BEARAMEDICS

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FIELD REFERENCE CARDS

Field Differentials · Crew Task Flows · ECG Recognition

IN THIS SET

1. **Chest Pain** — Chest Pain / ACS Crew Flow
2. **Respiratory Distress** — Respiratory Crew Flow
3. **Abdominal Pain** — Abdominal Pain Crew Flow
4. **Altered Mental Status** — AMS Crew Flow
5. **Shock & Hypotension** — Shock Crew Flow
6. **Syncope** — Syncope Crew Flow
7. **Stroke & Mimics** — Stroke / CVA Crew Flow
8. **Trauma Considerations** — Falls & Trauma Crew Flow
9. **12-Lead Speed Read** — Common Dysrhythmias
10. **STEMI & the 12-Lead** — ECG Zebras

Back of this cover: the G.O.L.D. Standard PCR narrative quick reference. **Each card:** differential or recognition reference on the front, crew task flow or companion reference on the back.

Card key: Do EMT performs · Prep EMT stages it, medic gives it · (P) Pearl, not in county protocol
Base Base hospital order only · #640 SLOEMSA protocol number

Not a treatment protocol. These cards are a study and field reference. Treat per patient presentation, vitals, and current SLO County EMS protocols; when a card and a protocol disagree, the protocol wins. An independent Bearamedics project, not issued or endorsed by any agency or employer.

Prepared by **Thomas Moore, EMT-P**

v1.0 · Oct 2026 · Flip for the G.O.L.D. Standard

DOCUMENTATION

THE G.O.L.D. STANDARD

PCR Narrative Quick Reference
911 Emergency Response · does not replace the full guide

WRITE EVERY CHART FOR THREE PEOPLE WHO WEREN'T THERE

- ✦ The next clinician, a QI reviewer, and an attorney
- ✦ Your own narrative, every call, in your own words: no auto-narrative #124
- ✦ If it isn't written, it wasn't done. If it isn't defensible, it isn't finished
- ✦ Never chart a fact you didn't confirm or care you didn't witness
- ✦ Every sentence should survive one question: "How do you know that?"
- ✦ Abbreviations from the county-approved list only #124

STEP 1: Four Letters That Hold All Seven Required Elements #124

G GATHER
What Happened

- **Dispatch and scene:** how dispatched, what you found on arrival
- **Patient and chief complaint:** age, sex, their own words in quotes
- **History:** OPQRST or the equivalent
- Pertinent negatives matter as much as positives
- Attribute it: patient states, bystander reports

Elements 1, 2, 4

O OBSERVE
What You Found

- Focused exam by system, tied to the chief complaint
- Chart the normal findings too: show that you looked
- Vitals, cardiac monitor, 12-lead, and any other diagnostics
- **Objective only:** what you saw, heard, felt, or measured
- Not what you think it means yet

Element 3

L LINK
Your Reasoning Between the Two

- Primary impression, and secondary if it applies
- Stated as reasoning that connects back to what you gathered and observed
- Not a diagnosis pulled from nowhere
- Findings first, impression second
- **The letter that gets skipped when you're slammed,** and the one that makes a chart defensible

Element 5

D DO & DOCUMENT
What You Did, What Happened After

- Every intervention, the response, and the reassessment
- Meds: dose, route, what changed
- Procedures: attempts, who, how confirmed
- **Movement to the gurney:** method and assist level
- Position, monitoring, changes en route
- **Transfer of care:** who took report, and their title

Elements 6, 7

THREE RULES THAT MAKE A CHART HOLD UP

The Link: One Sentence Minimum

"Given [X] and [Y], impression of [Z]."

Given diaphoresis, substernal pressure, and 12-lead findings, primary impression of ACS.

"How Do You Know That?"

"I observed it" or "the patient told me": write it that way. "I assumed it": don't write it at all.

Times in the Narrative

CAD, the monitor, and the med fields own their times. Write one only when no field captures it (last seen normal, onset) or when sequence is the point.

STEP 2: Weak vs. Gold

Weak	What's Missing	Gold
Patient was having a heart attack.	A diagnosis you didn't make	Given diaphoresis, substernal pressure, and 12-lead findings, primary impression of ACS.
Patient was given 4 mg Zofran.	Care you didn't witness, stated as fact	Reportedly given 4 mg Zofran by first responders.
Patient walked to the gurney.	Who assisted, how, and what you assessed	Patient ambulated to gurney with stand-by assist x2 crew, gait steady, no distress noted.
Pt fell, no injury noted.	What you ruled out	Denies LOC, denies head strike, denies chest pain, ambulatory at baseline per caregiver.
Patient refused further evaluation.	The whole refusal	Capacity, risks explained, alternatives offered, the patient's own words, signature or witness.
Unable to sign.	The reason	Unable to sign due to altered mental status at the time of transport.

BEFORE YOU SUBMIT Gather, Observe, Link, Do & Document.

- ☐ Written in my own words
- ☐ Exam by system, normals included
- ☐ Impression reasoned from findings
- ☐ Refusal or restraint checklist if it applies
- ☐ Subjective claims attributed
- ☐ Narrative-only times; none restated
- ☐ Impression fields match any alert
- ☐ Transfer of care: name and title
- ☐ Pertinent negatives documented
- ☐ 12-lead and rhythm strips attached
- ☐ Every move: method and assist level
- ☐ Uploaded inside the window

Upload clock #124 **60 min** after transfer of care for Step 1 or 2 trauma, cardiac arrest or ROSC, STEMI, stroke alerts, and any code 3 transport · **2 hours** for everything else · **12 hours** or end of shift for non-transports

BACK

Quick reference only. Refusal, restraint, signature, and IFT checklists are in the full guide: The G.O.L.D. Standard, 911 Emergency Response Edition, v1.1. Chart per SLOEMSA Policy #124.

CHEST PAIN

RED FLAGS: TREAT & TRANSPORT, DON'T STOP TO DIFFERENTIATE

- ✦ STEMI on 12-lead
- ✦ Unequal BP or pulses between arms
- ✦ Sudden max-intensity onset ("worst instantly")
- ✦ Hypotension or shock with chest pain
- ✦ Syncope or near-syncope with pain
- ✦ Chest pain + hypoxia + tachycardia (suspect PE)
- ✦ Diaphoresis, pallor, "sense of doom"
- ✦ New dysrhythmia or bradycardia

STEP 1: Characterize the Pain, Then Narrow by History & Exam

PRESSURE / SQUEEZING

- Exertional, radiates to jaw/arm/back → ACS
- Diaphoresis, N/V, dyspnea → ACS
- Elderly, diabetic, female: pain may be mild or absent
- Stimulant or cocaine use → demand ischemia

ACS / STEMI

TEARING / RIPPING

- Max intensity at onset, radiates to back
- HTN hx, unequal pulses or BP >20 mmHg arm-to-arm
- Pain + neuro deficit or syncope
- May mimic inferior MI if dissection involves the RCA

Aortic Dissection

PLEURITIC (worse with breath)

- Sudden + dyspnea + tachycardia, DVT or immobility risk → PE
- Unilateral absent sounds, hyperresonant → pneumothorax
- Fever, productive cough, focal crackles → pneumonia

PE · Pneumothorax · Pneumonia

POSITIONAL / REPRODUCIBLE

- Better leaning forward, worse supine, recent viral illness → pericarditis
- Reproducible on palpation, recent exertion or injury → musculoskeletal
- Tenderness alone **never** rules out ACS

Pericarditis · Musculoskeletal

BURNING / EPIGASTRIC

- After meals, worse supine, hx GERD → GI
- Relief with antacid does **not** rule out ACS
- Inferior MI classically mimics indigestion: 12-lead every one

GI, after ruling out MI

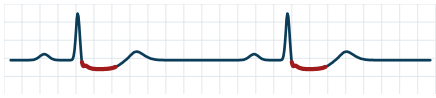
12-LEAD QUICK READ: Acquire Within 10 Min of Contact; One Tracing Is Never Enough

ST Elevation



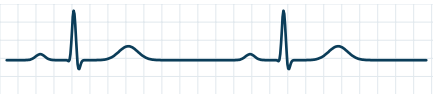
≥1 mm in 2 contiguous leads. **V2–V3:** ≥2 mm men 40+, ≥2.5 mm men under 40, ≥1.5 mm women. Inferior (II, III, aVF) → get **V4R**: an RV infarct is preload-dependent.

ST Depression + Tall R in V1–V3



Don't stop at "ischemia." Tall R + ST depression anteriorly suggests **posterior MI** → get V7–V9: **≥0.5 mm** counts (≥1 mm in men under 40).

Normal / Nonspecific



A single clean 12-lead does **not** rule out ACS. Repeat with any change in pain, vitals, or rhythm. LBBB or paced: modified Sgarbossa (Card 10).

STEP 2: Confirm / Compare Leading Differentials

Dx	Onset	Key History	Pain Character	Other Exam / Vitals	Field Clue
ACS / MI	Gradual or exertional	CAD, HTN, DM, smoking, prior MI/stents, family hx	Pressure, heaviness; radiates jaw/arm	Diaphoresis, N/V, dyspnea; may be normotensive	Unchanged by position or palpation
Aortic Dissection	Abrupt, max at onset	Uncontrolled HTN, Marfan, stimulant use	Tearing or ripping, radiates to back	BP differential arm-to-arm, pulse deficit, neuro deficit	Severe pain with unequal pulses
PE	Sudden	Immobility, recent surgery, DVT or cancer hx, hormonal birth control	Pleuritic, sharp	Tachycardia, hypoxia, clear lungs, unilateral leg swelling	Dyspnea out of proportion to exam
Pneumothorax	Sudden	Trauma, tall thin male, COPD bullae, exertion	Sharp, unilateral, pleuritic	Diminished or absent unilateral sounds, hyperresonant	+ Hypotension + tracheal shift = tension
Pericarditis	Gradual, days	Recent viral illness, renal failure, autoimmune	Sharp, positional	Friction rub; diffuse ST elevation, PR depression	Better leaning forward, worse supine
GI / Esophageal	Gradual, meal-related	GERD, hiatal hernia, alcohol, NSAIDs	Burning, epigastric	Usually normal vitals; epigastric tenderness	Diagnosis of exclusion: 12-lead first
Musculoskeletal / Costochondritis	Gradual or post-activity	Recent lifting, cough, trauma, repetitive motion	Sharp, localized, reproducible	Point tenderness on palpation; normal vitals	Reproducible pain still gets a 12-lead

RCA right coronary artery **V4R** right-sided chest lead **V7–V9** posterior chest leads **LBBB** left bundle branch block **SOB** shortness of breath

CHEST PAIN / ACS

Crew Task Flow
Bearamedics Reference · follow SLOEMSA protocols

CALL IT EARLY

- ✦ STEMI on 12-lead: STEMI alert, pads on, scene time 10 min or less #601
- ✦ Hypotension or instability with chest pain: treat en route, don't linger
- ✦ Computer reads ***STEMI***: STEMI Alert to nearest SRC. Your read only: 12-lead consult with French #152

CREW FLOW: MEDIC AND EMT LANES

SLOEMSA #152, #601, #602, #603, #615, #640, #707

	MEDIC	EMT gives O2 and oral glucose only; never draws or administers other meds
1 First contact	• General impression, OPQRST, cardiac history • Ask about erectile dysfunction meds now, since they decide nitro later • Direct partner: electrodes on, ASA out	Do Vitals and SpO2 Do O2 only if SpO2 under 94% or in distress #602 Do Clear chest, place 12-lead electrodes Prep ASA bottle and our nitro out for the medic (162 mg = two 81 mg chewables)
2 Before moving STEMI: scene time 10 min or less #601	• 12-lead early #640, within 10 min of contact (P) • ASA 162 mg PO chewable #640 • Inferior STEMI: V4R first. RVI means hold nitro Base • ST depression V1 to V3: posterior leads V7 to V9 (P) • Nitro 0.4 mg SL every 5 min if SBP 100 or higher #640 ▪ Nitro paste 1 inch may follow SL doses • IV. STEMI: large bore plus second large-bore saline lock #640	Do BP before every nitro dose Do Med list, allergies, anticoagulants Prep IV kit and primed NS bag Prep STEMI: pads out, second lock supplies Do Stage stretcher, clear the path out
3 En route	• Updated STEMI Alert after leaving scene; transmit with age and sex, no name #152 • Serial 12-leads #707 • SBP under 90 and the SRC adds 30+ min: consult French for destination #152 • Pain refractory to nitro: fentanyl 25 to 50 mcg slow IV, keep SBP 100 or higher, may repeat at 5 min, 200 mcg max #640 ▪ No IV: 50 to 100 mcg IM/IN, repeat at 15 min • No ketamine for coronary chest pain #603 • Hypotension: NS up to 500 mL #601. More fluid or push-dose epi Base • Nausea: ondansetron 4 mg slow IV #615	• Smooth or pause the ride when the medic calls "12-lead" or "IV" (P) • Confirm destination type and relay ETA
4 Arrival and handoff	• Report times of ASA, each nitro, fentanyl, and pain scores • Two 12-lead copies: one to the hospital, one with the PCR #152	Do Transfer; bring the med list and belongings Do Restock electrodes and pads

DOORS-CLOSED CHECK

Confirm together before the EMT goes up front. After this, the medic is on their own.

