



Informed®

Emergency & Critical Care

Pocket Guide™
ACLS Version

Eighth Edition

- ACLS
- Advanced Airway Management
- Stroke
- Pediatric Advanced Life Support
- Emergency Medications
- Medical Emergencies
- Trauma
- Poisons and Overdoses
- Common Lab Values
- Prescription Drugs

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ACLS | Airway | Neuro | Pediatrics | Medications

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This book is intended solely as a guide to the appropriate procedures to be employed when rendering emergency care to the sick and injured. It is not intended as a statement of the standards of care required in any particular situation, because circumstances and the patient's physical condition can vary widely from one emergency to another. Nor is it intended that this book shall in any way advise emergency personnel concerning legal authority to perform the activities or procedures discussed. Such local determination should be made only with the aid of legal counsel.

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ACLS

CPR: Adult, Child, or Infant

1. **Unresponsive?** (Not breathing, or only gasping?)
2. **Call for assistance**—have someone get defibrillator/AED.
3. **Check pulse within 10 seconds** (If present, give 1 breath every 5–6 seconds; check pulse every 2 minutes).

IF NO PULSE:

4. **Position patient supine** on hard, flat surface.
5. **Begin chest compressions**, 30:2, push hard and fast ≥100/minutes, allow full chest recoil—minimize interruptions.
6. **Open airway:** head-tilt/chin-lift, ventilate × 2* (avoid excessive ventilations).
7. **Attach AED** to adult (and child >1 year old).

SHOCKABLE RHYTHM?

Yes

8. **Shock × 1**.
9. **Resume CPR immediately** for 2 minutes.
10. **Check rhythm**.

IF SHOCKABLE:

11. **Shock × 1**; resume CPR.

No

8. **Resume CPR immediately** for 2 minutes.
9. **Initiate ALS interventions.**
10. **Check rhythm** every 2 minutes.



Lower half of sternum

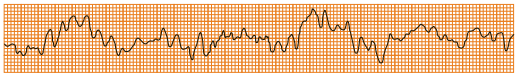


Head-tilt/chin-lift

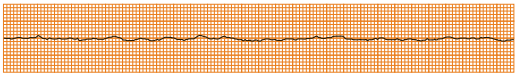
CPR	Ratio	Rate	Depth	Check Pulse
Adult: 1 Person*	30:2	100	>2 in.	Carotid
Adult: 2 Person*	30:2	100	>2 in.	Carotid
Child: 1 Person	30:2	100	2 in.	Carotid
Child: 2 Person	15:2	100	2 in.	Carotid
Infant: 1 Person	30:2	100	1/3 cx	Brachial, femoral
Infant: 2 Person	15:2	100	1/3 cx	Brachial, femoral
Newborn: 2 Person	3:1	100	1/3 cx	Brachial, femoral

*__Adult__—once an advanced airway is placed, ventilate at 8–10 breaths/minute.

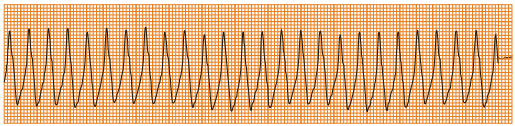
Cardiac Arrest Rhythms



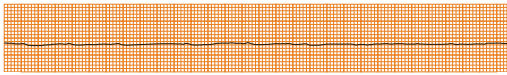
Coarse Ventricular Fibrillation
Note the chaotic, irregular electrical activity. **Treatment**: Shock.



Fine Ventricular Fibrillation
Note the low-amplitude, irregular electrical activity. **Treatment**: Shock.

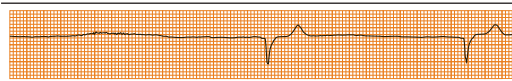


Ventricular Tachycardia
Note the rapid, wide complexes. **Treatment**: Shock if no pulse.



Asystole

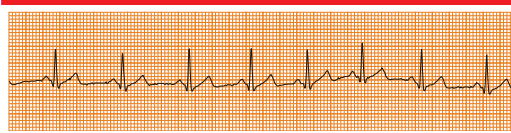
Note the absence of electrical activity. **Treatment**: Perform CPR.



Pulseless Electrical Activity (PEA)

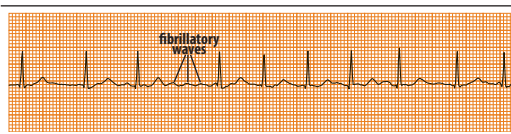
Any organized ECG rhythm with no pulse. **Treatment**: Perform CPR.

Other Common ECG Rhythms



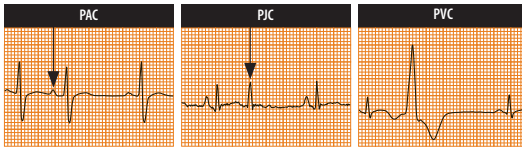
Normal Sinus Rhythm

Note the regular PQRST cycles.



Atrial Fibrillation

Note the irregular rate and atrial fibrillatory waves.



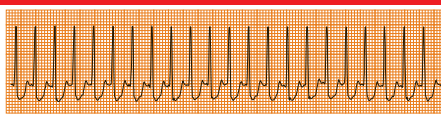
Normal QRS complex; different P wave

Normal QRS complex; inverted or no P wave

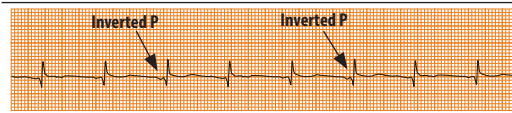
Wide, bizarre complex; no P wave

Premature Atrial, Junctional, and Ventricular Complexes

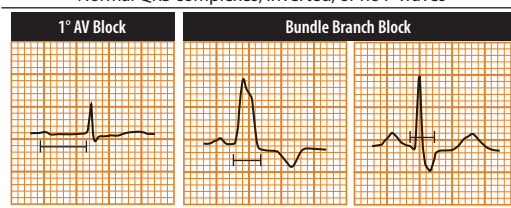
Other Common ECG Rhythms



Supraventricular Tachycardia (SVT)
Note the rapid, narrow QRS complexes.



Junctional Rhythm
Normal QRS complexes; inverted, or no P waves



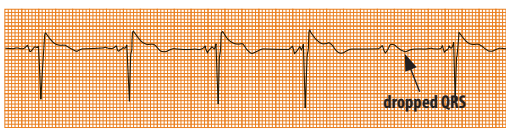
Prolonged PR Interval >0.20 seconds

Wide QRS >0.12 seconds

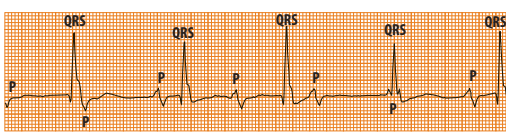


2° Heart Block, Wenckebach, Mobitz Type I
The PR interval lengthens, resulting in a dropped QRS.

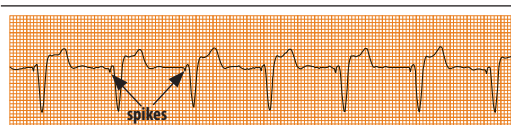
Other Common ECG Rhythms



2° Heart Block, Mobitz Type II
The PR interval does not lengthen, but a QRS is dropped.

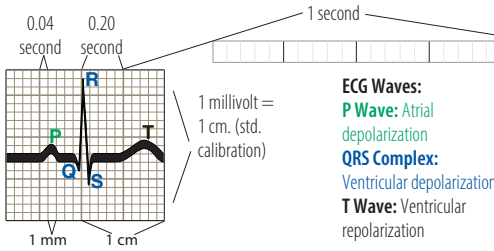


Third° (Complete) Heart Block
The P waves are dissociated from the QRS complexes.

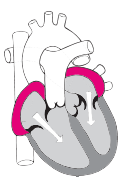


Electronic Ventricular Pacemaker
Note the pacer spikes before each QRS.

Basic ECG Interpretation



ECG Waves:
P Wave: Atrial depolarization
QRS Complex: Ventricular depolarization
T Wave: Ventricular repolarization



Atrial contraction



Ventricular contraction



Ventricular relaxation and passive filling



P Wave

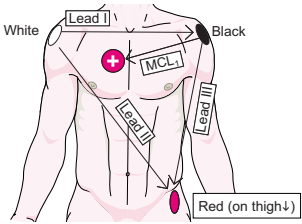


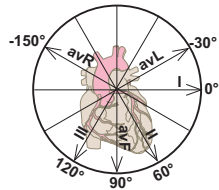
QRS



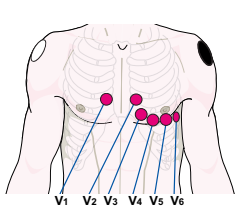
T Wave

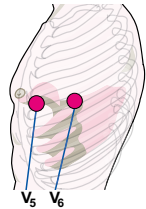
3-Lead and MCL_1 Electrode Placement





12-Lead Electrode Placement





V_1:	Fourth interspace, just to the right of the sternum
V_2:	Fourth interspace, just to the left of the sternum
V_3:	Halfway between V_2 and V_4
V_4:	Fifth intercostal space, midclavicular line
V_5:	Anterior-axillary line, horizontal with V_4
V_6:	Mid-axillary line, horizontal with V_4
MCL_1:	Red lead on V_1, black lead on left arm—monitor lead III
MCL_6:	Red lead on V_6, white lead on right arm—monitor lead II
MC_4R:	Red lead on fifth intercostal space right midclavicular line, black lead on left arm—monitor lead III

ACLS Algorithms

NOTE: Not all patients require the treatment indicated by these algorithms. These algorithms assume that you have assessed the patient, started CPR where indicated, and performed reassessment after each treatment. These algorithms also do not exclude other appropriate interventions that may be warranted by the patient's condition.

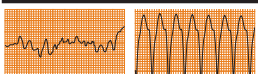
Treat the patient, not the ECG.

Cardiac Arrest

Shout for help, begin CPR (30:2, push hard and fast at ≥100/min, minimize interruptions), **give O_2, attach ECG.**

YES ← **Shockable Rhythm?** → ***NO***

VF or VT



Defibrillate 120 J–200 J
Biphasic (or 360 J monophasic, or AED)

↓

Continue CPR immediately × 2 minutes. Start IV/IO.

↓

VF/VT?

↓

Defibrillate
Continue CPR × 2 minutes
Epinephrine, 1 mg IV/IO, repeat every 3–5 minutes, ***OR:***
Vasopressin 40 Units IV/IO (single dose only)
Consider advanced airway (ET tube, supraglottic airway)
Ventilate 8–10 breaths/minute with continuous compressions
Use waveform capnography:
If PETCO2 <15, improve CPR

↓

VF/VT?
Defibrillate
Continue CPR × 2 minutes.
Amiodarone, 300 mg IV/IO (may repeat once 150 mg in 5 minutes)
Consider reversible causes.*

↓

If ROSC (pulse, BP, $PETCO_2$ ≥40 mm Hg), see *ROSC algorithm*, next page.

Asystole/PEA



Continue CPR immediately × 2 minutes. Start IV/IO.
Epinephrine, 1 mg IV/IO, repeat every 3–5 minutes, ***OR:***
Vasopressin, 40 Units IV/IO (single dose only), consider advanced airway (ET tube, supraglottic airway)
Ventilate 8–10 breaths/minute with continuous compressions
Use waveform capnography:
If $PETCO_2$ <15, improve CPR

↓

Asystole/PEA?
Continue CPR × 2 minutes
Consider reversible causes.*

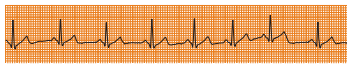
↓

If ROSC (pulse, BP, $PETCO_2$ ≥40 mm Hg), see *ROSC algorithm*, next page.

*Reversible Causes

- Hypoxia
- Hypovolemia
- Acidosis
- Hyper-hypokalemia
- Hypothermia
- Coronary thrombosis
- Pulmonary thrombosis
- Cardiac tamponade
- Tension pneumothorax
- Toxins

Return of Spontaneous Circulation: Post-Cardiac Arrest Care



Optimize ventilation/oxygenation
(Start at 10–12 breaths per minute, but *do not hyperventilate*)
Goal: $PETCO_2$ 35–40 mm Hg
Use minimum amount of FiO_2 to keep SaO_2 ≥94%
Consider waveform capnography
↓
Keep blood pressure ≥90 mm Hg (or MAP ≥65 mm Hg)
IV fluid bolus: 1–2 Liter(s) NS or RL
(May use cold [4°C] IV fluid if induced hypothermia)

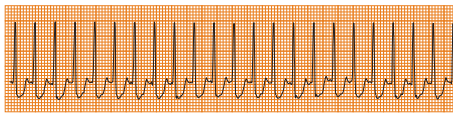
Consider vasopressor infusion
Epinephrine: 0.1–0.5 mcg/kg/minute
Dopamine: 5–10 mcg/kg/minute
Norepinephrine: 0.1–0.5 mcg/kg/minute

Consider reversible causes*
Monitor ECG, obtain 12-lead ECG
Follows commands?
(If not, consider induced hypothermia)
↓
STEMI or high suspicion AMI?
↓
Coronary reperfusion (PCI)
Advanced critical care

*Reversible Causes

- Hypoxia
- Acidosis
- Hypovolemia
- Toxins
- Coronary thrombosis
- Cardiac tamponade
- Hyper-hypokalemia
- Hypothermia
- Pulmonary thrombosis
- Tension pneumothorax

Tachycardia



Consider and treat reversible causes*

Assess C-A-B, secure airway, give O_2, start IV/IO, check BP, apply oximeter, get 12-lead ECG

Is Patient Unstable? ↙ ↘ ***Stable?***

(Serious S/S must be related to the tachycardia: HR ≥150/minute, ischemic chest pain, dyspnea, ↓ LOC, ↓ BP, shock, heart failure)

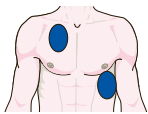
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Immediate Synchronized Cardioversion

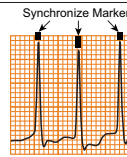
(For narrow QRS, consider adenosine, 6 mg, rapid IVP [Flush with NS, may repeat with 12 mg IVP]; **also consider sedation**, but do not delay cardioversion)

Initial Energy Doses (if unsuccessful, increase doses in a stepwise fashion):

- ***Narrow QRS, Regular:*** 50 J–100 J
- ***Narrow QRS, Irregular:*** 120 J–200 J biphasic (or 200 J monophasic)
- ***Wide QRS, Regular:*** 100 J
- ***Wide QRS, Irregular:*** defibrillate with 120 J–200 J biphasic (or 360 J monophasic)

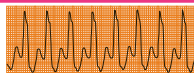


Pad/paddle placement for synchronized cardioversion



Synchronize on R wave

Stable Patient, Wide QRS (≥0.12 seconds)



- **12-lead ECG**
- **Start IV**
- **Consider adenosine, 6 mg IVP** (for regular, monomorphic rhythm) flush with saline, may **repeat 12 mg IVP**
- **Consider antiarrhythmic:**

Either:

Procainamide, 20–50 mg/minute IV until rhythm converts, QRS widens by 50%, hypotension, or maximum dose of 17 mg/kg. Avoid if CHF or prolonged QT. Drip 1–4 mg/minute ***OR:***

Amiodarone, 150 mg IV, over 10 minutes. May repeat (maximum dose: 2.2 g/24 h IV). Drip 1 mg/minute ***OR:***

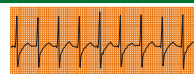
Sotalol, 1.5 mg/kg IV for over 5 minutes. Avoid if prolonged QT.

- **Consult with expert**

*Reversible Causes

- Hypoxia
- Acidosis
- Hypovolemia
- Toxins
- Coronary thrombosis
- Cardiac tamponade
- Hyper-hypokalemia
- Hypothermia
- Pulmonary thrombosis
- Tension pneumothorax

Stable Patient, Narrow QRS



- **12-lead ECG**
- **Start IV**
- **Vagal maneuvers**†
- **Adenosine, 6 mg IVP** (for regular rhythm), flush with saline, may repeat 12 mg IVP

Either:

- **Calcium blocker** (choose one):

Verapamil, 2.5–5 mg IV over 2–3 minutes. May repeat 5–10 mg. Maximum of 30 mg.

Diltiazem, 0.25 mg/kg IV over 2 minutes. May repeat 0.35 mg/kg ***OR:***

- **β-blocker** (choose one):

Metoprolol, 5 mg IV over 2–5 minutes. May repeat. Maximum of 15 mg.

Atenolol, 5 mg IV over 5 minutes. May repeat once.

Propranolol, 1–3 mg IV, slowly over 2–5 minutes.

Esmolol, 250–500 mcg/kg for 1 minute.

- **Consult with expert**

†Carotid sinus massage is contraindicated in patients with carotid bruits. Avoid ice application to face if patient has ischemic heart disease.

Wide Complex Tachycardia

(VT versus SVT with aberrancy)

VT



Consider lidocaine or amiodarone

Suggestive ECG signs for VT:



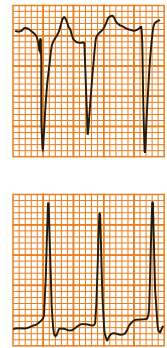
- Fusion beats: diagnostic
- Capture beats: diagnostic
- Extreme RAD (-90° to 180°)
- QRS >0.14 seconds
- QRS V1–V6 are all negative or all positive
- L rabbit ear > R rabbit ear in V1
- Wide initial R wave in V1
- AV dissociation (independent P waves)
- Small R wave in V6 or QS in V6
- Hx: MI, LVH, CAD, cardiomyopathy

Suggestive ECG signs for SVT:

- Irregular rhythm: consider AF
- Associated P waves: consider PSVT

When in doubt, treat for VT

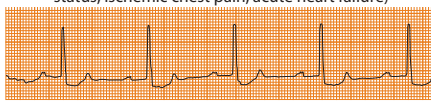
SVT with aberrancy



Consider adenosine

Bradycardia

(HR <50/minute with serious S/S: shock, hypotension, altered mental status, ischemic chest pain, acute heart failure)



Assess C-A-B, maintain airway, give O_2, assist breathing if needed. Attach pulse, oximeter, BP cuff, 12-lead ECG; start IV/IO fluids. **Consider and treat reversible causes***

↓

Atropine, 0.5 mg IV/IO every 3–5 minutes, maximum of 3 mg. (Do not delay TCP while starting IV, or waiting for atropine to work.*)

If ineffective:

↓

Transcutaneous pacing (verify capture and perfusion; use sedation as needed) ***OR:***

Dopamine, 2–10 mcg/kg per minute, ***OR:***

Epinephrine, 2–10 mcg per minute

↓

Consider expert consult; prepare for transvenous pacer

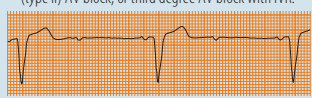
↓

Cardiac arrest?—See *ACLS Section, Cardiac Arrest algorithm*

***Reversible Causes**

- Hypoxia
- Acidosis
- Hypovolemia
- Toxins
- Coronary thrombosis
- Cardiac tamponade
- Hyper-hypokalemia
- Hypothermia
- Pulmonary thrombosis
- Tension pneumothorax

*Atropine may not work for transplanted hearts, Mobitz (type II) AV block, or third degree AV block with IVR.



—Begin pacing and/or catecholamine infusion

UNSYMPTOMATIC BRADYCARDIA?
NOT type II (Mobitz) second-degree or third-degree AV heart block?

↓

Observe

Asthma Cardiac Arrest

Use standard ACLS guidelines

Endotracheal intubation via RSI
(Use largest ET tube possible; monitor waveform capnography)

↓

To reduce hyperinflation, hypotension, and risk of tension pneumothorax, consider:

- **Ventilation with a slower respiratory rate**
- **Smaller tidal volume (6–8 mL/kg)**
- **Shorter inspiratory time (80–100 mL/minute)**
- **Longer expiratory time (I/E 1:4 or 1:5)**

↓

Continue use of **inhaled β_2-agonist (albuterol)** via ET tube
Evaluate for tension pneumothorax

↓

Consult with expert

↓

Consider brief disconnect from BVM and press on chest wall during exhalation to relieve air trapping if the patient suddenly deteriorates

↓

DOPE

- Displacement of ET tube
- Obstruction of tube
- Pneumothorax
- Equipment failure
- Evaluate for auto-PEEP

Cardiac Arrest During PCI

- Consider mechanical CPR
- Consider emergency cardiopulmonary bypass
- Consider cough CPR
- **Consider intracoronary verapamil for reperfusion-induced VT**

Cardiac Tamponade Cardiac Arrest

- **Consider emergency pericardiocentesis**
- Consider emergency department thoracotomy

Drowning Cardiac Arrest

- **Begin rescue breathing ASAP**
- Start CPR with A-B-C (airway and breathing first)
- Anticipate vomiting (have suction ready)
- Attach AED (dry chest off with towel)
- **Check for hypothermia**
- **Use standard BLS and ACLS**

Electrocution Cardiac Arrest

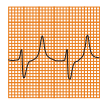
(Respiratory arrest is common)

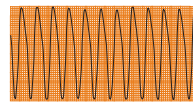
- **Is the scene safe?**
- **Triage patients and treat those with respiratory arrest or cardiac arrest first**
- Start CPR
- Stabilize the cervical spine
- Attach AED
- **Remove smoldering clothing**
- Check for trauma
- **Use large bore IV catheter for rapid fluid administration**
- Consider early intubation for airway burns
- **Use standard BLS and ACLS**

Electrolyte Imbalance Cardiac Arrest

Hyperkalemia

Wide QRS, peaked T waves, IVR





VT

Calcium chloride 10%, 500–1000 mg IV/IO (5–10 mL), over 2–5 minutes (or calcium gluconate 10%, 15–30 mL over 2–5 minutes)

Sodium bicarbonate, 50 mEq IV/IO over 5 minutes (may repeat in 15 minutes)

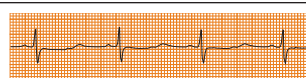
Dextrose, 25 g (50 mL of D_{50}) IV/IO, and regular insulin 10 Units IV/IO over 15–30 minutes

Albuterol, 10–20 mg nebulized over 15 minutes

Furosemide, 40–80 mg IV/IO

Hypokalemia

Use standard BLS and ACLS



Long QT interval, flat T waves, U wave

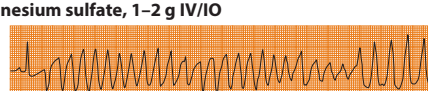
Hypermagnesemia

Stop magnesium infusion

Consider calcium chloride 10%, 500–1000 mg IV/IO (5–10 mL) over 2 to 5 minutes (or calcium gluconate 10%, 15–30 mL over 2–5 minutes)

Hypomagnesemia

Magnesium sulfate, 1–2 g IV/IO



Polymorphic VT (torsades)

Pulmonary Embolism Cardiac Arrest

(PEA is common)

- **Use standard BLS and ACLS**
- Perform emergency echocardiography
- **Consider fibrinolytic for presumed PE**
- **Consult expert**
- Consider percutaneous mechanical thrombectomy or surgical embolectomy

Trauma Cardiac Arrest

Consider reversible causes*

- **Stabilize cervical spine**
- Jaw thrust to open airway
- Direct pressure for hemorrhage
- **Perform standard CPR and defibrillation**
- **Use advanced airway if BVM inadequate** (consider cricothyrotomy if ventilation impossible)
- **Administer IV fluids** for hypovolemia
- Consider resuscitative thoracotomy

***Reversible Causes**

- Hypoxia
- Acidosis
- Hypovolemia
- Toxins
- Coronary thrombosis
- Cardiac tamponade
- Hyper-hypokalemia
- Hypothermia
- Pulmonary thrombosis
- Tension pneumothorax

"Commotio Cordis": a blow to the anterior chest causing VF

- **Prompt CPR and defibrillation**
- **Use standard BLS and ACLS**

Hypothermia

- **Remove wet clothing and stop heat loss** (cover with blankets and insulating equipment)
- **Keep patient horizontal**
- **Move patient gently, if possible;** do not jostle
- **Monitor core temperature and cardiac rhythm**
- Treat underlying causes (drug overdose, alcohol, trauma, etc.) simultaneously with resuscitation
- **Check responsiveness, breathing, and pulse**

If Pulse and Breathing

34°C–36°C / 93°F–97°F
(MILD hypothermia)
Passive rewarming

30°C–34°C / 86°F–93°F
(MODERATE hypothermia)
Active external rewarming
Forced-air rewarming

<30°C / <86°F
(SEVERE hypothermia)
Core rewarming
(Cardiopulmonary bypass, thoracic cavity warm water lavage, extracorporeal blood warming with partial bypass)

Adjunctive rewarming

- Warm IV fluids (43°C)
- Warm, humid O_2 (42°C–46°C)
- Peritoneal lavage
- Extracorporeal rewarming
- Esophageal rewarming tubes
- Endovascular rewarming

No Pulse/Apneic

Start CPR, ventilate
Defibrillate VF/VT
Biphasic: 120 J–200 J *OR:*
Monophasic 360 J
Resume CPR immediately
(Consider further defibrillation attempts for VF/VT)
See ACLS section, Cardiac Arrest algorithm
Intubate, ventilate with warm, humid oxygen (42°C–46°C)
Start IV/IO fluids, administer warm normal saline (43°C)
(Consider vasopressor: epinephrine, 1 mg IV every 3–5 minutes, ***OR:*** vasopressin, 40 Units IV)

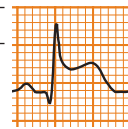
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Continue CPR, transport to ED, start core rewarming when feasible. Continue resuscitation until patient is rewarmed.

↓

After ROSC, rewarm patient to 32°C–34°C (90°F–93°F) or to normal body temperature

STEMI Fibrinolytic Protocol



"Time is muscle"

"Door-to-drug" time should be <30 minutes

- **S/S: Cx pain >15 minutes but <12 hours**
- **Get immediate 12-lead ECG** (must show ST elevation or new LBBB)
- **ECG and other findings consistent with AMI**
- **Give: O_2, NTG, morphine, ASA** (If no contraindications)
- **Start 2 IV catheters** (but do not delay transport)
- **Systolic/diastolic BP: right arm ___/___ left arm___/___**
- **Complete Fibrinolytic Checklist** (all should be "No"):
  - Systolic BP greater than 180 to 200 mm Hg
  - Diastolic BP >100–110 mm Hg
  - Right arm versus left arm BP difference >15 mm Hg
  - Stroke >3 hours or <3 months
  - Hx of structural CNS disease
  - Head/facial trauma within 3 weeks
  - Major trauma, GI or GU bleeding, or surgery within 4 weeks
  - Taking blood thinners; bleeding/clotting problems
  - Pregnancy
  - Hx of intracranial hemorrhage
  - Advanced cancer, severe liver/renal disease

High-Risk Profile/Indications for Transfer:

(If any are checked, consider transport to a hospital capable of angiography and revascularization)

- ❑ Heart rate ≥100 bpm and SBP ≤100 mm Hg
- ❑ Pulmonary edema (rales)
- ❑ Signs of shock
- ❑ Received CPR
- ❑ Contraindications to fibrinolytics

If no contraindications and Dx of AMI is confirmed:

- **Administer fibrinolytic**. Also consider: **anticoagulants and standard ACS treatments.** *Signs of reperfusion include*: pain relief, ST-segment normalization, reperfusion dysrhythmias, resolution of conduction block, and early cardiac marker peak.

Acute Coronary Syndromes

1. **Signs and symptoms suggestive of ischemia or infarction**
2. **EMS assessment**
   - ABCs, prepare for CPR; have defibrillator ready
   - Give oxygen, aspirin, NTG, start IV fluids, morphine as indicated
   - **Oxygen** at 4 L/minute; keep O_2 saturation ≥94%
   - **Aspirin,** 160–325 mg chewable
   - **Nitroglycerin,** 0.4 mg SL tablet, or aerosol; may repeat × 2
   - **Morphine,** 2–5 mg IV, if pain not relieved with NTG
   - Obtain 12-lead ECG; *if ST elevation*:
   - Notify hospital to mobilize resources for STEMI

↓

3. **Immediate ED assessment and treatment**
   - Vital signs, O_2 saturation
     - Obtain IV access
     - Continue MONA (morphine, oxygen, nitroglycerin, aspirin)
   - **Review 12-lead ECG**
   - Brief, targeted Hx and physical examination; fibrinolytic checklist, especially contraindications
   - Get initial serum cardiac marker levels
   - Evaluate initial electrolyte and coagulation studies
   - Portable chest radiograph (<30 minutes)

↓

4. 12-lead ECG results

5. ST elevation or new or presumably new LBBB: strongly suggestive of injury



STEMI

↓

9. T-wave inversion or ST depression: strongly suggestive of ischemia



High-risk unstable angina/non-STEMI

↓

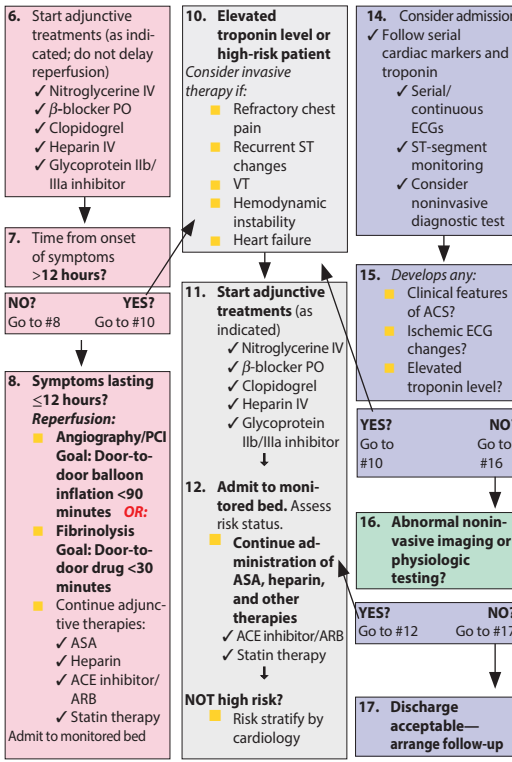
13. Normal or nondiagnostic ECG; no change in ST segments or T waves



Intermediate/ low-risk ACS

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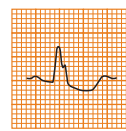
NOTE: This algorithm provides general guidelines that may not apply to all patients. For all treatments, carefully consider the presence of proper indications and the absence of contraindications.

Rapid Interpretation—12-Lead ECG

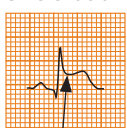
1. **Identify the rhythm.** If supraventricular (sinus rhythm, atrial fibrillation, atrial tachycardia, atrial flutter):
2. **Rule out LBBB** (QRS >0.12 seconds and R–R′ in I, or V_5, or V_6) LBBB confounds the Dx of AMI/ACS (unless it is new-onset LBBB)
3. If no LBBB, **check for:**
   - ST-segment elevation, ***OR***
   - ST depression with T-wave inversion, ***OR***
   - Pathologic Q waves

LBBB

I, V_5, V_6

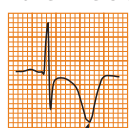


ST elevation



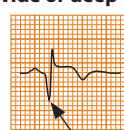
Means AMI

T-wave inversion



May mean myocardial ischemia or impending MI

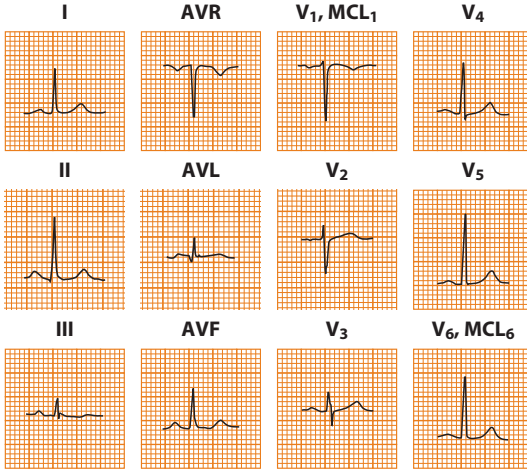
Wide or deep QS



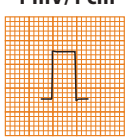
Means infarction

4. **Rule out other confounders:** WPW (mimics infarct, BBB), pericarditis (mimics MI), digoxin (depresses STs), LVH (depresses STs, inverts T).
5. **Identify location of infarct and consider appropriate treatments** (MONA, PCI [or fibrinolytic], nitrate infusion, heparin, GP IIb, IIIa inhibitor, β-blockers, antiarrhythmic, etc).

Normal 12-Lead ECG



1 mV/1 cm

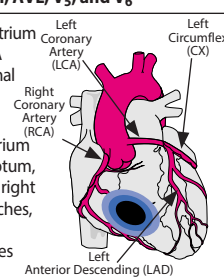


(Standard calibration)

Small Q waves are normal in leads I, II, AVL, V_5, and V_6

RCA supplies: right atrium and right ventricle, SA and AV nodes, proximal His bundle, posterior hemibundle

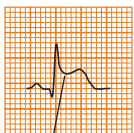
LCA supplies: left atrium and left ventricle, septum, SA node, His bundle, right and left bundle branches, and anterior and posterior hemibundles



Myocardial Infarction ECG Patterns

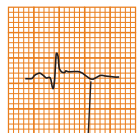
(If signs of AMI are not present on the initial ECG, perform serial ECGs)

Injury



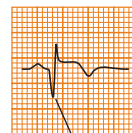
(ST segments usually elevate within minutes of the onset of cardiac chest pain.)

Ischemia



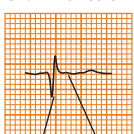
(T waves invert fully by 24 hours)

Acute Infarction



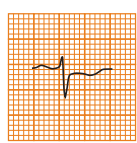
(Pathologic Q waves ≥0.03 seconds or $\frac{1}{3}$ height of QRS begin to form in 1 hour)

Old Infarction



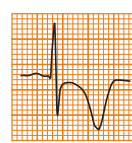
(Q waves remain forever) (ST segments are normal)

Reciprocal ST Depression



(Found in leads away from the infarction)

Non–Q-Wave Infarction



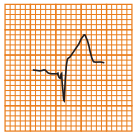
(Flat, depressed ST segments in two or more contiguous leads or may have inverted T waves)

NOTE: Early reperfusion is the definitive treatment for most AMI patients. The patient can lose 1% of salvageable myocardium for each minute of delay. Remember: "Time is muscle."

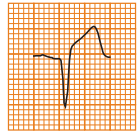
Anterior AMI

(ST-segment elevation ≥0.5 to 1 mm, with or without Q waves in two or more contiguous leads: V_1–V_4. Poor R wave progression* and inverted T waves may also be present. Reciprocal ST depression may be present in leads II, III, and AVF.)

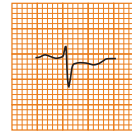
V_1, MCL_1



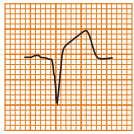
V_2



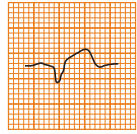
II, III, AVF



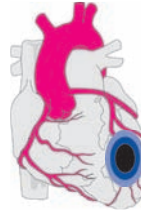
V_3



V_4



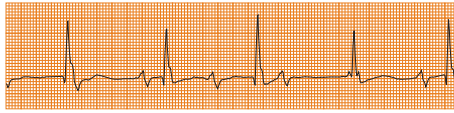
Reciprocal ST depression



***NOTE:** LVH also can cause poor R-wave progression and Q waves in V_1–V_2. Rule it out first.

The anterior descending branch of the left coronary artery is occluded. May cause left anterior hemiblock; RBBB; **2° AV block Mobitz II, 3° AV block with IVR, pump failure.**

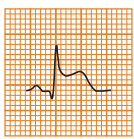
Third-Degree Block



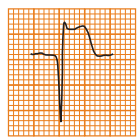
Inferior AMI

(ST-segment elevation ≥0.5–1 mm in two or more contiguous leads: II, III, and AVF. Q waves and inverted T waves may also be present. Reciprocal ST depression may be present in leads I, AVL, and V_2–V_4.)

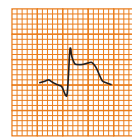
II



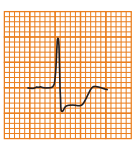
III



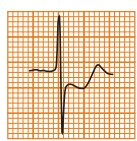
AVF



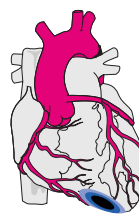
I, AVL



V_2, V_3, V_4



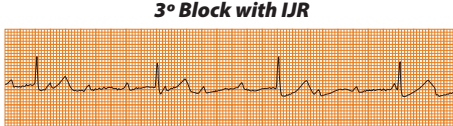
Reciprocal ST depression



The right (or left) coronary artery is occluded. May cause left posterior hemiblock, left axis deviation, ↓ BP, sinus bradycardia, 1° AV block, 2° AV block Mobitz I (Wenckebach), *3° AV block with IJR.*

NOTE: Right ventricle AMI accompanies inferior AMI 30% of the time. Check lead V_4R for elevated ST segment and Q wave.

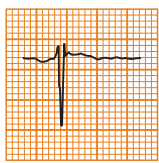
3° Block with IJR



Right Ventricle AMI

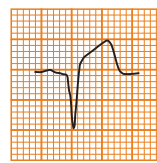
(ST-segment elevation in lead V_4R [MC_4R]. Q wave and inverted T wave may also be present.) Accompanies inferior MI in 30% of cases.

V_4R, MC_4R

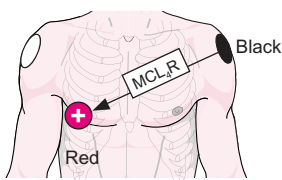


Normal

V_4R, MC_4R

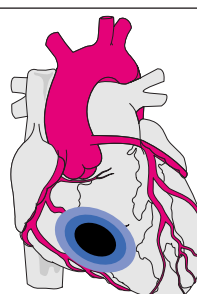


Pathologic



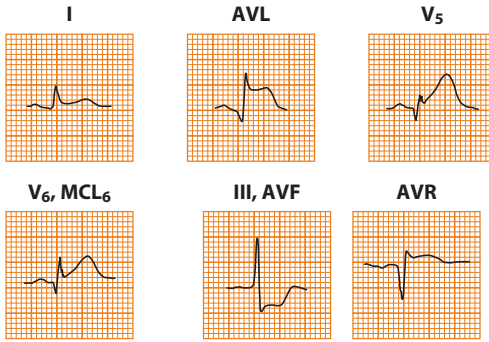
MC_4R lead placement: fifth interspace, right midclavicular line; monitor lead III.

RCA is occluded. May cause **AV block**, atrial fibrillation, atrial flutter, right heart failure, JVD with clear lungs, **BP may decrease if preload is reduced** (be cautious with morphine, NTG, and furosemide). Treat hypotension with IV fluids and pacing.



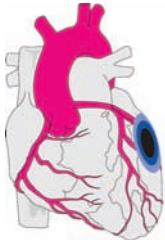
Lateral AMI

(ST-segment elevation ≥0.5–1 mm in leads I, AVL, V_5, and V_6. Q waves and inverted T waves may also be present.)



Reciprocal ST depression
(ST elevation in AVR)

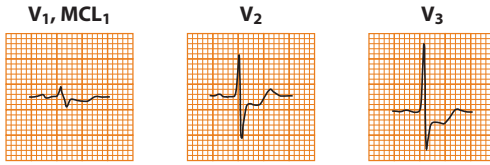
NOTE: Lateral MI may be a component of a multiple site infarction, including anterior, inferior, and/or posterior MI.



The circumflex branch of the LCA is occluded. May cause left ventricular dysfunction and **AV nodal block.**

Posterior AMI*

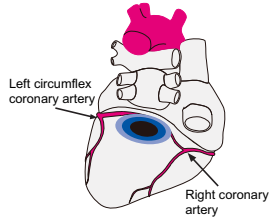
(ST-segment depression with or without large R waves in leads V_1, V_2, and V_3. Inverted T waves may also be present.)



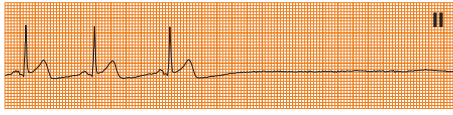
*Posterior AMI is rarely seen alone. It is usually a component of a multiple site infarction, including inferior MI. If suspected, obtain posterior chest leads V_7–V_9 for diagnoses.

NOTE: RVH can also cause a large R wave in V_1. Rule out RVH first.

The RCA or the circumflex branch of the LCA is occluded. May cause **sinus arrest.**



Sinus Arrest

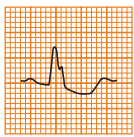


Bundle Branch Block

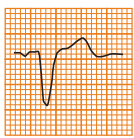
LBBB

(Notched/slurred R waves in I, or V_5, V_6. Qs in V_1.)

I, V_5, V_6

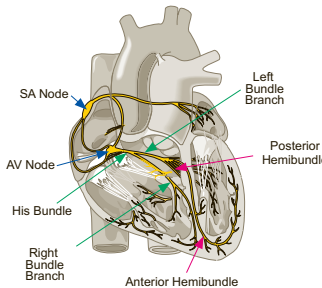


V_1, MCL_1



NOTE: If LBBB is present, do not attempt to diagnose AMI using only ECG criteria.

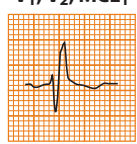
(QRS ≥0.12 second)



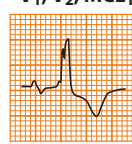
RBBB

(Notched or 2 R waves in V_1 or V_2. Large S in I, V_5, and V_6.)

