because this can take several hours, you may want the patient to wait in the waiting room for his/her prescriptions.

Transfer Process

During high census times, we often seek to transfer stable patients who do not require specialty care from Harborview to nearby community hospitals. The first hospital we try to transfer to is Northwest.

The process begins by asking the patient if he or she would be willing to transfer. Patients can decline. If the patient is amenable, inform the charge nurse and PSS (who sits behind the desk at the nurse’s station on the trauma side near the charge nurse) that you plan to contact the transfer center.

Call the operator and ask to speak to the transfer center and give the nurse a short report. They will contact neighboring hospitals and connect you with a receiving physician once they’ve found an appropriate hospital with availability. Give report to the receiving physician and make sure to take down the physician’s name and receiving hospital.

Before patients can leave the ED they must have the following:
● An accepting physician’s name.
● A completed ED note to accompany them including radiology and lab reports (if they leave without this, it is an EMTALA violation).
● Completed COBRA form (which the attending must sign).
● A sign out between you and the accepting doctor.

**Discharges to Jail or SNFs**
Patients discharged to **Jail or a SNF** require a copy of their note to go with them. Other patients may NOT get a copy even if they ask; they must call medical records for a copy. Jail patients should not be told a specific follow-up date – recommend a particular clinic only, and the staff at jail will schedule. Place their discharge instructions in a sealed white envelope and hand to the corrections officer.

**AMA discharges**
Patients who are alert, oriented, clinically sober, logical and without suicidal ideation may sign out AMA. Keep your discussion with them non-confrontational and focus on their well-being. Have them sign the AMA form and invite them to return at any time. Patients who are intoxicated with drugs or alcohol, disoriented, suicidal, or on legal or psychiatric holds may not refuse care. Use restraints and/or sedation as needed to facilitate medical treatment. Discuss all AMA discharges with the attending prior to discharge. Inform the attending of all patients trying to elope. Even if they are leaving AMA, send them with any prescriptions and referrals that would be beneficial to their wellbeing.

**Minors and AMA**
Patients less than 18 years who are not emancipated cannot be discharged or sign out AMA unless a parent or guardian is present. Notify social work if none is available.
TIME SENSITIVE ACTIVATIONS

Code STEMI

Contact your attending for any EKG with ST-elevations and compare to a prior (if available). If you and your attending decide to activate code STEMI, alert the charge nurse of a “Code STEMI” so that they can call out the code and activate the cath lab. For incoming medics, codes can be activated prior to the patient’s arrival. Please review the OCCAM protocol prior to starting your ED rotation.

The national standard is door to needle < 90 minutes, however at HMC we strive for < 30 minutes.

Code STEMI Activation Criteria

- ST Elevation in contiguous anterior leads
  - Male: ≥ 2mm
  - Female: ≥1.5mm
- ST elevation ≥ 1mm in any other contiguous leads (M and F)
- New Left Bundle Branch Block (LBBB) with focus on Smith/Sgarbosa* criteria
- Old LBBB, focus on Smith/Sgarbosa* criteria to aid in diagnosing STEMI
- Arrest (VF/VT/PEA) with Return of Spontaneous Circulation (ROSC) EKG meeting any of above criteria. Note that ROSC EKG not meeting above criteria should be a cards consult, not a CODE STEMI
- Active chest pain syndrome should be present (not asymptomatic)
- If doubt exists on whether a patient meets CODE STEMI criteria, page the interventional (‘cath’) attending directly (NOT the fellow or consult resident)
**Code Stroke**

**Criteria for activating code stroke:**
If persistent / fluctuating stroke symptoms < 24 hrs

Tell the charge nurse to call a CODE STROKE and then the start PULSARA case (start case before ED arrival if pre-notification)

If code stroke called prior to arrival, meet medics at the door.
At the door, perform quick neuro exam, check glucose, confirm story is consistent with a stroke, ensure stable vital signs and confirm patient has a protected airway. If all of this is confirmatory/stable, go straight to the CT scanner. NIH stroke scale should not hold movement to the scanner.

While in the CT booth, enter all orders in “ED stroke” powerplan. Order tPA immediately from CT control room so that pharmacy can start mixing it, once CT non-con is negative for any bleeding. Time is brain! Hospital is reimbursed for tPA if not used so there is no downside to ordering it. You have to specifically tell the nurse to administer it after ordering it once decision is made to treat.

Goal Times:
   Door to IV-tPA: 45 minutes
   Door to Intra-Arterial Intervention: 90 minutes

If there is a large vessel occlusion (LVO) and a CT perfusion suggests the patient may be a candidate for a thrombectomy, a level 2 stroke activation may be called by the neurology stroke attending.