- ☐ Monitor on, 12-lead cables connected
- ☐ ASA given; nitro and ED med status known
- ☐ Destination: STEMI to French north of El Campo Rd, Marian south #152
- ☐ STEMI: pads on, chest clear #640
- ☐ IV kit and primed bag within the medic's reach
- ☐ Med list and belongings on board

HOLD NITRO AND CONSULT BASE #640

- SBP trending toward or under 100, or other signs of instability
- Evidence of RVI (ST elevation in V4R)
- Erectile dysfunction meds (P) sildenafil or vardenafil within 24 h, tadalafil within 48 h
- AFib with RVR (rate over 100)
- Significant SBP drop after a dose

IF YOU TAKE A FIRE RIDER

Optional, at the medic's discretion. Hand off within the rider's scope:

- Serial vitals and BP before each nitro
- History, med list, and talking with family
- Holding equipment and helping with lead placement

Do EMT performs Prep EMT gathers and stages it only: the medic draws, mixes, and gives every medication (P) Pearl, not in county protocol
Base Base hospital order only #640 SLOEMSA protocol
O2: EMT gives it; the medic picks the device and the flow rate. Use the side-stream EtCO2 cannula whenever O2 is indicated.

RESPIRATORY DISTRESS

Field Differential Algorithm
Bearamedics Reference · not a treatment protocol

RED FLAGS: TREAT & TRANSPORT, DON'T STOP TO DIFFERENTIATE

- ✦ SpO2 <90% despite O2
- ✦ Altered LOC or fatiguing from SOB
- ✦ Unilateral absent sounds + hypotension + tracheal shift (tension pneumo)
- ✦ Silent chest / minimal air movement
- ✦ Cyanosis
- ✦ Sudden dyspnea + tachycardia + hypotension (suspect massive PE)
- ✦ Cannot speak in full sentences
- ✦ Stridor, drooling, or tripoding

STEP 1: Auscultate Breath Sounds, Then Narrow by History & Exam

WHEEZING (bilateral)

- Known asthma or COPD history?
- Sudden onset, allergen or exercise trigger → asthma or anaphylaxis
- Gradual, smoker, chronic sputum → COPD
- JVD, edema, orthopnea, crackles too → cardiac wheeze

Asthma · COPD · Anaphylaxis · CHF

CRACKLES / RALES

- Bibasilar + JVD + edema + orthopnea → CHF
- Sudden onset with severe HTN → SCAPE (flash pulmonary edema)
- Fever, productive cough, focal → pneumonia
- Recent vomiting or aspiration risk → aspiration

CHF · SCAPE · Pneumonia

DIMINISHED / ABSENT (unilateral)

- Trauma or sudden pleuritic pain, hyperresonant → pneumothorax
- + Hypotension + JVD + tracheal shift → tension (emergent)
- Dull to percussion, gradual → effusion

Pneumothorax · Effusion

STRIDOR

- Allergen exposure, hives, swelling → anaphylaxis
- Witnessed choking → foreign body
- Fever, drooling, tripod (peds) → epiglottitis

Upper Airway Obstruction

CLEAR / NORMAL

- Pleuritic pain, unilateral leg swelling, recent surgery → PE
- Slow, shallow breathing, pinpoint pupils → opioid overdose
- Deep rapid breathing, fruity breath, diabetic → DKA
- Situational, tingling, normal SpO2 → anxiety (exclusion)

PE · Opioid · DKA · Anxiety

CAPNOGRAPHY QUICK READ: Shape Matters as Much as the Number

Normal / Square



Sharp up and down, flat plateau. Normal V/Q. Supports CHF or pneumonia over bronchospasm.

Shark Fin



Slanted upstroke, no flat plateau. Bronchospasm → asthma or COPD. Steeper slope = worse spasm.

Normal Shape, Low & Dropping



Good shape, falling height, clear lungs, tachypneic → suspect PE (dead space) or worsening perfusion.

Doesn't Return to Baseline



Floor never reaches zero → rebreathing or incomplete exhalation. Bagging or vent rate too fast (breath stacking, auto-PEEP), stuck valve, or wet sensor. Slow the rate. (P)

STEP 2: Confirm / Compare Leading Differentials

Dx	Onset	Key History	Lung Sounds	Other Exam / Vitals	Field Clue
Asthma	Sudden, minutes	Known asthma; allergen, exercise, or cold-air trigger	Expiratory wheeze, prolonged expiration	Accessory muscles, tachycardia; SpO2 may be normal until late	Responds to bronchodilator
COPD	Gradual, days	Smoking history, known COPD, recent URI	Wheeze ± diminished, prolonged expiration	Barrel chest, pursed-lip breathing, chronic sputum	Baseline SpO2 often low for this patient
CHF / Pulm Edema	Gradual to sudden (flash)	CHF, HTN, diet or med noncompliance	Bibasilar crackles ± wheeze	JVD, pedal edema, orthopnea, pink frothy sputum	Worse lying flat. Sudden + severe HTN = SCAPE: CPAP and nitro per #617
Pneumonia	Gradual, days	Fever, productive cough, recent illness	Focal crackles or rhonchi	Fever, pleuritic pain, malaise	Unilateral or focal findings
Anaphylaxis	Sudden, minutes	Food, sting, drug, or known allergy	Wheeze or stridor	Hives, swelling, vomiting or cramping, hypotension	Epi early; unsure still means epi #611
PE	Sudden	Immobility, recent surgery, DVT or cancer hx, hormonal birth control	Often clear	Tachycardia, pleuritic pain, unilateral leg swelling	Sudden dyspnea + clear lungs = red flag
Opioid Overdose	Rapid	Known use, paraphernalia, pain scripts	Clear; snoring or gurgling	RR 8 or less, pinpoint pupils, EtCO2 over 45	Ventilate first, then Narcan #618
Pneumothorax	Sudden	Trauma, tall thin male, COPD bullae, exertion	Diminished or absent unilateral, hyperresonant	Tracheal deviation + hypotension = tension (emergent)	Sudden unilateral pleuritic pain + dyspnea

V/Q ventilation/perfusion **SCAPE** sympathetic crashing acute pulmonary edema **PEEP** positive end-expiratory pressure **URI** upper respiratory infection
DKA diabetic ketoacidosis

RESPIRATORY DISTRESS

Crew Task Flow
Bearamedics Reference · follow SLOEMSA protocols

CALL IT EARLY

- ✦ Tiring, altered, or SpO2 falling despite treatment: BVM now, don't wait #703
- ✦ Unsure if allergic reaction or anaphylaxis: give epi early #611
- ✦ Opioid with poor breathing: ventilate with BVM before Narcan #618

PICK THE PATHWAY FIRST

WHEEZES	CRACKLES	OPIOID	ALLERGIC
Asthma or COPD history, prolonged exhale, shark-fin EtCO2	CHF or cardiac history, hypertension, pink frothy sputum	RR 8 or less, SpO2 under 94%, EtCO2 over 45, pinpoint pupils	Exposure plus hives, angioedema, stridor, GI upset, hypotension
Bronchospasm #616	**Pulmonary edema #617**	**Opioid overdose #618**	**Anaphylaxis #611**

CREW FLOW: MEDIC AND EMT LANES

SLOEMSA #602, #611, #616, #617, #618, #701, #703

	MEDIC	EMT gives O2 and oral glucose only; never draws or administers other meds
1 First contact	• Work of breathing, speech, mental status, lung sounds • Pick the pathway: wheezes, crackles, opioid, or allergic • Direct partner: sit them up, O2, monitor with EtCO2	Do Sit patient up; vitals and SpO2 Do O2 to 94% or higher; never withhold in distress #602 Do Poor breathing: open airway, BVM with O2 Do Side-stream EtCO2 cannula whenever O2 goes on: standard here #701
2 Before moving	• EtCO2 on every patient in distress; watch the waveform #701 • Wheezes: albuterol 2.5 to 5 mg; moderate, add ipratropium 500 mcg #616 ▪ Severe: magnesium 2 g IV over 20 min. Refractory, under 70, no cardiac history: epi 0.01 mg/kg IM, 0.3 mg max #616 • Crackles, including SCAPE: CPAP 7.5 to 10 cm; nitro 0.4 mg SL every 5 min if SBP 100 or higher. No higher doses #617 #703 • Opioid: Narcan up to 1 mg IV/IM or 2 mg IN, titrate to breathing #618 • Allergic: epi 0.01 mg/kg IM (0.5 mg max), diphenhydramine 50 mg, albuterol if wheezing #611 • 12-lead for crackles, diabetics with SOB, or cardiac signs #707	Do Vitals and SpO2 after each treatment Do Home O2, inhalers, allergies, med list Prep HHN set assembled; albuterol and ipratropium vials out, unopened Prep CPAP circuit assembled, flow confirmed; medic sets the pressure #703 Prep MAD, IM syringe, and BVM staged; medic handles the drug Prep 12-lead electrodes on
3 En route	• Reassess every 5 min: work of breathing, SpO2, EtCO2, mental status • Repeat albuterol as needed; ipratropium once more after 20 min #616 • Magnesium: watch for respiratory depression, ALOC, rhythm change. Calcium chloride Base • Titrate CPAP in 3 cm steps, 15 cm max; notify base when used #703 • Nitro with ED meds, AFib with RVR, or non-cardiogenic edema Base • Still drowning despite CPAP and SL nitro: base for further orders #617 • Failing despite treatment: BVM, then advanced airway #717 #718	• Smooth ride; watch the on-board O2 supply • Be ready to pull over if the medic needs hands for BVM (P) • Relay ETA
4 Arrival and handoff	• Report pathway, meds and times, CPAP settings, SpO2 and EtCO2 before and after • Opioid: consider leave-behind naloxone #618	Do Switch to wall O2; transfer with CPAP or neb running Do Bring the med list, belongings, and their inhalers

DOORS-CLOSED CHECK

Confirm together before the EMT goes up front. After this, the medic is on their own.