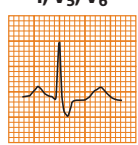
V_1, V_2, MCL_1



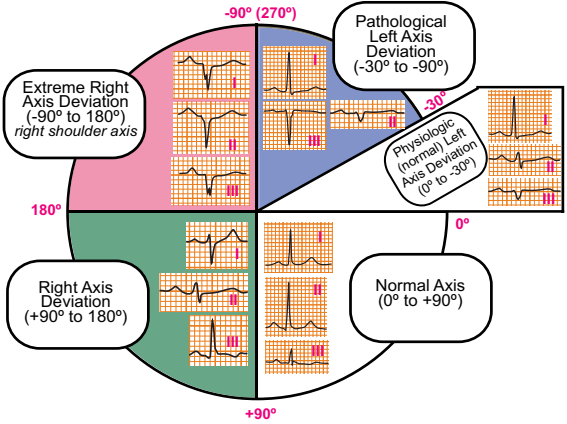
V_1, V_2, MCL_1



I, V_5, V_6



Axis



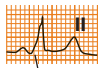
Causes of LAD
- Horizontal heart
- Obese patient
- Pregnancy
- LBBB
- LVH
- Left anterior hemiblock
- Inferior MI
- Ascites

Causes of RAD
- Slender build
- Pulmonary disease
- RBBB
- RVH
- Left posterior hemiblock

Causes of Extreme RAD
- MI
- Ectopic rhythm, such as VT

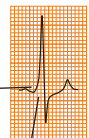
WPW and LGL Syndromes

WPW Syndrome
(Short PR, wide QRS, delta wave) **Patient is prone to PSVT**

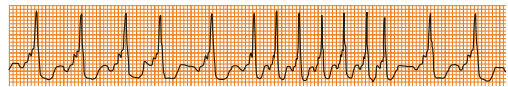


Delta wave

Any lead



(Mimicking BBB)

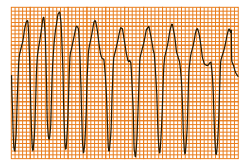


WPW Syndrome with PSVT



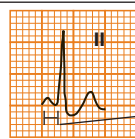
WPW Syndrome
(Mimicking a Q wave)

V_1

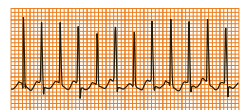


WPW Syndrome with Atrial Fibrillation
(Very fast rate, mimicking VT—**Cardiovert!**)

Lown-Ganong-Levine (LGL) Syndrome
(Short PR, normal QRS width)
Patient is prone to PSVT and VT



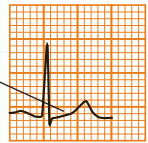
Short PR

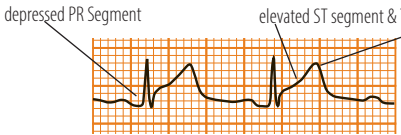


LGL Syndrome with PSVT

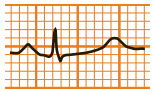
Other ECG Patterns

ST-Segment Elevation—Benign Normal Variant
(Upsloping, mildly elevated ST segments in a few leads; no reciprocal ST depression)



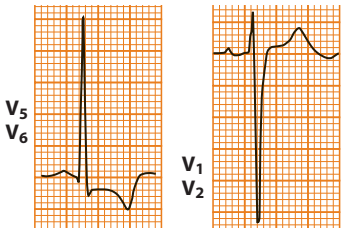


Pericarditis
(Flat or concave elevated ST segments in all leads; T wave elevated off baseline, no reciprocal ST depression; depressed PR segment)
Other S/S: fever; friction rub or click at apex; muffled heart sounds; sharp, pleuritic pain
Patient may develop tamponade, atrial fibrillation, atrial flutter, or PAT



I, II, III, AVR, L, F

COPD (Small QRSs in limb leads)
RVH may also be present



Left Ventricular Hypertrophy
(R waves ≥25 mm in V_5 and V_6; or S waves ≥25 mm in V_1 and V_2)

U Wave

Associated with some electrolyte disturbances, medications, or heart disease



J Wave

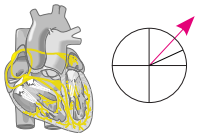
Present in hypothermia

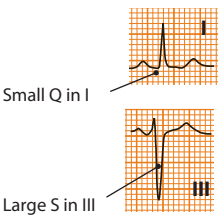


Hemiblocks

Left Anterior Hemiblock

Pathologic left axis deviation
≥–30°; Q1, S_3; no inferior MI



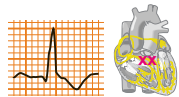


Suspect anterior MI

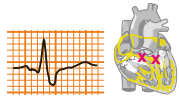
Bifascicular Block

Patient may develop 3° block

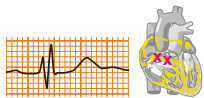
RBBB and Left Posterior Hemiblock



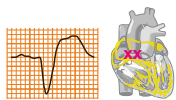
RBBB and Left Anterior Hemiblock



RBBB and 1° block

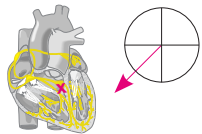


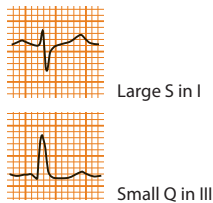
LBBB and 1° block



Left Posterior Hemiblock

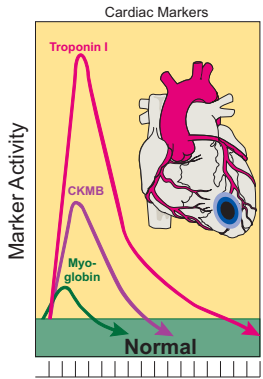
Right axis deviation ≥+90°, S_1, Q3, no RVH





Patient may develop AV blocks

Cardiac Markers Panel

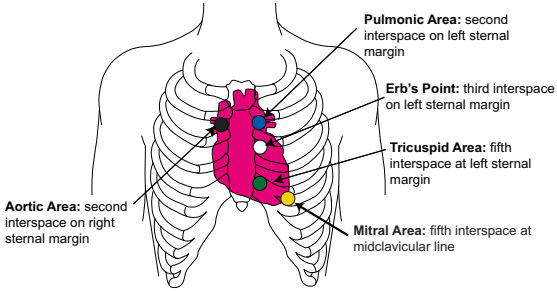


Normal Values*			
Sex	Troponin I, ng/mL	Myoglobin, ng/mL	CK-MB, ng/mL
Female	0–0.1	10–65	0–4
Male	0–0.1	10–95	0–4 (>10% of total)

Values in AMI Patients*			
	Troponin I	Myoglobin	CK-MB
Onset, hrs	4–6 h	1–3 h	3–4 h
Peak, hrs	12–24 h	6–10 h	12–24 h
Duration, days	4–7 d	12–24 h	2–3 d

*These values are guidelines. Individual markers may vary, depending on the size of the infarct, onset of symptoms, and the laboratory or methods used.

Heart Sounds



S_1 ○ ● Use diaphragm: listen at **mitral** and **tricuspid** sites

S_2 ● ● Use diaphragm: listen at **aortic** and **pulmonic** sites

S_3 ○ Use bell: listen at **mitral** site ("Ken-tuc-ky") Indicates CHF—rapid ventricular filling

S_4 ○ Use bell: listen at **mitral** site ("Ten-nes-see") Indicates ventricular hypertrophy

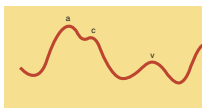
○ Listen at **Erb's point** for pericardial friction rub (a "thrill" may indicate pulmonary hypertension)

● Listen at **aortic area** for the murmur of aortic stenosis (Also radiates to the R side of the neck)

Pulmonary Artery (PA) Catheter Monitoring (Swan-Ganz Catheter)

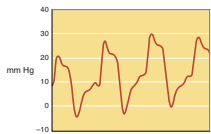
NOTE: Trends in values coupled with patient assessment findings illustrate a better clinical picture than baseline values alone. When a PA catheter is in place, PA pressure must be monitored at all times to detect inadvertent continuous wedge tracing.

Normal Waveforms



CVP/RA

Central venous pressure/right atrial pressure. Measures Right heart preload. Normal: 2–6 mm Hg.



RV

Right ventricular pressure.

RSVP: 15–30 mm Hg.

RVDP: 2–8 mm Hg.

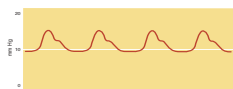
PAP

Pulmonary artery pressure. Measures blood returning to lungs.

PASP: 15–30 mm Hg.

PADP: 8–15 mm Hg.

MPAP: 9–18 mm Hg.





PCWP/PAOP

Pulmonary capillary wedge pressure/pulmonary artery occlusion pressure. Measures left heart preload. Normal: 6–12 mm Hg.

Intra-aortic Balloon Pump

IABP Transport

1. Visually assess the surroundings to ensure that hallways, elevators, and routes of travel will accommodate necessary equipment and personnel.
2. Obtain the patient report.
3. Ascertain current IABP settings and note typical pressures.
4. Determine IAB catheter model, size, and insertion depth.
5. Ascertain that the balloon tip location has been verified by chest radiograph.
6. Conduct an assessment.
7. Attach new ECG leads and secure each lead over the electrode with 2″ cloth tape.
8. Ensure that the IAB catheter is taped securely to the patient's leg.
9. Apply a knee immobilization splint to the leg in which the IAB was inserted to prevent leg flexion during transport. Ensure that the appropriate connectors to attach the IABP to the transport console are available. Take any adapters that will be necessary at the receiving facility.
10. Move the patient to the transport stretcher. Connect and secure all pumps, monitors, ventilators, and other equipment.
11. Transfer the IABP to the transport console at the bedside or in the transport vehicle (if the IABP console is mounted in the vehicle).
12. Establish power to the transport IABP console.
13. Open the helium tank and verify pressure.

14. Follow the IABP console instructions for start-up (on console help screens or in manufacturer-provided user manual):
    - Establish ECG and pressure waveforms from the patient.
    - Confirm initial pump settings.
    - Set timing.
    - Initiate IAB pumping.
    - Set console alarms.
    - Confirm all pump settings.
15. Optimize IABP timing in a 1:2 mode:
    - Set inflation by adjusting to a later time until the dicrotic notch becomes visible, then move inflation to an earlier time until a crisp V-pattern appears at the dicrotic notch.
    - Set deflation to achieve the lowest possible diastolic pressure while maintaining maximal augmentation.
16. Assess pressures every 5 minutes or with any changes in the patient's condition during transport. Check the insertion site and pulses every 15 minutes.

IABP Troubleshooting and Emergencies

- **Cardiac Arrest**—set trigger to "pressure" and begin CPR. Maintain MAP ≥60 mm Hg. Shock as needed (no need to disconnect or isolate IABP or monitoring equipment). After ROSC, return IABP trigger to ECG, once stable.
- **Balloon Rupture or Leak**—discontinue IABP therapy immediately. Disconnect catheter. If s/s gas embolism, position patient in left lateral recumbent position.
- **Console Failure**—manually inflate and deflate balloon with 40 mL air every 5 minutes.

- **Helium Depletion**—confirm tank valve is open. Note a full helium tank will provide many weeks of therapy. If necessary, change tank.
- **Excessive Bleeding**—direct pressure to site. Consider diverting to closest medical facility.
- **Catheter Migration or Unintentional Removal**—prevent by splinting IABP leg with knee immobilizer, do not tape tubing connectors, tape IABP to leg. Stop IABP therapy if dislodged. Reinsert if within sterile sheath to original depth. Consult medical control.

Airway Management

Rapid Sequence Intubation

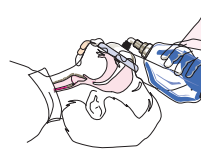
Prepare equipment (IV, ECG, oximeter, BVM, suction, ETT); **CO_2 detector; backup airway.**

↓

C-spine immobilization, as needed.

↓

Preoxygenate with 100% O_2; apply and maintain cricoid pressure.

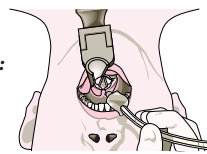


Place patient in sniff position; hyperventilate with O_2.

↓

Give sedative:

- Midazolam, 0.1–0.3 mg/kg IV/IO, ***OR:***
- Thiopental, 1–3 mg/kg IV/IO, ***OR:***
- Ketamine, 1–2 mg/kg IV/IO, ***OR:***
- Etomidate, 0.3 mg/kg IV/IO, ***OR:***
- Diazepam, 0.2 mg/kg IV/IO (maximum, 20 mg)



Lift tongue leftward and visualize vocal cords.

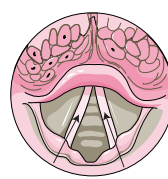
↓

If patient <2 yo., **give atropine, 0.02 mg/kg IV/IO** (blocks reflex bradycardia).

↓

Give neuromuscular blocker:

- Succinylcholine, 1–1.5 mg/kg IV/IO, ***OR:***
- Rocuronium, 0.6–1.2 mg/kg, IV/IO, ***OR:***
- Vecuronium, 0.1 mg/kg IV/IO



Vocal cords.

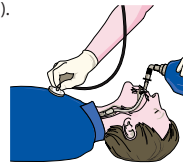
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Intubate (apply cricoid pressure, as needed).
↓

Inflate cuff; verify tube placement:

- **Check chest expansion.**
- **Check lung sounds.**
- **Check for fogging of tube.**
- **Apply CO_2 detector.**
- **Secure with ETT holder and C-collar, when applicable.**



Insert ETT; inflate cuff; check breath sounds.

Laryngeal Mask Airway

Contraindications—Severe oropharyngeal trauma; **poorly tolerated in conscious patients.**

1. **C-spine immobilization** prn.
2. **Deflate cuff. Lubricate posterior** (palatal) surface of LMA.
3. **Preoxygenate with 100% O_2.**
4. **Extend head**; flex neck; place LMA against hard palate.
5. **Follow natural curve** of patient's airway, insert LMA until it is seated snugly.
6. **Inflate cuff** with just enough air (see chart); do not hold tube down during inflation; allow LMA to "seat itself."
7. **Verify proper placement:**
   - Check chest expansion and lung sounds.
   - Secure with tape or tube holder.
   - Apply CO_2 detector; oximeter.
   - Reassess airway periodically.



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Patient Size	LMA Size	Maximum Cuff Volume
Neonate/infant: up to 5 kg	1	Up to 4 mL
Infant: 5–10 kg	1½	Up to 7 mL
Infant/child: 10–20 kg	2	Up to 10 mL
Child: 20–30 kg	2½	Up to 14 mL
Child: 30–50 kg	3	Up to 20 mL
Normal adult: 50–70 kg	4	Up to 30 mL
Large adult: 70–100 kg	5	Up to 40 mL
Large adult: >100 kg	6	Up to 50 mL

King LT Airway

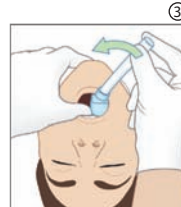
Contraindications—Patients <4 ft tall; does not protect against aspiration.

1. **C-spine immobilization**, as needed. **Preoxygenate with 100% O_2.** Apply water-based lube to distal tip and posterior aspect of tube.
2. **Deflate cuff. Open mouth, apply chin lift, insert tip** into side of mouth.
3. **Advance tip** behind tongue while rotating tube to midline.
4. **Advance tube** until base of connector is aligned with teeth or gums.
5. **Inflate cuff** with air (use minimum volume necessary).

②



③



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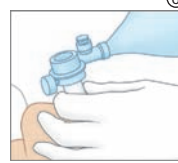
Patient Size	LT Size	Cuff Volume (mL)
35–45 in.	2	25–35
41–51 in.	2.5	30–40
4–5 ft	3	45–60
5–6 ft	4	60–80
>6 ft	5	70–90

6. **Attach bag-valve device.** While ventilating, gently withdraw tube until ventilation becomes easy.
7. **Adjust cuff inflation**, if necessary, to obtain a good seal.
8. **Verify proper placement:**
   - Check chest expansion and lung sounds.
   - Apply CO_2 detector; oximeter.
   - Secure with tape or tube holder.
   - Reassess airway periodically.

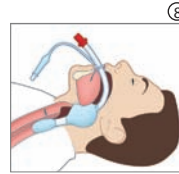
④



⑥



⑧



Ventilator Guidelines

Transporting a patient receiving mechanical ventilation

- Determine current ventilator settings.
- Assess most recent blood gas.
- Assure artificial airway is secure (taped, tied, device in place).
- Begin monitoring pulse oximetry and waveform capnography.

- Power on transport ventilator.
- Attach new transport ventilator circuit.
- Adjust continuous flow.
- Select ventilator rate, inspiratory rate, flow rate, and Fio_2.
- Make mode selection (CPAP and PEEP, IMV/SIMV, AC …).
- Attach patient to ventilator.
- Reassess patient, pulse oximetry, and waveform capnography.
- Adjust settings to maintain oxygenation (pulse oximetry, 92–94%) and adequate minute ventilation.
- Maintain stable and patent airway (suction as needed).
- Verify and document ventilator settings before, during, and at end of transport.
- Ensure adequate power and oxygen supplies during transport.
- Assess and document breath sounds.
- Manually ventilate (with a bag-valve-mask device) if any doubt about functioning of ventilator.

Troubleshooting a ventilator low-pressure alarm

- Quickly inspect the ventilator-patient connection for disconnect. Tighten all connections.
- If alarm continues to sound, disconnect the ventilator and manually ventilate with a bag-valve-mask device.
- Occlude the patient ventilator circuit with a gloved finger and observe the next ventilator-delivered breath.
- If ventilator pressure manometer attempts to rise and high pressure alarm sounds, vent circuit is intact and leak is with patient or artificial airway device.

Ventilator Settings Checklist

Noninvasive Ventilation Support	
CPAP (continuous positive airway pressure)	Improves oxygenation in spontaneously breathing patients. Usual setting 5–13 cm H_2O.
BiPAP (bilevel positive airway pressure)	Improves oxygenation and ventilation in spontaneously breathing patients. Usual settings: inspiratory pressure 6–14 cm H_2O, expiratory 3–5 cm H_2O. Adjust by tidal volumes, respiratory rates, and O_2 saturations.

Invasive Ventilation Modes		
Mode	**Definition**	**Indication**
CMV (continuous manual ventilation)	Vent delivers a preset rate and volume. Patient cannot breathe over set rate.	When a specific minute volume is required and patient apneic or chemically sedated
AC (assist/control)	Vent guarantees minimum rate. Patient can breathe over set minimum rate, but each breath will be delivered at the preset tidal volume.	Controls work of breathing, allows patient to set his or her own rate
SIMV (synchronized intermittent mandatory ventilation)	Vent delivers set rate and tidal volume synchronized with patient-initiated breaths. Spontaneous breaths above set rate are at the patient's own rate and depth (tidal volume).	Allows patient to assume some or most of work of breathing, depending on set rate. May be used as a weaning mode.

Invasive Ventilation Modes (Cont'd)		
Mode	Definition	Indication
PCV (pressure control ventilation)	Vent delivers preset pressure instead of volume. Tidal volumes may vary considerably, depending on lung compliance.	Used to avoid excessive pressures, often in conjunction with other lung protective strategies in patients for whom providing ventilation is difficult
PRVC (pressure regulated volume control)	Vent delivers set tidal volume at least amount of pressure possible.	Used when both pressure and volume regulation are needed
IRV (inverse ratio ventilation)	Inspiratory phase is set longer than expiratory phase.	Used to increase oxygenation. Caution needed to avoid hyperinflation and breath stacking.
PSV (pressure support ventilation)	A clinician selected level of positive pressure delivered to augment each spontaneous breath.	Often used as a weaning or comfort mode. Overcomes the resistance of airway and vent circuit.

Guidelines for Initiating Mechanical Ventilation in Adults		
Parameter	Definition	Setting Range
V_T (tidal volume)	Amount of air delivered with each ventilator breath	5–7 mL/kg initially, adjusted by ABG, $EtCO_2$, or PIPs
RR (respiratory rate)	Number of ventilator breaths delivered per minute	10–14 initially, adjusted by ABG, $EtCO_2$, or patient demand

Guidelines for Initiating Mechanical Ventilation in Adults (Cont'd)

Parameter	Definition	Setting Range
Fio_2 (fraction of inspired oxygen)	Percentage of inspired oxygen expressed as a decimal	0.2–1.0, initially 1.0 (100%) titrated downward to maintain oxygen saturations of 92–94%, use lowest Fio_2 possible (<0.5) to avoid oxygen toxicity
Peak flow	Speed at which tidal volume is delivered	Varies greatly (35–100 L/minute)
I time (inspiratory time)	Time set to deliver set tidal volume or flow	Varies between 0.5 and 1.5 seconds
PIP (peak inspiratory pressure)	The peak pressure generated during ventilation	Should be maintained at lowest level possible to avoid barotrauma (20–30 cm H_2O)—should not exceed 50
I:E ratio (inspiratory to expiratory ratio)	Ratio of inspiratory time to expiratory time	1:2

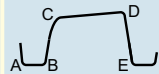
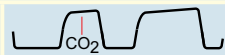
SVo_2 Values

Normal values range from 60–80%. Does not correlate directly with Do_2 or Vo_2.	Values <60% or >80% indicate an imbalance between oxygen delivery and consumption.
↓ SVo_2	↑ SVo_2
↓ Oxygen delivery	↑ Oxygen delivery
↓ Arterial O_2 saturation	↑ Arterial O_2 saturation
↓ Hemoglobin	↑ Hemoglobin
↓ CO	↑ CO
↓ Arterial partial pressure of oxygen	↑ Arterial partial pressure oxygen

SVo_2 Values (Cont'd)

↑ O_2 Consumption	↓ O_2 Consumption
Shivering	Anesthesia
Fever	Hypothermia
↑ Work to breathe	↓ Work to breathe
↑ Musculoskeletal activities	↓ Musculoskeletal activities
Seizures	Drug sedation and paralysis
Pain	Hypothyroidism
Patient care interventions—turning, suctioning, dressing changes, bathing	Cellular dysfunction

End-Tidal CO_2 Monitoring (Capnography)

Applications	Description	Wave Form
Normal capnographic wave form	4 phases, plots CO_2 concentration over time AB = respiratory baseline BC = expiratory upstroke CD = expiratory plateau DE = inhalation of CO_2-free gas	
Detect esophageal placement of ET tube during intubation	A flat line occurs; no CO_2 is detected	
Detect ET tube placement in trachea	When tracheal placement occurs, exhaled CO_2 is shown on capnogram	

End-Tidal CO_2 Monitoring (Capnography) (Cont'd)

Applications	Description	Wave Form
Identify patient's attempt to breathe while paralyzed	Movement of patient's diaphragm results in a dip in the capnogram wave form	
Recognize patient disconnection from mechanical ventilator	Wave form immediately disappears and goes flat	
Predictor of patient outcome	The higher the CO_2 the higher the cardiac output, and the more effective the resuscitation efforts	

Neurologic

Stroke

EMS Assessment and Treatment

- Support ABCs, give O_2, check glucose level
- Perform stroke assessment (see LAPSS or CPSS, after Stroke)
- Establish onset of symptoms
- **Rapid transport to stroke center** (bring family member)
- Alert hospital: "possible stroke patient"

Immediate Assessment and Stabilization

- Check ABCs, vital signs; give O_2 if hypoxemic
- Start IV fluids; get blood samples; 12-lead ECG
- Check blood glucose level: correct hypoglycemia/hyperglycemia
- Perform general neurologic screening assessment
- Activate stroke team
- Initiate emergency CT scan or MRI of brain



Max time: 10 minutes

Immediate Neurologic Assessment by Stroke Team

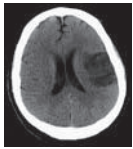
- Review patient history
- Establish onset of symptoms
- Perform neurologic examination (NIH Stroke Scale or Canadian Neurologic Scale)



Max time: 15 minutes

Hemorrhage on CT/MRI?

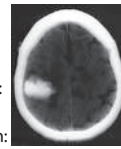
NO Hemorrhage: Probable Ischemic Stroke





20 minutes for rtPA decision

Hemorrhage



- Review fibrinolytic exclusions: are any present?
- Repeat neurologic examination: deficits improving?(If so, give aspirin and begin **Stroke Pathway**.)

Patient remains candidate for fibrinolytic therapy?

Review risks and benefits with patient and family.
If acceptable:

Administer rtPA if <3–4.5* hours from documented onset of symptom. (*<3 hours if any: >80 years old, severe stroke, NIHSS score >25, taking oral anticoagulant, Hx of diabetes, and prior ischemic stroke)

Do not give anticoagulants or antiplatelets for 24 hours.

Begin **Stroke Pathway**

Hemorrhage Present on CT/MRI

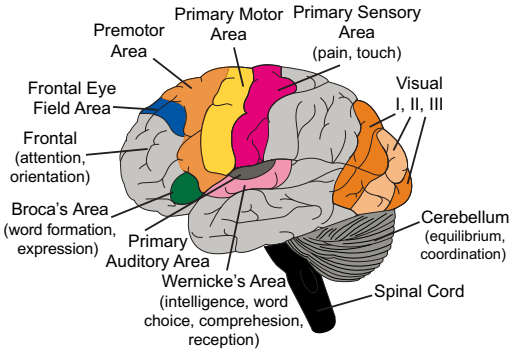
- **A bleeding patient is never a candidate for rtPA.**
- Consult neurologist or neurosurgeon.
- Consider transfer if neurology consult unavailable.
- ***Begin Stroke or Hemorrhage Pathway**
  - Admit to stroke unit or ICU.
  - Monitor BP: treat if indicated.
  - Monitor blood glucose level and treat, if needed.
  - Initiate supportive therapy and treat comorbidities.
  - Monitor neurologic status: perform emergency CT if patient deteriorates.



Max time: 15 minutes



Max time: 2 hours



General Care for the Stroke Patient

- **Ensure patient airway.**
- Monitor vital signs.
- Rule out trauma or other medical causes.
- **Check blood glucose level (correct if hypoglycemic/ hyperglycemic).**
- Administer thiamine, 100 mg IV, intramuscularly, or subcutaneously (if malnourished or alcoholic).
- **Avoid excess IV fluids and D_5W**
- Administer acetaminophen (if patient is febrile).
- **If patient is eligible, rapidly transfer to stroke facility.**
- **Give O_2.**
- NPO.

Los Angeles Prehospital Stroke Screen (LAPSS)

***Screening Criteria*:**

1. Age older than 45 years ❑ Yes ❑ No
2. No prior history of seizure disorder ❑ Yes ❑ No
3. New neurologic symptoms in last 24 hours ❑ Yes ❑ No
4. Patient was ambulatory before event ❑ Yes ❑ No
5. Blood glucose level of 60–400 mg/dL ❑ Yes ❑ No
6. Examination (below) reveals only unilateral weakness ❑ Yes ❑ No

Examination: look for obvious asymmetry

	Normal	Right	Left
Facial smile/grimace		Droop	Droop
Grip		Weak grip No grip	Weak grip No grip
Arm weakness		Drifts down Falls rapidly	Drifts down Falls rapidly

7. If "yes" to all items above, the LAPSS screening criteria are met: **Notify receiving hospital with "code stroke."**

NOTE: The patient may still be experiencing a stroke even if LAPSS criteria are not met.

Cincinnati Prehospital Stroke Scale (CPSS)

Symptoms	Normal	Abnormal
Facial droop	Both sides of face move equally	One side of face does not move as well as other side
Arm drift	Both arms move equally or not at all	One arm drifts compared with the other
Speech	Patient uses correct words with no slurring	Slurred or inappropriate words or mute

NOTE: Any abnormal finding suggests potential stroke.

Fibrinolytic Checklist for Ischemic Stroke

All the "yes" and "no" boxes must be checked before fibrinolytic therapy can be given.

Inclusion Criteria (all must be YES)

- ❑ Age 18 years or older
- ❑ Clinical Dx: ischemic stroke causing measurable neurologic deficit
- ❑ Time of symptom onset will be <4.5* hours before fibrinolytic treatment begins (*<3 hours if any: >80 years old, severe stroke [NIHSS score >25], taking oral anticoagulant, Hx of diabetes and prior ischemic stroke)

Exclusion Criteria (all must be NO)

- ❑ Prior stroke or head injury within the past 3 months
- ❑ Intracranial hemorrhage on noncontrast CT
- ❑ Clinical suspicion subarachnoid bleed, even with normal CT
- ❑ Arterial puncture within 7 days at a noncompressible site
- ❑ Multilobar infarction on CT >⅓ cerebral hemisphere
- ❑ Uncontrolled HTN: systolic BP >185 mm Hg or diastolic BP >110 mm Hg
- ❑ Evidence of active hemorrhage on examination
- ❑ Blood glucose level <50 mg/dL (2.7 mmol/L)
- ❑ Hx: previous intracranial bleed, AV malformation, aneurysm, or neoplasm

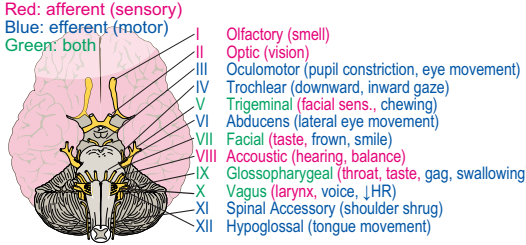
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- Active internal bleeding or acute trauma (fracture)
- Acute bleeding diathesis, including but not limited to:
  - Platelet count $<100{,}000/mm^3$
  - Patient has received heparin within 48 hours and had an elevated aPTT (greater than upper limit of normal for laboratory)
  - Current use of anticoagulant (eg, warfarin sodium) with elevated prothrombin time >15 seconds or INR >1.7

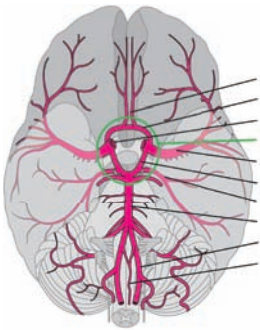
Relative Contraindications (weigh risks vs benefits)

- Only minor or rapidly improving stroke symptoms
- Within 14 days of major surgery or serious trauma
- Within 21 days of GI or urinary tract hemorrhage
- Recent acute MI within 3 months
- Witnessed seizure at stroke onset, with postictal impairments

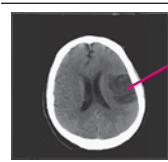
Cranial Nerves



Cerebral Arteries



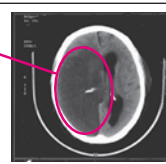
CT Scans (noncontrast)



L parietal ischemic stroke

Ischemic Stroke:

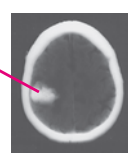
- Focal deficits
- H/A
- ↓LOC



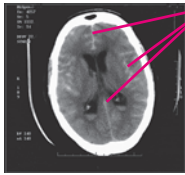
Severe R-sided ischemic stroke

Intracerebral Hemorrhage:

- Decreased LOC
- Major neurologic deficits
- Headache
- **Fibrinolytics contraindicated**

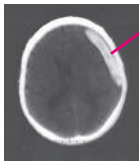


R parietal hemorrhage



Subarachnoid Hemorrhage:

- Sudden onset, often with exertion
- "Worst headache of my life"
- May have stiff neck, N/V, ↓LOC
- **Fibrinolytics contraindicated**

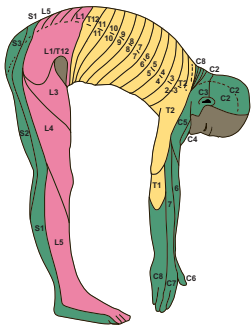


L subdural blood

Subdural Hematoma:

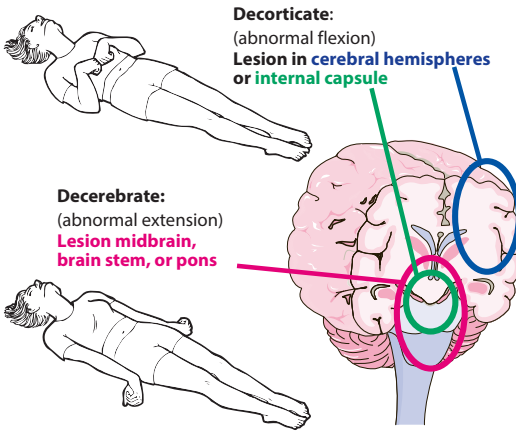
- ↓LOC
- Drowsiness
- Unequal pupils, dilated pupils
- Headache, N/V
- Agitation, confusion, irritability
- **Fibrinolytics contraindicated**

Dermatomes



Motor	
C1-C4	Diaphragm
C-5	Abduct arm
C-6	Flex elbow
C-7	Extend elbows
C-8	Most hand function
Sensory	
C-2	Just below chin
T-4	Nipple line
T-10	Umbilicus
L-1	Ischial crests
S-3	Anus

Posturing


Decorticate:
(abnormal flexion)
Lesion in cerebral hemispheres
or internal capsule
Decerebrate:
(abnormal extension)
Lesion midbrain,
brain stem, or pons

Pediatrics

Pediatric Assessment

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The Pediatric Assessment Triangle

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Appearance
Mental status
Muscle tone
Body position

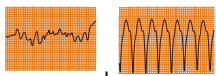
Breathing
Visible movement
Work of breathing (normal/increased)

Circulation
Color

Pediatric Cardiac Arrest

Shout for help, activate emergency response, begin CPR, give O_2, and attach defibrillator.

VF or Pulseless VT



↓

⚡ **Defibrillate 2 J/kg Continue CPR immediately** (2 minutes of 15:2*). **Obtain IV or IO access**

↓

Still VF/VT? ⚡ **Shock 4 J/kg**
Continue CPR × **2 minutes**
Epinephrine: 0.01 mg/kg IV/IO (1:10,000, 0.1 mL/kg)
every 3–5 minutes *OR:*
ET: 0.1 mg/kg (1:1000, 0.1 mL/kg)
Consider advanced airway (ET tube, supraglottic airway)
Ventilate 8–10 breaths/minute with continuous compressions.
Use waveform capnography: If $PETCO_2$ <15, improve CPR

Still VF/VT? ⚡ **Shock ≥4J/kg** (maximum, 10 J/kg or adult dose)
Continue CPR (× 2 minutes)
Amiodarone: 5 mg/kg IV/IO; may repeat twice
Identify and treat causes*

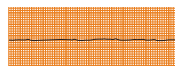
↓

Still VF/VT ⚡ **Shock ≥4 J/kg** (maximum 10 J/kg or adult dose)
Continue CPR (× 2 minutes)
Verify paddle position/contact

↓

If ROSC (pulse, BP, $PETCO_2$ ≥40 mm Hg), provide post cardiac care.

Asystole/PEA



↓

Continue CPR immediately (2 minutes of 15:2*)
Obtain IV or IO access
Epinephrine: 0.01 mg/kg IV/IO (1:10,000, 0.1 mL/kg)
every 3–5 minutes *OR:*
ET: 0.1 mg/kg (1:1000; 0.1 mL/kg)
Consider advanced airway (ET tube, supraglottic airway)
Ventilate 8–10 breaths/minute with continuous compressions.
Use waveform capnography: If $PETCO_2$ <15, improve CPR

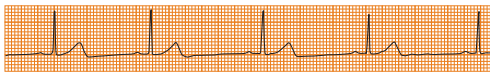
VF/VT? **—Start VF/VT algorithm on left**
Otherwise: **CPR** (× 2 minutes); repeat **epinephrine** as above.

***After an advanced airway is placed, give 8–10 breaths/minute during CPR.**

*Identify and treat causes

- Hypoxia
- Acidosis
- Hypovolemia
- Toxins
- Hyper-/hypokalemia
- Hypothermia
- Cardiac tamponade
- Tension pneumothorax
- Pulmonary thrombosis
- Coronary thrombosis

Pediatric Bradycardia
(with a pulse but symptomatic)



Treat reversible causes*

Maintain airway, administer O_2, ventilate as needed, attach ECG, assess BP, SaO_2, start IV or IO, 12-lead ECG
(but do not delay treatment)

↓

Severe cardiorespiratory compromise?
(Altered mental status, hypotension, shock)

YES

Start CPR if HR <60 beats/minute despite good oxygenation and ventilation
Oxygenate, ventilate

↓

Still bradycardic after 2 minutes of CPR? *(If not)*

↓

Check airway, O_2 source, ventilation adequacy
Epinephrine: 0.01 mg/kg IV/IO (1:10,000, 0.1 mL/kg) **every 3–5 minutes *OR:***
ET: 0.1 mg/kg (1:1000; 0.1 mL/kg)

↓

Atropine: 0.02 mg/kg IV/IO *OR:*
ET: 0.04–0.06 mg/kg for increased vagal tone or primary AV block
(minimum dose, 0.1 mg; maximum single dose, 0.5 mg may repeat once: maximum total dose, 1 mg)

↓

Consider pacing
Treat reversible causes*

↓

If arrest develops, see *Pediatric Cardiac Arrest above.*

NO

Support ABCs, O_2, Observe, Consult with expert

*Reversible causes

- Hypoxia
- Acidosis
- Hypovolemia
- Toxins
- Hypoglycemia
- Hyper-/hypokalemia
- Hypothermia
- Pulmonary thrombosis
- Tension pneumothorax
- Cardiac tamponade
- Coronary thrombosis

NOTE: Pediatric bradycardia is often the result of hypoxia.

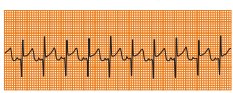
Pediatric Tachycardia
(with poor perfusion)

Treat reversible causes*
Maintain airway, administer O_2, ventilate as needed, attach ECG, assess BP, SaO_2, start IV/IO, 12-lead ECG
(but do not delay treatment)

QRS DURATION?

Narrow QRS ≤0.09 seconds

Probably sinus tachycardia if:



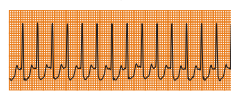
Compatible history?
Normal P waves?
Variable R-R and normal PR?
Infant HR <220/minute?
Child HR <180/minute?

↓

Treat reversible causes*

Wide QRS? >0.09 seconds

Possibly SVT if:



Hx abrupt rate changes?
Absent/abnormal P waves?
HR not variable?
Infant HR ≥220/minute?
Child HR ≥180/minute?

↓

Consider vagal maneuvers
(Do not delay treatment)

↓

Adenosine: 0.1 mg/kg IVP/IO (6 mg maximum dose)
May repeat with 0.2 mg/kg (12 maximum dose) ***OR:***

↓

⚡ **Synchronized cardioversion**
(0.5–1.0 J/kg; may increase to 2 J/kg if initial dose fails; sedate if possible, but do not delay cardioversion)

↓

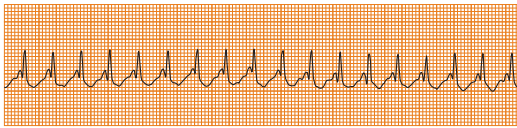
Consult expert

*Reversible causes

- Hypoxia
- Acidosis
- Hypovolemia
- Toxins
- Hypoglycemia
- Hyper-hypokalemia
- Hypothermia
- Pulmonary thrombosis
- Tension pneumothorax
- Cardiac tamponade
- Coronary thrombosis

Go to next page

Pediatric Tachycardia—Wide QRS? >0.09 seconds



Unstable Patient
(Hypotension, Shock, AMS)

Possible VT

⚡ Synchronized Cardioversion

0.5–1.0 J/kg; may increase to 2 J/kg if initial dose fails (sedate if possible, but do not delay cardioversion)

↓

Consult with expert

Stable Patient

Hemodynamically stable?

Consider adenosine

0.1 mg/kg IVP/IO
(6 mg maximum dose)
if regular monomorphic QRS

↓

Consult expert

↓

EITHER:

Amiodarone: 5 mg/kg IV over 20–60 minutes

OR:

Procainamide: 15 mg/kg IV over 30–60 minutes

Pediatric Septic Shock

Recognize altered mental status and poor perfusion

Give O_2, support ventilation, start IV/IO, resuscitate according to PALS. *Laboratory tests:* blood gases (VBG or ABG), lactate, glucose, ionized calcium, cultures, CBC.

↓

For shock: repeated IV/IO boluses of 20 mL/kg of crystalloid (up to 3, 4, or more boluses unless rales, respiratory distress, or hepatomegaly develops)



First hour

Additional therapies:

- Correct hypoglycemia and hypocalcemia
- **Administer antibiotics immediately**
- Consider immediate vasopressor drip (start second IV/IO)
- Consider stress-dose hydrocortisone (draw baseline cortisol; consider ACTH stimulation test. If adrenal insufficiency suspected, give hydrocortisone, ~2 mg/kg bolus IV/IO) [maximum, 100 mg]

↓

Improved perfusion after IV fluids? → **YES** Consider ICU monitoring

NO ←

Start vasopressor: (titrate to correct hypotension and poor perfusion; consider arterial and central venous access)
Goal: $ScvO_2$ >70%

- **Normotensive?** Start **dopamine**, 2–20 mcg/kg/minute
- **Warm Shock?** (hypotensive and vasodilated): start **norepinephrine**, 0.1–2 mcg/kg/minute. Titrate to BP and systemic perfusion.
- **Cold shock?** (hypotensive vasoconstricted): start **epinephrine**, 0.1–1 mcg/kg/minute. Titrate to BP and systemic perfusion.

↓

YES ← **$ScvO_2$ >70%?** → **NO**

But low BP? *(Warm Shock)*

- Additional fluid boluses
- **Norepinephrine:** 0.1–2 mcg/kg/minute. Titrate to BP and systemic perfusion.
- May add **vasopressin**: 0.2–2 milliunits/kg/minute

Go to next page

$ScvO_2$ <70%?
Normal BP?

YES

Normal BP but poor perfusion?

- Transfuse to Hgb >10 g/dL
- Optimize arterial O_2 saturation
- Additional fluid boluses
- *Consider:*

Milrinone:
50 mcg/kg loading dose for 10–60 minutes;
drip: 0.25–0.75 mcg/kg/minute

OR:

Nitroprusside:
0.3–1 mcg/kg/minute; titrate to response; maximum, 8 mcg/kg/minute

- *Consider:*

Dobutamine:
2–20 mcg/kg/minute

NO

Low BP and poor perfusion?
(Cold Shock)

- Transfuse to Hgb >10 g/dL
- Optimize arterial O_2 saturation
- Additional fluid boluses
- *Consider:*

Epinephrine:
0.1–1 mcg/kg/minute

Titrate to BP and perfusion

OR:

Dobutamine:
2–20 mcg/kg/minute

+

Norepinephrine:
0.1–2 mcg/kg/minute.

Titrate to BP and perfusion.