Before your first shift, review the following topics:
   ● Stroke syndromes
   ● Inclusion and exclusion criteria for tPA
   ● Blood pressure management in stroke patients
   ● OCCAM stroke algorithm (link below)

The stroke algorithm is updated on-line:
https://depts.washington.edu/uwstroke/stroke_rx/HMC_Rx_Algorithm.pdf
Acute Stroke Evaluation and Treatment

If persistent / fluctuating stroke symptoms < 24 hrs
Call CODE STROKE, start PULSARA case
(start case before ED arrival if pre-notification)

First 15 minutes in ER
- Meet patient at door if pre-notification
- Short Hx and PE: document time last normal, and quantify deficits with GCS and NIHSS (Neurology)
- DIRECT TO STAT HEAD CT (non-contrast and CTA)
- Weigh patient on transfer to scanner table
- STAT blood draw: full electrolytes and glucose, CBC, Emergency Stroke Panel (ESP)
- Finger stick blood glucose check
- Place 2 large bore peripheral IVs
- Do NOT insert Foley catheter (if possible)
- Call Pharmacy to alert of possible need for tPA
- EKG

Radiology/ED/Neurology in CT Scanner reviewing images...
Blood on Head CT? (determined by 30 min from arrival)
YES Blood: (IPH/SAH) CTA Head only
NO Blood (Ischemic): CTA Neck (arch thru circle of Willis)

IV tPA candidate (15 minutes to Rx)
- If patient may qualify, order tPA via CPOE IV tPA orders - but don’t give until confirmed with Stroke Phone
- Give IV tPA information form to patient/family to review, document verbal consent if possible
- Review exclusion/criteria
- Call STROKE PHONE (744-6789)
- If patient qualifies – START tPA
  a. admit to ICU for ≥ 24 h
  b. Possible hemorrhage post tPA protocol
  c. ICU/NSU BP Rx guidelines
- CPOE Ischemic Stroke NICU tPA orders

Endovascular thrombectomy candidate
- Call STROKE PHONE (744-6789)
- Engage Neuro-Interventional team
- Give tPA information form to patient/family to review (Interventional team does final consent)
- Review inclusion/exclusion criteria
- If qualifies, consents
  a. Rx per protocol/Interventional team
  b. admit to NSU/ICU for ≥ 24 h
- ICU/NSU BP Rx guidelines

* IV labetolol then nicardipine drip preferred BP agents
Protocol for use of IV tPA for Acute Ischemic Stroke


Inclusion criteria

• Age ≥ 18 years old
• Clinical diagnosis of ischemic stroke causing a disabling neurologic deficit
  - Ischemic stroke is defined as an event characterized by the sudden onset of an acute focal neurologic deficit presumed to be due to brain ischemia after CT excludes hemorrhage
• Onset of symptoms of ischemic stroke within 3 hours of the time to initiation of treatment with intravenous tissue plasminogen activator (t-PA).
• 3 - 4.5 hour time window eligibility criteria for treatment are the same as those for persons treated at earlier time periods, WITH THE FOLLOWING ADDITIONAL CAUTIONARY CRITERIA:
  - Baseline NIHSS > 25
  - >80 years of age
  - Hx of both diabetes mellitus and prior stroke
  - Oral anticoagulant use
  - Evidence of ischemic injury involving >1/3 of the MCA territory

Wake-up, unknown onset, and 4.5-9 hour window patients can be considered for IV tPA based on either the WAKE-UP trial or the EXTEND trial (all other inclusion and exclusion criteria apply; these criteria are not included in guidelines to date, so informed consent is especially important and should be documented)

  - For the WAKE-UP trial, which applies to Wake-up and unknown onset patients (NEJM. 2018;379(7):611-622), a “Code Stroke MRI” must be done and show a diffusion abnormality without a corresponding FLAIR abnormality (this essentially suggests they are within 4.5 hours), then the patient can qualify for IV tPA treatment
  - For the EXTEND trial (NEJM. 2019;380(19):1795-1803), which applies to Wakeup or unknown onset patients if they are within 4.5-9 hours of clear last known well, or within 9 hours of mid-point of sleep period, a CTP can be performed and to qualify for IV tPA treatment the patient must meet criteria including:
    - Core (CBV < 30%) < 70 ml
    - (Penumbra (Tmax > 6 sec) – Core) (aka absolute difference) > 10 ml
    - Penumbra/Core (Mismatch Ratio) > 1.2

EXCLUSION CRITERIA

• CT scan with evidence of hemorrhage
• CT demonstrates extensive regions of clear hypoattenuation.
• Ischemic stroke within the previous 90 days
• History of severe head trauma within the previous 90 days
• Clinical presentation suggestive of subarachnoid hemorrhage, even if initial CT scan is normal
• Intracranial or intraspinal surgery within the past 90 days
• Hypertension with systolic blood pressure >185 mmHg or diastolic blood pressure >110 mmHg on repeated measures prior to starting tPA
• Active internal bleeding
• Hx of gastrointestinal malignancy or recent gastrointestinal or urinary tract hemorrhage within 21 days
• Acute hemorrhagic diathesis
  ○ Platelet count < 100,000/mm3 *
  ○ Use of warfarin with prolonged PT > 15 sec, INR > 1.7 or aPTT >40 sec
  ○ Confirmed or suspected use of a direct thrombin inhibitor, such as dabigatran. ** (Note: If the TT assay is normal (not elevated/prolonged), little or no dabigatran effect is present; the TT assay usually takes <10 minutes and is part of the Emergency Stroke Panel).
  ○ Confirmed or suspected use of a direct factor Xa inhibitor, such as rivaroxaban or apixaban.*
  ○ Abnormal values in the Emergency Stroke Panel, which includes the TT, PT, and anti-Xa, should raise concerns.