- ☐ O2 switched to on-board supply, tank level checked
- ☐ EtCO2 and SpO2 reading
- ☐ Severe: magnesium or second neb staged
- ☐ CPAP or neb running, circuit secured
- ☐ BVM, suction, and airway kit within reach
- ☐ Opioid: medic has a Narcan redose ready; mixed drugs may need more #618

PULL CPAP AND BAG THEM #703

- SBP under 90 (remove any nitro paste)
- Increasing distress or dropping respiratory drive
- Decreasing level of consciousness
- Signs of pneumothorax or subcutaneous air
- Vomiting or unable to control secretions

IF YOU TAKE A FIRE RIDER

Optional, at the medic's discretion. Hand off within the rider's scope:

- Two-hand mask seal on BVM or CPAP
- Serial vitals and SpO2 after each treatment
- Home med and allergy history from family

Do EMT performs **Prep** EMT gathers and stages it only: the medic draws, mixes, and gives every medication (P) Pearl, not in county protocol **Base** Base hospital order only #640 SLOEMSA protocol **O2:** EMT gives it; the medic picks the device and the flow rate. Use the side-stream EtCO2 cannula whenever O2 is indicated.

Crew workflow guidance only. Treat per SLO County EMS protocols. EMT lane assumes EMTs give only O2 and oral glucose, narrower than SLOEMSA BLS scope.

ABDOMINAL PAIN

Field Differential Algorithm
Bearamedics Reference · not a treatment protocol

RED FLAGS: TREAT & TRANSPORT, DON'T STOP TO DIFFERENTIATE

- ✦ Pulsatile mass + back or flank pain
- ✦ Pain out of proportion to a soft exam
- ✦ Childbearing age + pain + syncope (ectopic)
- ✦ Rigid, board-like, or guarding abdomen
- ✦ Hematemesis, melena, or hematochezia
- ✦ Epigastric pain: get a 12-lead before calling it GI
- ✦ Tachycardia with a normal blood pressure
- ✦ Fever + hypotension (sepsis)

STEP 1: Localize the Pain, Then Narrow by History & Exam

RUQ

- After fatty meal, radiates to right shoulder or scapula → biliary
- + Fever, jaundice → cholangitis (sepsis risk)
- Cough, fever, referred from chest → right lower lobe pneumonia

Biliary · Hepatic

EPIGASTRIC

- **12-lead first:** inferior MI presents here
- Bores to back, alcohol or gallstone hx, vomiting → pancreatitis
- Burning, worse when hungry or at night → PUD or gastritis

MI · Pancreatitis · PUD

RLQ

- Periumbilical pain migrating to RLQ, anorexia, low fever → appendicitis
- Childbearing age → check LMP: ectopic, torsion, cyst
- Colicky, radiates to groin, can't sit still → renal colic

Appendicitis · GYN · Renal

LLQ

- Older, fever, change in bowel habits → diverticulitis
- Childbearing age → check LMP: ectopic, torsion, cyst
- Colicky, radiates to groin, hematuria → renal colic

Diverticulitis · GYN · Renal

DIFFUSE / PERIUMBILICAL

- Older, back or flank pain, pulsatile mass → AAA
- Distension, vomiting, no stool or flatus → obstruction
- Severe pain, soft belly, afib or vascular hx → mesenteric ischemia
- Rigid + septic → perforation or peritonitis

AAA · Obstruction · Ischemia

DON'T BE FOOLED: Normal-Looking Vitals and a Soft Belly Don't Rule These Out

Shock Index = HR ÷ SBP



HR 110 ÷ SBP 110 = 1.0. Rises before the pressure drops: a "normal" BP with a fast rate is still bleeding.

Pain Out of Proportion



Screaming patient, benign belly. Elderly, afib, or vascular hx → **mesenteric ischemia** until proven otherwise.

Pulsatile Mass

Palpate gently above the umbilicus. AAA can present as back, flank, or groin pain, and **mimic renal colic** in older patients.

STEP 2: Confirm / Compare Leading Differentials

Dx	Onset	Key History	Pain Location / Character	Other Exam / Vitals	Field Clue
AAA	Sudden	Age >60, HTN, smoker, vascular disease	Abdominal to back or flank, tearing	Pulsatile mass, unequal femoral pulses, hypotension	Mistaken for renal colic in the elderly
Appendicitis	Gradual, 12–24 hr	Any age, most common 10–30	Periumbilical migrating to RLQ	Low-grade fever, anorexia, rebound or guarding	Migration of the pain is the tell
Cholecystitis	Gradual, post-meal	Female, 40s, overweight, gallstone hx	RUQ, radiates to right shoulder or scapula	Fever, N/V, RUQ tenderness; jaundice if ductal	Follows a fatty meal, comes in waves
Pancreatitis	Gradual to sudden	Alcohol use, gallstones, high triglycerides	Epigastric, bores straight to back	Persistent vomiting, tachycardia, may be hypovolemic	Better sitting up and leaning forward
Bowel Obstruction	Gradual, hours–days	Prior abdominal surgery, hernia, cancer	Diffuse, crampy, comes in waves	Distension, high-pitched or absent sounds, vomiting	No stool or flatus passed
Ectopic Pregnancy	Sudden	Childbearing age, missed or late LMP, prior ectopic	Unilateral lower quadrant	Tachycardia, hypotension if ruptured; shoulder pain	Assume pregnancy until ruled out
Diverticulitis	Gradual, days	Age >50, prior episodes, low-fiber diet	LLQ, steady and localized	Fever, LLQ tenderness, altered bowel habits	"Left-sided appendicitis" in an older patient
Renal Colic	Sudden	Prior stones, dehydration	Flank radiating to groin, colicky	Hematuria, restless, afebrile, no peritoneal signs	Can't find a comfortable position

AAA abdominal aortic aneurysm **PUD** peptic ulcer disease **LMP** last menstrual period **melena** black tarry stool **hematochezia** bright red rectal bleeding

ABDOMINAL PAIN

CALL IT EARLY

- ✦ Hypotension or shock signs: supine, IV, NS 500 mL, and go #610 #619
- ✦ Older adult with abdominal or back pain and low BP: think AAA Ⓟ
- ✦ Childbearing age with pain and dizziness or shock: think ectopic Ⓟ

CREW FLOW: MEDIC AND EMT LANES

SLOEMSA #601, #603, #610, #615, #619

	MEDIC	EMT gives O2 and oral glucose only; never draws or administers other meds
1 First contact	• OPQRST; vomit and stool: blood, coffee grounds, black • Female patients: LMP, possible pregnancy, vaginal bleeding Ⓟ • Palpate all four quadrants, the painful area last Ⓟ • Direct partner: vitals and orthostatics if safe	Do Nothing by mouth, position of comfort #610 Do Vitals and SpO2; O2 per #602 Do Orthostatics if vitals allow #610 Do Unstable vitals: supine as tolerated #610 Prep Emesis bag, suction, monitor

2 Before moving	• Consider 12-lead and BGL, especially upper abdominal pain #610
	• IV. Hypotension or early shock: NS 500 mL, repeat once #619
	• Pain: fentanyl 50 to 100 mcg slow IV, repeat at 5 min, 200 mcg max #603
	  ▪ Over 65: start at 25 mcg. SBP under 90 or ALOC Base
	  ▪ Or ketamine 0.3 mg/kg (30 mg max) IV **over 10 min**; never in pregnancy #603
	• Nausea: ondansetron 4 mg slow IV, or IM/PO #615
	• Pregnant: ondansetron Base
		Prep 12-lead electrodes on; glucometer to medic
		Prep IV kit and primed NS bag
		Do Med list: anticoagulants, NSAIDs, past surgeries Ⓟ
		Do Note vomit and stool color, blood, amount
		Prep Syringes and flushes staged; pain meds stay with the medic and the safe

DOORS-CLOSED CHECK

Confirm together before the EMT goes up front. After this, the medic is on their own.

- ☐ Vitals trend recorded; orthostatics done or skipped for a reason
- ☐ IV kit and primed bag within the medic's reach
- ☐ Monitor on; 12-lead done if indicated
- ☐ Emesis bag and suction within reach
- ☐ Pregnancy status known for female patients
- ☐ Destination confirmed

3 En route	• Reassess pain and vitals after every dose • Hypotension persists after fluids: push-dose epi 1 mL every 1 to 3 min to SBP over 90 #619 • Repeat ondansetron every 20 min, 12 mg max; push slowly #615 • Changing pain or vitals: repeat 12-lead; consider atypical ACS #610	• Smooth ride; slow over bumps • Relay ETA
4 Arrival and handoff	• Report meds and times, pregnancy status, vomit and stool findings	Do Transfer; bring the med list and belongings Do Bring the emesis bag if it contains blood Ⓟ

DON'T MISS

- AAA Ⓟ over 50, back or flank pain, hypotension, pulsatile mass
- Ectopic Ⓟ missed period, shoulder pain, shock
- GI bleed Ⓟ coffee grounds, black stool, anticoagulants, tachycardia
- Atypical ACS: epigastric pain in older, diabetic, or female patients #610

IF YOU TAKE A FIRE RIDER

Optional, at the medic's discretion. Hand off within the rider's scope:

- Serial vitals and orthostatics
- Emesis and suction management
- History and pregnancy questions with family out of earshot

Do EMT performs Prep EMT gathers and stages it only: the medic draws, mixes, and gives every medication Ⓟ Pearl, not in county protocol
Base Base hospital order only #640 SLOEMSA protocol
O2: EMT gives it; the medic picks the device and the flow rate. Use the side-stream EtCO2 cannula whenever O2 is indicated.

Crew workflow guidance only. Treat per SLO County EMS protocols. EMT lane assumes EMTs give only O2 and oral glucose, narrower than SLOEMSA BLS scope.

ALTERED MENTAL STATUS

Field Differential Algorithm
Bearamedics Reference · not a treatment protocol

RED FLAGS: TREAT & TRANSPORT, DON'T STOP TO DIFFERENTIATE

- ✦ Glucose <60: correct it now
- ✦ Focal deficit: get last known well
- ✦ Seizure that will not stop
- ✦ Unequal, fixed, or non-reactive pupils
- ✦ Rising BP + falling HR (herniation)
- ✦ Hypoxia, hypoventilation, or hypotension
- ✦ Not protecting the airway
- ✦ Fever + neck stiffness or petechial rash

STEP 1: Check These Five Before You Theorize

1. GLUCOSE

- Low → hypoglycemia. Diaphoretic, combative, may mimic stroke or intoxication
- Very high + dehydrated, deep rapid breathing → DKA or HHS
- Always check it, every time, before anything else

Hypoglycemia · DKA/HHS

2. PUPILS & RESPIRATIONS

- Pinpoint + slow shallow breathing → opioid
- Dilated + tachycardic, hot, agitated → sympathomimetic or anticholinergic
- Drowning in secretions, bradycardic → cholinergic

Toxidrome

3. FOCAL / ASYMMETRIC

- One-sided weakness, facial droop, speech change → stroke
- Sudden severe headache then decline → bleed
- Rule out low glucose first: it mimics stroke exactly

Stroke · ICH

4. TEMPERATURE

- Fever + tachycardia + hypotension → sepsis (very common cause in the elderly)
- Fever + headache + neck stiffness → meningitis
- Very low or very high core temp is itself the cause

Sepsis · Meningitis

5. OXYGEN & PERFUSION

- Low SpO2 → hypoxia; restless and confused before obtunded
- High EtCO2, sleepy, COPD → hypercapnia
- Hypotension or dysrhythmia → brain is underperfused

Hypoxia · Shock

PUPILS: The Fastest Free Information You Have

Pinpoint, Bilateral



With slow, shallow breathing → **opioid**. Also pontine bleed or organophosphate (those come soaked in secretions and bradycardic).

Dilated, Bilateral



Hot, dry, agitated → **anticholinergic**. Diaphoretic, tachycardic → **sympathomimetic**. Also seen postictal and in hypoxia.

Unequal or Blown



Structural until proven otherwise: bleed, mass, or herniation. Time critical. Pair with rising BP and falling HR.