Pediatric Medications

	Preterm (1.5 kg)	Term (3.5 kg)	6 mo (7 kg)	1 y (10 kg)	3 y (15 kg)	6 y (20 kg)	8 y (25 kg)	10 y (30 kg)	11 y (35 kg)	12 y (40 kg)	14 y (45 kg)
Weight (lb)	3	7.5	15	22	33	44	55	66	77	88	99
Length (in)	16	21	26	31	39	46	50	54	57	60	64
Length (cm)	41	53	66	79	99	117	127	137	145	152	163
Heart rate (beats/minutes)	140	125	120	120	110	100	90	90	85	85	80
Respirations (breaths/minute)	40–60	40–60	24–36	22–30	20–26	20–24	18–22	18–22	16–22	16–22	14–20
Systolic BP (mm Hg)	50–60	60–70	60–120	65–125	100	100	105	110	110	115	115
ET tube size (mm)	2.5–3.0	3.5	3.5	4.0	4.5	5.5	6.0	6.5	6.5	7.0	7.0
LMA size	1	1	1 1/2	1 1/2–2	2	2–2 1/2	2 1/2	2 1/2–3	3	3	3
Suction catheter size (Fr)	5–6	8	8	8	8	10	10	10	10	10	10
Nasogastric tube size (Fr)	5	8	8	8	10	12	14	14	16	16	18

Pediatric Medications (Cont'd)

	Preterm (1.5 kg)	Term (3.5 kg)	6 mo (7 kg)	1 y (10 kg)	3 y (15 kg)	6 y (20 kg)	8 y (25 kg)	10 y (30 kg)	11 y (35 kg)	12 y (40 kg)	14 y (45 kg)
Cardioversion											
0.5–1 J/kg (initial)	1–2 J	2–4 J	4–7 J	5–10 J	8–15 J	10–20 J	13–25 J	15–30 J	18–35 J	20–40 J	23–45 J
2 J/kg	3 J	7 J	14 J	20 J	30 J	40 J	50 J	60 J	70 J	80 J	90 J
Defibrillation											
2 J/kg (initial)	3 J	7 J	14 J	20 J	30 J	40 J	50 J	60 J	70 J	80 J	90 J
4 J/kg (repeat)	6 J	14 J	28 J	40 J	60 J	80 J	100 J	120 J	140 J	160 J	180 J
8 J/kg (repeat)	12 J	28 J	56 J	80 J	120 J	160 J	200 J	240 J	280 J	320 J	360 J
10 J/kg (repeat)	15 J	35 J	70 J	100 J	150 J	200 J	250 J	300 J	350 J	360 J	360 J
Fluid challenge (20 mL/kg IV/IO) [Neonatal: 10 mL/kg]	15 [10 mL/kg]	35 [10 mL/kg]	140	200	300	400	500	600	700	800	900

Pediatric Medications (Cont'd)

	Preterm (1.5 kg)	Term (3.5 kg)	6 mo (7 kg)	1 y (10 kg)	3 y (15 kg)	6 y (20 kg)	8 y (25 kg)	10 y (30 kg)	11 y (35 kg)	12 y (40 kg)	14 y (45 kg)
Adenosine (3 mg/mL)											
0.1 mg/kg IVP/IO	0.05 mL	0.1 mL	0.2 mL	0.3 mL	0.5 mL	0.7 mL	0.8 mL	1 mL	1.2 mL	1.3 mL	1.5 mL
0.2 mg/kg IVP/IO	0.1 mL	0.2 mL	0.5 mL	0.7 mL	1 mL	1.3 mL	1.7 mL	2 mL	2.3 mL	2.7 mL	3 mL
Amiodarone (50 mg/mL)	0.15 mL	0.35 mL	0.7 mL	1 mL	1.5 mL	2 mL	2.5 mL	3 mL	3.5 mL	4 mL	4.5 mL
5 mg/kg IV/IO											
Atropine (0.1 mg/mL)	1 mL	1 mL	1.4 mL	2 mL	3 mL	4 mL	5 mL	6 mL	7 mL	8 mL	9 mL
0.02 mg/kg IV/IO											
CaCL 10% (100 mg/mL)	0.3 mL	0.7 mL	1.4 mL	2 mL	3 mL	4 mL	5 mL	6 mL	7 mL	8 mL	9 mL
20 mg/kg slow IV/IO											
Cefotaxime (250 mg/mL)	0.3 mL	0.7 mL	1.4 mL	2 mL	3 mL	4 mL	5 mL	6 mL	7 mL	8 mL	9 mL
50 mg/kg IV/IO/IM											
Ceftriaxone (100 mg/mL)	0.75–1.5 mL	1.75–3.5 mL	3.5–7 mL	5–10 mL	7.5–15 mL	10–20 mL	12.5–25 mL	15–30 mL	17.5–35 mL	20–40 mL	22.5–45 mL
50–100 mg/kg IV/IO/IM											

Pediatric Medications (Cont'd)

	Preterm (1.5 kg)	Term (3.5 kg)	6 mo (7 kg)	1 y (10 kg)	3 y (15 kg)	6 y (20 kg)	8 y (25 kg)	10 y (30 kg)	11 y (35 kg)	12 y (40 kg)	14 y (45 kg)
Charcoal 1 g/kg PO/NG	.....	.....	7 gm	10 gm	15 gm	20 gm	25 gm	30 gm	35 gm	40 gm	45 gm
Dextrose 50%, 0.5 g/kg IV/IO [Use D25W for infant]	3 mL [D25W]	7 mL [D25W]	14 mL [D25W]	20 mL [D25W]	15 mL	20 mL	25 mL	30 mL	35 mL	40 mL	45 mL
Diazepam (5 mg/mL) 0.1–0.3 mg/kg slow IV/IO	0.03–0.09 mL	0.07–0.21 mL	0.14–0.42 mL	0.2–0.6 mL	0.3–0.9 mL	0.4–1.2 mL	0.5–1.5 mL	0.6–1.8 mL	0.7–2.1 mL	0.8–2.4 mL	0.9–2.7 mL
Epinephrine 1:10,000 (0.1 mg/mL) 0.01 mg/kg IV/IO	0.15 mL	0.35 mL	0.7 mL	1 mL	1.5 mL	2 mL	2.5 mL	3 mL	3.5 mL	4 mL	4.5 mL
ET epinephrine 1:1000 (1 mg/mL) 0.1 mg/kg ET	0.15 mL	0.35 mL	0.7 mL	1 mL	1.5 mL	2 mL	2.5 mL	3 mL	3.5 mL	4 mL	4.5 mL
Fentanyl (50 mcg/mL) 2–4 mcg/kg	0.06–0.12 mL	0.14–0.28 mL	0.28–0.56 mL	0.4–0.8 mL	0.6–1.2 mL	0.8–1.6 mL	1–2 mL	1.2–2.4 mL	1.4–2.8 mL	1.6–3.2 mL	1.8–3.6 mL

Pediatric Medications (Cont'd)

	Preterm (1.5 kg)	Term (3.5 kg)	6 mo (7 kg)	1 y (10 kg)	3 y (15 kg)	6 y (20 kg)	8 y (25 kg)	10 y (30 kg)	11 y (35 kg)	12 y (40 kg)	14 y (45 kg)
Fosphenytoin (50 mg/mL) 20 mg/kg IV/IM	0.6 mL	1.4 mL	2.8 mL	4 mL	6 mL	8 mL	10 mL	12 mL	14 mL	16 mL	18 mL
Furosemide (10 mg/mL) 1 mg/kg slow IV/IO	0.15 mL	0.35 mL	0.7 mL	1 mL	1.5 mL	2 mL	2.5 mL	3 mL	3.5 mL	4 mL	4.5 mL
Lidocaine 1% (10 mg/mL) 1 mg/kg IV/IO	0.15 mL	0.35 mL	0.7 mL	1 mL	1.5 mL	2 mL	2.5 mL	3 mL	3.5 mL	4 mL	4.5 mL
Methylprednisolone (40 mg/mL) 2 mg/kg IV/IO/IM	0.08 mL	0.18 mL	0.35 mL	0.5 mL	0.75 mL	1 mL	1.25 mL	1.5 mL	1.75 mL	2 mL	2.25 mL
Morphine (1 mg/mL) 0.1 mg/kg IV/IO/IM	0.15 mL	0.35 mL	0.7 mL	1 mL	1.5 mL	2 mL	2.5 mL	3 mL	3.5 mL	4 mL	4.5 mL

Pediatric Medications (Cont'd)

	Preterm (1.5 kg)	Term (3.5 kg)	6 mo (7 kg)	1 y (10 kg)	3 y (15 kg)	6 y (20 kg)	8 y (25 kg)	10 y (30 kg)	11 y (35 kg)	12 y (40 kg)	14 y (45 kg)
Naloxone (0.4 mg/mL) 0.1 mg/kg IV/IO/IM/SQ	0.4 mL	0.9 mL	1.8 mL	2.5 mL	3.8 mL	5 mL	5 mL	5 mL	5 mL	5 mL	5 mL
Phenobarbital (65 mg/mL) 10–20 mg/kg slow IV/IO/IM	0.2– 0.5 mL	0.5– 1.1 mL	1.1– 2.2 mL	1.5– 3.1 mL	2.3– 4.6 mL	3.1– 6.2 mL	3.8– 7.7 mL	4.6– 9.2 mL	5.4– 10.8 mL	6.2– 12.3 mL	6.9– 13.8 mL
Sodium bicarbonate 8.4% 1m Eq/kg IV/IO [Neonatal: 4.2%]	3 mL [4.2%]	7 mL [4.2%]	7 mL	10 mL	15 mL	20 mL	25 mL	30 mL	35 mL	40 mL	45 mL
Vasopressin (cardiac arrest) (20 Units/mL) 0.4–1 Unit/kg	0.03– 0.08 mL	0.07– 0.18 mL	0.14– 0.35 mL	0.2– 0.5 mL	0.3– 0.75 mL	0.4– 1.0 mL	0.5– 1.25 mL	0.6– 1.5 mL	0.7– 1.75 mL	0.8– 2 mL	0.9– 2.3 mL

Pediatric Medications (Cont'd)

	Preterm (1.5 kg)	Term (3.5 kg)	6 mo (7 kg)	1 y (10 kg)	3 y (15 kg)	6 y (20 kg)	8 y (25 kg)	10 y (30 kg)	11 y (35 kg)	12 y (40 kg)	14 y (45 kg)
Etomidate (2 mg/mL) 0.3 mg/kg	0.2 mL	0.5 mL	1 mL	1.5 mL	2.3 mL	3 mL	3.8 mL	4.5 mL	5.3 mL	6 mL	6.8 mL
Midazolam (1 mg/mL) 0.1–0.3 mg/kg IV/IM	0.15– 0.45 mL	0.35– 1.05 mL	0.7– 2.1 mL	1–3 mL	1.5– 4.5 mL	2–6 mL	2.5– 7.5 mL	3– 9 mL	3.5– 10.5 mL	4– 12 mL	4.5– 13.5 mL
Succinylcholine (20 mg/mL) 1 mg/kg IV/IO [Infant: 2 mg/kg]	0.15 mL [2 mg/kg]	0.35 mL [2 mg/kg]	0.7 mL [2 mg/kg]	1 mL [2 mg/kg]	0.75 mL	1 mL	1.25 mL	1.5 mL	1.75 mL	2 mL	2.3 mL
Vecuronium (1 mg/mL) 0.1 mg/kg IV/IM	0.15 mL	0.35 mL	0.7 mL	1 mL	1.5 mL	2 mL	2.5 mL	3 mL	3.5 mL	4 mL	4.5 mL

Pediatric Medication Infusions

AMINOPHYLLINE (use 25 mg/mL solution) loading dose: 5 mg/kg (0.2 mL/kg in 100 mL D_5W for 20–30 minutes. Maintenance dose: 0.5–1 mg/kg/h. To mix: add 125 mg to 250 mL of D_5W (or 50 mg in 100 mL of D_5W). 1 microdrop/kg/minute of this solution = 0.5 mg/kg/h.

DOBUTAMINE (use 12.5 mg/mL solution) dose: 2–20 mcg/kg/minute. To mix: add 30 mg (2.4 mL) to 250 mL of D_5W. 1 microdrop/kg/minute of this solution = 2 mcg/kg/minute.

DOPAMINE (use 40 mg/mL solution) dose: 2–20 mcg/ kg/minute. To mix: add 75 mg (1.9 mL) to 250 mL of D_5W. 1 microdrop/kg/minute of this solution = 5 mcg/kg/minute.

EPINEPHRINE (use 1:1000 solution, 1 mg/mL) dose: 0.1–1 mcg/kg/minute. To mix: add 1.5 mg (1.5 mL) to 250 mL of D_5W. 1 microdrop/kg/minute of this solution = 0.1 mcg/kg/minute.

INAMRINONE (INOCOR) (use 5 mg/mL solution) loading dose: 0.75–1 mg/kg (0.15–0.2 mL/kg) over 10 minutes. Maintenance dose: 2–20 mcg/kg/min. To mix: add 30 mg (6 mL) to 250 mL of NS. 1 microdrop/kg/minute of this solution = 2 mcg/kg/minute.

LIDOCAINE DRIP (use 2% solution, 20 mg/mL) dose: 20–50 mcg/kg/minute. To mix: add 300 mg (15 mL) to 250 mL of D_5W. 1 microdrop/kg/minute of this solution = 20 mcg/kg/minute.

NITROPRUSSIDE (reconstitute 50 mg with 5 mL of D_5W) dose: 1–8 mcg/kg/minute. To mix: add 15 mg (1.5 mL) to 250 mL of D_5W. 1 microdrop/kg/minute of this solution = 0.5 mcg/kg/minute.

(For pediatric measurement purposes, this book is approximately: 11" when opened.)

Pediatric Trauma Score

	+2	+1	−1	Score
Patient size	>20 kg	10–20 kg	<10 kg	
Airway	Normal	Maintainable without invasive procedures	Not maintainable NEEDS invasive procedures	
CNS	Awake	Obtunded	Comatose	
Systolic BP (mm Hg) (or pulse)	>90 (radial)	50–90 (femoral)	<50 (no pulse)	
Open Wounds	None	Minor	Major or penetrating	
Skeletal	None	Closed Fx	Open/multiple fracture	
			Total =	

>12 = <1% mortality, minimal or no injury

≤8 = Critical injury; transport to Pediatric Trauma Center

4 = Predicts 50% mortality

<1 = Predicts >98% mortality

Intraosseous Infusion

NOTE: Most medications, blood products, or solutions that can be given IV can be given IO.

1. **Locate anterior medial (flat) surface of tibia, 2 cm below tibial tuberosity, below growth plate (other sites: distal anterior femur, medial malleolus, iliac crest).**
2. **Prep area with antiseptic solution.**
3. Advance IO needle at 90° angle through skin, fascia, and bone with constant pressure and twisting motion. Direct needle slightly away from epiphyseal plate.
4. **A popping sensation will occur** (and a lack of resistance) **when you have reached the marrow space.**
5. **Attempt to aspirate marrow** (you may or may not get marrow).
6. **Infuse fluids and check for infiltration.** Discontinue if site becomes infiltrated with fluid or medications; apply manual pressure to site followed by a pressure dressing.
7. Secure IO needle, tape in place, and attach to IV pump.



Medial malleolus

Pediatric Emergencies—General Assessment

Airway: Look for obstruction, drooling, trauma, edema.

Breathing: Retractions? Respiratory rate? Good air movement?

Circulation: Heart rate? Capillary refill?

Bradycardia means hypoxia. Ventilate!

Mental status: Is child acting normally?

Hx—Present illness/onset, intake, GI habits. Perform examination: Fever? Skin color? Other findings?

Children in shock need aggressive treatment.

- Ventilate. Reassess the airway, especially during transport.
- Check CBG, consider naloxone.
- IV fluid challenge (20 mL/kg—repeat if necessary.) Do not wait for BP to drop—hypotension is a late sign.
- Rapid transport to a pediatric intensive care facility.

Cautions—Not every seizure with fever is a febrile seizure.

- Consider meningitis, especially in children <2 yo (check for a rash that does not blanch).
- Early signs of sepsis are subtle: grunting respirations, temperature instability, hypoglycemia, poor feeding, etc.
- Consider toxins.

Croup

Hx—Cold or flu that develops into a **"barking cough"** at night. Relatively slow onset. Low fever.

Fluids, cool mist, nebulized racemic epinephrine. IM/IV steroids. Observe 6 hrs.

Cautions—Do not examine the upper airway.

Epiglottitis

Hx—Cold or flu that develops into a high fever at night. **Drooling**, **difficulty swallowing**, relatively rapid onset. Inspiratory stridor may be present in severe cases.

O_2, place patient in position of comfort, give IV antibiotics. If airway becomes completely obstructed, ventilate with BVM, prepare for ET intubation. Consider cricothyrotomy.

Cautions—Do not examine the upper airway. This may cause total airway obstruction. Some patients with epiglottitis deteriorate rapidly, requiring ventilation, intubation, or cricothyrotomy.

Croup versus Epiglottitis

	Croup	Epiglottitis
Age	<3 yo	2–6 yo
Sex	♂ > ♀	Both ♂ and ♀
Onset	Gradual (at night)	Relatively rapid
Infection	Viral	Bacterial (Hib)
Fever	Low grade	High fever
Breathing	Retractions	Tripod: sitting, leaning forward
Sounds	"Barking cough"	Inspiratory stridor
Voice	Hoarseness	Muffled voice
Other S/Sx		Drooling, painful swallowing
Treatment	Fluids, cool mist, nebulized Rx, steroids, racemic epinephrine. Observe 6 h.	O_2, position of comfort, IV antibiotics, prepare for intubation and cricothyrotomy, **do not examine airway.**

Since the advent of routine Hib immunizations, epiglottitis is more common in adults than children.

Emergency Medications

NOTE: This section is not a complete or comprehensive list of all medications. For complete information, please consult the drug product insert or an appropriate medical resource.

Abbreviations Used In This Section

Drug Type—for medications (white/italic text)
RX—Primary indications (black text)
Contra—Primary contraindications (red text)
Dosages*—(blue/bold text)
SE—Common side effects (green text)
Peds—*Pediatric doses* (black/italic text)
* ***NOTE:*** All medications, blood, and blood products can be given IO.

Activated Charcoal • *Adsorbent*

RX—Poisoning/overdose: 1 g/kg PO or by NG tube.
Mix with water to make a slurry.
Contra—Do not give before or together with ipecac. Contact poison center for more advice.
SE—Constipation, black stools, diarrhea.
Peds—*1 gm/kg PO/NG.*

Adenosine (Adenocard®) • *Antiarrhythmic*

RX—PSVT: 6 mg (2 mL) **IV rapidly over 1–3 seconds** (flush with 20 mL of NS bolus; elevate IV arm). If no effect in 1–2 minutes, **give 12 mg** over 1–3 seconds. **May repeat 12-mg** bolus one more time.

Contra—2nd° or 3rd° AV block, VT, sick sinus syndrome.

SE—Transient dysrhythmias, facial flushing, dyspnea, chest pressure, ↓ HR, ↓ BP, H/A, nausea, bronchospasm.

NOTE: Adenosine is blocked by theophyllines, but potentiated by dipyridamole and carbamazepine.

Peds*—0.1–0.2 mg/kg IV rapidly/IO up to 6 mg. May double dose if no effect (maximum, 12 mg per dose).*

Albuterol 0.5% (Ventolin®) • *Bronchodilator*

RX—Bronchospasm 2° COPD, asthma: 2.5 mg mixed in 3 mL of saline in nebulizer.

Contra—Tachydysrhythmias, HTN, hypokalemia.

SE—Tachydysrhythmias, anxiety, N/V.

Peds*—2.5 mg nebulized in 3 mL of saline.*

Alteplase (Activase tPA®) • *Fibrinolytic*

RX—Acute MI (<12 hours old): 100 mg IV over 3 hours.

Mix 100 mg in 100 mL of sterile water over 1 mg/mL.

Accelerated 1.5-hour infusion:

- Administer **15 mg IV bolus** (15 mL) **over 2 minutes,**
- Then give **0.75 mg/kg (maximum, 50 mg) over next 30 minutes,**
- Followed by **0.5 mg/kg (maximum, 35 mg) over next hour.**

RX—Acute ischemic stroke (<3 hours old): 0.9 mg/kg IV (maximum, 90 mg) **over 1 hour**.

- Give 10% of the total dose as an IV bolus over 1 minute,
- Then give the remaining 90% over the next hour.

RX—Acute pulmonary embolism: 100 mg IV over 2 hours.

Contra—Any within 3 months: stroke, AV malformation, neoplasm, recent trauma, aneurysm, recent surgery. Active internal bleeding within 21 days; major surgery or trauma within 14 days, aortic dissection, severe HTN, known bleeding disorders, prolonged CPR with thoracic trauma, LP within 7 days, arterial puncture at a noncompressible site. See *ACLS section, Stemi Fibrinolytic Protocol* for more contraindications.

SE—Reperfusion dysrhythmias, bleeding, shock.

Amiodarone (Cordarone®) • *Antiarrhythmic*

RX—Cardiac arrest VF/VT: 300 mg IVP. May repeat 150 mg IVP every 3–5 minutes (maximum, 2,200 mg/24 h).

RX—Stable wide complex tachycardia:

Rapid infusion:

- **150 mg IV over 10 minutes.** May repeat 150 mg IVP every 10 minutes (mix 150 mg in 100 mL; run at 10 mL/minute or **600 microdrops/minute**) (maximum, 2,200 mg/24 h).

Slow infusion:

- **360 mg IV over 6 hours** (mix 1000 mg in 500 mL; run at 30 mL/h or **30 microdrops/minute**).

Maintenance infusion:

- **540 mg IV over 18 hours** (mix 1000 mg in 500 mL; run at 15 mL/h or **15 microdrops/minute**).

Contra—Cardiogenic shock, bradycardia, 2° or 3° block; do not use with drugs that prolong QT interval.

SE—Vasodilation, ↓ BP, ↓ HR, AV block, hepatotoxicity, ↑ QTc, VF, VT, 40-day half-life.

Peds*—5 mg/kg IV/IO.*

Amyl Nitrite • *Cyanide Antidote*

RX—Cyanide poisoning: Administer vapors from crushed inhalant over 30 seconds, then administer oxygen over 30 seconds, repeat continuously. Consider following with sodium nitrite and sodium thiosulfate.

SE—Hypotension, H/A, nausea.

Aspirin (ASA) • *Antiplatelet*

RX—Suspected ACS: 160–325 mg PO (2–4 chewable children's aspirin tablets).

Contra—Allergy. Use caution with asthma, ulcers, GI bleeding, and other bleeding disorders.

SE—GI bleeding.

Atenolol (Tenormin®) • β-*Blocker*

RX—VT, VF, atrial fibrillation, atrial flutter, PSVT, HTN.

RX—Myocardial salvage for:

- Acute anterior AMI with HTN and tachycardia.
- Large MI <6 hours old.
- Refractory chest pain or tachycardia 2° excess sympathetic tone.

Give 5 mg IV slowly over 5 minutes. Wait 10 minutes. Then give another 5 mg IV slowly over 5 minutes. If tolerated well, in 10 minutes, give 50 mg PO and titrate to effect.

Contra—CHF, APE, bronchospasm, Hx asthma, ↓ HR, 2° or 3° heart block, cardiogenic shock, ↓ BP.

SE—↓ BP, CHF, bronchospasm, ↓ HR, chest pain, H/A, N/V.

NOTE: Calcium blockers may exacerbate adverse effects.

Atracurium (Tracrium®) • *Paralytic*

RX—Paralysis to facilitate ET intubation:

- **0.4–0.5 mg/kg IV bolus**; then either an infusion of 5–9 mcg/kg/minute (some patients may require higher dose) or boluses of 0.08–0.1 mg/kg every 15–25 minutes.

Contra—Do not mix with lactated Ringer's solution.

SE—↓ BP, ↓ HR, ↑ HR, dyspnea, wheezing, flushing, rash.

Atropine Sulfate • *Vagolytic*

RX—Symptomatic bradycardia: 0.5–1 mg IVP every 3 to 5 minutes; up to 0.04 mg/kg total dose, or 3 mg.

RX—Organophosphate or carbamate insecticide poisoning: 1–5 mg IV/IO, IM. Double doses every 5 minutes until SLUDGE goes away. **Start at 2 mg IV/IO, IM** for moderate signs and symptoms.

Peds*—0.05 mg/kg, every 5 minutes, until vital signs improve.*

RX—Asthma: 0.4–2 mg nebulized in 3 mL of saline.

RX—RSI (pediatric): *0.02 mg/kg (minimum, 0.1 mg).*

Contra—Tachycardia, glaucoma.

SE—Dilated pupils, ↑ HR, VT, VF, H/A, dry mouth.

Calcium Chloride 10% • *Electrolyte*

RX—Calcium blocker toxicity, hypocalcemia with tetany, hyperkalemia, hypermagnesemia: 500–1000 mg IV over 5–10 minutes.

Contra—VF, digitalis toxicity, hypercalcemia.

SE—↓ HR, ↓ BP, VF, coronary and cerebral artery spasm, N/V; extravasation causes necrosis.

NOTE: Precipitates with $NaHCO_3$ in IV bag/tubing.

Peds*—10–20 mg/kg (0.1–0.2 mL/kg) IV/IO slowly.*

Calcium Gluconate 10% • *Electrolyte*

RX—Calcium blocker OD; hypocalcemia; hyperkalemia; hypermagnesemia: 500–1000 mg IV slowly.

Contra—VF, digitalis toxicity, hypercalcemia.

SE—↓ HR, ↓ BP, VF, arterial spasm; infiltration causes necrosis.

NOTE: Precipitates with $NaHCO_3$ in IV bag/tubing.

Peds: *60–100 mg/kg (0.6–1 mL/kg) IV, IO slowly.*

Capoten (Captopril®) • *ACE/Inhibitor*

RX—Hypertension, CHF: 25 mg PO (wet tablet and place sublingual).

Contra—Hypersensitivity to ACE inhibitors, impaired renal function, hypotension, pregnancy.

SE—Angioedema, anaphylaxis, neutropenia, hypotension, coughing, rash.

Dalteparin (Fragmin®) *(See Enoxaparin [Lovenox])*

Dantrolene (Dantrium®) • *Muscle Relaxant*

RX—Malignant hyperthermia crisis: 1 mg/kg rapid IV; may repeat (**maximum dose, 10 mg/kg**).

CAUTION: Liver disease, ↓ pulmonary and cardiac function.

SE—Dizziness, malaise, diarrhea, H/A, confusion, tremor.

WARNING: Do not dilute in dextrose or electrolyte solution.

Dexmedetomidine (Precedex®) • *Sedative*

Rx—Procedural sedation. Half life: 6 minutes.
ICU sedation: Loading dose: 1 mcg/kg/over 10 minutes; maintenance infusion rate 0.2–0.7 mcg/kg/hour; maximum dose: 1.5 mcg/kg/hour.

Contra—Duration of infusion should not exceed 24 hours. Dosage adjustment in renal/hepatic impairment and elderly patients.

SE—↓ BP, ↓ HR, respiratory depression, AF, nausea, sinus arrest, dry mouth, ARDS, agitation.

Mix 200 mcg (2 mL) in 48 mL 0.9% NS for a concentration of 4 mcg/mL.

	Patient Weight (kg)					
Loading dose	**50**	**60**	**70**	**80**	**90**	**100**
1 mcg/kg (mcg) over 10 min (mL)	12.5	15	17.5	20	22.5	25
Maintenance rate						
0.2 mcg/kg/hour mL/hour	2.5	3	3.5	4	4.5	5
0.4 mcg/kg/hour mL/hour	5	6	7	8	9	10
0.7 mcg/kg/hour mL/hour	8.75	10.5	12.3	14	15.8	17.5
Maximum infusion rate						
1 mcg/kg/hour mL/hour	12.5	15	17.5	20	22.5	25

Microdrops/minute or mL/hour

Dexamethasone (Decadron®) • *Anti-inflammatory*

RX—Cerebral edema, anaphylaxis, COPD, spinal trauma: 10–100 mg IV.

Contra—Uncontrolled infections, TB, ulcers.

Peds—*0.25–1 mg/kg IV/IO, IM.*

Dextrose 50% • *Nutrient*

RX—Coma, hypoglycemia: 25 g (50 mL) **IV.**

SE—Tissue necrosis if extravasation occurs.

Contra—Intracerebral bleeding, hemorrhagic CVA.

Diazepam (Valium®) • *Anticonvulsant/Sedative*

RX—Status epilepticus: 5–10 mg IV slowly.

RX—Sedation: 5–15 mg IV slowly. (Rectal diazepam: 0.5 mg/kg via 2" rectal catheter. Flush with 2–3 mL of air after administration.)

Contra—Head injury, ↓ BP, acute narrow angle glaucoma.

SE—↓ Respirations, ↓ BP, drowsiness, venous irritation.

NOTE: Overdose may be reversed with flumazenil.

Digoxin (Lanoxin®) • *Antiarrhythmic*

RX—Atrial fibrillation/atrial flutter/PSVT: 0.5–1 mg IV over 5 minutes.

Contra—VF, VT; use caution in renal failure. If HR <60 beats/minute, withhold drug and obtain consultation.

Toxicity: VT, ↑ K^+, anorexia, N/V, fatigue, H/A, ↓ BP, pallor, visual disturbances, weakness, psychosis, seizures, diarrhea, mesenteric ischemia/infarction.

Quinidine, verapamil, amiodarone, propafenone, indomethacin, itraconazole, alprazolam: ↑ serum digoxin levels.

Peds*—Newborn to children 10 yo: 7–15 mcg/kg IV (loading dose, 15–30 mcg/kg IV).*

Digoxin Immune FAB (Digifab®) • *Antidote*

RX—Life-threatening digitalis toxicity:

- **Average dose: 3–5 vials** (120–200 mg).
- **Cardiac arrest dose: 20 vials** (800 mg).

[Dose in vials = (serum digoxin level) × (weight in kg) ÷ 100]

Each 40 mg vial binds approximately 0.6 mg of digoxin. Mix each vial in 4 mL of SW (10 mg/mL). Infuse through 0.22 micron filter.

Serum Digoxin Level	No. of Vials Needed per Patient Weight (kg)								
	10	20	40	50	60	70	80	90	100
1 ng/mL	0.1V	0.2V	0.5V	0.5V	0.5V	1V	1V	1V	1V
2 ng/mL	0.2V	0.4V	1V	1V	1V	2V	2V	2V	2V
4 ng/mL	0.4V	0.8V	2V	2V	3V	3V	3V	3V	3V
8 ng/mL	0.8V	1.6V	3V	4V	5V	5V	7V	7V	8V
12 ng/mL	1.2V	2.4V	5V	6V	7V	9V	10V	11V	12V
16 ng/mL	1.6V	3.2V	7V	8V	10V	11V	13V	14V	15V
20 ng/mL	2V	4V	8V	10V	12V	14V	16V	18V	20V

Contra—Use caution with impaired cardiac or renal function.

SE—Monitor TPR, BP, ECG and serum K^+ during and after administration.

NOTE: Serum digoxin levels increase during Digibind® therapy. Do not use them to guide ongoing therapy.

Diltiazem (Cardizem®) • *Antiarrhythmic*

RX—PSVT, rapid atrial fibrillation, atrial flutter:

- **0.25 mg/kg IV/IO slowly over 2 minutes**; if no effect in 15 minutes, **0.35 mg/kg IV/IO slowly over 2 minutes.**

	Bolus Doses by Patient Weight (kg)					
Diltiazem Bolus	**50**	**60**	**70**	**80**	**90**	**100**
1st dose: 0.25 mg/kg	2.5 mL	3 mL	3.5 mL	4 mL	4.5 mL	5 mL
2nd dose: 0.35 mg/kg	3.5 mL	4.2 mL	4.9 mL	5.6 mL	6.3 mL	7 mL

- **Drip:** 10–15 mg/hour (5 mg/hour for some patients).

For drip, mix 125 mg (25 mL) in 100 mL of IV solution (1 mg/mL) and run at:

Diltiazem Drip			
mg/hour	5mg	10mg	15mg
microdrops/minute	5 µgtt	10 µgtt	15 µgtt

Contra—2nd° or 3rd° block, ↓ BP, sick sinus syndrome, VT; WPW or short PR syndrome with atrial fibrillation or atrial flutter. Do not give with oral β-blockers. Do not give with furosemide in same IV line (flush line first).

SE—Hypotension, bradycardia, H/A, N/V, CHF, dizziness, weakness. Diltiazem ↑ serum digoxin levels.

Diphenhydramine (Benadryl®) • *Antihistamine*

RX—Allergic reaction, EPS: 25–50 mg IV or deep IM.

Contra—Asthma, pregnant, or lactating females.

SE—Sedation, blurred vision, anticholinergic effects.

Peds—*1–2 mg/kg IV/IO slowly or IM.*

Dobutamine (Dobutrex®) • *Inotrope*

RX—CHF: 2–20 mcg/kg/minute.

Mix 250 mg in 250 mL of D_5W (1 mg/mL) and run at:

	Patient Weight (kg)											
mcg/kg/min	2.5	5	10	20	30	40	50	60	70	80	90	100
2 mcg	*	*	1	2	4	5	6	7	8	10	11	12
5 mcg	*	1.5	3	6	9	12	15	18	21	24	27	30
10 mcg	1.5	3	6	12	18	24	30	36	42	48	54	60
15 mcg	2	5	9	18	27	36	45	54	63	72	81	90
20 mcg	3	6	12	24	36	48	60	72	84	96	108	120

Microdrops/minute or mL/hour

Contra—Tachydysrhythmias, hypertrophic cardiomyopathy, hypovolemia, poison-induced shock, shock with BP <100 mm Hg.

SE—Tachydysrhythmias, VT, VF, HTN, N/V, H/A, AMI.

****Peds***—*For pediatric infusion, see Pediatric section, Pediatric Medication Infusions.*

Dopamine (Intropin®) • *Inotrope*

- **RX—Hypotension; bradycardia: 2–20 mcg/kg/minute.**
- **Renal dose: 2–5 mcg/kg/minute.**
- **Inotropic dose: 5–10 mcg/kg/minute.**
- **Pressor dose: >10 mcg/kg/minute.**

Mix 400 mg in 250 mL of D_5W (1600 mcg/mL) and run at:

	Patient Weight (kg)											
mcg/kg/ min	2.5	5	10	20	30	40	50	60	70	80	90	100
2 mcg	*	*		1.5	2	3	4	5	5	6	7	8
5 mcg	*	1	2	4	6	8	9	11	13	15	17	19
10 mcg	1	2	4	8	11	15	19	23	26	30	34	38
15 mcg	1.4	3	6	11	17	23	28	34	39	45	51	56
20 mcg	2	4	8	15	23	30	38	45	53	60	68	75

Microdrops/minute or mL/hour

Contra—↑ HR, HTN. ↓ dose to 1/10th for patients taking MAOIs.

SE—Tachydysrhythmias, VT, VF, HTN, N/V, H/A, ischemia, AMI.

NOTE: Extravasation causes tissue necrosis; infiltrate tissues with phentolamine.

Droperidol (Inapsine®) • *Tranquilizer*

RX—Treatment of acute agitation: 0.625–10 mg IV slowly or IM; maintenance: 1.25–2.5 mg IV.

Contra—Renal or hepatic disease, prolonged QT interval.

SE—↓ BP, tachycardia, apnea, EPS; VT (torsades).

Peds*—2–12 yo: 0.1–0.15 mg/kg IV, IO, IM.*

Enalaprilat (Vasotec®) • *ACE Inhibitor/ Antihypertensive*

RX—HTN, AMI, CHF: 0.625–1.25 mg IV slowly (use lower dose if patient is taking diuretics). Repeat in 1 hour if no response, then 1.25 mg IV every 6 hours.

Contra—Renal impairment, pregnancy, lactation.

SE—H/A, dizziness, fatigue, ↓ LOC, dyspnea, ↓ BP, angina.

Enoxaparin (Lovenox®)

(See *Heparin—Low Molecular Weight*)

Epinephrine (Adrenalin®) • *Sympathomimetic*

RX—Allergic reaction: 0.3–0.5 mg (0.3–0.5 mL 1:1000) **SQ.**

***Peds**—0.01 mg/kg (0.01 mL/kg) SQ (maximum, 0.5 mg).*

RX—Anaphylaxis: 0.3–0.5 mg (3–5 mL 1:10,000) **IV.**

RX—Asthma: 0.3–0.5 mg (0.3–0.5 mL 1:1000) **SQ.**

RX—Bradycardia/hypotension: 2–10 mcg/minute IV.

Mix 1 mg epinephrine in 250 mL of D_5W:

Epinephrine Drip									
mcg/minute	2	3	4	5	6	7	8	9	10
microdrops/minute	30	45	60	75	90	105	120	135	150

RX—Cardiac arrest: 1 mg IV/IO every 3–5 minutes.

Alternative doses for cardiac arrest:

- **High dose: 0.2 mg/kg IVP every 3–5 minutes.**
- **Endotracheal dose: 2–2.5 mg every 3–5 minutes.**

Contra—Tachydysrhythmias, severe coronary artery disease.

SE—Tachydysrhythmias, VT, VF angina, HTN, N/V, anxiety.

Eptifibatide (Integrilin®)

(See Glycoprotein IIb/IIIa Inhibitors)

Esmolol (Brevibloc®) • *Antiarrhythmic*

RX—SVT, atrial fibrillation/flutter: 250*–500* mcg/kg for 1 minute. Start drip: 25–50 mcg/kg/minute over 4 minutes. May ↑ by 25–50 mcg/kg/minute (maximum, 300 mcg/kg/minute).

Mix 2.5 g of Esmolol in 250 mL of D_5W:

	Patient Weight (kg)								
mcg/kg/min	40	50	60	70	80	90	100	110	120
*250 mcg	60	75	90	105	120	135	150	165	180
*500 mcg	120	150	180	210	240	270	300	330	360
25 mcg	6	7.5	9	10.5	12	13.5	15	16.5	18
50 mcg	12	15	18	21	24	27	30	33	36
100 mcg	24	30	36	42	48	54	60	66	72
150 mcg	36	45	54	63	72	81	90	99	108
200 mcg	48	60	72	84	96	108	120	132	144
300 mcg	72	90	108	126	144	162	180	198	216

Microdrops/minute or mL/hour

Contra—↓ HR, 2° or 3° block, shock, CHF, COPD, asthma.

SE—↓ BP, ↓ HR, dizziness, cx pain, H/A, bronchospasm.

Calcium blockers exacerbate side effects.

Etomidate (Amidate®) • *Sedative/hypnotic*

RX—Sedation for RSI: 0.3 mg/kg IV slowly.

Contra—Patient <10 yo, pregnancy: do not use with ketamine, immunosuppression, sepsis, transplant patient.

SE—Apnea, bradycardia, ↓ BP, arrhythmias, N/V.

Fentanyl (Sublimaze®) • *Narcotic Analgesic*

RX—Analgesia: 50–100 mcg IM or IV slowly.

Contra—MAOI use, asthma, myasthenia gravis.

SE—↓ LOC, ↓ BP, N/V, bradycardia, apnea.

Fentanyl (Sublimaze), 2500 mcg/250 mL			
mcg/hour	mL/hour	mcg/hour	mL/hour
20	2	60	6
25	2.5	65	6.5
30	3	70	7
35	3.5	75	7.5
40	4	80	8
45	4.5	85	8.5
50	5	90	9
55	5.5	95	9.5

***Peds*—*1–3* y.o.: 2–3 mcg/kg IV every 1–4 hours prn;**
***3–12* y.o.: 1–2 mcg/kg IV every 1–4 hours prn;**
***>12* y.o.: 0.5–1 mcg/kg IV every 1–4 hours prn.**

Flumazenil (Romazicon®) • *Antidote*

RX—Benzodiazepine overdose: 0.2 mg IV/IO; repeat 0.3 mg IV/IO, then 0.5 mg IV/IO. If patient not responding after total dose of 5 mg, it is likely not a benzodiazepine overdose.

WARNING: May cause seizures in patients dependent on benzos, including cyclic antidepressant overdose.

SE—Seizure, N/V, agitation, withdrawal, ↑ ICP. Watch for resedation.

Peds*—0.01 mg/kg IV/IO, up to 0.2 mg single dose, repeat every minute, as needed (maximum total dose, 1 mg).*

Fosphenytoin (Cerebyx®) • *Anticonvulsant*

RX—Status epilepticus: 15–20 mg PE/kg IV, IM (phenytoin equivalents). Infuse at 100–150 mg PE/minute. Maintenance dose: 100 mg PE/kg every 8 hours.

Contra—Severe bradycardia, heart block, hypotension, porphyria, renal or hepatic disease.

SE—Tinnitus, dizziness, somnolence, H/A, paresthesia, pruritus.

Peds—*20 mg PE/kg IV, IO, IM.*

Furosemide (Lasix®) • *Diuretic*

RX—CHF with pulmonary edema, hypertensive crisis: 0.5–1 mg/kg IV/IO slowly (maximum, 2 mg/kg).

Contra—Dehydration, hypokalemia, hepatic coma, anuria.

SE—Hypokalemia, hypotension, dehydration.

Peds—*1 mg/kg IV/IO slowly.*

Glucagon • ↑ *Blood Glucose*

RX—Hypoglycemia: 0.5–1 mg (or Unit) IM, SQ, IV. Give carbohydrate, such as prompt meal, orange juice, or D50%, as soon as the patient is alert and can eat.

RX—β-blocker calcium channel OD: 5–10 mg IV over 1 minute, followed by drip: 1–10 mg/hour.

Peds—*0.5–1 mg IV/IO, IM, SQ.*

Glycoprotein IIb/IIIa inhibitors • *Antiplatelet*

Contra—Active bleeding; surgery or trauma <6 weeks, bleeding diathesis. Hx: Intracranial bleeding, CA, AV malformation, aneurysm, CVA <30 days. Aortic dissection, pericarditis, severe HTN, use of other glycoprotein IIb/IIIa inhibitor. Platelets <150,000/mL.

SE—Bleeding, allergy, dysrhythmias, thrombocytopenia.

Abciximab (ReoPro®)

Binds with platelets for 48 hours.

RX—ACS, unstable angina, PCI: 0.25 mg/kg IV. Then 0.125 mcg/kg/minute drip (maximum, 10 mcg/minute). Use with heparin. For drip: mix 9 mg (4.5 mL) in 250 mL of IV solution (36 mcg/mL) and run at:

	Patient Weight (kg)					
	50	60	70	80	90	100
Drip: 0.125 mcg/kg/minute	10.4	12.5	14.6	16.7	17	17

Microdrops/minute or mL/hour

Eptifibatide (Integrilin®)

Platelets recover in 4–8 hours.

RX—ACS or PCI: 180-mcg/kg IV bolus, followed by 2 mcg/kg/minute IV drip (use 1 mcg/kg/minute IV drip if creatinine is 2–4 mg/dL):

For drip: use premixed vial; 75 mg/100 mL (0.75 mg/mL):

	Patient Weight (kg)					
	50	60	70	80	90	100
Drip: 2 mcg/kg/minute	8 gtt	9.6 gtt	11 gtt	13 gtt	14.4 gtt	16 gtt

Microdrops/minute or mL/hour

Tirofiban (Aggrastat®)

Platelets recover in 4–8 hours.
RX—ACS: 0.4 mcg/kg/minute IV over 30 minutes; then 0.1 mcg/kg/minute for 12–24 hours, after PCI. Give half dose, if renal insufficiency (CrCl <30).
Mix 25 mg in 500 mL of D_5W or NS (50 mcg/mL) and run at:

	Patient Weight (kg)					
	50	60	70	80	90	100
Loading: 0.4 mcg/ kg/minute	24 gtt	29 gtt	34 gtt	38 gtt	43 gtt	48 gtt
Drip: 0.1 mcg/kg/minute	6 gtt	7 gtt	8 gtt	10 gtt	11 gtt	12 gtt

Microdrops/minute or mL/hour

Haloperidol (Haldol®) • *Antipsychotic/Neuroleptic*

RX—Schizophrenia, mania, psychosis: 2.5–5 mg IV or IM. May repeat up to 10 mg maximum.
Contra—Parkinson disease.

SE—Tardive dyskinesia, muscle contractions/tremors, neuroleptic malignant syndrome, depression, insomnia.
Peds*—Ages 3–12 yo: 0.05 IV mg/kg (maximum, 2.5 mg).*

Heparin—Unfractionated • *Anticoagulant*

RX—AMI, venous thrombosis: 60 International Units/kg IV (maximum, 4000 International Units bolus); **followed by 12 International Units/kg/hour IV drip** (maximum, 1000 International Units/hour). (Keep PTT 1.5–2 times normal—~50–70 seconds.)
Heparin Bolus

	Patient Weight (kg)					
	50	60	70	80	90	100
Bolus dose	3000U	3600U	4000U	4000U	4000U	4000U

Heparin Drip

For Heparin drip mix 25,000 International Units in 500 mL of D_5W (50 Units/mL) and run at:

	Patient Weight (kg)					
	50	60	70	80	90	100
IV drip: 12 International Units/kg/hour	12 gtt	14 gtt	17 gtt	19 gtt	20 gtt	20 gtt

Microdrops/minute or mL/hour

Contra—Thrombocytopenia, hemorrhagic stroke, aneurysm, severe HTN, bleeding (except DIC), platelets <100,000/mL.

SE—Bleeding, allergy, thrombocytopenia, itching.

Heparin antagonist: Protamine sulfate, 25 mg IV over 10 minutes (1 mg neutralizes approximately 100 International Units of heparin).

Peds—*Bolus: 50 Units/kg IV; drip: 10–20 Units/kg/hour.*

Heparin—Low Molecular Weight: Dalteparin (Fragmin®), Enoxaparin (Lovenox®)

RX—ACS, non–Q-wave MI:

Contra—Hypersensitivity, allergy to pork products, thrombocytopenia, bleeding.

SE—Bleeding, allergy, thrombocytopenia, itching.

Dalteparin (Fragmin®)

120 Intl Units/kg SQ twice daily for 2–8 days (give with ASA).

Enoxaparin (Lovenox®)

1 mg/kg SQ twice daily for 2–8 days (give with aspirin).

Ibutilide (Corvert®) • *Antiarrhythmic*

RX—Atrial fibrillation, atrial flutter: 1 mg IV slowly over 10 minutes. For patients <60 kg, give 0.01 mg/kg IV slowly over 10 minutes. May repeat in 10 minutes.

Contra—Do not give with Class 1a antiarrhythmics, such as disopyramide, quinidine, and procainamide, or Class III drugs, such as amiodarone and sotalol. Use caution with drugs that prolong the QT interval: phenothiazines, TCAs, and H_1 receptor antagonists.

SE—PVCs, VT, hypotension, heart block, nausea, H/A, tachycardia, QT prolongation, torsades, HTN.

Inamrinone (Inocor®) • *Inotrope/Vasodilator*

RX—Acute severe, refractory CHF: 0.75 mg/kg IV slowly over 2–3 minutes. May repeat after 30 minutes.

