MCHD
Standard Delegated Orders

Standard Delegated Orders for the Montgomery County Hospital District EMS Service

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1. Introduction

1.1: Cover Page

Revised 10/16/2025

Montgomery County Hospital District

Standard Delegated Orders

Casey Patrick, MD
Medical Director

Michael DePasquale, MD
Associate Medical Director

1.2: Medical Director Statement

Revised 09/09/2025

All MCHD EMS personnel practice under the delegated authority of the Medical Director and must function within the approved Standard Delegated Orders (SDOs) as written in this document. These orders apply exclusively to MCHD personnel who are working under the medical direction of the MCHD EMS Medical Director in an official capacity.

Those of higher level clinical authorization may delegate tasks and procedures to those of lower clinical authorization under direct supervision.

MCHD SDOs define the expected out-of-hospital standard of care for MCHD personnel and are based upon current medical evidence, local practice standards, emerging technologies, and national organization positions. Each employee of the agency is expected to know and understand the SDOs up to their level of authorization and training.

The MCHD SDOs are intended to guide and direct patient care, and are not intended to be absolute treatment documents. No guideline can be written to cover every clinical situation that may be encountered, nor are these guidelines a substitute for good judgement and clinical experience. It is expected that MCHD personnel utilize their best clinical judgement to deliver care according to what is reasonable and prudent for each specific patient encounter. **SDOs deviations must be documented as an Unusual Occurrence.**

MCHD SDOs will be reviewed, at a minimum, every two years. The following SDOs are in effect as of this date:

September 8th, 2025

THESE GUIDELINES ARE NOT A SUBSTITUTE FOR GOOD CLINICAL JUDGEMENT

1.3: General Practice Authorization

Revised 08/11/2025

All Levels

The following may be performed on any patient as deemed clinically necessary:

- Airway management
- Oxygen administration
- Vital signs
- 3-lead EKG monitoring
- 12-lead EKG
- Blood glucose check

Paramedic

- Vascular access (IV or IO)

2. Airway

2.1: Airway Management

Revised 10/23/2025

All Levels

Airway Management

Provide Manual Ventilations as needed:

Reference document 10.16 / Manual Ventilations

Oropharyngeal Airways should be used in unconscious patients or patients without a gag reflex

Nasopharyngeal Airways are better tolerated in conscious patients or in the presence of gag reflex

Ventilation Rates:

Reference Mechanical Ventilation Reference

Pediatric Equipment Sies:

Reference Pediatric Equipment Sizes

Preoxygenation - Rule of 15s

Reference document 11.2 / Rule of 15s

Positioning

a) Consider the position of the patient and potential difficulty in airway management
b) Align external ear canal with sternal notch
c) Ensure "ramping" of obese patients
d) Elevate head of bed 15 degrees

Paramedic

Advanced Airway Management

Administer Ketamine to facilitate airway management, if needed:

Administer Ketamine (Airway Management), 4 mg/kg, via IM, conc. 50 mg/mL, 100 mg/mL. Note: Repeat q10min PRN

Administer Ketamine (Airway Management), 2 mg/kg, via IV, IO, conc. 50 mg/mL, 100 mg/mL. Note: Repeat q10min PRN

If intubation is indicated:

Reference document 2.3 / Delayed Sequence Intubation

Advanced Airway in Place (ETT or SGA)

(i) Verify advanced airway using capnography as soon as possible

(ii) Capnography must be monitored during the entirety of the patient encounter to ensure the advanced airway remains in the correct position

(iii) If endotracheal tube in place, make note of the depth of the tube at the patient's lips

If capnography does not confirm airway placement, or if there is any doubt as to the correct placement of the advanced airway:

▪ Remove the advanced airway immediately and ventilate the patient via BVM ventilations

Reference document 10.16 / Manual Ventilations

If contents are obstructing the endotracheal tube and the patient requires suctioning:

Reference document 10.2 / Airway Suctioning

If there is difficulty ventilating using an advanced airway:

Reference document 14.3 / DOPES (Ventilation Difficulty)

Provide Post-Airway Sedation:

Reference document 2.4 / Post-Airway Sedation

A nasogastric tube may be placed after endotracheal intubation, if time and clinical condition allows:

Reference document 10.19 / Nasogastric Tube Insertion

Tracheostomy Management

If tracheostomy is present:

Reference document 10.30 / Tracheostomy Management

2.2: Airway Obstruction/Choking

Revised 09/16/2025

All Levels

Conscious Patient

- If the patient is coughing, encourage the patient to continue coughing
- If the patient is unable to make any noise or cough, perform abdominal thrusts
- **For INFANTS:** Alternate 5 back blows and 5 chest compressions

Unconscious Patient

Proceed to CPR:

Reference document 10.6 / CPR

Paramedic

For the unconscious patient with suspected airway foreign body:

a) Perform laryngoscopy

b) If the foreign body is visualized, remove the foreign body using Magill forceps or large bore suction catheter

If an obstruction is visualized but unable to be removed, proceed to surgical airway:

Reference document 10.27 / Surgical Airway

Continue with Airway Management:

Reference document 2.1 / Airway Management

2.3: Delayed Sequence Intubation

Revised 10/16/2025

Paramedic Only

Pre-Intubation Checklist

☐ Set automatic BP cuff to q3minutes

☐ Full patient monitoring, including blood glucose, EtCO2, and 3-lead ECG

☐ Assign roles

☐ Verbalize backup plan

☐ Push-dose vasopressor mixed and drawn up into syringe

☐ Prepare suction, backup i-gel, and surgical airway plan

☐ Ensure Rule of 15s is applied

Reference document 11.2 / Rule of 15s

Induction

Perform induction with Ketamine, as described in the Airway Management protocol:

Reference document 2.1 / Airway Management

After administration of Ketamine, the patient must be continually monitored for **3 minutes** before consideration of paralysis

The patient must maintain **SpO2 ≥ 94%** and **SBP ≥ 90** for the **entire 3-minute duration**, or the **DSI attempt must be aborted** and **alternative airway management techniques should be used**.

Paralysis

Paralysis with Rocuronium:

Administer Rocuronium, 1 mg/kg, via IV, IO, conc. 10 mg/mL. Note: Contraindications Child < 45 kg

After paralysis, proceed with endotracheal intubation:

Reference document 10.9 / Endotracheal Intubation

Intubation Hard-Stops

Intubation attempts **must be stopped** if the **SpO2 falls below 90%**

◦ If this occurs, provide BVM ventilations until SpO2 recovers

Intubation Not Completed

If intubation is unsuccessful or if intubation Hard-Stops are not met:

◦ Place a supraglottic airway device, such as an i-gel

◦ If a supraglottic airway device is unavailable or is unable to be placed, proceed with BVM ventilations

If the patient is unable to be ventilated via any means, proceed with surgical airway:

Reference document 10.27 / Surgical Airway

Post Intubation

After successful intubation, reference Airway Management Guidelines:

Reference document 2.1 / Airway Management

Provide post-intubation sedation:

Reference document 2.4 / Post-Airway Sedation

2.4: Post-Airway Sedation

Revised 10/23/2025

Paramedic Only

For patients who are intubated or have a supraglottic airway in place, provide sedation with Ketamine:

Administer Ketamine (Post-Airway Sedation) (Push), 2 mg/kg, via IV, IO, conc. 50 mg/mL, 100 mg/mL. Note: Repeat q10min PRN if not using Ketamine drip

Followed by

For prolonged transport, if time allows:

Administer Ketamine (Post-Airway Sedation) (Drip), 2 mg/kg/hr, via IV, IO, conc. 50 mg/mL, 100 mg/mL, prepare in 500 mg in 100 mL

3. Cardiac Arrest

3.1: Cardiac Arrest

Revised 08/22/2025

This protocol is for medical cardiac arrest. For traumatic cardiac arrest:

Reference document 9.2 / Traumatic Cardiac Arrest

All Levels

Determine if resuscitation is medically appropriate:

Reference document 3.6 / Withholding Resuscitation / Obvious Death

Perform CPR, with emphasis on high compression fraction:

Perform CPR at 110 compressions per minute over 110

Reference document 10.6 / CPR

EMT

a) Apply AED as soon as possible and follow prompts

b) Continue BLS resuscitation until ALS arrives on scene

Paramedic

For all patients in cardiac arrest:

Administer Epinephrine, 1 mg, via IV, IO, conc. 0.1 mg/mL. Note: Repeat q3min x1

Administer Epinephrine, 0.01 mg/kg, via IV, IO, max single dose 1 mg, conc. 0.1 mg/mL. Note: Repeat q3min

Perform rhythm interpretation and proceed accordingly:

Reference document 3.2 / Asystole / PEA

Reference document 3.3 / Ventricular Fibrillation / Pulseless Ventricular Tachycardia

If ROSC is obtained:

Reference document 3.4 / Post-Arrest Care (ROSC)

If ongoing resuscitative efforts are felt to be futile, consider field termination:

Reference document 3.5 / Medical Termination of Resuscitation

3.2: Asystole / PEA

Revised 08/12/2025

Paramedic Only

Consider Hs and Ts early in resuscitation

If suspected hyperkalemia:

Reference document 6.9 / Hyperkalemia

If the patient is hypothermic:

Reference document 5.4 / Hypothermia

If suspected toxins, refer to the "Poisoning/Overdose" section

If rhythm changes to ventricular fibrillation or ventricular tachycardia:

Reference document 3.3 / Ventricular Fibrillation / Pulseless Ventricular Tachycardia

If ROSC is obtained:

Reference document 3.4 / Post-Arrest Care (ROSC)

If ongoing resuscitative efforts are felt to be futile, consider field termination:

Reference document 3.5 / Medical Termination of Resuscitation

3.3: Ventricular Fibrillation / Pulseless Ventricular Tachycardia

Revised 09/03/2025

Paramedic Only

*If the patient is **hypothermic** (below 85 F), attempt defibrillation only ONCE until the patient has been rewarmed. Do not administer medications while the patient is hypothermic.*

For patients in ventricular fibrillation or pulseless ventricular tachycardia:

Reference document 10.15 / Manual Defibrillation

Start medications only after Defibrillation has been performed:

Administer Amiodarone, 300 mg, via IV, IO, conc. 50 mg/mL

Administer Amiodarone, 5 mg/kg, via IV, IO, max single dose 150 mg, conc. 50 mg/mL. Note: First Dose

If >2 defibrillation attempts without conversion:

• Place a second set of pads in the anterior/lateral position and defibrillate using these pads for **vector change**, or perform **double sequential defibrillation** if a second defibrillator is available

Reference document 10.8 / Double Sequential Defibrillation

For refractory VF/VT after first antiarrhythmic dose:

Adult

Administer Amiodarone, 150 mg, via IV, IO, conc. 50 mg/mL

Followed by

Administer Esmolol, 0.5 mg/kg, via IV, IO, conc. 10 mg/mL

Followed by

Administer Lidocaine, 1 mg/kg, via IV, IO, conc. 20 mg/mL. Note: Contraindications: History of WPW

Followed by

Administer Magnesium Sulfate, 2 g, via IV, IO, conc. 500 mg/mL

Pediatric

Administer Amiodarone, 5 mg/kg, via IV, IO, max single dose 150 mg, conc. 50 mg/mL. Note: Second Dose
Repeat q5min x1 for Third Dose before moving to Lidocaine

Followed by

Administer Lidocaine, 1 mg/kg, via IV, IO, max single dose 100 mg, conc. 20 mg/mL.
Note: Contraindications:
History of WPW

Followed by

Administer Magnesium Sulfate, 50 mg/kg, via IV, IO, max single dose 2 g, conc. 500 mg/mL

Consider transport after 25 minutes of resuscitation with continued refractory VF/VT using mechanical CPR device

If rhythm changes to Asystole or PEA:

Reference document 3.2 / Asystole / PEA

If ROSC is obtained:

Reference document 3.4 / Post-Arrest Care (ROSC)

3.4: Post-Arrest Care (ROSC)

Revised 09/30/2025

All Levels

Patients who were previously in cardiac arrest are at high risk for subsequent re-arrest

Implement the following in post-ROSC patients prior to moving the patient off of the scene:

☐ Ensure a vasopressor is mixed and drawn up with dose ready to be administered

☐ Initiate vasopressor drip for blood pressure with SBP < 90 prior to patient movement

☐ 12-lead acquisition should be delayed at least 10 minutes post-ROSC

☐ Implement MOVES

Reference document 11.3 / MOVES

If the patient was noted to be in Ventricular Fibrillation or Ventricular Tachycardia while in cardiac arrest:

Administer Amiodarone, 300 mg, via IV, IO, conc. 50 mg/mL, prepare in 300 mg in 100 mL, administer 10 minutes. Note: Administer if the patient did not receive Amiodarone while in cardiac arrest

Followed by

Administer Amiodarone, 1 mg/min, via IV, IO, conc. 50 mg/mL, prepare in 150 mg in 100 mL

Ventilate the patient at the post-ROSC ventilation rate:

Reference Mechanical Ventilation Reference

3.5: Medical Termination of Resuscitation

Revised 08/04/2025

This protocol is for medical cardiac arrest. For traumatic cardiac arrest:

Reference document 9.2 / Traumatic Cardiac Arrest

Paramedic Only

Field termination is an option and not a directive. If unusual circumstances exist, proceed with transport.

Patients with the following presentations may not be considered for field termination:

• Pregnant

• Visible signs of life, such as breathing

• Unexpected cardiac arrest in care of MCHD

Patients **can be considered for field termination** after **25 minutes of resuscitation** and with the following interventions in place:

1. Vascular Access (IV or IO)

2. An advanced airway (Endotracheal tube or Supraglottic airway)

Upon consideration of termination, the following should be present:

1. Asystole **OR** PEA with a rate of < 30

2. Carotid ultrasound does not show evidence of carotid pulsations

To consider field termination, a District Chief must be on scene or consulted

Reference document 10.7 / District Chief Consult

Field termination requests must be approved by the on-call Medical Director

Reference document 10.17 / Medical Director Consult

Upon completion of the call, an MCHD provider should notify Life Gift:

Contact: Life Gift
Phones:
- Phone: +1 (800) 633 6562

3.6: Withholding Resuscitation / Obvious Death

Revised 08/12/2025

All Levels

Obvious Death

For any patient who is found pulseless and apneic, resuscitation should be withheld (and resuscitation in progress can be stopped) if ANY of the following indicators of obvious death are present:

a) Rigor mortis

b) Dependent lividity

c) Submersion in water for > 60 minutes, regardless of water temperature

d) Patient has injuries incompatible with life:

(i) Decapitation

(ii) Massive deformity of the head or chest

(iii) Hemicorporectomy

(iv) Incineration

e) Obvious traumatic cardiac arrest with initial rhythm of Asystole

If there is any doubt as to whether the patient meets obvious death criteria, resuscitative efforts should be initiated.

Do Not Resuscitate Orders

For any patient who is found pulseless and apneic, resuscitation should be withheld (and resuscitation in progress can be stopped) if:

◦ A valid and signed original or photocopied Do Not Resuscitate order or a Do Not Resuscitate medical wrist band is present

If family on scene requests resuscitation despite the presence of a valid DNR order:

◦ Make one attempt to explain the DNR order was signed by the patient when the patient was able to make their own decisions, and as medical providers we want to respect the patient's wishes

If family continues to request resuscitation, proceed with cardiac arrest resuscitation:

Reference document 3.1 / Cardiac Arrest

If there is any doubt as to whether the patient meets criteria for withholding resuscitation, resuscitative efforts should be initiated

Family Requests Withholding Resuscitation

If a family member on scene is requesting resuscitation be withheld, resuscitation should be withheld (and resuscitation in progress can be stopped) if ALL of the following are true:

a) All family members on scene agree to withhold resuscitation

b) The patient's age is ≥ 70

c) The patient has a known terminal illness **OR** is on hospice **OR** the presenting rhythm is **Asystole**

If the above criteria for withholding resuscitation are not met, **provide BLS resuscitative measures** and consult with a District Chief.

Reference document 10.7 / District Chief Consult

3.7: Pediatric Cardiac Arrest Doses

Revised 09/03/2025

Administer Epinephrine, 0.01 mg/kg, via IV, IO, max single dose 1 mg, conc. 0.1 mg/mL.
Note: Repeat q3min

Administer Amiodarone, 5 mg/kg, via IV, IO, max single dose 150 mg, conc. 50 mg/mL.
Note: First Dose

Administer Amiodarone, 5 mg/kg, via IV, IO, max single dose 150 mg, conc. 50 mg/mL.
Note: Second Dose
Repeat q5min x1 for Third Dose before moving to Lidocaine

Administer Lidocaine, 40 mcg/kg/min, via IV, IO, max total dose 1 mg/min, conc.
20 mg/mL. Note: Contraindications:
History of WPW

Administer Magnesium Sulfate, 50 mg/kg, via IV, IO, max single dose 2 g, conc.
500 mg/mL, administer 10 minutes

4. Cardiac

4.1: ACS / AMI

Revised 08/29/2025

All Levels

For chest pain suspected to be cardiac in nature:

Administer Aspirin (ASA), 324 mg, via PO. Note: Contraindications:
Known active bleeding

Paramedic

For chest pain suspected to be cardiac in nature:

Administer Nitroglycerin, 0.4 mg, via SL. Note: Repeat q5min PRN
If administration results in hypotension, withhold further doses

Contraindications:
Erectile dysfunction medication use in the last 24 hours
SBP < 120

If evidence of STEMI on 12-lead EKG, place therapy pads on patient and proceed with rapid transport to PCI-capable facility

For patients with continued pain:

Reference document 6.13 / Pain Management

If the patient becomes hypotensive:

Reference document 6.10 / Hypotension

4.2: CHF / Pulmonary Edema

Revised 09/30/2025

Paramedic Only

Administer Nitroglycerin (NTG), 0.8 mg, via SL. Note: Repeat q5min PRN
If administration results in hypotension, withhold further doses

Contraindications:
Erectile dysfunction medication use in the last 24 hours
SBP < 100
Head injury with altered mental status

For moderate to severe respiratory distress:

Administer Nitroglycerin (NTG), 1 mg, via IV, IO, conc. 0.1 mg/mL. Note: If SBP > 160 q5min PRN x1

Contraindications:
Patient intubated or preparing for DSI

Place patient on BiPAP:

Reference document 10.21 / Noninvasive Ventilation (BiPAP/CPAP)

If patient having difficulty tolerating BiPAP because of anxiety:

Reference document 6.3 / Anxiety Reaction

For hypotensive patients with pulmonary edema and CHF exacerbation (in cardiogenic shock), withhold fluid bolus and proceed to vasopressors.

Reference document 6.21 / Vasopressors

4.3: LVAD Patients

Revised 08/29/2025

All Levels

Patients with an LVAD may not have a palpable pulse. Use other signs, such as mental status, EtCO2, respiratory rate, and skin as signs of perfusion.

Never unplug any cables or wires from the patient's LVAD controller

Call the patient's LVAD coordinator for guidance:

Contact: Houston Methodist LVAD Coordinator
Phones:
- 24/7 On-Call: 346-238-5700

Note:

Contact: St. Luke's LVAD Coordinator
Phones:
- First Contact: 832-355-2285
- Second Contact: 832-355-4146

Contact: Memorial Hermann LVAD Coordinator
Phones:
- Paging Center: 713-704-4300

Note: Call Paging Center phone number and request the LVAD Coordinator

Bring the following LVAD supplies with the patient to the hospital:

• Two spare batteries

• One spare LVAD controller

If the patient is found in cardiac arrest, perform CPR:

Perform CPR at 110 compressions per minute over 110

Do NOT apply the Lucas device to a patient with LVAD in place

Reference document 3.1 / Cardiac Arrest

4.4: Narrow Complex Tachycardia

Revised 09/17/2025

Paramedic Only

If hyperkalemia is suspected:

Reference document 6.9 / Hyperkalemia

Determine if the patient is stable or unstable:

Calculate score Signs of Unstable Hypoperfusion

Stable

Atrial Fibrillation

Consider causes of Atrial Fibrillation with Rapid Ventricular Response:

Reference document 6.16 / Sepsis

Reference document 6.17 / Shortness of Breath

Reference document 4.2 / CHF / Pulmonary Edema

Non-Atrial Fibrillation / Regular SVT

Perform Modified Valsalva Maneuver if patient able to follow instructions:

Reference document 10.18 / Modified Valsalva Maneuver

If Valsalva Maneuver unsuccessful:

Administer Adenosine, 12 mg, via IV, conc. 3 mg/mL. Note: RAPID IV PUSH
Repeat q3min x1

Administer Adenosine, 0.2 mg/kg, via IV, max single dose 12 mg, conc. 3 mg/mL. Note: RAPID IV PUSH
Repeat q3min x1

Unstable

If unstable proceed with Synchronized Cardioversion:

Calculate score Signs of Unstable Hypoperfusion

Reference document 10.28 / Synchronized Cardioversion

Provide Procedural Sedation prior to Cardioversion if clinical circumstances allow:

Reference document 6.14 / Procedural Sedation

If Synchronized Cardioversion is unsuccessful:

Repeat Synchronized Cardioversion x1

If second Synchronized Cardioversion is unsuccessful:

Consult with **District Chief** for further treatment options

Reference document 10.7 / District Chief Consult

4.5: Symptomatic Bradycardia

Revised 09/30/2025

Paramedic Only

This protocol applies to patients with **symptomatic bradycardia**, which is defined as **bradycardia for patient age (see reference below)** and signs of hypoperfusion including altered mental status, syncope, or SBP < 90.

Reference Normal Vitals by Age

Bradycardia in children is often **respiratory related**. Consider respiratory causes prior to administration of medications for bradycardia or transcutaneous pacing.

If Bradycardia is felt to be secondary to Hyperkalemia:

Reference document 6.9 / Hyperkalemia

Determine if the patient is stable or unstable:

Calculate score Signs of Unstable Hypoperfusion

Stable

Administer Atropine, 1 mg, via IV, IO, conc. 0.1 mg/mL. Note: q5min PRN x3

Administer Atropine, 0.02 mg/kg, via IV, IO, max single dose 1 mg, conc. 0.1 mg/mL

Unstable

Administer Epinephrine (Push Dose), 20 mcg, via IV, IO, conc. 1 mg in 100 mL. Note: Repeat q5min PRN

Administer Epinephrine (Push Dose), 10 mcg, via IV, IO, conc. 1 mg in 100 mL. Note: Repeat q5min PRN

Followed by

Administer Epinephrine (Infusion), 2–20 mcg/min, via IV, IO, conc. 1 mg/mL, prepare in 5 mg in 500 mL. Note: For adult patients with profound hypotension, start infusion at 20 mcg/min
For adult patients with moderate hypotension, start infusion at 10 mcg/min

For profound hypotension requiring higher doses of vasopressor infusion:

Reference document 10.7 / District Chief Consult

If bradycardic despite Epinephrine administration, perform Transcutaneous Pacing:

Reference document 10.31 / Transcutaneous Pacing

Provide Procedural Sedation if clinical circumstances allow:

Reference document 6.14 / Procedural Sedation

4.6: Wide Complex Tachycardia

Revised 09/16/2025

Paramedic Only

If hyperkalemia is suspected:

Reference document 6.9 / Hyperkalemia

Determine if the patient is stable or unstable:

Calculate score Signs of Unstable Hypoperfusion

Stable

For patients with stable wide complex tachycardia without suspicion for hyperkalemia:

Administer Amiodarone, 150 mg, via IV, IO, conc. 50 mg/mL, prepare in 150 mg in 100 mL, administer 10 minutes

Followed by

Administer Amiodarone, 1 mg/min, via IV, IO, conc. 50 mg/mL, prepare in 150 mg in 100 mL. Note: Begin drip after patient has received at least 150mg of Amiodarone

If tachycardia refractory to initial antiarrhythmic agent:

Administer Lidocaine, 1 mg/kg, via IV, IO, conc. 20 mg/mL. Note: Contraindications: History of WPW

Followed by

Administer Magnesium Sulfate, 2 g, via IV, IO, conc. 500 mg/mL, prepare in 100 mL, administer 10 minutes

Unstable

If unstable proceed with Synchronized Cardioversion:

Reference document 10.28 / Synchronized Cardioversion

Provide Procedural Sedation prior to Cardioversion if clinical circumstances allow:

Reference document 6.14 / Procedural Sedation

If Synchronized Cardioversion is unsuccessful:

Repeat Synchronized Cardioversion x1

If second Synchronized Cardioversion is unsuccessful:

Consult with **District Chief** for further treatment options

Reference document 10.7 / District Chief Consult

Following successful cardioversion:

Administer Amiodarone, 150 mg, via IV, IO, conc. 50 mg/mL, prepare in 150 mg in 100 mL, administer 10 minutes

Followed by

Administer Amiodarone, 1 mg/min, via IV, IO, conc. 50 mg/mL, prepare in 150 mg in 100 mL

5. Environmental

5.1: Drowning

Revised 07/27/2025

All Levels

If the patient is pulseless and apneic:

Reference document 3.1 / Cardiac Arrest

Paramedic

If the patient presents with moderate or severe respiratory distress:

Reference document 10.21 / Noninvasive Ventilation (BiPAP/CPAP)

Airway management as indicated:

Reference document 2.1 / Airway Management

5.2: Hazmat Operations

Revised 08/05/2025

All Levels

Do not enter **HOT** or **WARM** zone unless cleared by HAZMAT team

If exposure is localized and not generalized:

- **Dry chemical:** brush off chemical and flush with copious amounts of water
- **Wet chemical:** irrigate with copious amounts of water

Irrigate on scene, as able, for at least 20 minutes

Paramedic

If suspected organophosphate poisoning:

Reference document 8.3 / Cholinergics / Organophosphate Poisoning

If the patient is seizing:

Reference document 6.15 / Seizure

5.3: Hyperthermia

Revised 08/28/2025

All Levels

1. Remove the patient's clothing and apply cold packs to the groin and axilla
2. Rectal temperature should be obtained on all hyperthermic patients, if possible

If temperature > 105 F and patient presents with altered mental status or seizure:

Reference document 10.11 / Immersion Cooling

District Chief consult required for cold water immersion in **patients ≥ 70 years old**

Paramedic

Administered cooled IV fluids:

Administer Normal Saline, 1000 mL, via IV, IO. Note: Repeat PRN

Administer Normal Saline, 20 mL/kg, via IV, IO, max single dose 1000 mL. Note: Repeat PRN x1

If the patient is actively seizing:

Reference document 6.15 / Seizure

5.4: Hypothermia

Revised 08/05/2025

All Levels

1. Passive rewarming in warm ambulance
2. Remove any wet clothing
3. Apply heat packs to the groin and axilla
4. Do not allow refreezing

Paramedic

Administer warmed IV fluids:

Administer Normal Saline, 1000 mL, via IV, IO. Note: Repeat PRN

Administer Normal Saline, 20 mL/kg, via IV, IO, max single dose 1000 mL. Note: Repeat PRN x1

If the patient is in cardiac arrest:

*If the patient is **hypothermic** (below 85 F), attempt defibrillation only ONCE until the patient has been rewarmed. Do not administer medications while the patient is hypothermic.*

Reference document 3.1 / Cardiac Arrest

5.5: Insect / Animal / Snake bite

Revised 07/21/2025

All Levels

1. Transport patient with wound above the level of the heart if possible
2. Avoid ice, heat, tourniquet, or manipulation of the site
3. Do not place IV access in affected extremity

Pain management as indicated:

Reference document 6.13 / Pain Management

6. General/Medical

6.1: Agitation Sedation

Revised 09/30/2025

Paramedic Only

All patients who receive sedation must have the SNORES bundle implemented:

Reference document 11.1 / SNORES

RASS Score should be determined prior to sedation:

Calculate score RASS Score

Severe agitation (RASS +4)

For patients <70 years old with severe agitation as measured by a RASS score of +4:

Intramuscular Ketamine

Administer Ketamine (Sedation), 250 mg, via IM, conc. 50 mg/mL, 100 mg/mL.
Note: Repeat q10min PRN x1
DC Consult required for 500 mg dose

Administer Ketamine (Sedation), 4 mg/kg, via IM, max single dose 250 mg, conc. 50 mg/mL, 100 mg/mL. Note: Repeat q10min PRN x1

OR

IV/IO Ketamine

Administer Ketamine (Sedation), 100 mg, via IV, IO, conc. 50 mg/mL, 100 mg/mL.
Note: Repeat q10min PRN x1

Administer Ketamine (Sedation), 2 mg/kg, via IV, IO, max single dose 100 mg, conc. 50 mg/mL, 100 mg/mL. Note: Repeat q10min PRN x1

District Chief consultation is required prior to Ketamine administration if:

- If the patient is ≥ 70 years old or ≤ 10 years old
- The patient's condition, acuity, or size dictate a starting IM dose of 500 mg
- A repeat dose of Ketamine is deemed necessary earlier than q10min

Reference document 10.7 / District Chief Consult

Moderate Agitation (RASS +2 to +3)

For patients with moderate agitation as measured by a RASS score of +2 to +3, **EITHER Midazolam OR Droperidol may be administered**:

Midazolam

Midazolam is the preferred agent for postictal agitation, alcohol withdrawal, or sympathomimetic use

Intramuscular

Administer Midazolam (Sedation) (Versed), via IM, conc. 5 mg/mL. Note: Repeat q10min PRN x1

Administer Midazolam (Sedation), 0.2 mg/kg, via IM, max single dose 10 mg, conc. 5 mg/mL. Note: Repeat q10min PRN x1

OR

IV/IO

Administer Midazolam (Sedation) (Versed), via IV, IO, conc. 5 mg/mL. Note: Repeat q10min PRN x1

Administer Midazolam (Sedation), 0.2 mg/kg, via IV, IO, max single dose 5 mg, conc. 5 mg/mL. Note: Repeat q10min PRN x1