Use of treatment dose heparin/LMWH in previous 24 hours • Blood glucose < 50
• Arterial puncture at non-compressible site in the last 7 days
• Unruptured and unsecured large intracranial aneurysm (>10mm)
• Intracranial, intra-axial tumor (extra-axial tumors likely OK)
• Symptoms consistent with or known infective endocarditis
• Aortic Arch dissection

* = In patients without a history of thrombocytopenia, IV tPA can be started before platelet count returns, but should be discontinued if platelet count returns < 100,000/mm3 ** = IV tPA should not be used in a patient who has received FXa inhibitor < 48h

RELATIVE EXCLUSION CRITERIA
Not absolute contraindications, may imply overall poorer prognosis, may increase risk of symptomatic hemorrhage, yet do not exclude the possibility of benefit from tPA therapy

• Previous known non-traumatic intracranial hemorrhage (previously in exclusion criteria)
• Vascular malformation unless severe neurological deficits (ischemic risks outweigh those of ICH)
• Pregnancy; tPA has been given, with varying levels of success, risks to fetus and woman not clearly known, but may be considerable. Consult OB/Gyn immediately.
• Major extra-cranial surgery or trauma within 14 days
• Acute or recent MI within 3 months, depending on type of MI (though lower level evidence supports using tPA in these settings)
• Acute Pericarditis
• Abnormal aPTT, TT, or anti-Xa activity with unknown use of direct thrombin inhibitor or factor Xa inhibitor (may be false positive due to
lupus anticoagulant, consider IV tPA if able to reliably confirm that patient is not taking one of these agents)

- Cerebral microbleeds: >10 known CMB may increase risk for ICH If the patient has all of the inclusion criteria and none of the exclusion criteria, he or she is eligible for treatment with t-PA. If so, obtain informed consent and sign orders. If patient is not competent and there is no legally authorized representative, proceed without consent.

**Septic Shock**

Early identification is critical to patient outcomes. Per the American College of Emergency Physicians “Suspect sepsis/septic shock in obvious cases such as those with fever, leukocytosis, and hypotension. Outside classic presentations, suspect sepsis for unexplained altered mental status, tachypnea with a clear chest and normal oxygenation, or if clinical instinct suggests something is “not right” in a patient with a seemingly routine infection or suspected infection.” There are scoring tool such as “SIRS Criteria” and “qSOFA” that may be helpful.

While the ideal strategy to manage septic shock remains a dynamic topic, there is strong evidence to suggest that time to antibiotics matter, and we try to cover these patients with broad spectrum antibiotics as early as possible.

There are CMS quality measures looking at time to antibiotics. The 2018 Surviving Sepsis “One Hour Bundle” includes the following:

- Measure lactate level, re-measure if > 2
- Obtain blood cultures prior to antibiotic administration
- Administer broad spectrum antibiotics
- Begin rapid fluid resuscitation of 30ml/kg LR for crystalloid for hypotension or lactate > 4.
- Apply vasopressors if patient is hypotensive during or after fluid resuscitation for target MAP > 65.

Other things you should be aware of include:

- Be sure to document “Shock reevaluation” in your note with a time stamp for all patients with hypotension or lactate >4. This is a CMS requirement.
- Use the “ED sepsis” power plans for broad spectrum antibiotics organized by site of infection. This is a multiphase powerplan that also has an automatic repeat lactate ordered, as well as blood cultures.
• If you do not administer 30cc/kg bolus, document in your MDM why you did not feel that this was appropriate (e.g. Heart failure, bedside ultrasound)
• Talk to your nurse about whether the antibiotics your ordered are in the Pyxis—if they are not, you may speak to pharmacy about having them expedited. If you just order it, the patient may wait an inappropriate amount of time for antibiotics.


Tips to Running Cardiac Arrest Codes in the ED

Running codes is a bread and butter skill in the emergency department and something we hope you will feel more comfortable with by the end of your rotation. Here are a few tips to set you up for success.

Tips to running an ED code:
• Call over the radio for a “prearrival huddle” in the room where the patient is going ~5 minutes before they arrive.
• Give a one-liner about what is coming in, note any airway or access issues that you are aware of. Introduce yourself and do quick introductions around the room
• Roles to identify:
  o Nurse for charting and time keeper
  o Nurse for confirming access and pushing meds
  o Pharmacy
  o Physician proceduralist (central access, airway, chest tube if needed)—this allows code leader to keep running the code.
    ▪ If you want to be the proceduralist, talk to your attending to see if they can help facilitate you doing the central line. Generally the proceduralist will not be running the code at the same time (this applies to EM residents as well).
    ▪ NO BLIND or UNSTERILE central lines for patients who might go to ECMO (this could ruin their ECMO access).
• Intubations are typically performed by the Emergency Medicine resident or attending. Anesthesia does NOT routinely come to codes unless there is a specific challenge with the airway or a
plan to crash to ECMO. EM residents must have completed a month of anesthesia to perform ED intubations. EM2 residents will be given preference over EM1 residents.

- Follow usual ACLS protocol. There are certain scenarios in which you may consider ECMO (see below).