Maintenance infusion: 5–10 mcg/kg/minute (mix 300 mg in 240 mL of saline = 1 mg/mL).

	Patient Weight (kg)									
mcg/kg/ min	20	30	40	50	60	70	80	90	100	110
2 mcg	2.4	3.6	4.8	6	7.2	8.4	9.6	10.8	12	13.2
5 mcg	6	9	12	15	18	21	24	27	30	33
7.5 mcg	9	14	18	23	27	32	36	41	45	50
10 mcg	12	18	24	30	36	42	48	54	60	66
15 mcg	18	28	36	46	54	64	72	82	90	100

Microdrops per minute or mL/hour

Contra—Hypotension, severe cardiac valve disease. Do not mix with dextrose solutions or furosemide.

SE—Dysrhythmias, ↓ BP, N/V, fever, chest pain, myocardial ischemia, hepatotoxicity, thrombocytopenia, burning at infusion site.

Ipratropium 0.02% (Atrovent®) • *Bronchodilator*

RX—Bronchospasm, COPD, asthma: 0.5 mg (2.5 mL "fish") nebulized (with albuterol), **repeat once.**

Contra—Glaucoma

SE—Dry mouth, H/A, cough.

Peds*—0.25–0.5 mg.*

Ketamine (Ketalar®) • *Anesthetic/Analgesic*

RX—Anesthesia: 2 mg/kg IV every 10–20 minutes (or 10 mg/kg IM every 12–25 minutes).

Contra—Hypertensive crisis, allergy.

SE—HTN, respiratory depression, ↑ HR, hallucinations, delirium, confusion.

Ketorolac (Toradol®) • *NSAID Analgesic*

RX—Analgesia: 15–30 mg IV or 30–60 mg IM.

Contra—Kidney disease, labor, allergy to ASA or other NSAIDs. Use caution in kidney or liver disease, COPD, asthma, ulcers, bleeding disorders, warfarin use, elderly, diabetes.

SE—Nausea, GI bleeding, edema, HTN.

Labetalol (Normodyne®) • *Antihypertensive*

RX—Severe HTN (choose either bolus loading dose or infusion loading dose):

- **Bolus loading: 20 mg IV over 2 minutes.** May double dose every 10 minutes—40 mg, 80 mg, 160 mg, up to 300 mg total dose given.
- **Infusion loading dose:** Mix 200 mg (40 mL) in 160 mL of D_5W for a concentration of 1 mg/mL. **Start initial infusion at 2 mg/minute and titrate to BP.** May increase up to 6 mg/minute, up to 300 mg of total dose infused.

WARNING: Check BP every 5 minutes between doses.

Labetalol Drip (1 mg/mL)			
mg/minute	2 mg	4 mg	6 mg
microdrops/minute (mL/hour)	120 gtt	240 gtt	360 gtt

Contra—Asthma, cardiac failure, 2° or 3° block, severe bradycardia, cardiogenic shock, hypotension.

SE—Hypotension, nausea, dizziness, dyspnea.

Lidocaine 2% (Xylocaine®) • *Antiarrhythmic*

RX—**Cardiac arrest VT/VF: 1–1.5 mg/kg IVP**; may repeat with 0.5–0.75 mg/kg IVP every 5–10 minutes (maximum, 3 mg/kg). **ET dose: 2–4 mg/kg**.

RX—**VT with pulse: 1–1.5 mg/kg IVP**; then 0.5–0.75 mg/kg every 5–10 minutes up to 3 mg/kg. Start drip ASAP.

RX—**PVCs: 0.5–1.5 mg/kg IV**; then 0.5–1.5 mg/kg every 5–10 minutes up to 3 mg/kg. Start drip ASAP.

Drip: 1-4 mg/minute.

Mix 1 g in 250 mL D_5W and run at:

Lidocaine Drip (4 mg/mL)				
mg/minute	1 mg	2 mg	3 mg	4 mg
microdrops/minute	15 gtt	30 gtt	45 gtt	60 gtt

IM Dose: 300 mg IM (4 mg/kg) **of 10% solution.**

Contra—2° or 3° block, hypotension, Stokes-Adams syndrome. Reduce maintenance infusion by 50% if patient is >70 yo, has liver disease, or is in CHF or shock.

SE—Seizure, slurred speech, altered mental status, ↓ HR, N/V, tinnitus.

Lisinopril (Prinivil®) • *ACE Inhibitor/ Antihypertensive*

RX—Hypertension, AMI: 5–10 mg PO.

Contra—Renal impairment, angioedema, pregnancy, hypovolemia.

SE—H/A, dizziness, fatigue, nausea, ↓ BP.

Lorazepam (Ativan®) • *Anticonvulsant/Sedative*

RX—Status epilepticus: 2–4 mg slowly IV or IM.

RX—Anxiety, sedation: 0.05 mg/kg up to 4 mg IM.

Contra—Acute narrow-angle glaucoma, pregnancy.

SE—Apnea, N/V, drowsiness, restlessness, delirium, ↓ BP.

IMPORTANT: Be prepared to ventilate the patient.

NOTE: Overdose may be reversed with flumazenil.

Peds*—0.05–0.1 mg/kg IV/IO slowly or IM (maximum, 2 mg per dose).*

Magnesium Sulfate 10% • *Electrolyte*

RX—Cardiac arrest (torsades, hypomagnesemia): 1–2 g IVP (5–10 g may be required).

RX—Torsades with a pulse: 1–2 g IV over 5–60 minutes (mix in 50 mL of D_5W). Start drip of 0.5–1 g/hour and titrate.

RX—AMI: 1–2 g IV over 5–60 minutes (mix in 50 mL of D_5W). Start drip: 0.5–1 g/hour; run for up to 24 hours.

RX—Seizures 2° eclampsia: 1–4 g IV slowly.

Contra—Renal disease, heart block, hypermagnesemia.

SE—Hypotension, asystole, cardiac arrest, respiratory and CNS depression, flushing, sweating.

Peds*—25–50 mg/kg IV/IO for 10–20 minutes (maximum, 2 g).*

Mannitol 20% • *Osmotic Diuretic*

RX—Cerebral edema with ↑ ICP: 1–2 g/kg IV over 30 minutes. May repeat if no effect. Consider using hypertonic 3% saline instead of mannitol.

Contra—Renal impairment, severe dehydration, severe heart disease, pulmonary edema.

SE—CHF, acidosis, Sz, cx pain, ↑ HR, electrolyte depletion, dehydration, ↓ BP, coma, hyperosmolality, H/A.

Peds—*1 g/kg IV, IO slowly over 30 minutes.*

Meperidine (Demerol®) • *Analgesic*

RX—Analgesia: 50–100 mg IM, SQ, or slowly IV.

Contra—Patients receiving MAOIs.

SE—Sedation, apnea, hypotension, ↑ ICP, N/V, ↑ HR.

Peds—*1 mg/kg IV/IO, IM, SQ.*

IMPORTANT: Dilute before giving IV.

Metaproterenol 5% (ALUPENT®) • *Bronchodilator*

RX—Bronchospasm 2° to COPD, asthma: 10–15 mg (0.2–0.3 mL) **nebulized in 3 mL of saline.**

Contra—Tachydysrhythmias.

SE—↑ HR, anxiety, N/V.

Peds—*<2 y.o. = 0.1 mL; 2–9 y.o. = 0.2 mL; >9 y.o. = 0.3 mL.*

Methylprednisolone (Solu-Medrol®) • *Steroid*

RX—Asthma: 2 mg/kg IV.

RX—Spinal cord trauma: 30 mg/kg IV.

- **Initial bolus: 30 mg/kg** (reconstitute each vial with 10 mL of diluent and add to 50–100 mL of normal saline or 5% glucose).
- **Infusion: 5.4 mg/kg/h over 23 hours**, add to 500 or 1000 mL of 5% glucose). Start 45 minutes after bolus, infuse over 23 hours.

Contra—GI bleed, diabetes, seizures, systemic fungal infection.

SE—Euphoria, peptic ulcer, hyperglycemia, hypokalemia.

Peds—*Asthma: 2 mg/kg IV, IO, IM.*

Peds—*Spinal cord injury: 30 mg/kg IV, IO, IM.*

Metoprolol (Lopressor®) • β-*Blocker*

RX—Atrial fibrillation, atrial flutter, PSVT: 2.5–5 mg every 2–5 minutes (maximum, 15 mg).

RX—Myocardial infarction: 5 mg IV slowly over 2–5 minutes, repeated every 5 minutes to a total of 15 mg. Then 50 mg orally, every 6 hours for 48 hours, thereafter increased to 100 mg twice a day.

Contra—CHF, APE, bronchospasm, bradycardia, hypotension, cardiomegaly, thyrotoxicosis, Hx asthma.

SE—↓ BP, CHF, bronchospasm, ↓ HR, chest pain, H/A, N/V.

NOTE: Calcium blockers may potentiate adverse effects.

Midazolam (Versed®) • *Sedative*

RX—Seizures: 5–15 mg IV slowly, titrate to patient response. May repeat in 10–15 minutes.

RX—Sedation: 1–2 mg IV over 1–2 minutes, titrated to effect. May repeat in 2–5 minutes (maximum total dose, 5 mg).

Contra—Acute narrow angle glaucoma, shock.

SE—Respiratory depression, apnea, ↓ BP, ↓ HR, H/A, N/V.

May reverse with flumazenil IV.

Peds—Seizures: 0.15 mg/kg IV.

Peds—Sedation: >6-month-old child: 0.05–0.1 mg/kg IV slowly titrated to effect.

Milrinone (Primacor®) • *Inotrope/Vasodilator*

RX—CHF: loading dose: 50 mcg/kg over 10 minutes.

Use premixed bag or mix 20 mg (20 mL) in 80 mL of D_5W for 200 mcg/mL:

Milrinone Loading Dose

	Patient Weight (kg)					
	50	60	70	80	90	100
Loading dose: 50 mcg/kg	12.5 mL	15 mL	17.5 mL	20 mL	22.5 mL	25 mL
Microdrops/minute for 10 minutes	75 gtt	90 gtt	105 gtt	120 gtt	135 gtt	150 gtt

Maintenance: 0.375–0.75 mcg/kg/minute. Titrate infusion by 0.125 mcg/kg/minute every 15–30 minutes, as needed (maximum daily dose, 1.13 mg/kg/day).

Milrinone Maintenance Infusion

	Patient Weight (kg)					
	50	60	70	80	90	100
0.375 mcg/kg/minute	5.6	6.8	7.9	9	10.1	11.3
0.5 mcg/kg/minute	7.5	9	10.5	12	13.5	15
0.625 mcg/kg/minute	9.4	11.3	13.1	15	16.9	18.8
0.75 mcg/kg/minute	11.3	13.5	15.8	18	20.3	22.5

Microdrops/minute or mL/hour

Contra—Aortic or pulmonary valve disease, impaired renal/hepatic function, pregnancy, lactation. Reduce maintenance infusion for renal impairment.

SE—Hypotension, H/A, angina, dysrhythmias.

Peds*—50–75 mcg/kg IV, IO slowly. Drip: 0.5–0.75 mcg/kg/min.*

Morphine Sulfate • *Analgesic*

RX—Analgesia, pulmonary edema: 2–5 mg IV, IM, SQ. May repeat every 5 minutes up to 10 mg.

Contra—Head injury, exacerbated COPD, depressed respiratory drive, hypotension, acute abdomen, ↓ LOC, labor.

NOTE: Overdose may be reversed with naloxone.

SE—Respiratory depression, ↓ BP, ↓ LOC, N/V, ↓ HR.

Peds*—0.1–0.2 mg/kg IV/IO, IM, SQ.*

Nalmefene (Revex®) • *Opioid Antagonist*

RX—Narcotic overdose: 0.5 mg/70 kg IV, IM, SQ.

(Single IM dose, 1 mg.) Can give second IV dose in 2–5 minutes: **1 mg/70 kg IV**. Maximum total IV dose is 1.5 mg. (Give over 60 seconds in renal failure.)

Contra—Use extreme caution if narcotic dependence is suspected. May try 0.1 mg IV to test for withdrawal symptoms.

SE—Acute withdrawal signs and symptoms, N/V, tachycardia, HTN.

Naloxone (Narcan®) • *Narcotic Antagonist*

RX—Opiate overdose; coma: 0.4–2 mg IV/IO, IM, SQ, ET, IL. Repeat every 2–3 minutes, if needed, up to 10 mg total dose.

Contra—Do not use on a newborn if the mother is addicted to narcotics; may cause withdrawal.

SE—Withdrawal symptoms in the addicted patient, APE, N/V, ↓ BP, HTN, seizure.

Nesiritide (Natrecor®) • *Vasodilator*

RX—CHF: 2 mcg/kg IV, followed by an infusion of 0.01 mcg/kg/minute (0.1 mL/kg/hour).

Mix 1.5 mg in 250 mL of D_5W, or NS, for a concentration of 6 mcg/mL.

Bolus

Patient Weight (kg)	60	70	80	90	100	110
Bolus dose	20 mL	23 mL	27 mL	30 mL	33 mL	37 mL

Infusion

Patient Weight (kg)	60	70	80	90	100	110
IV drip: 0.1 mL/kg/hour	6 gtt	7 gtt	8 gtt	9 gtt	10 gtt	11 gtt

Microdrops/minute or mL/hour

Contra—Hypotension, cardiogenic shock, valvular stenosis, low cardiac filling pressures.

SE—Hypotension, azotemia, headache, anxiety, N/V, tachycardia, HTN.

Nicardipine (Cardene®) • *Calcium Blocker*

RX—HTN: 5–20 mg/1 hour. Mix 50 mg in 230 mL of D_5W for 200 mcg/mL. Run at 25–100 mL/hour.

Nicardipine Drip (200 mcg/mL)				
mg/hour	5 mg	10 mg	15 mg	20 mg
mL/hour	25 mL	50 mL	75 mL	100 mL

Contra—Hypotension, aortic stenosis. Caution with renal failure and hepatic dysfunction.

WARNING: Do not mix with RL.

SE—Edema, hypotension, dizziness, H/A, tachycardia, N/V, facial flushing, vein irritation: change IV site every 12 hours.

Nitrates • *Vasodilators*

RX—ACS, angina, hypertension, CHF with APE.

Contra—↓ BP; hypovolemia; intracranial bleeding; aortic stenosis; right ventricle infarction; severe bradycardia or tachycardia; recent use of Viagra, Cialis, or Levitra; ↑ ICP; tamponade.

SE—HA, hypotension, syncope, tachycardia, flushing.

Nitroglycerin Tablets (Nitrostat®)

0.3–0.4 mg SL, may repeat in 3–5 minutes (maximum, 3 doses). Ensure adequate BP.

Nitroglycerin Paste (Nitro-Bid®)

1–2 cm of paste (6–12 mg) **topically.**

Nitroglycerin Spray (Nitrolingual®)

1–2 sprays (0.4–0.8 mg) **under the tongue.**

WARNING: Do not shake container.

Nitroglycerin IV (Tridil)

10–20 mcg/minute. Increase by 5–10 mcg/minute every 5 minutes until desired effect. Mix 25 mg in 250 mL of D_5W (100 mcg/mL) and run at:

Dose (mcg/minute)	µgtt/minute (or mL/hour)	Dose (mcg/minute)	µgtt/minute (or mL/hour)
5 mcg =	3 µgtts/minute	110 mcg =	66 µgtts/minute
10 mcg =	6 µgtts/minute	120 mcg =	72 µgtts/minute
20 mcg =	12 µgtts/minute	130 mcg =	78 µgtts/minute
30 mcg =	18 µgtts/minute	140 mcg =	84 µgtts/minute
40 mcg =	24 µgtts/minute	150 mcg =	90 µgtts/minute
50 mcg =	30 µgtts/minute	160 mcg =	96 µgtts/minute
60 mcg =	36 µgtts/minute	170 mcg =	102 µgtts/minute
70 mcg =	42 µgtts/minute	180 mcg =	108 µgtts/minute
80 mcg =	48 µgtts/minute	190 mcg =	114 µgtts/minute
90 mcg =	54 µgtts/minute	200 mcg =	120 µgtts/minute
100 mcg =	60 µgtts/minute		

NOTE: Use glass IV bottle and non-PVC IV tubing.

Nitroprusside (Nipride®) • *Vasodilator*

RX—Hypertensive crisis, CHF: 0.1–10 mcg/kg/minute.

Start at 0.1 mcg/kg/minute and titrate every 3–5 minutes until desired effect.

Mix 50 mg in 250 mL of D_5W (200 mcg/mL) and run at:

mcg/kg/min	Patient Weight (kg)											
	2.5	5	10	20	30	40	50	60	70	80	90	100
0.1 mcg	*	*	0.3	0.6	0.9	1.2	1.5	1.8	2	2.4	2.8	3
0.5 mcg	*	*	1.5	3	4.5	6	7.5	9	10	12	14	15
1 mcg	*	1.5	3	6	9	12	15	18	21	24	27	30
2 mcg	1.5	3	6	12	18	24	30	36	42	48	54	60
4 mcg	3	6	12	24	36	48	60	72	84	96	108	120
8 mcg	6	12	24	48	72	96	120	144	168	192	216	240
10 mcg	7.5	15	30	60	90	120	150	180	210	240	270	300

Microdrops/minute or mL/hour

Contra—Compensatory HTN, hypotension, aortic stenosis, recent use (within 24 hours) of Viagra, Cialis, Levitra.

SE—Hypotension, tachycardia, thiocyanate toxicity, hypoxemia, CO_2 retention, H/A, N/V.

***NOTE:* Wrap IV bag in foil or other opaque cover.**

Peds—For pediatric infusions, see Pediatrics section, Pediatric Medication Infusions chart.*

Nitrous Oxide (Nitronox®) • *Analgesic*

RX—Analgesia/sedation: Give mask to patient and allow to self-administer.

Contra—↓ LOC, cyanosis, acute abdomen, shock, ↓ BP, pneumothorax, chest trauma, patients who need >50% O_2.

SE—Drowsiness, euphoria, apnea, N/V.

NOTE: Ventilate patient area during use.

Norepinephrine (Levophed®) • *Vasopressor*

RX—Cardiogenic, septic, or neurogenic shock:

0.5–30 mcg/minute. Mix 4 mg in 250 mL of D_5W (16 mcg/mL):

Dose (mcg/minute)	µgtt/minute (or mL/hour)	Dose (mcg/minute)	µgtt/minute (or mL/hour)
0.5 mcg =	2 µgtts/min.	12 mcg =	45 µgtts/min.
1 mcg =	4 µgtts/min.	13 mcg =	49 µgtts/min.
2 mcg =	8 µgtts/min.	14 mcg =	53 µgtts/min.
3 mcg =	11 µgtts/min.	15 mcg =	56 µgtts/min.
4 mcg =	15 µgtts/min.	16 mcg =	60 µgtts/min.
5 mcg =	19 µgtts/min.	17 mcg =	64 µgtts/min.
6 mcg =	23 µgtts/min.	18 mcg =	68 µgtts/min.
7 mcg =	26 µgtts/min.	19 mcg =	71 µgtts/min.
8 mcg =	30 µgtts/min.	20 mcg =	75 µgtts/min.
9 mcg =	34 µgtts/min.	25 mcg =	94 µgtts/min.
10 mcg =	38 µgtts/min.	30 mcg =	113 µgtts/min.
11 mcg =	41 µgtts/min.		

Contra—Hypovolemia (unless as a temporary measure until volume can be replaced); mesenteric or peripheral vascular thrombosis; ischemic heart disease.

SE—Tachydysrhythmias, VT, VF, HTN, N/V, AMI, ischemia; decreased renal perfusion; ↓ urine output.

NOTE: Extravasation causes tissue necrosis—give phentolamine (Regitine®) in the area of the infiltrate: 5–10 mg diluted in 10–15 mL of saline.

Peds*—0.1–2 mcg/kg/minute and titrate to effect.*

Ondansetron (Zofran®) • *Antinauseant*

RX—Nausea and vomiting: 4–8 mg IV slowly or IM or 8 mg PO.

Contra—Hypersensitivity to dolasetron, granisetron. May precipitate with bicarbonate.

SE—H/A, diarrhea, FV, dizziness, pain, seizure, EPS, QT prolongation.

Peds—*0.1 mg/kg slow IV/IO or IM (maximum, 4 mg).*

Oxytocin (Pitocin®) • ↑ *Uterine Contractions*

RX—Postpartum hemorrhage: 10 Units IM after placenta delivers or mix 10–40 Units in 1000 mL of balanced salt solution and titrate to control uterine bleeding.

Contra—Rule out multiple fetuses before administration.

SE—HTN, dysrhythmias, N/V, anaphylactic reaction.

Pancuronium (Pavulon®) • *Paralytic*

***RX*—Paralysis to facilitate tracheal intubation: 0.04–0.1 mg/kg IVP** (onset: 3 minutes; recovery: 30–45 minutes). Maintenance: 0.01 mg/kg every 60 minutes.

Contra—First trimester pregnancy; use reduced dose in newborns, myasthenia gravis.

SE—Apnea, prolonged paralysis, tachycardia, hypotension, hypertension.

Phenobarbital (Luminal®) • *Anticonvulsant*

RX—Status epilepticus: 10–20 mg/kg IV slowly or IM.

Contra—Porphyria, pulmonary, or hepatic dysfunction.

SE—Respiratory depression, hypotension, coma, N/V.

Peds—*10–20 mg/kg IV/IO slowly or IM. May repeat.*

Phenylephrine (Neosynephrine®) • *Pressor*

RX—PSVT: 0.5 mg IV in 20–30 seconds.

RX—Hypotension: 0.1–0.5 mg slowly every 10–15 minutes, as necessary, to obtain BP.

Maintenance infusion: 40–60 mcg/minute.

Mix 10 mg in 500 mL of D_5W (20 mcg/mL), and run at:

Phenylephrine Drip (20 mcg/mL)

mcg/minute	40 mcg	45 mcg	50 mcg	55 mcg	60 mcg
microdrops/minute (mL/hour)	120 gtt	135 gtt	150 gtt	165 gtt	180 gtt

Contra—Severe HTN, VT, mesenteric or peripheral ischemia. Use caution in patients with heart block, hyperthyroidism, bradycardia, severe arteriosclerosis.

SE—H/A, seizure, weakness, CVA, chest pain, bradycardia, HTN, dysrhythmias, restlessness, respiratory distress.

WARNING: If extravasation occurs: stop infusion; inject 5–10 mg of phentolamine SQ mixed in 10–15 mL of NS.

Potentiated by TCAs, atropine, oxytocics, and MAOIs. Antagonized by diuretics, α- and β-blockers, phenothiazines.

Phenytoin (Dilantin®) • *Anticonvulsant*

RX—Seizures: 10–20 mg/kg IV/IO slowly (maximum, 50 mg/minute).

Contra—Hypoglycemic seizures (give glucose), ↓ HR, 2nd° or 3rd° heart block, impaired hepatic or renal function, ↓ BP, hyperglycemia.

SE—Lethargy, H/A, irritability, restlessness, vertigo, hypotension, bradycardia.

WARNING: Caustic to veins. Use central line if possible. Flush line after each dose.

Peds*—15–20 mg/kg over 30 minutes (maximum, 1 g).*

Procainamide (Pronestyl®) • *Antiarrhythmic*

RX—Cardiac arrest VF/VT: 50-mg/minute IV drip (maximum dose, 17 mg/kg).

RX—Atrial fibrillation, VT, PSVT with WPW: 20 mg/minute IV until dysrhythmia is converted, hypotension or QRS/QT widening develops, or 17 mg/kg has been given.

Drip: 1–4 mg/minute. Mix 1 g in 250 mL of D_5W and run at:

Procainamide Drip				
mg/minute	1 mg	2 mg	3 mg	4 mg
microdrops/minute (mL/hour)	15 gtt	30 gtt	45 gtt	60 gtt

Contra—2° and 3° AV block, torsades de pointes, lupus, digitalis toxicity, myasthenia gravis.

SE—PR, QRS, and QT widening; AV block; cardiac arrest; hypotension; seizure; N/V.

Peds*—15 mg/kg IV, IO over 30–60 minutes.*

Peds Drip*—20–80 mcg/kg/minute.*

Promethazine (Phenergan®) • *Antiemetic/Sedative*

RX—Nausea and vomiting: 12.5–25 mg IV, IM, or 25 mg PO.

RX—Sedation: 25–50 mg IV, IM, PO.

Contra—<2 yo, allergy to antihistamines and phenothiazines, lactating females, MAOI use, COPD, HTN, pregnancy.

WARNING: May cause respiratory depression, severe tissue injury, gangrene.

SE—Drowsiness, viscous bronchial secretions, urinary urgency, EPS, confusion, ↑ HR, ↓ HR.

Peds—Nausea and vomiting: *0.25–1 mg/kg IV/IO, PO.*

Peds—Sedation: *0.5–1 mg/kg IV/IO.*

Propofol (Diprivan®) • *Anesthetic*

RX—Anesthesia: 2–2.5 mg/kg IV over 1 minute until onset of anesthesia.

Maintenance: 100–200 mcg/kg/minute.

Reduce dose for elderly, debilitated, or neurosurgical patient.

RX—Sedation: 100–150 mcg/kg/minute over 3–5 minutes, followed by maintenance infusion of 25–75 mcg/kg/minute.

RX—ICU sedation in the intubated patient: 5 mcg/kg/minute over at least 5 minutes. May increase by 5–10 mcg/kg/minute, every 5–10 minutes until desired level of sedation. Maintenance infusion: 5–50 mcg/kg/minute may be required. Maximum dose: 150 mcg/kg/minute (some may require higher dose).

Contra—↑ ICP, impaired cerebral circulation, lipid metabolism disorders, respiratory, renal, circulatory, or hepatic disease.

SE—Apnea, hypotension, N/V, pain at IV site, jerking, H/A, bradycardia, HTN, fever. Reduce dose if patient has received large doses of narcotics.

Use 100-mL vial (10 mg/mL) and run at:

mcg/kg/min	Patient Weight (kg)											
	35	40	45	50	55	60	65	70	75	80	90	100
5 mcg	1.05	1.2	1.35	1.5	1.65	1.8	1.95	2.1	2.25	2.4	2.7	3
10 mcg	2.1	2.4	2.7	3	3.3	3.6	3.9	4.2	4.5	4.8	5.4	6
20 mcg	4.2	4.8	5.4	6	6.6	7.2	7.8	8.4	9	9.6	10.8	12
30 mcg	6.3	7.2	8.1	9	9.9	10.8	11.7	12.6	13.5	14.4	16.2	18
40 mcg	8.4	9.6	10.8	12	13.2	14.4	15.6	16.8	18	19.2	21.6	24
50 mcg	10.5	12	13.5	15	16.5	18	19.5	21	22.5	24	27	30
60 mcg	12.6	14.4	16.2	18	19.8	21.6	23.4	25.2	27	28.8	32.4	36
70 mcg	14.7	16.8	18.9	21	23.1	25.2	27.3	29.4	31.5	33.6	37.8	42
80 mcg	16.8	19.2	21.6	24	26.4	28.8	31.2	33.6	36	38.4	43.2	48
90 mcg	18.9	21.6	24.3	27	29.7	32.4	35.1	37.8	40.5	43.2	48.6	54
100 mcg	21	24	27	30	33	36	39	42	45	48	54	60
150 mcg	31.5	36	40.5	45	49.5	54	58.5	63	67.5	72	81	90
200 mcg	42	48	54	60	66	72	78	84	90	96	108	120
250 mcg	52.5	60	67.5	75	82.5	90	97.5	105	113	120	135	150
300 mcg	63	72	81	90	99	108	117	126	135	144	162	180

Microdrops per minute or mL/hour

Peds—*1–2.5 mg/kg IV over 1–2 minutes.*
Drip: 100–300 mcg/kg/minute.

Propranolol (Inderal®) • β-*Blocker*

RX—VT, VF, atrial fibrillation, atrial flutter, PSVT, HTN

RX—Myocardial salvage for:

- Acute AMI with HTN and tachycardia.
- Large MI <6 hours old.
- Refractory cx pain or tachycardia 2° excess sympathetic tone.

1–3 mg IV slowly over 2–5 minutes. Repeat dose after 2 minutes to a total of 0.1 mg/kg. Then 180–320 mg/day orally in divided doses.

Contra—CHF, APE, bronchospasm, Hx asthma, COPD, bradycardia, 2nd° or 3rd° heart block, hypotension, cardiogenic shock.

SE—Hypotension, CHF, bronchospasm, bradycardia, dizziness, N/V.

WARNING: Use of calcium blockers may potentiate adverse effects.

Reteplase (Retavase®) • *Fibrinolytic*

RX—AMI (<12 hours old): 10 units IV over 2 minutes. Repeat dose in 30 minutes. (Flush with NS before and after.)

Contra—Active internal bleeding. Any within 3 months: stroke, AV malformation, neoplasm, aneurysm, recent trauma, recent surgery. Bleeding disorders, LP within 7 days. See *ACLS section, Stemi Fibrinolytic Protocol* for more contraindications.

SE—Dysrhythmias, bleeding, ↓ BP, shock, fever, allergy.

Rocuronium (Zemuron®) • *Paralytic*

RX—Paralysis to facilitate tracheal intubation:

- 0.6–1.2 mg/kg IVP (onset: 1–3 minutes; recovery: 30 minutes). Maintenance: 0.1–0.2 mg/kg every 12 minutes.

Contra—Caution if impaired hepatic or respiratory function or if severe obesity.

SE—Bronchospasm, dysrhythmias, hypotension, HTN.

Sodium Bicarbonate 8.4% • *Alkalinizer*

RX—Cardiac arrest with good ventilation: 1 mEq/kg IV (1 mL/kg) followed by 0.5 mEq/kg every 10 minutes.

RX—Hyperkalemia; OD of: tricyclic, phenobarbital, diphenhydramine, ASA, cocaine: 1 mEq/kg IV.

SE—Metabolic alkalosis, ↓ K^+, fluid overload.

IMPORTANT: Must provide ventilatory assistance to the patient after administration.

WARNING: Tissue necrosis may occur with extravasation.

Contra—Alkalosis, hypocalcemia, CHF, hypovolemia, hypernatremia.

Succinylcholine (Anectine®) • *Paralytic*

RX—Paralysis to facilitate ET intubation: 1–2 mg/kg IV/IO (onset: 1 minute; recovery: 4–6 minutes; IM dose: 3–4 mg/kg, maximum: 150 mg [onset: 2–3 minutes]).

Contra—Acute narrow angle glaucoma, penetrating eye injuries, burns >8 hours, massive crush injury.

SE—Apnea, malignant hyperthermia, dysrhythmias, ↓ HR, HTN, ↓ BP, cardiac arrest, ↑ K^+, ↑ intraocular pressure.

Peds*—Smaller children: 2 mg/kg; older children: 1 mg/kg.*

WARNING: Use caution in children and adolescents. May cause hyperkalemia, arrhythmias, cardiac arrest.

Tenecteplase (TNKase®) • *Fibrinolytic*

RX—AMI (<12 hours old): 30–50 mg IVP over 5 seconds.
For bolus: mix 50-mg vial in 10 mL of SW (5 mg/mL) and give:

	Patient Weight (kg)					
	50	60	70	80	90	100
Bolus dose	6 mL	7 mL	8 mL	9 mL	10 mL	10 mL

Contra—Previous hemorrhagic stroke; other CVA within 1 year, intracranial CA, internal bleeding, aortic dissection.

NOTE: See *ACLS section*, *Stemi Fibrinolytic Protocol* for more contraindications.

SE—Intracranial hemorrhage, dysrhythmias, bleeding, ↓ BP, shock, CHF.

Thiamine (Vitamin B1) • *Nutrient*

RX—Coadministration with $D_{50}W$ in patients suspected of malnutrition or thiamine deficiency (starvation, severe alcoholism): **100 mg slow IV or IM.**

Contra—Hypersensitivity.

SE—N/V, hypotension, rash, warm sensation, anaphylaxis.

Tirofiban (Aggrastat®)

(See Glycoprotein IIb/IIIa Inhibitors)

Vasopressin (Pitressin®) • *Vasopressor*

RX—Cardiac arrest (VF/VT): 40 Units IVP/IO.

Contra—Renal impairment, migraine, epilepsy, CHF, asthma, CAD, pregnancy, lactation.

SE—IV site pain, stomach cramps, N/V, angina, diarrhea, trembling, eructation, pallor, hives, wheezing, HTN.

Vecuronium (Norcuron®) • *Paralytic*

RX—Paralysis/ET intubation: 0.1 mg/kg IVP (onset: 2–3 minutes; recovery: 30–45 minutes). Maintenance: 0.01–0.05 mg/kg.

Contra—Newborns, neuromuscular disease.

SE—Apnea, weakness, bronchospasm.

Peds*—0.1 mg/kg IV/IO.*

Verapamil (Isoptin®) • *Antiarrhythmic*

RX—PSVT, rapid atrial fibrillation, atrial flutter:

- **2.5–5 mg IV slowly over 2–3 minutes.** May repeat with 5–10 mg every 15–30 minutes (maximum dose, 20 mg).

Drip: 1–10 mg/hour. Mix 100 mg in 250 mL of D_5W (0.4 mg/mL)

mg/hour	1	2	3	4	5	6	7	8	9	10
microdrops/minute	2.5	5	7.5	10	12.5	15	17.5	20	22.5	25

Contra—Wide-complex tachycardia, heart failure, impaired ventricular function, hypotension, shock, sick sinus syndrome, 2nd° or 3rd° block, AF with WPW or LGL, IV β-blocker use, children <1 yo

NOTE: Hypotension can be reversed with calcium chloride 500–1000 mg IV/IO every 5 minutes.

SE—Hypotension, AV block, bradycardia, asystole.

Peds*—0.1–0.3 mg/kg IV/IO slowly (maximum, 5 mg per initial dose). May give second dose in 30 minutes, up to 10 mg.*

IV Drip Y-Site Compatibility Chart

	Amiodarone	Cisatracurium	Dexmedetomidine	Diltiazem	Dobutamine	Dopamine	Epinephrine	Eptifibatide	Esmolol	Fentanyl	Heparin	Insulin	Isoproterenol	Labetalol	Lidocaine	Midazolam	Nicardipine	Nitroglycerin	Nitroprusside	Norepinephrine	Phenylephrine	Procainamide	Propofol	Vasopressin
Amiodarone			C																					
Cisatracurium			C		C	C	C		C	C	NO!	NO!	C	C	C	C		C	NO!	C	C	C		C
Diltiazem			C		C	C	C		C						C			C	C	C				
Dobutamine		C	C			C	C		C	C	NO!	NO!	C	C	C	C		C	C	C	C	C		C
Dopamine		C	C		C		C		C	C	C	NO!	C		C	C		C	C	C	C	C		C
Epinephrine		C			C	C			C	C	C	NO!	C		C	C		C	C	C	C	C		C
Eptifibatide					C						C				C	C		C						
Esmolol		C			C	C	C			C	NO!	C	C		C	C		C	C	C	C	C		C
Fentanyl		C	C		C	C	C		C		C	C	C		C	C		C	C	C	C	C	C	C
Heparin		NO!	C		NO!	C	C		NO!	C		C	C		C	C		C	C	C	C	C		C
Insulin		NO!			NO!	NO!	NO!		C	C	C				C	C		C	C	NO!	NO!	C		NO!
Isoproterenol		C	C		C	C	C		C	C	C	NO!			C	C		C	C	C	C	C		C

C = Compatible; No! = Incompatible data; Blank = No data

IV Drip Y-Site Compatibility Chart (Cont'd)

	Amiodarone	Cisatracurium	Dexmedetomidine	Diltiazem	Dobutamine	Dopamine	Epinephrine	Eptifibatide	Esmolol	Fentanyl	Heparin	Insulin	Isoproterenol	Labetalol	Lidocaine	Midazolam	Nicardipine	Nitroglycerin	Nitroprusside	Norepinephrine	Phenylephrine	Procainamide	Propofol	Vasopressin
Labetalol		C	C		C	C	C		C	C	C	**NO!**	C		C	C		C	C	C	C	C		C
Lidocaine			C		C	C	C		C	C	C	C	C	C		C		C	C	C	C	C		C
Midazolam		C	C		C	C	C		C	C	C	C	C	C	C			C	C	C	C	C	C	C
Nicardipine																								
Nitroglycerin		C	C		C	C	C		C	C	C	C	C	C	C	C			C	C	C	C		C
Nitroprusside		**NO!**			C	C	C		C	C	C	C	C	C	C	C		C		C	C	C		C
Norepinephrine		C	C		C	C	C		C	C	C	**NO!**	C	C	C	C		C	C		C	C		C
Phenylephrine		C	C		C	C	C		C	C	C	**NO!**	C	C	C	C		C	C	C		C		C
Procainamide		C	C		C	C	C		C	C	C	C	C	C	C	C		C	C	C	C			C
Propofol			C		C	C	C		C	C	C	C			C	C		C	C	C	**NO!**			
Vasopressin		C			C	C	C		C	C	C	**NO!**	C	C	C	C		C	C	C	C	C		

C = Compatible; No! = Incompatible data; Blank = No data

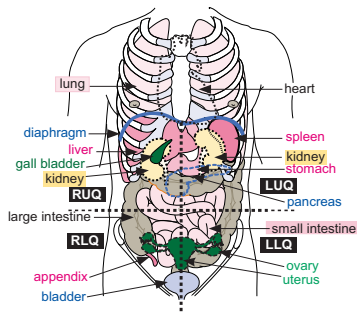
Medical Emergencies

Pain Assessment

5-Point Pain Scale

Appearance					
Pain Level	No Pain	Mild Pain	Moderate Pain	Severe Pain	Overwhelming Pain
Score	0	1	2–3	4	5

Abdominal



Abdominal Pain—Common Causes

- **Epigastric:** AMI, gastroenteritis, ulcer, esophageal disease, heartburn
- **LUQ:** gastritis, pancreatitis, AMI, pneumonia
- **LLQ:** ruptured ectopic pregnancy, ovarian cyst, PID, kidney stones, diverticulitis, enteritis, abdominal abscess
- **RLQ:** appendicitis, ruptured ectopic pregnancy, enteritis, diverticulitis, PID, ovarian cyst, kidney stones, abdominal abscess, strangulated hernia
- **RUQ:** gallstones, hepatitis, liver disease, pancreatitis, appendicitis, perforated duodenal ulcer, AMI, pneumonia
- **Midline:** bladder infection, aortic aneurysm, uterine disease, intestinal disease, early appendicitis
- **Diffuse pain:** pancreatitis, peritonitis, appendicitis, gastroenteritis, dissecting or rupturing aortic aneurysm, diabetes, ischemic bowel, sickle cell crisis

Abuse

Intentional Trauma

Remove patient from the environment. Report possible abuse to police, ED staff, and child welfare office. Call for police assistance if needed to remove patient from the scene. **Do not confront the alleged abuser.** Document your findings and any statements made by child, parent, or others. Provide medical care as needed. If sexual abuse, do not allow patient to wash.

Child Maltreatment

Hx—Any unusual MOI, or one that does not match the child's injury or illness. Parents may accuse the child of hurting himself/herself or may be vague or contradictory in providing Hx. There may be a delay in seeking medical care. **The child may not cling to mother.** Fx in any child <2 yo; **multiple injuries in various stages of healing** or on many parts of the body; obvious cigarette burns or wire marks; **malnutrition**; insect infestation, chronic skin infection, or unkempt patient.

Intimate Partner Violence

Repeated ED visits, with injuries becoming more severe with each visit; **minimizing the seriousness** or frequency of the injuries; seeking treatment ≥1 day after the injury; **injuries that are not likely to have been caused by the incident reported**; overprotective significant other who does not allow the patient to be alone with the healthcare professional; **fractures in different stages of healing** according to radiographic findings; history of child abuse to patient or partner.

Older Adult Maltreatment

Fractures or bruises at various stages of healing; unexplained bruises or cigarette burns on the torso or extremities; soft tissue injuries from signs of restraint use; head injuries; malnourishment, listlessness, dehydration unexplained; **poor hygiene**, inappropriate clothing; decubitus ulcer, **urine and feces on body and clothing**; unusual interaction between caregiver and patient.

Altered Mental Status

Present History: onset, witnessed, previous episode, trauma, fever, headache, chest pain, pill bottles, syringes, gas odor, street drugs?

Past History: alcoholism, seizures, diabetes, thyroid condition, renal condition, TIA or CVA, Alzheimer disease, COPD, psychiatric conditions, previous suicide attempt?

Medications: new medications, insulin or oral hypoglycemic, pill count and date filled, last oral intake?

Physical Examination:

- Vital signs
- General appearance, trauma, speech pattern, incontinent of urine
- Airway: gag reflex, tongue lacerations
- Breathing: lung sounds, respiratory rate, oxygen saturation
- Circulation: heart rate, regular/irregular
- Disability: moves all extremities, alert/oriented, blood glucose
- Eyes: deviation, pupils (size, reactive), nystagmus
- Skin: rashes, needle tracks, cutting, scars

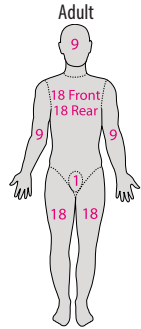
AEIOU TIPS Mnemonic for Coma			
A	Alcohol/Acidosis	**T**	Trauma/Tumors/Temp
E	Epilepsy	**I**	Infection
I	Insulin/Infection	**P**	Psychiatric/Poisoning
O	Opiates/Overdose	**S**	Subdural/Stroke
U	Uremia/Underdose		

Burn Chart

NOTE:

Count only second-degree and third-degree burns.





IV Fluid Resuscitation*

$$\frac{\text{Burn Area \%} \times \text{Pt. Wt. in Kg}}{4} = \text{mL/hour NS}$$

- Give this amount during the first 8 hours; give an equal amount during the next 16 hours.

Example: 20% burned area, in a patient weighing 70 kg:

$$\frac{20 \times 70}{4} = \frac{1400}{4} = 350 \text{ mL/h for 8 hours}^{\dagger}$$

- Then give 175 mL/h during the next 16 hours.†

*The patient in shock needs more aggressive IV fluid replacement and should be treated according to your shock protocol.

† Calculated from time of injury

NOTE: Major burns should be treated in a burn center, including ≥25% body surface; hands, feet, face, or perineum; electrical burns; inhalation burns; other injuries; or severe preexisting medical problems.

Childbirth

(See OB/GYN Emergencies section)

Hx—Timing of contractions? Intensity? Does mother have urge to push or to move bowels? Has amniotic sac ruptured? Medications—any medical problems? Vital signs, **check for:**

- **Vaginal bleeding** or amniotic fluid; note color of fluid
- **Crowning** (means imminent delivery)
- **Abnormal presentation:** foot, arm, breech, cord, shoulder
- **Transport immediately** if patient has had previous C-section, known multiple births, any abnormal presentation, excessive bleeding, or if pregnancy is not full-term and child will be premature.

Normal: Control delivery using gloved hand to guide head, suction mouth and nose, deliver, keep infant level with perineum, clamp and cut cord 8"–10" from infant, **warm and dry infant**, stimulate infant by drying with towel, **make sure respirations are adequate. Normal VS: pulse >120 beats/minute; respiratory rate >40 breaths/minute; BP 70 mm Hg; weight 3.5 kg.**

Give infant to mother to nurse at breast. Get Apgar scores at 1 and 5 minutes after birth.

If excessive postpartum bleeding, treat for shock, massage uterus to aid contraction, have mother nurse infant, *start large bore IV catheter and consider oxytocin IV infusion or IM administration*, transport without waiting for placenta to deliver. Bring it with you to the hospital. Obtain mother's vital signs.