Droperidol

Droperidol is the preferred agent for psychiatric agitation

Intramuscular

Administer Droperidol (Agitation Sedation), via IM, conc. 2.5 mg/mL. Note: Repeat q10min PRN x1

Contraindications:
Parkinson Disease
Prolonged QTc (> 500 ms)

OR

IV/IO

Administer Droperidol (Agitation Sedation), via IV, IO, conc. 2.5 mg/mL. Note: Repeat q10min PRN x1

Contraindications:
Parkinson Disease
Prolonged QTc (> 500 ms)

6.2: Allergic Reaction / Anaphylaxis

Revised 10/16/2025

Treat as anaphylaxis if there is suspected allergic reaction and ANY of the following are present:

- Hypotension
- Stridor
- Significant facial swelling
- Airway obstruction
- Diffuse body rash **WITH** vomiting OR diarrhea

All Levels

If the patient presents with anaphylaxis:

Administer Epinephrine (Anaphylaxis), 0.5 mg, via IM, conc. 1 mg/mL. Note: Repeat q5min PRN

Administer Epinephrine, 0.01 mg/kg, via IM, max single dose 0.5 mg, conc. 1 mg in 1 mL. Note: Repeat q5min PRN

Paramedic

After administration of Epinephrine in anaphylaxis, or if the patient presents with a mild allergic reaction:

Administer Diphenhydramine (Benadryl), 25 mg, via IV, IO, IM, conc. 50 mg/mL

Administer Diphenhydramine (Benadryl), 1 mg/kg, via IV, IO, IM, max single dose 25 mg, conc. 50 mg/mL

Followed by

Administer Methylprednisolone (Solu-Medrol), 125 mg, via IV, IO, IM, conc. 62.5 mg/mL

Administer Methylprednisolone (Solu-Medrol), 2 mg/kg, via IV, IO, IM, max single dose 125 mg, conc. 62.5 mg/mL

If wheezing is present:

Administer Albuterol Sulfate, 2.5 mg, via Nebulized, conc. 2.5 mg in 3 mL. Note: Repeat q5min PRN

Administer Ipratropium, 0.5 mg, via Nebulized, conc. 0.5 mg in 3 mL. Note:
Contraindications:
History of Glaucoma

If the patient remains hypotensive:

Reference document 6.21 / Vasopressors

6.3: Anxiety Reaction

Revised 09/30/2025

Paramedic Only

For general anxiolysis:

Administer Midazolam (Anxiety/Dystonic Reaction), via IV, IO, IM, conc. 5 mg/mL. Note: Repeat q10min PRN x1

If patient having difficulty tolerating BiPAP because of anxiety:

Administer Ketamine (BiPAP Intolerance), 20 mg, via IV, conc. 50 mg/mL, 100 mg/mL. Note: q10min PRN x1

6.4: Diabetic Emergencies

Revised 09/08/2025

All Levels

Hypoglycemia

Hypoglycemia is defined as a **blood glucose level less than 70 mg/dL**

Blood glucose measurement of 40 mg/dL **should be treated regardless of other signs or symptoms**

A blood glucose measurement that appears inconsistent with the patient presentation should be repeated

Once the patient's blood sugar has been corrected, if the patient is not transported to the hospital, attempt to have the patient consume protein or complex carbohydrates such as peanut butter or starch

If the patient can tolerate PO:

Administer Oral Glucose, 30 g, via PO. Note: Repeat q5min PRN

EMT

If the patient cannot tolerate PO:

Administer Glucagon, 1 mg, via IM

Glucagon administration should be followed by oral glucose once the patient can follow commands

Paramedic

Administer Dextrose 10%, 25 g, via IV, IO, conc. 25 g in 250 mL, administer 10 minutes. Note: Repeat q5min PRN

Contraindications:
Head injury with altered mental status

Administer Dextrose 10%, 0.5 g/kg, via IV, IO, max single dose 25 g, conc. 25 g in 250 mL, administer 10 minutes. Note: Repeat q5min PRN

Contraindications:
Head injury with altered mental status

If unable to establish vascular access:

Administer Glucagon, 1 mg, via IM

Glucagon administration should be followed by oral glucose once the patient can follow commands

Hyperglycemia

Paramedic Only

Proceed with fluid resuscitation if BGL > 180 and any one of the following is present:

◦ Altered mental status

◦ Tachypnea

◦ Abdominal pain

◦ Hypotension

◦ Tachycardia

Administer Normal Saline, 1000 mL, via IV, IO. Note: Repeat PRN

Administer Normal Saline, 20 mL/kg, via IV, IO, max single dose 1000 mL. Note: Repeat PRN x1

6.5: Dystonic Reaction

Revised 10/14/2025

Paramedic Only

Administer Diphenhydramine (Benadryl), 25 mg, via IV, IO, IM, conc. 50 mg/mL

Administer Diphenhydramine (Benadryl), 1 mg/kg, via IV, IO, IM, max single dose 25 mg, conc. 50 mg/mL

If no response from diphenhydramine:

Administer Midazolam (Anxiety/Dystonic Reaction), via IV, IO, IM, conc. 5 mg/mL. Note: Repeat q10min PRN x1

Administer Midazolam (Dystonic Reaction) (Versed), 0.2 mg/kg, via IV, IO, IM, max single dose 1 mg, conc. 5 mg/mL

6.6: End of Life Care

Revised 08/14/2025

All Levels

This protocol is for patients who are in the end stage of life. These patients are usually on hospice.

1. **Determine who can make medical decisions for the patient:**
   a) If the patient is alert and oriented with **medical decision making capacity**, the patient shall determine all aspects of care
      - The presence of a medical power of attorney does not supersede the patient's ability to make their own decisions, if the patient has medical decision making capacity

   b) If the patient is unable to make their own decisions, medical power of attorney may make treatment decisions

   c) If no medical power of attorney, on-scene family members may make treatment decisions

   d) If the patient is enrolled in hospice, the hospice nurse may make treatment decisions
2. Attempt to locate any Do Not Resuscitate paperwork
3. If the patient is enrolled in hospice, attempt to contact the hospice nurse

Manage pain as needed:

Reference document 6.13 / Pain Management

Provide non-invasive airway support as needed:

Reference document 2.1 / Airway Management

Treatment Priorities

- Many hospice patients may not wish to be transported to the hospital
- Encourage family to provide the patient with home medications
- If the patient is enrolled in hospice, defer transport decision to hospice nurse
- Honor and respect patient and family treatment decisions

Paramedic

- May assist in administration of the patient's home medications

◦ For patients enrolled in hospice, **treatment without transport** is authorized if hospice nurse is on scene or enroute to home, with District Chief consultation

Reference document 10.7 / District Chief Consult

6.7: Epistaxis

Revised 10/14/2025

All Levels

Apply direct pressure to nose, use nasal clamp, do not remove clamp

Paramedic

For uncontrollable epistaxis refractory to nasal pressure, remove clamp, have patient blow nose completely, then:

Administer Tranexamic Acid (Epistaxis) (TXA), 100 mg, via IN, conc. 100 mg/mL.
Note: One dose in each bleeding nostril

After TXA administration, apply nasal clamp and do not remove clamp

6.8: Fever

Revised 09/08/2025

All Levels

For fever as defined as a temperature > 38 degrees C or > 100.3 degrees F:

Administer Acetaminophen (Tylenol), 975 mg, via PO, conc. 32.5 mg/mL

Administer Acetaminophen (Ofirmev, apap, tylenol), 15 mg/kg, via PO, max total dose 975 mg, conc. 32.5 mg/mL

Paramedic

If the patient is unable to take Acetaminophen PO:

Administer Acetaminophen, 1000 mg, via IV, IO, conc. 1000 mg in 100 mL, administer 10 minutes

Administer Acetaminophen (Ofirmev, apap, tylenol), 15 mg/kg, via IV, IO, max single dose 1000 mg, conc. 1000 mg in 100 mL, administer 10 minutes

6.9: Hyperkalemia

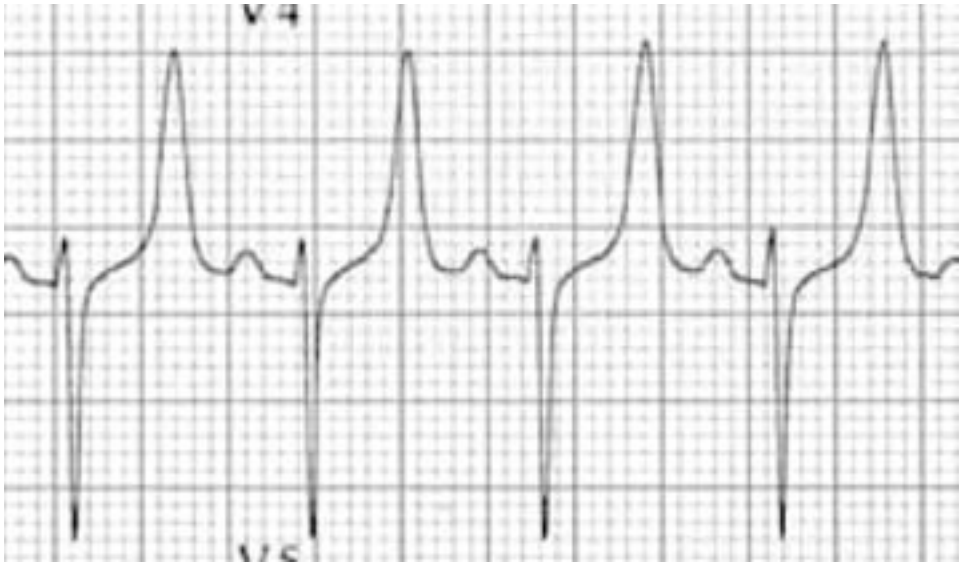
Revised 09/30/2025

Paramedic Only

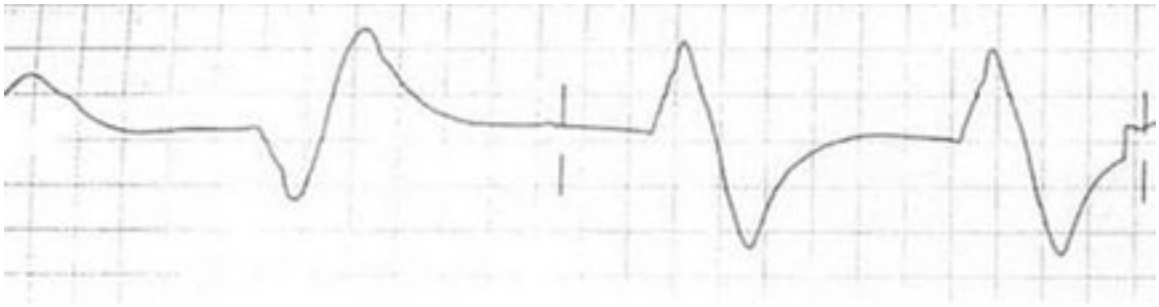
This protocol applies to patients for whom hyperkalemia is suspected, and there is clinical evidence of hyperkalemia by acute EKG findings

EKG findings that are consistent with hyperkalemia:

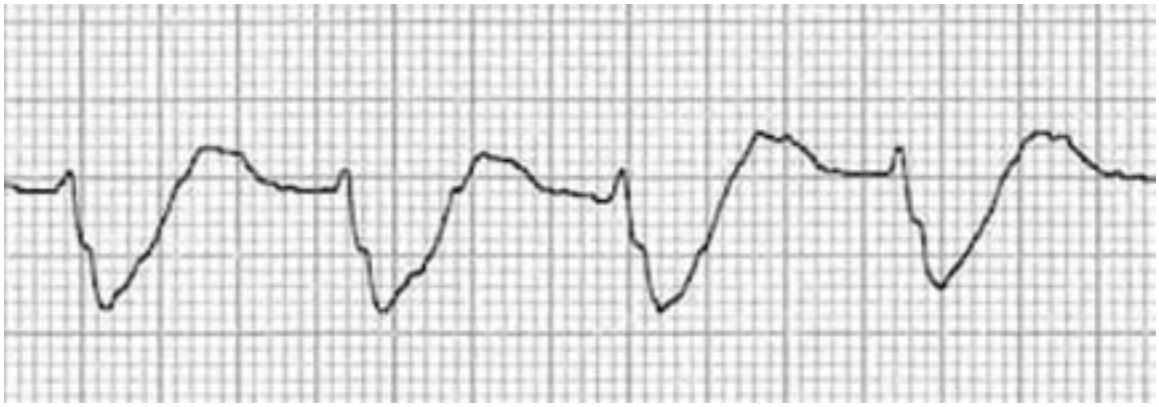
- **Unstable bradycardia**
  - **Do NOT perform Transcutaneous Pacing for symptomatic bradycardia in the setting of suspected Hyperkalemia**
- **Peaked T waves:**



- **Sine wave tachycardia:**



- **QRS widening, often very wide with QRS duration > 240:**



Administer Calcium Chloride, 1 g, via IV, IO, conc. 100 mg/mL. Note: Repeat q5min x1

Administer Calcium Chloride, 20 mg/kg, via IV, IO, max single dose 1 g, conc. 100 mg/mL. Note: Repeat q5min x1

Followed by

Administer Albuterol Sulfate, 2.5 mg, via Nebulized, conc. 2.5 mg in 3 mL. Note: Repeat q5min PRN

Followed by

If using one IV, flush line completely after Calcium Chloride administration before administering Sodium Bicarbonate

Administer Sodium Bicarbonate, 100 mEq, via IV, IO, conc. 5 mEq/mL. Note: Repeat q10min PRN x1

Administer Sodium Bicarbonate, 1 mEq/kg, via IV, IO, max single dose 100 mEq, conc. 5 mEq/mL. Note: Repeat q10min PRN x1

6.10: Hypotension

Revised 09/17/2025

Paramedic Only

This protocol is for **symptomatic hypotension**, which is defined as **SBP < 90** or **MAP < 65** for adults, or SBP below appropriate level for age in pediatrics, **AND** symptoms of hypoperfusion.

Reference Normal Vitals by Age

Calculate score Signs of Unstable Hypoperfusion

If the patient is suspected to be hypovolemic:

Administer Normal Saline, 1000 mL, via IV, IO. Note: Repeat PRN

Administer Normal Saline, 20 mL/kg, via IV, IO, max single dose 1000 mL. Note: Repeat PRN x1

If the patient remains hypotensive:

Reference document 6.21 / Vasopressors

6.11: Malnutrition

Revised 09/08/2025

Paramedic Only

If malnutrition is suspected:

Administer Thiamine, 100 mg, via IV, IO, conc. 100 mg/mL. Note: Administer prior to the administration of dextrose

Administer Thiamine, 25 mg, via IV, IO, conc. 100 mg/mL. Note: Administer prior to the administration of dextrose

6.12: Nausea and Vomiting

Revised 09/08/2025

All Levels

Administer Ondansetron ODT, 4 mg, via ODT. Note: Repeat q5min PRN x4

Administer Ondansetron ODT, 4 mg, via ODT. Note: For Patient Weight ≥ 30 kg Repeat q5min PRN x1

Paramedic

Administer Ondansetron OR Droperidol:

Administer Ondansetron (Zofran), 4 mg, via IV, IO, IM, IN, conc. 2 mg/mL. Note: Repeat q5min PRN x2

Administer Ondansetron, via IV, IO, IM, IN, conc. 2 mg/mL. Note: Repeat q5min PRN x1

OR

Administer Droperidol (Nausea), via IM, conc. 2.5 mg/mL. Note: Repeat q10min PRN x1

Contraindications:
Parkinson Disease
Prolonged QTc (> 500 ms)

Administer Droperidol (Nausea), via IV, IO, conc. 2.5 mg/mL. Note: Repeat q10min PRN x1

Contraindications:
Parkinson Disease
Prolonged QTc (> 500 ms)

6.13: Pain Management

Revised 09/30/2025

All Levels

Administer Nitrous Oxide, 1 patient actuated breath, via Inhaled. Note: PRN; patient controlled
50% N2O / 50% O2
Use in well ventilated areas
Patient must be alert and oriented
If side effects occur, discontinue inhalation therapy and apply 100% oxygen for at least 5 minutes

Contraindications:
History of COPD
Chest trauma

Administer Acetaminophen (Tylenol), 975 mg, via PO, conc. 32.5 mg/mL

Administer Acetaminophen (Ofirmev, apap, tylenol), 15 mg/kg, via PO, max total dose 975 mg, conc. 32.5 mg/mL

Paramedic

Mild to Moderate pain

If the patient is unable to take Acetaminophen PO:

Administer Acetaminophen, 1000 mg, via IV, IO, conc. 1000 mg in 100 mL, administer 10 minutes

Administer Acetaminophen (Ofirmev, apap, tylenol), 15 mg/kg, via IV, IO, max single dose 1000 mg, conc. 1000 mg in 100 mL, administer 10 minutes

Administer Ketorolac (Toradol), 15 mg, via IV, IO, IM, conc. 30 mg/mL. Note:
Contraindications:
Age ≥ 70 or <18
Pregnant women
History of chronic kidney disease
Known active bleeding
Blood thinner use

Severe Pain

Avoid multiple analgesic medications, unless clinical circumstances warrant it

Fentanyl

Administer Fentanyl, 1 mcg/kg, via IV, IO, IN, IM, max single dose 100 mcg, conc. 50 mcg/mL. Note: Repeat q10min PRN
Dose up to next 25 mcg
District Chief consult required for patients ≤ 10 kg

District Chief consult required for patients ≤ 10 kg:

Reference document 10.7 / District Chief Consult

Ketamine

Administer Ketamine (Pain), 20 mg, via IV, IO, IM, conc. 50 mg/mL, 100 mg/mL. Note: Repeat q10min PRN

OR

Administer Ketamine (Pain), 1 mg/kg, via Nebulized, max single dose 100 mg, conc. 50 mg/mL, 100 mg/mL. Note: Mix with saline to a total of 5 mL of volume
Must use Breath Actuated Nebulizer
Patient must be able to self-administer
No repeat dose

Analgesia after IO Insertion

After insertion of an IO needle in a conscious patient:

Administer Lidocaine (IO Insertion), 50 mg, via IO, conc. 20 mg/mL

Administer Lidocaine (IO Insertion), 0.5 mg/kg, via IO, max single dose 50 mg, conc. 20 mg/mL

6.14: Procedural Sedation

Revised 09/30/2025

Paramedic Only

• For patients undergoing painful procedures, provide procedural sedation if the clinical scenario allows

District Chief consult required if patient age ≥ 70

Reference document 10.7 / District Chief Consult

Administer Ketamine (Sedation), 100 mg, via IV, IO, conc. 50 mg/mL, 100 mg/mL. Note: Repeat q10min PRN x1

Administer Ketamine (Sedation), 2 mg/kg, via IV, IO, max single dose 100 mg, conc. 50 mg/mL, 100 mg/mL. Note: Repeat q10min PRN x1

Procedural sedation should be considered for the following procedures:

Reference document 10.28 / Synchronized Cardioversion

Reference document 10.31 / Transcutaneous Pacing

For other painful procedures, such as patient extrication, consult the District Chief for Procedural Sedation orders:

Reference document 10.7 / District Chief Consult

6.15: Seizure

Revised 09/30/2025

Paramedic Only

If the patient is actively seizing:

Administer Midazolam (Seizure), via IM, conc. 5 mg/mL. Note: Repeat q5min PRN x1

Administer Midazolam (Seizure), 0.2 mg/kg, via IM, max single dose 10 mg, conc. 5 mg/mL. Note: Repeat q5min PRN x1

OR

Administer Midazolam (Seizure), via IV, IO, conc. 5 mg/mL. Note: Repeat q5min PRN x1

Administer Midazolam (Seizure), 0.2 mg/kg, via IV, IO, max single dose 5 mg, conc. 5 mg/mL. Note: Repeat q5min PRN x1

Implement SNORES care bundle:

Reference document 11.1 / SNORES

If the patient is postictal and a potential harm to themselves or others:

Reference document 6.1 / Agitation Sedation

District Chief consult required for additional doses of Midazolam:

Reference document 10.7 / District Chief Consult

6.16: Sepsis

Revised 10/06/2025

All Levels

If there is concern for Sepsis, complete a qSOFA score. If score ≥ 2, alert the receiving facility of a Sepsis Alert.

Calculate score qSOFA

If the patient is hypotensive:

Reference document 6.10 / Hypotension

If the patient is febrile:

Reference document 6.8 / Fever

6.17: Shortness of Breath

Revised 10/14/2025

EMT

If patient has a history of COPD or Asthma and wheezing is present:

Administer Albuterol Sulfate, 2.5 mg, via Nebulized, conc. 2.5 mg in 3 mL. Note: Repeat q5min PRN

Paramedic

If wheezing is present:

Administer Albuterol Sulfate, 2.5 mg, via Nebulized, conc. 2.5 mg in 3 mL. Note: Repeat q5min PRN

Administer Ipratropium, 0.5 mg, via Nebulized, conc. 0.5 mg in 3 mL. Note:
Contraindications:
History of Glaucoma

Administer Methylprednisolone (Solu-Medrol), 125 mg, via IV, IO, IM, conc. 62.5 mg/mL

Administer Methylprednisolone (Solu-Medrol), 2 mg/kg, via IV, IO, IM, max single dose 125 mg, conc. 62.5 mg/mL

If respiratory distress is severe:

Administer Magnesium Sulfate, 2 g, via IV, IO, conc. 500 mg/mL, prepare in 100 mL, administer 10 minutes

Administer Magnesium Sulfate, 50 mg/kg, via IV, IO, max single dose 2 g, conc. 500 mg/mL, administer 10 minutes

If significant respiratory distress, consider Noninvasive Ventilation:

Reference document 10.21 / Noninvasive Ventilation (BiPAP/CPAP)

If patient having difficulty tolerating BiPAP because of anxiety:

Administer Ketamine (BiPAP Intolerance), 20 mg, via IV, conc. 50 mg/mL, 100 mg/mL. Note: q10min PRN x1

If patient has a history of Asthma or Asthma is felt to be the etiology, and the patient's respiratory distress is not improving with inhaled medications:

Administer Epinephrine (Asthma), 0.5 mg, via IM, conc. 1 mg/mL. Note: Repeat q5min PRN

Contraindications:
History of COPD

Administer Epinephrine, 0.01 mg/kg, via IM, max single dose 0.5 mg, conc. 1 mg in 1 mL. Note: Repeat q5min PRN

If Croup is suspected:

Administer Epinephrine (Croup), 1 mg, via Nebulized, conc. 1 mg/mL. Note: Dilute in 3mL Normal Saline
Repeat q5min PRN x1

Administer Methylprednisolone (Solu-Medrol), 2 mg/kg, via IV, IO, IM, max single dose 125 mg, conc. 62.5 mg/mL

If Airway Management is needed:

Reference document 2.1 / Airway Management

6.18: Stroke / CVA

Revised 09/08/2025

All Levels

1. Perform prehospital stroke scale using LAMS:

   Calculate score LAMS Score

2. Obtain blood glucose level

3. Make every attempt to identify the "last known well" (LKW) time of the patient, which is the last time the patient was seen well, not when the patient was discovered to be symptomatic.

4. Prevent hypotensive or hypoxic episodes as these worsen outcomes in stroke patients

5. Notify receiving facility as soon as reasonable possible of incoming Stroke Alert and provide LKW time

6. Transport patient with HOB 15 elevated degrees

If the patient is hypoglycemic:

Reference document 6.4 / Diabetic Emergencies

Paramedic

If SBP > 185 or DBP > 110:

Administer Labetalol, 10 mg, via IV, IO, conc. 5 mg/mL. Note: SLOW PUSH
Repeat q5min x1 for refractory hypertension
Goal is reduction in SBP by 15%

Contraindications:
HR < 50

If the patient seizes:

Reference document 6.15 / Seizure

6.19: Syncope

Revised 09/08/2025

All Levels

For any patient who presents with syncope:

Reference document 10.1 / 12-lead EKG

If the patient is hypotensive:

Reference document 6.10 / Hypotension

If the patient is hyper/hypoglycemic:

Reference document 6.4 / Diabetic Emergencies

6.20: Transport to Dialysis Center

Revised 09/08/2025

All Levels

This protocol is only in effect at the direct order of the Medical Director

In the event of an emergency or disaster situation, patients requiring dialysis may be transported to their dialysis center by MCHD if no other means are available

The patient may be transported to a dialysis center if the following criteria are met:

• Patient is without acute illness such as hemodynamic instability, profound dyspnea, fever, vomiting, or other concerning symptoms

• Patient is agreeable to transport to an outpatient dialysis facility, even if it may not be their usual facility

If the patient is to be transported to an outpatient dialysis facility, consult with a District Chief to determine availability

6.21: Vasopressors

Revised 09/08/2025

Paramedic Only

Norepinephrine is the vasopressor of choice and should be administered first-line. However, Epinephrine should be administered first in patients who meet any of the following criteria:

• Anaphylaxis

• Bradycardia

• Severe Asthma

Administer Norepinephrine in trauma patients with SBP < 90 AND altered mentation

Norepinephrine

Administer Push-dose first:

Administer Norepinephrine (Push Dose) (NE), 16 mcg, via IV, IO, conc. 4 mg in 500 mL. Note: Repeat q5min PRN

Administer Norepinephrine (Push Dose), 8 mcg, via IV, IO, conc. 4 mg in 500 mL. Note: Repeat q5min PRN

If the patient remains hypotensive, consider continuous infusion:

Administer Norepinephrine (Infusion) (Levophed), 2–20 mcg/min, via IV, IO, conc. 1 mg/mL, prepare in 4 mg in 500 mL. Note: For adult patients with profound hypotension, start infusion at 20 mcg/min
For adult patients with moderate hypotension, start infusion at 10 mcg/min

Epinephrine

Administer Push-dose first:

Administer Epinephrine (Push Dose), 20 mcg, via IV, IO, conc. 1 mg in 100 mL. Note: Repeat q5min PRN

Administer Epinephrine (Push Dose), 10 mcg, via IV, IO, conc. 1 mg in 100 mL. Note: Repeat q5min PRN

If the patient remains hypotensive, consider continuous infusion:

Administer Epinephrine (Infusion), 2–20 mcg/min, via IV, IO, conc. 1 mg/mL, prepare in 5 mg in 500 mL. Note: For adult patients with profound hypotension, start infusion at 20 mcg/min
For adult patients with moderate hypotension, start infusion at 10 mcg/min

For profound hypotension requiring higher doses of vasopressor infusion:

Reference document 10.7 / District Chief Consult

7. Obstetrical

7.1: Pre-Eclampsia / Eclampsia

Revised 09/16/2025

Paramedic Only

• Pre-eclampsia can occur in women who are ≥ 20 weeks pregnant or up to 6 weeks post-partum

• Pre-eclampsia is defined as SBP > 140 OR DBP > 90 with **ANY** one of the following:

- Headache
- Nausea or vomiting
- Peripheral edema
- Abdominal pain

For patients with pre-eclampsia:

Administer Magnesium Sulfate, 4 g, via IV, IO, conc. 500 mg/mL, administer 10 minutes. Note: Repeat q10min PRN x1

If SBP > 140 despite Magnesium Sulfate:

Administer Labetalol, 10 mg, via IV, IO, conc. 5 mg/mL. Note: SLOW PUSH

If the patient begins to seize:

Reference document 6.15 / Seizure

7.2: Childbirth / Imminent Delivery

Revised 08/11/2025

All Levels

If delivery is imminent and the patient is crowning:

1. Support child's head with gentle downward pressure
2. Once anterior shoulder has been delivered, apply upward pressure
3. Once the neonate has delivered, clamp umbilical cord approximately 10cm and 12cm from the navel, and cut cord between clamps
4. Do not attempt to deliver the placenta. If the placenta delivers spontaneously, collect the all placental material in a bag.