**ECMO-CPR Candidate Criteria**

**ECMO Activation Criteria**
- age 12 (>40kg)- 65yrs
- PEA due to reversible cause including:
  - Massive PE
  - Environmental hypothermia
  - Toxic ingestion
- Initial rhythm VT/VF with environmental hypothermia (T < 28°C)
- Not in asystole in the ED (unless T < 28°C)
- Dispatch to ED <60 min (unless T < 28°C)
- No known life limiting condition including:
  - Advanced COPD
  - Advanced CHF
  - ESRD
  - Cirrhosis or ESLD
  - Metastatic malignancy
  - Major stroke or neurologic impairment
  - Preexisting DNR
- ETCo2>10mmHg (unless PE)
- Fits into mechanical CPR device

[https://occam.uwmedicine.org/media/2087/cardiac-arrest-codes-082918.jpg](https://occam.uwmedicine.org/media/2087/cardiac-arrest-codes-082918.jpg)

**Immediate Post-Arrest Care**

OCCAM protocol Sept 11, 2019

1. Obtain Stat 12-lead ECG
2. STEMI alert for usual criteria
3. Titrate FI02 to SpO2 94-97%
4. Vasoactives, inotropes, +/- fluids to MAP >70mmHg
5. Obtain ABG and basic labs
6. Initiate TTM (see below)
7. Titrate respiratory rate to PaCO2 40-45mmHg; maintain tidal volume ≤ 8 ml/kg PBW or ≤ 6 ml/kg PBW if ARDS
8. Consider arterial line and CVC
9. Consider CT cardiac arrest protocol and infectious workup: blood cultures, ET aspirate, UA, antibiotics (if concern for infection)
10. Obtain bedside ultrasound or echo to determine cardiac function and investigate causes of arrest (i.e. Tamponade, Massive PE, etc.)
11. Contact MICU or cardiology for expedited ICU admission

Initiating Targeted Temperature Management

**Inclusion criteria:** not following commands after cardiac arrest

**Exclusion criteria:** evidence of serious bleeding

1. Order TTM PowerPlan
2. Check with Charge RN re: availability to TTM console
3. Place Artic Sun surface cooling pads & esophageal temperature probe or endovascular temperature management (EVTM) catheter
4. Sedation and neuromuscular blockade per TTM protocol
5. Order continuous EEG for seizure monitoring

**Pearls:**

- Temperature management device should be placed ASAP regardless of initial temp
- If sedation/NMB needed to control shivering during induction, it should be stopped for reassessment once patient reaches goal temperature

**Early discussion points on prognosis & goals of care**

- Predicting neurological outcome after cardiac arrest can be very challenging, and we usually must wait at least 4 days before attempting.
- Elicit values and baseline quality of life.
- Contact LCNW, but defer any donation discussions to them.
- Survival of Patients Admitted to Hospital
<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Neuro intact</th>
<th>Survived to D/C</th>
<th>Died in hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF/VT</td>
<td>764</td>
<td>60%</td>
<td>65%</td>
<td>35%</td>
</tr>
<tr>
<td>PEA</td>
<td>490</td>
<td>31%</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td>asystole</td>
<td>427</td>
<td>8%</td>
<td>12%</td>
<td>88%</td>
</tr>
</tbody>
</table>

Seattle & King County 2013-2016: Resuscitation attempted, non-trauma, no DNR

**Postarrest critical care by system**

We have included the following chart from OCCAM to help you organize your thoughts and provide a standardized approach to post arrest care. Some of the elements in this chart pertaining to you in the emergency department, other elements are more appropriate for the ICU setting (for example DVT prophylaxis). In general, critically ill patients should spend a minimal amount of time in the emergency department and should be admitted to the ICU in an expeditious manner. There are times, however, in which a critically ill patient may have a prolonged emergency department stay and it is important that they continue to receive high-level critical care in the emergency department.

<table>
<thead>
<tr>
<th>System</th>
<th>Consideration</th>
<th>Suggested actions</th>
</tr>
</thead>
</table>
| Neurologic       | Postarrest neurologic injury          | * Targeted temperature management (TTM)  
* Defer prognostication until 72 hours after rewarming  
* Neurologic consultation  
Minimize sedation  
* At 60-72 hours: SSEP, LP for CK-BB, Consider MRI brain stroke protocol |
|                  | Bleed, edema, herniation             | Head CT for screening                                                                                                                                 |
|                  | Shivering                            | Grade severity using bedside shivering assessment scale (BSAS)  
BSAS 0-1: Counter warming and acetaminophen  
BSAS 2: Magnesium, fentanyl, dexmedetomidine  
BSAS 3: Midazolam or propofol, Cistatracurium |