Most births are normal—reassure the mother.

Apgar Scale					
	0 points	1 point	2 points	1 min	5 min
Heart rate	Absent	<100	>100		
Respiratory effort	Absent	Slow, irregular	Strong cry		
Muscle tone	Flaccid	Some flexibility	Active motion		
Irritability	No response	Some	Vigorous		
Color	Blue, pale	Body: pink Extremities: blue	Fully pink		
			TOTAL =		

Infants with scores of 7–10 usually only need supportive care. **A score of 4–6 indicates moderate depression. Infants with scores of ≤3 require aggressive resuscitation.**

Breech: Call OLMC. If head will not deliver, consider applying gentle pressure on mother's abdomen. If unsuccessful, insert two gloved fingers in vagina between baby's face and vaginal wall to create airway. **Rapid transport.**

Cord Presents: Call OLMC. Place mother in Trendelenburg and knee-chest position, hold pressure on infant's head to relieve pressure on cord, check pulses in cord, keep cord moist with saline dressing, administer O_2, **begin rapid transport,** *start IV catheter en route.*

Foot/leg presentation: Call OLMC. Support presenting part, place mother in Trendelenburg and knee-chest position, administer O_2, **begin rapid transport, *start IV catheter en route.***

Cord around neck: Unwrap cord from neck and deliver normally, keep face clear, suction mouth and nose.

Infant not breathing: Stimulate with dry towel, rub back, flick soles of feet with finger. **Suction mouth and nose. Ventilate with BVM and 100% O_2** (this will revive most infants). **Begin chest compressions if HR <60 bpm.** Ventilate with 100% O_2. If infant does not respond, contact OLMC and reassess quality of ventilation efforts, lung sounds (pneumothorax? obstruction?), check O_2 tube is connected. *Ventilate. Consider intubation; IV fluids, 10 mL/kg; glucose, 2 mL/kg D25%W; epinephrine, 0.01 mg/kg IV/IO or 0.1 mg/kg 1:1000 ET.*

Rapid transport. Failure to respond usually indicates hypoxia.

Choking

For Responsive Choking Adult or Child > 1 Year



1. If patient cannot talk or has stridor or cyanosis
2. **Perform Heimlich maneuver** (use chest thrusts if patient is pregnant or obese), repeat until successful or patient is unconscious
3. **Begin CPR/call for assistance**
4. Perform chest compressions (30:2)
5. Open airway—head-tilt/chin-lift (look and remove object, if visible)
6. Ventilate with 2 breaths, if unable . . .

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7. Reposition head; attempt to ventilate, if unable . . .
8. Perform chest compressions (30:2)
9. Repeat: inspect mouth → remove object → ventilate → chest compressions **until successful**
10. Consider laryngoscopy and removal of object by forceps, ET intubation, transtracheal ventilation, cricothyrotomy
11. **If patient resumes breathing, place in the recovery position**

For Unresponsive Choking Adult or Child



1. Determine unresponsiveness
2. Call for assistance
3. Position patient supine **on hard, flat surface**
4. Perform chest compressions (30:2)
5. Open airway—head-tilt/chin-lift (look and remove object if visible)
6. Attempt to ventilate, if unable . . .
7. Reposition head and chin; attempt to ventilate, if unable . . .
8. Perform chest compressions (30:2)
9. Repeat: inspect mouth → remove object → ventilate → chest compressions **until successful**
10. Consider laryngoscopy and removal of object by forceps, ET intubation, transtracheal ventilation, cricothyrotomy
11. **If patient resumes breathing, place in the recovery position**

For Choking Infant



1. Confirm obstruction: **if infant cannot make sounds, breathe, cry, or is cyanotic**
2. Invert infant on arm: **support head by cupping face in hand;** perform 5 back slaps and 5 chest thrusts **until object is expelled**
3. Repeat until successful
4. If patient becomes unconscious, start CPR
5. Perform chest compressions (30:2)
6. Open airway, and ventilate × 2—**if unable** . . .
7. Reposition head and chin; attempt to ventilate again
8. Perform chest compressions (30:2)
9. Consider laryngoscopy and removal of object by forceps, ET intubation, transtracheal ventilation, cricothyrotomy
10. **If patient resumes breathing, place in the recovery position**

Endocrine

Hyperglycemia

Hx—Slow onset, excessive urination, thirst. When was insulin last taken? Abdominal cramps, N&V? Mental status, high glucose level on strip test, skin signs, dehydration? Respirations: deep and rapid? Breath odor: acetone, fruity?

Secure airway; get vital signs, give O_2, large bore IV fluid challenge (isotonic crystalloid solution, NS or LR). Monitor ECG.

Hypoglycemia/Insulin Shock

Hx—Sudden onset, low blood glucose level on CBG test. Last insulin dose? Last meal? Mental status? Diaphoresis, H/A, blurred vision, dizziness, tachycardia, tremors, seizures?

Support ABCs, give O_2, take vital signs, start IV fluids. Give 50 mL $D_{50}W$ PO/NG/IV, if patient comatose (perform CBG before and after). Consider glucagon IM if IV not possible. **Do not give oral glucose if airway is compromised.**

Caution: Hypoglycemia can mimic a stroke or intoxication. Seizures, coma, and confusion are common symptoms. When in doubt about the diagnosis, give glucose IV or PO.

Hypoglycemia Versus Hyperglycemia

Also know as	Hypoglycemia (Insulin Shock)	Hyperglycemia (Ketoacidosis)
Incidence	More common	Less common
Blood sugar	Low (≤ 80 mg/dL)	High (≥180 mg/dL)
Onset	Rapid (minutes)	Gradual (days)
Skin	Moist, pale	Dry, warm
Respirations	Normal	Deep or rapid
Pulse	Normal or fast	Rapid, weak
Blood pressure	Normal or high	Normal or low
Breath odor	Normal	Ketone/acetone odor
Seizures	Common	Uncommon
Dehydration	No	Yes
Urine output	Normal	Excessive
Thirst	Normal	Very thirsty
Mental status	Disoriented, coma	Awake, weak, tired
Treatment	Glucose IV or PO	*IV fluids*, *insulin*, K^+
Recovery	Rapid (minutes)	Gradual (days)

NOTE: When in doubt about the diagnosis, give glucose IV or PO.

Head Injuries

Present History: onset sudden or gradual; any headache, hunger, confusion, tremors; skipped meals; recent illness; extreme exercise; usual blood glucose and when checked last

Past History: history diabetes, previous episodes hypoglycemia (how do these compare to present episode?)

Meds: prescribed and OTC medications, recent medication changes, adherence with medications, last oral intake?

Tips:

- Head injuries may be associated with spinal injuries.
- A treatable medical condition may have preceded the head injury (hypoglycemia, seizure, MI). Always consider precipitating cause.
- GCS

Glasgow Coma Scale

NOTE: A score of 3 is considered a coma; ≤8 requires intubation and airway management.

INFANT		Eye Opening		CHILD/ ADULT	
	4	Spontaneously	Spontaneously	4	
	3	To speech	To command	3	
	2	To pain	To pain	2	
_____	1	No response	No response	1	_____
		Best Verbal Response			
	5	Coos, babbles	Oriented	5	
	4	Irritable cries	Confused	4	
	3	Cries to pain	Inappropriate words	3	
	2	Moans, grunts	Incomprehensible	2	
_____	1	No response	No response	1	_____
		Best Motor Response			
	6	Spontaneous	Obeys commands	6	
	5	Localizes pain	Localizes pain	5	
	4	Withdraws from pain	Withdraws from pain	4	
	3	Flexion (decorticate)	Flexion (decorticate)	3	
	2	Extension (decerebrate)	Extension (decerebrate)	2	
_____	1	No response	No response	1	_____

_____ = Total (GCS score ≤8? → Intubate!) Total = _____

Infectious Diseases

Infectious Diseases of Special Concern		
Disease	**Spread by**	**Risk to you**
AIDS/HIV	IV/sex/blood products	↓ Immune function, pneumonias, cancer
Anthrax	*Cutaneous:* contact with skin lesions	Infection = 25% mortality, but much lower if treated
	Ingestion: eating contaminated meat	Infection = high mortality, unless treated with antibiotics
	Pulmonary: inhaled spores	Infection = 95% mortality, but much lower if treated
Clostridium difficile	Secretions/excretions Antibiotic use	Diarrhea, nausea, shock
Hepatitis A*	Fecal-oral	Acute hepatitis, jaundice
Hepatitis B*	IV/sex/birth/blood	Acute and chronic hepatitis, cirrhosis, liver CA
Hepatitis C	Blood	Chronic hepatitis, cirrhosis, liver CA
Hepatitis D	IV/sex/birth	Chronic liver disease
Hepatitis E	Fecal-oral	↑ Mortality to pregnant women and fetus
Herpes	Skin contact	Skin lesions, shingles
Influenza	Droplet/airborne	Fever, pneumonia, prostration
MRSA	Secretions/excretions Hand to nose	Ulceration, tissue destruction
Meningitis*	Nasal secretions	Low risk to rescuer
Norovirus	Fecal-oral Hand to mouth	Diarrhea, nausea, vomiting
Tuberculosis	Sputum/cough/ airborne	Cough, weight loss, lung damage

*Get vaccinated against Hepatitis A, B, and Meningitis A, C, W, Y.

Universal Precautions/BSI

- Wear gloves for all patient contacts and for all contacts with body fluids.
- Wash hands after patient contact.
- Place a mask on patients who are coughing or sneezing.
- Place a mask on yourself.
- Wear eye shields or goggles when body fluids may splash.
- Wear gowns when needed.
- Wear utility gloves for cleaning equipment.
- Do not recap, cut, or bend needles.

CAUTION: Report every exposure and get immediate treatment!

OB/GYN Emergencies

Continuous fetal monitoring is a standard of care and used throughout any OB/GYN emergency.

Abruptio placenta: Separation of placenta from uterine wall. Usually occurs >20 weeks gestation. S/S: painful third trimester vaginal bleeding (dark red); hypovolemic shock, hypotension, tachycardia, fetal distress; ↓ FHT, ↑ fundal height, pale skin, diaphoresis. Give O_2, prepare for emergency C-section.

Placenta previa: Placenta covers cervical os, can occur during second and third trimester. S/S: painless bright red bleeding, possible hypotension, tachycardia; *start IV fluid*, give O_2, patient may require C-section.

Preeclampsia/PIH: HTN; H/A; proteinuria; edema of hands, feet, face; and sacrum; weight gain; ↓ urine output; visual disturbances; possible ↑ liver enzymes, ↑ neurologic reflexes; ↑ chances of seizures; ↓ FHT. **Transport** quietly and gently. Monitor vital signs, give IV fluid; treat HTN with hydralazine or magnesium sulfate; OB consult; supportive care; **seizure precautions:** diazepam, phenytoin, calcium gluconate 10%.

Physiologic Changes During Pregnancy

BP	Pulse	CO	ECG	Resp.	ABG	Blood	Other
↓ ↑	↑	↑	T-wave changes lead II, avF, avL	↑ Resp rate ↑ Tidal volume ↑ Vital capacity ↓ Functional residual capacity	↑ pH ↑ PaO_2 ↓ $PaCO_2$ ↓ HCO_3 Respiratory alkalosis	↓ HCT ↑ WBC ↑ Fibrinogen ↑ Clotting factors Prone to DIC ↑ Blood volume	↑ N/V aspiration ↑ Injury: uterus, pelvis, bladder ↑ Falls ↑ Peripheral venous pressure

Maternal Cardiac Arrest

Activate maternal cardiac arrest team (document start time).

Consider and treat causes.*

Assess C-A-B, secure airway, give 100% O_2.

↓

Start CPR (hand placement higher on sternum than usual; use continuous cricoid pressure for ventilations).

Defibrillate as usual—See *ACLS section, Adult Cardiac Arrest.*

Give standard ACLS drugs and doses.

If receiving IV/IO magnesium, stop infusion and give 1 g calcium chloride 10% (10 mL) IV/IO *OR*
3 g of calcium gluconate 10% (30 mL) IV/IO.

Start IV fluids above the diaphragm—fluid bolus for hypovolemia.

Experienced provider for advanced airway placement:

- may require smaller ET tube
- monitor for airway bleeding
- **preoxygenate to prevent hypoxia**
- RSI with cricoid pressure preferred
- choose sedative that will minimize hypotension

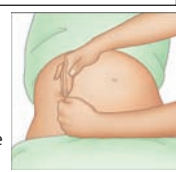
Monitor waveform capnography and CPR.

If $PEtCO_2$ <15, improve CPR.

↓

If obvious gravid uterus:

- Manually displace uterus to left to relieve aortocaval compression
- Remove any internal and external fetal monitors



manual left uterine displacement

- **Prepare for emergency C-section if no ROSC in 4 minutes**
- **Goal: delivery within 5 minutes of beginning CPR**
- Continue maternal resuscitation during and after C-section.

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*Special Causes	
■ Bleeding	■ Hyper/hypokalemia
■ DIC	■ Cardiac tamponade
■ PE	■ Tension pneumothorax
■ Amniotic fluid embolus	■ MI
■ Anesthetic effects	■ Cardiac disease
■ Uterine atony	■ Placenta abruption
■ HTN/eclampsia	■ Placenta previa
■ Acidosis	■ Sepsis
■ Hypovolemia	■ Hypothermia
■ Toxins	■ Hypoxia

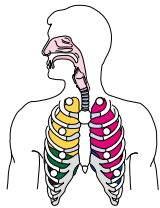
Organ and Tissue Donations

Tissue	Age, years	Restrictions
Bone	15–75	No IV drug use, no malignant tumors, no transmissible diseases
Eyes	Any age	No systemic infection, no IV drug use, no transmissible diseases
Heart valves	NB–55	No IV drug use, no malignant tumors, no transmissible disease
Organs	NB–70	Brain dead or potential to meet brain death, ventilator dependent
Skin	15–75	No IV drug use, no malignant tumors, no transmissible disease

NOTE: There are very few contraindications to donation.

Respiratory

Lung Sounds

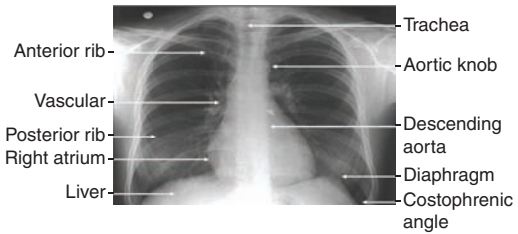


Move stethoscope from apices to bases, comparing sounds from left to right

Disease	Lung Sounds	Other S/Sx; Notes
Asthma	Symmetrical wheezing, crackles	Hx allergies, Hx asthma; patient takes bronchodilators
Bronchitis	Symmetrical wheezing, crackles	Recent respiratory tract infection; smoker
Congestive heart failure	Dependent crackles, wheezing	Pedal edema; Hx CHF; patient takes Lanoxin, Lasix
Emphysema (COPD)	Wheezing; Rhonchi	Smoker; barrel chest; patient takes theophylline, O_2
Foreign body obstruction	Stridor; wheezing	Heard best right over the site of the obstruction
Pneumonia	Scattered crackles; wheezing	Fever; brown, green, or yellow sputum; dehydration; patient takes antibiotics
Pneumothorax	Decreased on one side	Deviated trachea (late); hyperresonant percussion

NOTE: When in doubt about the cause of the patient's respiratory distress, give oxygen. Hyperventilation of unknown origin can be shock, sepsis, stroke, drug OD.

Chest Radiograph



- Check date, patient's name, position, and technical quality of radiograph.
- Review soft tissue structures, skeletal structures, chest wall, and companion shadow.
- Account for all tubes, wires, electrodes, etc.
- Check bronchovascular markings.
- Check borders of the heart, contours of the mediastinum, and pleural space.
- Review the ribs and spine.
- Review abdomen for organ size, bowel gas, free air, and abnormal calcifications.
- Review soft tissue and spine of neck.
- Review spine and rib cage, check alignment, and check disc space narrowing.
- Review mediastinum: overall size and shape, tracheal position, and margins (SVC, ascending aorta, main pulmonary artery, left ventricle).
- Review lines and stripes, paratracheal paraspinal, paraesophageal, azygoesophageal, and para-aortic.
- Review retrosternal clear space.

Trauma

(See also Trauma section)

IV Gauge and Estimated Hourly Flow Rate

Catheter Gauge	Catheter Length, in	Flow Rate, mL/hours
24	0.56	1500
22	1	2100
20	1	3800
20	1.16	3600
18	1.16	6500
18	1.88	5700
16	1.16	13,200
16	1.7	12,300
14	1.75	19,600

IV Fluid Rates in Drops/Minute

Drip Set	10	12	15	20	60*
30 mL/h	5	6	8	10	30
60 mL/h	10	12	15	20	60
100 mL/h	17	20	25	33	100
200 mL/h	33	40	50	67	200
300 mL/h	50	60	75	100	300
400 mL/h	67	80	100	133	400
500 mL/h	83	100	125	167	500
1000 mL/h	167	200	250	333	1000

***Standard "microdrip" IV tubing has 60 gtt/mL.**
A normal TKO or KVO rate is 30–60 mL/h.
(Note that with a microdrip IV set, mL/h = drops/minute.)

Pediatric Trauma Score				
	+2	+1	−1	Score
Patient size	>20 kg	10–20 kg	<10 kg	
Airway	Normal	Maintainable without invasive procedures	Not maintainable NEEDS invasive procedures	
CNS	Awake	Obtunded	Comatose	
Systolic BP (or pulse)	>90 (radial)	50–90 (femoral)	<50 mm Hg (no pulse)	
Open wounds	None	Minor	Major or penetrating	
Skeletal	None	Closed fracture	Open/multiple fracture	
			Total =	
>12 = <1% mortality, minimal or no injury ≤8 = Critical injury: transport to Pediatric Trauma Center 4 = Predicts 50% mortality <1 = Predicts >98% mortality				

- It may also be worthwhile to have an adult trauma score calculator.

Trauma

Trauma Triage Chart

(See also, "Trauma Cardiac Arrest" in ACLS section)

Measure vital signs and level of consciousness

Glasgow Coma Scale	< 14 or
Systolic blood pressure	< 90 or
Respiratory rate	< 10 or > 29 (< 20 in infant < one year)

YES

Take to a trauma center. These patients should be transported preferentially to the highest level of care within the trauma system.

NO

Assess anatomy of injury

- All penetrating injuries to head, neck, torso, and extremities proximal to elbow and knee
- Flail chest
- Two or more proximal long-bone fractures
- Crushed, degloved, or mangled extremity
- Amputation proximal to wrist and ankle
- Pelvic fractures
- Open or depressed skull fracture
- Paralysis

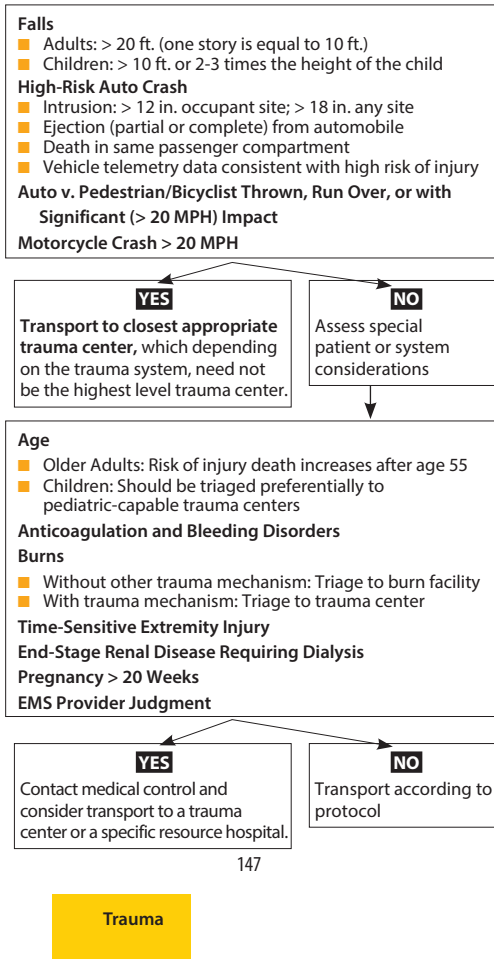
YES

Take to a trauma center. These patients should be transported preferentially to the highest level of care within the trauma system.

NO

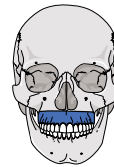
Assess mechanism of injury and evidence of high-energy impact

Go to next page


Falls
Adults: > 20 ft. (one story is equal to 10 ft.)
Children: > 10 ft. or 2-3 times the height of the child
High-Risk Auto Crash
Intrusion: > 12 in. occupant site; > 18 in. any site
Ejection (partial or complete) from automobile
Death in same passenger compartment
Vehicle telemetry data consistent with high risk of injury
Auto v. Pedestrian/Bicyclist Thrown, Run Over, or with Significant (> 20 MPH) Impact
Motorcycle Crash > 20 MPH
YES
Transport to closest appropriate trauma center, which depending on the trauma system, need not be the highest level trauma center.
NO
Assess special patient or system considerations
Age
Older Adults: Risk of injury death increases after age 55
Children: Should be triaged preferentially to pediatric-capable trauma centers
Anticoagulation and Bleeding Disorders
Burns
Without other trauma mechanism: Triage to burn facility
With trauma mechanism: Triage to trauma center
Time-Sensitive Extremity Injury
End-Stage Renal Disease Requiring Dialysis
Pregnancy > 20 Weeks
EMS Provider Judgment
YES
Contact medical control and consider transport to a trauma center or a specific resource hospital.
NO
Transport according to protocol

Maxillary Fractures

Le Fort I: A horizontal maxillary fracture above the level of the teeth, resulting in separation of the teeth from the rest of the maxilla.



S/S for Le Fort I:

- Slight swelling
- Maxilla moves independently of the rest of the face
- Possible malocclusion

Le Fort II: A pyramidal maxillary fracture involving the middle facial area. The apex of the pyramid crosses the bridge of the nose, and the base of the fracture extends above the level of the upper teeth. A CSF leak is possible.



S/S for Le Fort II:

- Massive edema, malocclusion
- Nose is obviously fractured
- Cerebrospinal fluid leak possible

Le Fort III: Complete craniofacial separation. Frequently associated with a fx mandible.



S/S for Le Fort III:

- Massive edema
- Mobility of zygoma, orbital rim
- Anesthesia of cheek possible
- Diplopia (without blowout fx of orbit)
- Depression of cheek bone
- Open bite
- Cerebrospinal fluid leak possible

Poisons and Overdoses

NOTE: This section is not a comprehensive list of all drugs, poisons, adverse effects, cautions, or treatments. Before administering any treatments, consult your poison center, the product label or insert, your protocols, and/or your online medical resource.

Abbreviations Used In This Section

AKA—Common brands,®™ and "street names"

SE—Common toxic side effects (green text)

Cautions—Primary cautions (red text)

RX—Prehospital care (blue text)

Acetaminophen • *Analgesic*

AKA—Tylenol®, APAP.

SE—There may be no symptoms, but acetaminophen is toxic to the liver. N/V, anorexia, RUQ pain, pallor, diaphoresis.

RX—ABCs, O_2, IV, ECG, fluids for hypotension. Activated charcoal 1 g/kg PO or by NG tube, if given within 4 hours of ingestion. Acetylcysteine may be given in the ED.

Stages of Acute Acetaminophen Overdose		
Stage	Post Ingestion Time	Symptoms
1	0–24 hours	N/V, anorexia
2	24–72 hours	RUQ pain, ALT, AST, INR, Bilirubin begins to elevate
3	72–96 hours	Peaking ALT, AST, INR, bilirubin, vomiting. Renal failure and pancreatitis may be present
4	> 5 days	Resolve hepatoxicity or progress to multiple organ failure, may be fatal

Acids • *Caustics*

AKA—Rust remover, metal polish.

SE—Pain, GI tract chemical burns, lip burns, vomiting.

RX—Give milk or water, milk of magnesia, egg white, prevent aspiration. Transport patient in sitting position, if possible.

Cautions—Do not induce vomiting.

Alkalis • *Caustics*

AKA—Drano®, drain and oven cleaners, bleach.

SE—Pain, GI tract chemical burns, lip burns, vomiting.

RX—Give milk or water, prevent aspiration. Transport patient in sitting position, if possible.

Cautions—Do not induce vomiting.

Amphetamines/Stimulants • *Stimulant*

AKA—Methamphetamine, "speed," "crank."

SE—Anxiety, ↑ HR, arrhythmias, diaphoresis, seizure, N/V, H/A, CVA, HTN, hyperthermia, dilated pupils, psychosis, suicidal.

RX—ABCs, O_2, ECG, IV fluids for hypotension. Activated charcoal 50–100 g orally. Maintain normal body temperature. Benzodiazepine as adjunct.

Cautions—Protect yourself against the violent patient.

Antidepressants (TCA) • *Mood Elevators*

AKA—Norpramin®, Sinequan®, amitriptyline, Elavil®.

SE—Hypotension, PVCs, cardiac arrhythmias, QRS complex widening, seizures, coma, death, torsades de pointe.

RX—ABCs, O_2, IV, ECG, IV fluids, 1 mEq/kg $NaHCO_3$ IV, intubate and ventilate.

Cautions—Onset of coma and seizures can be sudden. Do not induce vomiting.

Aspirin • *Analgesic*

AKA—Bayer®, ASA, salicylates.

SE—GI bleeding, N/V, LUQ pain, pallor, diaphoresis, shock, tinnitus, ↑ RR.

RX—ABCs, O_2, IV, ECG, fluids for hypotension. Activated charcoal 1 g/kg PO.

Barbiturates/Sedatives • *Hypnotic*

AKA—Phenobarbital, "barbs," "downers."

SE—Weakness, drowsiness, respiratory depression, apnea, coma, hypotension, bradycardia, hypothermia, APE, death.

RX—ABCs, O_2, ventilate, IV fluids for hypotension.

Cautions—Protect the patient's airway.

Benzodiazepines • *Sedative/Hypnotics*

AKA—Valium®, Xanax®, diazepam, midazolam.

SE—Sedation, weakness, dizziness, tachycardia, hypotension, hypothermia, (↓ respirations with IV use).

RX—ABCs, monitor VS; flumazenil IV if no seizure history.

Cautions—Coma usually means some other substance or cause is also involved. OD is almost always in combination with other drugs. Protect the patient's airway.

Carbon Monoxide • *Odorless Toxic Gas*

Causes—Any source of incomplete combustion, such as car exhaust, fire suppression, and stoves.

SE—H/A, dizziness, DOE, fatigue, tachycardia, visual disturbances, hallucinations, cherry red skin color, ↓ respirations, N/V, cyanosis, altered mental status, coma, blindness, hearing loss, convulsions.

RX—Remove patient from toxic environment, ABCs, 100% O_2 (check blood glucose), transport. Hyperbaric treatment in severe cases.

Cautions—O_2 saturation monitor can give false high reading with CO exposure.

WARNING: Protect yourself from exposure!

Cocaine • *Stimulant/Anesthetic*

AKA—"Coke," "snow," "flake," "crack."

SE—H/A, N/V, ↓ RR, agitation, ↑ HR, arrhythmias, chest pain, vasoconstriction, AMI, HTN, seizure, vertigo, euphoria, paranoia, vomiting, hyperthermia, tremors, paralysis, coma, dilated pupils, bradycardia, death, APE with IV use.

RX—ABCs, O_2, IV, ET intubation. Consider benzodiazepine for seizures, lidocaine for PVCs, nitrates, and phentolamine

for AMI. Control HTN. Monitor VS and core temperature: cool patient if hyperthermic. Minimize sensory stimulation. Consider activated charcoal for oral cocaine ingestion.

Cautions—Protect yourself against the violent patient. A "speedball" is cocaine and heroin. Do not give β-blockers.

Ecstasy/MDMA • *Stimulant/Hallucinogen*

AKA—"XTC," "X," "love drug," "MDMA," "Empathy."

SE—Euphoria, hallucinations, agitation, teeth grinding (use of pacifiers), nausea, hyperthermia, sweating, HTN, tachycardia, renal and heart failure, dilated pupils, seizures, rhabdomyolysis, DIC, APE, CVA, coma, electrolyte imbalance.

RX—ABCs, O_2, VS, ECG, IV, cool patient if hyperthermic, intubate if unconscious, benzodiazepine for seizures and bicarbonate for myoglobinuria.

Cautions—Do not give β-blockers.

GHB (Gama hydroxybutyrate) • *Depressant*

AKA—"G," "easy lay," "liquid X," "Blue Nitro."

SE—Euphoria, sedation, dizziness, myoclonic jerking, N/V, H/A, coma, bradycardia, apnea.

RX—ABCs, manage airway, ventilate.

Cautions—A common "date rape" drug.

Hallucinogens • *Alter Perception*

AKA—LSD, psilocybin mushrooms.

SE—Anxiety, hallucinations, panic, disorientation, N/V.

RX—Calm and reassure the patient. Be supportive.

Cautions—Watch for violent and unexpected behavior.

Hydrocarbons • *Fuels, Oils*

AKA—Gasoline, oil, petroleum products.

SE—Breath odor, SOB, seizures, acute pulmonary edema, coma, bronchospasm.

RX—ABCs, O_2, gastric lavage.

Cautions—Do not induce vomiting.

Opiates • *Narcotic Analgesic*

AKA—Dilaudid®, heroin, morphine, codeine, fentanyl.

SE—↓ Respirations, apnea, ↓ BP, coma, bradycardia, pinpoint pupils, vomiting, diaphoresis.

RX—ABCs, O_2, ventilate, intubate, IV fluids for hypotension, naloxone 2 mg IV/IO, IM, SQ, ET, IL.

Cautions—Consider other concurrent overdoses.

Organophosphates • *Insecticides*

AKA—Malathion®, Diazinon®.

SE—SLUDGE (Salivation, Lacrimation, Urination, Defecation, G-I, Emesis), pinpoint pupils, weakness, bradycardia, sweating, N/V, diarrhea, dyspnea.

RX—Decontaminate patient, ABCs. O_2, Atropine 1–5 mg IV/IO, IM. Double doses every 5 minutes until SLUDGE goes away. Start at 2 mg IV/IO, IM for moderate signs and symptoms.

Peds—*0.05 mg/kg, every 5 minutes, until vital signs improve.*

Cautions—Protect yourself first! Do not become contaminated.

PCP—Phencyclidine • *Tranquilizer*

AKA—"Peace Pill," "angel dust," "horse tranquilizer."

SE—Nystagmus, disorientation, HTN, hallucinations, catatonia, sedation, paralysis, stupor, mania, tachycardia, dilated pupils, status epilepticus.

RX—ABCs, O_2, vitals, IV, ECG. Consider benzodiazepines or antipsychotics (eg, haloperidol)

Cautions—Protect yourself against the violent patient. Examine patient for trauma that may have occurred due to anesthetic effect of PCP.

Tranquilizers (major) • *Antipsychotic*

AKA—Haldol®, Navane®, Thorazine®, Compazine®.

SE—EPS, dystonias, painful muscle spasms, respiratory depression, hypotension, torsades de pointes.

RX—Diphenhydramine 25–50 mg IV or deep IM for EPS. ABCs, O_2, vitals, ECG. Consider activated charcoal 50–100 g orally. IV fluids for hypotension. Consider intubation for the unconscious patient.

Cautions—Protect the patient's airway.

Major Toxidromes		
Toxidrome	**Drug Examples**	**Signs and Symptoms**
Stimulant	Amphetamine, methamphetamine, cocaine, diet aids, nasal decongestants	Restlessness, agitation, incessant talking, insomnia, anorexia; dilated pupils, tachycardia; tachypnea, hypertension or hypotension; paranoia, seizures, cardiac arrest
Narcotic (opiate and opioid)	Heroin, opium, morphine, hydromorphone, (Dilaudid), fentanyl, oxycodone-aspirin combination (Percodan)	Constricted (pinpoint) pupils, marked respiratory depression; needle tracks in IV abusers; drowsiness, stupor, coma
Sympathomimetic	Pseudoephedrine, phenylephrine, phenylpropanolamine, amphetamine, and methamphetamine	Hypertension, tachycardia, dilated pupils (mydriasis), agitation and seizures, hyperthermia
Sedative and hypnotic	Phenobarbital, diazepam (Valium), thiopental, zolpidem tartrate (Ambien), secobarbital	Drowsiness, disinhibition, ataxia, slurred speech, mental confusion, respiratory depression, progressive CNS depression, hypotension
Cholinergic	Diazinon, orthene, parathion, sarin, tabun, VX (nerve agent)	Increased salivation, lacrimation, gastrointestinal distress, diarrhea, respiratory depression, apnea, seizures, coma
Anticholinergic	Atropine, scopolamine, antihistamines, antipsychotics	Dry, flushed skin, hyperthermia, dilated pupils, blurred vision, tachycardia; mild hallucinations, dramatic delirium

Common Laboratory Values

NOTE: Reference values may vary, depending on the laboratory or methods used.

Hematology

RBC	♂ 4.2–5.6 M/µL; ♀ : 3.8–5.1 M/µL; Child: 3.5–5 M/µL
WBC	♂ / ♀ : 3.8–11.0 K/mm^3; Child: 5–10 K/mm^3
Hgb	♂ : 14–18 g/dL; ♀ : 11–16 g/dL;
	Child: 10–14 g/dL; Newborn: 15–25 g/dL
Hct	♂ : 39–54%; ♀ : 34–47%; Child: 30–42%
MCV	78–98 fL
MCH	27–35 pg
MCHC	31–37%
Neutrophils	50–81%
Bands	1–5%
Lymphocytes	14–44%
Monocytes	2–6%
Eosinophils	1–5%
Basophils	0–1%

Cardiac Markers

(See ACLS section, Cardiac Markers Panel)

Troponin I	0–0.1 ng/mL (onset: 4–6 hours, peak: 12–24 hours, return to normal: 4–7 days)
Troponin T	0–0.2 ng/mL (onset: 3–4 hours, peak: 10–24 hours, return to normal: 10–14 days)
Myoglobin	♂: 10–95 ng/mL; ♀: 10–65 ng/mL (onset: 1–3 hours, peak: 6–10 hours, return to normal: 12–24 hours)
CK-MB	♀: 0–4 ng/mL; ♂: 0–4 ng/mL >10% of total (onset: 3–4 hours, peak: 12–24 hours, return to normal: 2–3 days)

General Chemistry

Acetone	0.3–2 mg%
Albumin	3.5–5.0 g/dL
Alkaline phosphatase	32–110 U/L
Anion gap	5–16 mEq/L
Ammonia	11–35 µmol/L
Amylase	50–150 U/dL
AST (SGOT)	♂: 7–21 U/L; ♀: 6–18 U/L
Bilirubin, direct	0.0–0.4 mg/dL
Bilirubin, indirect	Total minus direct
Bilirubin, total	0.2–1.4 mg/dL
BUN	6–23 mg/dL
Calcium (total)	8–11 mg/dL
Carbon dioxide	21–34 mEq/L
Carbon monoxide	Symptoms at >10% saturation

Chloride (Cl^-)	96–112 mEq/L
Creatine	♂: 0.2–0.6 mg/dL; ♀: 0.6–1 mg/dL
Creatinine	0.6–1.5 mg/dL
Ethanol	0 mg; coma: ≥400–500 mg
Folic acid	2.0–21 ng/mL
Glucose	70–110 mg/dL (diuresis ≥180 mg/dL)
HDL	♂: 25–65 mg/dL; ♀: 38–94 mg/dL
Iron	52–169 µg/dL
Iron-binding capacity	246–455 µg/dL
Lactate	0.3–2.3 mEq/L
Lactic acid	0.4–2.3 mEq/L
Lipase	10–140 U/L
Magnesium	1.5–2.5 mg/dL
Osmolarity	276–295 mOsm/kg
Parathyroid hormone	12–68 pg/mL
Phosphorus	2.2–4.8 mg/dL
Potassium (K^+)	3.5–5.5 mEq/L
Protein (total)	6.0–9.0 g/dL
SGPT	8–32 U/L
Sodium (Na^+)	135–148 mEq/L
Triiodothyronine (T_3)	0.8–1.1 µg/dL
Thyroglobulin	<55 ng/mL
Thyroxine (T_4) total	5–13 µg/dL
Total protein	5–9 g/dL
TSH Thyrotropin	<9 µU/mL
Urea nitrogen	8–25 mg/dL
Uric acid	♂: 3.5–7.7 mg/dL; ♀: 2.5–6.6 mg/dL

Coagulation

ACT	90–130 seconds
APTT	21–35 seconds
Bleeding time	3–7 minutes
Fibrinogen	160–450 mg/dL
FSP	<10 µg/dL
Plasminogen	62–130%
Platelets	140,000–450,000/mL
PT	10–14 seconds
PT INR	Normal = 0.9–1.2; Anticoagulation for AF, PE, DVT = 2.0–3.0; Anticoagulation for prosthetic heart valve or recurrent emboli = 2.5–3.5; Critical value = 5.0
PTT	32–45 seconds
Thrombin time	11–15 seconds

Urine

Cl^-	<8 mEq/L
Color	Straw
K^+	<8 mEq/L
Na^+	10–40 mEq/L
Osmolality	80–1300 mOsm/L
pH	4.6–8.0
Protein	1–15 mg/dL
Specific gravity	1.003–1.040

24-Hour Urine

Amylase	250–1100 IU/24 h
Calcium	100–250 mg/24 h
Chloride	100–250 mEq/24 h
Creatine clearance	♂: 100–140 mL/minute; ♂: 16–26 mg/kg/24 h ♀: 80–130 mL/minute; ♀: 10–20 mg/kg/24 h
Creatinine	1–2 g/24 h
Magnesium	6–9 mEq/24 h
Osmolality	450–900 mOsm/kg
Phosphorus	0.9–1.3 g/24 h
Potassium	35–85 mEq/24 h
Protein	0–150 mg/24 h
Sodium	30–280 mEq/24 h
Urea nitrogen	10–22 g/24 h
Uric acid	240–755 mg/24 h

Lipid Panel—Adult

Cholesterol (HDL)	30–75 mg/dL
Cholesterol (LDL)	<130 mg/dL desirable; <70 if previous MI
Cholesterol (total)	<200 mg/dL desirable
Triglycerides	♂: >40–170 mg/dL; ♀: >35–135 mg/dL

Cerebral Spinal Fluid

Appearance	Clear
Glucose	40–85 mg/dL
Osmolality	290–298 mOsm/L
Pressure	70–180 mm/H_2O
Protein	15–45 mg/dL
Total cell count	0–5 cells
WBCs	0–6/µL

Therapeutic Drug Levels

Acetaminophen	5–20 mg/L
Amiodarone	0.5–2 mg/L
Depakote® (valproic acid)	55–100 µg/mL
Digoxin	0.5–2 µg/mL
Disopyramide	2–4 mg/L
Flecainide	0.2–1 mg/L
Lidocaine	1.5–5 mg/L
Lithium	0.6–1.2 mmol/L
Phenobarbital	15–40 mg/L
Phenytoin	10–20 mg/L
Procainamide	4–10 mg/L
Quinidine	2.5–5 mg/L
Salicylate	15–30 mg/dL
Tegretol	8–12 µg/mL
Theophylline	10–20 mg/L

Antibiotics Trough (and Peak)

Amikacin	<10 mg/L (20–40 mg/L)
Chloramphenicol	5–10 mg/L (10–25 mg/L)
Gentamycin	<2 mg/L (4–10 mg/L)
Netilmicin	<2 mg/L (4–10 mg/L)
Tobramycin	<2 mg/L (4–10 mg/L)
Vancomycin	<10 mg/L (20–40 mg/L)

Normal Hemodynamic Parameters—Adult

	Equation	Reference Range
Arterial oxygen saturation (SaO_2)		95–100%
Mixed venous saturation (SvO_2)		60–80%
Central venous oxygen saturation ($ScvO_2$)		70%
Arterial blood pressure (BP)	Systolic (SBP) Diastolic (DBP)	100–140 mm Hg 60–90 mm Hg
Mean arterial pressure (MAP)	SBP + (2 × DPB)/3	70–105 mm Hg
Right atrial pressure (RAP)		2–6 mm Hg
Right ventricular pressure (RVP)	Systolic (RVSP) Diastolic (RVDP)	15–30 mm Hg 2–8 mm Hg
Pulmonary artery pressure (PAP)	Systolic (PASP) Diastolic (PADP)	15–30 mm Hg 8–15 mm Hg
Mean pulmonary artery pressure (MPAP)	PASP + (2 × PADP)/3	9–18 mm Hg
Pulmonary capillary wedge pressure (PCWP)/ pulmonary artery occlusion pressure (PAOP)		6–12 mm Hg

	Equation	Reference Range
Left atrial pressure (LAP)		4–12 mm Hg
Cardiac output (CO)	HR × SV	4.0–8.0 L/min
Cardiac index (CI)	CO/BSA	2.5–4.0 L/min/m^2
Stroke volume (SV)	CO/HR	60–100 mL/beat
Stroke volume index (SVI)	CI/HR × 1000	33–47 mL/m^2/beat
Stroke volume variation (SVV)	SV maximum − SV minimum/ SV mean × 100	10–15%
Systemic vascular resistance (SVR)	80 × (MAP − RAP)/CO	800–1200 dynes—sec/cm^{-5}
Systemic vascular resistance index (SVRI)	80 × (MAP − RAP)/CI	1970–2390 dynes—sec/cm^{-5}/m^2
Pulmonary vascular resistance (PVR)	80 × (MPAP × PAOP)/CO	<250 dynes—sec/cm^{-5}
Pulmonary vascular resistance index (PVRI)	80 × (MPAP − PAOP)/CI	255–285 dynes—sec/cm^{-5}/m^2
Left ventricular stroke work (LVSW)	SI × MAP × 0.0144	8–10 g/m/m^2
Left ventricular stroke work index (LVSWI)	SVI × (MAP − PAOP) × 0.0136	50–62 g/m^2/beat
Right ventricular stroke work (RVSW)	SI × MAP × 0.0144	51–61 g/m/m^2
Right ventricular stroke work index (RVSWI)	SVI × (MPAP − CVP) × 0.0136	5–10 g/m^2/beat
Coronary artery perfusion pressure (CPP)	Diastolic BP − PAOP	60–80 mm Hg
Left ventricular ejection fraction (LVEF)	SV/EDV × 100	58–75% (mean, 65%)
Arterial oxygen content (CaO_2)	(0.0138 × Hgb × SaO_2) + 0.0031 × PaO_2	16–22 mL/dL

	Equation	Reference Range
Venous oxygen content (CvO_2)	$(0.0138 \times Hgb \times SvO_2) + 0.0031 \times PVO_2$	12–15 mL/dL
A – V oxygen content difference ($C(a-v)O_2$)	$CaO_2 - CvO_2$	4–6 mL/dL
Oxygen delivery (DO_2)	$CaO_2 \times CO \times 10$	950–1150 mL/min
Oxygen delivery index (DO_2I)	$CaO_2 \times CI \times 10$	500–600 mL/min/m^2
Oxygen consumption (VO_2)	$C(a-v)O_2 \times CO \times 10$	200–250 mL/min
Oxygen consumption index (VO_2I)	$C(a-v)O_2 \times CI \times 10$	120–160 mL/min/m^2
Oxygen extraction ratio (O_2ER)	$(CaO_2 - CvO_2)/CaO_2 \times 100$	22–30%
Oxygen extraction index (O_2EI)	$(SaO_2 \times SvO_2)/SaO_2 \times 100$	20–25%
Cerebral perfusion pressure (CPP)	[MAP – ICP]	70–90 mm Hg
Intracranial pressure (ICP)		5–15 mm Hg or 5–10 cm H_2O

Hemodynamic Changes With Shock

Shock type	SVO_2	CO	Arterial Pressure	Pulse Pressure	PAP	SVR	PVR	CVP	PWP
Anaphylactic	↓	↓	↓	↓	↓	↓	NC ↑	↓	↓
Cardiogenic	↓	↓	↓	↓	↑	↑ NC ↓	↑	NC ↑	↑
Neurogenic	↓	NC ↓	↓	↓	↓	↓	NC	↓	↓
Compensated	↓	NC ↓	NC	↓	↓	↑	NC	↓	↓
Decompensated	↓	↓	↓	↓	↑ NC ↓	↑	↑	↓	↓
Hypodynamic	↓ NC ↑	↓	↓	↓	↓ NC ↑	↓ NC ↑	↑	↓ NC ↑	↓ NC ↑
Hyperdynamic	NC ↑	↑	NC ↓	↑ NC ↓	↑ NC ↓	↓	NC ↑	↓ NC	NC ↓

↑, increase; ↓, decrease; NC, no change

Hemodynamic Outcomes

Medication	Mean BP	HR	Urine Output	CO	MAP	PCWP	SVR	PVR	CI	SV	CVP
Dobutamine	↑	↑	↑	↑	↑↓	↓	↓	↓	↑	↑	↓
Dopamine *0.5–5 µg/kg/minute*	NC ↓	NC	↑↓	NC	NC ↓	NC	↓	NC	↓	NC	NC
Dopamine *5–10 µg/kg/minute*	↑	↑	↑↓	↑	↑	↑	↓	↑	↑	↑	↑
Dopamine *>10 µg/kg/minute*	↑	↑	↓	↑	↑↑	↑	↑↑	↑	↑	↑	↑
Epinephrine	↑	↑	↑↓	↑	↑	↑	↑	↑	↑	↑	↑
Isoproterenol	↓	↑	↑	↑	↓	↓	↓	↓	↓	↓	↓
Milrinone	↓	NC	↑	↑	↓	↓	↓	↓	↑	↑	↓
Nicardipine	↓	↑	↑	↑	↓	NC, ↓	↓	↑	↑	↓	↓
Nitroglycerine *20–40 µg/minute*	NC	NC	NC	NC	NC	↓	NC	NC	↓	↑	↓
Nitroglycerine *50–250 µg/minute*	↓	↑	↑	↑	↓	↓	↓	↓	↑	↑	↓
Nitroprusside	↓	↑	↑	↑	↓	↓	↓	↓	↑	↑	↓
Norepinephrine	↑	NC	↑↓	↑	↑	↑	↑	↑	↓	↑	↑
Phenylephrine	↑	↓	↓	↓	↑	↑	↑	↑	↓	↑	↑

Blood Gases

Normal Arterial Values					
pH	$PaCO_2$	HCO_3^-	O_2 Saturation	PaO_2	BE
7.35–7.45	35–45 mm Hg	22–26 mEq/L	96–100%	85–100 mm Hg	−2 to +2 mmol/L

Abnormal Values			
pH	$PaCO_2$	HCO_3^-	Acid base imbalance
↓	↑	Normal	Respiratory acidosis
↑	↓	Normal	Respiratory alkalosis
↓	Normal	↓	Metabolic acidosis
↑	Normal	↑	Metabolic alkalosis
↓	↑	↑	Respiratory acidosis with metabolic compensation
↑	↑	↑	Metabolic alkalosis with respiratory compensation
↓	↑	↓	Metabolic and respiratory acidosis
↑	↓	↑	Metabolic and respiratory alkalosis

Normal Venous Values					
pH	$PaCO_2$	HCO_3^-	O_2 Saturation	PaO_2	BE
7.31–7.41	41–51 mm Hg	22–29 mEq/L	60–85%	34–40 mm Hg	0 to +4 mmol/L

Phone Numbers

911 Communication Center	
American Red Cross	
Chemtrec Emergency	1-800-424-9300
Chemtrec Nonemergency	1-800-262-8200
Child Protective Services	
Crisis Center	
Domestic Violence Shelter	
HazMat Team	
Homeless Shelter	
Medical Examiner/Coroner	
Medical Resource Center	
National Response Center	1-800-424-8802
Organ Donation Center	
Poison Control Center	1-800-222-1222
Public Health Department	
Sexual Abuse Hotline	
State/County EMS Office	
Translation Services	
Trauma Center	
Other	
Other	
Other	
Other	
Other	
Other	
Other	

Spanish Translations

(In Spanish, "h" is silent; "ll" is pronounced like "y" [yip]; "j" like "h" [ham]; "qu" like "k" [keep]; and "ñ" like "nya" [canyon]. An accented vowel [á, ó, etc.] simply indicates the syllable that must be stressed when pronouncing the word.)