If the presenting fetal part is a limb or the presentation is breech:

1. Do NOT attempt delivery
2. Rapid emergent transport to OB-capable facility

If the presenting fetal part is a prolapsed umbilical cord:

1. Do NOT attempt delivery
2. Rapid emergent transport to OB-capable facility
3. Wrap umbilical cord in moist sterile dressing
4. Insert gloved hand into vagina and attempt to elevate the presenting fetal part off of the umbilical cord to present cord compression
5. Transport mother in the prone knee-to-chest position

Once the neonate is delivered:

Reference document 7.3 / Neonatal Care

If there is significant post-partum hemorrhage:

Reference document 7.4 / Post-Partum Hemorrhage

If the mother is hypotensive:

Reference document 6.10 / Hypotension

7.3: Neonatal Care

Revised 09/02/2025

All Levels

1. After delivery, rub neonate vigorously using towel to remove vernix and stimulate
2. Assess heart rate and respiratory rate
3. Determine APGAR

Calculate score APGAR

If HR and RR appropriate:

1. Wrap neonate in Aegis wrap or blanket
2. Give neonate to mother
3. Allow skin-to-skin with mother
4. Encourage breastfeeding

If HR < 60, neonate is apneic, or has depressed respirations:

1. Perform BVM ventilations
2. It is okay to apply supplemental oxygen to neonates
3. Place neonate in an insulated bag if performing resuscitation

If after one minute HR remains <60:

1. Start chest compressions

Reference document 3.1 / Cardiac Arrest

If there is concern for opiates:

Reference document 8.5 / Opiate Overdose

7.4: Post-Partum Hemorrhage

Revised 10/14/2025

All Levels

If there is significant post-partum bleeding after delivery of the fetus and/or placenta:

1. Encourage the neonate to suckle
2. Fundal massage

Paramedic

If the patient becomes hypotensive (SBP < 90):

Administer Tranexamic Acid (Bleeding/Trauma) (TXA), 2 g, via IV, IO, conc. 100 mg/mL.
Note: For bleeding within the last 3 hours
Slow push over 3 minutes

Reference document 6.10 / Hypotension

8. Overdose/Poisoning

8.1: Carbon Monoxide

Revised 08/11/2025

All Levels

1. Provide 100% O2 via NRB
2. Evaluate CO level if equipped
3. Remember CO exposure can provide falsely normal SpO2 readings

If the patient is in significant respiratory distress or unresponsive:

Reference document 2.1 / Airway Management

8.2: Cardiotoxins

Revised 08/11/2025

Paramedic Only

If the patient presents hypotensive:

Reference document 6.21 / Vasopressors

If QRS widening present (>120 ms):

Administer Sodium Bicarbonate, 100 mEq, via IV, IO, conc. 5 mEq/mL. Note: Repeat q10min PRN x1

Administer Sodium Bicarbonate, 1 mEq/kg, via IV, IO, max single dose 100 mEq, conc. 5 mEq/mL. Note: Repeat q10min PRN x1

Calcium Channel Blockers

Examples of calcium channel blockers:

- Diltiazem (Cardizem)
- Amlodipine (Norvasc)
- Nifedipine (Procardia)
- Verapamil (Verelan)

Administer Calcium Chloride, 1 g, via IV, IO, conc. 100 mg/mL. Note: Repeat q5min x1

Administer Calcium Chloride, 20 mg/kg, via IV, IO, max single dose 1 g, conc. 100 mg/mL. Note: Repeat q5min x1

Administer Glucagon, 1 mg, via IM

Beta Blockers

Examples of beta blockers:

- Metoprolol (Lopressor, Toprol)
- Atenolol (Tenormin)
- Nadolol (Corgard)
- Propranolol (Inderal, InnoPran)

Administer Calcium Chloride, 1 g, via IV, IO, conc. 100 mg/mL. Note: Repeat q5min x1

Administer Calcium Chloride, 20 mg/kg, via IV, IO, max single dose 1 g, conc. 100 mg/mL. Note: Repeat q5min x1

Followed by

Administer Atropine, 2 mg, via IV, IO, conc. 0.1 mg/mL. Note: Repeat q5min PRN

Administer Atropine, 0.02 mg/kg, via IV, IO, max single dose 2 mg, conc. 0.1 mg/mL. Note: Repeat q5min PRN

Followed by

Administer Glucagon, 1 mg, via IM

8.3: Cholinergics / Organophosphate Poisoning

Revised 08/11/2025

Paramedic Only

• Multiple doses are often required for organophosphate poisoning

• Repeat dosing targeting resolution of bronchospasm and bronchorrhea

Administer Atropine, 2 mg, via IV, IO, conc. 0.1 mg/mL. Note: Repeat q5min PRN

Administer Atropine, 0.02 mg/kg, via IV, IO, max single dose 2 mg, conc. 0.1 mg/mL. Note: Repeat q5min PRN

8.4: Cyanide Poisoning

Revised 08/11/2025

Paramedic Only

Cyanide poisoning should be suspected in any patient who is unresponsive after being in a building fire.

If the patient is unresponsive or is seizing:

Administer Hydroxocobalamin (CYANOKIT) (CYANOKIT), 5 g, via IV, IO, conc. 5 g in 100 mL, administer 15 minutes

Manage airway as needed:

Reference document 2.1 / Airway Management

8.5: Opiate Overdose

Revised 08/18/2025

All Levels

In suspected opiate overdose, the goal of therapy is to **maintain the patient's respiratory effort**

Withhold Naloxone in patients whom are awake and alert.

Administer Naloxone (Narcan), 0.5 mg, via IM, IN, conc. 1 mg/mL. Note: Repeat q3min PRN

Paramedic

If vascular access is available, administration of Naloxone IV or IO is preferred:

Administer Naloxone (Narcan), 0.5 mg, via IV, IO, IM, IN, conc. 1 mg/mL. Note: Repeat q3min PRN

8.6: Sympathomimetic Overdose

Revised 08/05/2025

Paramedic Only

This protocol applies to patients for whom sympathomimetic overdose is suspected.

Some examples of sympathomimetic substances include:

• Methamphetamine / Amphetamines

• Cocaine

• Phencyclidine (PCP)

• Adderall

For management of patient agitation:

Reference document 6.1 / Agitation Sedation

If QRS widening present (>120 ms):

Administer Sodium Bicarbonate, 100 mEq, via IV, IO, conc. 5 mEq/mL. Note: Repeat q10min PRN x1

Administer Sodium Bicarbonate, 1 mEq/kg, via IV, IO, max single dose 100 mEq, conc. 5 mEq/mL. Note: Repeat q10min PRN x1

9. Trauma

9.1: Trauma Management

Revised 09/02/2025

All Levels

Determine if patient is a Trauma Activation:

Reference document 14.11 / Trauma Activation Criteria

Consider Spinal Motion Restriction:

Reference document 10.25 / Spinal Motion Restriction

For pain management:

Reference document 6.13 / Pain Management

If the patient is hypotensive:

Reference document 9.9 / Traumatic Hypotension

Significant Extremity Bleeding

- Apply direct pressure

If bleeding continues despite direct pressure:

- Apply tourniquet to the extremity
- Apply at least 10cm proximal to the site of bleeding
- Apply tourniquet over soft tissue, not over joint space

If bleeding continues despite tourniquet application:

- Apply a second tourniquet more proximal than the first

Evisceration

- Occlude wound with moist sterile dressing

Open chest wound

- Occlude chest wound with chest seal

Penetrating Injury

- Stabilize object if penetrating object remains in place
- Bandage and dress open wounds

Taser Injury

- Assure electrical output is no longer engaged
- Remove taser barb unless embedded in breast, groin, or face
- Remove by holding skin taut and grasping probe between thumb and forefinger, then pulling straight out

Multi-system trauma

- Completely undress the patient and perform complete assessment

Extremity fracture/deformity

- Bandage/splint injury
- Evaluate neurovascular status before and after splinting

If distal pulse is absent:

- Reduce fracture using inline traction
- If unable to regain pulse, splint limb in position

If open longbone fracture is present:

Reference document 9.6 / Open Longbone Fracture

Pneumothorax

- Apply supplemental oxygen

If tension pneumothorax is suspected:

Reference document 9.8 / Tension Pneumothorax

Extremity entrapment

If the patient is unstable and has an extremity that is pinned and the patient cannot be extricated through any other means, consider field amputation of the pinned extremity:

Reference document 10.10 / Field Amputation

9.2: Traumatic Cardiac Arrest

Revised 08/05/2025

All Levels

Determine if resuscitation is medically appropriate:

Reference document 3.6 / Withholding Resuscitation / Obvious Death

Traumatic Arrest is different from Medical Arrest as cardiac function is usually preserved, and often cardiac arrest is the result of hypovolemia.

Therefore in Trauma Arrest chest compressions are **DE-EMPHASIZED** and chest compressions should be **STOPPED** to perform other critical interventions such as **simple thoracostomy**.

Manage traumatic injuries that are life threatening:

Reference document 9.1 / Trauma Management

Paramedic

Perform bilateral simple thoracostomy:

Reference document 10.24 / Simple Thoracostomy

Prioritize the management of life threatening traumatic injuries:

a) Apply tourniquet to obvious bleeding

b) Simple Thoracostomies

c) Ensure airway patency

d) Straighten long bone fractures

e) Apply pelvic binder if appropriate

f) Vascular access and fluid administration

g) CPR

After implementation of the above, proceed based on cardiac rhythm:

PEA > 30 or ROSC

Initiate rapid transport to the closest Trauma Center

Asystole or PEA ≤ 30

Proceed with field termination; ensure District Chief is on scene or consulted:

Reference document 10.7 / District Chief Consult

Field termination requests must be approved by the on-call Medical Director

Reference document 10.17 / Medical Director Consult

9.3: Amputation

Revised 07/21/2025

All Levels

If there is severe hemorrhage:

Reference document 9.1 / Trauma Management

If the patient is hypotensive:

Reference document 6.10 / Hypotension

Care of the amputated part:

1. Rinse with sterile water
2. Place in a plastic bag, then keep cool by placing bag on ice/cold packs

9.4: Burns

Revised 07/21/2025

All Levels

1. Remove jewelry and restrictive clothing
2. Keep the patient warm after removing clothing

If burns involve the airway:

Reference document 2.1 / Airway Management

Dress burns according to TBSA:

• TBSA < 15% use wet sterile dressing

• TBSA >= 15% use dry sterile dressing or burn sheet

For chemical burns:

1. Brush off any powdered chemical
2. Obtain MDS, if able
   a) If chemical is known and water irrigation is appropriate, irrigate copiously with water

Transport to burn center if:

• Burns involve airway, hands, feet, face, or genitalia

• >30% TBSA partial-thickness burns

• Any full-thickness burns

• Patient age < 12 or ≥ 70

For pain management:

Reference document 6.13 / Pain Management

If there is concern for cyanide toxicity:

Reference document 8.4 / Cyanide Poisoning

If there is concern for carbon monoxide poisoning:

Reference document 8.1 / Carbon Monoxide

9.5: Ocular Injury

Revised 07/29/2025

All Levels

Remove foreign body if the globe is not penetrated, and shield affected eye

If chemical exposure:

• Flush eyes continuously with copious amounts of normal saline for a total of 20 minutes of eye irrigation

If obvious globe injury, shield both eyes

If suspected corneal abrasion, arc burn, or foreign body:

Administer Tetracaine, 2 drops, via Eye Drops. Note: To affected eye
q5min PRN

9.6: Open Longbone Fracture

Revised 09/08/2025

Paramedic Only

This protocol is for patients who have OPEN longbone fractures

• OPEN fractures are those where bone is visible or suspected to be exposed

Longbones include:

• Humerus

• Radius

• Ulna

• Femur

• Tibia

• Fibula

First, manage extremity fracture per Trauma Management protocol:

Reference document 9.1 / Trauma Management

If open longbone fracture is present:

Administer Ceftriaxone, 1 g, via IV, IO, IM, conc. 1 g in 10 mL. Note: If IV/IO, push over 2 minutes
Do not delay transport or other interventions to administer Ceftriaxone

Contraindications:
Known allergic reaction to cephalosporins

Administer Ceftriaxone, 50 mg/kg, via IV, IO, IM, max single dose 1 g, conc. 1 g in 10 mL. Note: If IV/IO, push over 2 minutes
Do not delay transport or other interventions to administer Ceftriaxone

Contraindications:
Known allergic reaction to cephalosporins

9.7: Sexual Assault

Revised 08/28/2025

All Levels

1. Recommend patient refrain from bathing or changing clothes
2. Collect pertinent items in unused biohazard bag and transport with patient
3. Any blankets or sheets used by or on the patient during transport should stay with the patient
4. Contact SANE nurse to notify of patient that may require forensic exam at receiving facility

9.8: Tension Pneumothorax

Revised 09/02/2025

Paramedic Only

Patients should be considered to have tension pneumothorax if ALL THREE of the below criteria are present:

1. Hypotension (SBP < 90)
2. Hypoxia (SpO2 < 90%)
3. **ANY ONE** of the following findings:
   - Increased respiratory effort
   - Difficulty with BVM ventilations
   - Diminished or absent lung sounds on one side
   - Subcutaneous emphysema

If tension pneumothorax is suspected:

Reference document 10.20 / Needle Thoracostomy

If the patient is in cardiac arrest:

Reference document 9.2 / Traumatic Cardiac Arrest

9.9: Traumatic Hypotension

Revised 10/14/2025

All Levels

If undifferentiated traumatic hypotension, or if pelvic injury is suspected:

• Apply pelvic binder

Paramedic

For any trauma patient with SBP < 90 and injury within the last 3 hours:

Administer Tranexamic Acid (Bleeding/Trauma) (TXA), 2 g, via IV, IO, conc. 100 mg/mL.
Note: For bleeding within the last 3 hours
Slow push over 3 minutes

Provide fluid bolus, with goal of SBP ≥ 90:

Administer Normal Saline, 1000 mL, via IV, IO. Note: Repeat PRN

Administer Normal Saline, 20 mL/kg, via IV, IO, max single dose 1000 mL. Note: Repeat PRN x1

If the patient has altered mental status and hypotension is severe or persistent, proceed to vasopressors:

Reference document 6.21 / Vasopressors

10. Procedures

10.1: 12-lead EKG

Revised 08/11/2025

Procedure

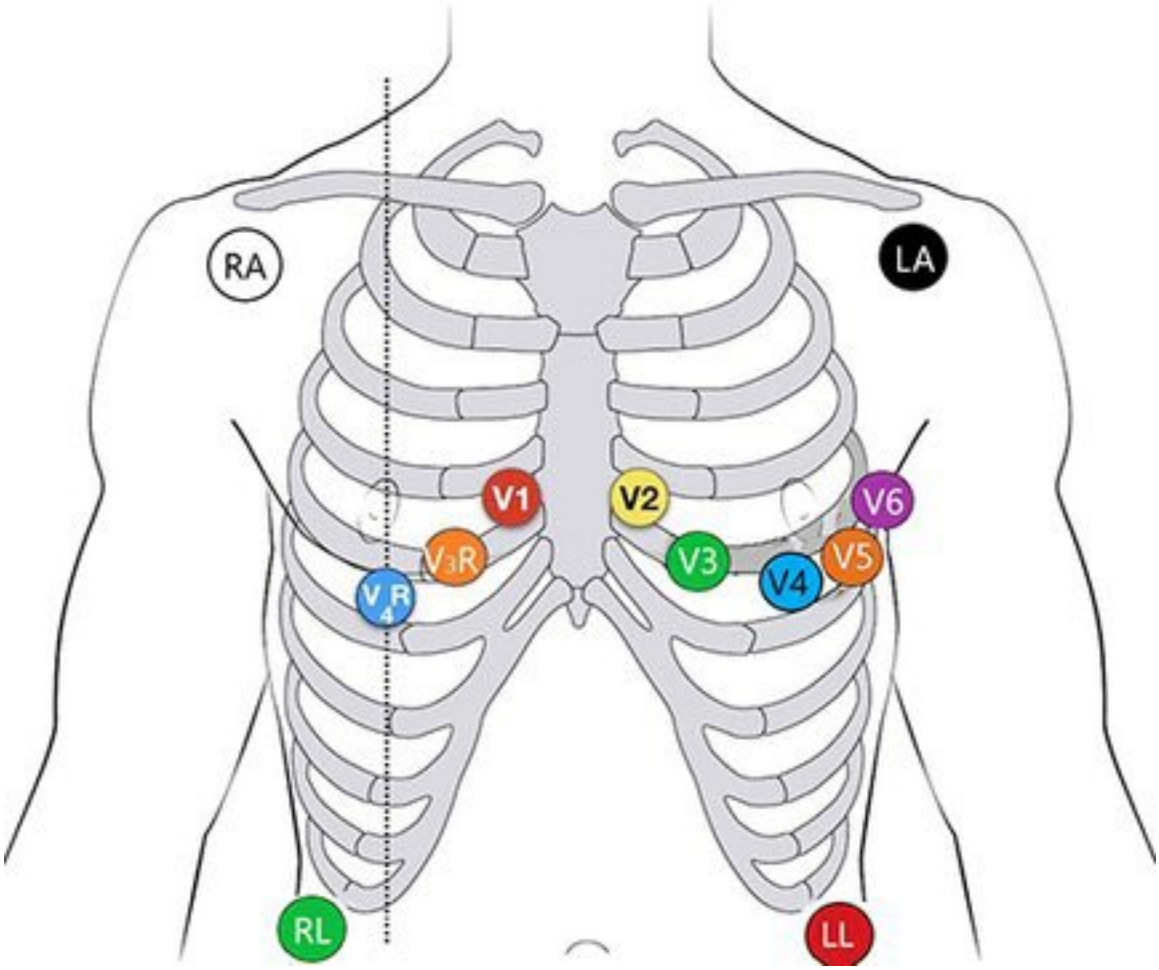
1. Prep the skin and shave hair as necessary.
2. Apply electrodes as follows and attach the appropriate lead to each electrode

Limb Leads: Extremities

- (RA) Right arm
- (RL) Right leg
- (LA) Left arm
- (LL) Left Leg

Precordial Leads: Chest

- V1 – Fourth intercostal space to the right of the sternum
- V2 – Fourth intercostal space to the left of the sternum
- V3 – Directly between leads V2 and V4
- V4 – Fifth intercostal space at midclavicular line
- V5 – Level with V4 at left anterior axillary line
- V6 – Level with V5 at left midaxillary line


RA
LA
V1
V2
V6
V3R
V3
V5
V4R
V4
RL
LL

10.2: Airway Suctioning

Revised 08/11/2025

Procedure

Rigid suction

a) Insert rigid suction catheter into mouth, do not insert beyond the visualized oropharynx

b) Apply suction while removing the catheter for no greater than 15 seconds

French suction

c) Insert french suction tubing completely into the endotracheal tube or advance airway or until resistance is felt

d) Apply suction while removing the catheter for no greater than 15 seconds

10.3: Blood Draw Request by Texas J.P.

Revised 08/11/2025

• Per HB 3775 of the State of Texas, a Justice of the Peace in the State of Texas can order a paramedic to draw blood for the purpose of determining the alcohol content or the presence of chemical substances. This bill became effective 09/01/99.

• A certified paramedic acting at the request of a Justice of the Peace shall not incur any civil or criminal liability as a result of the blood draw.

• If, for any reason, an MCHD paramedic feels uncomfortable performing this procedure, he/she should contact a District Chief.

Procedure

1. Blood draw should be under the supervision of the requesting Justice of the Peace.
2. Use the blood draw kit as supplied by the Justice of the Peace.
3. Don appropriate personal protective equipment.
4. Cleanse the venipuncture site using alcohol preps or Chlorohexidine.
5. Make venipuncture with an 18 or 20 ga catheter.
6. Withdraw blood into two (2) gray top tubes using the needleless vacutainer equipment.
7. Slowly invert the tubes at least 5 times to assure proper mixing of the blood and the anticoagulant powder. The paramedic should write his initials, date and time on the tube before handing the tubes to the Justice of the Peace.
8. Discontinue the I. V. unless otherwise indicated.
9. The paramedic who drew the blood sample should sign any required forms or labels and observe the blood tubes being sealed by the officer.
10. If not already done, an incident number should be generated from the Alarm office.
11. Accurate and thorough documentation of the circumstances and events should be recorded including name of JP and Peace Officer requesting procedure, site of the blood draw, time performed and time the blood sample was released to the Peace Officer.
12. Have the Officer or other authorized individual sign as having received the blood sample to document chain of custody after being drawn by EMS. This documentation is important so that the integrity of the blood draw by MCHD-EMS is not in question.

10.4: Blood Glucose Analysis

Revised 08/11/2025

Procedure

1. Wipe pad of finger with alcohol/chloraprep.
2. Stick finger with the lancet device and press finger to form a small drop of blood.

   a) Blood samples can be obtained from Alternate Testing Sites as outlined in CG-02 “Blood Glucose”

3. Touch and hold the Test End of the Test Strip to the drop of blood until after the meter "beeps."
4. The blood glucose result will appear in the display window.

   b) If symptoms are inconsistent with test results, perform a second blood glucose analysis with a different glucometer device for confirmation.

5. Document the glucometer reading and treat the patient as indicated by the analysis and protocol.

   c) If "Hi" appears your BG level may be above 600 mg/dl.

   d) If "Lo" appears in the display, your BG level may be below 20 mg/dl.

6. Repeat glucose analysis as indicated for reassessment after treatment and as per protocol.
7. Dispose of the used lancet in the sharps container. Remove the test strip from the glucometer and dispose in biohazard bag.

10.5: Central Line Access

Revised 08/11/2025

Central lines approved for access:

- PICC Line
- iVAD
- Central Venous Catheter

Procedure

1. Leave distal catheter clamped until syringe is attached.
2. Explain the need for IV administration and describe procedure to patient.
3. Check IV solution for expiration date, cloudiness, etc.
4. Spike the bag with the appropriate IV tubing, remove air from tubing
5. For PICC line access: scrub the distal catheter port with Chloraprep for at least 15 seconds and let dry for at least 15 seconds.
6. For Central Catheter access: scrub the catheter port with Cloraprep for at least 90 seconds using sterile technique; also wear Mask. Let dry for at least 15-30 seconds.
7. Ask the patient or caregiver if the line is flushed with Heparin or Saline. If Heparin, aspirate 10ml of blood and discard. Central Catheters are likely to have Heparin, while PICC lines may have Saline.
8. Attach 10ml syringe to the port. Unclamp line if required.
9. Aspirate for blood return. Blood should draw freely, if it does not, remove syringe and DO NOT use the Central line.
10. If blood aspirates easily, gently flush line. If line does not flush, remove syringe and DO NOT use the Central line.
11. If line flushes appropriately, remove syringe, attach IV tubing to catheter and infuse NS at proper rate for patient.
12. Administer IV medications through port as needed.


5 ml/sec MAX
PowerPICC

10.6: CPR

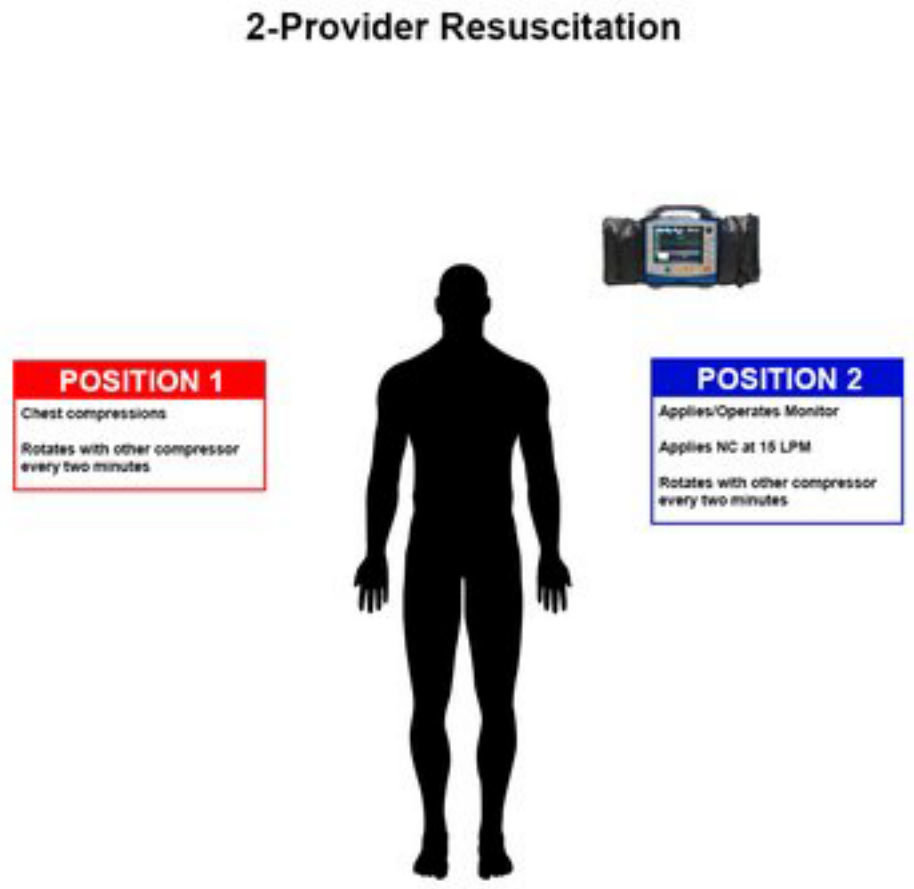
Revised 08/29/2025

Procedure

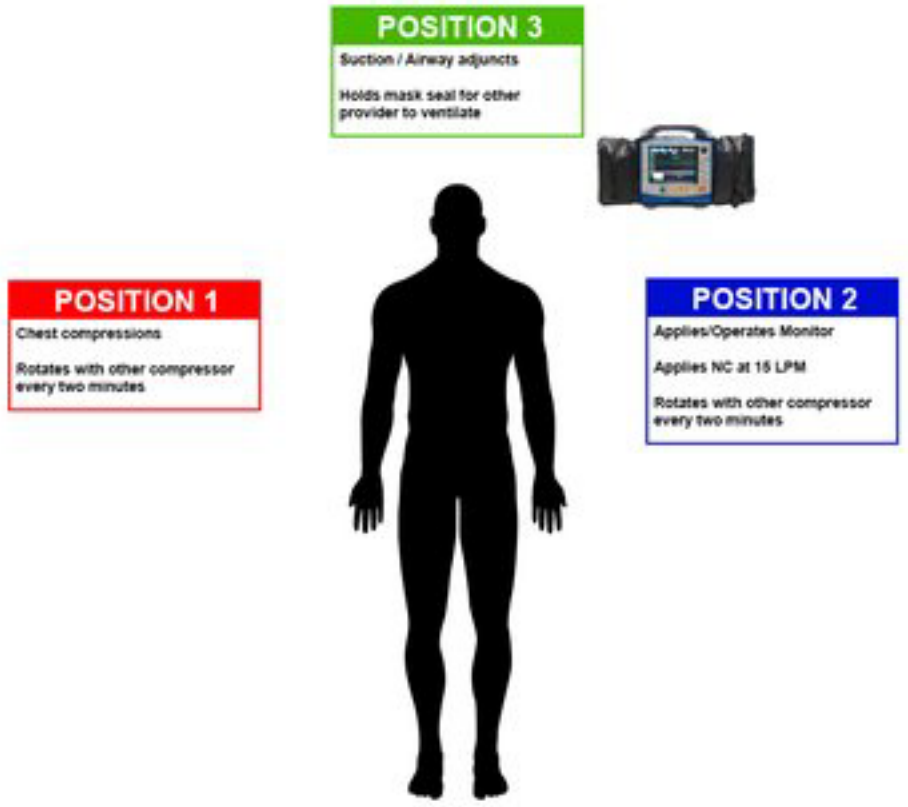
See CPR tool for CPR instructions:

Perform CPR at 110 compressions per minute over 110

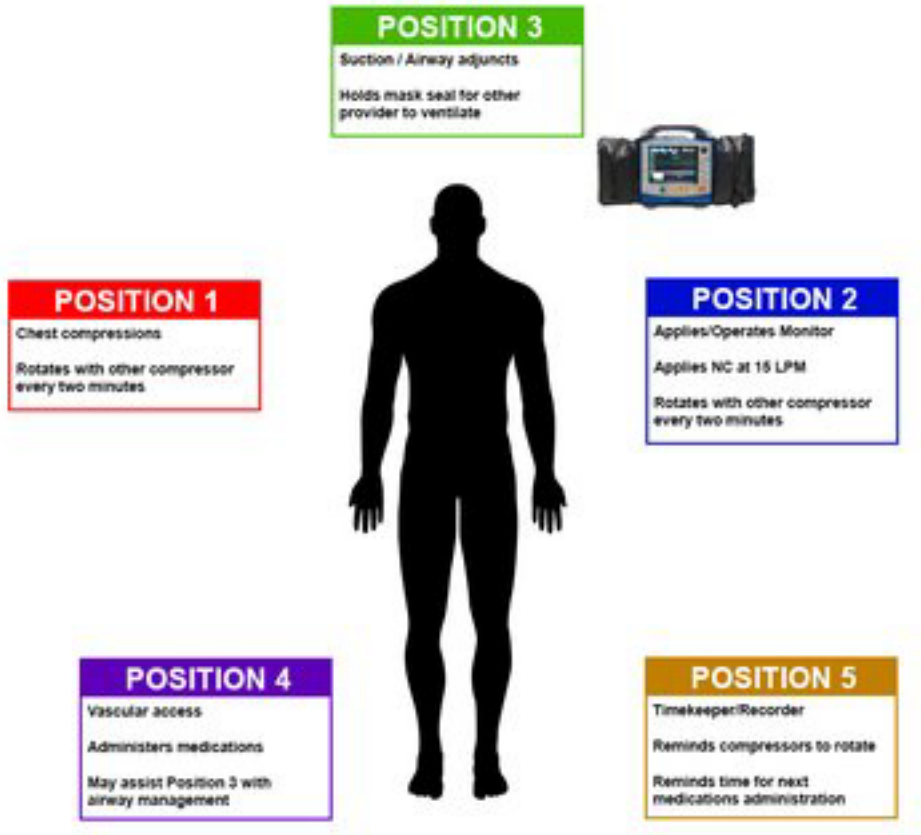
Positioning



3-Provider Resuscitation



5-Provider Resuscitation



10.7: District Chief Consult

Revised 08/11/2025

Procedure

Consults must be recorded. The following are the allowed consult modalities:

Radio

a) Request District Chief consult from ALARM

Phone patch through ALARM

b) Call ALARM and request District Chief consult

Contact: ALARM
Phones:
- Phone: 936-441-6243
Emails:
- :
Address: 1400 S Loop 336 W, Conroe, TX, 77304
Note: MCHD Main Communications Center

Pulsara

a) Start a new case on Pulsara

b) Enter pertinent patient data

c) Add the District Chief to the case

Protocols where District Chief consult is required:

Reference document 3.5 / Medical Termination of Resuscitation

Reference document 2.3 / Delayed Sequence Intubation

Reference document 6.21 / Vasopressors

Reference document 5.3 / Hyperthermia

Reference document 6.1 / Agitation Sedation

10.8: Double Sequential Defibrillation

Revised 08/12/2025

Procedure

1. Using second defibrillator, attach pads in either Anterior/Lateral or Anterior/Posterior locations, depending on the placement of the initial set of defibrillator pads
2. Charge both defibrillators and ensure both are ready to be discharged
   a) If an AED is used as the second device, stop CPR and allow the AED to analyze the rhythm and charge completely
3. Defibrillate the patient using both devices with a less than one second delay between each defibrillation
   b) Do not defibrillate with both devices exactly simultaneously, delay the second defibrillation slightly