WORK THE CAUSE: Two Screens You Can Run on Scene

Sepsis Screen

Suspected infection **AND 2 or more:** temp over 38°C (100.4°F) or under 36°C (96.8°F) · HR over 90 · RR over 20.
Supports it: new or unexplained AMS, glucose over 140 in a non-diabetic, EtCO2 25 or less. (P)
Severe: SBP under 90 → fluids per #619. No county sepsis alert: tell the receiving hospital the screen is positive.

AEIOU-TIPS #612

A Alcohol	**E** Epilepsy	**I** Insulin
O Overdose, low O2	**U** Uremia	**T** Trauma
I Infection	**P** Psychiatric	**S** Stroke

STEP 2: Confirm / Compare Leading Differentials

Dx	Onset	Key History	Pupils / Neuro	Other Exam / Vitals	Field Clue
Hypoglycemia	Rapid	Diabetic, missed meal, insulin or oral agents, alcohol	May be focal and mimic stroke	Diaphoretic, tachycardic, combative or seizing	Resolves with correction: check first, always
Stroke / ICH	Sudden	Age, HTN, afib, anticoagulants, prior stroke	Focal deficit, facial droop, gaze deviation	Often hypertensive; vomiting and headache with bleed	Establish and document last known well
Opioid Overdose	Rapid	Known use, paraphernalia, chronic pain scripts	Pinpoint, reactive	Slow shallow breathing, low SpO2, high EtCO2	Respiratory rate drops before the level of consciousness
Sepsis	Gradual, hours–days	Elderly, recent infection, indwelling lines or catheters	Global slowing, no focal deficit	Fever or hypothermia, tachycardia, hypotension	Run the screen above; in the elderly, confusion may be the only symptom
Post-ictal	Sudden, then improving	Seizure hx, missed meds, witnessed activity	Sleepy but improving; may have transient one-sided weakness	Incontinence, tongue trauma, muscle soreness	Gets better minute by minute; stroke does not
DKA / HHS	Gradual, hours–days	Diabetic, infection, missed insulin, heavy fluid intake	Global slowing	Deep rapid breathing, dry, tachycardic, fruity breath	Very high glucose with dehydration
Hypoxia / Hypercapnia	Gradual or sudden	COPD, CHF, pneumonia, airway problem	Restless and confused before obtunded	Low SpO2, high EtCO2, accessory muscle use	Agitation is an early sign, not a behavior problem
Alcohol / Sedative	Gradual	Known use, bottles or pills on scene, withdrawal hx	Sluggish, nystagmus; usually symmetric	Odor, ataxia; hypoglycemia and head injury often coexist	Never the final answer until glucose and trauma are cleared

ICH intracranial hemorrhage **HHS** hyperosmolar hyperglycemic state **toxidrome** drug-class vital sign pattern **post-ictal** after a seizure **EtCO2** end-tidal CO2

ALTERED MENTAL STATUS

Crew Task Flow
Bearamedics Reference · follow SLOEMSA protocols

CALL IT EARLY

- ✦ Airway and breathing first, then glucose
- ✦ BGL on every altered patient; under 60, treat now #612
- ✦ Any BEFAST finding: switch to the stroke flow #621

CREW FLOW: MEDIC AND EMT LANES

SLOEMSA #602, #612, #613, #618, #619, #620, #621

	MEDIC	EMT gives O2 and oral glucose only; never draws or administers other meds
1 First contact	• Airway, breathing, GCS; compare to baseline with family • Work the cause with AEIOU-TIPS #612 • Direct partner: vitals, O2, glucometer out	Do Vitals, SpO2, GCS; O2 to 94% or higher #602 Do Airway: position, suction, BVM if needed Do Oral glucose 15 g if awake, can swallow, follows commands #612 Prep Glucometer to medic Do Look for clues: pill bottles, insulin, paraphernalia
2 Before moving	• BGL #612 • BGL under 60, unstable: D10 150 mL IV, recheck at 5 min, 100 mL more if still under 60 #612 ▪ Or D50 25 g slow IV. No IV after 2 attempts: glucagon 1 mg IM #612 • Opioid with RR 8 or less, SpO2 under 94%, or EtCO2 over 45: Narcan up to 1 mg IV/IM, titrate #618 • SBP under 100 or shock signs: NS 500 mL, repeat once #619 • Sepsis screen positive (flip): fluids per #619; tell the receiving hospital • 12-lead and EtCO2 #707 #701	Do Baseline mental status and last seen normal from family Do Diabetes, insulin, med history; temperature if available Prep D10 and tubing out of the kit, IV supplies; medic spikes and gives it Prep MAD and BVM staged; medic handles the Narcan Prep 12-lead electrodes on
3 En route	• Recheck BGL 5 min after dextrose #612 • Repeat GCS; follow the EtCO2 trend #701 • Persistent hypotension after fluids: push-dose epi to SBP over 90; keep warm #619 • Seizure: midazolam 5 mg IV/IM/IN #620 • Severe agitation: midazolam 5 mg #613; restraints per #711	• Smooth ride; relay ETA • Be ready to pull over for airway help (P)
4 Arrival and handoff	• Report BGL before and after, meds and times, suspected cause	Do Transfer; bring the med list, belongings, and any pill bottles Do Bring family contact for baseline history

DOORS-CLOSED CHECK

Confirm together before the EMT goes up front. After this, the medic is on their own.

- ☐ Airway protected; suction ready
- ☐ IV patent; D10 or fluids running
- ☐ Monitor and EtCO2 on
- ☐ BGL result and recheck time known
- ☐ Opioid: medic has a Narcan redose ready
- ☐ Destination confirmed; stroke center if BEFAST positive

BEFORE YOU CALL IT BEHAVIORAL

- Check glucose, SpO2, and perfusion first #613
- Agitation can be hypoxia, not attitude (P)
- Alcohol hides head injuries and low sugar (P)
- Long-acting insulin or oral agents: sugar can drop again after dextrose (P)
- Restrained: check circulation every 15 min, never prone #711

IF YOU TAKE A FIRE RIDER

Optional, at the medic's discretion. Hand off within the rider's scope:

- Airway: suction and BVM seal
- Baseline and history from family
- Serial vitals and GCS

Do EMT performs Prep EMT gathers and stages it only: the medic draws, mixes, and gives every medication (P) Pearl, not in county protocol
Base Base hospital order only #640 SLOEMSA protocol
O2: EMT gives it; the medic picks the device and the flow rate. Use the side-stream EtCO2 cannula whenever O2 is indicated.

SHOCK & HYPOTENSION

Field Differential Algorithm
Bearamedics Reference · not a treatment protocol

RED FLAGS: SHOCK IS A PERFUSION PROBLEM, NOT A BLOOD PRESSURE NUMBER

- ✦ Tachycardia with a normal pressure
- ✦ Mottling or delayed capillary refill
- ✦ Bradycardia with hypotension
- ✦ Shock index over 0.9
- ✦ Altered mental status with hypotension
- ✦ Pressure that does not respond to fluid
- ✦ Pulse pressure narrowing on serial vitals
- ✦ Distended neck veins with hypotension

STEP 1: Feel the Skin, Look at the Neck, Listen to the Lungs

COLD + FLAT NECK VEINS

- The tank is empty: find where it went
- Trauma, GI bleed, vomiting, diarrhea, burns, ruptured AAA or ectopic
- Blood hides in five places: chest, abdomen, pelvis, femurs, and the floor

Hypovolemic

COLD + JVD + WET LUNGS

- The pump has failed
- Recent or active MI, known heart failure, sustained dysrhythmia
- Crackles, pink frothy sputum, orthopnea
- **12-lead on every one**

Cardiogenic

COLD + JVD + CLEAR LUNGS

- Something is blocking filling or outflow, often **correctable**
- Absent sounds one side + tracheal shift → tension pneumothorax
- Muffled tones + narrow pulse pressure + electrical alternans → tamponade
- Sudden dyspnea + hypoxia + clear lungs → massive PE

Obstructive

WARM + FLAT NECK VEINS

- The pipes are too wide
- Fever, recent infection, indwelling line or catheter → septic
- Hives, swelling, wheeze, vomiting or cramping, known exposure → anaphylactic
- Warm skin in a hypotensive patient is a warning, not reassurance

Distributive

SLOW + HYPOTENSIVE

- Hypotensive without the expected tachycardia
- Warm, dry, flushed below a level + spinal trauma → neurogenic
- Beta blocker or calcium channel blocker ingestion
- Inferior MI with block, or hyperkalemia

Neurogenic · Toxic · Cardiac

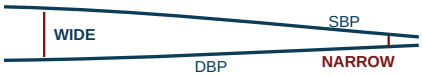
THE NUMBERS THAT MOVE FIRST: Long Before the Pressure Falls

Compensated Until It Isn't



Rate climbs the whole time. Pressure holds, then falls off a cliff. **A normal BP does not mean they aren't in shock.**

Narrowing Pulse Pressure



Systolic falls while diastolic holds or rises: stroke volume dropping as they clamp down. Also points to tamponade.

Shock Index = HR ÷ SBP



HR 110 ÷ SBP 110 = 1.0. Rises before the pressure drops. Free on every set of vitals you already take.

STEP 2: Confirm / Compare the Shock States

Type	Skin	Neck Veins	Lungs	Key History	Field Clue
Hypovolemic / Hemorrhagic	Cold, pale, clammy	Flat	Clear	Trauma, GI bleed, vomiting, diarrhea, burns	Tachycardic with narrowing pulse pressure before the systolic ever drops
Cardiogenic	Cold, mottled	Distended	Wet: crackles	Recent MI, known heart failure, sustained dysrhythmia	The only shock where the lungs fill up
Tension Pneumothorax	Cold	Distended	Absent on one side	Trauma, COPD, positive pressure ventilation	Hypotension plus a silent hemithorax
Cardiac Tamponade	Cold	Distended	Clear	Penetrating chest trauma, cancer, renal failure, recent cardiac procedure	Muffled tones, narrow pulse pressure, JVD; electrical alternans or low voltage on the monitor
Massive PE	Cold, may be cyanotic	Distended	Clear	Immobility, recent surgery, DVT or cancer hx	Hypoxia and hypotension with lungs that sound fine
Septic	Warm early, cold late	Flat	Clear, or focal if pneumonia	Elderly, recent infection, indwelling lines or catheters	Fever or hypothermia; confusion may be the first sign
Anaphylactic	Warm, flushed, hives	Flat	Wheeze or stridor	Sting, food, drug, or contrast exposure	Skin, airway, and GI symptoms (vomiting, cramping) within minutes of exposure
Neurogenic	Warm, dry, flushed below the injury	Flat	Clear	Spinal cord injury, usually above the mid-thoracic level	Hypotensive and **bradycardic**; no sweating and lost temperature control below the injury

JVD jugular venous distension **pulse pressure** systolic minus diastolic **shock index** heart rate divided by systolic
electrical alternans QRS height alternating beat to beat **hemithorax** one side of the chest

SHOCK & HYPOTENSION

CALL IT EARLY

- ✦ SBP under 100 or poor perfusion: supine, IV, NS 500 mL #619
- ✦ Tachycardic with a normal BP, or shock index over 0.9: treat it as shock now Ⓟ
- ✦ Name the type (flip), then fix what's fixable: bleeding, tension, anaphylaxis, rhythm

CREW FLOW: MEDIC AND EMT LANES

SLOEMSA #601, #602, #611, #619, #640, #660, #705, #706

	MEDIC	EMT gives O2 and oral glucose only; never draws or administers other meds
1 First contact	• Skin, neck veins, lung sounds: pick the shock type • Find the source: bleeding, fever, exposure, chest pain, trauma, ingestion • Direct partner: supine, O2, full vitals, pads and monitor	Do Supine if tolerated #619 Do Vitals and SpO2; O2 to 94% or higher #602 Do Control external bleeding #706 Do Keep warm #619 Prep Monitor, pads, 12-lead electrodes
2 Before moving Trauma or STEMI: scene time 10 min or less #601	• IV or IO; consider a second line #619 • SBP under 100: NS 500 mL, repeat once if still hypotensive #619 ▪ Caution with fluids in CHF, liver, or renal failure #619 • Wet lungs or JVD (cardiogenic): 12-lead; stop fluids once crackles appear Ⓟ • Anaphylaxis: epi 0.01 mg/kg IM, 0.5 mg max, before anything else #611 • Tension pneumothorax: needle thoracostomy #705 • Trauma: TXA and fluids per #660 and #714 • Rhythm is the cause: brady #644, SVT #642, VT #643, AFib #645	Do Serial vitals every 5 min; call out SBP under 90 Do Med list: BP meds, beta blockers, anticoagulants Prep IV kit, IO, and two primed NS bags Prep Push-dose epi supplies out: saline flush, female-to-female connector, epi 1:10,000 prefilled; medic mixes it #619 Do Stage stretcher; blankets on

DOORS-CLOSED CHECK

Confirm together before the EMT goes up front. After this, the medic is on their own.