History and Examination	
I am a paramedic (firefighter, nurse, doctor).	Soy paramédico (bombero, enfermera/ enfermero, médico).
I speak a little Spanish.	Hablo un poco de español.
Is there someone here that speaks English?	¿Alguien habla inglés?
What is your name?	¿Cómo se llama usted?
I don't understand.	No entiendo.
Can you speak more slowly please?	¿Puede hablar más despacio, por favor?
Wake up sir/madam.	Despiértese, señor/señora.
Sit up.	Siéntese.
Listen.	Escúcheme.
How are you?	¿Cómo se siente?
Do you have neck or back pain?	¿Le duele el cuello o la espalda?
Were you unconscious?	¿Estuvo inconsciente?
Move your fingers and toes.	Mueva los dedos de las manos y los pies.
What day is today?	¿Qué día es hoy?
Where is this?	¿Dónde estamos?
Where are you?	¿Dónde está usted?
What is your telephone number? . . . address?	¿Cuál es su número de teléfono? . . . domicilio?
When were you born?	¿Cuándo nació?

Sit here please.	Siéntese aquí, por favor.
Lie down please.	Acuéstese, por favor.
Do you have pain? . . . trouble breathing? . . . weakness?	¿Tiene dolor? . . . dificultad para respirar? . . . debilidad?
Where?	¿Dónde?
Show me where it hurts with your hand.	Muéstreme con su mano dónde le duele.
Does the pain increase when you breathe?	¿El dolor aumenta al respirar?
Breathe deeply through your mouth. Breathe slowly . . .	Respire profundo por la boca. Respire lentamente . . .
What medicine(s) do you take?	¿Qué medicina(s) toma?
Have you been drinking?	¿Ha estado tomando alcohol?
Have you taken any drugs?	¿Ha tomado alguna droga?
Do you have chest pain? . . . heart problems? . . . diabetes? . . . asthma? . . . allergies?	¿Tiene dolor en el pecho? . . . problemas del corazón? . . . diabetes? . . . asma? . . . alergias?
Have you had this pain before?	¿Ha tenido el mismo dolor en otras ocasiones?
How long ago?	¿Hace cúanto tiempo?
Are you sick to your stomach?	¿Tiene náuseas o asco?
Are you pregnant?	¿Está embarazada?
Do you need to vomit?	¿Quiere vomitar?
You will be okay.	Va a estar bien.
You are going to be okay.	Todo saldrá bien.
It is not serious.	No es grave.
It is serious.	Es grave.

Treatment	
Please don't move.	Por favor, no se mueva.
What's the matter?	¿Qué pasa?
Do you want to go to the hospital?	¿Quiere ir al hospital?
To which hospital?	¿A cuál hospital?
You must go to the hospital.	Tiene que ir al hospital.
We're going to take you to the hospital.	Le vamos a llevar al hospital.
We are going to give you oxygen.	Le vamos a poner oxígeno.
We are going to apply a C-collar.	Vamos a ponerle un collarín.
We are going to give you an IV.	Vamos a ponerle un suero.

Miscellaneous			
Thank you.	Gracias.	hand	la mano
Excuse me.	Disculpe.	head	la cabeza
Hello.	Hola.	heart	el corazón
Goodbye.	Adiós.	to help	ayudar
Yes.	Sí.	hip	la cadera
No.	No.	hypertension	hipertensión/ presión alta
abdomen	el abdomen	leg	la pierna
ankle	el tobillo	lungs	los pulmones
arm	el brazo	meds	medicinas
back	la espalda	mouth	la boca
bone	el hueso	neck	el cuello
cancer	cáncer	penis	el pene
chest	el pecho	stretcher	la camilla
drugs	drogas	stroke	ataque cerebral
ear	el oído	throat	la garganta
eye	el ojo	vagina	la vagina

foot	el pie	wrist	la muñeca
fracture	una fractura		

Metric Conversions

Temperature		Weight	
°F	°C	lbs	kg
106	41.1	396	180
105	40.6	374	170
104	40	352	160
103	39.4	330	150
102	38.9	308	140
101	38.3	286	130
100	37.8	264	120
99	37.2	242	110
98.6	**37**	**220**	**100**
98	36.7	**209**	**95**
97	36.1	**198**	**90**
96	35.6	**187**	**85**
95	35	**176**	**80**
94	34.4	**165**	**75**
93	33.9	**154**	**70**
92	33.3	**143**	**65**
91	32.8	**132**	**60**
90	32.2	**121**	**55**
89	31.7	**110**	**50**
88	31.1	99	45
87	30.6	88	40
86	30	77	35

85	29.4	66	30
84	28.9	55	25
83	28.3	44	20
82	27.8	33	15
81	27.2	22	10
80	26.7	15	7
75	23.8	11	5
70	21.1	7.5	3.5
65	18.3	5	2.3
32	0	3	1.4

Volume	Pressure
1 tsp = 5 mL	1 mm Hg = 1.36 cm H_2O
1 tbsp = 15 mL	
1 fl oz = 30 mL	
1 qt = 946 mL	

Length	Weight
3/8 in. = 1 cm	1/150 grains = 0.4 mg
1 in. = 2.54 cm	1/100 grains = 0.6 mg
39.4 in. = 1 m	1/65 grains = 1 mg
	1 grain = 65 mg
	15 grains = 1 g
	1 g = 1000 mg
	1 mg = 1000 µg
	1 oz = 28 g
	1 lb = 454 g
	2.2 lb = 1 kg

"3:00 AM Rule"
To convert lb → kg, divide lb by 2 and subtract 10%.

Prescription Drugs

A

ABILIFY (aripiprazole): antipsychotic; Rx: schizophrenia

Acarbose (PRECOSE): oral hypoglycemic; Rx: diabetes

ACCOLATE (zafirlukast): bronchospasm inhibitor; Rx: asthma

ACCUNEB (albuterol): β-2 agonist bronchodilator; Rx: asthma, COPD

ACCUPRIL (quinapril): ACE inhibitor; Rx: HTN, CHF

ACCURETIC (quinapril/HCTZ): ACE inhibitor/diuretic; Rx: HN

Acebutolol (SECTRAL): β blocker; Rx: HTN, angina, dysrhythmias

ACEON (perindopril): ACE inhibitor; Rx: HTN, CAD

Acetaminophen (TYLENOL): non-narcotic analgesic

Acetazolamide (DIAMOX): diuretic/anticonvulsant; Rx: glaucoma, edema in CHF, epilepsy, mountain sickness

ACIPHEX (rabeprazole): inhibits gastric acid secretion; Rx: ulcers, GERD, Zollinger-Ellison syndrome

ACLOVATE (alclometasone): topical corticosteroid; Rx: rashes, psoriasis

ACTICIN (permethrin): scabicide; Rx: scabies

ACTIFED (triprolidine/pseudoephedrine): antihistamine/decongestant; Rx: allergies, hay fever, cold

ACTIGALL (ursodiol): bile acid; Rx: gallstones

ACTIQ (fentanyl): oral transmucosal narcotic analgesic; Rx: chronic CA pain

ACTONEL (risedronate): reduces bone loss; Rx: osteoporosis, Paget's disease

ACTOS (pioglitazone): oral hypoglycemic; Rx: diabetes

Acyclovir (ZOVIRAX): antiviral; Rx: herpes, shingles, chicken pox

ADALAT, ADALAT CC (nifedipine): calcium channel blocker; Rx: angina, HTN

ADDERALL (amphetamines): CNS stimulant; Rx: ADHD, narcolepsy

ADRENALIN (epinephrine): bronchodilator, vasopressor; Rx: asthma, life-threatening allergic reactions

ADVAIR DISKUS (fluticasone/salmeterol): inhaled steroid/β-2 bronchodilator; Rx: asthma, COPD

ADVICOR (niacin/lovastatin): antihyperlipidemic; Rx: hypercholesterolemia

AEROBID, AEROBID M (flunisolide): inhaled steroid; Rx: asthma, bronchitis

AGGRENOX (aspirin/dipyridamole): antiplatelet agents; Rx: to reduce the risk of stroke

Albuterol (PROVENTIL): β-2 agonist bronchodilator; Rx: asthma, COPD

ALDACTAZIDE (HCTZ/spironolactone): diuretics; Rx: HTN, fluid retention

ALDACTONE (spironolactone): potassium-sparing diuretic; Rx: CHF, ESLD, HTN

ALDOMET (methyldopa): centrally acting antihypertensive; Rx: HTN

Alendronate (FOSOMAX): reduces bone loss; Rx: osteoporosis, Paget's disease

ALLEGRA (fexofenadine): antihistamine; Rx: allergies

Allopurinol (ZYLOPRIM): xanthine oxidase inhibitor; Rx: gout

Alosetron (LOTRONEX): antidiarrheal; Rx: irritable bowel

Alprazolam (XANAX): benzodiazepine; Rx: anxiety disorders, panic attacks

ALTACE (ramipril): ACE inhibitor; Rx: HTN, CHF post MI

ALUPENT (metaproterenol): β-2 agonist bronchodilator; Rx: asthma, bronchitis, COPD

Amantadine (SYMMETREL): antiviral, antiparkinsonian; Rx: influenza A, Parkinson's disease

AMARYL (glimepiride): oral hypoglycemic; Rx: diabetes mellitus

AMBIEN (zolpidem): sedative; Rx: insomnia

AMERGE (naratriptan): selective serotonin receptor agonist; Rx: acute migraine HA

Amiloride (MIDAMOR): diuretic; Rx: HTN, fluid retention

Amiloride/HCTZ (MODURETIC): diuretics; Rx: HTN, fluid retention

Aminophylline: bronchodilator; Rx: COPD, asthma, bronchitis

Amiodarone (CORDARONE, PACERONE): antiarrhythmic; Rx: dysrhythmias

AMITIZA (lubiprostone): intestinal stimulant; Rx: chronic idiopathic constipation

Amitriptyline: a tricyclic antidepressant; Rx: depression, neuropathic pain

Amlodipine (LOTREL): calcium channel blocker; Rx: HTN, angina

Amoxapine (ASENDIN): tricyclic antidepressant

Amoxicillin (AMOXIL): penicillin class antibiotic

Amoxicillin/claculanate (Augmentin): penicillin class antibiotic

AMOXIL (amoxicillin): penicillin class antibiotic

Amphetamine (ADDERALL): stimulant; Rx: ADHD

Amphotericin B (FUNGIZONE): antifungal agent; Rx: fungal infections

Ampicillin: penicillin class antibiotic

ANAFRANIL (clomipramine): tricyclic antidepressant; Rx: obsessive-compulsive disorder

ANAPROX, ANAPROX DS (naproxen): NSAID analgesic; Rx: arthritis, pain

ANTABUSE (disulfiram): alcohol-abuse deterrent; Rx: alcohol abuse

ANTIVERT (meclizine): antiemetic; Rx: motion sickness

ANZEMET (dolasetron): antiemetic; Rx: nausea and vomiting caused by chemotherapy, anesthesia, or surgery

APAP (acetaminophen): a non-narcotic analgesic; Rx: mild-to-moderate pain

ARALEN (chloroquine): antimalarial agent; Rx: malaria

ARANESP (darbepoetin): erythropoiesis stimulating agent; Rx: anemia

ARAVA (leflunomide): immunomodulator agent; Rx: rheumatoid arthritis

ARICEPT (donepezil): cholinergic enhancer; Rx: dementia associated with Alzheimer's

ARISTOCORT (triamcinolone): corticosteroid; Rx: arthritis, severe allergies, asthma

ARIXTRA (fondaparinux): anticoagulant; Rx: treatment and prophylaxis for DVT/PE

ARMOUR THYROID: thyroid hormone; Rx: hypothyroidism

ARTHROTEC (diclofenac/misoprostol): NSAID analgesic, antiulcer; Rx: arthritis

ASACOL (mesalamine): anti-inflammatory agent; Rx: colitis

Aspirin (acetylsalicylic acid, ASA): NSAID analgesic; Rx: pain

ASTELIN (azelastine): antihistamine; Rx: allergic rhinitis

ASTRAMORPH PF (morphine): narcotic analgesic; Rx: pain

ATACAND (candesartan): ACE inhibitor; Rx: HTN, CHF

ATARAX (hydroxyzine): antihistamine; Rx: itching caused by allergies, motion sickness, alcohol withdrawal

Atenolol (TENORMIN): β blocker; Rx: HTN, angina, acute MI

Atenolol/Chlorthalidone (TENORETIC): β-blocker/diuretic; Rx: HTN

ATIVAN (lorazepam): benzodiazepine hypnotic; Rx: anxiety

Atovaquone (MEPRON): antiprotozoal; Rx: prophylaxis and treatment for *P. carinii* pneumonia

ATRIPLA (tenofovir, emtricitabine, efavirenz): antiretrovirals; Rx: HIV/AIDS

ATROVENT (ipratropium): inhaled anticholinergic bronchodilator; Rx: COPD

AUGMENTIN (amoxicillin, clavulanate potassium): penicillin class antibiotic; Rx: bacterial infections

AURALGAN (benzocaine/antipyrine): otic analgesic; Rx: acute otitis media

AVALIDE (irbesartan/hydrochlorothiazide): angiotensin receptor blocker/diuretic; Rx: HTN

AVANDAMET (rosiglitazone/metformin): oral hypoglycemic combination; Rx: diabetes

AVANDIA (rosiglitazone): oral hypoglycemic; Rx: diabetes

AVAPRO (irbesartan): angiotensin receptor blocker; Rx: HTN, diabetic nephropathy

AVELOX (moxifloxacin): fluoroquinolone antibiotic; Rx: bronchitis, pneumonia

AVINZA (morphine ER): narcotic analgesic; Rx: severe pain

AVODART (dutasteride): androgen inhibitor; Rx: benign prostatic hypertrophy

AVONEX (interferon): immunonodulator; Rx: multiple sclerosis

AXERT (almotriptan): selective serotonin receptor agonist; Rx: migraine headaches

AXID (nizatadine): histamine-2 antagonist, inhibits gastric acid secretion; Rx: ulcers

AYGESTIN (norethindrone): hormone; Rx: amenorrhea, endometriosis

AZACTAM (aztreonam): monobactam antibiotic; Rx: bacterial infections

Azathioprine (IMURAN): immunosuppressant; Rx: organ transplants, lupus, rheumatoid arthritis

Azelastine (OPTIVAR): antihistamine; Rx: hay fever, allergies

AZILECT (rasagiline): MAO-B inhibitor, slows metabolism of dopamine; Rx: Parkinson's disease

Azithromycin (ZITHROMAX): macrolide antibiotic; Rx: bacterial infection

AZMACORT (triamcinolone): inhaled corticosteroid; Rx: asthma,

AZOPT OPTH (brinzolamide): carbonic anhydrase inhibitor; Rx: glaucoma, ocular hypertension

AZT (zidovudine): antiretroviral agent; Rx: HIV

Aztreonam (AZACTAM): monobactam antibiotic; Rx: bacterial infections

AZULFIDINE-EN (sulfasalazine): anti-inflammatory; Rx: ulcerative colitis, arthritis

B

B & O SUP (belladonna, opium): antispasmodic/analgesic; Rx: ureteral spasm pain

Bacitracin: topical antibiotic; Rx: prevention/treatment of superficial infections

Bacitracin/Neomycin/Polymyxin/HC (Cortisporin): topical antibiotics/steroid; Rx: skin infection/inflammation

Bacitracin/Polymyxin (Polysporin): topical antibiotic

Baclofen: muscle relaxant; Rx: spasm in MS, spinal cord disease

Balsalazide (COLAZAL): anti-inflammatory; Rx: ulcerative colitis

Beclomethasone (QVAR): inhaled corticosteroid; Rx: asthma

BECONASE AQ (beclomethasone): nasal steroid; Rx: allergies

Belladonna Alkaloids w/ Phenobarbital (DONNATAL): antispasmodic; Rx: irritable bowel

Benazepril (LOTENSIN): ACE inhibitor; Rx: HTN

Benazepril/HCTZ (LOTENSIN HCT): ACE inhibitor/diuretic; Rx: HTN

BENICAR (olmesartan): angiotensin II receptor antagonist; Rx: HTN

BENTYL (dicyclomine): anticholinergic; Rx: irritable bowel

Benzonatate (TESSALON): antitussive; Rx: cough

Benzphetamine (DIDREX): amphetamine; Rx: obesity

Benztropine (COGENTIN): anticholinergic; Rx: Parkinson's disease, extrapyramidal disorders

BETAGAN OPTH (levobunolol): β-blocker, lowers intraocular pressure; Rx: glaucoma

Betamethasone (CELESTONE): corticosteroid anti-inflammatory

BETAPACE (sotalol): antiarrhythmic; Rx: dysrhythmias

BETASERON (interferon): immunomodulator; Rx: multiple sclerosis

Betaxolol (KERLONE): β-blocker; Rx: HTN

Bethanechol (URECHOLINE): urinary cholinergic; Rx: urinary retention

BETOPTIC (betaxolol): ophthalmic β-blocker; Rx: glaucoma

BIAXIN (clarithromycin) macrolide antibiotic; Rx: bacterial infections

BICILLIN (penicillin): penicillin antibiotic; Rx: bacterial infections

BIDIL (hydralazine/isosorbide dinitrate): vasodilators; Rx: heart failure

Bisacodyl (DULCOLAX): laxative; Rx: constipation

Bismuth (PEPTO-BISMOL): gastrointestinal; Rx: indigestion, diarrhea

Bisoprolol (Zebeta): β-blocker; Rx: HTN

Bisoprolol/HCTZ (ZIAC): β-blocker/diuretic; Rx: HTN

BONIVA (ibandronate): osteoclast inhibitor; Rx: osteoporosis

BRETHINE (terbutaline): β-2 agonist; Rx: COPD, asthma

BREVICON: oral contraceptive

Brimonidine (ALPHAGAN): α adrenergic agonist; Rx: glaucoma, ocular hypertension

Brinzolamide (AZOPT OPHTHALMIC): α adrenergic agonist; Rx: glaucoma, ocular hypertension

Bromocriptine (PARLODEL): dopamine agonist; Rx: Parkinson's disease, hyperprolactinemia, acromegaly

Brompheniramine (BROMFED): antihistamine; Rx: allergies

Budesonide (RHINOCORT, PULMICORT): nasal, inhaled corticosteroid; Rx: allergic rhinitis, asthma

Bumetanide (BUMEX): diuretic; Rx: edema, CHF

BUPAP (butalbital, acetaminophen): sedative analgesic; Rx: tension headache

Buprenorphine: opioid partial agonist-antagonist; Rx: opioid dependence

Bupropion (WELLBUTRIN, ZYBAN): antidepressant; Rx: depression, smoking cessation

Buspirone (BUSPAR): antianxiety agent; Rx: anxiety disorders

Busulfan (MYLERAN): anticancer agent; Rx: chronic myelogenous leukemia

Butalbital/Acetaminophen/Caffeine (FIORICET/ESGIC): sedative analgesic; Rx: tension headaches

Butalbital/Aspirin/Caffeine (FIORINAL): sedative analgesic; Rx: tension headache

Butorphanol (STADOL): opioid analgesic; Rx: pain

BYETTA (exenatide): enhances insulin secretion; Rx: type II diabetes

C

CADUET (amlodipine/atorvastatin): calcium blocker/lipid lowering agent; Rx: HTN and high cholesterol

CAFERGOT (ergotamine/caffeine): vasoconstrictors; Rx: migraine/tension HA

CALAN, CALAN SR (verapamil): calcium channel blocker; Rx: angina, hypertension, prophylaxis headache, dysrhythmias

CALCIFEROL (ergocalciferol): vitamin D; Rx: hypocalcemia, hypoparathyroidism, rickets, osteodystrophy

CALCIJEX (calcitriol): vitamin D supplement; Rx: hypocalcemia in renal disease, hypoparathyroidism, bone disease

Calcipotriene (DOVONEX): vitamin D agonist; Rx: psoriasis

Calcitonin-Salmon (MIACALCIN): bone resorption inhibitor hormone; Rx: hypercalcemia, Paget's disease, osteoporosis

Calcitriol (CALCIJEX, ROCALTROL): vitamin D supplement; Rx: hypocalcemia in renal disease, hypoparathyroidism, bone disease

CAMPRAL (acamprosate): reduces alcohol withdrawal symptoms; Rx: alcohol dependence

Candesartan (ATACAND): ACE inhibitor; Rx: HTN, CHF

CAPOTEN (captopril): ACE inhibitor; Rx: CHF, HTN, diabetic nephropathy

Capsaicin (ZOSTRIX): topical analgesic; Rx: muscle/joint pain including arthritis

Captopril (CAPOTEN): ACE inhibitor; Rx: HTN, CHF, diabetic nephropathy

CARAFATE (sucralfate): gastrointestinal agent; Rx: duodenal ulcer

Carbamazepine (CARBATROL, TEGRETOL): anticonvulsant; Rx: seizures, trigeminal neuralgia, bipolar disorder

CARBATROL (carbamazepine): anticonvulsant; Rx: seizures, trigeminal neuralgia, bipolar disorder

Carbidopa/Levodopa (SINEMET, PARCOPA): dopamine precursors; Rx: Parkinson's disease

CARDIZEM (diltiazem): Ca channel blocker; Rx: angina, HTN

CARDURA (doxazosin): α blocker; Rx: HTN, benign prostatic hypertrophy

Carisoprodol (SOMA): muscle relaxant; Rx: musculoskeletal pain

Carvedilol (COREG): β and α blocker; Rx: angina, heart failure, HTN

CASODEX (bicalutamide): antiandrogen; Rx: prostate cancer

CATAPRES, CATAPRES TTS (clonidine): centrally acting α agonist; Rx: HTN

CECLOR (cefaclor): cephalosporin antibiotic; Rx: bacterial infections

CEDAX (ceftibuten): cephalosporin antibiotic; Rx: bacterial infections

Cefaclor (CECLOR): cephalosporin antibiotic; Rx: bacterial infections

Cefadroxil (DURICEF): cephalosporin antibiotic; Rx: bacterial infections

Cefazolin (ANCEF): cephalosporin antibiotic; Rx: bacterial infections

Cefdinir (OMNICEF): cephalosporin antibiotic; Rx: bacterial infections

Cefepime (MAXIPIME): cephalosporin antibiotic; Rx: bacterial infections

Cefixime (SUPRAX): cephalosporin antibiotic; Rx: bacterial infections

CEFIZOX (ceftizoxime): cephalosporin antibiotic; Rx: bacterial infections

Cefotetan (CEFOTAN): cephalosporin antibiotic; Rx: bacterial infections

Cefoxitin (MEFOXIN): cephalosporin antibiotic; Rx: bacterial infections

Cefpodoxime (VANTIN): cephalosporin antibiotic; Rx: bacterial infections

Cefprozil (CEFZIL): cephalosporin antibiotic; Rx: bacterial infections

Ceftazidime (FORTAZ): cephalosporin antibiotic; Rx: bacterial infections

Ceftibuten (CEDAX): an antibiotic; Rx: bacteria infections

CEFTIN (cefuroxime): cephalosporin antibiotic; Rx: bacterial infections

Ceftizoxime (CEFIZOX): cephalosporin antibiotic; Rx: bacterial infections

Cefuroxime (CEFTIN): cephalosporin antibiotic; Rx: bacterial infections

CEFZIL (cefprozil): cephalosporin antibiotic; Rx: bacterial infections

CELEBREX (celecoxib): NSAID; Rx: arthritis, acute pain

CELEXA (citalopram): SSRI; Rx: depression

CELONTIN (methsuximide): anticonvulsant; Rx: absence Sz

Cephalexin (KEFLEX): cephalosporin antibiotic; Rx: bacterial infections

CEREBYX (fosphenytoin): anticonvulsant; Rx: epilepsy

Cetirizine (ZYRTEC): antihistamine; Rx: allergic rhinitis, urticaria

CHANTIX (varenicline): nicotine receptor stimulator; Rx: smoking cessation

Chloral Hydrate: sedative/hypnotic; Rx: insomnia, pain, alcohol withdrawal

Chlordiazepoxide (LIBRIUM): benzodiazepine; Rx: anxiety, agitation from alcohol withdrawal

Chloroquine (ARALEN): antimalarial, amebicidal agent; Rx: malaria

Chlorothiazide (DIURIL): diuretic; Rx: fluid retention in CHF, renal failure, HTN

Chlorpheniramine (CHLOR-TRIMETON): antihistamine; Rx: colds, allergies

Chlorpromazine (THORAZINE): antipsychotic; Rx: schizophrenia

Chlorthalidone (HYGROTON): diuretic; Rx: fluid retention in CHF, renal failure, HTN

Chlorzoxazone (PARAFON FORTE): skeletal muscle relaxant

Cholestyramine (QUESTRAN): bile acid sequestrant; Rx: antihyperlipidemic

CIALIS (tadalafil): vasodilator; Rx: male erectile dysfunction

Cidofovir (VISTIDE): antiviral; Rx: cytomegalovirus in AIDS

Cilostazol (PLETAL): vasodilator, platelet inhibitor; Rx: leg cramps

Cimetidine (TAGAMET): histamine-2 blocker, inhibits gastric acid secretion; Rx: ulcers

CIPRO (ciprofloxacin): fluoroquinolone antibiotic; Rx: bacterial infections

Ciprofloxacin (CIPRO): fluoroquinolone antibiotic; Rx: bacterial infections

Citalopram (CELEXA): SSRI; Rx: depression

CLAFORAN (cefotaxime): cephalosporin antibiotic; Rx: bacterial infections

CLARINEX (desloratadine): antihistamine; Rx: urticaria, allergies

Clarithromycin (BIAXIN): macrolide antibiotic; Rx: bacterial infections

CLIMARA (estradiol): transdermal estrogen; Rx: symptoms of menopause

Clindamycin (CLEOCIN): antibiotic; Rx: bacterial infections

CLINORIL (sulindac): NSAID analgesic; Rx: arthritis, acute pain

Clobetasol (TEMOVATE): topical steroid anti-inflammatory; Rx: dermatoses

Clomipramine (ANAFRANIL): tricyclic compound; Rx: obsessive compulsive disorder

Clonazepam (KLONOPIN): anticonvulsant; Rx: seizures, panic disorders

Clonidine (CATAPRES): centrally acting α agonist; Rx: HTN

Clopidogrel (PLAVIX): antiplatelet; Rx: ACS, AMI, stroke

Clorazepate (TRANXENE): benzodiazepine; Rx: anxiety/Sz

Clotrimazole (MYCELEX, LOTRIMIN AF): antifungal; Rx: fungal infection

Clotrimazole/betamethasone (LOTRISONE): topical antifungal/corticosteroid; Rx: fungal infection

Clozapine (CLOZARIL): antipsychotic; Rx: schizophrenia

CLOZARIL (clozapine): antipsychotic; Rx: schizophrenia

Codeine: narcotic analgesic/antitussive

COGENTIN (benztropine): anticholinergic; Rx: Parkinson's disease, extrapyramidal disorders

COGNEX (tacrine): cholinesterase inhibitor; Rx: Alzheimer's disease

COLACE (docusate): stool softener; Rx: constipation

COLAZAL (balsalazide): anti-inflammatory; Rx: ulcerative colitis

Colchicine: anti-inflammatory; Rx: gout

Colesevelam (WELCHOL): bile acid sequestrant; Rx: hyperlipidemia

COLESTID (colestipol): bile acid sequestrant; Rx: hyperlipidemia

Colestipol (COLESTID): bile acid sequestrant; Rx: hyperlipidemia

Colistimethate (COLY-MYCIN M): antibiotic; Rx: pseudomonas infection

COLY-MYCIN M (colistimethane): antibiotic; Rx: pseudomonas infection

COMBIPATCH (estradiol, norethindrone): estrogens; Rx: menopause symptoms

COMBIVENT (albuterol/ipratropium): bronchodilators; Rx: asthma, COPD

COMBIVIR (lamivudine/zidovudine): antiretrovirals; Rx: HIV

COMTAN (entacapone): COMT inhibitor; Rx: Parkinson's disease

CONCERTA (methylphenidate): stimulant; Rx: ADHD, narcolepsy

COPAXONE (glatiramer): immunomodulator; Rx: MS

COPEGUS (ribavirin): antiviral; Rx: Hepatitis C

CORDARONE (amiodarone): antiarrhythmic; Rx: dysrhythmias

COREG (carvedilol): β and α blocker; Rx: HTN, CHF, angina

CORGARD (nadolol): β-blocker; Rx: HTN, angina

CORTIFOAM (hydrocortisone): steroid anti-inflammatory; Rx: proctitis, various skin conditions

CORTISOL (hydrocortisone): steroid anti-inflammatory; Rx: arthritis, allergies, asthma

Cortisone: steroid anti-inflammatory; Rx: various skin conditions, allergies, adrenal insufficiency

CORVERT (ibutilide): antiarrhythmic; Rx: atrial fibrillation, flutter

COSOPT (timolol/dorzolamide): decreases intraocular pressure; Rx: glaucoma

COUMADIN (warfarin): an anticoagulant; Rx: thrombosis prophylaxis

COVERA HS (verapamil): calcium channel blocker; Rx: HTN, angina, dysrhythmias
COZAAR (losartan): angiotensin receptor blocker; Rx: HTN, diabetic nephropathy
CREON, CREON 5, CREON 10, CREON 20 (pancrelipase): pancreatic enzyme replacement
CRESTOR (rosuvastatin): statin; Rx: hyperlipidemia
CRIXIVAN (indinavir): protease inhibitor antiretroviral; Rx: HIV
Cromolyn (INTAL): anti-inflammatory agent; Rx: asthma prophylaxis, allergies
Cyanocobalamin (vitamin B-12): Rx: anemia
Cyclobenzaprine (FLEXERIL): skeletal muscle relaxant
Cyclosporine (GENGRAF, NEORAL, SANDIMMUNE): immunosuppressant agent; Rx: organ transplants
CYMBALTA (duloxetine): SSRI; Rx: depression, diabetic neuropathy
Cyproheptadine (PERIACTIN): antihistamine
CYTOMEL (liothyronine): thyroid hormone; Rx: hypothyroidism
CYTOTEC (misoprostol): prevents gastric ulcers from NSAIDs
CYTOVENE (ganciclovir): antiviral; Rx: CMV disease

D

d4T stavudine (ZERIT): antiretroviral; Rx: HIV
DALMANE (flurazepam): benzodiazepine; Rx: insomnia
Danazol: sex hormone; Rx: endometriosis
DANTRIUM (dantrolene): skeletal muscle antispasmodic; Rx: spasm, malignant hyperthermia
Dantrolene (DANTRIUM): skeletal muscle antispasmodic; Rx: spasm, malignant hyperthermia
Dapsone: antibacterial drug; Rx: leprosy, PCP prophylaxis
DARAPRIM (pyrimethamine): antiparasitic; Rx: malaria, toxoplasmosis
DARVOCET-N (propoxyphene/APAP): narcotic analgesic; Rx: mild-to-moderate pain
DAYPRO (oxaprozin): NSAID; Rx: arthritis
DECADRON (dexamethasone): steroid anti-inflammatory; Rx: neoplastic disorders, allergies, GI diseases, endocrine disorders
Delavirdine (RESCRIPTOR): antiretroviral; Rx: HIV

Deltasone (prednisone): steroid anti-inflammatory

DEMADEX (torsemide): loop diuretic; Rx: HTN, edema in CHF, kidney disease, liver disease

DEMEROL (meperidine): opioid analgesic; Rx: moderate-to-severe pain

DENAVIR (penciclovir): topical antiviral; Rx: herpes, cold sores

DEPACON (divalproex): anticonvulsant; Rx: seizures, bipolar disorder, migraine

DEPAKENE (valproic acid): anticonvulsant; Rx: seizures

DEPAKOTE, DEPAKOTE ER (divalproex): anticonvulsant, antimigraine; Rx: migraine headache, absence seizures

DEPO-MEDROL (methylprednisolone): corticosteroid anti-inflammatory

DEPO-PROVERA (medroxyprogesterone): progesterone; Rx: endometrial or renal CA

Desipramine (NORPRAMIN): tricyclic antidepressant

Desonide (DESOWEN): topical corticosteroid; Rx: dermatoses

Desoximetasone (TOPICORT): topical corticosteroid; Rx: dermatoses

DESOXYN (methamphetamine): amphetamine; Rx: ADHD, obesity

DETROL (tolterodine): urinary bladder antispasmodic; Rx: overactive bladder

Dexamethasone (DECADRON): steroid anti-inflammatory; Rx: neoplastic disorders, allergies, GI diseases, endocrine disorders

DEXEDRINE (dextroamphetamine): amphetamine; Rx: ADHD, narcolepsy

Dextroamphetamine (DEXEDRINE): amphetamine; Rx: ADHD, narcolepsy

Dextroamphetamine/Amphetamine (ADDERALL): amphetamine; Rx: ADHD, narcolepsy

Dextromethorphan (DELSYM, ROBITUSSIN): non-narcotic antitussive

DIABETA (glyburide): oral hypoglycemic; Rx: diabetes (type 2 only)

DIAMOX (acetazolamide): diuretic/anticonvulsant; Rx: glaucoma, CHF, epilepsy, mountain sickness

Diazepam (VALIUM): anxiolytic; Rx: anxiety, Sz, panic disorder

Diclofenac (VOLTAREN): NSAID, analgesic; Rx: arthritis, postoperative. ocular inflammation

Dicloxacillin: penicillin antibiotic; Rx: bacterial infections

Dicyclomine (BENTYL): anticholinergic; Rx: irritable bowel syndrome

Didanosine, ddi (VIDEX): antiretroviral; Rx: HIV

DIDREX (benzphetamine): amphetamine; Rx: obesity

DIDRONEL (etidronate): bone metabolism regulator; Rx: Paget's disease, total hip replacement

DIFLUCAN (fluconazole): antifungal; Rx: yeast infection

Diflunisal (DOLOBID): NSAID analgesic; Rx: arthritis

DIGITEK (digoxin): cardiac glycoside; Rx: CHF, atrial fibrillation

Digoxin (DIGITEK LANOXIN): cardiac glycoside; Rx: CHF, atrial fibrillation

Dihydroergotamine (D.H.E.): vasoconstrictor; Rx: migraine HA

DILANTIN (phenytoin): anticonvulsant; Rx: seizures

DILATRATE SR (isosorbide): long-acting nitrate; Rx: angina

DILAUDID (hydromorphone): opioid analgesic; Rx: moderate-to-severe pain

Diltiazem (CARDIZEM): calcium channel blocker; Rx: angina, HTN, PSVT

Dimenhydrinate (DRAMAMINE): antihistamine; Rx: motion sickness

DIOVAN (valsartan): angiotensin II receptor inhibitor; Rx: HTN, CHF, post MI

DIOVAN HCT (valsartan/HCTZ): angiotensin II receptor inhibitor/diuretic; Rx: HTN

DIPENTUM (olsalazine): anti-inflammatory agent; Rx: ulcerative colitis

Diphenhydramine (BENADRYL): antihistamine; Rx: allergies

Diphenoxylate/Atropine (LOMOTIL): opioid congener; Rx: diarrhea

Dipyridamole (PERSANTINE): antiplatelet; Rx: lowers risk of postoperative thromboembolic complications after heart valve replacement

Disopyramide (NORPACE): antiarrhythmic; Rx: ventricular dysrhythmias

Disulfiram (ANTABUSE): alcohol-abuse deterrent; Rx: alcohol abuse

DITROPAN XL (oxybutynin): anticholinergic/antispasmodic; Rx: urinary frequency, incontinence, dysuria

DIURIL (chlorothiazide): diuretic; Rx: fluid retention in CHF, renal failure, HTN

Divalproex (DEPAKOTE): anticonvulsant; Rx: seizures, bipolar disorder, migraines

Docusate (COLACE): stool softener; Rx: constipation

Dolasetron (ANZEMET): antiemetic; Rx: nausea and vomiting

DOLOBID (diflunisal): NSAID analgesic; Rx: arthritis

DOLOPHINE (methadone): opioid analgesic; Rx: pain, opiate withdrawal symptoms

Donepezil (ARICEPT): cholinergic; Rx: dementia associated with Alzheimer's disease

DONNATAL (phenobarbital/belladonna alkaloids): barbiturate sedative/antispasmodic; Rx: irritable bowel syndrome

Dornase Alfa (PULMOZYME): lytic enzyme that dissolves infected lung secretions; Rx: cystic fibrosis

Dorzolamide OPTH (TRUSOPT): decreases intraocular pressure; Rx: glaucoma

Dorzolamide/Timolol OPTH (COSOPT): decreases intraocular pressure; Rx: glaucoma

DOVONEX (calcipotriene): vitamin D analog; Rx: psoriasis

Doxazosin (CARDURA): α blocker; Rx: HTN, benign prostatic hypertrophy

Doxepin (SINEQUAN): tricyclic antidepressant; Rx: depression, anxiety

DOXIL (doxorubicin): antineoplastic; Rx: AIDS-related tumors, cancer, leukemia

Doxycycline (VIBRAMYCIN): tetracycline antibiotic; Rx: bacterial infections

Doxylamine (UNISOM): antihistamine sedative; Rx: insomnia

DRAMAMINE (dimenhydrinate): antihistamine; Rx: motion sickness

Dronabinol (MARINOL): appetite stimulant; Rx: weight loss in cancer, AIDS

DUONEB (ipratropium/albuterol): bronchodilators; Rx: asthma, COPD

DURAGESIC (fentanyl): transdermal opioid analgesic; Rx: chronic pain

DURAMORPH (morphine): opioid analgesic; Rx: moderate-to-severe pain

DURATUSS AM/PM PACK GP (guaifenesin/pseudoephedrine): decongestant/expectorant; Rx: colds

DYAZIDE (HCTZ/triamterene): diuretics; Rx: HTN

DYNACIN (minocycline): tetracycline antibiotic; Rx: bacterial infections, acne
DYNACIRC CR (isradipine): calcium channel blocker; Rx: HTN
DYRENIUM (triamterene): potassium-sparing diuretic; Rx: edema in CHF/ESLD/nephrotic syndrome

E

Econazole (SPECTAZOLE): topical antifungal; Rx: fungal infections
EDECRIN (ethacrynic acid): diuretic; Rx: CHF, pulmonary edema
EDULAR (zolpidem): sedative; Rx: insomnia
EES (erythromycin): macrolide antibiotic; Rx: bacterial infection
Efavirenz (SUSTIVA): antiviral; Rx: HIV-I infection
EFFEXOR, EFFEXOR XR (venlafaxine): antidepressant; Rx: depression, anxiety, panic disorder
ELDEPRYL (selegiline): MAO inhibitor; Rx: Parkinson's disease
ELIMITE (permethrin): parasiticide; Rx: scabies, lice
ELOCON (mometasone): topical corticosteroid; Rx: dermatoses
EMSAM Patch (selegiline): MAO inhibitor; Rx: depression
EMTRIVA (emtricitabine): antiretroviral; Rx: HIV
ENABLEX (darifenacin): anticholinergic; Rx: overactive bladder
Enalapril, Enalaprilat (VASOTEC): ACE inhibitor; Rx: HTN, CHF
Enalapril/HCTZ (VASORETIC): ACE inhibitor/diuretic; Rx: HTN
ENBREL (etanercept): immunomdulator; Rx: arthritis; psoriasis
ENDOCET (oxycodone/acetaminophen): opioid analgesic; Rx: moderate-to-severe pain
Entacapone (COMTAN): COMT inhibitor; Rx: Parkinson's disease
ENTEREG (alvimopan): GI opioid antagonist; Rx: postoperative ileus
ENTOCORT EC (budesonide): corticosteroid; Rx: Crohn's disease
Ephedrine: bronchodilator; Rx: asthma, COPD
EPIPEN (epinephrine): bronchodilator/vasoconstrictor; Rx: allergic reaction
EPIVIR, EPIVIR HBV (lamivudine): antiretroviral; Rx: HIV, hepatitis B
Epoetin Alfa (EPOGEN): increases RBC production; Rx: anemia
EPOGEN (epoetin alfa): increases RBC production; Rx: anemia
EPZICOM (abacavir/lamivudine): antiretroviral; Rx: HIV