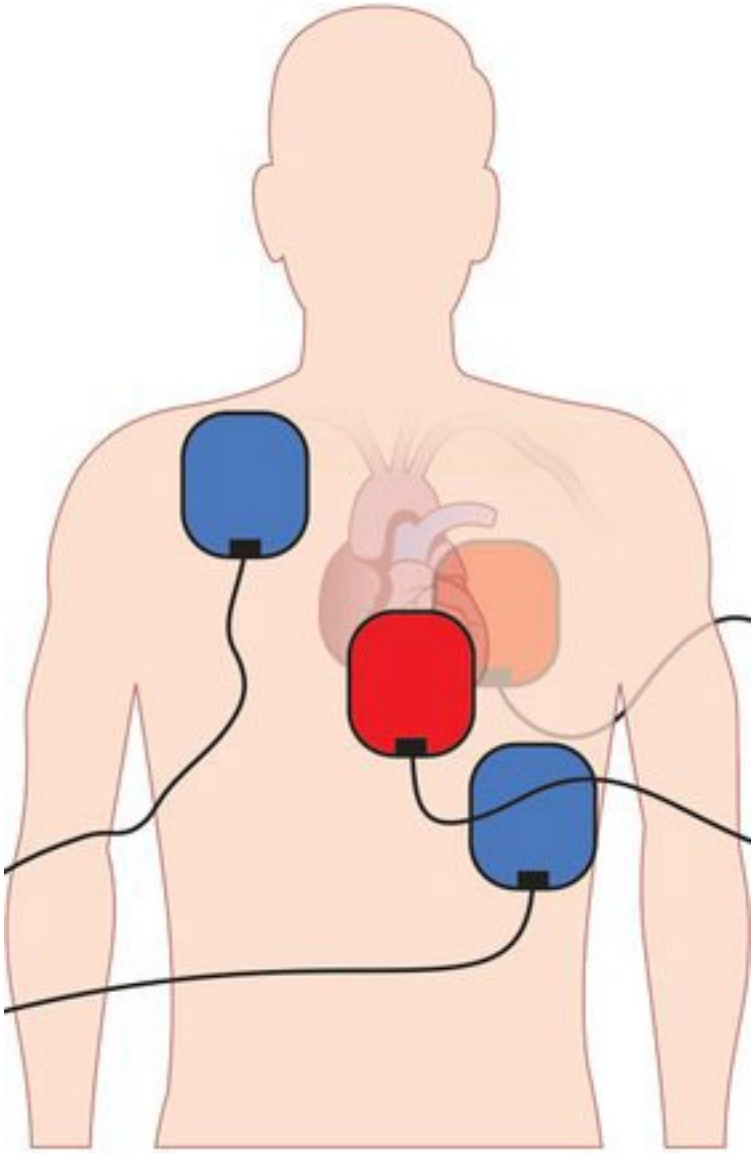
See the Manual Defibrillation procedure for details on performing defibrillation:

Reference document 10.15 / Manual Defibrillation

Illustration of pad placement:

Blue pads: Anterior/Lateral

Red pads: Anterior/Posterior



10.9: Endotracheal Intubation

Revised 09/30/2025

Equipment

For pediatric patients, see Pediatric Equipment Sizes:

Reference Pediatric Equipment Sizes

Intubation Attempts

An intubation attempt has occurred when the blade of any laryngoscopic device crosses the margin of the lips

◦ Video laryngoscopy is the standard of care at MCHD and is the expected method of intubation

◦ If the device is non-functional or unavailable, direct laryngoscopy may be performed

Intubation attempts:

◦ One provider may make two intubation attempts

◦ There can be a maximum of four total intubation attempts

If intubation is unsuccessful:

◦ Place a supraglottic airway device, such as an i-gel

◦ If a supraglottic airway device is unavailable or is unable to be placed, proceed with BVM ventilations

Technique

a) The bougie should be used as the stylet for the endotracheal tube

b) Have the bougie to extend approximately 10-20 cm beyond distal tip of the endotracheal tube

c) Insert the tip of the laryngoscope blade into the vallecular space and lift upward and outward

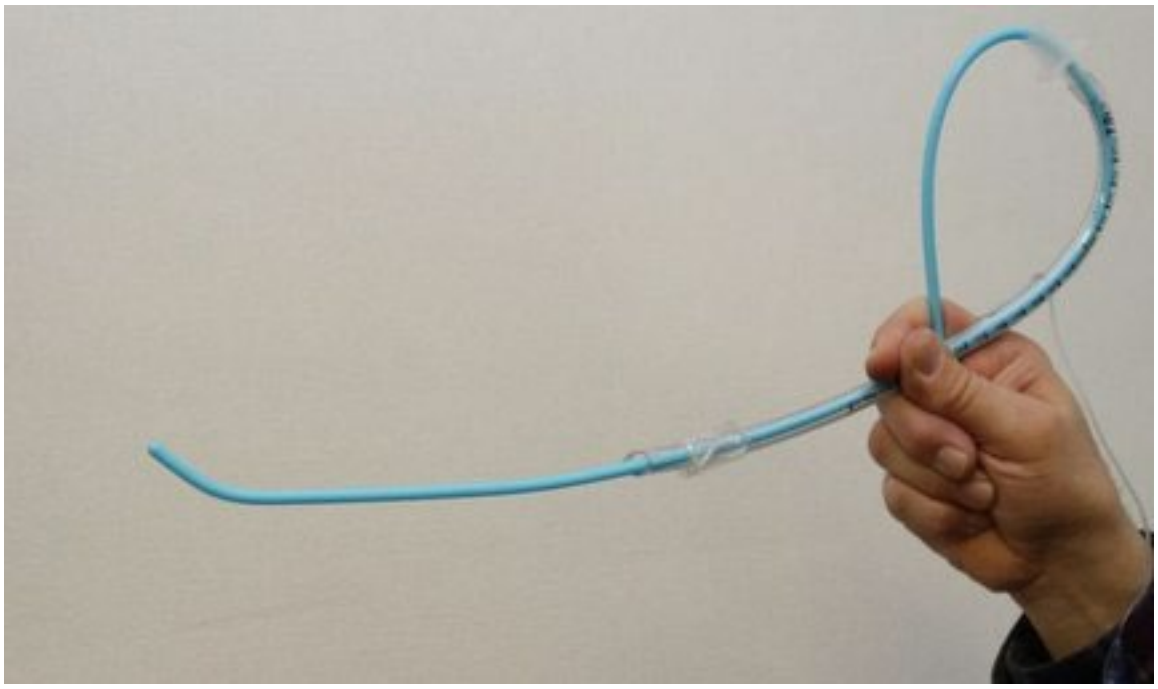
d) Once a view is obtained using the video laryngoscope, place the distal tip of the bougie in the trachea

e) Advance the bougie and endotracheal tube into the airway

f) If resistance is met with advancement of the bougie or ET tube, rotate and then advance

g) Once the endotracheal tube has been advanced into the airway, remove the bougie

h) Secure the endotracheal tube using a commercial securement device



Device

- All intubation attempts must be made with the video laryngoscope device (UE Scope)
  - In the event of complete failure of the video laryngoscope, direct laryngoscopy with a traditional blade and handle may be attempted
- Once turned on, the device should automatically start recording
  - **Look for the red circle on the screen to indicate the device is recording**
- All intubation attempts must have the associated video uploaded

10.10: Field Amputation

Revised 08/11/2025

Field amputation of an extremity must be directly authorized by the on-call MCHD medical director

Only the on-call MCHD medical director or his designee shall be authorized to conduct this procedure

Contraindications

When extrication can be accomplished by any other means

Setup

Anesthesia and analgesia will be provided by a second provider who is not participating in the surgical procedure

Reference document 6.14 / Procedural Sedation

Procedure

1. A **time out** will be taken prior to the procedure to **ensure correct patient and side for amputation**. This will be verbalized to the entire team prior to procedure continuing
2. Place tourniquet above the level of amputation and note time of placement
3. Use scalpel for sharp soft tissue dissection down to bone
4. Use Gigli saw to transect through bony tissues
5. Wrap stump with large moist surgical dressing and wrap with elastic wrap
6. Transport amputated limb with the patient if possible

10.11: Immersion Cooling

Revised 08/11/2025

Equipment

1. Cooling Bag
2. Ice
3. Water

Procedure

1. Lay cooling bag on stretcher
2. Undress the patient
3. Place patient in cooling bag on stretcher with head elevated at minimum 15 degrees
4. Fill the cooling bag with ice and/or cold water to patient's mid-axillary line up to nipple-line
5. Zip bag up only enough to keep water/ice in the bag
6. Continue to monitor temperature

Considerations

• If ice and/or water is not available do not delay transport. Use other cooling methods.

• Ensure early pre-notification to receiving facility that the patient has received cold water/Ice immersion therapy.

• Immersion cooling should not delay other emergent procedures, such as airway management

• Do not interrupt cooling for diarrhea, emesis, combativeness, or seizures

10.12: Implantable Venous Access Device (iVAD)

Revised 08/11/2025

General

◦ This procedure is to be considered a sterile procedure and should always be performed with the patient or care-giver's consent. The iVAD (also referred to as a Port-A-Cath) should be accessed prior to departing the scene. At NO TIME should the device be accessed while the ambulance is in motion, so as to minimize damage to the site.

◦ The iVAD is a surgically inserted device connected to the subclavian vein and it is beneath the skin. The device is ALWAYS heparinized when not in use. Access should ALWAYS occur with a Huber needle. Other needles with damage and ruin the device.

◦ Care should be taken to ensure that this procedure is performed in a near sterile environment. The most aseptic technique precautions should be used.

◦ An attempt to withdraw should be made and a minimum of 10cc of blood must be evacuated to remove heparin from the device. If the site will not flush DISCONTINUE the access.

Procedure

1. Prime Huber needle and attached tubing with saline.

2. Examine site for infection, redness, swelling, pain or other complications. If these exist, DO NOT ACCESS SITE. If the site feels too deep or the site is turned, and/or rotated and you do not feel comfortable accessing it, DO NOT ATTEMPT.

3. EMS crew utilizes sterile gloves and mask.

4. Identify edges of iVAD and center with fingers donned with sterile gloves.

5. Turns patient's head away from the insertion site.

6. Cleanse area with Chlorhexidine for a minimum of 90 seconds working from the center out in a circular motion.

7. Allow the site to completely dry. DO NOT blot, blow, or wave a hand past to dry site. These increase the potential for infection.

8. Close clamp on tubing attached to Huber needle until ready to aspirate.

9. Stabilize the site with one hand and with the other, insert the needle at a 90o angle through the skin and septum of device.

10. Feel resistance of needle touching the back of the port to avoid subcutaneous placement.

11. Attempt to Aspirate 10 ml of blood to clear heparin and ensure patency of site. WASTE THIS BLOOD. **If you are unable to obtain a blood return from the site have the patient raise their arm on the side of the iVAD. If blood return is still not obtained, CONNECT a flushed saline lock and secure site as noted in step 18 and 21. DO NOT FLUSH OR FLOW FLUID THROUGH THE SITE. LEAVE THE NEEDLE IN PLACE AND NOTIFY ER STAFF UPON YOUR ARRIVAL, of the inability to ensure patency of the site by blood return.**

12. Connect IV tubing and flush with saline solution to clear blood and establish patency of line.

13. Secure needle with sterile dressing. Use folded sterile 4x4's on either side of needle and cover with tegaderm provided in access kit or clear tape.

14. Observe for signs of infiltration.

15. DO NOT ALLOW IV BAG TO RUN EMPTY. IF AIR ENTERS THE DRIP CHAMBER THIS MAY CAUSE AN AIR EMBOLISM. TO AVOID THIS, CONSIDER THE FOLLOWING

a) Keep IV Bag vertical at all times.

b) Ensure that IV bag has fluid.

c) Continually monitor flow and ensure that drip chamber is NEVER dry.

d) Do not lay IV bag on patient, between their legs, or in such a position that air can enter the drip chamber.

16. Label edge of tegaderm with the following:

e) Date accessed

f) Time accessed

g) Initials of person accessing

10.13: Intraosseous Access (IO)

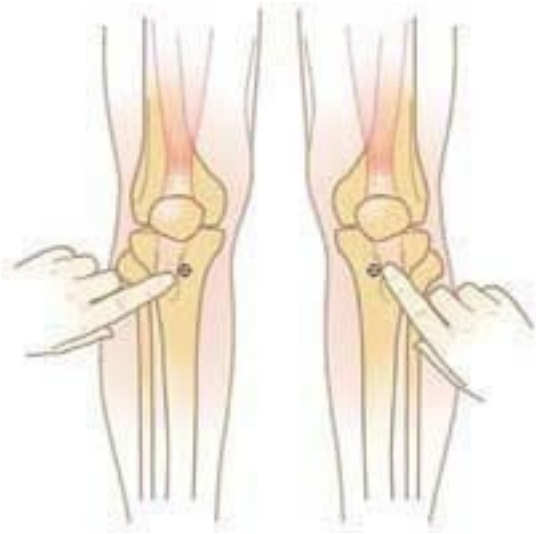
Revised 08/11/2025

Contraindications

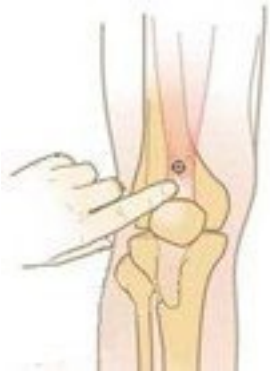
- Suspected fracture of the associated tibia or femur.
- Previous orthopedic procedures: i.e., knee replacement
- Extremity that is compromised by a pre-existing medical condition. i.e. tumor or PVD
- Overlying skin infection/trauma at placement site
- Inability to locate the anatomical landmark for insertion

Procedure

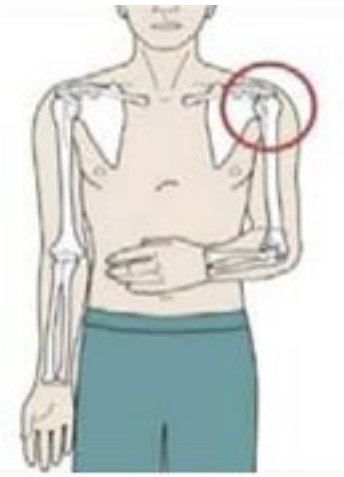
1. Locate acceptable insertion site: Proximal Tibia, Distal Femur, Humeral Head
   - **Proximal Tibia:**
     - Locate the anterior surface of the patella.
     - Moving inferiorly, locate the tibial tuberosity
     - Insertion location is 1 finger width medial of the tibial tuberosity

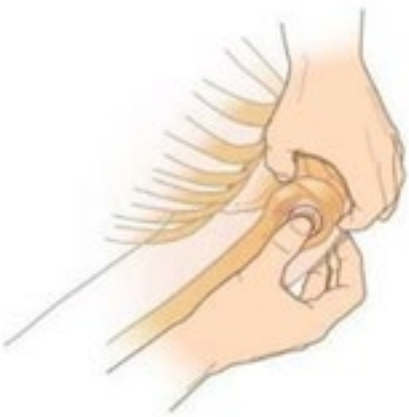


   - **Distal Femur:**
     - Locate the anterior surface of the patella
     - The insertion site is just proximal to the patella (maximum 1 cm) and approximately 1-2cm medial to midline



- **Humeral Head:**
  - Position arm in 90° flexion, with elbow kept to side of truck.
  - Palpate and identify the mid-shaft humerus and continue palpating with a thumb proximal toward the humeral head.
  - Near the shoulder, note the greater tubercle insertion site, as a small protrusion.
  - With the opposite hand “pinching” the anterior and inferior aspects of the humeral head, confirm the identification of the greater tubercle in the midline of the humerus.





2. Cleanse the insertion site with Chlorohexidine or similar prep-pads using accepted aseptic technique. Remember to work from the inside to the outside in concentric circles.

3. If patient is conscious, inform patient of the need to perform procedure and that they might feel some discomfort until Lidocaine is administered. Obtain consent from patient; recall that the patient has the right to refuse.

4. Consider an anesthetic/analgesic if indicated by medical direction.

5. Prepare the EZ-IO™ Driver and Needle Set.
   - Open the cartridge and attach the needle set to the driver
   - Remove needle set from the cartridge.
   - Remove the cap from the needle set.

6. Begin insertion of the EZ-IO™
   - Hold the EZ-IO™ Driver in one hand and stabilize the insertion site with the opposite hand.
   - Position the driver at the insertion site at a 90o angle to the bone surface.
   - Power the driver through the skin at the insertion site until it makes contact with bone.
7. Power the EZ-IO™ Driver and continue insertion until the flange (base) of the EZ-IO™ needle set touches the skin OR a sudden lack of resistance is felt, indicating entry into the marrow cavity.
8. Remove the driver from the needle set.
9. Remove the stylet from the catheter and place in sharps container.
10. Confirm proper placement by checking for the following:
    - IO catheter standing at 90° and firmly seated in the bone.
    - Blood at tip of the stylet.
11. Attach and prime extension tubing.
12. Confirm proper catheter tip placement by checking the following:
    - Ability to flush 10ml normal saline with no evidence of extravasation
    - A free-flow of fluid through the needle with no evidence of extravasation
13. Connect IV tubing and begin infusion.
14. If site does not flow, consider pressure infusion, reflush and/or rotate needle 180°. Consider a combination of these procedures and repeat as necessary.
15. Dress site with roller gauze to prevent accidental dislodgement.

10.14: Invasive Ventilation

Revised 09/30/2025

Contraindications

• Patients weighing less than 6kg

Procedure

1. Prepare Equipment
   ◦ Attach circuit to Zoll Z Ventilator
   ◦ Attach Zoll Z Ventilator to oxygen source
   ◦ Turn on Zoll Z Ventilator
   ◦ Select appropriate patient size (Adult – Pediatric)
2. Test circuit integrity
   ◦ First check for patient disconnect alarm
   ◦ Check manual breath button is functioning appropriately
   ◦ Occlude distal end of the circuit and check for high airway pressure alarm
3. Adjust ventilator mode to “AC (V)”
4. Adjust settings and titrate to patient's need
   ◦ Vt: [(Patient’s height in feet) – 1.5] X 100 = appropriate Vt based on ideal body weight for patients ≥ 45kg
   ◦ Set mechanical ventilation rate:
   ◦ Reference Mechanical Ventilation Reference
   ◦ I:E Ratio: Consider increasing to 1:4 to allow for an extended exhalation phase to correct breath stacking if present (asthma/COPD).
   ◦ PEEP: Titrate up to 15 cmH20 for patients that do not experience an increase in SpO2
   ◦ FiO2: Consider titrating down to 60% for prolonged transports, patients intubated for non- respiratory indications, or for patients with known PaO2 > 100. Titrate lowest FiO2 to keep SpO2 > 94% after ALWAYS beginning with an FiO2 of 100%.
5. Attach circuit to ET Tube or SGA. ETCO2 detector should be placed between the circuit and ET Tube/SGA if applicable. Viral filter should be placed in between vent circuit and elbow connector.
6. Confirm ET placement and functionality of ventilator by continual monitoring of EtCO2.

Alarms / Troubleshooting

Do not ignore any alarms provided by the Zoll Z Ventilator. Utilize the “DOPES” acronym to troubleshoot any complication in addition to the "Smart Help" function. **If in doubt, remove circuit and utilize BVM.**

Consider DOPES for ventilation difficulty:

Reference document 14.3 / DOPES (Ventilation Difficulty)

10.15: Manual Defibrillation

Revised 08/11/2025

Procedure

1. Apply defibrillator pads to the patient
   a) Apply in the Anterior/Posterior placement, if able
   b) If unable to apply Anterior/Posterior, apply in the Anterior/Lateral placement
2. Select the desired energy
   c) Adults: 200 J
   d) Pediatrics: 10 J / kg (Max 200 J)
3. Press the **Charge** button and wait for the device to fully charge
4. To deliver the energy, press the orange **Shock** button

10.16: Manual Ventilations

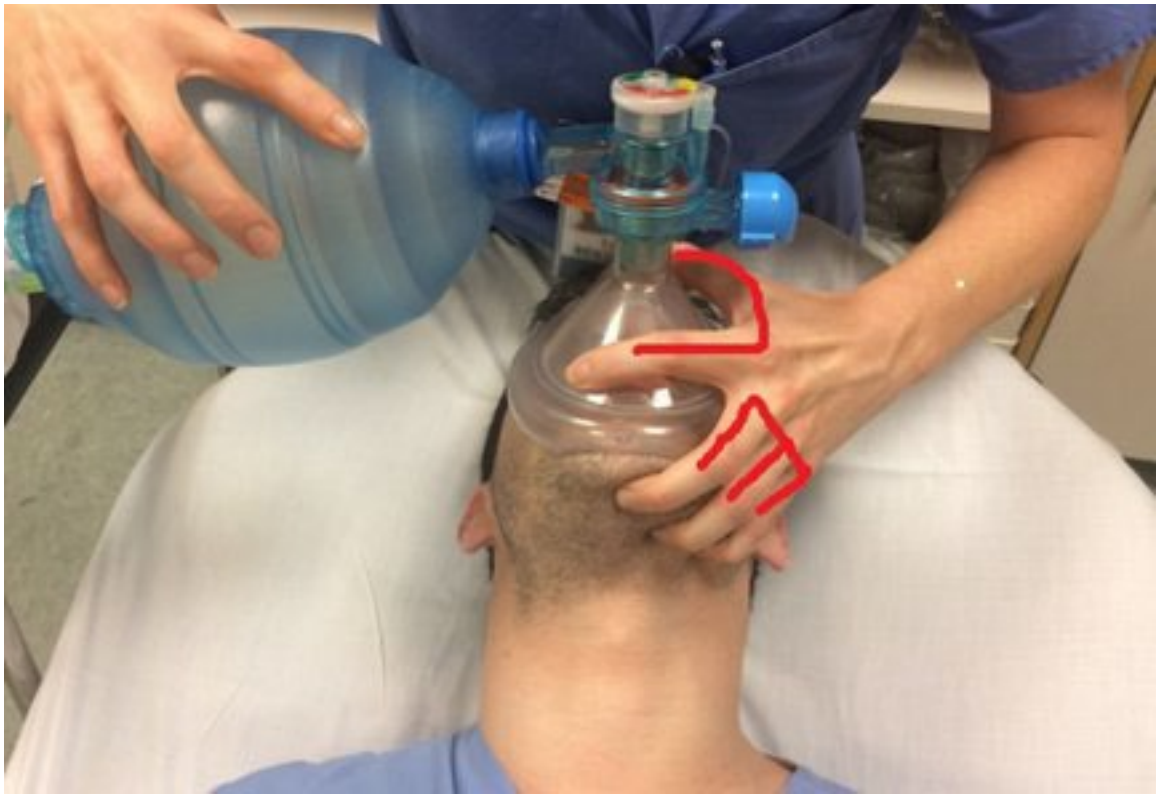
Revised 08/11/2025

Procedure

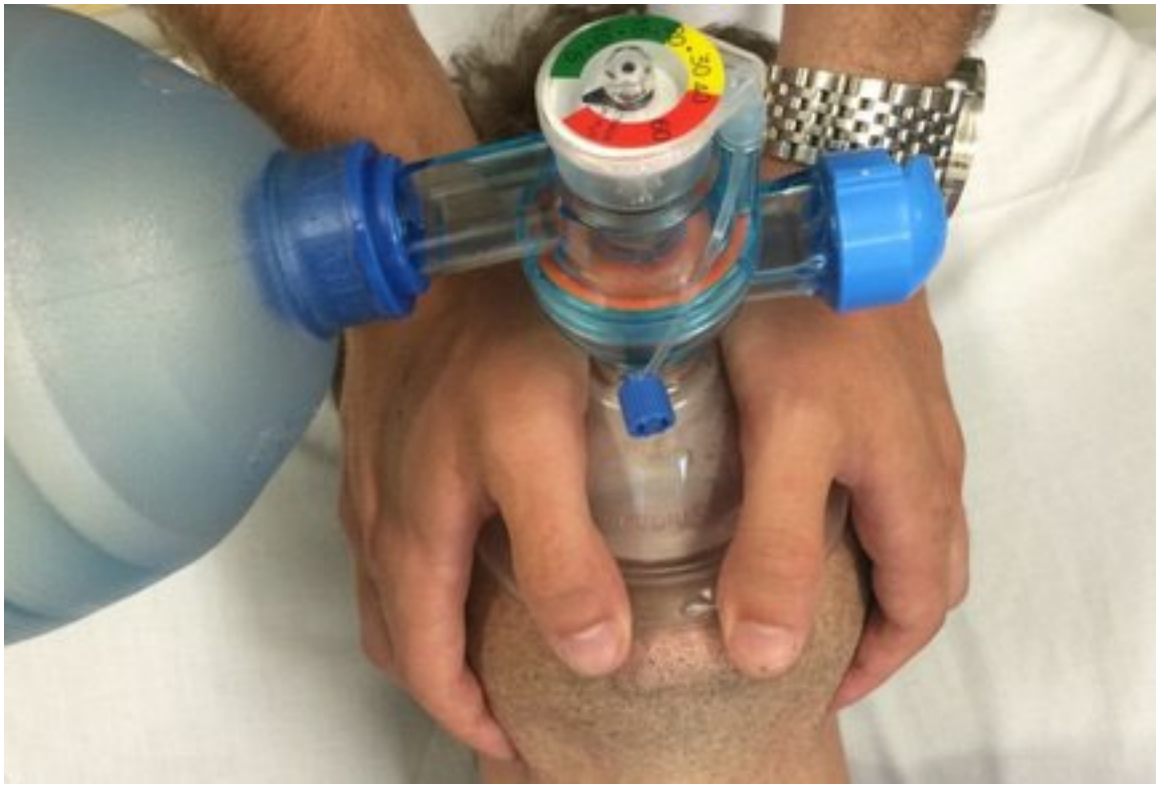
Ensure a proper mask seal using the E-C technique if ventilating alone, or if two providers are available for ventilation, one should hold the mask seal and one should provide BVM ventilations.

Two-person ventilations is the preferred method, if available.

E-C Seal:



Jaw thrust seal:



10.17: Medical Director Consult

Revised 08/11/2025

All Levels

Consultation with the on-call Medical Director can be performed during any patient encounter where further medical guidance is needed, or as required by these protocols.

The on-call Medical Director should be consulted using the following communication methods, in the order listed:

1. Pulsara Consult

2. Phone patch through ALARM

Contact: ALARM
Phones:
- Phone: 936-441-6243
Emails:
- :
Address: 1400 S Loop 336 W, Conroe, TX, 77304
Note: MCHD Main Communications Center

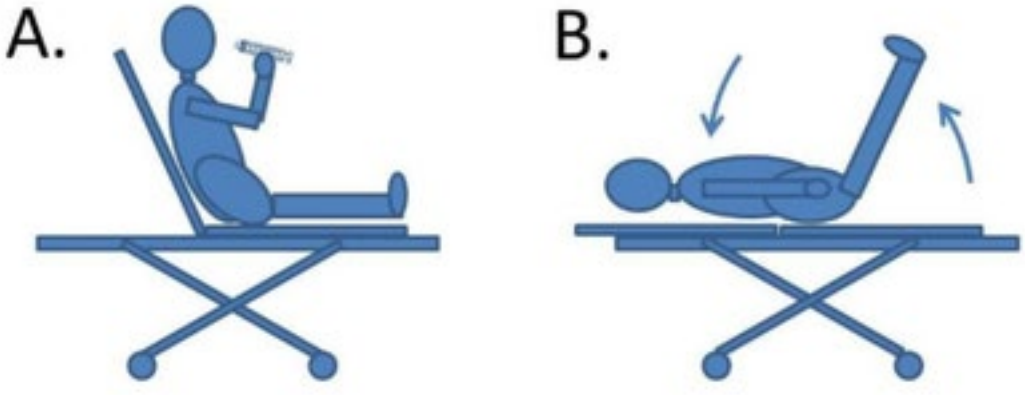
10.18: Modified Valsalva Maneuver

Revised 09/11/2025

Reference document 4.4 / Narrow Complex Tachycardia

Procedure

1. Have patient attempt to blow stopper out of a 10cc syringe for 15 seconds
2. Immediately place patient in supine position
3. Raise legs above the patient's head



10.19: Nasogastric Tube Insertion

Revised 08/11/2025

Contraindications

- Severe facial trauma

Procedure

1. Select appropriate catheter size:
   - Adults: 12 – 18 fr.
   - Pediatric: 8 – 12 fr.
2. Measure the tube by placing the tip of the tube on the patient's nose, then extend the tube to the tip of the ear lobe and then to the end of the xyphoid process.
3. Lubricate tip
4. Pass the tube through the nose downward but do not force. If resistance is met, remove the tube, lubricate and try the other nostril.
5. Verify proper placement by injecting 10 – 20 ml of air through the tube into the stomach while auscultating the stomach. You should hear air entering the stomach.
6. Connect tube to suction.

10.20: Needle Thoracostomy

Revised 09/05/2025

Procedure

1. Prepare decompression needle
   a) In adults, use ARS needle, or Cook kit if available
   b) In children < 12 years, use a 14G angiocath
2. Identify/cleanse the site:
   c) Primary: Fourth, or fifth, intercostal space at anterior-axillary line
   d) Secondary: Second, or third, intercostal space at the mid clavicular line.
3. Position tip of needle just over top of the rib. Completely insert into the chest at 90° angle to the chest wall and remove needle.
   e) If decompression occurs, a rush of air may be heard
4. Leave catheter in place. Do not occlude catheter with syringe

10.21: Noninvasive Ventilation (BiPAP/CPAP)

Revised 09/05/2025

Relative Contraindications

- Inability to maintain open airway (severe AMS)
- Apnea
- Suspected pneumothorax or chest trauma
- Patients at risk for aspiration (nausea/vomiting, foreign body airway obstruction, etc.)
- Anatomy that would interfere with proper fit of mask (trauma, tracheostomy, etc.)