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<table>
<thead>
<tr>
<th>Category</th>
<th>Subclinical seizure activity</th>
<th>Cardiovascular</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>* Continuous EEG monitoring &lt;br&gt; * Neurologic consultation</td>
<td>* Stat 12-lead ECG &lt;br&gt; * Cath Lab for post-arrest STEMI &lt;br&gt; * Interventional cardiology consultation for VT/VF without STEMI &lt;br&gt; * Consider stat echo &lt;br&gt; * Antiplatelet therapy and anticoagulation for acute MI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Bedside ultrasound or echo to assess cardiac function, volume responsiveness, other causes of arrest &lt;br&gt; * IV fluid challenges indicated &lt;br&gt; * norepinephrine as first line vasopressor &lt;br&gt; * Dobutamine or epinephrine as needed for inotrope &lt;br&gt; * consider placement as CBC and arterial line &lt;br&gt; * Trend lactate &lt;br&gt; * Interventional cardiology or ECMO consultation for persistent cardiogenic shock</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Arrhythmia</strong> &lt;br&gt; * Maintained K, Ca, Mg, Phos at upper limits &lt;br&gt; * Antiarrhythmic as needed &lt;br&gt; * Consider warming from 33°C to 36°C if unstable</td>
</tr>
<tr>
<td><strong>Pulmonary</strong></td>
<td><strong>Ventilator management</strong> &lt;br&gt; * Low tidal volume (6-8ml/kg PBW) &lt;br&gt; * Add PEEP as needed for pulmonary edema &lt;br&gt; * Eucapnia (goal PaCO2 40-45 mmhg) &lt;br&gt; * Normoxia (goal SpO2 94-97%)</td>
<td><strong>Pulmonary causes of arrest</strong> &lt;br&gt; * Full PERT activation is suspicious for PE as etiology &lt;br&gt; * Evaluate for pneumonia and ARDS, treat if indicated</td>
</tr>
<tr>
<td><strong>Renal</strong></td>
<td><strong>Hypo-K, Hypo-Mg, Hypo-Phos</strong> &lt;br&gt; * Electrolyte protocol for aggressive supplementation</td>
<td><strong>Cold diuresis during TTM</strong> &lt;br&gt; * Hourly urine output, IV fluid replacement, target euvoolemia</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Acute kidney injury</strong> &lt;br&gt; Gentle volume expansion, increased MAP goals, +/- Inotropes per prerenal oliguria</td>
</tr>
<tr>
<td><strong>Infectious disease</strong></td>
<td><strong>Bacteremia, pneumonia, sepsis contributing to or complicating cardiac arrest</strong></td>
<td><strong>Infectious disease</strong> &lt;br&gt; * Routine blood cultures (High-frequency of bacteremia in OHCA) &lt;br&gt; * consider endotracheal aspirate or BAL if evidence of aspiration &lt;br&gt; *Low threshold for empiric broad spectrum</td>
</tr>
<tr>
<td>Endocrine</td>
<td>Hyperglycemia</td>
<td>Insulin infusion</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Pituitary-adrenal insufficiency</td>
<td>Consider hydrocortisone + vasopressin if high vasopressor requirements</td>
<td></td>
</tr>
<tr>
<td>Polyuria</td>
<td>If UOP &gt; 300 ml/hr for 2 hours, check serum / urine Na, Osm, Specific gravity. Order DI PowerPlan</td>
<td></td>
</tr>
</tbody>
</table>

| Hematologic | Occult Hemorrhages or bleeding diathesis | Hold anticoagulation Consider TTM target of 36°C instead of 33°C if bleeding |

| Musculoskeletal | Traumatic injuries causing or related to arrest | * Consider cervical spine precautions * Complete secondary survey, consider pan CT scan |
| Rhabdomyolysis or compartment syndrome if significant downtime | Complete musculoskeletal exam, Trend CPK |

| Prophylaxis | Ventilator associated pneumonia | VAP Bundle (oral care, elevate HOB, OG tube) |
| Stress ulcer, DVT, skin care, eye care | Tube feeds, SC heparin, frequent turns, Lacri-Lube |

**Management of environmental hypothermia**

In winter months we may see environmental hypothermia more commonly. Always consider sepsis in these patients, particularly if the story is not consistent with pure exposure.

- <30 degrees- invasive rewarming. Consider ECMO if cardiac arrest.
- 30-34 degrees, active external rewarming (warm O2, warm fluids, bair hugger)
- >34 degrees – passive rewarming
NO CRASH LINES for patients being considered for ECMO. Only ultrasound guided sterile lines may be placed for these patients.

See OCCAM protocol for ECMO guidelines (and see below under “Codes in the ED”)


**Intracranial Hemorrhage**

Most intracranial hemorrhage patients arrive as transfers from other facilities, via Airlift or ACLS ground transport. Spontaneous bleeds are evaluated by Neurology, who calls neurosurgery at their discretion. Traumatic bleeds are evaluated by Neurosurgery. Images usually arrive before the patient. Patients who arrive by Medic, and some Airlift patients, are coming directly from home with suspected ICH/ ischemic CVA. When you hear of these patients, inform radiology so they can be prepared to scan right away.

Elevate the patient’s head. Keep NPO. Check EKG, labs including emergency hemorrhage panel, type and cross, CXR (to check tube placement if they are intubated) and a brief neuro exam. Ask if the patient has taken aspirin, Plavix, NSAIDs, a DOAC (direct oral anticoagulant such as Dabigatran) or warfarin in the last 7 days. If so, refer to Stroke Algorithm on OCCAM for reversal. Send for a head CT without contrast ASAP to confirm the diagnosis, or to check progression in transferred patients. Subarachnoid hemorrhages and most intraparenchymal hemorrhages will then need a CT Angio to look for aneurysm or AVM – confer with the radiologist and neurology.