EQUETRO (carbamazepine): anticonvulsant; Rx: bipolar disorder

Ergocalciferol (CALCIFEROL): vitamin D; Rx: hypocalcemia, hypoparathyroidism, rickets, osteodystrophy

ERYPED (erythromycin): macrolide antibiotic; Rx: bacterial infection

ERY-TAB (erythromycin): antibiotic; Rx: bacterial infection

Erythromycin (EES): antibiotic; Rx: bacterial infection

ESGIC, ESGIC-PLUS (APAP/caffeine/butalbital): analgesic/muscle relaxant/antianxiety compound; Rx: headache

ESKALITH, ESKALITH CR (lithium): antipsychotic; Rx: bipolar disorder

Estazolam (PROSOM): sedative/hypnotic; Rx: insomnia

ESTRACE (estradiol): estrogen; Rx: symptoms of menopause

ESTRADERM (estradiol): transdermal estrogen; Rx: symptoms of menopause

ESTRATEST (estrogens/methyltestosterone); Rx: symptoms of menopause

Estropipate (OGEN): estrogens; Rx: symptoms of menopause

Ethacrynate (EDECRIN): diuretic; Rx: pulmonary edema, CHF

Ethambutol (MYAMBUTOL): Rx: pulmonary tuberculosis

Ethosuximide (ZARONTIN): anticonvulsant; Rx: absence Sz

Etidronate (DIDRONEL): bone metabolism regulator; Rx: Paget's disease, total hip replacement

Etodolac (LODINE): NSAID analgesic; Rx: arthritis

EVISTA (raloxifene): estrogen modulator; Rx: osteoporosis, breast CA prevention

EXELON (rivastigmine): cholinesterase inhibitor; Rx: dementia in Alzheimer's and Parkinson's disease

F

Famciclovir (FAMVIR): antiviral; Rx: herpes

Famotidine (PEPCID): H-2 blocker, inhibits gastric acid; Rx: ulcers

FAMVIR (famciclovir): antiviral; Rx: herpes

FANAPT (iloperidone): antipsychotic; Rx: schizophrenia

FAZACLO (clozapine): antipsychotic; Rx: schizophrenia

FELBATOL (felbamate): antiepileptic; Rx: seizures

FELDENE (piroxicam): NSAID analgesic; Rx: arthrirtis

Felodipine (PLENDIL): calcium blocker blocker; Rx: HTN

FEMARA (letrozole): estrogen inhibitor; Rx: breast cancer

Fenofibrate (TRICOR): lipid regulator; Rx: hyperlipidemia

Fentanyl (DURAGESIC): opioid analgesic; Rx: moderate-to-severe pain

FERRLECIT (sodium ferric gluconate): hematinic; Rx: iron deficiency anemia in hemodialysis

Fexofenadine (ALLEGRA): antihistamine; Rx: allergies

Finasteride (PROSCAR, PROPECIA): antiandrogen; Rx: hair loss, BPH

FIORICET (butalbital/APAP/caffeine): sedative, analgesic; Rx: tension HA

FIORINAL (butalbital/ASA/caffeine): sedative analgesic; Rx: tension HA

FLAGYL (metronidazole): antibiotic; Rx: bacterial infections

Flecainide (TAMBOCOR): antiarrhythmic; Rx: PSVT, paroxysmal atrial fibrillation

FLEXERIL (cyclobenzaprine): skeletal muscle relaxant

FLOMAX (tamsulosin): α-1 blocker; Rx: BPH

FLONASE (fluticasone): nasal corticosteroid; Rx: allergic rhinitis

FLOVENT (fluticasone): inhaled corticosteroid; Rx: asthma

FLOXIN (ofloxacin): fluoroquinolone antibiotic; Rx: bacterial infections

Fluconazole (DIFLUCAN): antifungal; Rx: yeast infection

FLUMADINE (rimantadine): antiviral; Rx: influenza A virus

Flumazenil (ROMAZICON): antidote; Rx: benzodiazepine overdose

Flunisolide (AEROBID): inhaled corticosteroid; Rx: asthma

Flunisolide (NASAREL): nasal corticosteroid; Rx: allergic rhinitis

Fluocinolone (SYNALAR): topical corticosteroid; Rx: dermatoses

Fluocinonide (LIDEX): topical corticosteroid; Rx: dermatoses

Fluoxetine (PROZAC): antidepressant; Rx: depression, obsessive-compulsive disorder, bulimia

Fluphenazine: antipsychotic; Rx: schizophrenia

Flurazepam (DALMANE): benzodiazepine; Rx: insomnia

Flurbiprofen (ANSAID): NSAID analgesic; Rx: arthritis

Flutamide (EULEXIN): antiandrogenic; Rx: prostate cancer

Fluticasone (CUTIVATE, FLONASE): steroid anti-inflammatory; Rx: dermatoses, asthma

Fluvastatin (LESCOL): statin; Rx: hypercholesterolemia

Fluvoxamine (LUVOX): SSRI; Rx: obsessive compulsive disorder, anxiety

FOCALIN (dexmethylphenidate): stimulant; Rx: ADHD

FORADIL (formoterol): long acting β-2 agonist bronchodialator; Rx: asthma, COPD

FORTAZ (ceftazidime): cephalosporin antibiotic; Rx: bacterial infections

FOSAMAX (alendronate): reduces bone loss; Rx: osteoporosis, Paget's disease

Fosinopril (MONOPRIL): ACE inhibitor; Rx: HTN, CHF

Fosphenytoin (CEREBYX): anticonvulsant; Rx: seizures

FOSRENOL (lanthanum): phosphate binder; Rx: hyperphosphatemia in ESRD

FRAGMIN (daltaparin): LMWH; Rx: prophylaxis/tx DVT/PE, ACS

FROVA (frovatriptan): serotonin receptor agonist; Rx: migraine headaches

Furosemide (LASIX): loop diuretic; Rx: CHF, hypertension

FUZEON (enfuvirtide): antiretroviral; Rx: HIV

G

Gabapentin (NEURONTIN): anticonvulsant; Rx: seizures, persistent pain

GABITRIL (tiagabine): anticonvulsant; Rx: partial seizures

Galantamine (RAZADYNE): cholinergic enhancer; Rx: Alzheimer's disease

Ganciclovir (CYTOVENE): antiviral; Rx: CMV

Gemfibrozil (LOPID): antihyperlipidemic; Rx: hypertriglyceridemia

GENGRAF (cyclosporine): immunosuppressive; Rx: rheumatoid arthritis, psoriasis, prevention of transplant rejection

Gentamicin (GARAMYCIN): aminoglycoside antibiotic; Rx: bacterial infections

GEODON (ziprasidone): antipsychotic; Rx: schizophrenia

GLEEVEC (imatinib): antineoplastic; Rx: leukemia, gastrointestinal cancer

Glimepiride (AMARYL): oral hypoglycemic; Rx: diabetes

Glipizide (GLUCOTROL): oral hypoglycemic; Rx: diabetes

Glucagon: hormone, mobilizes glucose; Rx: hypoglycemia

GLUCOPHAGE (metformin): oral hypoglycemic; Rx: diabetes

GLUCOTROL (glipizide): oral hypoglycemic; Rx: diabetes

GLUCOVANCE (glyburide/metformin): oral hypoglycemic; Rx: diabetes

Glyburide (DIABETA, GLYNASE): oral hypoglycemic; Rx: diabetes

Glycopyrrolate (ROBINUL): anticholinergic; Rx: peptic ulcers

GLYNASE (glyburide): oral hypoglycemic; Rx: diabetes

GLYSET (miglitol): oral hypoglycemic; Rx: diabetes

GRIFULVIN V (griseofulvin): antifungal; Rx: ringworm, onychomycosis

Griseofulvin (GRIFULVIN V): antifungal; Rx: ringworm, onychomycosis

Guaifenesin (HUMIBID, MUCINEX): expectorant; Rx: loosen bronchial secretions

Guanfacine (TENEX): antihypertensive; Rx: HTN

H

HALCION (triazolam): benzodiazepine hypnotic; Rx: insomnia

HALDOL (haloperidol): antiphychotic; Rx: psychotic disorders

Halobetasol (ULTRAVATE): topical corticosteroid; Rx: dermatoses

Haloperidol (HALDOL): antipsychotic; Rx: psychotic disorders

HCT, HCTZ (hydrochlorothiazide): diuretic; Rx: HTN, water retention

HUMALOG (insulin lispro): hypoglycemic; Rx: diabetes

HUMIBID (guaifenesin): expectorant; Rx: loosen bronchial secretions

HUMIRA (adalimumab): immunomodulator; Rx: rheumatoid and psoriatic arthritis, ankylosing spondylitis, Crohn's disease

HUMULIN R (regular insulin): hypoglycemic; Rx: diabetes

HYCODAN (hydrocodone/homatropine): narcotic antitussive

HYCOTUSS (hydrocodone/guaifenesin): narcotic antitussive/expectorant

Hydralazine (APRESOLINE): vasodilator; Rx: HTN, CHF

Hydrochlorothiazide (HCTZ): thiazide diuretic; Rx: HTN, water retention

Hydrocodone/APAP (NORCO, LORTAB, VICODIN): narcotic analgesic compound; Rx: moderate-to-severe pain

Hydrocortisone (CORTEF): topical corticosteroid; Rx: dermatoses

HYDRODIURIL (HCTZ): diuretic; Rx: HTN, water retention

Hydromorphone (DILAUDID): opioid analgesic; Rx: moderate-to-severe pain

Hydroxychloroquine (PLAQUENIL): antimalarial; Rx: malaria, lupus, rheumatoid arthritis

Hydroxyurea (DROXIA, HYDREA): antineoplastic, elastogenic; Rx: melanoma, leukemia, ovarian CA, sickle cell anemia

Hydroxyzine (ATARAX, VISTARIL): antihistamine; Rx: allergies, anxiety, sedation

Hyoscyamine (LEVSIN): antispasmodic; Rx: lower urinary tract and GI tract spasm/secretions

HYTRIN (terazosin): α blocker; Rx: BPH, HTN

HYZAAR (losartan/HCTZ): angiotensin receptor blocker; Rx: HTN

I

Ibutilide (CORVERT): antiarrhythmic; Rx: atrial fib, atrial flutter

IMDUR (isosorbide mononitrate): vasodilator long acting nitrate; Rx: angin

Imipenem/Cilastatin (PRIMAXIN): carbapenem antibiotic; Rx: bacterial infections

Imipramine (TOFRANIL): tricyclic antidepressant; Rx: depression, bed wetting

IMITREX (sumatriptan): selective serotonin receptor agonist; Rx: migraine H/A

IMODIUM (loperamide): slows peristalsis; Rx: diarrhea

IMURAN (azathioprine): immunosuppressant; Rx: organ transplants, lupus, rheumatoid arthritis

Indapamide (LOZOL): diuretic; Rx: HTN, edema in CHF

INDERAL, INDERAL LA (propranolol): β blocker; Rx: HTN, angina, cardiac dysrhythmias, AMI, migraine H/A

INDOCIN, INDOCIN SR (indomethacin): NSAID analgesic; Rx: arthritis

Indomethacin (INDOCIN): NSAID analgesic; Rx: arthritis

INFERGEN (interferon alfacon-1): antiviral; Rx: hepatitis C

Infliximab (REMICADE): neutralizes tumor necrosis factor; Rx: Crohn's disease
INH (isoniazid): antibiotic; Rx: tuberculosis
INSPRA (eplerenone): aldosterone blocker; Rx: HTN, CHF
INTAL (cromolyn): anti-inflammatory; Rx: asthma
INTELENCE (etravirine): antiretroviral; Rx: HIV
INVEGA (paliperidone): antipsychotic; Rx: schizophrenia
INVIRASE (saquinavir): protease inhibitor antiretroviral; Rx: HIV
IONAMIN (phentermine): appetite suppressant; Rx: obesity
Ipecac: detoxification agent; Rx: overdose/poisoning
Ipratropium (ATROVENT): bronchodilator; Rx: COPD
Irinotecan (CAMPTOSAR): antineoplastic; Rx: colon and rectal CA
ISENTRESS (raltegravir): antiretroviral; Rx: HIV
ISMO (isosorbide mononitrate): vasodilator; Rx: angina
Isoniazid: antibiotic; Rx: tuberculosis
Isoproterenol: β-bronchodilator; Rx: asthma, COPD
ISOPTIN SR (verapamil): calcium channel blocker; Rx: angina, HTN, PSVT prophylaxis, headache
Isosorbide dinitrate (ISORDIL): nitrate vasodilator; Rx: angina
Isosorbide mononitrate (IMDUR, ISMO, MONOKET): long-acting nitrate; Rx: angina
Isradipine (DYNACIRC): calcium channel blocker; Rx: HTN
Itraconazole (SPORANOX): antifungal; Rx: fungal infections

J

JANUMET (sitagliptin/metformin): oral hypoglycemics; Rx: diabetes
JANUVIA (sitagliptin): oral hypoglycemic; Rx: diabetes

K

KADIAN (morphine ER): opioid analgesic; Rx: severe pain
KALETRA (lopinavir/ritonavir): antiretrovirals; Rx: HIV
Kanamycin (KANTREX): aminoglycoside antibiotic; Rx: bacterial infection
KAOPECTATE (bismuth): gastrointestinal; Rx: indigestion, diarrhea

KAPIDEX (dexlansoprazole): proton pump inhibitor; Rx: GERD, erosive esophagitis

KAYEXALATE (sodium polysterene sulfonate): Na/K exchange resin; Rx: hyperkalemia

K-DUR (potassium): electrolyte; Rx: hypokalemia

KEFLEX (cephalexin): cephalosporin antibiotic; Rx: bacterial infections

KEPPRA (levatiracetam): anticonvulsant; Rx: seizures

KERLONE (betaxolol): β-1 blocker; Rx: HTN

KETEK (telithromycin): ketolide antibiotic; Rx: community–acquired PNA

Ketoconazole (NIZORAL): antifungal agent; Rx: fungal infections

Ketoprofen: NSAID analgesic; Rx: arthritis

Ketorolac (TORADOL): NSAID analgesic; Rx: acute pain

KLONOPIN (clonazepam): benzodiazepine hypnotic; Rx: seizures, panic disorder

KLOR-CON (potassium): electrolyte; Rx: hypokalemia

KONSYL (psyllium): bulk-forming laxative; Rx: constipation

KUTRASE (pancreatin): pancreatic enzyme replacement in CF, chronic pancreatitis

KWELL (lindane): parasiticide; Rx: lice, scabies

KYTRIL (granisetron): antiemetic; Rx: chemotherapy–induced nausea/vomiting

L

Labetalol (TRANDATE): β blocker; Rx: HTN

LAC-HYDRIN (ammonium lactate): emollient; Rx: dry, itchy skin

LACRI-LUBE OPTH (white petrolatum/mineral oil): Rx: ophthalmic lubrication

Lactulose (CEPHULAC): hyperosmotic laxative; Rx: constipation, encephalopathy

LAMICTAL (lamotrigine): anticonvulsant; Rx: seizures, bipolar disorder

LAMISIL (terbinafine): antifungal; Rx: fungal infections

Lamivudine (EPIVIR): antiviral; Rx: HIV

Lamotrigine (LAMICTAL): anticonvulsant; Rx: seizures, bipolar disorder

LANOXIN (digoxin): cardiac glycoside; Rx: CHF, atrial fibrillation

Lansoprazole (PREVACID): gastric acid pump inhibitor; Rx: ulcers, GERD

LANTUS (insulin glargine): hypoglycemic; Rx: diabetes

LARIAM (mefloquine): antimalarial agent

LASIX (furosemide): loop diuretic; Rx: HTN, CHF

Leflunomide (ARAVA): immunomodulator, anti-inflammatory; Rx: rheumatoid arthritis

LESCOL (fluvastatin): statin; Rx: hypercholesterolemia

Leucovorin: vitamin; Rx: methotrexate toxicity, megaloblastic anemia

Leuprolide (LUPRON): hormone; Rx: endometriosis, advanced prostate CA

Levalbuterol (XOPENEX): inhaled β-2 bronchodilator; Rx: COPD, asthma

LEVAQUIN (levofloxacin): antibotic; Rx: pneumonia, COPD, UTI

Levatiracetam (KEPPRA): anticonvulsant; Rx: seizures

LEVATOL (penbutolol): β blocker; Rx: hypertension

LEVEMIR (insulin detemir): hypoglycemic; Rx: diabetes

LEVITRA (vardenafil): vasodilator; Rx: erectile dysfunction

LEVLIN (ethinyl estradiol/levonorgestrel): oral contraceptive

Levobunolol OPTH (BETAGAN): β-blocker; Rx: glaucoma

Levodopa/carbidopa (SINEMET): dopamine precursor; Rx: Parkinson's disease

Levofloxacin (LEVAQUIN): fluoroquinolone antibiotic; Rx: bacterial infections

LEVORA (levonorgestrel/estradiol): oral contraceptive

LEVOTHROID (levothyroxine): thyroid hormone; Rx: hypothyroidism

Levothyroxine (LEVOTHROID, LEVOXYL, SYNTHROID): thyroid hormone; Rx: hypothyroidism

LEVOXYL (levothyroxine): thyroid hormone; Rx: hypothyroidism

LEXAPRO (escitalopram): SSRI antidepressant; Rx: depression, anxiety disorder

LEXIVA (fosamprenavir): antiretroviral; Rx: HIV

LIBRIUM (chlordiazepoxide): benzodiazepine; Rx: anxiety, alcohol withdrawal

LIDEX (fluocinonide): topical corticosteroid; Rx: dermatoses

LIDODERM (lidocaine) topical local anesthetic; Rx: postherpetic neuralgia

Lindane (KWELL): parasiticide; Rx: scabies, lice

Liothyronine (CYTOMEL): thyroid hormone; Rx: hypothyroidism

Liotrix (THYROLAR): thyroid hormone; Rx: hypothyroidism

LIPITOR (atorvastatin): statin; Rx: hypercholesterolemia, CHD

Lisinopril (PRINIVIL, ZESTRIL): ACE inhibitor; Rx: HTN, CHF, AMI

Lisinopril/HCTZ (ZESTORETIC): ACE inhibitor; Rx: HTN, CHF, AMI

Lithium (LITHOBID): antipsychotic; Rx: bipolar disorder

LITHOBID (lithium): antipsychotic; Rx: bipolar disorder

LOCOID (hydrocortisone): topical corticosteroid; Rx: dermatoses, seborrheic dermatitis

LOESTRIN (ethinyl estradiol/norethindrone): oral contraceptive

LOMOTIL (diphenoxylate/atropine): opioid congener; Rx: diarrhea

LO/OVRAL (ethinyl estradiol/norgestrel): oral contraceptive

Loperamide (IMODIUM): slows peristalsis; Rx: diarrhea

LOPID (gemfibrozil): antihyperlipidemic; Rx: hypertriglyceridemia

Lopinavir (KALETRA): antiviral; Rx: HIV, AIDS

LOPRESSOR (metoprolol): β-1 blocker; Rx: hypertension

LOPROX (ciclopirox): antifungal; Rx: ringworm, candida

Loratadine (CLARITIN): antihistamine; Rx: allergies

Lorazepam (ATIVAN): benzodiazepine hypnotic; Rx: anxiety, status epilepticus

LORCET 10/650, LORCET HD, LORCET PLUS (hydrocodone, APAP): opioid analgesic compound; Rx: mild-to-moderate pain

LORTAB (hydrocodone/APAP): narcotic analgesic

Losartan (COZAAR): angiotensin receptor blocker; Rx: HTN, diabetic nephropathy

LOTENSIN (benazepril): ACE inhibitor; Rx: HTN, CHF

LOTENSIN HCT (benazepril/HCTZ): ACE inhibitor/diuretic; Rx: HTN

LOTREL (amlodipine/benazepril): calcium channel blocker/ACE inhibitor; Rx: HTN

LOTRIMIN (clotrimazole): topical antifungal agent; Rx: fungal infections

LOTRISONE (clotrimazole/betamethasone): topical antifungal/corticosteroid; Rx: fungal infections

LOTRONEX (alosetron): antidiarrheal; Rx: irritable bowel syndrome

Lovastatin (MEVACOR): statin; Rx: hypercholesterolemia, CHD

LOVENOX (enoxaparin): antigoagulant; Rx: prophylaxis/tx DVT/PE, ACS

Loxapine (LOXITANE): antipsychotic; Rx: schizophrenia

LOXITANE (loxapine): antipsychotic; Rx: schizophrenia

LOZOL (indapamide): diuretic; Rx: HTN, edema in CHF

LUCENTIS (ranibizumab): blood vessel growth inhibitor; Rx: macular degeneration

LUNESTA (eszopiclone): sedative; Rx: insomnia

LUPRON DEPOT (leuprolide): hormone; Rx: endometriosis, prostrate CA

LUVOX (fluvoxamine): SSRI antidepressant; Rx: obsessive compulsive disorder, anxiety

LYRICA (pregabalin): anticonvulsant; Rx: partial seizures, neuropathic pain

M

MACROBID (nitrofurantoin): nitrofuran antibiotic; Rx: UTI

MACRODANTIN (nitrofurantoin): nitrofuran antibiotic; Rx: UTI

MAFENIDE (sulfamylon): topical antimicrobial; Rx: burn wounds

MALARONE (atovaquone/proguanil): antimalarial agents; Rx: malaria prevention/tx

Malathion (OVIDE): organophosphate insecticide; Rx: head lice

Mannitol (OSMITROL): osmotic diuretic; Rx: cerebral edema, IOP

Maprotiline (LUDIOMIL): tetracyclic antidepressant; Rx: depression, bipolar disorder, anxiety

MARINOL (dronabinol): appetite stimulant; Rx: weight loss in cancer, AIDS

MAVIK (trandolapril): ACE inhibitor; Rx: HTN, CHF post MI

MAXAIR (pirbuterol): inhaled β-2 stimulant; Rx: asthma, COPD

MAXALT (rizatriptan): selective serotonin receptor agonist; Rx: migraine headaches

MAXZIDE (triamterene/HCTZ): diuretics; Rx: HTN, water retention

MEBARAL (mephobarbital): barbiturate sedative; Rx: epilepsy, anxiety

Mebendazole (VERMOX): anthelmintic; Rx: intestinal worms

Meclizine (ANTIVERT): antinauseant; Rx: motion sickness

Meclofenamate: NSAID analgesic; Rx: arthritis, acute pain

MEDROL (methylprednisolone): glucocorticoid; Rx: adrenal insufficiency, allergies, RA

Medroxyprogesterone (PROVERA): progestin hormone; Rx: endometriosis, amenorrhea, uterine bleeding, contraception

Mefloquine (LARIAM): antimalarial; Rx: prevention and treatment of malaria

MEFOXIN (cefoxitin): cephalosporin antibiotic; Rx: bacterial infections

Megestrol (MEGACE): progestin, appetite stimulant; Rx: anorexia with AIDS; antineoplastic; CA

Meloxicam (MOBIC): NSAID analgesic; Rx: arthritis

Meperidine (DEMEROL): opioid analgesic; Rx: moderate-to-severe pain

MEPHYTON (vitamin K-1): Rx: coagulation disorders

MEPRON (atovaquone): antiprotozoal; Rx: prophylaxis and treatment for *pneumocystic carinii* pneumonia in AIDS

MERIDIA (sibutramine): stimulant; Rx: obesity

MERREM (meropenem): carbapenem antibiotic; Rx: bacterial infections

Mesalamine (ASACOL, PENTASA): anti-inflammatory agent; Rx: ulcerative colitis

METADATE CD, ER (methylphenidate): stimulant; Rx: ADHD, narcolepsy

METAGLIP (glipizide/metformin): oral hypoglycemics; Rx: diabetes

Metaproterenol (ALUPENT): β-2 agonist bronchodilator; Rx: COPD, asthma

Metformin (GLUCOPHAGE): oral hypoglycemic; Rx: diabetes

Methadone (DOLOPHINE): opioid analgesic; Rx: moderate-to-severe pain, opiate withdrawal

METHADOSE (methadone): opioid analgesic; Rx: detoxification of opioid addiction

Methenamine (URISED, UREX): antibiotic; Rx: UTI prophylaxis

METHERGINE (methylergonovine): increases uterine contractions; Rx: uterine contraction/bleeding

Methimazole (TAPAZOLE): antithyroid; Rx: hyperthyroidism

Methocarbamol (ROBAXIN): skeletal muscle relaxant

Methotrexate: antineoplastic; Rx: psoriasis, cancer, rheumatoid arthritis

Methsuximide (CELONTIN): anticonvulsant; Rx: absence Sz

Methyldopa (ALDOMET): centrally acting antihypertensive; Rx: HTN

Methylphenidate (RITALIN): stimulant; Rx: ADHD, narcolepsy

Methylprednisolone (MEDROL): glucocorticoid; Rx: adrenal insufficiency, allergies, RA

Metoclopramide (REGLAN): improves gastric emptying; Rx: heartburn, diabetic gastroparesis

Metolazone (ZAROXOLYN): thiazide diuretic; Rx: HTN, fluid retention

Metoprolol (LOPRESSOR, TOPROL-XL): β-1 blocker; Rx: HTN, angina, dysrhythmias

Metronidazole (FLAGYL): antibiotic; Rx: bacterial infections

MEVACOR (lovastatin): statin; Rx: hypercholesterolemia, CHD

Mexiletine (MEXITIL): antiarrhythmic; Rx: ventricular dysrhythmias

MEXITIL (mexiletine): antiarrhythmic; Rx: ventricular dysrhythmias

MIACALCIN (calcitonin-salmon): bone resorption inhibitor hormone; Rx: hypercalcemia, Paget's disease, osteoporosis

MICARDIS (telmisartan): angiotensin II receptor antagonist; Rx: HTN

MICRO-K (potassium): electrolyte; Rx: hypokalemia

Miconazole (MONISTAT): antifungal; Rx: candidiasis

MICROZIDE (HCTZ): thiazide diuretic; Rx: HTN, water retention

MIDAMOR (amiloride): potassium-sparing diuretic; Rx: HTN, CHF

Midazolam: benzodiazepine hypnotic; Rx: anxiety before surgery

Midodrine (PROAMATINE): vasopressor; Rx: orthostatic hypotension

MIDRIN (isometheptene, dichloralphenazone, APAP): vasoconstrictor/sedative/analgesic; Rx: migraines

MINIPRESS (prazosin): α-1 blocker; Rx: hypertension

MINITRAN (transdermal nitroglycerin): nitrate; Rx: angina

MINOCIN (minocycline): tetracycline antibiotic; Rx: bacterial infections, acne

Minocycline (MINOCIN): tetracycline antibiotic; Rx: bacterial infections, acne

Minoxidil: vasodilator; Rx: severe HTN

MIRALAX (polyethylene glycol): osmotic laxative; Rx: constipation

MIRAPEX (pramipexole): dopamine agonist; Rx: Parkinson's disease, restless leg syndrome

Mirtazapine (REMERON): antidepressant; Rx: depression

Misoprostol (CYTOTEC): antiulcer; Rx: NSAID-induced gastric ulcers

MOBIC (meloxicam): NSAID analgesic; Rx: athritis

Modafinil (PROVIGIL): wakefulness-promoting agent; Rx: narcolepsy, daytime sleepiness

MODURETIC (amiloride/HCTZ): diuretics; Rx: HTN, fluid retention

Moexipril (UNIVASC): ACE inhibitor; Rx: HTN

MONOCAL (fluoride, calcium): mineral supplement

MONOKET (isosorbide mononitrate): long-acting nitrate; Rx: angina

MONOPRIL (fosinopril): ACE inhibitor; Rx: HTN, CHF

MONUROL (fosfomycin): antibiotic; Rx: UTI

Morphine sulfate (MS CONTIN): opioid analgesic; Rx: moderate-to-severe pain

MOTOFEN (difenoxin/atropine): decreases intestinal motility; Rx: diarrhea

Moxifloxacin (AVELOX): fluoroquinolone antibiotic; Rx: bacterial infections

MS CONTIN (morphine ER): narcotic analgesic; Rx: moderate-to-severe pain

MUCINEX (guaifenesin): expectorant; Rx: loosen bronchial secretions

Mupirocin (BACTROBAN): topical antibiotic; Rx: skin infections

MYCELEX 3 (butoconazole): vaginal antifungal; Rx: yeast infection

MYCOBUTIN (rifabutin): antibiotic; Rx: mycobacterium avium complex in HIV

MYCOSTATIN (nystatin): antifungal; Rx: candidiasis

MYLERAN (busulfan): alkylating agent; Rx: leukemia

MYSOLINE (primidone): anticonvulsant; Rx: seizures

N

Nabumetone (RELAFEN): NSAID analgesic; Rx: arthritis

Nadolol (CORGARD): β-blocker; Rx: HTN, angina

Nafcillin: penicillin antibiotic; Rx: bacterial infection

Nalbuphine (NUBAIN): opioid agonist-antagonist analgesic; Rx: pain relief, pruritis

Naltrexone (REVIA): narcotic antagonist; Rx: narcotic or alcohol addiction

NAMENDA (memantine): NMDA antagonist; Rx: Alzheimer's disease

NAPROSYN (naproxen): NSAID analgesic; Rx: arthritis, pain, inflammation, H/A

NARDIL (phenelzine): MAO inhibitor; Rx: depression, bulimia

NASACORT AQ (triamcinolone): nasal corticosteroid; Rx: allergic rhinitis

NASALCROM (cromolyn): nasal anti-inflammatory agent; Rx: allergic rhinitis

NASAREL (flunisolide): nasal corticosteroid; Rx: allergic rhinitis

NASONEX (mometasone): nasal corticosteroid; Rx: allergic rhinitis

Nefazodone (SERZONE): antidepressant; Rx: depression

Nelfinavir (VIRACEPT): protease inhibitor antiretroviral; Rx: HIV

NEMBUTAL (pentobarbital): barbiturate; Rx: insomnia, sleep induction, status epilepticus

NEOSPORIN (neomycin/polymyxin/bacitracin): topical antibiotic compound; Rx: topical infections

NEUPOGEN (filgrastim): white blood cell stimulator; Rx: chemotherapy, bone marrow transplant

NEURONTIN (gabapentin): anticonvulsant; Rx: seizures, persistent pain

Nevirapine (VIRAMUNE): antiretroviral; Rx: HIV

NEXIUM (esomeprazole): protein pump inhibitor; Rx: esophagitis, GERD, ulcers

Niacin (vitamin B-3): nicotinic acid; Rx: hypercholesterolemia, hypertriglyceridemia

NIACOR (niacin): vitamin B-3; Rx: hypercholesterolemia, hypertriglyceridemia

NIASPAN (niacin slow release): vitamin B-3; Rx: hypercholesterolemia, hypertriglyceridemia

Nicardipine (CARDENE): calcium channel blocker; Rx: angina, HTN

NICODERM (transdermal nicotine): Rx: smoking cessation

Nicotinic Acid (niacin): vitamin B-3; Rx: hypercholesterolemia, hypertriglyceridemia

NICOTROL Inhaler (nicotine): Rx: smoking cessation

NICOTROL NS (nicotine): Rx: smoking cessation

Nifedipine (PROCARDIA, ADALAT): calcium channel blocker; Rx: angina, HTN

NIFEREX, NIFEREX-150 (iron): mineral; Rx: anemia

NILANDRON (nilutamide): antiandrogen; Rx: prostate CA

Nimodipine (NIMOTOP): calcium channel blocker; Rx: improves neurological deficits after subarachnoid hemorrhage

Nisoldipine (SULAR): calcium channel blocker; Rx: HTN

NITRO-DUR (nitroglycerin): transdermal nitrate; Rx: angina

Nitrofurantoin (macrodantin): antibacterial agent; Rx: UTI

Nitroglycerin (NITROSTAT): vasodilator; Rx: angina

NITROLINGUAL SPRAY (nitroglycerin): nitrate; Rx: angina

NITROMIST (nitroglycerin): vasodilator lingual spray; Rx: angina

NITROSTAT (nitroglycerin): vasodilator; Rx: angina

NIX (permethrin): parasiticide; Rx: head lice

Nizatidine (AXID): histamine-2 antagonist; Rx: ulcers, GERD

NIZORAL (ketoconazole): antifungal agent; Rx: fungal infections

NORCO (hydrocodone/APAP): narcotic analgesic compound; Rx: moderate-to-severe pain

NORFLEX (orphenadrine): skeletal muscle relaxant

Norfloxacin (NOROXIN): fluoroquinolone antibiotic; Rx: bacterial infections

NORGESIC (orphenadrine): skeletal muscle relaxant

NOROXIN (norfloxacin): fluoroquinolone antibiotic; Rx: bacterial infections

NORPACE, NORPACE CR (disopyramide): antiarrhythmic; Rx: ventricular dysrhythmias

NORPRAMIN (desipramine): tricyclic antidepressant; Rx: depression

Nortriptyline (PAMELOR): tricyclic antidepressant

NORVASC (amlodipine): calcium blocker; Rx: HTN, angina

NORVIR (ritonavir): protease inhibitor antiretroviral; Rx: HIV

NOVOLIN R (regular insulin): hypoglycemic; Rx: diabetes

NOVOLOG (insulin aspart): hypoglycemic; Rx: diabetes

NOVOLOG MIX 70/30 (insulin mixture): hypoglycemic; Rx: diabetes

NUVIGIL (armodafinil): CNS stimulant; Rx: narcolepsy, shift-work sleep disorder

Nystatin (MYCOSTATIN): antifungal; Rx: candidiasis

NYSTOP (nystatin): antifungal; Rx: candidiasis

O

Ofloxacin (FLOXIN): fluoroquinolone antibiotic; Rx: bacterial infections

Olanzapine (ZYPREXA): antipsychotic; Rx: schizophrenia, bipolar disorder

Olopatadine (PATANOL): antihistamine; Rx: allergic conjunctivitis

Olsalazine (DIPENTUM): salicylate; Rx: ulcerative colitis

Omeprazole (PRILOSEC): suppresses gastric acid secretion; Rx: ulcers, esophagitis, GERD

OMNARIS (ciclesonide): intranasal steroid; Rx: allergic rhinitis

OMNICEF (cefdinir): cephalosporin antibiotic; Rx: bacterial infections

OMNIHIST LA (chlorpheniramine/phenylephrine/methscopalamine): antihistamine/decongestant; Rx: rhinitis, colds

Ondansetron (ZOFRAN): antinauseant; Rx: N&V secondary to chemotherapy, radiation, and surgery

OPANA (oxymorphone): opioid analgesic; Rx: moderate-to-severe pain

Opium Tincture (morphine): opioid analgesic; Rx: diarrhea

ORAMORPH SR (morphine sulfate SR): opioid analgesic; Rx: moderate-to-severe pain

ORENCIA (abatacept): immunomodulator; Rx: rheumatoid arthritis

Orphenadrine (NORFLEX): skeletal muscle relaxant

Oxacillin: penicillin class antibiotic; Rx: bacterial infections

Oxandrolone (OXANDRIN): anabolic steroid; Rx: osteoporosis, promotes weight gain

Oxaprozin (DAYPRO): NSAID analgesic; Rx: arthritis

Oxazepam (SERAX): benzodiazepine hypnotic; Rx: anxiety, alcohol withdrawal

Oxcarbazepine (TRILEPTAL): anticonvulsant; Rx: partial seizures

Oxybutynin (DITROPAN): anticholinergic, antispasmodic; Rx: overactive bladder

Oxycodone (ROXICODONE, OXYCONTIN): opioid analgesic; Rx: moderate-to-severe pain

Oxycodone/ASA (PERCODAN): opioid analgesic/aspirin; Rx: moderate-to-severe pain

Oxycodone with APAP (ENDOCET, PERCOCET, TYLOX): opioid analgesic/APAP; Rx: moderate-to-severe pain

OXYCONTIN (oxycodone SR): opioid analgesic; Rx: moderate-to-severe pain

OXYFAST (oxycodone): opioid analgesic; Rx: moderate-to-severe pain

Oxymetazoline (AFRIN): nasal decongestant; Rx: sinusitis, cold

Oxymetholone (ANADROL-50): anabolic steroid/androgen; Rx: anemia

Oxytocin (PITOCIN): stimulates uterine contractions; Rx: induction of labor

OXYTROL (oxybutynin): transdermal anticholinergic, antispasmodic; Rx: overactive bladder

P

PACERONE (amiodarone): antiarrhythmic; Rx: dysrhythmias

PAMELOR (nortriptyline): tricyclic antidepressant; Rx: depression

Pantoprazole (PROTONIX): suppresses gastic acid; Rx: ulcers, GERD

PARCOPA (carbidopa/levodopa): dopamine precursors; Rx: Parkinson's disease

PAREGORIC (morphine): opioid analgesic; Rx: diarrhea

Paricalcitol (ZEMPLAR): vitamin D; Rx: hyperparathyroidism in chronic kidney disease

PARNATE (tranylcypromine): MAO inhibitor; Rx: depression

Paroxetine (PAXIL): SSRI antidepressant; Rx: depression, OCD, anxiety, PTSD

PASER (aminosalicylic acid): antibacterial; Rx: tuberculosis

PATANASE (olopatadine): nasal antihistamine; Rx: allergic rhinitis

PATANOL OPTH (olopatadine): antihistamine; Rx: allergic conjunctivitis

PAXIL (paroxetine): SSRI antidepressant; Rx: depression, OCD, anxiety, PTSD

PEDIAFLOR (fluoride): mineral; Rx: osteoporosis, dental caries

PEDIAPRED (prednisolone): glucocorticoid; Rx: allergies, arthritis, MS

Penbutolol (LEVATOL): β blocker; Rx: HTN

Penciclovir (DENAVIR): topical antiviral; Rx: herpes, cold sores

Penicillin (VEETIDS): antibiotic; Rx: bacterial infection

Pentamidine (PENTAM 300): antiprotozoal; Rx: *P. carinii* pneumonia

PENTASA (mesalamine): anti-inflammatory; Rx: ulcerative colitis

Pentazocine (TALWIN): opioid agonist-antagonist analgesic; Rx: moderate-to-severe pain

Pentazocine/APAP (TALACEN): opioid analgesic/APAP compound

Pentazocine/Naloxone (TALWIN NX): opioid analgesic compound; Rx: pain

Pentobarbital (NEMBUTAL): barbiturate hypnotic; Rx: insomnia, status epilepticus

Pentoxifylline (TRENTAL): reduces blood viscosity; Rx: intermittent claudication

PEPCID, PEPCID AC (famotidine): histamine-2 blocker reduces gastric acid; Rx: ulcers, GERD

PERCOCET (oxycodone/APAP): opioid analgesic; Rx: moderate-to-severe pain

PERCODAN (oxycodone/aspirin): opioid analgesic; Rx: moderate-to-severe pain

PERI-COLACE (docusate/senna): stool softener/laxative; Rx: constipation

Perindopril (ACEON): ACE inhibitor; Rx: HTN, CAD

Permethrin (ELIMITE, ACTICIN, NIX): parasiticide; Rx: head lice, scabies

Perphenazine: anitpsychotic; Rx: schizophrenia, hiccoughs

PERSANTINE (dipyridamole): platelet inhibitor; Rx: blood clots after heart valve replacement

Phenazopyridine (PYRIDIUM): urinary tract analgesic; Rx: relief of pain on urination

Phenelzine (NARDIL): MAO inhibitor; Rx: depression

PHENERGAN (promethazine): sedative/antiemetic; Rx: rhinitis, urticaria, N&V

Phenobarbital: barbiturate sedative; Rx: sedative, anticonvulsant

Phentermine (ADIPEX-P): amphetamine; Rx: obesity

Phenylephrine (SUDAFED PE): decongestant; Rx: colds, allergies

Phenytoin (DILANTIN): anticonvulsant; Rx: epilepsy

PHISOHEX (hexachlorophene): bacteriostatic skin cleanser

PhosLo (calcium): phosphate binder; Rx: hyperphosphatemia in ESRD

PHRENILIN, PHRENILIN FORTE (butalbital/acetaminophen): barbiturate sedative, analgesic; Rx: tension HA

Phytonadione (AQUAMEPHYTON): vitamin K1; Rx: coagulation disorders

Pilocarpine (SALAGEN): cholinergic; Rx: dry mouth, Sjogren's Syndrome

Pilocarpine OPTH (ISOPTO CARPINE, PILOCAR): cholinergic miotic; Rx: glaucoma

Pindolol (VISKEN): β blocker; Rx: HTN

Pioglitazone (ACTOS): oral hypoglycemic; Rx: diabetes

Piperacillin (PIPRACIL): penicillin antibiotic; Rx: bacterial infections

Pirbuterol (MAXAIR): β bronchodilator; Rx: asthma, COPD

Piroxicam (FELDENE): NSAID analgesic; Rx: arthritis

PLAQUENIL (hydroxychloroquine): antimalarial agent; Rx: malaria, rheumatoid arthritis, lupus

PLAVIX (clopidogrel): platelet inhibitor; Rx: MI, stroke, atherosclerosis

PLETAL (cilostazol): platelet inhibitor; Rx: intermittent claudication

Polyethylene glycol (MIRALAX): osmotic laxative; Rx: constipation

PONSTEL (mefenamic acid): NSAID analgesic; Rx: mild-to-moderate pain

Posaconazole (NOXAFIL): antifungal; Rx: fungal infections

Potassium Citrate (UROCIT-K): urinary alkalinizer; Rx: kidney stones

Potassium Iodide (PIMA): expectorant; Rx: asthma, bronchitis

Pramipexole (MIRAPEX): dopamine agonist; Rx: Parkinson's disease, restless legs syndrome

PRANDIMET (repaglinide/metformin): oral hypoglycemics; Rx: diabetes

PRANDIN (repaglinide): oral hypoglycemia; Rx: diabetes

PRAVACHOL (pravastatin): statin; Rx: hypercholesterolemia, CAD

Pravastatin (PRAVACHOL): statin; Rx: hypercholesterolemia, CAD

Prazosin (MINIPRESS): α-1 blocker, vasodilator; Rx: HTN

PRECOSE (acarbose): delays carbohydrate digestion; Rx: diabetes mellitus

Prednisolone (ORAPRED, PRELONE): glucocorticoid; Rx: adrenal insufficiency, allergies, RA, lupus, COPD

Prednisone: glucocorticoid; Rx: adrenal insufficiency, allergies, RA, lupus, COPD

PRELONE (prednisolone): glucocorticoid; Rx: adrenal insufficiency, allergies, RA, lupus, COPD

PREMARIN (conjugated estrogens): hormones; Rx: menopause

PREMPRO (estrogens/progesterone): hormones; Rx: menopause

PREVACID (lansoprazole): gastric acid pump inhibitor; Rx: ulcers, esophagitis, GERD