Procedure

1. Prepare equipment
   a) Attach mask to circuit
   b) Attach circuit to Zoll Z Ventilator
   c) Turn on Zoll Z Ventilator
   d) Select Mask CPAP in the Start Menu
2. Adjust ventilator mode to “CPAP” or "BL" mode and verify/adjust settings.
   - For CPAP: Adjust the PEEP setting (between 2-15 cmH20) and leave the PSV blank.
   - For BiLevel: Adjust the EPAP setting (typically 5 cmH20) and adjust the IPAP setting (typically 10-20 cmH2O). Most common initial setting EPAP 5 cmH20 and IPAP 10 cmH20.
3. Place facemask on patient (without straps) and verbally coach patient to breathe deeply and allow the ventilator to support their efforts.
4. Completely attach the head strap to both sides of the facemask ensuring a tight, but tolerable, seal.
5. Once the patient is compliant with the procedure, slowly increase IPAP up to 20 cmH20 in "BL" mode or slowly increase PEEP up to 15 cmH20 in "CPAP" mode. Titrate to effect.

10.22: Patient Safety Restraint

Revised 09/05/2025

Procedure

• Patient Restraints should be considered whenever a patient requiring immediate medical treatment becomes a threat to themselves or other emergency personnel. This should be accomplished with the least amount of force necessary to protect the patient and emergency personnel.

• The safety of EMS personnel comes first. If EMS personnel are threatened verbally and/or physically, EMS personnel should physically remove themselves from the scene and move to a location of safety until Law Enforcement officials arrive. If necessary, EMS personnel should leave medical equipment to accomplish this task.

• LEO/FRO should be requested for assistance when applying physical restraints.

• Nothing should be placed over the patients face, head, or neck.

• Patients should never be placed in a prone position.

• If chemical sedation utilized, SNORES bundle should be in place as soon as feasible:

Reference document 11.1 / SNORES

10.23: Quikclot

Revised 09/05/2025

Procedure

1. Pack Quik-Clot tightly into the wound directly over the bleeding site.
2. Apply direct pressure to while packing the gauze and apply enough force to stop the bleeding.
3. After the gauze has been packed, continue to hold direct pressure for AT LEAST 3 minutes.
4. Reassess for bleeding control.
5. **DO NOT REMOVE** combat gauze, leave in place.
6. Cover with roller gauze, or other securing method.
7. More than one package of gauze may be used to control the hemorrhage.
8. If the gauze becomes over saturated and bleeding is continuing, remove the combat gauze and repeat above steps and consider TQ if needed

10.24: Simple Thoracostomy

Revised 09/05/2025

Contraindications

- Patient not in cardiac arrest

Procedure

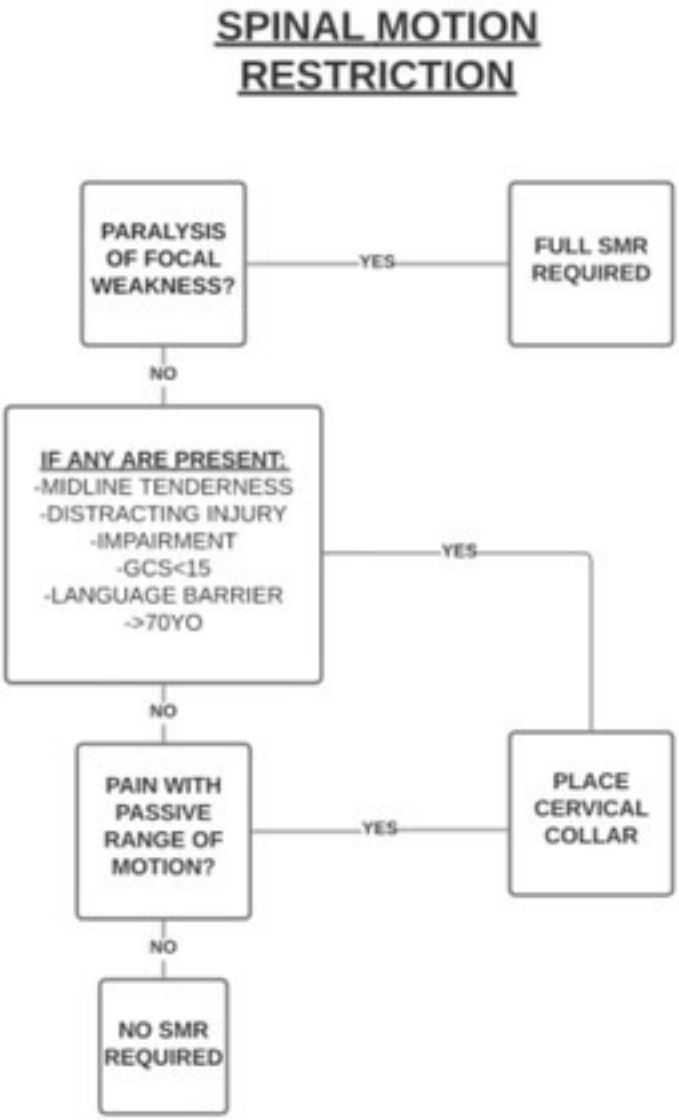
1. CPR MUST BE STOPPED PRIOR TO INITIATION OF THIS PROCEDURE.

2. Using the scalpel, make a 1-2 inch incision along the line of the ribs in the 4th or 5th intercostal space at the midaxillary line.
3. Utilizing curved forceps, enter the pleural cavity carefully to avoid any fractures.
4. Insert finger into pleural space.
5. Advance bougie into the thoracic cavity using your finger as a guide.
6. Pass an 8-0 ET tube over the proximal end of the bougie and into the thoracic cavity.
7. Inflate the cuff and gently pull the ET tube outward until the cuff meets resistance
8. Remove the bougie and resume CPR

10.25: Spinal Motion Restriction

Revised 09/05/2025

Procedure



10.26: Supraglottic Airway (i-gel)

Revised 09/05/2025

Procedure

1. Choose the correct size i-gel based on the patients weight and product packaging.
2. Apply a water based lubricant to the posterior aspect of the i-gel.
3. Position the head – the ideal head position for insertion of the i-gel is the sniffing position however, it can also be used with the head in a neutral position.
4. Hold the i-gel along the bite block with the dominate hand. With the non-dominate hand hold the mouth open.
5. Introduce the leading soft tip into the mouth of the patient toward the hard palate.
6. Glide the device downwards and backwards along the hard palate with a continuous, but gentle push until a definitive resistance is felt. Do not apply excessive force.
7. The tip of the igel should be located into the upper esophageal opening and the cuff should be located against the laryngeal framework. The incisors should be resting on the integral bite block. There is NO cuff to inflate.
8. Confirm proper position by auscultation of bilateral breath sounds and capnography.
9. Secure the i-gel using included strap.

10.27: Surgical Airway

Revised 09/05/2025

Indication

◦ **Patients ≥ 9 years old** who cannot be oxygenated or ventilated via any other means of airway management, meaning the patient cannot be ventilated via ETT, SGA, or BVM

◦ **Consider and prepare for surgical airway early in patients with facial trauma, facial burns, or severe anaphylaxis**

Contraindications

◦ **No contraindications in the setting of can't ventilate, can't oxygenate**

Procedure

1. Prepare and assemble equipment
   a) Preload 6.0 endotracheal tube onto bougie
2. Disinfect the area of procedure
3. For Non-Traumatic patients, hyperextend the neck
4. Locate the cricothyroid membrane
   b) Place finger on thyroid cartilage (“Adams apple”) and
   c) Move finger down into soft depression between thyroid cartilage and cricoid cartilage (next firm “bump”)
   d) If unable to palpate, two fingerbreadths above the sternoclavicular notch should be identified and utilized
5. Use scalpel at 90 degree angle to make a vertical incision over the cricothyroid membrane
6. Bluntly dissect overlying tissue to expose cricothyroid membrane
7. Provide bilateral retraction of the skin incision to expose cricothyroid membrane
8. Make a stab incision through the cricothyroid membrane. Immediately place finger into the airway
9. Introduce bougie into trachea
10. Introduce 6.0 endotracheal over bougie into trachea until balloon is just beyond cricothyroid membrane

11. Inflate endotracheal Cuff
12. Secure endotracheal tube

10.28: Synchronized Cardioversion

Revised 09/05/2025

Procedure

1. Prepare equipment
2. Attach therapy pads to patient
3. **Enable SYNC** and ensure the **SYNC marker** is present on the screen
4. **Select energy:**
   a) Adults: **200 J**
   b) Pediatrics: **2 J / kg**
5. Press the **Charge** button
6. **PRESS AND HOLD Shock** button to deliver energy

10.29: Tourniquet Use

Revised 09/05/2025

Procedure

1. Apply proximal to injury away from joint
2. Tighten, and then begin twisting the windlass until bleeding has stopped and NO distal pulse is palpable.
3. Secure windlass with all available security features
4. Inform hospital staff of tourniquet use and time of application
5. Reassess the site frequently
    - As perfusion improves, bleeding may begin again
    - Tighten the tourniquet or apply a second tourniquet if bleeding begins again

10.30: Tracheostomy Management

Revised 09/05/2025

Patients with history of Laryngectomy **DO NOT HAVE AN UPPER AIRWAY**. Use **EXTREME CAUTION** with management of the tracheostomy in a patient with laryngectomy.

Ventilation Difficulties

If there is difficulty with ventilation through the tracheostomy:

a) Remove any speech valve or inner cannula

b) Pass Bougie or French suction tubing through tracheostomy

c) Deflate the tracheostomy cuff balloon and attempt to adjust the tracheostomy position

d) Remove Bougie or suction tubing and attempt to ventilate

If still unable to ventilate:

a) Pass Bougie or French suction tubing through tracheostomy

b) Remove tracheostomy tube and attempt to replace with size 5.5 endotracheal tube

c) Remove Bougie or suction tubing and attempt to ventilate

If still unable to ventilate:

a) Manage the airway from above, with either endotracheal intubation, supraglottic airway, or BVM

Reference document 2.1 / Airway Management

Bleeding Tracheostomy

◦ Most common cause of bleeding is location irritation/tissue damage

◦ Apply direct pressure to the area of bleeding and ensure bleeding is controlled

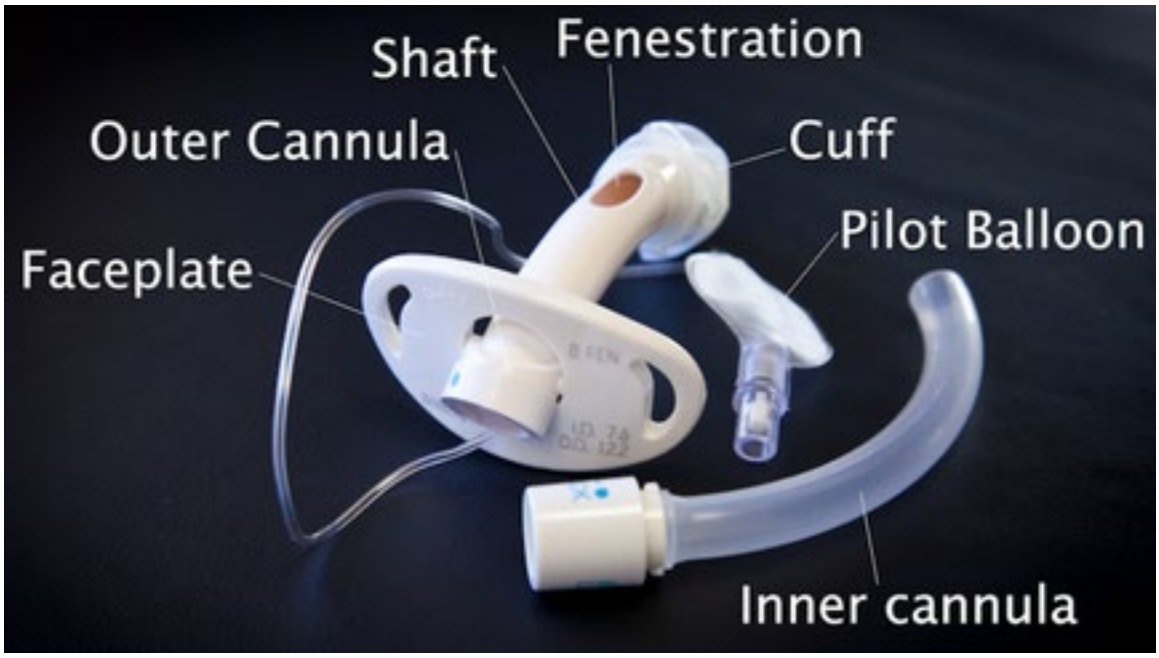
If there is significant bleeding from around the tracheostomy site or from the tracheostomy tube:

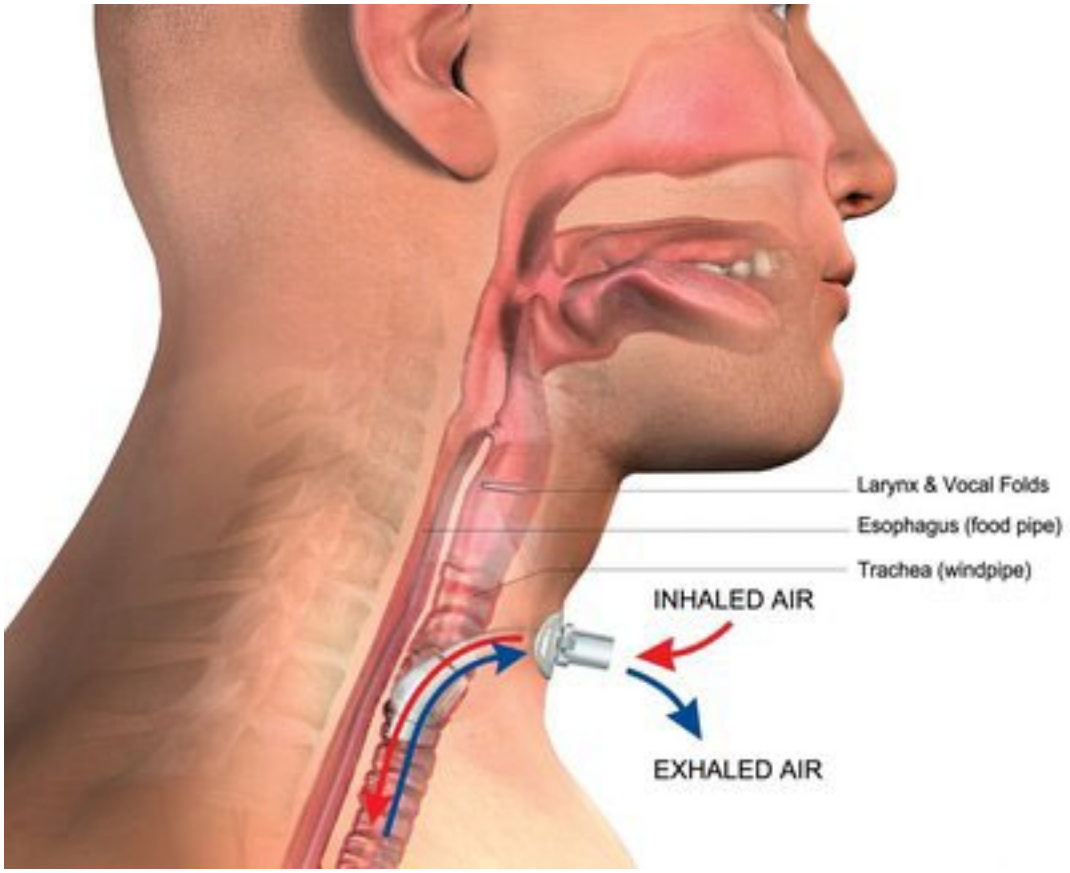
a) Hyperinflate the tracheostomy cuff balloon, if the tracheostomy is cuffed

b) If bleeding continues, intubate the patient from above

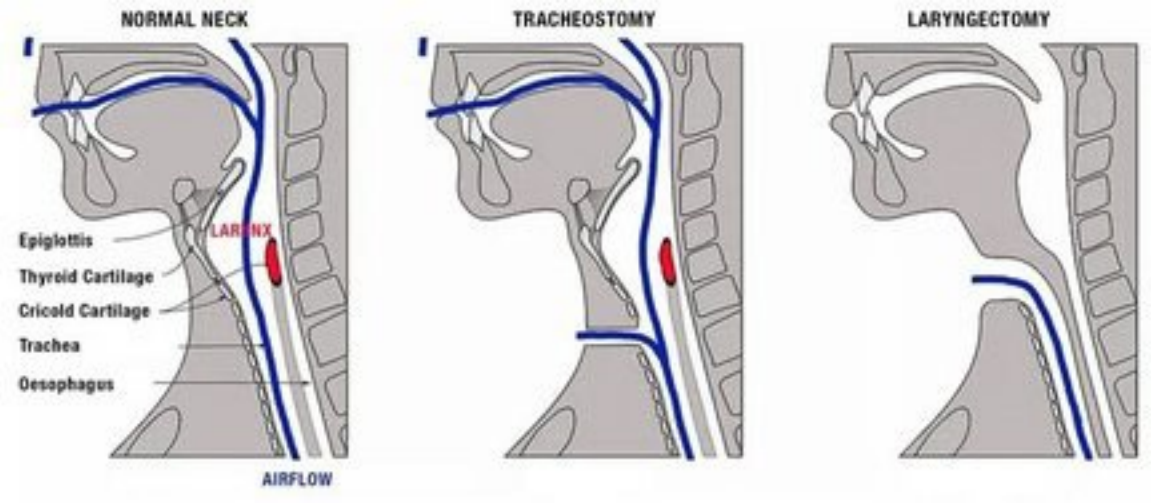
c) Once intubated, remove the tracheostomy and insert a gloved finger into the stoma and apply strong pressure

Anatomy of Tracheostomy:





Laryngectomy:


NORMAL NECK
TRACHEOSTOMY
LARYNGECTOMY
Epiglottis
LARYNX
Thyroid Cartilage
Cricoid Cartilage
Trachea
Oesophagus
AIRFLOW

10.31: Transcutaneous Pacing

Revised 09/05/2025

Procedure

1. Place the therapy pads on the patient, preferably in the anterior/posterior position but anterior/lateral is acceptable.
2. Place the limb leads on the patient
3. Enter 'Pacing' Mode
4. Set pacing mode to "Fixed"
5. Set the pacing rate to 80/min
6. Set the energy output to 50 mA
7. Slowly increase the energy output until capture is seen.
8. Once capture has occurred, increase the energy output by 10 mA

Images


00:01:32
12
70
Fixed
37
PACER
SHOCK

10.32: Ultrasound-Guided Pulse Check

Revised 09/05/2025

General

- Ultrasound for pulse checks to is evaluate for the presence of arterial pulsatility where palpable pulses are not detected.
- **THIS PROCEDURE MUST NOT EXTEND PULSE CHECK TIMES AND MUST BE LIMITED TO < 10 SECONDS**

Procedure

1. Login to the Butterfly App, connect the Butterfly to iPhone/iPad.
2. Ensure a sufficient amount of ultrasound gel is applied to the transducer.
3. Set scan mode to the vascular: carotid setting
4. Press record to start recording just prior to scanning
5. Place ultrasound probe at scanning site prior to stopping compressions.
6. During the first pulse check scan the carotid artery. Do not delay restarting chest compressions.
7. After the scan, stop the recording and then review for pulse
8. Immediately after the case, add the incident number and your employee number to the case file and upload to the Butterfly Cloud.

11. Care Bundles

11.1: SNORES

Revised 09/02/2025

The **SNORES** bundle of care must be implemented post sedation for all patients that receive Droperidol, Midazolam, or Ketamine for sedation management:

☐ **S:** SpO2 Monitoring

☐ **N:** Nasal EtCO2 Monitoring

☐ **O:** Oxygen 6 LPM Nasal Cannula, minimum

☐ **R:** RASS Score

☐ **E:** EKG obtained (3-lead and 12-lead)

☐ **S:** Sugar / Blood Glucose Checked

Calculate score RASS Score

11.2: Rule of 15s

Revised 07/21/2025

The following "Rule of 15s" should be applied to any patient in preparation for advanced airway management:

☐ Apply nasal cannula at 15 LPM for passive oxygenation

☐ Apply NRB at 15 LPM if patient spontaneously breathing, otherwise BVM at 15 LPM
Once sedated, convert to BVM at 15 LPM

☐ Apply PEEP at 15 cmH2O

☐ Elevate head of bed 15 degrees

11.3: MOVES

Revised 08/19/2025

The MOVES care bundle should be implemented prior to patient movement for patients who appear clinically unstable or those who may have clinical deterioration.

The patient should be moved from the scene once MOVES has been fully implemented.

Apply MOVES for patients with one abnormal vital sign with altered mental status or respiratory distress.

☐ **M:** Monitor

Apply therapy pads

☐ **O:** Oxygen

Apply oxygen, insert OPA/NPA, as indicated

Consider implementing Rule of 15s

☐ **V:** Venous & Ventilate

Establish vascular access with IV or IO

Ventilate patient as indicated

☐ **E:** Epi / Norepi

Push dose pressors mixed and ready to administer

☐ **S:** Sugar / Sedate

Check BGL, consider sedation, have plan to move patient

Relevant Protocols:

Reference document 11.2 / Rule of 15s

Reference document 2.1 / Airway Management

Reference document 6.21 / Vasopressors

Reference document 6.4 / Diabetic Emergencies

Reference document 6.1 / Agitation Sedation

12. Clinical Guidelines

12.1: Air Medical Utilization

Revised 07/29/2025

*The utilization of helicopters as a means of transport for critically ill or injured patients is an **optional tool**.*

Indication for Air Medical Utilization

Utilization should be based on the following criteria:

◦ The aircraft can deliver the patient to definitive care faster than ground transportation including response, scene, and transport times.

◦ When specialized services are required that local receiving hospitals are not equipped to provide, e.g. pediatric trauma or life-threatening burns.

◦ Severely injured patient(s) with extended extrication times. (> 30 min)

◦ Mass casualty situations where EMS resources are exhausted.

Coordination of Air Medical Utilization

Responsibility for overall command rests with the Incident Commander (IC). The highest- ranking MCHD provider on-scene should assume the role of EMS Sector officer and have the ultimate responsibility for patient care. EMS Sector is responsible for keeping the IC informed of patient condition and status and any manpower, equipment or other needs that may arise.

An Air Medical Provider (AMP) may be placed on standby by:

◦ Responding EMS unit

◦ First Responders on scene

Air Medical should not be launched until one of the following occurs:

◦ District Chief request

◦ EMS unit is on scene and has made a determination that AMP is needed.

The person requesting AMP assistance shall provide Alarm with the following information:

◦ Medic number

◦ Brief report of patient condition

◦ Once the aircraft is enroute, the authority to terminate a request for services shall lie solely with the MCHD EMS employee with the highest level of clinical authorization.

Landing Zone (LZ) Requirements

During normal daylight hours the LZ should be at least 60 x 60 feet. Additionally, it should be marked with one traffic cone at each corner and one traffic cone on the upwind side.

During nighttime hours the LZ should be at least 100 x 100 feet with lighted cones at each corner and one lighted cone on the upwind side.

12.2: Allied Health Care Providers

Revised 07/21/2025

Allied Health Care providers are authorized to accompany ambulances in the MCHD EMS System when they are requested by the attending EMS personnel, the transferring physician, or on-line medical direction.

The In-Charge Paramedic is ultimately responsible for managing the patient while in the care of the EMS system. Allied Health Care providers may not independently treat patients while those patients are in the care of the EMS system.

12.3: Authorization Levels

Revised 09/03/2025

MCHD Authorization Levels

The following skills and procedures can be performed during any patient encounter when clinically indicated:

EMT

- Vital sign acquisition
- Basic airway management including use of BVM, airway suctioning, oral/nasal adjuncts, supraglottic airway
- Bandaging and splinting, including traction splint, tourniquets, and QuikClot
- CPR, AED use, LUCAS application and use
- Non-invasive ventilation
- Application of 3-lead and 12-lead EKGs (without interpretation) with transmission of EKGs via Pulsara
- Spinal motion restriction
- Transport patient with IV saline lock during interfacility transfers
- Cold water immersion
- IO placement in cardiac arrest

AEMT

- AEMTs are clinically authorized at the EMT level with the following additions:
- IV placement
- Blood specimen collection
- Administration of Dextrose, Thiamine, or Normal Saline

Attendant Paramedic

- All above skills
- Video and direct laryngoscopy
- Endotracheal intubation
- All routes of medication administration
- 3-lead monitoring and 12-lead acquisition with interpretation

- Manual defibrillation

In-Charge Paramedic

- All above skills
- NG tube placement
- Needle thoracostomy
- Synchronized cardioversion
- Transcutaneous pacing
- Central line access
- IVAD access
- Vasoactive medications, push dose vasopressors
- Simple thoracotomy
- Surgical airway
- Delayed sequence intubation

Captain

- All above skills
- Delayed sequence intubation
- Point-of-care Ultrasound
- Authorized to act clinically as District Chief when assigned

District Chief

- All above skills
- Provide on-line medical direction to those of lower clinical authorization as needed
- Vasopressors at 30mcg/min
- Additional doses of MCHD formulary medications beyond standing orders

Delegation of Care

Performance of interventions and administration of medications can be delegated from Paramedics of higher clinical authorization to Paramedics of lower clinical authorization, unless explicitly prohibited with the **Cannot Delegate** tag.

Performance of interventions and administration of medications outside the scope of an EMT cannot be delegated from Paramedics to EMT providers unless explicitly marked with the **Delegated Only** tag.

EMS Students

MCHD employees enrolled in an approved EMS certification course and assigned to a unit in a student capacity **may** perform advanced skills within the scope of the course in which they are enrolled. The skills are to be performed under the direct supervision of an authorized MCHD provider. All other rules and regulations regarding student conduct should be observed.

MCHD employees enrolled in approved certification courses **may not** perform advanced skills beyond their current certification level **while in the course of their normal job duties.**

12.4: Attendant Unit Authorization

Revised 09/05/2025

Purpose

To establish a guideline for patient care activities for Attendants working within the 911 system, Special Events and or standbys for employees currently authorized as Paramedics, Advanced EMT's, or EMT-B, at the attendant level within the MCHD organization.

Guideline

An Attendant low priority response Ambulance unit placed in the 911 system must have one provider authorized as an Attendant:

• With a minimum of 6 months experience at the Paramedic Attendant authorization level at MCHD

• Considered in good standing with DCS, Operations and Human Resources

• With all required card courses current

A BLS low priority response Ambulance unit placed in the 911 system must have one provider authorized as an EMT Attendant:

• With a minimum of 6 months experience at the Paramedic Attendant authorization level at MCHD.

• Who has successfully completed the BLS Bootcamp

• Considered in good standing with DCS, Operations and Human Resources

• With all required card courses current

All Special Event, Attendant staffed unit, and/or Standby units should have two providers authorized at or above the Attendant level. The District Chiefs and Alarm should be notified whenever Special Event and/or Standby unit is placed in service with Attendant Level employees as well as the location of the special event and/or standby. BLS Attendant Units may not be assigned to a special event assignment without Deputy Chief Approval.

Units dedicated to any event usually do not transport patients from the site. However, exceptions may be made to this generalization as necessary by a Deputy Chief or above. When the crew encounters a patient and transport is required, ALARM shall be notified and an additional medic unit will be dispatched.

Ambulance units in the 911 system

MCHD has implemented a tiered response plan utilizing Low Priority 911 Response Ambulance Units. These units, both BLS and ALS, will be focused on responding to lower acuity calls that are determined by the dispatch determinant. However, in the event the unit is significantly closer than an MICU truck, Ambulances will be assigned to

priority 1 and priority 2 responses. In the event an ALS Ambulance is assigned to a priority 1 response, a District Chief will be assigned to the incident. In the event that a BLS Ambulance is assigned to a priority 1 or priority 2 response, a District Chief unit will be assigned to the response. Both ALS Ambulances and BLS Ambulances may disregard incoming units when appropriate. The determinants have been approved by the Medical Director and will be updated as needed.

Clinical

When staffing an Ambulance, the provider with the highest medical authorization level or most seniority is responsible for clinical care provided but may delegate patient care to the lower certification level provider when appropriate as outlined in the **Authorization Levels** Clinical Guideline. The following will provide clinical guidance for Ambulance Units or Special Event Units:

• Providers will be allowed to practice up to level of authorization.

• Any treatment or procedure outside a provider's scope of authorization will require a District Chief or Captain (if riding up) Consult.

• When a patient requires care beyond the providers' scope of practice or comfort level, the provider shall consult with a District Chief or Captain (if riding up) for guidance.

Reference document 12.3 / Authorization Levels

Ambulance Unit Refusal Authorization

Attendant Units or Ambulance units can obtain patient refusals following guidance from the **Patient Refusal** Clinical Guideline. Patient Refusals without consulting with a District Chief or telehealth provider if the patient can demonstrate capacity does not meet exclusion criteria requiring consult.

Reference document 12.22 / Patient Refusal

Exclusion Criteria

• In custody of Law Enforcement

• Minor (<18 years old)

• Pregnant or suspected pregnancy

• Patients requiring an ALS assessment

• Any patient that received a medication or had a procedure performed by MCHD Personnel (exception c-spine clearance)

Consults with a District Chief (or Captain riding up) or telemedicine provider is required for any patient outside the attendant unit refusal guideline or any refusal concerning for high-risk to the provider.

Operational

The Attendant with the most seniority is responsible for all operational aspects while on working on an Ambulance Response Unit.

• Follow all Clinical Guidelines and Field Operating Guidelines that pertain to MCHD ambulance operations

• MICU ambulances may not request the Ambulance Unit to downgrade care

• MICU ambulances may request an Ambulance unit if they encounter a 2nd patient that is considered stable

• BLS Ambulances must have Deputy Chief approval to be assigned to special event assignments.