Consider CT c-spine if the patient fell before/during the bleed.

If there are clinical or radiographic signs of herniation, call the “Type A Herniation Phone” at 910-2743. This is a direct line to Neurosurgery, for pre-arrivals or arrived patients. For patients who are actively herniating, outside of surgical intervention, Emergency Department treatment options include Mannitol 1 g/kg, Hypertonic saline (23.4% NaCl 30-60ml over 10 minutes but must be given via central line).

Please check OCCAM for protocols on how to reverse warfarin and direct-oral anticoagulants (DOAC).
Exposures: Blood/Body Fluid, Sexual Assault, Sexual Exposure to HIV
These are usually handled by the advance practice providers (APP). If you do find yourself caring for these patients, there are very specific protocols that we must adhere to. Speak with your attending prior to picking up one of these patients in order to obtain the protocol packet which is stored in the radio room. There are different protocols for employees versus non-employee (due to the follow up arrangements) so make sure you work off the correct protocol packet.

For sexual assault cases (labeled as HSA on the trackshell) these should be cared for by an EM R2 or above only. These residents have undergone training that is required to care for these patients. They coordinate care with SW and the sexual assault nurse examiner (SANE).

SPECIAL PATIENT POPULATIONS

Domestic Violence, Elder Abuse, Child Abuse
Do not be afraid to ask patients about abuse
- Do you feel safe with the people in your home?
- Have you felt controlled or forced to do something you don’t want to do by someone important to you?
- Within the past year, have you been hit, slapped, kicked, pushed, or otherwise physically hurt by someone in your home?
- Are you afraid of your partner or anyone who may be in your home?

Document history objectively and be detailed in physical exam findings. Consult social work early (and ask about need for photographs to document trauma).

History of Sexual Assault (CC: HSA)
These patients will be picked up by an EM R2 or higher. These patients require specialized training for legal and patient wellbeing reasons. This is beyond the scope of this brief manual.

Pediatrics
A few quick pearls about seeing children in the ED.
For any complex pediatric case or case that involves trauma or abuse, the pediatrics team is typically involved and can be extremely helpful. We don’t admit medical pediatrics cases (they must be transferred to Seattle Childrens). When placing orders, order everything within a pediatric PowerPlans and remember medications are weight based.

Psychiatric Patients
Many patients are brought in for Suicidal Ideation (SI), Homicidal Ideation (HI) or out of control behavior (OOC). While often these patients have a well-established psychiatric condition and/or drug use history, it is our job to medically clear them for psychiatric evaluation. Note that the PES cannot place IVs or perform acute medical therapies for the most part (e.g. cannot manage acute etoh withdrawal).

Consider medical causes for psychosis, depression, or anxiety including but not limited to:

- Electrolyte abnormalities
- Anemia
- Hypoglycemia
- Hypo or hyperthyroidism
- PE (anxiety)
- ACS or arrhythmia (anxiety)
- Intracranial pathology such as mass or subdural in elderly population
- Head trauma (particularly in agitated patients or presumed overdose)
- Meningitis/Encephalitis

Be sure to perform a thorough neuro exam, especially if this is a new presentation of psychosis.

Medical clearance labs usually includes at least CBC, BMP +/- LFTs, Utox, UA. Further workup is at your discretion.

If any history of ingestion, or plan for ingestion, send Tylenol/ASA levels, and EKG.

You may call a “doc to doc” once patient is medically cleared prior to urine studies resulting as this may take several hours. You should prioritize this note so the PES doc can reference it (especially if you provided some medical treatment that may need to be continued such as oral antibiotics for cellulitis).
Selected Drug Doses

### ACLS: Full Cardiac Arrest

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose/Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Epinephrine Bolus</strong></td>
<td>1 mg IV or IO (10 mL of 1:10,000 solution) Repeat every 3-5 minutes</td>
</tr>
<tr>
<td>VF/pulseless VT</td>
<td></td>
</tr>
<tr>
<td>PEA/Asystole</td>
<td></td>
</tr>
<tr>
<td><strong>Vasopressin</strong></td>
<td>40 units IV or IO Replaces first or second dose of epi Epi 1 mg every 3-5 minutes after vasopressin</td>
</tr>
<tr>
<td>VF/pulseless VT</td>
<td></td>
</tr>
<tr>
<td>PEA/Asystole</td>
<td></td>
</tr>
<tr>
<td><strong>Amiodarone</strong></td>
<td>300 mg IV/IO May repeat 150 mg IV in 3-5 minutes Once resuscitated, 1 mg/min infusion X 6 hrs</td>
</tr>
<tr>
<td>VF/pulseless VT</td>
<td></td>
</tr>
<tr>
<td><strong>Magnesium</strong></td>
<td>1-2 gm IV Once resuscitated, 0.5-1 gm/hr infusion</td>
</tr>
<tr>
<td>Torsades de pointes</td>
<td></td>
</tr>
<tr>
<td>VF/VT and suspected ↓mg</td>
<td></td>
</tr>
</tbody>
</table>