- ☐ IV or IO patent, fluids running
- ☐ Pads on, monitor running, BP on a 5 min cycle
- ☐ Bleeding controlled; tourniquet time written
- ☐ Push-dose epi supplies within the medic's reach: flush, connector, prefilled epi
- ☐ Patient supine and covered
- ☐ Destination confirmed: trauma center, SRC, or closest ED

3 En route	• Still hypotensive after fluids: push-dose epi 1 mL (10 mcg) every 1 to 3 min to SBP over 90 #619 ▪ Mix: 9 mL NS + 1 mL epi 1:10,000. Epi drip 10 mcg/min for long transports #619 • Fluids before pressors, every time #619 • Listen to the lungs after every bolus Ⓟ • Recheck reversible causes (box below) #619 • Cardiogenic or neurogenic, still low: more fluid or pressors Base #640 #660	• Smooth ride; relay ETA • Be ready to pull over if the medic needs hands Ⓟ
4 Arrival and handoff	• Report suspected shock type, total fluids, pressor doses and times, BP trend	Do Transfer with lines and tubing secured; bring the med list and belongings Do Tell staff the blood loss you saw on scene Ⓟ

REVERSIBLE CAUSES #619

- Hypoxemia
- Tachycardia or bradycardia
- Hyper- or hypothermia
- Hypovolemia
- Altered mental status
- Fractures, bleeding, tension pneumothorax
- Anaphylaxis
- Chest pain
- Overdose

IF YOU TAKE A FIRE RIDER

Optional, at the medic's discretion. Hand off within the rider's scope:

- Serial vitals, including manual BP
- Bleeding control and direct pressure
- Spiking bags and lifting

Do EMT performs Prep EMT gathers and stages it only: the medic draws, mixes, and gives every medication Ⓟ Pearl, not in county protocol
Base Base hospital order only #640 SLOEMSA protocol
O2: EMT gives it; the medic picks the device and the flow rate. Use the side-stream EtCO2 cannula whenever O2 is indicated.

Crew workflow guidance only. Treat per SLO County EMS protocols. EMT lane assumes EMTs give only O2 and oral glucose, narrower than SLOEMSA BLS scope.

SYNCOPE

Field Differential Algorithm
Bearamedics Reference · not a treatment protocol

RED FLAGS: TREAT & TRANSPORT, DON'T STOP TO DIFFERENTIATE

- ✦ Syncope **during** exertion
- ✦ Family hx of sudden death under 50
- ✦ With chest, back, or abdominal pain
- ✦ Syncope while lying down
- ✦ Abnormal 12-lead or new dysrhythmia
- ✦ Childbearing age with abdominal pain (ectopic)
- ✦ No warning at all: "just dropped"
- ✦ Still hypotensive or tachycardic on arrival

STEP 1: What Was Happening at the Moment They Dropped?

DURING EXERTION, OR LYING DOWN

- No warning, abrupt drop, injury from the fall → cardiac first
- Palpitations before, or family hx of sudden death
- Known structural disease, pacemaker, prior MI
- 12-lead every one: blocks, long QT, WPW, Brugada (Card 10)

Cardiac: Highest Risk

STANDING, HEAT, PAIN, EMOTION

- Warmth, nausea, sweating, tunnel vision first → vasovagal
- Triggered by blood draw, pain, fear, crowded room
- Recovers quickly and fully once supine

Vasovagal

ON STANDING UP

- Only on rising from sitting or lying → orthostatic
- Vomiting, diarrhea, poor intake, diuretics, new BP meds
- Black or bloody stool → occult GI bleed

Orthostatic · Volume Loss

WITH PAIN OR DYSPNEA

- + Chest pain → MI, dissection
- + Dyspnea, tachycardia, low SpO2 → PE
- + Back or flank pain, older → AAA
- + Lower abdominal pain, childbearing age → ectopic

Vascular Catastrophe

PROLONGED CONFUSION AFTER

- Sleepy and confused for minutes after → seizure, not syncope
- Tongue trauma, incontinence, witnessed shaking
- Brief jerking during true syncope is common and does not mean seizure

Seizure (mimic)

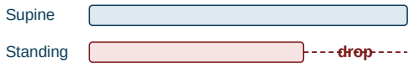
THREE THINGS THAT SORT CARDIAC FROM BENIGN

Warning vs. No Warning



A ramp of symptoms first points vasovagal. A cliff with no warning is **cardiac until proven otherwise**.

Orthostatic Vitals



Positive if systolic falls **20+**, diastolic falls **10+**, or HR rises **20+**. Skip it if they are already hypotensive or symptomatic.

During vs. After Exertion



Dropping **during** exertion suggests outflow obstruction or dysrhythmia. Dropping **after** stopping is usually vasovagal.

STEP 2: Confirm / Compare Leading Differentials

Dx	Circumstance	Key History	Warning Before	Other Exam / Vitals	Field Clue
Cardiac (dysrhythmia or structural)	Exertion, or lying down	Prior MI, CHF, pacemaker, family sudden death	None, or brief palpitations	Abnormal 12-lead, irregular rate, murmur	Injured in the fall because there was no warning
Vasovagal	Standing, heat, pain, emotion	Young, prior similar episodes, known trigger	Warmth, nausea, sweating, tunnel vision	Pale then flushed; normal vitals once supine	Full, fast recovery after lying flat
Orthostatic	On standing up	Vomiting, diarrhea, poor intake, diuretics, new BP meds	Lightheaded on rising	Positive orthostatics, dry mucosa, tachycardia	Only happens on position change
GI Bleed	On standing up	NSAIDs, anticoagulants, ulcer or liver disease	Lightheaded, weak, fatigued for days	Pale, tachycardic, black or bloody stool	Orthostatic with no obvious fluid loss
PE	Any	Immobility, recent surgery, DVT or cancer hx	Sudden dyspnea	Tachycardia, low SpO2, clear lungs, pleuritic pain	Syncope plus unexplained hypoxia
AAA / Dissection	Any	Age >60, HTN, smoker, vascular disease	Sudden severe pain	Back or flank pain, pulsatile mass, unequal pulses	Syncope with pain is vascular until ruled out
Ectopic Pregnancy	Any	Childbearing age, missed or late period	Lower abdominal pain	Tachycardia, hypotension, unilateral tenderness	Assume pregnancy until ruled out
Seizure (mimic)	Any	Seizure hx, missed meds, alcohol withdrawal	Aura, or none	Tongue trauma, incontinence, muscle soreness	Confused for minutes after, not seconds

syncope transient loss of consciousness with full spontaneous recovery **vasovagal** reflex drop in rate and tone **orthostatic** brought on by standing up
WPW Wolff-Parkinson-White

SYNCOPE

Crew Task Flow
Bearamedics Reference · follow SLOEMSA protocols

CALL IT EARLY

- ✦ During exertion, lying down, or no warning: cardiac until proven otherwise Ⓟ
- ✦ Still brady, tachy, or hypotensive: treat the rhythm or shock first #644 #619
- ✦ Syncope with chest, back, or abdominal pain: vascular catastrophe until ruled out Ⓟ

CREW FLOW: MEDIC AND EMT LANES

SLOEMSA #601, #602, #612, #619, #642, #643, #644, #645, #707

	MEDIC	EMT gives O2 and oral glucose only; never draws or administers other meds
1 First contact	• What were they doing when they dropped? Any warning? (flip) • Witness account: shaking, color, how long out, confused after • Injured in the fall? Add the trauma card • Direct partner: keep supine, vitals, electrodes on	Do Keep supine; vitals and SpO2 Do O2 if SpO2 under 94% #602 Prep 12-lead electrodes on Prep Glucometer to medic Do Witness name and what they saw Ⓟ
2 Before moving	• 12-lead on every syncope #707 ▪ Look for blocks, long QT, WPW, Brugada, ischemia (Cards 9 and 10) • BGL #612 • Rhythm cause: brady #644, SVT #642, VT with pulses #643, AFib with RVR #645 • IV. Hypotension: NS 500 mL #619 • Orthostatics only if normotensive and symptom-free lying down Ⓟ • Childbearing age: LMP, pregnancy, abdominal pain Ⓟ	Do Orthostatic vitals when the medic says it's safe Do Med list: BP meds, diuretics, antiarrhythmics, anticoagulants Do Check for tongue bite, incontinence, and injuries Prep IV kit and primed NS bag Prep Pads out for high-risk syncope or an abnormal rhythm Ⓟ
3 En route	• Monitor the whole ride; repeat 12-lead with any change #707 • Print or save any rhythm event, and grab a strip the moment they say “it’s happening again” Ⓟ • Unstable brady: atropine 0.5 mg, TCP #644. With STEMI, contact base first unless in extremis #644 • Pain, dyspnea, or hypoxia appears: switch to the chest pain or respiratory card	• Smooth ride; relay ETA • Ready to pull over if the medic calls for hands (pacing, CPR) Ⓟ
4 Arrival and handoff	• Report circumstances, warning or none, 12-lead findings, and rhythm strips	Do Transfer; bring the med list, belongings, and the 12-lead copy Do Pass along the witness name and contact

DOORS-CLOSED CHECK

Confirm together before the EMT goes up front. After this, the medic is on their own.

- ☐ 12-lead done and read; copy on board
- ☐ BGL result known
- ☐ Patient supine; sit up only if the medic says so
- ☐ Pads on if a cardiac cause is suspected
- ☐ IV kit within the medic's reach
- ☐ Destination confirmed; SRC if STEMI #152

HIGH-RISK SYNCOPE: DON'T DOWNPLAY IT

- Exertional, supine, or no-warning syncope Ⓟ
- Abnormal 12-lead: blocks, long QT, WPW, Brugada, ischemia Ⓟ
- Chest pain, dyspnea, palpitations, or sudden headache with it Ⓟ
- Heart disease, pacemaker, or family sudden death under 50 Ⓟ
- Orthostatic with black stool or anticoagulants: GI bleed Ⓟ

IF YOU TAKE A FIRE RIDER

Optional, at the medic's discretion. Hand off within the rider's scope:

- Witness history and scene details
- Serial vitals and orthostatics
- Lifting and packaging

Do EMT performs Prep EMT gathers and stages it only: the medic draws, mixes, and gives every medication Ⓟ Pearl, not in county protocol
Base Base hospital order only #640 SLOEMSA protocol
O2: EMT gives it; the medic picks the device and the flow rate. Use the side-stream EtCO2 cannula whenever O2 is indicated.

Crew workflow guidance only. Treat per SLO County EMS protocols. EMT lane assumes EMTs give only O2 and oral glucose, narrower than SLOEMSA BLS scope.