Once Alarm has assigned a MICU to a response, they should not downgrade the response to an Ambulance response Unit, without approval from a District Chief or MEDCOM operator.

The EMS Resource Navigator will monitor Ambulance responses, both BLS Units and Paramedic Attendant Units, to ensure there is no significant delay in response time and that the call was coded correctly for a low acuity unit response.

12.5: BLS Care Delegation

Revised 09/05/2025

If the patient presents as stable and does not require continued ALS care, then the In-Charge Paramedic may allow BLS transport by an EMT. All providers are equally responsible for communicating the treatment plan and ensuring care documentation is thorough and accurate. The In-Charge Paramedic is responsible for delegation of care and for the patient throughout transport, even if care has been delegated to an EMT.

Delegation of Care Not Allowed

The following patients cannot be delegated to an EMT:

◦ Any patient who requires or might reasonably require additional or ongoing medications, procedures, and/or monitoring beyond the scope of practice of the lower credentialed provider.

◦ Any patient for whom all providers on the scene do not agree can be safely transported without a paramedic in attendance in the patient care compartment.

◦ Any patient suffering from chest pain of suspected cardiac origin, cardiac arrhythmia, moderate-to-severe respiratory distress, acute stroke, agitation/sedation, multiple trauma, or imminent childbirth.

◦ Post-ictal seizure patients, due to the possibility of a re-occurrence of a seizure.

Delegation of Care Is Allowed

The following interventions can be performed and still have the patient delegated to an EMT:

◦ 12-lead EKG without arrythmia or signs of ischemia

◦ A single dose of pain management (IV/IM/IN), including opioids

◦ Single dose of anti-emetics (IV/IM/IN)

These patients must meet the following criteria:

a) Providers agree that repeat doses are unlikely during transport

b) The patient must be monitored on scene for sufficient time to ensure no adverse reactions

These patients may be continuously monitored via EKG and ETCO2 by the EMT who is not to interpret the EKG, but rather, the intent of EKG monitoring is to enhance the accuracy of the patient's heart rate.

12.6: Captain Ride-Up Authorization

Revised 09/05/2025

Requirements

a) Candidate must be in good standing with Department of Clinical Services and EMS Operations Department.

b) Minimum credentialing as an EMS Captain with a minimum of 6 months tenure.

Process

Step 1: Attend mandatory ultrasound training and District Chief ride up orientation

Step 2: Evaluation phase that consists of:

- Two (2) twelve hour evaluation shifts with a District Chief (Required to be same District Chief for both shifts)
- Evaluating District Chief's endorsement to be able to ride in the District Chief's seat.
- Completion of evaluation paperwork.

Post Process

◦ After completion of this process, the Captain will be continually evaluated through Operations, Department of Clinical Services and the Quality Department to ensure that MCHD's standard of care is maintained.

◦ If at any time a Captain becomes considered "not in good standing" with any department within the organization, the Captain will not be allowed to "ride up" until he/she is considered back in "good standing".

12.7: Care and Transportation of Minors

Revised 09/05/2025

In the absence of a consenting parent, guardian, or adult family member, minors may only receive the treatment necessary to preserve life and prevent further injury. Parents and guardians retain the right to consent to and refuse treatment for minors in their charge who are under eighteen years of age unless the minor qualifies to consent to treatment. When a minor's parent or guardian refuses treatment for the minor, MCHD personnel should not force any treatment but shall encourage treatment or recommend that the minor patient be transported to a hospital.

If a minor's life is endangered by the parent's or guardian's refusal of treatment, or if abuse is suspected, the life-sustaining treatment should be provided.

If there is concern for child abuse:

Reference document 12.8 / Child and Elderly Abuse and Neglect

Married Minors

Married minors reserve the right to consent or refuse treatment.

Unmarried, Pregnant Minors

Unmarried, pregnant minors may consent or refuse treatment for pregnancy-related conditions only. Treatment for other conditions requires parental consent or refusal of treatment.

Abandoned Children

Section 262.301 of the Texas Family Code, as amended, requires MCHD personnel, without a court order, to take possession of a child who is thirty (30) days old or younger if the child is voluntarily delivered to the employee by the child's parent and the parent did not express an intent to return for the child.

An MCHD employee who takes possession of a child under these circumstances shall perform any act necessary to protect the physical health or safety of the child. The employee must notify a District Chief as soon as possible.

12.8: Child and Elderly Abuse and Neglect

Revised 09/05/2025

General Information

State law requires all professionals to report suspected cases of abuse (Texas Family Code § 261.101). Therefore, all employees are required to report actual and suspected cases of abuse. However, it is not the responsibility of MCHD personnel to confront and attempt to remediate abusive situations.

Transport situations: Privately and discreetly advise the nurse and/or physician of your suspicions.

Non-transport situations: If transport is refused, request Law Enforcement to the scene. If necessary, leave the scene and request to meet with law enforcement nearby. When law enforcement and the District Chief arrive, advise them of your suspicions.

In either situation, the MCHD employee responding to the call or witnessing the event should contact Child Protective Services or Adult Protective Services.

Contact: Child Protective Services / Adult Protective Services (CPS/APS)
Phones:
- APS/CPS: +1 (800) 252 5400
Note:

Documentation

In all cases, employees should include a detailed assessment of the actual or suspected abuse situation in the Patient Care Record. The appropriate agency should be contacted within 24 hours after the employee witnesses the actual or suspected abuse.

Child and Elderly Abuse should be reported to Adult Protective Services (AS) or Child Protective Services (CPS): 1-800-252-5400 or https://www.txabusehotline.org

12.9: Controlled Substances

Revised 10/16/2025

MedixSafe Access, Documentation and Accountability

◦ On-duty field personnel are responsible for carrying their access card to the MedixSafe at all times during the shift.

◦ Attendant personnel are not authorized to access the MedixSafe unless instructed to do so by the In-Charge Paramedic or if staffing a unit with attendant-level personnel only.

◦ Controlled substance inventory and administration will be managed through Operative IQ at https://mchd.operativeiq.com

◦ Each on-duty unit and District Chief Tahoe will account for and track their Controlled Substances Inventory and usage through Operative IQ. Within the Operative IQ website, there are multiple forms and tabs for tracking:

▪ **"Pick up from Crew"** –Transfer of possession of controlled substances. This event should occur through a face-to-face exchange unless the circumstance does not permit. In the event a face-to-face exchange is not possible, both the In-Charge and Attendant can open the MedixSafe together, verify the inventory, verify the correct control numbers mirror Operative IQ for the boxes and transfer the controlled substances into the In-Charge's possession.

▪ **Controlled Substance Control Numbers** – documents the unique tracking numbers assigned to each specific controlled substance. There will be separate inventory control numbers for the different controlled substances (Fentanyl, Midazolam, Ketamine). Once a tracking number has been utilized, the associated Incident Number needs to be documented on the Controlled Substance Administration Form.

▪ **Controlled Substance Administration Form** - reflects the necessary information documented for each administration of an individual controlled substance. After administration of a controlled substance, the administering paramedic should complete the form immediately after transferring care to the receiving facility. The In-Charge is responsible for ensuring the completion of the Administration Form(s) before placing the unit in-service following the incident where the controlled substance was administered.

▪ **Incident Form** – An incident form will be required anytime a controlled substance vial is damaged, expired, wrong incident number selected, or unaccounted for. In addition to this form, a District Chief/Deputy Chief shall be immediately notified and an unusual occurrence form immediately completed.

◦ Unusual events, including discrepancy regarding the accounting of controlled substances, should be immediately reported to the appropriate District Chief/Deputy Chief for investigation. Unusual events will be addressed on a case by case basis and reviewed by the Division Chief - Clinical, Division Chief – Quality, Chief of EMS,

and/or the Medical Director to ensure that necessary safeguards are in place to maintain the chain of custody required by Federal and State rules and regulations.

◦ All unusual events will be documented by completing an unusual occurrence form immediately following the event. https://lf.mchd-tx.org/Forms/EMSUO

Face-to-Face Standard Exchange

◦ The Controlled Substance Inventory shall be accounted for by the on-coming and off-going In-Charge Paramedic or District Chief at the beginning and end of every shift with both In-Charge Paramedics/ District Chiefs present whenever possible. The expectation is that the MedixSafe will be opened with both In-Charge Paramedics/District Chiefs present during the verification/signature process. After a face-to-face exchange, both the off-going and on-coming provider will be responsible for ensuring the controlled substances transferred into the on-coming provider's possession in Operative IQ.

◦ The on-coming In-Charge Paramedic/District Chief is responsible for ensuring the following:

▪ Signed into Operative IQ website and controlled substances transferred ("Pick up from Crew") into their possession on Operative IQ. Both In-Charges/District Chiefs will enter their password and PIN to transfer the controlled substances from the off-going to on-coming In- Charge/District Chief. In the event another In-Charge or District Chief is not available, an attendant may wittiness the exchange of possession.

▪ The controlled substance inventory is accurate minus any used controlled substances. All boxes in possession must match the Box ID assigned to the unit. Each controlled substance must equal the inventory stated on Operative IQ. All control numbers must match the assigned inventory for the boxes on Operative IQ.

▪ All vials/ampules are intact with no damage and there is no suspicion of tampering

◦ The off-going In-Charge Paramedic or District Chief is responsible for ensuring that all documentation was completed appropriately during the shift and is able to be transferred to the on-coming In-Charge Paramedic or on-coming District Chief. It is unacceptable for the In-Charge Paramedic/District Chief on shift to sign out BEFORE the end of shift.

◦ In the event when a truck is only staffed with Attendant personnel, both Attendants will be held accountable as an In-Charge paramedic for all documentation.

◦ In the event a unit the Deputy Chief converts the MICU to Ambulance unit, the In-Charge Paramedic shall perform controlled substance possession exchange with most senior Paramedic Attendant staffing the Ambulance.

Face-to-Face Exchange Exceptions

◦ If the on-coming crew is assigned a response (including post moves) prior to completing the standard face-to-face exchange, personnel should not delay the

response to accommodate the exchange. In such circumstances, the on-coming crew should complete the verification process as soon as possible after the call or post move is completed. Under these circumstances the In-Charge and Attendant or both attendants for Ambulances will open the MedixSafe together, verify the correct box ID for the unit, account for the controlled substances, verify the assigned control numbers and transfer (“Pick up from Crew”) the controlled substances into the In-Charge (MICU unit) or Attendants (Ambulance unit) possession in Operative IQ.

◦ In the event of an emergency and the In-Charge or Attendant cannot release possession of the controlled substances in Operative IQ, the District/Deputy Chief will move the controlled substances to the appropriate virtual safe until the unit is placed back in-service.

◦ Peak demand unit assignments are situations in which a face-to-face exchange is not always possible. For peak demand units or 24 hour units, the controlled substances should be maintained within the MedixSafe. Both the In-Charge and Attendant (MICU) or both Attendants (Ambulance unit) working the Peak Demand Unit will ensure the correct Box IDs are selected from the Peak Demand Unit Safe, account for the controlled substances, verify the correct control numbers are present, verify the count and virtually move (“Pick up from safe”) the controlled substances boxes to the “Peak Demand Unit Safe” in Operative IQ. Upon the unit being returned to service, both the crew members will open the MedixSafe together, account for the controlled substances, verify the count is accurate and “return” the assigned controlled substance boxes to the “Peak Demand Safe”. If a situation prevents an off-going transfer back to the Operative IQ safe, a District/Deputy Chief shall be notified and the reason should be documented on an incident form and unusual occurrence.

◦ Event Units will obtain their controlled substances from the Event Locker in the peak supply room at the service center unless the shop has been pre-assigned controlled substances by the Division Chief - Clinical. The crew will obtain the controlled substances from the event locker together, ensure the correct Box ID is selected, verify the control numbers, account for the controlled substances and the In-Charge will take possession of the controlled substances (“Pick up from safe”) from the Event Truck Safe in operative IQ. In the occasion no In-Charge is assigned to an event truck, the senior attendant will transfer the controlled substances into their possession in Operative IQ.

Other Restrictions

◦ Controlled substances may be administered by MCHD employees who are authorized to do so as outlined in CG-11 (Medical Authorization Levels) and by paramedic students under the direction and careful supervision of their preceptor.

◦ Operative IQ should only be accessed on an MCHD issued device.

◦ Only MCHD employees should document the usage/waste of controlled substances. If administered by a student, the preceptor should complete the documentation and have their partner witness the waste of the controlled substance.

◦ The medic unit may remain in-service with a minimum of one of each controlled substance while awaiting replacement. The medic unit should be placed out of service anytime all of one controlled substance has been depleted.

◦ The administering paramedic and the usage witnesses are responsible for ensuring all information is correctly documented on the Controlled Substance Administration Form and in the ePCR.

◦ On the Administration Form the employee who signs (password/PIN) as the “waste witness” is co- responsible for ensuring that:

- Cumulative amount administered PLUS amount wasted EQUALS the total vial/ampule volume
- The correct virtual control number is selected in Operative IQ to match the actual physical control number administered on the vial
- The mcg/mg documented as amount wasted was visually witnessed as wasted
- The waste witness name and password/PIN/signature fields are appropriately completed
- The empty vial/ampule was placed in a sharps container
- The controlled substance administration is correctly documented in the ePCR.
- The correct virtual control number has been removed from the virtual safe. In order to complete this task, the individual who is in virtual possession of the narcotics must select "VIEW/AUDIT NARCOTICS" after administration and confirm absence of the administered control number with the waste witness.

◦ After receiving or returning narcotics, both the original recipient and the witness must ensure that all intended narcotics are fully accounted for and are in the possession of the recipient or securely stored in the virtual safe location.

Expired Medications and/or Compromised Security Seals/Operative IQ outage

◦ Controlled substances that are discovered as expired should be clearly marked so as to not be inadvertently administered. An Unusual Occurrence and incident form should be completed and the District Chief/Deputy Chief should be notified so that an exchange can be arranged. Possessing expired controlled substances will be not considered a violation of this guideline.

◦ Any suspecting tampering will be immediately reported to a Deputy/District Chief. It is the responsibility of the investigating Chief to contact Division Chief – Clinical.

◦ In the event Operative IQ website is not responding, complete an unusual occurrence documenting the controlled substance usage and waste. Both the employee administering and the witnessing employee will need to sign the unusual occurrence form. Once Operative IQ is back on-line, complete an administration form documenting the use/waste.

Disciplinary Action

◦ Failure at any time to maintain the chain of custody for controlled substances as described in these guidelines is considered a violation of this policy.

◦ Errors, omissions, and other incorrect documentation to include, but not be limited to control number, incident number, amount of medication administered, and amount of medication wasted is considered a violation of this policy. This includes Operative IQ and the ePCR.

◦ Failure to comply with this guideline will result in the following disciplinary action:

- 1st offense – Written Employee Action Notice (EAN)
- 2nd offense – One-shift suspension
- 3rd offense – Two-shift suspension
- 4th offense – Termination at discretion of Medical Director, Division Chief – Clinical, and HR

◦ Disciplinary actions are escalated from the **most recent level of discipline issued** within a 12 month rolling calendar. This is to recognize the most recent behavioral patterns.

◦ Any tampering or diversion of a controlled substance(s) will result in termination.

12.10: Coordination with Law Enforcement

Revised 09/05/2025

Patients in Custody / Prisoner Transport

Patients in custody must receive the same standard of care as any other patient. If transport is needed or requested by law enforcement, MCHD will transport to the appropriate facility. If there's a disagreement about the need for transport, crew members should advocate for care, involving the District Chief if needed. The officer should follow the ambulance and ensure the patient is handcuffed—ideally in front or at their side for access. If safety is a concern, an officer may ride in the back. **Patients should never be handcuffed to the stretcher or ambulance. They also must NEVER be transported in the prone position.**

Preserving Evidence/Crime Scene Management

In an effort to keep disruptions of the crime scene to a minimum, crewmembers should use the same pathway into and out of the crime scene with as few crewmembers required. Unless it is necessary for crew safety or patient care, nothing in the “crime scene” should be touched or moved.

When moving evidence at a suspected or known crime scene, use gloved hands and cut clothing along seams to preserve markings and avoid disturbing potential evidence.

Dead On Scene (DOS)/Suicide Attempts

If a patient is obviously dead from non-natural causes, do not move the body or disturb the scene. Request Law Enforcement if not present, and avoid touching weapons, notes, medications, doors, or switches.

Notify Law Enforcement of all suicides or attempts. Do not move the body unless absolutely necessary. In hangings, avoid cutting or untying knots. If deceased, leave the noose intact. If Law Enforcement is on scene, leave all evidence with them.

Jail/Detention Center Responses

Never leave equipment unattended in prisoner areas, and always stay escorted—no crew member should be alone.

Confidentiality Exception

There will be times that an MCHD provider has learned information while providing care to a patient regarding a criminal offense or reasonable threats of such an offense. If a provider determines that there is a probability of imminent physical danger to any person or if there is a probability of immediate mental or emotional injury to the patient, then the provider is authorized to disclose such information to Law Enforcement on-scene or following the response, as requested. In these cases the provider shall consult with a supervisor, or command staff, and complete the "Statement of Emergency Medical Responder Pursuant to Health and Safety Code 773.091 (e)(1) located below. This form will be provided to the District Chief and retained for record-keeping.

STATEMENT OF EMERGENCY MEDICAL RESPONDER PURSUANT TO HEALTH & SAFETY CODE 773.091(e)(1)

My name is_____. I am an emergency medical responder for Montgomery County Hospital District. I received communications from a patient in connection with an EMS call that I responded to on_____, ____, 20__ at approximately_____a.m. / p.m. (circle one), referred to herein as the "incident".

I understand that law enforcement desires that I release the nature and content of my communications with the patient in connection with their investigation of the incident, which may involve criminal conduct. I have spoken with Officer_____of the_____Police Department / Sheriff's Department / Department of Public Safety (circle one) regarding these matters.

I recognize that the communications between EMS responders and patients are made confidential by Texas law.

However, I understand that an exception to confidentiality of such communications exist *when emergency medical services personnel determines that there is a probability of imminent physical danger to any person or if there is a probability of immediate mental or emotional injury to the patient.*

Having spoken with law enforcement regarding their ongoing investigation into the incident, I HAVE FORMED A GOOD FAITH BELIEF THAT THERE IS A PROBABILITY OF IMMINENT PHYSICAL DANGER TO A PERSON OR THERE IS A PROBABILITY OF IMMEDIATE MENTAL OR EMOTIONAL INJURY TO THE PATIENT, and for this reason I believe I should disclose the nature and content of my communications with the patient to law enforcement.

I have consulted with my supervisor or EMS command staff regarding these matters.

_____

Signature

_____

Printed Name

_____

Date & Time

12.11: Destination Determination

Revised 10/15/2025

Personnel should consider the needs and requests of the patient as the primary factor in selecting a destination. They should take into consideration a facility's resources and capabilities before a final decision is made. Patient preferred destination request should be honored as long as that facility has the resources to care for the patient. If a specialty resource is needed to treat the patients current condition, the patient should be transported to the closest facility that has that resource. If a patient insists on being transported to a facility that is incapable of appropriately managing the current condition, the provider should inform the patient of the risks, transport to the facility requested, and document appropriately.

Routine Emergency Departments

The following Emergency Departments are within our transportation area and are approved for transport on a routine basis:

Contact: CHI St. Luke's Health – The Woodlands
Phones:
- Phone: 936-266-2000
Address: 17200 St Lukes Way, Conroe, TX, 77384

Contact: CHI St. Luke's Health – The Vintage
Phones:
- Phone: 832-534-5000
Address: 20171 Chasewood Park Dr, Houston, TX, 77070

Contact: HCA Houston Healthcare – Conroe
Phones:
- Phone: 936-539-1111
Address: 504 Medical Center Blvd, Conroe, TX, 77304
Note: Level 2 Trauma Center

Contact: HCA Houston Healthcare – Kingwood
Phones:
- Phone: 281-348-8000
Address: 22999 US-59, Houston, TX, 77339
Note: Level 2 Trauma Center

Contact: HCA Houston Healthcare – Northwest
Phones:
- Phone: 281-440-1000
Address: 710 Cypress Creek Pkwy, Houston, TX, 77090
Note: Level 2 Trauma Center

Contact: HCA Houston Healthcare – Tomball
Phones:

- Phone: 281-401-7500
Address: 605 Holderrieth Blvd, Tomball, TX, 77375
Note: Level 3 Trauma Center

Contact: Houston Methodist - Cypress
Phones:
- Phone: 346-618-2000
Address: 24500 Northwest Fwy, Harris County, TX, 77429
Note:

Contact: Houston Methodist - The Woodlands
Phones:
- Phone: 936-270-2000
Address: 17201 I-45, Shenandoah, TX, 77385
Note: Capabilities:
Stroke
PCI

Contact: Houston Methodist – Willowbrook
Phones:
- Phone: 281-737-1000
Address: 18220 TX-249, Houston, TX, 77070
Note:

Contact: Huntsville Memorial Hospital
Phones:
- Phone: 936-291-3411
Address: 110 Memorial Hospital Dr, Huntsville, TX, 77340
Note:

Contact: Memorial Hermann – Northeast Hospital
Phones:
- Phone: 281-540-7700
Address: 18951 N Memorial Dr, Humble, TX, 77338

Contact: Memorial Hermann – Cypress
Phones:
- Phone: 346-231-4000
Address: 27800 Northwest Fwy, Harris County, TX, 77433
Note:

Contact: Memorial Hermann - The Woodlands
Phones:
- Phone: 713-897-2300
Address: 9250 Pinecroft Dr, The Woodlands, TX, 77380
Note: Level 2 Trauma Center

Contact: Texas Children’s Hospital – The Woodlands
Phones:
- Phone: 936-267-5000
Address: 17600 I-45, The Woodlands, TX, 77384
Note:

Hospitals in the Texas Medical Center:

Contact: Ben Taub Hospital - TMC
Phones:
- Phone: 713-873-2000
Address: 1504 Ben Taub Loop, Houston, TX, 77030
Note: Level 1 Trauma Center

Contact: Houston Methodist Hospital - TMC
Phones:
- Phone: 713-790-3311
Address: 6565 Fannin St, Houston, TX, 77030

Contact: Memorial Hermann - TMC
Phones:
- Phone: 713-704-4000
Address: 6411 Fannin St, Houston, TX, 77030
Note: Level 1 Trauma Center

Contact: Texas Children's Hospital - TMC
Phones:
- Phone: 832-824-1000
Address: 6621 Fannin St, Houston, TX, 77030
Note: Level 1 Pediatric Trauma Center

Freestanding Emergency Departments

Patient must meet the criteria for Freestanding ED transport:

Calculate score Freestanding ED Transport Criteria

Approved Destinations:

Contact: America's ER – Magnolia
Phones:
- Phone: 281-789-3400
Address: 32784 FM2978, Magnolia, TX, 77354

Contact: CHI St. Luke's ECC – Huntsville
Phones:
- Phone: 936-439-4850
Address: 540 I-45, Huntsville, TX, 77320

Contact: CHI St. Luke's ECC – Springwoods Village
Phones:
- Phone: 346-305-5000
Address: 2255 E Mossy Oaks Rd, Spring, TX, 77389

Contact: CHI St. Luke's – Lakeside Hospital
Phones:
- Phone: 936-266-9000
Address: 17400 St Lukes Way, The Woodlands, TX, 77384

Contact: HCA - Cleveland
Phones:
- Phone: 281-593-8350
Address: 1103 E Houston St, Cleveland, TX, 77327

Contact: HCA - Cy Fair
Phones:
- Phone: 281-890-4285
Address: 10655 Steepletop Dr, Houston, TX, 77065
Note:

Contact: HCA - Spring
Phones:
- Phone: 281-973-0122
Address: 621 Rayford Rd, Spring, TX, 77386

Contact: Houston Methodist ECC – Magnolia
Phones:
- Phone: 281-737-0010
Address: 18230 FM 1488, Magnolia, TX, 77354

Contact: Houston Methodist ECC - The Woodlands
Phones:
- Phone: 936-280-4750
Address: 3759 FM 1488, Spring, TX, 77382
Note:

Contact: Memorial Hermann - CCC Kingwood
Phones:
- Phone: 346-320-5300
Address: 4533 Kingwood Dr, Houston, TX, 77345

Contact: Memorial Hermann - CCC Spring
Phones:
- Phone: 281-374-5400
Address: 7474 N Grand Pkwy, Spring, TX, 77379
Note:

Contact: Memorial Hermann – CCC Summer Creek
Phones:
- Phone: 281-436-8800
Address: 14201 East Sam Houston Pkwy N, Westlake Market Place, Houston, TX, 77044

Contact: Memorial Hermann - Woodlands West
Phones:
- Phone: (281) 719-3333
Address: 9950 Woodlands Pkwy, The Woodlands, TX, 77382
Note:

Other alternative destinations may be approved during time of high-volume or natural disaster at the discretion of the Medical Director.

Trauma Designations

Patients who meet Trauma Activation Criteria should be transported to the nearest Level 1 or Level 2 Trauma Center. Patients who do not meet Trauma Activation Criteria but are at risk of significant injuries due to the mechanism of their injury should be transported to the closest Level 1, Level 2, or Level 3 center.

Calculate score Trauma Activation Criteria

Level 1 Trauma Centers:

Contact: Ben Taub Hospital - TMC
Phones:
- Phone: 713-873-2000
Address: 1504 Ben Taub Loop, Houston, TX, 77030
Note: Level 1 Trauma Center

Contact: Memorial Hermann - TMC
Phones:
- Phone: 713-704-4000
Address: 6411 Fannin St, Houston, TX, 77030
Note: Level 1 Trauma Center

Contact: Texas Children's Hospital - TMC
Phones:
- Phone: 832-824-1000
Address: 6621 Fannin St, Houston, TX, 77030
Note: Level 1 Pediatric Trauma Center

Level 2 Trauma Centers:

Contact: HCA Houston Healthcare – Conroe
Phones:
- Phone: 936-539-1111
Address: 504 Medical Center Blvd, Conroe, TX, 77304
Note: Level 2 Trauma Center

Contact: HCA Houston Healthcare – Kingwood
Phones:
- Phone: 281-348-8000
Address: 22999 US-59, Houston, TX, 77339
Note: Level 2 Trauma Center

Contact: HCA Houston Healthcare – Northwest
Phones:
- Phone: 281-440-1000
Address: 710 Cypress Creek Pkwy, Houston, TX, 77090
Note: Level 2 Trauma Center

Contact: Memorial Hermann - The Woodlands
Phones:

- Phone: 713-897-2300
Address: 9250 Pinecroft Dr, The Woodlands, TX, 77380
Note: Level 2 Trauma Center

Level 3 Trauma Centers:

Contact: HCA Houston Healthcare – Tomball
Phones:
- Phone: 281-401-7500
Address: 605 Holderrieth Blvd, Tomball, TX, 77375
Note: Level 3 Trauma Center

Psychiatric Crisis

Eligibility is dependent on assessment using MCHD's Psychiatric Facility Inclusion/Exclusion Criteria. Personnel must contact the facility to verify patient meets criteria.

Reference document 14.8 / Psychiatric Facility Transport Criteria

Contact: Tri-County - Psychiatric Emergency Treatment Center
Phones:
- Phone: 936-521-6100
Address: 706 Old Montgomery Rd, Conroe, TX, 77301
Note:

Contact: Kingwood Pines Hospital
Phones:
- Phone: 281-404-1001
Address: 2001 Ladbrook Dr, Houston, TX, 77339

Contact: Cypress Creek Hospital
Phones:
- Phone: 281-586-7600
Address: 17750 Cali Dr, Houston, TX, 77090

Contact: Woodland Springs
Phones:
- Phone: 936-270-7520
Address: 15860 Old Conroe Rd, Conroe, TX, 77384

Contact: Voyages Behavioral Health (ADULTS ONLY)
Phones:
- Phone: 936-242-0409
Address: 1317 S Loop 336 W, Conroe, TX, 77304
Note:

Non-routine Destinations

Transport of a patient to a destination not listed above requires District Chief consultation

Reference document 10.7 / District Chief Consult

12.12: District Chief Notification

Revised 09/05/2025

Any incident which potentially has an adverse or negative impact on the patient or system should be immediately reported to the on-duty District Chief, and Unusual Occurrence Form completed, as soon as practical after the completion of the call so that an analysis may be initiated.

Mandatory District Chief notification should include, but not be limited to the following:

• Cardiac/respiratory arrest immediately following any medication administration

• Any attempt (successful or unsuccessful) at surgical airways

• Incorrect medication administration or use (i.e., excessive amount, wrong dose, route, etc.)

• Any cardiac and/or respiratory arrest or patient injury while attempting physical restraint

• Any unusual circumstance or intervention that potentially causes or caused patient harm

• Unexpected/unanticipated death of a patient

• A provider has operated outside of their level of certification, training, and/or authorization

• Any medical device failure occurring during patient care

If any of the above incidents occur, the District Chief is responsible for contacting the Division Chief - Clinical appropriately.

12.13: Documentation Standards

Revised 09/05/2025

Standards For Documentation

All providers shall have the responsibility for ensuring that all incidents to which a unit goes enroute are documented in the PCR system. Any patient encountered by a field credentialed MCHD employee shall have an ePCR documented for the event.

The provider shall have the responsibility for ensuring that a patient care report is completed.

All PCR's must be completed before the end of shift unless approved by a District Chief. The only acceptable reasons for approval are:

◦ Emergency

◦ Hardware failure (troubleshooting should be attempted)

◦ Software failure (troubleshooting should be attempted)

EKG Monitor Data

Any vital signs and 3/12 lead data obtained utilizing an EKG monitor MUST be imported into the patient care record. If this cannot be done, then justification as to why MUST be documented within the PCR narrative.

◦ Erroneous data may be deleted to reflect the patient's condition accurately.