### ACLS: Non-arrest Algorithms

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose/Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Atropine</strong></td>
<td>0.5-1 mg IV, repeat every 3-5 minutes to 3 mg</td>
</tr>
<tr>
<td>Symptomatic bradycardia</td>
<td></td>
</tr>
<tr>
<td><strong>Dopamine</strong></td>
<td>2-20 mcg/kg/min</td>
</tr>
<tr>
<td>Symptomatic bradycardia</td>
<td></td>
</tr>
<tr>
<td><strong>Epinephrine Drip</strong></td>
<td>2-10 mcg/min</td>
</tr>
<tr>
<td>Symptomatic bradycardia</td>
<td></td>
</tr>
<tr>
<td><strong>Amiodarone</strong></td>
<td>150 mg IV over 10 minutes Repeat every 10 minutes as needed Max dose 2.2 gm/day</td>
</tr>
<tr>
<td>Stable VT</td>
<td></td>
</tr>
<tr>
<td>A Fib with WPW</td>
<td></td>
</tr>
<tr>
<td><strong>Lidocaine</strong></td>
<td>100 mg (1-1.5 mg/kg) IV or IO May repeat ½ above dose in 3-5 minutes</td>
</tr>
<tr>
<td>Stable VT with preserved LV function</td>
<td>Once resuscitated, 1-4 mg/min infusion</td>
</tr>
<tr>
<td><strong>Procaainamide</strong></td>
<td>20-50 mg/min until arrhythmia is suppressed OR hypotension OR QRS increases &gt;50%. Max dose 17 mg/kg. 1-4 mg/min maintenance infusion.</td>
</tr>
<tr>
<td>Stable WCT</td>
<td></td>
</tr>
<tr>
<td>Re-entrant SVT (after adenosine)</td>
<td></td>
</tr>
<tr>
<td>A fib + WPW</td>
<td></td>
</tr>
<tr>
<td><strong>Adenosine</strong></td>
<td>6 mg RAPID IV push first dose</td>
</tr>
<tr>
<td>Stable SVT</td>
<td>12 mg RAPD IV push subsequent doses</td>
</tr>
<tr>
<td>Stable monomorphic WCT</td>
<td><strong>lower doses if pushing through a central line</strong></td>
</tr>
<tr>
<td><strong>Diltiazem</strong></td>
<td>15-20 mg IV over 2 minutes</td>
</tr>
<tr>
<td>Rate control for SVTs</td>
<td></td>
</tr>
<tr>
<td><strong>Metoprolol</strong></td>
<td>5 mg IV, repeat every 5 minutes x 3</td>
</tr>
<tr>
<td>Rate control for SVTs</td>
<td></td>
</tr>
<tr>
<td><strong>Intubation</strong></td>
<td><strong>Etomidate</strong></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Induction sedation</td>
<td>20 mg IV (0.3 mg/kg)</td>
</tr>
<tr>
<td><strong>Succinylcholine</strong>*</td>
<td><strong>Rocuronium</strong>**</td>
</tr>
<tr>
<td>Induction paralysis</td>
<td>Alternative paralysis</td>
</tr>
<tr>
<td>1-2 mg/kg IV, may repeat x 1</td>
<td>100 mg IV (0.6-1.2 mg/kg) once</td>
</tr>
<tr>
<td>2-4 mg/kg IM</td>
<td>10-20 mg IV (0.2 mg/kg) every 10 min prn</td>
</tr>
<tr>
<td><strong>Fentanyl</strong></td>
<td><strong>Midazolam</strong></td>
</tr>
<tr>
<td>Sedation/pain once intubated</td>
<td>Sedation/amnesia once intubated</td>
</tr>
<tr>
<td>50-100 mcg IV prn</td>
<td>1-4 mg IV prn</td>
</tr>
<tr>
<td><strong>Propofol</strong></td>
<td></td>
</tr>
<tr>
<td>Sedation/amnesia</td>
<td>0.5 mg/kg IV bolus</td>
</tr>
<tr>
<td>0.02 mg/kg/min starting, titrate to effect</td>
<td>Max 0.1 mg/kg/min</td>
</tr>
</tbody>
</table>

* Onset of action 1 minute.  
Duration of action 5-10 minutes.  
Contraindications: Renal failure, burns, neuromuscular disease, cardiac disease, ↑K⁺

** Onset of action 1-6 minutes.  
Duration of action 12-15 minutes.
Emergency medicine is a dynamic field, one in which anything could walk through the door on any given day. The purpose of this guide is to give you some background into ED operations and time sensitive protocols you may be expected to know about while working in the emergency department. Below we have listed some key and critical topics and procedures you should review and read about on your own to prepare yourself for the patients you may care for. For each of these clinical topics, when you read, ask yourself the following questions: 1) How would this patient present? 2) What would be on my differential? 3) What tests would I need to order? 4) What medications / therapeutics could I offer?