BACK

STROKE & MIMICS

Field Differential Algorithm
Bearamedics Reference · not a treatment protocol

RED FLAGS: CALL THE ALERT FIRST, SORT THE MIMICS SECOND

- ✦ Any BEFAST finding with last seen normal under 6 h #621
- ✦ Anticoagulated with any new deficit
- ✦ Deficit that comes and goes (stuttering stroke)
- ✦ Worst headache of life, sudden onset
- ✦ New deficit after a head strike
- ✦ Seizure at onset with a deficit that isn't improving
- ✦ Deficit with falling LOC or vomiting (bleed)
- ✦ Unequal or blown pupil

STEP 1: What Does the Deficit Look Like?

ONE SIDE: FACE, ARM, SPEECH

- Sudden, with a known last seen normal → ischemic stroke
- Afib, HTN, diabetes, prior stroke or TIA
- Fully resolved within minutes → TIA: still high risk, still transport

Ischemic Stroke · TIA

HEADACHE, THEN DECLINE

- Sudden "worst ever" headache, vomiting, falling LOC → hemorrhage
- Anticoagulants, very high BP, stimulants
- Neck stiffness after sudden headache → subarachnoid bleed

ICH · SAH

GLUCOSE OR TOXIC

- BGL under 60 can mimic a stroke **exactly** #621
- Intoxication or sedatives: slurred, ataxic, but usually symmetric
- Hypoxia or overdose: correct and reassess #621

Hypoglycemia · Toxic

AFTER A SEIZURE

- Witnessed shaking, tongue bite, incontinence
- One-sided weakness that **improves** over minutes to hours → Todd's paralysis
- Not improving, or no witnessed seizure → treat as stroke

Post-ictal (Todd's)

FACE ONLY, OR SLOW SPREAD

- Whole half of face including forehead, nothing else → Bell's palsy
- Visual aura or tingling that marches over minutes, known migraines → migraine
- Old deficit reappearing with infection or low BP → unmasking Ⓟ

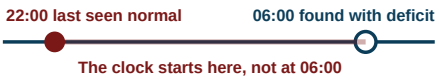
Bell's · Migraine · Old Deficit

BEFAST AND THE CLOCK: The Two Things Every Stroke Report Needs

BEFAST #621

B	Balance	**E**	Eyes
F	Face droop	**A**	Arm drift
S	Speech	**T**	Time (LSN)

Last Seen Normal



Woke up with it? LSN is when they went to bed. **Not** when symptoms were noticed #621.

Stroke or Bell's?

A stroke **spares the forehead**: they can still wrinkle it. Bell's takes the whole half of the face. Any arm, leg, or speech deficit makes it a stroke. Ⓟ

Posterior Strokes Hide

Dizziness, vomiting, can't walk, vision loss, while face, arm, and speech look normal. That's why **B** and **E** come first. Ⓟ

STEP 2: Confirm / Compare Stroke and Its Mimics

Dx	Onset	Key History	Neuro Findings	Other Exam / Vitals	Field Clue
Ischemic Stroke	Sudden	Afib, HTN, diabetes, prior stroke or TIA	Focal weakness, droop, aphasia, gaze deviation	Often hypertensive	Last seen normal is the most important thing you document
Hemorrhage (ICH / SAH)	Sudden, headache first	Anticoagulants, HTN, aneurysm, stimulants	Deficit plus declining LOC	Vomiting, very high BP; HR falls late	Worst headache of life, then decline
TIA	Sudden, resolves	Same risks as stroke	Deficit that clears, often within an hour	Normal by the time you arrive	Resolution doesn't mean safe; high short-term stroke risk
Hypoglycemia	Rapid	Diabetic, insulin, missed meal	Can be focal, identical to stroke	Diaphoretic, tachycardic	Check BGL before you call it
Post-ictal (Todd's)	After a seizure	Seizure hx, missed meds	Weakness that improves over minutes to hours	Tongue bite, incontinence	A witnessed seizure at onset
Bell's Palsy	Hours	Recent viral illness	Whole half of face, forehead included; nothing else	Normal vitals	Any other deficit makes it a stroke
Migraine with Aura	Spreads over minutes	Known migraines, similar past episodes	Visual aura, tingling that marches	Headache follows the aura	A new or different pattern is a stroke until proven otherwise
Sepsis or Illness Unmasking an Old Deficit	Gradual	Prior stroke, infection, dehydration	Old deficits return	Fever, tachycardia, low BP	Ask family exactly what baseline looks like Ⓟ

LSN last seen normal **TIA** transient ischemic attack **ICH** intracerebral hemorrhage **SAH** subarachnoid hemorrhage
Todd's paralysis temporary weakness after a seizure

For field reference only. Treat per patient presentation, vitals, and SLO County EMS protocols.

STROKE / CVA

Crew Task Flow
Bearamedics Reference · follow SLOEMSA protocols

CALL IT EARLY

- ✦ Any BEFAST finding plus last seen normal under 6 h: STROKE ALERT, early transport #621
- ✦ Last seen normal starts the clock, not when symptoms were noticed #621
- ✦ Scene time 10 min or less; don't delay transport for treatment #601 #621

CREW FLOW: MEDIC AND EMT LANES

SLOEMSA #601, #602, #612, #614, #618, #620, #621

	MEDIC	EMT gives O2 and oral glucose only; never draws or administers other meds
1 First contact	• Last seen normal: exact time, and who saw them #621 • Rule out mimics: hypoxia, hypoglycemia, overdose, seizure #621 • Direct partner: BEFAST, glucometer out	Do BEFAST exam #621 Do Vitals and SpO2; O2 only if under 94% #602 Do Head elevated, position of comfort #621 Prep Glucometer to medic Do Witness name and callback number Ⓟ
2 Before moving Scene time 10 min or less #601	• BGL. Under 60: treat per AMS #612, then reassess • Call STROKE ALERT base report early #621 • Package and move; IV and 12-lead can wait for the ambulance Ⓟ	Do Fibrinolytic checklist with patient or family #621 ▪ Anticoagulants; prior stroke, TIA, or brain tumor; bleeding disorder ▪ Bleeding, surgery, or trauma within 3 weeks; liver or kidney failure; terminal illness Do Photo of med bottles or the med list Ⓟ Do Stage stretcher; ask family to follow or stay reachable Ⓟ

DOORS-CLOSED CHECK

Confirm together before the EMT goes up front. After this, the medic is on their own.

- ☐ Last seen normal time documented
- ☐ BGL done
- ☐ Witness callback number captured
- ☐ BEFAST findings recorded
- ☐ STROKE ALERT called
- ☐ Med list and anticoagulant status on board

3 En route	• IV, ideally 18 or 20 g in the AC for CT angiography Ⓟ • 12-lead en route Ⓟ • Repeat BEFAST; note any change and the time • Nothing by mouth; swallowing may be impaired Ⓟ • Keep SpO2 at 94% or higher #602 • Seizure: midazolam 5 mg IV/IM/IN #620	• Confirm stroke-capable destination • Relay ETA
4 Arrival and handoff	• Report last seen normal, BEFAST findings, BGL, and checklist answers • Hand off the witness callback number	Do Transfer; bring the med list, belongings, and family contact Do Point family to where they should go

STROKE ALERT REPORT Ⓟ

- Unit, ETA, age and sex
- Last seen normal: the exact clock time #621
- BEFAST findings, and any change since first contact
- BGL, and whether a mimic was corrected
- Anticoagulants and fibrinolytic checklist red flags #621

IF YOU TAKE A FIRE RIDER

Optional, at the medic's discretion. Hand off within the rider's scope:

- Repeat BEFAST and vitals
- Fibrinolytic checklist questions with family
- Carrying and packaging to keep scene time short

Do EMT performs Prep EMT gathers and stages it only: the medic draws, mixes, and gives every medication Ⓟ Pearl, not in county protocol
Base Base hospital order only #640 SLOEMSA protocol
O2: EMT gives it; the medic picks the device and the flow rate. Use the side-stream EtCO2 cannula whenever O2 is indicated.

Crew workflow guidance only. Treat per SLO County EMS protocols. EMT lane assumes EMTs give only O2 and oral glucose, narrower than SLOEMSA BLS scope.

BACK

TRAUMA

LOAD AND GO: STEP 1 & 2 TRAUMA ALERT, SCENE TIME 10 MIN OR LESS #153

- ✦ GCS 13 or less
- ✦ Penetrating injury to head, neck, torso, or extremity above elbow or knee
- ✦ Mangled, degloved, or pulseless extremity; open or depressed skull fracture
- ✦ SBP under 90 (adult)
- ✦ Flail chest or chest wall deformity
- ✦ Paralysis, or pelvic injury with a high-risk mechanism
- ✦ RR under 10 or over 29
- ✦ Two proximal long bone fractures

STEP 1: Who's the Patient? Injuries Hide in These Five

OLDER ADULT (over 65)

- **SBP under 110 may be shock** #153
- Beta blockers hide the tachycardia Ⓟ
- Low-energy falls still break pelvises and hips #713
- Any spinal-area pain → SMR #702

Step 4: Trauma Consult

ANTICOAGULATED

- On a blood thinner **with a head injury** (not minor) → Step 4 consult #153
- Aspirin alone doesn't count #153
- Bleeding can build for hours; a normal first GCS is not a pass Ⓟ
- Note the drug and last dose Ⓟ

Step 4: Trauma Consult

PREGNANT (over 20 weeks)

- Step 4 consult #153
- Transport left lateral #660-A
- Mom compensates while the fetus is already in trouble Ⓟ
- Ask weeks, bleeding, contractions, fluid leak Ⓟ

Step 4: Trauma Consult

PEDIATRIC (34 kg or less, or under 14)

- Age-based vitals: GCS 13 or less, poor perfusion, abnormal HR or RR #153
- Falls over 10 ft or twice their height #153
- Car seat can be SMR #702; no TXA under 15 #714
- Broselow tape #601

Age-Based Criteria

INTOXICATED / UNRELIABLE

- Unreliable exam → SMR #702
- Distracting injury also makes the exam unreliable #702
- Don't blame the alcohol: check BGL, look for head injury Ⓟ

Assume the Injury

PROCEDURE QUICK CHECKS

Tourniquet #706

2–4 in above the wound, never over a joint. Tighten until bleeding stops. **Write the time on the device.** Never cover it. Tell staff the time.

Pelvic Binder #713

All three: high-risk mechanism, pelvic/low back/groin pain, SBP 90 or less. Center on the greater trochanters. Not for an isolated hip.

Needle Decompression #705

Signs of tension with respiratory compromise. 2nd intercostal space midclavicular, or 4th midaxillary. Over the top of the rib.

TXA #714

Age 15+, within 3 h, SBP 90 or less or uncontrolled bleeding. **Not** for isolated head injury, or a stroke or MI in the last 24 h.

STEP 2: Mechanism, Triage Step, and What to Look For

Mechanism	Triage Step (#153)	Look For	Easy to Miss	Field Clue
Fall from height	Step 3 if adult over 20 ft (1 story = 10 ft), child over 10 ft or 2× height	Heels, spine, pelvis, head	Spine fractures that come with heel fractures Ⓟ	Landed on their feet? Check the back
Ground-level fall	No consult if GCS 14+ or normal for them #153	Hip, wrist, face, head	Anticoagulated head strike, bleeding hours later	Ask why they fell: syncope changes everything
High-risk auto crash	Step 3: intrusion over 12 in at occupant or 18 in anywhere, ejection, or death in the compartment	Chest, abdomen, pelvis, femurs	Aortic, liver, and spleen injuries	Seatbelt sign, steering wheel or dash damage
Side impact	Step 3 if intrusion criteria met	Pelvis, ribs, spleen or liver on the impact side Ⓟ	Lateral pelvic compression fractures	Door intrusion on the patient's side
Auto vs. pedestrian or bicyclist	Step 3 if thrown, run over, or over 20 mph	Legs, pelvis, head	Head strike on the windshield or the ground	Look at the windshield and bumper height
Motorcycle or unenclosed vehicle	Step 3 if over 20 mph	Head, chest, femurs, pelvis	Injury under the gear and helmet	Helmet damage means head energy Ⓟ
Penetrating	Step 2 alert: head, neck, torso, above elbow or knee	Exit wounds, chest, abdomen	Wounds in the back, axillae, and groin	SMR only with a neuro deficit #702
Burns with trauma	Step 4 consult #153	Airway, inhalation injury, other trauma	Carbon monoxide in enclosed spaces #662	Soot, singed hair, hoarse voice

TRAUMA ALERT

Step 1 or 2 → closest trauma center: **Marian** south of El Campo Rd, **Sierra Vista** north. ALS calls it early from scene #153.