Refusal of Medication or Procedure

A patient with sufficient mental capacity can refuse any medication or procedure. If a patient refuses any recommended medication administration or therapeutic intervention, it should be documented within the narrative. Be specific about the refused intervention and include the following information.

◦ Why intervention is needed

◦ Consequences of refusing

◦ Any efforts to convince the patient to consent to the intervention

Refusal to Transport to a Recommended Destination

A patient with sufficient mental capacity can refuse transport to a recommended destination (Ex: Trauma center, Stroke Center). If a patient refuses transport to a recommended destination, please include:

◦ Why the recommended destination is advised

◦ Consequences of refusing

- Any efforts to convince the patient to consent to the appropriate destination

No Injury PCR Documentation

A No Injury disposition is only allowed on Motor Vehicle Collisions (MVC). The purpose of this is to ensure all potential patients are identified. All No Injuries associated with an MVC may be documented on the same No Injury PCR, a separate report from any PCR with a patient (Code 4, Transport, or Refusal). The following information should be documented within the narrative of the PCR.

- No Injury individual's name
- Second identifier for the individual (DOB, Phone number, or address)

Access to PCR Documentation Software System

The software that is used to document patient care reports contains PHI, which is subject to all HIPAA rules and regulations.

12.14: ED Extended Wait Patient Transfer

Revised 10/14/2025

This protocol applies when time since arrival at the hospital exceeds 90 minutes

If, **after 90 minutes**, the patient has not been transferred from the stretcher, the crew will consider the following criteria for waiting room disposition:

• The patient must be hemodynamically stable and meet the FSED transport criteria.

Calculate score Freestanding ED Transport Criteria

• The patient must have mental capacity to make decisions for themselves.

• No complaints involving altered mental status, seizure, syncope, or psychiatric crisis.

• No suspicion for time-sensitive emergency.

• The patient must be ambulatory

If the above criteria are met:

• Consult DC for approval of "waiting room" disposition.

• Ensure Pulsara communication with the hospital includes the most recent vital signs, age, DOB, and chief complaint, and description of where/how the patient was left.

• Attempt to notify and obtain signature from either the triage or charge nurse before leaving the ED

If the decision is made that the patient is appropriate for waiting room disposition, the time of the transfer will be documented in the PCR in the Patient Care Released field.

Questions about this protocol will be addressed through the Department of Clinical Services or Administrator on Call.

12.15: Encountering Emergencies

Revised 09/05/2025

The purpose of this guideline is to provide directive on the appropriate action when encountering an emergency while on-duty. MCHD has a duty to act when confronted with any emergency scene encountered within its territory.

Unassigned Emergency

If a provider encounters an emergency while not assigned to a response, they must notify ALARM, provide appropriate aid, and ensure the incident is properly documented.

While Assigned to a Response

If an emergency is encountered while on a response, ALARM should be notified as soon as possible. Hazardous situations without injuries should still be reported. If there are injuries or signs of illness, the incident must be reported and the unit may be reassigned.

When transporting a non-critical patient, the crew should stop and assess the scene, ensuring at least one crew member remains with the patient. Additional units can be requested to resume transport quickly.

If transporting a critical or urgent patient, notify ALARM but continue to the destination without stopping.

Emergency in Neighboring Service Area

If a provider encounters an emergency in another agency’s service area, they must notify ALARM and request a response from the appropriate service. Providers should stop to render aid and wait for local units to arrive. MCHD EMS may transport patients only if requested by the local agency, and all care must follow MCHD authorization and protocols.

12.16: Facility Diversion

Revised 09/05/2025

Diversion is a courtesy extended by MCHD to destination facilities.

Authorization for Override of Diversion Requests

MCHD personnel are not mandated to honor a Diversion Request but should attempt to find an appropriate alternative destination if possible. MCHD personnel should consider the condition of the patient, distance to alternate facilities, and the diversion status of alternate facilities in determining the destination for the patient.

Internal Disaster

Internal Disaster is a status that a hospital may declare when circumstances at that facility does not allow them to safely provide care to patients. This request will be evaluated by MCHD Medical Directors and leadership to determine if this request will be honored. This decision will be based on severity of issue the facility is reporting along with overall system needs.

Hospital Time Out

MCHD leadership reserves the right to place a facility on Time-Out based on their recent turnaround times. This decision will be made following FOG XXXXXXX. MCHD providers should attempt to divert all patients, including Time-Sensitive Emergencies, away from a facility that is on Time Out. MCHD providers may utilize a facility on Time Out if a patient refuses to be transported to a different facility or the patient was recently discharged from that facility after a surgical procedure.

12.17: Medication Storage

Revised 09/05/2025

All medications and medical devices shall be maintained in a temperature controlled environment. This pertains to being stored on the ambulance as well as in the station. Any time an employee believes a unit has not maintained proper temperature regulation for medication storage, it should be reported to the on-duty District Chief.

A “3M MonitorMark” will be affixed to the medication cabinet. When the temperature of the medications falls becomes greater than 88°, the increasing turns blue.

• A completely white strip indicates the medications have not exceeded temperature.

• A partially blue strip indicates the medications exceeded 88°, however not excessively

• A fully blue strip indicates the medications exceeded 88° for too long. In this case the crew needs to notify the District Chief and all the medications must be replaced.

USP Controlled Room Temperature

◦ Medications and IV fluids shall be kept within the range of 59°F-86°F

◦ Transient spikes up to 104 ºF may be permitted such that spikes don’t exceed 24 hours

◦ Min 32 ºF, Max 104 ºF

USP Controlled Cold Temperature

◦ Medications requiring refrigeration and certain IV fluids shall be kept within the range of 32°F- 46°F

◦ Transient spikes up to 77 ºF may be permitted such that spikes don’t exceed 24 hours

◦ Min 32 ºF, Max 77 ºF

Tamper-Evident Seal

All cabinets and kits that contain medications must be sealed with a tamper-evident seal.

12.18: New Employee Orientation Process

Revised 09/05/2025

The purpose of the MCHD New Employee Orientation Program is to provide new employees the opportunity to become acquainted with policies, guidelines and procedures as well as promote a team approach to patient care for the citizens and visitors of Montgomery County. Each employee should receive the appropriate paperwork, including copies of the current Clinical Guidelines, Medication References, and Medical Procedures currently performed by MCHD field staff, as well as the Field Operating Guidelines. This packet should also include paperwork to be completed by the preceptor/Captain.

Monitoring the progress of the employees in the New Employee Orientation Program is a collaborative effort between the Ops Recruitment and Development Coordinator and the EMT Supervisor. All paperwork pertaining to evaluations and patient care documentation shall be maintained through Agency 360 throughout the process and completed by their assigned preceptor/Captain. At the end of the field training portion of the NEOP program, the new employee shall report to the relevant employee listed above to review the documentation.

The initial orientation consists of classroom instruction that may include organizational history and structure, employee benefits, patient care reporting and field software training, introduction to the driver-trainer program, as well as the orientation packet. Additional topics covered in the remainder of the classroom orientation include, but are not limited to: introduction to trauma, airway, territory overview, and equipment/skills overview.

New employees are required to be evaluated for a minimum of twelve 24-hour shifts (or equivalent hours) with a driving coach/preceptor/Captain. After completion of these shifts, the employee should be evaluated for competency at the Attendant level and a recommendation should be made by the preceptor/Captain to release the employee or continue the evaluation process. Once the employee is released, the Assistant Chief of Operations should assign the employee to a schedule. If the recommendation is made to extend the orientation, the employee may be assigned to another preceptor/Captain with a written plan identifying specific areas of improvement. The employee will be re-evaluated at the end of two 24-hour shifts (or equivalent time). At that time, a recommendation may be made by the Department of Clinical Services to continue the process or terminate the employee.

The twelve 24-hour shifts will be scheduled as follows:

- Four 24-hour driving shifts with a driving coach. The new employee will be shadowed by a driving coach/preceptor/Captain at all times unless extraordinary circumstances exist.
- Six 24-hour shifts with primary preceptor/Captain (phase I). The new employee will be shadowed by the preceptor/Captain.

- Two 24-hour shifts with secondary preceptor/Captain (phase II). The new employee will be shadowed by the preceptor/Captain.

Additionally, all new employees must pass a 90-day exam which will consist of policies, procedures, Clinical Guidelines, and territory. Passing scores on these exams are 80%. If the new employee is unsuccessful at passing the 90-day exam, they will get one retake before being removed from the schedule and placed on unpaid administrative leave. The employee may return to work after passing all 90-day exams. At 180 days, the new employee will be scheduled for two hours with the Billing Manager and a 6-hour observational shift in Alarm.

All new employees have a 180-day probationary period. If clinical or operational issues arise that result in counseling or disciplinary action, the probation may be extended at the discretion of the Division Chief of Clinical or Assistant Chief of Operations. Documentation will be placed in the employees' file describing the reason for the extended probationary period and what requirements should be fulfilled by the employee, as well as management for successful completion.

12.19: Non-MCHD Personnel On Scene

Revised 09/05/2025

Non-Certified Bystanders

The use of non-certified bystanders in an emergency is not recommended. It should be reserved for “last resort” instances when their assistance is critical.

Certified Bystanders

Individuals who possess valid EMS certification and/or other healthcare licenses but are NOT employed by MCHD may be allowed to assist MCHD personnel in rendering patient care under the following conditions:

◦ Individuals may only participate in patient care under the direct supervision of MCHD EMS personnel.

◦ Individuals with advanced certification should NOT be permitted to administer invasive treatment unless approved by a District Chief.

On Scene Physicians

Before providing patient care, any physician offering aid must show ID and credentials.

If a patient's private physician is on the scene of an incident **and has provided the appropriate credentials**, MCHD EMS personnel should comply with their directions to the extent that those orders are consistent with established protocols. **Online medical control should be notified of all on-scene physician contacts wishing to assist.**

◦ If a physician elects to accompany their patient to the hospital, MCHD EMS personnel should respect the physician's wishes in managing the patient.

◦ If MCHD EMS employees believe that the physician has not adequately evaluated the patient, they should immediately provide emergent treatment and move the patient to the ambulance for further evaluation and treatment.

◦ The patient’s physician may write orders beyond the MCHD EMS Clinical Guidelines. Employees shall attempt to carry out the physician’s orders if the orders do not extend beyond the employees’ training, certification, or capabilities.

◦ All physicians at the scene of an emergency should be treated with professional courtesy.

Disagreements with Physicians on scene

◦ An employee who disagrees with a physician concerning patient management should NOT express his/her disagreement to the physician unless there is imminent danger to the patient.

◦ Advise physicians that all MCHD EMS personnel function under written standing orders and/or online medical direction.

◦ Advise the physician that they may continue to assist by advising on-scene MCHD personnel or assisting with patient care under MCHD's Clinical Guidelines.

◦ If the physician insists on providing direction outside established guidelines, they should take complete responsibility for the patient's care, including accompanying the patient to the hospital. The crew shall document all activities during transport.

◦ If the physician assumes responsibility for the patient's care, MCHD EMS personnel should comply with their directions if the orders are consistent with established standing orders.

◦ If the orders proposed by the intervening physician are inconsistent with MCHD standing orders, MCHD personnel shall respectfully decline to participate in that specific care. In this event, employees shall immediately contact an MCHD EMS District Chief.

◦ MCHD personnel should document all events and interactions between an intervening physician and the crew, including direction given and care provided.

12.20: Patient Care Standards

Revised 09/05/2025

Vital Signs

◦ A complete set of vital signs should be obtained within five (5) minutes of patient contact.

◦ Transport refusals should have two complete sets of V/S taken and charted (if patient allows).

◦ Patients should have a minimum of two complete sets of V/S documented.

◦ A complete set of vital signs is defined as: HR, BP, RR, SpO2, GCS

Interfacility Transports

◦ EMTs may attend patients from inter-facility transports with a pre-existing saline lock as long as no fluid or medications are being administered to the patient through the saline lock.

Medication Administration

◦ Any bag with medication added shall be clearly labeled with the name, quantity, time, and initials of the person preparing the bag for infusion.

◦ Before administration, the provider must state verbally the name of the drug, the dose to be administered, and the volume to be administered.

◦ Medications may only be given:

▪ By an approved MCHD credentialed provider.

▪ By an EMS student performing a clinical rotation with MCHD in which a credentialed provider has granted permission to the student to administer the medication

Medical Device Failure

◦ In the event of medical device failure, the failure must be reported to a District Chief at the completion of the patient encounter.

◦ The crew should complete an Unusual Occurrence form, and leave the device with Materials Management for further evaluation

◦ A malfunction should be reported whether or not the patient has an adverse outcome as a result.

Protocol Deviations

- Any protocol deviation must be documented as an Unusual Occurrence.

12.21: Patient Consent

Revised 09/05/2025

Patient Consent for Service

Texas Health and Safety Code § 773.008 provides that consent for emergency care of an individual is not required if:

(1) The individual is:

(A) unable to communicate because of an injury, accident, or illness or is unconscious; and

(B) suffering from what reasonably appears to be a life-threatening injury or illness.

(2) A court of record orders the treatment of an individual who is in an imminent emergency to prevent the individual's serious bodily injury or loss of life or

(3) The individual is a minor who is suffering from what reasonably appears to be a life-threatening injury or illness and whose parents, managing or possessory conservator, or guardian are not present.

Consent to Treatment of Child by Non-Parent

Texas Family Code § 32.001 provides that the following persons may consent to medical treatment of a child when the person having the right to consent, as otherwise provided by law, cannot be contacted and that person has not given actual notice to the contrary:

§ 32.001. Consent by Non-Parent

(a) The following persons may consent to medical, dental, psychological, and surgical treatment of a child when the person having the right to consent as otherwise provided by law cannot be contacted and that person has not given actual notice to the contrary:

(1) a grandparent of the child;

(2) an adult brother or sister of the child;

(3) an adult aunt or uncle of the child;

(4) an educational institution in which the child is enrolled that has received written authorization to consent from a person having the right to consent;

(5) an adult who has actual care, control, and possession of the child and has written authorization to consent from a person having the right to consent;

(6) a court having jurisdiction over a suit affecting the parent-child relationship of which the child is the subject;

(7) an adult responsible for the actual care, control, and possession of a child under the jurisdiction of a juvenile court or committed by a juvenile court to the care of an agency of the state or county, or

(8) a peace officer who has lawfully taken custody of a minor if the peace officer has reasonable grounds to believe the minor needs immediate medical treatment.

(b) The Texas Youth Commission may consent to the medical, dental, psychological, and surgical treatment of a child committed to it under Title 3 when the person having the right to consent has been contacted and that person has not given actual notice to the contrary.

(c) This section does not apply to consent for the immunization of a child.

(d) A person who consents to the medical treatment of a minor under Subsection (a)(7) or (8) is immune from liability for damages resulting from the examination or treatment of the minor, except to the extent of the person's own acts of negligence. A physician or dentist licensed to practice in this State, or a hospital or medical facility at which a minor is treated, is immune from liability for damages resulting from the examination or treatment of a minor under this section, except to the extent of the person's own acts of negligence.

Consent to Treatment by Child

Texas Family Code § 32.003 provides that a child may consent to medical treatment if the child:

§ 32.003. Consent to Treatment by Child

(a) A child may consent to medical, dental, psychological, and surgical treatment for the child by a licensed physician or dentist if the child:

(1) is on active duty with the armed services of the United States of America;

(2) is:

(A) 16 years of age or older and resides separate and apart from the child's parents, managing conservator, or guardian, with or without the consent of the parents, managing conservator, or guardian and regardless of the duration of the residence; and (B) managing the child's own financial affairs, regardless of the source of the income;

(3) consents to the diagnosis and treatment of an infectious, contagious, or communicable disease that is required by law or a rule to be reported by the licensed physician or dentist to a local health officer or the Texas Department of Health, including all diseases within the scope of Section 81.041, Health and Safety Code;

(4) is unmarried and pregnant and consents to hospital, medical, or surgical treatment, other than abortion, related to the pregnancy;

(5) consents to examination and treatment for drug or chemical addiction, drug or chemical dependency, or any other condition directly related to drug or chemical use; or

(6) is unmarried, is the parent of a child, and has actual custody of his or her child and consents to medical, dental, psychological, or surgical treatment for the child.

(b) Consent by a child to medical, dental, psychological, and surgical treatment under this section is not subject to disaffirmance because of minority.

(c) Consent of the parents, managing conservator, or guardian of a child is not necessary in order to authorize hospital, medical, surgical, or dental care under this section.

(d) A licensed physician, dentist, or psychologist may, with or without the consent of a child who is a patient, advise the parents, managing conservator, or guardian of the child of the treatment given to or needed by the child.

(e) A physician, dentist, psychologist, hospital, or medical facility is not liable for the examination and treatment of a child under this section except for the provider's or the facility's own acts of negligence.

(f) A physician, dentist, psychologist, hospital, or medical facility may rely on the written statement of the child containing the grounds on which the child has capacity to consent to the child's medical treatment.

12.22: Patient Refusal

Revised 09/05/2025

Patient Refusal of Service

All adult patients with decision-making capacity retain the right to refuse care. MCHD personnel shall attempt to have the patient (if minor: parent, guardian, etc.) read and sign the statement of refusal of care and transport.

MCHD personnel are responsible for assuring that patients are informed of the reasonable consequences of treatment and refusals. Bystanders shall witness signatures for such informed refusal, if possible. If there are no bystanders, then signatures for such informed refusal may be witnessed by another MCHD provider or other LEO/FRO partner present.

No Injury

Patients involved in a Motor Vehicle Collision who decline evaluation and assessment by EMS can be documented as a "**No Injury**" in the following circumstances:

◦ EMS personnel make contact with the patient and the patient indicates they are uninjured and do not wish to be evaluated, the patient does not appear to be in any acute distress, and appears to be alert and oriented.

◦ Fire Department personnel make contact with the patient and communicate to EMS the patient does not wish to be evaluated.

▪ However, the Fire Department **may not cancel EMS** with a "No Injury" if **ANY** of the following are present:

▫ Vehicle rollover

▫ Significant passenger intrusion

▫ Significant injury of another passenger of the vehicle

Refusal of Signature

If an individual refuses to sign the refusal of care statement, MCHD personnel should have the refusal witnessed by a third party, preferably someone not employed by MCHD EMS. A statement regarding the circumstances of individual’s refusal to sign the statement should appear on the patient report.

Decision-making capacity

A patient must meet specific criteria before accepting a refusal of care or treatment.

The patient must have decision-making capacity in order to refuse care or treatment. This is defined as the patient:

a) being alert and oriented

b) possessing an understanding that a medical decision exists

c) is capable of appreciating and repeating the consequences of their refusal of medical care

d) is without intoxication or external influence significant enough to hider decision-making capacity.

All patient refusals involving individuals exhibiting questionable decision-making capacity should go through the current medical control system (i.e., District Chief, Deputy Chief, Medical Director).

High-Risk Refusals

For any patient with the capacity to refuse transport having high-risk vital signs (defined below), a time-sensitive emergency, or other emergent signs/symptoms, the provider must consult with a Medical Director or District Chief before obtaining the patient/guardian refusal.

Reference Abnormal Vital Signs for High-Risk Refusals

For all guardian refusals for patients < 1yo, the provider must perform a High-Risk Refusal consult as noted above. The guardian must be determined to have capacity as well.

Special Considerations:

◦ A post-treatment blood glucose >70 should be present in hypoglycemic patients before taking a refusal.

◦ **Suicidal or homicida**l patients **CAN NOT** refuse care.

◦ Patients under an **Emergency Detention Order** per law enforcement **CAN NOT** refuse care

◦ **Law enforcement** should ride with or follow all EDO's to the ED.

◦ An emancipated child (pregnant, legally enlisted, declared an adult by courts) should be treated as an adult.

◦ Minors (<18) should have a refusal signed by their guardian

◦ Minors (<18) with non-life-threatening injuries/illness should have reasonable attempts to contact parents before transporting if parents are not present on scene

12.23: Promotional Requirements

Revised 09/05/2025

In-Charge Paramedic

The Medical Director is the final authority for all clinical authorizations and may exercise discretion to authorize clinical levels outside this guideline.

The requirements will be based upon, but not limited to, the items listed below.

◦ Current Texas EMT-Paramedic certification required, Licensure preferred

◦ Candidate must be in good standing with The Department of Clinical Services, Human Resources, and EMS Operations Department.

◦ 180-day experience at the paramedic attendant level

◦ Must maintain full-time employment for 180 days following promotion. If a candidate becomes part-time they must meet the minimum part-time requirements to remain in good standing.

Step 1

Complete an EMS promotion application on Laserfiche.

Step 2

Upon receiving the application, the appropriate staff will verify class attendance, card classes, survey scores, documentation compliance, and standing with HR, Clinical Services, and Operations.

Step 3

The candidate must pass a written exam (80% minimum, no retest for 180 days) covering protocols, clinical guidelines, FOGs, and paramedic knowledge; scores remain valid for 180 days.

Step 4

After passing the written exam, candidates must complete a medical/trauma oral board with a Captain (or higher rank) and Medical Director; if unsuccessful, they may retry in 180 days, and passing scores are valid for 180 days.

Step 5

After passing the scenario and/or oral boards, the candidate begins a two-phase field evaluation with an EMS Captain. Phase 1 includes 240 hours (minimum 120 with exemption from the Division Chief – Clinical). The EMS Captain may remove candidates not meeting entry-level In-Charge Paramedic standards after consulting the Division Chief – Clinical.

Phase 2 includes a minimum of 48 hours with a second EMS Captain, during which the candidate must perform independently. Unsuccessful candidates may be assigned additional training and re-enter Phase 1 after 90–180 days. Once successful, the candidate will report to the Operations Recruitment and Development Coordinator to finalize In-Charge authorization and then to the Assistant Chief or Deputy Chief on duty for a shift assignment.

If not possible, a District Chief must be notified with the reason and timeline.

◦ If not possible, a District Chief must be notified with the reason and timeline.

Captains will provide PCR CQI oversight for all candidates for 180 days, regardless of outcome.

Captain

The Medical Director is the final authority for all clinical authorizations and may exercise discretion to authorize clinical levels outside this guideline.

The requirements will be based upon, but not limited to, the items listed below.

◦ Current EMT-Paramedic certification required, Licensure preferred

◦ Candidate must be in good standing with The Department of Clinical Services and EMS Operations Department.

◦ Minimum of 2 years of continuous, uninterrupted experience as an In-Charge Paramedic at MCHD and verifiable 4 years experience with a 911 service provider.

◦ Candidate must be a full-time employee and must remain full time for 6 months following promotion. If candidate becomes part-time, they must surrender their status as a Captain and may be re-credentialed at the In-Charge Paramedic level.

Step 1

Complete an EMS promotion application on Laserfiche.

Step 2

Upon receiving the application, the appropriate staff will verify class attendance, card classes, survey scores, documentation compliance, and standing with HR, Clinical Services, and Operations.

Step 3

The scenario evaluates the candidate's ability to assess an In-Charge Paramedic, intervene appropriately, and conduct a review. A combined average score of 80% is required to advance to Step 4.

The scenario evaluates the candidate's ability to assess an In-Charge Paramedic, intervene appropriately, and conduct a review. A combined average score of 80% is required to advance to Step 4.

Step 4

Within 30 business days of the scenario, candidates will be notified of acceptance or denial by the Department of Clinical Services. Accepted candidates are ranked and placed based on scores, which remain valid for 365 days. Unsuccessful candidates will receive a development plan within 45 days.

District Chief

The Medical Director is the final authority for all clinical authorizations and may exercise discretion to authorize clinical levels outside this guideline.

The requirements will be based upon, but not limited to, the items listed below.

◦ Current EMT-Paramedic certification required; Licensure preferred

◦ Candidate must be in good standing with the Department of Clinical Services and EMS Operations

◦ Current authorization as an EMS Captain for minimum of 1 year

◦ Candidate must remain full time for 6 months following promotion. If successful and not currently full-time in the field, they will be required to transition to the field full-time to accept the promotion. If candidate becomes part-time, they must surrender their status as a District Chief and may be re-credentialed at the In-Charge Paramedic level.

Step 1

Complete and submit an EMS promotional application for District Chief on Laserfiche.

Step 2

Upon receiving the application, the appropriate staff will verify class attendance, card classes, survey scores, documentation compliance, and standing with HR, Clinical Services, and Operations.

Step 3

Written Exam --- Passing is 80% or higher. Candidate will not proceed in the promotional process if they receive a score less than 80%. The written exam will be graded by a minimum of two District Chiefs or higher.

Step 4

After passing Step 3, candidates may be invited to a testing session with scenarios such as clinical evaluation, operational drills, in-basket tasks, and conflict resolution. A combined average score of 85% is required to advance to Step 5.

The testing committee may include Medical Directors, Chief of EMS, Assistant Chief of Operations, Division Chiefs, Deputy Chiefs, District Chiefs, Human Resources, and the Operations Recruitment and Development Coordinator.

Step 5

Professional Interview — The candidate will participate in a professional interview conducted by a panel selected by Command Staff, which may include Executive or Managerial staff. Advancing to evaluation and training requires maintaining an overall score of 85% after the interview.

Step 6

Within 14 business days of testing, candidates will be notified of their status. Successful candidates are ranked by the testing committee and will enter the evaluation and training phase as District Chief positions open. Scores remain valid for 180 days, provided the candidate stays in good standing with the Department of Clinical Services and EMS Operations.

The evaluation phase includes a minimum of ten 24-hour shifts with two different District Chiefs, one 12-hour shift with a Deputy Chief, and several 4-hour sessions with Division Chiefs (Clinical and Quality), the Medical Director, Chief of EMS, and Assistant Chief of EMS. Phase 2 includes three additional 24-hour shifts.

Upon successful completion, candidates will be granted District Chief privileges.

Within 45 days of completing the process, candidates may schedule a feedback session with EMS Command Staff or the Ops Recruitment and Development Coordinator to review performance and receive development guidance.

12.24: Rehabilitation of Responders

Revised 09/05/2025

This Clinical Guideline is for the on-scene rehabilitation of emergency responders

Initial Assessment

1. Obtain a complete set of vital signs including 3-lead EKG

10-minute Recovery Period

1. Have responders remove any PPE, including turnout pants
2. Initiate oral rehydration and encourage active/passive cooling measures

Repeat Assessment after 10 Minutes

1. If vital signs are outside of the High-Risk Refusal range, advise ED transport and initiate heat exposure treatment

   Reference Abnormal Vital Signs for High-Risk Refusals
2. If the responder refuses treatment or transport, the High-Risk Refusal protocol applies

   Reference document 12.22 / Patient Refusal

12.25: Reorientation Process

Revised 09/05/2025

The purpose of the MCHD Employee Reorientation Process is to provide employees the opportunity to become reacquainted with policies, Standard Delegated Orders, and Field Operating Guidelines after being out of the field, for any reason, for a period of more than 90 days, but less than one year.

When an employee is returning to the field after a period of 90 days to one year, they will be assigned to a preceptor, Captain, or District Chief and will receive the appropriate paperwork from the Ops Recruitment and Development Coordinator. This packet will include paperwork to be completed by the preceptor, Captain, or District Chief as appropriate for the level of reorientation necessary. The paperwork will be the same as the paperwork used for initial evaluation or training of that position.

The employee will be placed with a preceptor if reorienting at the Attendant level or a Captain/District Chief if reorienting at the In-Charge Paramedic level or above. Employees reorienting who hold a District Chief level clinical authorization will complete a mixture of ambulance and Tahoe shifts. The Ops Recruitment and Development Coordinator monitors the reorientation process. All paperwork pertaining to evaluations and patient care documentation are to be delivered to the Ops Recruitment and Development Coordinator at the end of the field reorientation.

The reorientation consists of the following:

• 0 to 90 days absence – No reorientation required. Employee returns at the same level of authorization

• 91 to 180 days absence – 5 (+/-) 2 – 24 hour retraining shifts

• 181 to 279 days absence – 8 (+/-) 2 – 24 hour retraining shifts

• 280 to 365 days absence – 10 (+/-) 2 – 24 hour retraining shifts

AS WELL AS:

• Completion of any missed mandatory courses or requirements (CE, EVDT, physical agility, fit testing, etc.)

After completion of these requirements the employee should be evaluated for competency at their level and a recommendation should be made by the preceptor, Captain, or District Chief to release the employee or continue the evaluation process. Once the employee is released, the Assistant Chief of Operations should assign the employee a schedule or return them to their original shift. If the recommendation is made to extend the orientation, the employee may be assigned to another preceptor, Captain, or District Chief with a written plan identifying specific areas of improvement. The employee will be reevaluated at the end of two 24-hour shifts (or equivalent time). At that time, a recommendation may be made by the Department of Clinical Services to continue the process or terminate the employee.

Note:

At 366+ days absence the employee is deauthorized and their EMS field operations role will be reviewed and action taken, up to and including termination from that role.

13. Medication Reference

13.1: Acetaminophen

Revised 08/19/2025

Side Effects

• Rare but can cause some GI upset and irritation.

• Hepatotoxicity with overdose (can cause liver failure)

Notes

• Acetaminophen is metabolized in the liver; overdose leads to accumulation of a toxic metabolite (NAPQI), which depletes glutathione and damages liver cells. This damage begins to occur at around 150mg/kg.

Mechanism of Action

At a Glance:

• When treating for pain acetaminophen reduces CNS prostaglandin levels, making nerves less sensitive to pain signals.

• For fevers, acetaminophen acts on the hypothalamus to regulate body temperature, allowing the body to return to normal temperature.

• Lastly acetaminophen has no anti-inflammatory effect simply because it doesn't block prostaglandin synthesis well outside the CNS.