Clinical Management Topics

- Critical Care
  - ACLS Algorithms
  - Shock differential diagnosis and management
  - Airway management
  - Ventilator management
- Approach to altered mental status
- Approach to abdominal pain
- Approach to shortness of breath
  - Pulmonary embolism
  - PERC and Wells Scores
  - Heart Failure Management
  - Asthma / COPD management
- Approach to chest pain
  - ACS risk stratification
  - Use of HEART and GRACE Scores
  - Review of ECG Essentials
  - Management of acute aortic dissection
- Anaphylaxis
- Electrolyte emergencies
  - Hyperkalemia
  - Hyponatremia
- Endocrine emergencies
  - DKA
  - Hypoglycemia
- Gastrointestinal
  - GI Bleeding Emergencies
- Infectious Disease
  - Management of Necrotizing Soft Tissue Infection
  - Review of antibiotic choices for septic patients of various sources (GI, Pulmonary, Skin/Soft Tissue, GU, CNS, NSTI)
- Neurology
- Seizures and status epilepticus
- Intracranial Hemorrhage (IPH, SAH)
- CVA
- Ophthalmology
  - Approach to the painful red eye
  - Approach to acute vision loss
- Toxicology
  - Alcohol Withdrawal
  - Acetaminophen overdose
  - Methamphetamines
  - Opiate overdose
  - Opiate withdrawal
  - Serotonin Syndrome
  - Salicylate overdose
  - TCA overdose
- OBGYN
  - Vaginal bleeding during pregnancy
  - Ectopic pregnancy
- Vascular Emergencies
  - Limb threatening ischemia
  - Abdominal aortic aneurysm

Procedures
- Lumbar Puncture
- Central line (Ultrasound guided IJ and Femoral)
- ABG
- Paracentesis
- Thoracentesis
- Intraosseous access (IO)
- Ultrasound skills
  - RUSH
  - Volume Status Evaluation
  - Ultrasound guided IV access
  - Echocardiography

Resources to consider using to study
- The Atlas of Emergency Medicine - available via Health Sciences Library, Access Medicine
- Procedures Consult - available via Health Sciences Library, Access Medicine
Key Literature To Review


Other Resources

IMPORTANT PHONE NUMBERS

ED Operator for consults / admissions 4-7988
Orca/Firstnet support 897-6722

HMC ED Doctor’s Line 4-4074
Psych Emergency Services (PES) 4-3076
Lab 4-3451
Pharmacy-Inpatient 4-3220
Pharmacy-Outpatient 4-3219
Code to battery room 3259

Radiology:
- Trauma radiology 4-3346
- CT scanner 4-6106
- Neuro reading room 4-6143
- Radiology resident 4-3651
- Ultrasound 4-2812

Cell phones:
- Gold Attending 4-7840
- Purple Attending 4-7870
- Trauma Attending 4-7138
- Charge Nurse 4-4025
- ED pharmacist 948-9010

Poison Control 1-800-222-1222
Surrounding Hospitals and Capabilities

Patients, pediatric and adult, with substantial trauma are transported to Harborview Medical Center. For other emergencies, in general, Seattle Medic One will transport patients to the hospital of the patient’s choice. While Seattle Medics will not transport to Everett, the medics will take patients to any hospital in the city that has the capability to care for that patient’s problem. We believe that patients get better medical care when they go to the hospital where they are comfortable and which has medical records and a relationship with the patient.

Certain patients should only be transported to selected specialty hospitals.

Trauma Center (Adults and Children)
Harborview Medical Center
All major trauma patients. Patients with isolated injuries and low risk for serious injury may be transported to the hospital of their choice.

Pediatrics
Seattle Children’s Hospital
Swedish First Hill
Harborview Medical Center (trauma)

STEMI
Harborview Medical Center
Northwest Hospital
Swedish Cherry Hill
University of Washington Medical Center
Virginia Mason Medical Center

Major Stroke
Harborview Medical Center
Swedish Cherry Hill
Virginia Mason Medical Center

Labor and Delivery & Postpartum Emergency
Northwest Hospital
Swedish Ballard
Swedish First Hill
University of Washington Medical Center

AAA/Aortic Dissection
Harborview
Swedish Cherry Hill
Virginia Mason Medical Center
## Seattle Medics Arsenal

<table>
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<tr>
<th>Medication</th>
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<td>Pericardiocentesis</td>
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<td>Sheetint the pelvis</td>
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<td>Femoral traction splint placement</td>
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<td>Tourniquet placement</td>
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<td>Vaginal delivery</td>
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<td>Atropine</td>
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<td>Diltiazem</td>
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<tr>
<td>Epinephrine</td>
<td>Anaphylaxis, VF/VT, PEA, Asystole (IM and IV)</td>
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<tr>
<td>Etomidate</td>
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<td>Furosemide</td>
<td>Pulmonary edema</td>
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<td>Ipratropium</td>
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<td>Ketamine</td>
<td>Excited delirium syndrome, intubation, pain (IM and IV)</td>
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<tr>
<td>Lidocaine</td>
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<td>Midazolam</td>
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<td>Ondansetron</td>
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<tr>
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<tr>
<td>Phenobarbital</td>
<td>Refractory seizures</td>
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<tr>
<td>Procainamide</td>
<td>Refractory VF/VT, wide complex tachycardia</td>
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<td>Rocuronium</td>
<td>Neuromuscular relaxant for intubation</td>
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<tr>
<td>Sodium Bicarbonate</td>
<td>Unwitnessed cardiac arrest, Metabolic acidosis, Hyperkalemia</td>
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<tr>
<td>Hydroxocobalamin</td>
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**Acknowledgements:**
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