PREVPAC (lansoprazole/amoxicillin/clarithromycin): *H. pylori* treatment; Rx: duodenal ulcers

PRIFTIN (rifapentine): antibiotic; Rx: tuberculosis

PRILOSEC (omeprazole): gastric acid pump inhibitor; Rx: ulcers, esophagitis, GERD

Primaquine: antimalarial agent; Rx: malaria

PRIMATENE MIST (epinephrine): bronchodilator; Rx: asthma

PRIMATENE TABLETS (ephedrine/guaifenesin): decongestant/expectorant; Rx: sinusitis/cough, bronchitis, asthma

Primidone (MYSOLINE): anticonvulsant; Rx: seizures

PRINIVIL (lisinopril): ACE inhibitor; Rx: HTN, CHF

PRINZIDE (lisinopril/HCTZ): ACE inhibitor/diuretic; Rx: HTN

PRISTIQ (desvenlafaxine): antidepressant; Rx: depression

Probenecid: increases uric acid secretion; Rx: gout

Procainamide (PROCANBID): antiarrhythmic; Rx: dysrhythmias

PROCANBID (procainamide): antiarrhythmic; Rx: dysrhythmias

PROCARDIA, PROCARDIA XL (nifedipine): calcium channel blocker; Rx: angina, HTN

Prochlorperazine (COMPAZINE): phenothiazine antiemetic; Rx: N/V, anxiety

PROCRIT (epoetin alfa): stimulates red blood cell production; Rx: anemia, renal failure, HIV, chemotherapy

Progesterone (PROMETRIUM): progestin; Rx: endometrial hyperplasia, secondary amenorrhea

PROGRAF (tacrolimus): immunosuppressant; Rx: transplant

PROLASTIN (α-1 proteinase inhibitor): Rx: α-1 antitrypsin deficiency, emphysema

Promethazine (PHENERGAN): phenothiazine; Rx: rhinitis, allergic conjuntivitis, sedation, N/V

PROMETRIUM (progesterone): progestin; Rx: endometrial hyperplasia, secondary amenorrhea

Propafenone (RYTHMOL): β blocker, antiarrhythmic; Rx: PSVT, paroxysmal atrial fibrillation

Propantheline: anticholinergic, inhibits gastric acid secretion; Rx: peptic ulcers

Proparacaine OPTH (ALCAINE): anesthetic; Rx: corneal anesthesia

Propranolol (INDERAL): β blocker; Rx: HTN; prophylaxis of: angina, cardiac dysrhythmias, AMI, migraine H/A

Propylthiouracil: antithyroid; Rx: hyperthyroidism

PROSCAR (finasteride): antiandrogen; Rx: benign prostatic hypertrophy

PROTONIX (pantoprazole): proton pump inhibitor; Rx: ulcers, GERD

PROVENTIL, PROVENTIL HFA (albuterol): β-2 agonist bronchodilator; Rx: COPD, asthma

PROVERA (medroxyprogesterone): hormone; Rx: amenorrhea, irregular vaginal bleeding

PROVIGIL (modafinil): stimulant; Rx: narcolepsy, daytime sleepiness

PROZAC (fluoxetine): SSRI antidepressant

Pseudoephedrine (SUDAFED): decongestant; Rx: colds, allergies

Psyllium (KONSYL, METAMUCIL): fiber laxative; Rx: constipation

PULMICORT (budesonide): inhaled corticosteroid; Rx: asthma

PULMOZYME (dornase alfa): lytic enzyme, dissolves lung secretions; Rx: cystic fibrosis

Pyrazinamide: antibacterial; Rx: tuberculosis

PYRIDIUM (phenazopyridine): urinary tract analgesic; Rx: relief of pain on urination

Pyridostigmine (MESTINON): anticholinesterase; Rx: myasthenia gravis

Pyridoxine (VITAMIN B6): vitamin

Pyrimethamine (DARAPRIM): antiparasitic; Rx: toxoplasmosis, malaria

Q

QUALAQUIN (quinine): antimalarial; Rx: malaria

QUESTRAN (cholestyramine): bile acid sequestrant; Rx: antihyperlipidemic

Quetiapine (SEROQUEL): antipsychotic; Rx: schiophrenia, bipolar disorder

Quinapril (ACCUPRIL): ACE inhibitor; Rx: HTN, CHF

Quinapril/HCTZ (ACCURETIC): ACE inhibitor/diuretic; Rx: HTN

Quinine: antimalarial; Rx: malaria

QVAR (beclomethasone): inhaled corticosteroid; Rx: asthma

R

Raloxifene (EVISTA): estrogen modulator; Rx: osteoporosis, breast CA prevention

Ramipril (ALTACE): ACE inhibitor; Rx: HTN, CHF post MI

RANEXA (ranolazine): anti-ischemic; Rx: chronic angina

Ranitidine (ZANTAC): histamine-2 blocker; Rx: ulcers, GERD, esophagitis

RAPAFLO (silodosin): α receptor agonist, Rx; benign prostatic hyperplasia

RAPAMUNE (sirolimus): immunosuppressive; Rx: renal transplant

RAPTIVA (efalizumab): immunosuppressant; Rx: psoriasis

RAZADYNE (galantamine): acetylcholinesterase inhibitor; Rx: Alzheimers disease

REBETOL (ribavirin): antiviral; Rx: hepatitis C

REBETRON (interferon alfa/ribavirin): antivirals; Rx: hepatitis C

Rebif (interferon-β-1a): immunomodulator; Rx: multiple sclerosis

RECOMBINATE (Factor VIII): antihemophilic factor; Rx: hemophilia

REGLAN (metoclopramide): improves gastric emptying; Rx: heartburn, diabetic gastroparesis

RELAFEN (nabumetone): NSAID analgesic; Rx: arthritis

RELENZA (zanamivir): antiviral; Rx: influenza

RELISTOR (methylnaltrexone): GI tract opioid antagonist; Rx: opioid-induced constipation

RELPAX (eletriptan): serotonin receptor agonist; Rx: migraine headaches

REMERON (mirtazapine): antidepressant; Rx: depression

REMICADE (infliximab): neutralizes tumor necrosis factor; Rx: Crohn's disease, arthritis, ulcerative colitis, psoriasis

RENAGEL (sevelamer): phosphate binder; Rx: hyperphosphatemia in renal disease

REQUIP (ropinirole): dopaminergic; Rx: Parkinson's disease, restless leg syndrome

RESCRIPTOR (delavirdine): antiretroviral; Rx: HIV

RESTORIL (temazepam): benzodiazepine hypnotic; Rx: insomnia

RETIN A (tretinoin): retinoid; Rx: acne

RETROVIR (zidovudine): antiretroviral agent; Rx: HIV

REVATIO (sildenafil): vasodilator; Rx: pulmonary artery hypertension

REYATAZ (atazanavir): antiretroviral; Rx: HIV

RHINOCORT (budesonide): nasal corticosteroid; Rx: allergic rhinitis

Ribavirin (REBETOL): antiviral; Rx: hepatitis C

RIFADIN (rifampin): antibiotic; Rx: tuberculosis, prophylaxis for *N. meningitidis*

RIFAMATE (rifampin/isoniazid): antibiotics; Rx: tuberculosis

Rifampin (RIFADIN): antibiotic; Rx: tuberculosis, prophylaxis for *N. meningitidis*

Rifapentine (PRIFTIN): antibiotic; Rx: tuberculosis

RIFATER (isoniazid/rifampin/pyrazinamide): antibiotics; Rx: tuberculosis

Rifaximin (XIFAXAN): antibiotic; Rx: traveler's diarrhea, hepatic encephalopathy

Rimantadine (FLUMADINE): antiviral; Rx: influenza A virus

RIOMET (metformin): oral hypoglycemic; Rx: diabetes

Risedronate (ACTONEL): bone stabilizer; Rx: Paget's disease, osteoporosis

RISPERDAL (risperidone): antipsychotic; Rx: schizophrenia, autism, bipolar disorder

Risperidone (RISPERDAL): antipsychotic; Rx: schizophrenia, autism, bipolar disorder

RITALIN (methylphenidate): stimulant; Rx: attention-deficit/hyperactivity disorder in children, narcolepsy

Ritonavir (NORVIR): antiretroviral; Rx: HIV

Rivastigmine (EXELON): cholinesterase inhibitor; Rx: dementia in Alzheimer's disease and Parkinson's disease

ROBAXIN (methocarbamol): skeletal muscle relaxant

ROBINUL FORTE (glycopyrrolate): anticholinergic; Rx: peptic ulcers

ROBITUSSIN (guaifenesin): expectorant

ROCALTROL (calcitrol): vitamin D analog; Rx: hypocalcemia in renal disease, hypoparathyroidism, bone disease

Ropinirole (REQUIP): dopaminergic; Rx: Parkinson's disease, restless leg syndrome

Rosiglitazone (AVANDIA): oral hypoglycemic; Rx: diabetes

ROWASA (mesalamine): anti-inflammatory; Rx: colitis, proctitis

ROXANOL (morphine): opioid analgesic; Rx: moderate-to-severe pain

ROXICET (oxycodone/APAP): opioid analgesic; Rx: moderate-to-severe pain

ROXICODONE (oxycodone): opioid analgesic; Rx: moderate-to-severe pain

ROZEREM (ramelteon): melatonin agonist; Rx: insomnia

RYNATAN (phenylephrine/chlorpheniramine/pyrilamine): antihistamine/decongestant compound; Rx: common cold

RYNATUSS: antitussive/decongestant/antihistamine; Rx: common cold

RYTHMOL, RYTHMOL SR (propafenone): antiarrhythmic; Rx: PSVT, paroxysmal atrial fibrillation

S

SALAGEN (pilocarpine): cholinengic; Rx: dry mouth

Salmeterol (SEREVENT): inhaled β-2 bronchodilator; Rx: asthma, COPD

SAL-PLANT Gel (salicylic acid): for removal of common warts

Salsalate: NSAID analgesic; Rx: arthritis

SANDIMMUNE (cyclosporine): immunosuppressant agent; Rx: organ transplants

SANDOSTATIN (octreotide): antidiarrheal, growth inhibitor; Rx: acromegaly, diarrhea associated with carcinoid and intestinal tumors

Saquinavir (INVIRASE): antiretroviral; Rx: HIV

SARAFEM (fluoxetine): antidepressant; Rx: premenstrual dysphoric disorder

SAVELLA (milnacipran): selective serotonin/norepinephrine inhibitor; Rx: fibromyalgia

Scopolamine: anticholinergic; Rx: motion sickness, IBS, diverticulitis

SECONAL (secobarbital): barbiturate hypnotic; Rx: insomnia

SECTRAL (acebutolol): β-blocker; Rx: HTN, angina, dysrhythmias

Selegiline (ELDEPRYL): MAO inhibitor; Rx: Parkinson's disease

SEMPREX-D (acrivastine/pseudoephedrine): antihistamine/decongestant; Rx: allergic rhinitis

Senna Extract (SENOKOT): laxative; Rx: constipation

SENNA-S, SENOKOT-S (senna/docusate): laxative/stool softener; Rx: constipation

SENOKOT, SENOKOT XTRA (senna): laxative; Rx: constipation

SENSIPAR (cinacalcet): reduces PTH levels; Rx: hyperparathyroidism

SEPTRA, SEPTRA DS (trimethoprim/sulfamethoxazole): sulfa antibacterial compound; Rx: bacterial infections

SEREVENT (salmeterol): inhaled β-2 bronchodilator; Rx: asthma, COPD

SEROQUEL (quetiapine): antipsychotic; Rx: schizophrenia, bipolar disorder

SEROSTIM (somatropin): hormone; Rx: AIDS wasting

Sertraline (ZOLOFT): antidepressant; Rx: depression, panic disorder, obsessive-compulsive disorder, premenstrual dysphoric disorder

SERZONE (nefazodone): antidepressant; Rx: depression

SILENOR (doxepin): TCA antidepressant; Rx: depression, insomnia

SILVADENE (silver sulfadiazine): topical antimicrobial agent; Rx: burn wounds

SIMCOR (niacin/simvastatin): cholesterol reducers; Rx: hypercholesterolemia, hypertriglyceridemia

Simethicone (MYLICON): Rx: relief of excess gas in GI tract

SIMPLY COUGH LIQUID (dextromethorphan): antitussive; Rx: cough

Simvastatin (Zocor): statin; Rx: hypercholesterolemia, CAD

SINEMET CR (carbidopa/levodopa): dopamine precursors; Rx: Parkinson's disease

SINEQUAN (doxepin): tricyclic antidepressant; Rx: depression, anxiety

SINGULAIR (montelukast): leukotriene receptor antagonist; Rx: asthma, allergic rhinitis

Sirolimus (RAPAMUNE): immunosuppressive; Rx: renal transplant

SKELAXIN (metaxalone): skeletal muscle relaxant

SLO-NIACIN (niacin CR): Rx: hypercholesterolemia, hypertriglyceridemia

Sodium Polysterene Sulfonate (KAYEXALATE): Na/K exchange resin; Rx: hyperkalemia

SOMA (carisoprodol): muscle relaxant; Rx: muscle spasm

SOMNOTE (chloral hydrate): sedative-hypnotic; Rx: insomnia, pain

SONATA (zaleplon): hypnotic; Rx: insomnia

SORIATANE (acitretin): retinoid; Rx: psoriasis

Sotalol (BETAPACE): antiarrhythmic; Rx: dysrhythmias

SPECTAZOLE (econazole): topical antifungal agent

SPECTRACEF (cefditoren): cephalosporin antibiotic; Rx: bacterial infections

SPIRIVA (tiotropium): inhaled anticholinergic bronchodilator; Rx: COPD

Spironolactone (ALDACTONE): potassium-sparing diuretic; Rx: hyperaldosteronism, HTN, CHF

SPORANOX (itraconazole): antifungal; Rx: fungal infections

SSKI (potassium iodide): expectorant; Rx: asthma, bronchitis

STALEVO (levodopa/carbidopa/entacapone): dopamine precursors; Rx: Parkinson's disease

STARLIX (nateglinide): oral hypoglycemic; Rx: diabetes

Stavudine d4T (ZERIT): antiretroviral; Rx: HIV

STAVZOR (valproic acid): antiepileptic; Rx: seizures, bipolar disorder, migraines

STRATTERA (atomoxetine): psychotherapeutic agent; Rx: ADHD

Streptomycin: aminoglycoside antibiotic; Rx: tuberculosis

STRIANT (testosterone): androgen; Rx: adult male hypogonadism

STROMECTOL (ivermectin): anti-parasite; Rx: parasites

SUBOXONE (buprenorphine/naloxone): opioid analgesic/antagonist; Rx: opiate addiction

SUBUTEX (buprenorphine): narcotic analgesic; Rx: opiate addiction

Sucralfate (CARAFATE): anti-ulcer agent; Rx: duodenal ulcers

SULAR (nisoldipine): calcium channel blocker; Rx: HTN

Sulfamethoxazole (SEPTRA): sulfa antibiotic; Rx: bacterial infections

Sulfasalazine (AZULFIDINE): anti-inflammatory; Rx: ulcerative colitis, rheumatoid arthritis

Sulfisoxazole: sulfonamide antibiotic; Rx: bacterial infections

Sulindac (CLINORIL): NSAID analgesic; Rx: arthritis

Sumatriptan (IMITREX): selective serotonin receptor agonist; Rx: migraine H/A

SUPRAX (cefixime): cephalosporin antibiotic; Rx: bacterial infections

SURVANTA (beractant): lung surfactant in premature infants

SUSTIVA (efavirenz): antiretroviral; Rx: HIV

SYMBICORT (budesonide/formoterol): inhaled corticosteroid/β-2 agonist; Rx: asthma, COPD

SYMBYAX (olanzapine/fluoxetine) antipsychotic/SSRI; Rx: bipolar disorder, resistant depression

SYNAREL (naferelin): nasal gonadotropin-releasing hormone; Rx: endometriosis, precocious puberty

SYNERCID (quinupristin/dalfopristin): streptogramin antibiotic; Rx: bacterial infections

SYNTHROID (levothyroxine): thyroid hormone; Rx: hypothyroidism

T

TAGAMET (cimetidine): inhibits gastric acid secretion; Rx: ulcers

TALACEN (pentazocine/APAP): opioid agonist/antagonist analgesic/APAP; Rx: pain

TALWIN NX (pentazocine/naloxone): opioid agonist/antagonist analgesic; Rx: pain

TAMBOCOR (flecainide): antiarrhythmic; Rx: PSVT, paroxysmal atrial fibrillation

TAMIFLU (oseltamivir): antiviral; Rx: influenza

Tamoxifen: antiestrogen; Rx: breast CA

TAPAZOLE (methimazole): antithyroid; Rx: hyperthyroidism

TARKA (trandolapril/verapamil): ACE inhibitor/calcium channel blocker; Rx: HTN

TEGRETOL, TEGRETOL XR (carbamazepine): anticonvulsant; Rx: seizures, trigeminal neuralgia

TEKTURNA (Aliskeren): direct renin inhibitor; Rx: HTN

Telmisartan (MICARDIS): angiotensin II receptor agonist; Rx: HTN

Temazepam (RESTORIL): benzodiazepine hypnotic; Rx: insomnia

TENEX (guanfacine): centrally acting α agonist; Rx: HTN

TENORMIN (atenolol): β-1 blocker; Rx: HTN, angina, CAD

TENORETIC (atenolol/chlorthalidone): β-blocker/diuretic; Rx: HTN

Terazosin (HYTRIN): α-1 blocker; Rx: HTN, benign prostatatic hyperplasia

Terbinafine (LAMISIL): antifungal; Rx: nail fungus, ringworm

Terbutaline (BRETHINE): β-2 agonist bronchodilator; Rx: asthma, COPD

Terconazole (TERAZOL): antifungal; Rx: vaginal candidiasis

TESSALON (benzonatate): antitussive; Rx: cough

Testosterone (ANDRODERM, DEPO-TESTOSTERONE): androgen; Rx: hypogonadism

TESTRED (methyltestosterone): androgen; Rx: hypogonadism

Tetracycline: antibiotic; Rx: bacterial infections

TEVETEN (eprosartan): angiotensin II receptor inhibitor; Rx: HTN

Thalidomide (THALOMID): immunosuppressant; Rx: HIV, leprosy, multiple myeloma

THALOMID (thalidomide): immunosuppressant; Rx: HIV, leprosy, multiple myeloma

THEO-24 (theophylline): bronchodilator; Rx: asthma, COPD

Theophylline (THEO-24, UNIPHYL): bronchodilator; Rx: asthma, COPD

THERA-GESIC (salicylate): topical NSAID analgesic; Rx: arthritis

Thiamin: vitamin B1; Rx: thiamin deficiency

Thioridazine: antipsychotic; Rx: schizophrenia

Thiothixene (NAVANE): antipsychotic; Rx: schizophrenia

THORAZINE (chlorpromazine): antipsychotic; Rx: schizophrenia

Thyroid (ARMOUR THYROID): thyroid hormone; Rx: hyporthyroidism

Tiagabine (GABITRIL): anticonvulsant; Rx: partial seizures

TIAZAC (diltiazem): calcium channel blocker; Rx: HTN, angina

Ticarcillin/clavulanate (TIMENTIN): penicillin antibiotic; Rx: bacterial infections

Ticlodipine (TICLID): platelet inhibitor; Rx: stroke prophylaxis

TIGAN (trimethobenzamide): antiemetic; Rx: postoperative N/V

TIKOSYN (dofetilide): antiarrhythmic; Rx: atrial fibrillation

TIMENTIN (ticarcillin/clavulanate): penicillin antibiotic; Rx: bacterial infections

Timolol (BLOCADREN): β-blocker; Rx: HTN, MI, migraine

TIMOPTIC OPTH (timolol): β-blocker; Rx: glaucoma

TINACTIN (tolnaftate): topical antifungal; Rx: athlete's foot, jock itch

Tizanidine (ZANAFLEX): skeletal muscle relaxant

TOBI Solution Inhalation (tobramycin): aminoglycoside antibiotic; Rx: cystic fibrosis

Tobramycin (Tobrex OPTH): aminoglycoside antibiotic; Rx: bacterial infections

TOFRANIL, TOFRANIL PM (imipramine): tricyclic antidepressant; Rx: depression, anxiety

Tolazamide: oral hypoglycemic; Rx: diabetes

Tolbutamide: oral hypoglycemic; Rx: diabetes

Tolmetin: NSAID analgesic; Rx: arthritis

Tolnaftate (TINACTIN): topical antifungal; Rx: athlete's foot, jock itch

Tolterodine (DETROL): urinary bladder antispasmodic; Rx: overactive bladder

TOPAMAX (topiramate): anticonvulsant; Rx: seizures, migraine

TOPROL-XL (metoprolol): cardioselective β blocker; Rx: HTN, angina, CHF

TORADOL (ketorolac): NSAID analgesic; Rx: acute pain

Torsemide (DEMADEX): loop diuretic; Rx: HTN, edema in CHF, kidney disease, liver disease

TOVIAZ (fesoterodine): anticholinergic; Rx: overactive bladder

TRACLEER (bosentan): endothelin receptor antagonist; Rx: pulmonary hypertension

Tramadol (ULTRAM): opioid analgesic; Rx: moderate-to-severe pain

TRANDATE (labetalol): β blocker; Rx: hypertension

Trandolapril (MAVIK): ACE inhibitor; Rx: HTN, CHF post MI

TRANSDERM-SCOP (scopolamine): anticholinergic antiemetic; Rx: motion sickness prophylaxis

TRANXENE (clorazepate): benzodiazepine hypnotic; Rx: anxiety, seizures

Trazodone: antidepressant; Rx: depression, insomnia

TRECATOR (ethionamide): antibiotic; Rx: tuberculosis

TRENTAL (pentoxifylline): reduces blood viscosity; Rx: intermittent claudication

Triamcinolone (KENALOG AZMACORT): steroid anti-inflammatory; Rx: dermatoses, asthma

Triamterenes/HCTZ (DYAZIDE, MAXZIDE): diuretics; Rx: HTN, water retention

Triazolam (HALCION): benzodiazepine hypnotic; Rx: insomnia

TRICOR (fenofibrate): lipid regulator; Rx: hyperlipidemia

Trifluoperazine: antipsychotic; Rx: schizophrenia

TRIGLIDE (fenofibrate): lipid reducer; Rx: hyperlipidemia

Trihexyphenidyl: anticholinergic; Rx: Parkinson's disease

TRILEPTAL (oxcarbazepine): anticonvulsant; Rx: partial seizures

Trimethoprim: antibiotic; Rx: UTI

Trimethoprim/Sulfamethoxazole (BACTRIM, SEPTRA): sulfa antibiotic compound; Rx: bacterial infections

TYKERB (lapatinib): antineoplastic; Rx: breast CA

TRIZIVIR (abacavir/lamivudine/zidovudine): antiretrovirals; Rx: HIV infection, hepatitis B

TRUSOPT OPTH (dorzolamide): decreases intraocular pressure: Rx: glaucoma

TRUVADA (emtricitabine/tenofovir): antiretrovirals; Rx: HIV

TUSSIGON (hydrocodone/homatropine): narcotic antitussive, bronchodilator; Rx: cough

TUSSIONEX (hydrocodone/chlorpheniramine): opioid antitussive/antihistamine; Rx: coughs, allergies, cold

TYLENOL SINUS CONGESTION (phenylephrine/guaifenesin/APAP): decongestant/expectorant/analgesic; Rx: sinusitis, rhinitis, colds

TYLENOL with Codeine (APAP, codeine): opioid with APAP analgesic; Rx: mild-to-moderate pain

TYZEKA (telbivudine): antiviral; Rx: hepatitis B

U

ULORIC (febuxostat): xanthine oxidase inhibitor; Rx: gout

ULTRACET (tramadol/APAP): opioid analgesic compound; Rx: acute pain

ULTRAM (tramadol): opioid analgesic; Rx: moderate-to-severe pain

ULTRASE, ULTRASE MT (pancrelipase): pancreatic enzyme replacement; Rx: chronic pancreatitis, cystic fibrosis

UNIPHYL (theophylline): bronchodilator; Rx: asthma, COPD

UNIRETIC (moexepril/HCTZ): ACE inhibitor/diuretic; Rx: HTN

UNISOM (doxylamine): antihistamine sedative; Rx: insomnia
UNIVASC (moexipril): ACE inhibitor; Rx: HTN
URECHOLINE (bethanechol): cholinergic; Rx: urinary retention
UROXATRAL (alfuzosin): smooth muscle relaxant; Rx: BPH
UROCIT-K (potassium citrate): urinary alkalinizer; Rx: kidney stones
Ursodiol (ACTIGALL): bile acid; Rx: gallstones

V

Valacyclovir (VALTREX): antiviral; Rx: herpes, shingles
VALCYTE (valganciclovir): antiviral; Rx: cytomegalovirus
VALIUM (diazepam): benzodiazepine hypnotic; Rx: anxiety, muscle spasms, seizures, alcohol withdrawal
Valproic acid (DEPAKENE): anticonvulsant; Rx: seizures, migraines, mania
Valsartan (DIOVAN): angiotensin II receptor inhibitor; Rx: HTN, CHF, post-MI
VALTREX (valacyclovir): antiviral; Rx: herpes, shingles
VANCOCIN (vancomycin): antibiotic; Rx: bacterial infections
Vancomycin (VANCOCIN): antibiotic; Rx: bacterial infections
VASERETIC (enalapril/HCTZ): ACE inhibitor/diuretic; Rx: HTN
VASOTEC (enalapril): ACE inhibitor; Rx: HTN, CHF
Venlafaxine (EFFEXOR): antidepressant; Rx: depression, anxiety, panic disorder
VENTOLIN (albuterol): β-2 agonist bronchodilator; Rx: asthma, COPD
Verapamil (CALAN): calcium channel blocker; Rx: angina, PSVT, HTN
VERELAN, VERELAN PM (verapamil): calcium blocker; Rx: angina, hypertension, PSVT
VESICARE (solifenacin): anticholinergic; Rx: overactive bladder
VIAGRA (sildenafil): vasodilator; Rx: erectile dysfunction
VIBRAMYCIN (doxycycline): tetracycline antibiotic; Rx: bacterial infections
VICODIN, VICODIN ES (hydrocodone/APAP): narcotic analgesic compound; Rx: moderate-to-severe pain
VIDEX (didanosine): antiretroviral; Rx: HIV
VIMPAT (lacosamide): anticonvulsant; Rx: partial onset Sz

VIOKASE (pancrelipase): pancreatic enzyme replacement; Rx: chronic pancreatitis, cystic fibrosis

VIRACEPT (nelfinavir): antiretroviral; Rx: HIV

VIRAMUNE (nevirapine): antiretroviral; Rx: HIV

VIREAD (tenofovir): antiretroviral; Rx: HIV, hepatitis B

VISTARIL (hydroxyzine): antihistamine; Rx: pruritis, sedation, anxiety

VIVELLE (estradiol): transdermal estrogen; Rx: symptoms of menopause

VOLTAREN (diclofenac): NSAID analgesic; Rx: arthritis, pain

VYTORIN (ezetimibe/simvastatin): antihyperlipidemics; Rx: high cholesterol

W

Warfarin (COUMADIN): anticoagulant; Rx: A-Fib, thrombosis

WELCHOL (colesevelam): bile acid sequestrant; Rx: hyperlipidemia

WELLBUTRIN (bupropion): antidepressant; Rx: depression

X

XALATAN OPTH (latanoprost): reduces intraocular pressure; Rx: glaucoma

XANAX, XANAX XR (alprazolam): benzodiazepine; Rx: anxiety disorder, panic attacks

XELODA (capecitabine): antineoplastic; Rx: breast cancer, colorectal cancer

XENICAL (orlistat): lipase inhibitor; Rx: obesity

XIFAXAN (rifaximin): antibiotic; Rx: traveler's diarrhea, hepatic encephalopathy

XOPENEX (levalbuterol): inhaled β-2 bronchodilator; Rx: asthma, COPD

Y

YASMIN 28 (drospirenone/estradiol): oral contraceptive

YAZ (drospirenone/estradiol): oral contraceptive

YODOXIN (iodoquinol): amebicide; Rx: intestinal amebiasis

Z

Zaleplon (SONATA): hypnotic; Rx: insomnia

ZANAFLEX (tizanidine): skeletal muscle relaxant

ZARONTIN (ethosuximide): anticonvulsant; Rx: absence Sz

ZAROXOLYN (metolazone): thiazide diuretic; Rx: HTN, fluid retention

ZEBETA (bisoprolol): β-blocker; Rx: HTN

ZEGERID (omeprazole/sodium bicarbonate): proton pump inhibitor compound; Rx: stress ulcer, ulcers, GERD

ZEMPLAR (paricalcitol): vitamin D analog; Rx: hyperparathyroidism in chronic kidney disease

ZERIT (stavudine d4T): antiretroviral; Rx: HIV

ZESTORETIC (lisinopril/HCTZ): ACE inhibitor/diuretic; Rx: HTN

ZESTRIL (lisinopril): ACE inhibitor; Rx: HTN, CHF

ZETIA (ezetimibe): antihyperlipidemic; Rx: hypercholesterolemia

ZIAC (bisoprolol/HCTZ): β blocker/diuretic; Rx: HTN

ZIAGEN (abacavir): antiretroviral; Rx: HIV

Zidovudine (AZT-RETROVIR): antiretroviral; Rx: HIV

ZINACEF (cefuroxime): cephalosporin antibiotic; Rx: bacterial infections

ZITHROMAX (azithromycin): macrolide antibiotic; Rx: bacterial infections

ZOCOR (simvastatin): statin; Rx: hypercholesterolemia, CAD

ZOFRAN (ondansetron): 5-HT3 receptor agonist; Rx: N/V due to chemotherapy, radiation, and surgery

ZOLADEX (goserelin): gonadotropin-releasing hormone agonist; Rx: endometriosis, prostate CA, breast CA

ZOLOFT (sertraline): antidepressant; Rx: depression, OCD, social anxiety disorder

Zolpidem (AMBIEN): hypnotic; Rx: insomnia

ZOMIG (zolmitriptan): serotonin receptor agonist; Rx: migraine headache

ZONEGRAN (zonisamide): anticonvulsant; Rx: partial seizures

Zonisamide (ZONEGRAN): anticonvulsant; Rx: partial seizures

ZOVIRAX (acyclovir): antiviral; Rx: herpes, shingles, chickenpox

ZYBAN (buproprion): antidepressant; Rx: smoking cessation

ZYFLO (zileuton): bronchospasm inhibitor; Rx: asthma
ZYLOPRIM (allopurinol): xanthine oxidase inhibitor; Rx: gout
ZYPREXA, ZYPREXA ZYDIS (olanzapine) antipsychotic; Rx: schizophrenia, bipolar disorder
ZYRTEC (cetirizine): antihistamine; Rx: allergy, hives, asthma
ZYRTEC D (cetirizine/pseudoephedrine): antihistamine/decongestant; Rx: allergic rhinitis
ZYVOX (linezolid): oxazolidinone antibiotic; Rx: bacterial infections

Abbreviations and Acronyms

1°	primary, first degree	ACLS	advanced cardiovascular life support
2°	secondary, second degree	ACT	activated coagulation time
3°	tertiary, third degree	ACTH	adrenocorticotropic hormone
α	alpha	A.D.	right ear
@	at	ADLs	activities of daily living
$\overline{a}$	before	AED	automated external defibrillator, antiepileptic drug
abd	abdomen	AF	atrial fibrillation
ABE	acute bacterial endocarditis	AIDS	acquired immunodeficiency syndrome
ABG	arterial blood gas	AKA	above-knee amputation, also known as
abn	abnormal	ALS	advanced life support
$\overline{ac}$	before meals	ALT	alanine aminotransferase
AC	alternating current	AMA	against medical advice
ACE	angiotensin-converting enzyme	AMI	acute myocardial infarction

Abbreviations and Acronyms (Cont'd)			
AMS	altered mental status	ax	axillary
ANS	autonomic nervous system	β	beta
ant.	anterior	BBB	bundle branch block
AODM	adult-onset diabetes mellitus	b.i.d.	twice each day
A-P, AP	anterior and posterior	bilat	bilateral
APAP	acetaminophen	BI s	blood sugar
APE	acute pulmonary edema	BLS	basic life support
aPTT	activated partial thromboplastin time	BM	bowel movement
ARB	angiotensin receptor blocker	BMI	body mass index
ARC	AIDS related complex	BP	blood pressure
ARDS	adult respiratory distress syndrome	bpm	beats per minute
ASA	acetylsalicylic acid (aspirin)	BS	bowel sounds
ASAP	as soon as possible	BSA	body surface area
ASHD	arteriosclerotic heart disease	BUN	blood urea nitrogen
AST	aspartate aminotransferase	BVM	bag-valve-mask
AV	arteriovenous, atrioventricular	$\overline{c}$	with
aVR, aVL, aVF	augumented voltage and leads (right shoulder, left shoulder, left foot)	C	centigrade, Celsius

Abbreviations and Acronyms (Cont'd)

Ca^{++}	calcium ion	COHB	carbonhemoglobin
CA	Cancer	COPD	chronic obstructive pulmonary disease
CAB	circulation, airway, breathing	CPK	creatine phosphokinase
CABG	coronary artery bypass graft	CPR	cardiopulmonary resuscitation
CaCl	calcium chloride	CN	capped needle, cranial nerve
CAD	coronary artery disease	CNS	central nervous system
CAO	conscious, alert, oriented	CO	cardiac output
CAT	computerized axial tomography	c/o	complaining of
CAVR	continuous arteriovenous rewarming	CO_2	carbon dioxide
CBC	complete blood count	CrCl	creatinine clearance
CBG	capillary blood glucose	CSF	cerebrospinal fluid
CC	chief complaint	CT	chest tube, computed tomography
CCU	coronary care unit	CV	cardiovascular
CHF	congestive heart failure	CVA	cerebrovascular accident (stroke)
CI	cardiac index	CVP	central venous pressure
CK	creatine kinase	cx	chest
CK-MB	creatine kinase-MB	D_5LR	dextrose 5% in lactated ringers

Abbreviations and Acronyms (Cont'd)			
D_5W	dextrose 5% in water	ECG	electrocardiogram
$D_{25}W$	dextrose 25% in water	ED	emergency department
$D_{50}W$	dextrose 50% in water	EEG	electroencephalogram
D_5NS	dextrose 5% in normal saline	EENT	eyes, ears, nose, and throat
DBP	diastolic blood pressure	EPS	extrapyramidal symptoms (dystonias, akathisia, etc.); electrophysiology study
DC, dc	direct current discontinue	ET	endotracheal
DIC	disseminated intravascular coagulation	$EtCO_2$	end tital CO_2
dL	deciliter (1/10 of 1 liter; 100 mL)	ETOH	ethanol (alcohol)
DKA	diabetic ketoacidosis	F	fahrenheit, female
DM	diabetes mellitus	Fem	female
DMARD	disease-modifying antirheumatic drug	FH	family history
DNR	do not resuscitate	FHR	fetal heart rate
DOA	dead on arrival	FHT	fetal heart tone
DOE	dyspnea on exertion	Fio_2	fraction of inspired oxygen
dT	diptheria tetanus	FFP	fresh frozen plasma
DTR	deep tendon reflex	FUO	fever of undetermined origin
Dx	diagnosis	Fv	fever
EBL	estimated blood loss	Fx	fracture

Abbreviations and Acronyms (Cont'd)

g, gm	gram	HIV	human immunodeficiency virus
GCS	Glasgow Coma Scale	HLA	human leukocyte antigen
GI	gastrointestinal	H&P	history and physical examination
Gr	grain	HR	heart rate
GSW	gun shot wound	hs	hour of sleep; bedtime
gtt	drop	HTN	hypertension
GU	genitourinary	Hx	history
GYN	gynecology	IABP	intra-aortic balloon pump
H^+	hydrogen ion	ICP	intracranial pressure
H/A	headache	ICS, IS	intercostal space
Hb, Hgb	hemoglobin	ICU	intensive care unit
HBP	high blood pressure	IDDM	insulin-dependent diabetes mellitus
HCO_3^-	bicarbonate ion	I/E	inspiratory to expiratory (time ratio)
HCL	hydrochloride	IJR	idiojunctional rhythm
Hct	hematocrit	IL	intralingual
HCTZ	hydrochlorothiazide	IM	intramuscular
HDL	high-density lipoprotein	INR	international normalized ratio
HEENT	head, eyes, ears, nose, and throat	I&O	intake and output
Hg	mercury	IO	intraosseous
Hib	*Haemophilus influenzae* type b	IPPB	intermittent positive pressure breathing

Abbreviations and Acronyms (Cont'd)			
I/U*	unapproved abbreviation; write out "International Units"	LGL	Lown-Ganong-Levine (syndrome)
IUD	intrauterine device	LLQ	lower left quadrant
IV	intravenous	LMA	laryngeal mask airway
IVP	IV push	LMP	last menstrual period
IVR	idioventricular rhythm	LOC	level of consciousness
JVD	jugular venous distention	LP	lumbar puncture
K^+	potassium ion	LR	lactated Ringers solution
KCl	potassium chloride	LS	lung sounds
kg	kilogram (1000 grams; 2.2 pounds)	LUQ	lower upper quadrant
KVO	keep vein open (30–60 µgtt/min)	LVEDP	left ventricular end-diastolic pressure
L, Ⓛ	left	LVH	left ventricular hypertrophy
L	liter	m	meter
LAD	left axis deviation	M	male, murmur
LBBB	left bundle branch block	MAO	monoamine oxidase
LCA	left coronary artery	MAP	mean arterial pressure
LDH	lactate dehydrogenase	mcg	(µg) microgram (1/1,000,000 of 1 gram)
LDL	low-density lipoprotein	MCH	mean corpuscular hemoglobin

Abbreviations and Acronyms (Cont'd)

MCHC	mean corpuscular hemoglobin concentration	N/A	not applicable
MCL	modified chest, left	NB	newborn (infant)
MCV	mean corpuscular volume	N&V, N/V	nausea and vomiting
mEq	milliequivalent	NaCl	sodium chloride
Mg^{++}	magnesium ion	NAD	no acute distress, no apparent distress
mg	milligram (1/1000 of 1 gram)	$NaHCO_3$	sodium bicarbonate
Mg SO_4	write out magnesium sulfate	Neuro	neurological
MI	myocardial infarction	NG	nasogastric
mL	milliliter (1/1000 of 1 liter; 1 mL)	NIDDM	non-insulin dependent diabetes mellitus
mm Hg	millimeters mercury	NKA	no known allergies
MOI	mechanism of injury	NPO	nothing by mouth
MRI	magnetic resonance imaging	NR	Normosol–R
MRSA	methicillin-resistant *Staphylococcus aureus*	NRB	nonrebreather (mask)
~~ms~~*	write out "millisecond"	NS	normal saline (0.9% NaCl)
~~MS~~*	write out multiple sclerosis, musculoskeletal	NSAID	nonsteroidal anti-inflammatory drug
~~MSO_4~~*	write out "morphine sulfate"	NSR	normal sinus rhythm
MVA	motor vehicle accident	NTG	nitroglycerin
Na^+	sodium ion	O_2	oxygen

Abbreviations and Acronyms (Cont'd)			
OB	obstetrics	PAOP	pulmonary artery occlusion pressure
OB/GYN	obstetrics/gynecology	PAP	pulmonary artery pressure
OD	overdose, right eye	PAS	pulmonary artery systolic
OLMC	online medical control	PAT	paroxysmal atrial tachycardia
Ophth	ophthalmology	PAWP	pulmonary artery wedge pressure
OS	left eye	PCA	patient-controlled analgesia
OTC	over the counter	PCI	percutaneous coronary intervention
OU	both eyes	Pco_2	partial pressure end-tidal CO_2
Oz	ounce	PCWP	pulmonary capillary wedge pressure
$\overline{p}$	after	PE	pulmonary embolus
PAC	premature atrial contraction	PEA	pulseless electrical activity
$Paco_2$	partial pressure arterial carbon dioxide	PEARL	pupils equal and react to light
PAD	pulmonary artery diastolic (pressure)	Ped	pediatric
PALS	pediatric advanced life support	PEEP	postive end-expiratory pressure
PAM	pulmonary artery mean	PTT	partial thromboplastin time
Pao_2	partial pressure arterial oxygen	$PETco_2$	end-tidal carbon dioxide

Abbreviations and Acronyms (Cont'd)

pH	hydrogen ion concentration (inverse)	PVR	pulmonary vascular resistance
PID	pelvic inflammatory disease	$\overline{q}$	every
PIH	pregnancy-induced hypertention	q.i.d.	four times daily
PLA	Plasma-Lyte A	R, Ⓡ	right
PMH	past medical history	RAD	right axis deviation
PND	paroxysmal nocturnal dyspnea	RAP	right atrial pressure
PO, p.o.	per os; by mouth	RBBB	right bundle branch block
PP	postpartum	RBC	red blood cell (or count)
PPD	purified protein derivative (TB)	RCA	right coronary artery
PPV	positive pressure ventilation	RL	Ringer lactate
PR	per rectum (rectally)	RLQ	right lower quadrant
preop	preoperative	R/O	rule out
prn	as needed	ROM	range of motion
PSVT	paroxysmal supraventricular tachycardia	ROSC	return of spontaneous circulation
Pt./Pts.	patient/patients	RR	respiratory rate
PT	prothrombin time	rtPA	recombinant tissue plasminogen activator
PTT	partial thromboplastin time	RUL	right upper lobe
PVC	premature ventricular contraction	RUQ	right upper quadrant

Abbreviations and Acronyms (Cont'd)			
RVH	right ventricular hypertrophy	Std	standard
Rx	prescribed for, used for	STD	sexually transmitted disease
SA	sinotrial	STEMI	ST-segment elevation myocardial infarction
SaO_2	arterial oxygen saturation	Susp	suspension
SC, SQ	subcutaneous	SV	stroke volume
SBP	systolic blood pressure	SVR	systemic vascular resistance
$ScvO_2$	central venous oxygen saturation	SVo_2	true mixed venous oxygen saturation
SGOT	serum glutamic-oxaloacetate transminase	SVT	supraventricular tachycardia
SGPT	serum glutamic pyruvic transaminase	SW	stab wound
SL	sublingual	Sx	symptoms
SLE	systemic lupus erythematosus	Syst	systolic
SLUDGE	salivation, lacrimation, urination, defecation, GI distress, emesis	Sz	seizure
SOB	shortness of breath	T	temperature
Spo_2	oxygen saturation via pulse oximetry	TB	tuberculosis
s/s	signs and symptoms	TCA	tricyclic antidepressant
Stat	immediately	TIA	transient ischemic attack

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Abbreviations and Acronyms (Cont'd)			
Tid	three times a day	VT	ventricular tachycardia
TIG	tetanus immune globulin	WBC	white blood cells
TKO	to keep open (30–60 µgtt/minute)	WNL	within normal limits
TM	tympanic membrane	WPW	Wolff-Parkinson-White (syndrome)
TPN	total parenteral nutrition	Wt	weight
TPR	temperature, pulse, and respiration	×	times
U*	write out "Unit"	y/o, yo	years old
UA	urinalysis	↓	decreased
URI	upper respiratory infection	↑	increased
UTI	urinary tract infection	µ	micro (1/1,000,000)
UV	umbilical vein, ultraviolet	Δ	change (delta)
VBG	venous blood gas	∅	no, none, null
VF	ventricular fibrillation	<	less than
Vo_2	consumption of oxygen	>	greater than
V-Q scan	ventilation-perfusion scan	≥	greater than or equal to
VS	vital signs	≤	less than or equal to

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