TRAUMA CONSULT

Step 3 or 4 → ALS contacts the SLO trauma center for destination #153.

CLOSEST ED INSTEAD

Unmanageable airway, uncontrolled bleeding with crashing vitals, or traumatic arrest #153.

SMR spinal motion restriction **TXA** tranexamic acid **MIVT** mechanism, injuries, vitals, treatment **GCS** Glasgow Coma Scale

FALLS & TRAUMA

CALL IT EARLY

- ✦ Ask why they fell: syncope, dizziness, or chest pain changes the call Ⓟ
- ✦ Step 1 or 2: TRAUMA ALERT to the closest trauma center, scene time 10 min or less #153
- ✦ Step 3 or 4: TRAUMA CONSULT for destination; only ALS can request it #153

CREW FLOW: MEDIC AND EMT LANES

SLOEMSA #153, #601, #603, #660, #702, #706, #713, #714

	MEDIC	EMT gives O2 and oral glucose only; never draws or administers other meds
1 First contact	• Mechanism and cause: tripped, or felt dizzy first? Ⓟ • Head strike, loss of consciousness, anticoagulants Ⓟ • Primary survey: bleeding, airway, breathing, circulation • Screen triage Steps 1 to 4 (flip) #153	Do Manual spine stabilization during assessment #702 Do Control bleeding: pressure, then tourniquet #706 Do Vitals and SpO2; manual BP if unstable #660 Do Expose to check injuries, then cover to keep warm #601 Do Ask about blood thinners and how they fell

2 Before moving
Trauma triage met: 10 min or less #601
	• SMR decision #702: 65 or older with any spinal-area pain; unreliable exam; motor or sensory deficit
	• SBP 90 or less: NS up to 500 mL, repeat once #660
	  ▪ TXA 1 g over 10 min if 15 or older and within 3 h; not for isolated head injury #714
	• Pain: fentanyl, starting at 25 mcg if over 65 #603
	  ▪ Hypotensive or multisystem trauma: ketamine 0.3 mg/kg (30 mg max) IV **over 10 min** #603
	• Medical cause suspected: BGL and 12-lead #707
		Do Pelvic binder if high-risk mechanism, pelvic pain, and SBP 90 or less #713
		Do Splint; check pulses and sensation before and after #660
		Do Remove rings and constricting items
		Prep IV kit, primed NS, and the TXA kit out; medic mixes it #714
		Prep Glucometer and electrodes if medical cause

3 En route	• Manual BP for unstable patients; reassess every 5 min #660 • Tension pneumothorax signs: needle thoracostomy #705 • More fluid, or push-dose epi for neurogenic shock Base • Repeat pain meds per #603 • ALERT or CONSULT report in MIVT format with step criteria; update en route #153 • SBP 90 or less at any time: say it out loud and communicate it #660	• Smooth ride to limit pain and spinal movement • Confirm trauma center or ED destination; relay ETA
4 Arrival and handoff	• Report mechanism, step criteria, tourniquet and TXA times, meds	Do Transfer with minimal spinal movement; bring the med list and belongings #702 Do Tell staff the tourniquet time #706

DOORS-CLOSED CHECK

Confirm together before the EMT goes up front. After this, the medic is on their own.

- ☐ SMR maintained; padding and straps secure
- ☐ Pulses rechecked after splinting and moving
- ☐ IV kit, fluids, and TXA within reach
- ☐ Bleeding controlled; tourniquet time written on the device #706
- ☐ Patient covered and warm
- ☐ Destination: Marian south of El Campo Rd, Sierra Vista north #153

OLDER ADULT FALLS

- Over 65: SBP under 110 may already be shock #153
- Anticoagulants with a head injury: Step 4 consult #153
- 65 or older with any spinal-area pain needs SMR #702
- Pelvic fractures happen even with low-energy falls #713
- Ground-level fall, GCS 14+ or normal for them: no consult needed, still assess #153
- Find the cause: syncope, dysrhythmia, stroke, hypoglycemia Ⓟ

IF YOU TAKE A FIRE RIDER

Optional, at the medic's discretion. Hand off within the rider's scope:

- Manual spine stabilization and lifting
- Bleeding control and splinting
- Serial vitals, including manual BP

Do EMT performs Prep EMT gathers and stages it only: the medic draws, mixes, and gives every medication Ⓟ Pearl, not in county protocol
Base Base hospital order only #640 SLOEMSA protocol
O2: EMT gives it; the medic picks the device and the flow rate. Use the side-stream EtCO2 cannula whenever O2 is indicated.

12-LEAD SPEED READ

BEFORE YOU READ: GET A TRACING WORTH READING

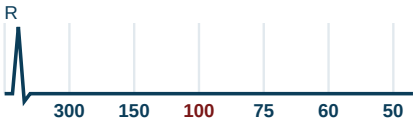
- ✦ Unstable patient: treat now, read later
- ✦ Your STEMI read, not the computer's: 12-lead consult with French #152
- ✦ Two copies: one to the hospital, one with the PCR #152
- ✦ Limbs still, electrodes on dry skin, no artifact Ⓟ
- ✦ Repeat with any change in pain, vitals, or rhythm #707
- ✦ Compare to an old tracing whenever you can Ⓟ
- ✦ Computer reads ***STEMI***: STEMI Alert to nearest SRC #152
- ✦ Transmit with age and sex, never the name #152

STEP 1: Six Steps, Same Order, Every Time

1. RATE	2. RHYTHM	3. P WAVES	4. INTERVALS	5. AXIS	6. ST & T
• 300, 150, 100, 75, 60, 50 by big boxes • Irregular: QRS in 6 seconds × 10 • Under 60 slow, over 100 fast	• March out the R-to-R • Regular, regularly irregular (grouped), or irregularly irregular • Irregularly irregular, no P waves → AFib	• Upright in II, one before every QRS → sinus • More P waves than QRS → block (flip) • Sawtooth → flutter; none → AFib or junctional	• PR 120–200 ms (3–5 small boxes) • QRS under 120 ms narrow; 120+ wide #643 • QT under half the R-to-R • Short PR + delta wave → WPW	• Leads I and aVF both up → normal • I up, aVF down → left • I down, aVF up → right • Both down → extreme: think VT	• Elevation, depression, or inversion? • One territory with a mirror → occlusion • Tall, broad T waves are the earliest sign
Brady · Normal · Tachy	**Regular or Not**	**Sinus or Not**	**Blocks · Wide · Long QT**	**Normal · Left · Right**	**Ischemia → Card 10**

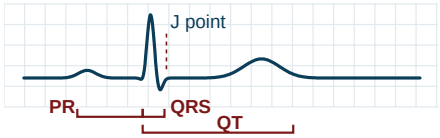
MEASURE IT: One Small Box = 1 mm = 40 ms; One Big Box = 200 ms

Rate by Big Boxes



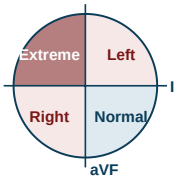
Start on an R that sits on a heavy line. Count heavy lines to the next R: **300, 150, 100, 75, 60, 50**. Irregular rhythm? Use the 6-second count instead.

Intervals and the J Point



PR: start of P to start of QRS. QRS: first deflection to the **J point**. QT: start of QRS to end of T. Measure ST changes at the J point.

Axis: The Thumbs Test



Treat leads I and aVF like thumbs. Both up is normal. Left axis with lead II upright is still physiologic. Extreme axis with a wide QRS is VT until proven otherwise.

STEP 2: Normal Values & What Abnormal Means

Measure	Normal	Abnormal	Think About	Field Clue
Rate	60–100	Under 60 or over 100	Sinus brady or tach, SVT, flutter, blocks	Sinus tach is a symptom: find the cause
PR Interval	120–200 ms	Over 200, or under 120	First-degree block; WPW or junctional if short	PR changing beat to beat → a block (flip)
QRS Width	Under 120 ms	120 ms or more	Bundle branch block, VT, paced, hyperkalemia, TCA	Wide + fast + cardiac history = VT #643
QT / QTc	QTc under 450 ms (men), 460 ms (women)	QTc 500 ms or more	Meds, low K or Mg, congenital	Torsades risk: 120 J unsynchronized #643
Axis	−30° to +90°	Left or right deviation	LBBB, LAFB, LVH; RVH, PE, lateral MI	Extreme axis with a wide QRS → VT
P Wave	Upright in I and II	Inverted, absent, sawtooth, or extra	Junctional, AFib, flutter, heart blocks	More P waves than QRS → a block
ST Segment	At baseline at the J point	Elevation or depression	STEMI, mimics, strain, digoxin	Territorial + reciprocal = occlusion (Card 10)
T Wave	Upright except aVR and V1	Peaked, inverted, flat, or biphasic	Hyperkalemia, ischemia, Wellens, hypokalemia	Peaked and tented: ask about dialysis

ms milliseconds **J point** end of the QRS, start of the ST segment **QTc** QT corrected for rate **LAFB** left anterior fascicular block **TCA** tricyclic antidepressant **SRC** STEMI receiving center

COMMON DYSRHYTHMIAS

UNSTABLE SIGNS: THE RHYTHM MATTERS LESS THAN THE PATIENT

- ✦ Hypotension or poor perfusion
- ✦ Wide-complex tachycardia: assume VT
- ✦ Very fast, irregular, wide and varying (WPW)
- ✦ Altered mental status
- ✦ Polymorphic VT / torsades
- ✦ Any rhythm change with new ST changes
- ✦ Chest pain or acute heart failure
- ✦ New second-degree Type II or complete block

STEP 1: Rate, Then Regularity, Then QRS Width

NARROW + REGULAR

- Gradual onset, rate under 150, a P before every QRS → sinus tach. **Find the cause**
- Abrupt, fixed near 150–180, no visible P → SVT
- Sawtooth baseline, rate near 150 → flutter with 2:1 conduction

Sinus Tach · SVT · Flutter

NARROW + IRREGULAR

- Irregularly irregular, no discernible P waves → atrial fibrillation
- Sawtooth with varying spacing → flutter, variable conduction
- Three or more P shapes → MAT, usually with COPD

Atrial Fib · MAT

WIDE + REGULAR

- **VT until proven otherwise**, especially with cardiac history
- Look for dissociated P waves, fusion and capture beats
- Very wide and slow with peaked T waves → consider hyperkalemia

VT

WIDE + IRREGULAR

- Twisting amplitude around the baseline → torsades
- Irregular with a bundle branch pattern → atrial fib with block
- Extremely fast with varying widths → atrial fib with WPW

Torsades · Fib with WPW

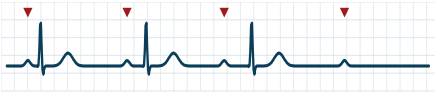
SLOW (under 60)

- P before every QRS, regular → sinus bradycardia
- Absent or inverted P, rate 40–60 → junctional
- More P waves than QRS complexes → a block. Sort it below

Brady · Junctional · Block

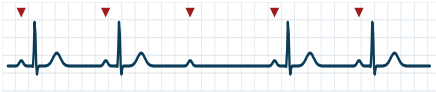
THE BLOCKS: Count the P Waves, Then Watch What the PR Interval Does

Second Degree, Type I (Wenckebach)



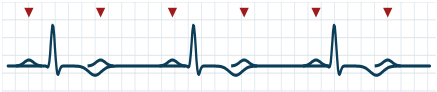
PR gets **longer and longer**, then one QRS drops out and it resets. Usually benign and at the AV node.

Second Degree, Type II



PR stays **constant**, then a QRS vanishes without warning. Below the AV node; can progress to complete block.

Third Degree (Complete)



P waves march at their own rate, QRS at its own, and the two **never relate**. PR is different every beat.

STEP 2: Confirm / Compare Common Rhythms

Rhythm	Rate	Regularity	P Waves	QRS	Field Clue
Sinus Tachycardia	100–150	Regular	Upright, one per QRS	Narrow	A symptom, not a diagnosis: look for pain, fever, volume loss, hypoxia
SVT	150–250	Regular, unvarying	Hidden or buried in the T wave	Narrow	Starts and stops abruptly. Stable: vagal, then adenosine #642
Atrial Flutter	Ventricular near 150 if 2:1	Regular, or regularly irregular	Sawtooth flutter waves	Narrow	A rate parked at 150 is flutter until you prove otherwise; no adenosine #642
Atrial Fibrillation	Any	Irregularly irregular	None discernible	Narrow	No two R-to-R intervals match. RVR unstable: consult base #645
Ventricular Tachycardia	120–200	Regular	Dissociated if visible	Wide, uniform	Don't talk yourself into SVT. Stable: amiodarone #643
Torsades / Polymorphic	Over 200	Irregular	None	Wide, varying	Ask about QT-prolonging meds. 120 J unsynchronized #643
2nd Degree Type II	Slow, depends on conduction	Regular with sudden pauses	More P waves than QRS	Often wide	Unstable-in-waiting: pads on, TCP #644 #716
3rd Degree (Complete)	20–45 typically	Both regular, independently	Marching through, unrelated to QRS	Wide if ventricular escape	Atropine often fails; go to TCP #644

SVT supraventricular tachycardia **MAT** multifocal atrial tachycardia **RVR** rapid ventricular response **TCP** transcutaneous pacing
AV node the relay between atria and ventricles ▼ marks a P wave

For field reference only. Treat per patient presentation, vitals, and SLO County EMS protocols.

STEMI & THE 12-LEAD

CAN'T-MISS PATTERNS: ACTIVATE, DON'T DELIBERATE

- ✦ ST elevation in 2 contiguous leads (criteria below)
- ✦ New LBBB with symptoms, or a positive Sgarbossa (flip)
- ✦ Any STEMI with hypotension or bradycardia
- ✦ Inferior elevation: get V4R before nitro #640
- ✦ Tall, broad, hyperacute T waves (earliest sign)
- ✦ ROSC goes to an SRC regardless of the 12-lead #152
- ✦ ST depression V1–V3 + tall R (posterior)
- ✦ Widespread depression + elevation in aVR

STEP 1: Locate the Territory, Then Look at Its Mirror

SEPTAL V1–V2	ANTERIOR V3–V4	LATERAL I, aVL, V5–V6	INFERIOR II, III, aVF	POSTERIOR V7–V9
• Artery: LAD • Often extends into V3–V4 as anteroseptal • Watch for new bundle branch block	• Artery: LAD • Reciprocal: II, III, aVF • Largest territory: watch for pump failure and cardiogenic shock	• Artery: circumflex or diagonal • Reciprocal: II, III, aVF • High lateral (I, aVL) is easy to overlook when subtle	• Artery: RCA in most • Reciprocal: I, aVL • **Get V4R.** RV involvement is preload-dependent • Expect bradycardia and AV blocks	• Artery: RCA or circumflex • Shows as a **mirror** in V1–V3: ST depression with tall R • Invisible unless you move the leads
LAD	**LAD**	**Circumflex**	**RCA: check V4R**	**Most-Missed MI**

HOW MUCH ELEVATION COUNTS: Measured at the J Point, in 2 Contiguous Leads

Most Leads
≥1 mm in any two contiguous leads outside V2–V3.

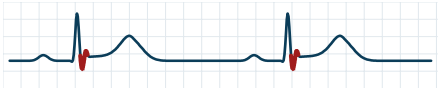
V2–V3
≥2 mm men 40+ · **≥2.5 mm** men under 40 · **≥1.5 mm** women.

V4R (Right-Sided)
≥0.5 mm (≥1 mm men under 30). RVI: hold nitro, consult base #640.

V7–V9 (Posterior)
≥0.5 mm (≥1 mm men under 40). Pull these leads with any V1–V3 depression.

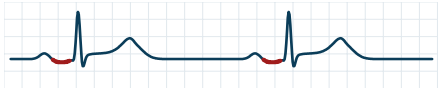
ELEVATION THAT ISN'T OCCLUSION: Know These Before You Activate

Early Repolarization



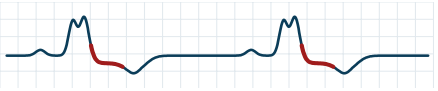
Notched J point (marked), **concave-up** ST, tall T. Young, healthy, asymptomatic. No reciprocal changes, unchanged on repeat.

Pericarditis



Concave elevation across **many territories at once**, PR segment depressed (marked), no reciprocal changes. Pain is positional and pleuritic.

Left Bundle Branch Block



Wide QRS with ST shifted **opposite** the main deflection (marked). Expected, not ischemic. Positive modified **Sgarbossa** = occlusion (flip).

STEP 2: Sorting True Occlusion From the Mimics

Pattern	ST Shape	Distribution	Reciprocal Change	Other Clues	Field Clue
TRUE STEMI	Flat or convex ("tombstone")	Follows one artery's territory	**Present:** the mirror wall depresses	Symptoms, evolving tracings, reciprocal depression	Territorial + reciprocal + sick patient
Early Repolarization	Concave up, notched J point	Precordial leads, mostly V2–V5	Absent	Young, healthy, asymptomatic; tracing doesn't change	Looks the same on the repeat tracing
Pericarditis	Concave up, diffuse	Crosses territories at once	Absent (except aVR and V1)	PR depression, friction rub, recent viral illness	Better leaning forward, worse lying flat
LBBB or Paced	Opposite the main QRS deflection	Wherever the QRS is wide	Not applicable	QRS 120 ms or more; pacer spikes if paced	Run modified Sgarbossa (flip); compare to an old tracing
LVH with Strain	Depression laterally, elevation in V1–V3	Follows the voltage, not an artery	Absent	Very tall voltage, long-standing hypertension	Big complexes, chronically hypertensive patient
Hyperkalemia	Peaked, narrow, tented T waves	Global, not territorial	Absent	Flattening P waves, widening QRS, dialysis or renal failure	Missed dialysis is the history that gives it away

LAD left anterior descending artery **RCA** right coronary artery **LVH** left ventricular hypertrophy **RVI** right ventricular infarct
reciprocal change depression in the wall opposite the infarct

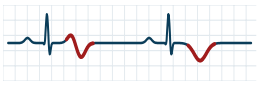
ECG ZEBRAS

ZEBRAS THAT KILL: RECOGNIZE IT, THEN CALL IT

- ✦ Wellens in a pain-free patient: critical LAD, not a clean bill
- ✦ Positive Sgarbossa: occlusion hiding in a LBBB
- ✦ Syncope + coved ST in V1–V2: Brugada
- ✦ De Winter: a STEMI equivalent with no elevation
- ✦ Peaked T + widening QRS: hyperkalemia
- ✦ The monitor won't call most of these: 12-lead consult with French #152
- ✦ aVR elevation + diffuse depression: left main or 3-vessel
- ✦ Wide QRS + tall R in aVR after an ingestion: TCA

STEP 1: Occlusion Without Tombstones

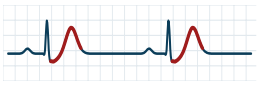
WELLENS



- Biphasic (A) or deep symmetric inverted (B) T in V2–V3
- Pain-free at the time of the tracing
- Little or no ST elevation, R waves preserved

Critical LAD

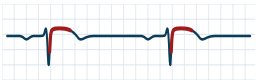
DE WINTER



- Upsloping ST depression at the J point, V1–V6
- Tall, symmetric, prominent T waves
- Often slight ST elevation in aVR

Acute LAD Occlusion

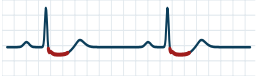
aVR + DIFFUSE DEPRESSION



- ST elevation in aVR (≥1 mm)
- ST depression in 6 or more leads
- Often hypotensive or in pulmonary edema

Left Main · 3-Vessel

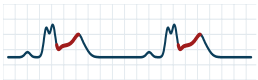
POSTERIOR MI



- ST depression in V1–V3 with tall, broad R waves
- Upright T waves in V1–V3
- Get V7–V9: ≥0.5 mm confirms it

Posterior STEMI

MODIFIED SGARBOSSA

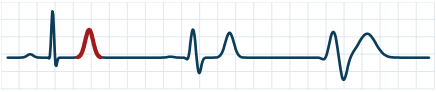


- Concordant ST elevation ≥1 mm, any lead
- Concordant ST depression ≥1 mm in V1–V3
- Discordant elevation ≥25% of the preceding S wave
- **Any one** is positive (LBBB or paced)

Occlusion in LBBB

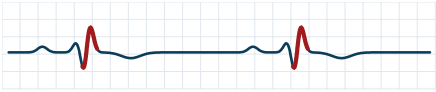
NOT AN MI, STILL DEADLY: Know the Look, Know the History

Hyperkalemia



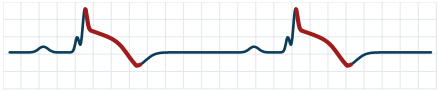
Peaked, tented T → P waves flatten → QRS widens → sine wave. Missed dialysis or renal failure. Calcium chloride Base #644

Tricyclic (TCA) Toxicity



Tachycardia, QRS over 100 ms, terminal R in aVR over 3 mm. Seizures and wide-complex rhythms follow. Sodium bicarbonate Base #614

Brugada Pattern



Coved ST elevation ≥2 mm in V1–V2 sloping into an inverted T. Syncope, fever, or family sudden death. Can degenerate to VF: pads on. (P)

STEP 2: More Zebras Worth Knowing

Pattern	ECG Look	Setting	Danger	Field Clue
WPW	Short PR, delta wave slurring the QRS upstroke	Young, palpitations, recurrent SVT	AFib with WPW: fast, irregular, wide → VF	No adenosine in AFib or flutter #642
Long QT	QTc 500 ms or more; T wave ends past half the R-to-R	QT-prolonging meds, low K or Mg, congenital	Torsades	Torsades: 120 J unsynchronized #643
Hypothermia	Osborn J waves, bradycardia, long intervals, shivering artifact	Cold exposure, elderly, intoxicated	VF with rough handling	Handle gently; pulse check 30–45 s #631
Digoxin Effect / Toxicity	Scooped ST depression; any brady, block, or ectopy	Elderly on digoxin, renal decline	Blocks, bidirectional VT	Nausea plus yellow-green vision changes (P)
Pulmonary Embolism	Sinus tach most often; S1Q3T3, new RBBB, T inversion V1–V4	Immobility, surgery, cancer, DVT	Obstructive shock, arrest	S1Q3T3 is uncommon; tachycardia + hypoxia matter more
Hypokalemia	Flat T waves, prominent U waves, ST depression	Diuretics, vomiting, diarrhea	Torsades, VT	A U wave after the T is the tell (P)
Pacemaker Failure	Spikes without capture, or no spikes when needed	Known pacer, dizziness, syncope	Profound bradycardia	Keep pads off the device; TCP #716 (P)

concordant ST moves the same direction as the QRS **discordant** ST moves opposite the QRS **QTc** QT corrected for rate **TCA** tricyclic antidepressant **RBBB** right bundle branch block

For field reference only. Treat per patient presentation, vitals, and SLO County EMS protocols.