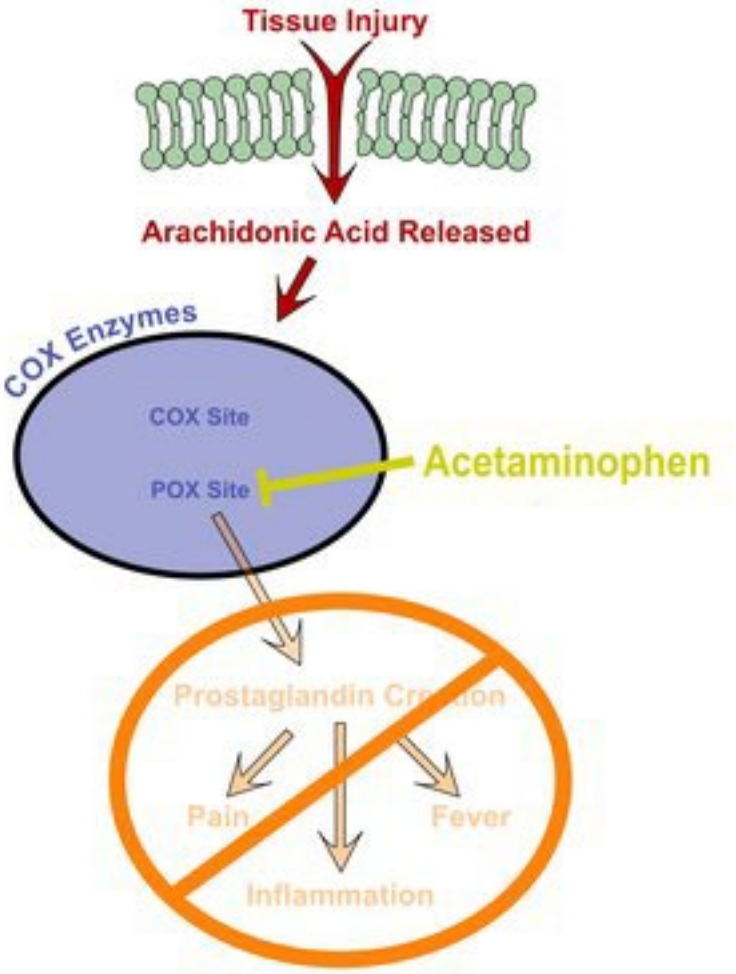
Mechanism in Detail:

Acetaminophen interferes with the arachidonic acid cascade by selectively inhibiting central cyclooxygenase (COX) enzymes, specifically at peroxidase (POX) sites within the COX enzymes, preventing the conversion of arachidonic acid into prostaglandins within the central nervous system. Prostaglandins are lipid based chemical messengers that play key parts in inflammation, fever, and more. Acetaminophen's actions can be broken down into 2 major portions:

• First, it raises the pain threshold which means that it takes more pain stimulus before a person perceives pain. Note that it does not dull existing pain directly like opioids do instead, it reduces the brain's sensitivity to pain signals.

• Second, it resets body temperature by inhibiting COX enzymes in the hypothalamus specifically, which decreases prostaglandin levels and lowers the fever-inducing set point. The body then dissipates the heat, eventually returning to normal temperature.

When Acetaminophen (Ofirmev) is given via IV infusion it bypasses both the gastrointestinal tract and avoids first-pass metabolism by the liver, allowing it to act more quickly and efficiently, delivering a more predictable and potent effect than oral routes. Because it also reduces the initial metabolic burden on the liver, IV acetaminophen is considered safer in patients with alcohol intoxication or chronic alcohol use, where liver function may already be compromised.


Tissue Injury
Arachidonic Acid Released
COX Enzymes
COX Site
POX Site
Acetaminophen
Pain
Fever
Inflammation

13.2: Adenosine

Revised 08/19/2025

Side Effects

Most side effects are short-lived, typically lasting <60 seconds due to adenosine's ultra-short half-life.

• Chest discomfort or pressure (non-cardiac, often described as a "sense of doom")

• Brief asystole, transient bradycardia, PVC's and other temporary arrhythmias.

• Dyspnea or bronchospasm

• Headache, lightheadedness

• Nausea

• Paresthesia or a sense of burning in the chest or arms

Notes

• Must be administered rapidly, preferably via a large-bore IV in a proximal vein. Immediately followed by at least a 20cc saline flush.

• Always monitor ECG during administration; expect a brief period of asystole or aberrant beats until rhythm resolves.

• Adenosine does not convert atrial fibrillation, atrial flutter, or VT. It may, however, temporarily slow the rhythm to help distinguish the underlying rhythm.

Mechanism of Action

At a Glance:

Adenosine briefly slows both AV and SA node activity by reducing cAMP and hyperpolarizing pacemaker cells. Its main effect is to temporarily block AV node conduction, which stops reentrant SVTs. This action is rapid and short-lived, typically lasting less than 10-15 seconds which makes it ideal for use in SVT.

Mechanism in Detail:

Adenosine is a medication that works by binding to Adenosine (A1) receptors in the heart. These receptors are found throughout the heart but are most concentrated in the AV node and SA node. When adenosine activates these receptors, it causes several changes inside the cells that slow down the heart's electrical conduction system.

It causes two main effects:

• Decreases cAMP inside the cell by blocking the enzyme adenylyl cyclase

• Opens potassium channels, which lets potassium leave the cell and makes the inside of the cell more negative (hyperpolarization)

In the AV node:

• Hyperpolarization slows calcium movement into the cell

• This makes the AV node less likely to conduct electrical signals

• It increases the refractory period, which helps stop reentrant rhythms like AVNRT or AVRT

• This can lead to a brief AV block or even a few seconds of asystole, allowing the SA to resume as the primary pacemaker.

In the SA node:

• Adenosine also slows the heart rate by affecting the SA node

• This effect is less predictable, and is usually an unseen effect that is overshadowed by effects on the AV node.

Other important points:

• Adenosine acts very quickly and its effects are very short-lasting (less than 10 seconds) because it is rapidly taken up by red blood cells and broken down

13.3: Albuterol

Revised 08/19/2025

Side Effects

- Tachycardia
- Palpitations
- Tremors (especially in the hands)
- Nervousness or restlessness
- Headache
- Nausea

Notes

- May require repeated doses in severe bronchospasm; be sure to monitor heart rate and rhythm closely in those with cardiac history.

Mechanism of Action

At a Glance:

Albuterol binds to beta-2 receptors in the lungs, triggering a cascade that relaxes bronchial smooth muscle and opens the airways. It works quickly to relieve bronchospasm in asthma, COPD, and allergic reactions. It also helps pull potassium into cells, which hyperpolarizes and stabilizes the muscle, making it less likely to contract. The result is fast and effective bronchodilation.

Mechanism in Detail:

Albuterol is a selective beta-2 adrenergic agonist that works mainly on beta-2 receptors in the smooth muscle of the airways. Its primary effect is to cause bronchodilation and does this by activating a cascade that ultimately leads to bronchodilation.

How it works:

- Albuterol binds to beta-2 receptors in bronchial smooth muscle
- This activates a cellular signaling cascade that increases cyclic AMP (cAMP)
- Increased cAMP activates protein kinase A (PKA)
- The PKA inhibits myosin light chain kinase (MLCK). MLCK is needed for muscle contraction and by blocking it the bronchial muscle relaxes
- In addition, Albuterol stimulates Na^+/K^+ ATPase pumps and potassium channels
- This causes potassium to move into cells, which hyperpolarizes the cell membrane. When cells are hyperpolarized they are less likely to contract, further promoting and maintaining bronchodilation

Albuterol also causes beta-1 receptor stimulation, leading to tachycardia, palpitations, or tremors, especially at higher doses. This is typically viewed as a side effect rather than a desired effect within standard applications.

13.4: Amiodarone

Revised 08/19/2025

Side Effects

- Hypotension
- Bradycardia
- QT prolongation, which can lead to Torsades
- Nausea

Notes

- Amiodarone has multiple negative drug interactions which can lead to arrhythmias, bradycardia, and hypotension.

Mechanism of Action

At a Glance:

- Amiodarone works by prolonging repolarization and increasing refractory period by blocking potassium channels
- Slowing conduction through sodium channel blockade, especially in damaged tissue
- Reducing heart rate and sympathetic activity via noncompetitive beta-blockade
- Slowing AV node conduction and supports rate control through mild calcium channel inhibition
- And lastly is long-acting and tissue-penetrating, making it very effective for complex or unstable rhythms even after a single dose

Mechanism in Detail:

Amiodarone is primarily a Class III antiarrhythmic but what makes it unique is that it also exhibits significant activity across all four Vaughan-Williams classes. By affecting multiple ion channels and receptors, it can suppress a wide range of atrial and ventricular arrhythmias, including both reentrant and automatic rhythms. Its primary effect is to prolong repolarization, but its additional class effects contribute to rate control and conduction slowing across the cardiac conduction system as described below.

- **Class III (Primary Action):**
Blocks potassium channels which prolongs repolarization, increases refractory period, and reduces reentry.
- **Class I (Sodium Channel Blocker):**
Slows phase 0 depolarization, especially in ischemic or depolarized tissue which helps stabilize damaged myocardium and suppress ectopic activity.
- **Class II (Beta-blocker-like):**
Noncompetitive beta-blockade, mainly β_1 which slows heart rate, reduces AV node conduction and dampens sympathetic-driven arrhythmias

- **Class IV (Calcium Channel Blocker):**
Mild inhibition of calcium channels which slows AV nodal conduction, prolongs PR interval, and supports rate control

13.5: Aspirin

Revised 08/19/2025

Side Effects

- GI irritation such as nausea and heartburn
- Gastrointestinal bleeding or ulceration
- Increased bleeding and bruising risk

Notes

- Onset of platelet inhibition begins within minutes of ingestion and lasts for the lifespan of the platelet which is approximately 7–10 days.

Mechanism of Action

At a Glance:

Aspirin works by irreversibly inhibiting the COX-1 enzyme in platelets. Since COX-1 is responsible for producing a substance that causes platelets to stick together, by blocking COX-1, aspirin reduces platelet aggregation and slows clot formation at sites of vascular injury.

Mechanism in Detail

Aspirin is a non-selective, irreversible cyclooxygenase (COX) inhibitor, with its primary therapeutic effect related to platelet inhibition.

- COX-1 is an enzyme that converts arachidonic acid into prostaglandin H_2 (PGH_2), which is then used to create thromboxane A_2 (TXA_2).
- Thromboxane A_2 is a potent vasoconstrictor and platelet activator which causes platelets to aggregate and form clots at sites of vascular injury.
- This significant reduction in platelet aggregation helps prevent the growth or formation of clots in coronary arteries during acute coronary syndromes.
- Although aspirin also inhibits prostaglandin production in other tissues, the antiplatelet effect is the primary goal.

Aspirin causes a permanent inactivation of the COX-1 enzyme. Since platelets lack a nucleus, they cannot synthesize new COX-1, so the effect lasts for the entire lifespan of the platelet.

13.6: Atropine

Revised 07/26/2025

Side Effects

- Tachycardia
- Dry mouth
- Blurred vision or pupil dilation (mydriasis)
- Flushed, warm skin
- Nausea or vomiting

Notes

- If given too slowly can cause worsening of bradycardia.
- Use in caution in the presence of AMI's as this can precipitate V-fib and V-tach.

Mechanism of Action

At a Glance:

Atropine blocks the vagus nerve's effect on the heart by preventing acetylcholine from slowing it down. This allows the sympathetic system to act more freely causing the heart rate to increase, making it useful for treating bradycardias caused by excessive parasympathetic tone.

Mechanism in Detail:

Atropine is a competitive antagonist of muscarinic acetylcholine receptors, specifically the M2 subtype found in the heart, which are part of the parasympathetic (vagal) system. Under normal conditions, the vagus nerve releases acetylcholine, which binds to M2 receptors and slows the heart rate by affecting the SA and AV nodes. The vagus nerve acts as the "brakes" of the heart and by blocking this mechanism Atropine removes the parasympathetic "braking" effect allowing the sympathetic system to become more dominant.

Effects on the heart include:

- Increased firing of the SA node, which raises heart rate
- Improved conduction through the AV node, which may speed up slow rhythms
- Reduction in vagal tone, allowing the heart to respond more freely to sympathetic stimulation

Because atropine acts only on the parasympathetic system, it is most effective in bradycardias caused by high vagal tone or sinus node suppression. It is often less effective or ineffective in bradycardias caused by structural conduction blocks, such as those seen in Mobitz type II or complete heart block.

13.7: Calcium Chloride

Revised 08/19/2025

Side Effects

- Nausea or vomiting
- Lethargy
- Headache

Notes

- Ensure IV patency before administration as infiltration can cause tissue necrosis.
- Push Calcium and then fully flush line before pushing sodium bicarbonate in the same line.

Mechanism of Action

At a Glance:

Calcium chloride raises calcium levels in the blood, helping stabilize the heart's electrical activity and improve contraction. This is extremely useful in cases like hyperkalemia or calcium channel blocker overdose where it protects the heart by restoring normal rhythms as well as the strength of contraction.

Mechanism in Detail:

Calcium chloride works by increasing extracellular calcium levels, which affects how electrically active tissues like the heart and muscles respond to depolarization. It provides positive inotropic effects (increased contractility) and helps stabilize the electrical activity of cardiac cells, especially in situations such as electrolyte imbalances or drug toxicity.

Calcium performs the following:

- Raises extracellular calcium, restoring the calcium gradient across cell membranes
- Helps restore normal threshold potential in cardiac cells, particularly in hyperkalemia
- In hyperkalemia, the resting membrane potential becomes less negative, bringing cells closer to threshold and calcium helps restore this balance and reduces excitability
- Enhances myocardial contractility by increasing the amount of calcium available during phase 2 (plateau) of the cardiac action potential
- Opposes the effects of calcium channel blockers by increasing the amount of available calcium which then improves contractility and conduction

13.8: Ceftriaxone

Revised 08/19/2025

Side Effects

• Diarrhea/GI upset

Notes

• Do not delay standard trauma care to administer.

Mechanism of Action

At a Glance:

Ceftriaxone is a powerful antibiotic that stops bacteria from building cell walls, killing the bacteria as it is unable to create a proper cell wall. Ceftriaxone is considered "broad-spectrum" meaning it has activity against both gram-positive and gram-negative organisms.

Mechanism in Detail:

Ceftriaxone is a third-generation cephalosporin antibiotic. It is classified as a beta-lactam antibiotic, as it contains a "beta-lactam" ring in the molecular structure. It binds to penicillin-binding proteins (PBPs) on bacterial cell membranes, which are essential for building and cross-linking peptidoglycan, the rigid structure that supports the bacterial cell wall, leading to bacterial cell death.

When ceftriaxone binds to these PBPs:

• It prevents proper cell wall formation which causes cell death.

• This action is referred to as bactericidal, meaning it kills bacteria rather than just stopping their growth.

Because it achieves really good tissue penetration and has a long half-life, ceftriaxone is very effective in preventing infection, such as with open fractures, where contamination is likely. It also has strong coverage against many gram-negative organisms, gram-positives, and is resistant to many beta-lactamase enzymes which is a product that is released by bacteria to defend themselves.

13.9: Dextrose 10%

Revised 08/19/2025

Side Effects

• Can cause tissue irritation or necrosis if infiltrated

• Rebound hypoglycemia, especially in malnourished or alcohol-dependent patients

Notes

• In patients with suspected or known alcohol abuse, give thiamine before dextrose to prevent Wernicke-Korsakoff Syndrome.

Mechanism of Action

At a Glance:

D10 provides a direct source of glucose, which is the primary fuel for the body's cells, especially the brain. In hypoglycemia, the lack of available glucose disrupts normal cellular function, particularly in the central nervous system, where insulin-independent glucose uptake is vital.

Mechanism in Detail:

D10 works by:

• Rapidly increasing blood glucose levels, correcting hypoglycemia

• Providing immediate energy to tissues, especially the brain, to restore normal neurological function

• Supporting aerobic metabolism, helping cells efficiently produce ATP

• Preventing or reversing symptoms such as confusion, seizures, or unconsciousness caused by low blood sugar

Once administered, dextrose is transported into cells via insulin-dependent and independent mechanisms, depending on the tissue. In patients with functioning pancreatic response, insulin may be released, which can drive glucose and potassium into cells, sometimes resulting in a drop in serum potassium levels.

13.10: Diphenhydramine

Revised 07/26/2025

Side Effects

- Drowsiness or sedation
- Dry mouth, blurred vision, or urinary retention
- Dizziness, confusion

Notes

- Use in caution if the patient has ingested alcohol or depressant type drugs.
- Due to anticholinergic effects, Diphenhydramine overdoses may range from immense sedation to overstimulation and agitation.

Mechanism of Action

At a Glance:

Diphenhydramine is a first-generation antihistamine that blocks H_1 receptors to reduce symptoms like swelling, itching, and hives during allergic reactions. It also crosses into the brain which help with nausea but also causes drowsiness. Its anticholinergic effects add further benefit by drying secretions and treating drug-induced movement disorders.

Mechanism in Detail:

Diphenhydramine is a first-generation antihistamine that primarily works by blocking histamine receptors (H_1) which are primarily located within the periphery, skin and the brain. Histamine is released from mast cells and basophils during allergic reactions and binds to these receptors causing a plethora of symptoms.

By blocking H_1 receptors, diphenhydramine:

- Reduces histamine's effects on blood vessels causing vasoconstriction
- Decreases capillary leakage, reducing swelling and hives
- Relieves itching
- Relaxes bronchial smooth muscle causing bronchodilation

Additionally, diphenhydramine crosses the blood-brain barrier and binds to central H_1 receptors which causes:

- Sedation and drowsiness
- Suppression of motion sickness and nausea

In addition to all the above it also has anticholinergic (muscarinic receptor-blocking) properties. These effects also help counteract the increased mucus production in allergic reactions and extrapyramidal symptoms caused by dopamine-blocking medications.

13.11: Droperidol

Revised 07/26/2025

Side Effects

- QT prolongation, which may lead to torsades
- Hypotension
- Extrapyramidal symptoms (EPS)

Notes

- SNORES should be fully implemented when administering for sedation.

Mechanism of Action

At a Glance:

Droperidol is a fast-acting antipsychotic and sedative that works mainly by blocking dopamine receptors in the brain which leads to reduced agitation, sedation, and strong anti-nausea effects. It also blocks alpha-1 receptors which ultimately reduces sympathetic tone and enhances its calming effect. Lastly it has mild effects on histamine and serotonin receptors further supporting sedation and mood stabilization.

Mechanism in Detail:

Droperidol is a potent butyrophenone antipsychotic and sedative that exerts its effects by targeting multiple receptor systems throughout the central nervous system. Its primary action is dopamine (D_2) receptor blockade, but it also interacts with adrenergic, histaminergic, and serotonergic receptors, giving it a broad range of clinical uses.

More specifically droperidol works as:

- Dopamine D_2 receptor antagonist (central)
- Which blocks dopamine in the chemoreceptor trigger zone (CTZ) and basal ganglia. This results in antiemetic effects, sedation and calming of agitation.
- This also helps suppress psychotic features like delusions or hallucinations.
- Alpha-1 adrenergic antagonist
- Causes vasodilation, leading to the side effect of lower blood pressure but reduces sympathetic “fight or flight” signals. This doesn’t directly sedate the brain, but it helps the body feel calmer and amplifies the sedative effects from its dopamine and histamine blocking actions.
- Histamine H_1 and serotonin 5-HT_2 antagonism (mild)
- Adds to sedation and anti-nausea effects
- May help stabilize mood and reduce sensory overstimulation

13.12: Epinephrine

Revised 07/26/2025

Side Effects

- Tachycardia
- Hypertension
- Palpitations
- Anxiety or restlessness
- Tremors
- Headache
- Ventricular arrhythmias

Notes

- Endogenously produced hormone and neurotransmitter from the adrenal medulla

Mechanism of Action

At a Glance:

Epinephrine is a fast-acting medication that activates alpha and beta receptors throughout the body. It raises blood pressure through vasoconstriction (alpha-1), strengthens and speeds up the heart (beta-1), opens the airways (beta-2), and uniquely halts the allergic reaction cascade by preventing mast cells from releasing more inflammatory chemicals. This means it doesn't just treat the symptoms, it stops the reaction at its source.

Mechanism in Detail:

Epinephrine is a powerful, non-selective adrenergic agonist that mimics the body's natural "fight or flight" response. It works by activating multiple adrenergic receptors throughout the body. Each receptor type triggers a different physiologic response, and together they produce a potent combination of effects from vasoconstriction to bronchodilation and calming the immune response.

More specifically it causes:

- Alpha-1 receptor stimulation:
- Causes vasoconstriction, increasing systemic vascular resistance (SVR).
- Elevates blood pressure and improves coronary perfusion pressure.
- Reduces mucosal edema in the upper airway during anaphylaxis or croup
- Beta-1 receptor stimulation:
- Increases heart rate (chronotropy)
- Increases myocardial contractility (inotropy)

• Enhances automaticity and conduction velocity, which helps initiate and maintain cardiac output.

• Beta-2 receptor stimulation:

• Causes bronchodilation by relaxing smooth muscle in the airways

Within anaphylaxis, Epinephrine helps stop by not just by treating symptoms, but also is the only thing that stops the degranulation process, stopping the entire anaphylactic cascade. It activates receptors located on mast cells and basophils which stabilizes them and stops them from releasing more inflammatory chemicals.

13.13: Esmolol

Revised 07/26/2025

Side Effects

- Bradycardia
- Hypotension
- Heart blocks

Notes

- Use in conjunction with dual sequential defibrillation.

Mechanism of Action

At a Glance:

Esmolol is a short-acting beta blocker that helps stabilize the heart by reducing excitability, suppressing abnormal rhythms, increasing the fibrillation threshold, lowering oxygen demand and also prolonging the refractory period, making it harder for dangerous reentrant rhythms to persist.

Mechanism in Detail:

Esmolol is a selective beta-1 adrenergic antagonist, meaning it binds to and blocks beta-1 receptors in the heart, competitively inhibiting the effects of catecholamines like epinephrine and norepinephrine. In cases of refractory VF/VT, excessive sympathetic stimulation often drives persistent arrhythmias by increasing automaticity, reducing the fibrillation threshold, and making defibrillation less effective.

Beta-1 blockade leads to:

- Reduction in myocardial excitability by slowing conduction and decreasing automaticity in the ventricles and conduction system.
- Increases the ventricular fibrillation threshold making it easier for defibrillation to succeed.
- Suppresses ectopic pacemaker activity helping reduce recurrent or shock-resistant rhythms.
- The above actions also lowers myocardial oxygen demand which helps limit ischemia-driven electrical instability.
- It increases the refractory period, disrupting the reentrant electrical loops that often maintain VF or VT.

In this setting, esmolol is used as a stabilizer of the cardiac electrical environment. Because esmolol is ultra-short acting (half-life of about 10 minutes), its ideal in treating immediate life threats without having any long term effects that might interfere with additional treatments.

13.14: Fentanyl

Revised 07/26/2025

Side Effects

- Respiratory depression
- Bradycardia and hypotension
- Chest wall rigidity, especially with rapid IV push
- Nausea and vomiting
- Sedation and altered mental status
- Constipation

Notes

- Patients with allergy to Morphine are NOT likely to have an allergy to Fentanyl.
- Use is caution within patients of age extremes.
- Capnography should always be placed and respirations monitored with Fentanyl administration.

Mechanism of Action

At a Glance:

Fentanyl is a fast-acting synthetic opioid that binds to mu-opioid receptors in the brain and spinal cord to block pain signals. It reduces neurotransmitter release and quiets nerve activity, dulling both the sensation and emotional response to pain. This results in pain relief, sedation, and a calming effect.

Mechanism in Detail:

Fentanyl is a synthetic opioid agonist that primarily works by binding to mu-opioid receptors (μ-receptors) located throughout the central nervous system, especially in the brainstem, spinal cord, and thalamus. These receptors are part of the body's natural pain-modulating system and when fentanyl binds to a μ-receptor, it inhibits the release of neurotransmitters like substance P, glutamate, and GABA at both presynaptic and postsynaptic sites.

By blocking the μ-receptors it works to:

- It achieves this by activating G-protein coupled pathways that:
- Close voltage-gated calcium channels on presynaptic neurons, reducing neurotransmitter release
- Open potassium channels on postsynaptic neurons, causing hyperpolarization (making the neuron less likely to fire)
- At the brainstem level, it also suppresses the respiratory centers' sensitivity to carbon dioxide, which can lead to respiratory depression.

• Fentanyl also acts in the limbic system and midbrain to modulate emotional responses to pain, contributing to sedation and euphoria.

13.15: Glucagon

Revised 07/26/2025

Side Effects

- Nausea and vomiting
- Tachycardia and hypertension
- Dizziness or headache

Notes

- Glucagon is useful when IV access is difficult or delayed, particularly in hypoglycemic emergencies.

Mechanism of Action

At a Glance:

Glucagon is a naturally occurring hormone and when administered it raises blood sugar by telling the liver to release stored glucose. In hypoglycemia, it works by activating receptors in liver cells, which triggers a chain reaction that breaks down glycogen and creates new glucose. In beta-blocker or calcium channel blocker overdose, glucagon helps the heart by increasing heart rate and strength of contraction through a different pathway, even when usual receptors are blocked.

Mechanism in Detail:

Glucagon is a peptide hormone normally produced by the alpha cells of the pancreas. It works by binding to glucagon receptors, which are G-protein-coupled receptors (GPCRs) found primarily in liver cells. This ultimately results in a release of glycogen and increases blood sugar levels throughout the body.

Glucagon has two different functions depending on what it's given for:

In hypoglycemia:

- Glucagon activates the GPCR receptors, stimulating adenylyl cyclase, which increases levels of cyclic AMP (cAMP) inside hepatocytes.
- cAMP activates protein kinase A (PKA), which phosphorylates key enzymes that promote glycogenolysis (breaking down stored glycogen into glucose).
- It also promotes gluconeogenesis, the synthesis of new glucose from amino acids and other substrates.
- All of this results in a rapid release of glucose from the liver into the bloodstream, raising blood sugar levels.

In beta-blocker or calcium channel blocker overdose:

- Glucagon bypasses the beta-adrenergic receptor system by directly stimulating cAMP production.

• This leads to increased intracellular calcium in cardiac myocytes, improving heart rate (chronotropy) and contractility (inotropy) even when beta-receptors are blocked.

• This action is present when Glucagon is given for hypoglycemia however it is viewed as a side effect (tachycardia & hypertension), not the desired action.

13.16: Dexamethasone

Revised 08/05/2025

Side Effects

- Hyperglycemia
- Fluid retention
- Increased risk of infection due to immune suppression

Notes

- Ensure slow IV push to avoid burning both at the site of injection and perineal/groin pain.

Mechanism of Action

At a Glance:

Dexamethasone is a powerful, long-acting steroid that works by entering cells and changing how certain genes behave. Instead of just blocking a single chemical, it turns off the body's inflammatory response at the source. It stops the production of substances that cause swelling, pain, and immune activation and boosts anti-inflammatory proteins that calm the body's response. This helps reduce tissue swelling and breathing issues. It also helps make medications like albuterol work better again by restoring the sensitivity of beta-2 receptors in the lungs.

Mechanism in Detail:

Dexamethasone is a long-acting synthetic glucocorticoid that mimics cortisol, the body's natural stress hormone, but with significantly more potency and duration. Unlike fast-acting medications that target a single molecule or pathway, dexamethasone works at the genetic level to regulate dozens of inflammatory and immune-related processes. It enters cells and modifies gene expression to suppress inflammation, calm overactive immune responses, and stabilize damaged tissues.

Once administered it:

- Enters cells and binds to intracellular glucocorticoid receptors where it directly affects gene transcription.
- Dexamethasone turns off genes that produce inflammatory messengers like cytokines, prostaglandins, leukotrienes, and adhesion molecules that recruit white blood cells to injury sites.
- It also increases production of lipocortin and other regulatory proteins that inhibit phospholipase A2, effectively shutting down the arachidonic acid pathway that fuels inflammation and pain.
- This reduces mast cell degranulation and limits the release of histamine and other damaging enzymes from lysosomes, helping reduce swelling and allergic responses.

• The reduction in inflammatory mediators thereby limits leakage of fluid into tissues, helping control edema and swelling, especially in the lungs, throat, and brain.

• Lastly it helps restore beta-2 receptor sensitivity, reversing tachyphylaxis to bronchodilators and enhancing the effectiveness of beta-agonist medications like albuterol.

13.17: Hydroxocobalamin

Revised 08/05/2025

Side Effects

• Red discoloration of skin, urine, and mucous membranes (harmless)

• Transient hypertension

Notes

• This has a very specific order in which it must be reconstituted and given. Follow package instructions closely on how to prepare.

Mechanism of Action

At a Glance:

Hydroxocobalamin treats cyanide poisoning by grabbing onto cyanide molecules and neutralizing them, allowing the body to safely flush them out. It restores the cell's ability to use oxygen and ultimately helps to reverse effects of cyanide poisoning.

Mechanism in Detail:

Hydroxocobalamin is a form of vitamin B12 that acts as a direct cyanide antidote by binding cyanide at the molecular level. Cyanide is lethal because it halts cellular respiration, preventing cells from using oxygen, even when oxygen is present in the bloodstream. This leads to cellular hypoxia, metabolic acidosis, and ultimately organ failure.

Specifically it works by:

• Binding directly to cyanide which forms cyanocobalamin, a completely harmless and non-toxic compound that can be safely excreted in urine over the next several weeks.

• This prevents cyanide from binding to cytochrome oxidase, a critical enzyme in the mitochondrial electron transport chain and thereby restoring the body's ability to use oxygen.

13.18: Ipratropium Bromide

Revised 08/05/2025

Side Effects

- Dry mouth or throat irritation
- Cough

Notes

- Give in tandem with Albuterol in a duo-neb
- Does not cross the blood-brain barrier significantly, reducing central anticholinergic effects

Mechanism of Action

At a Glance:

Ipratropium is an inhaled anticholinergic that relaxes the airways and reduces mucus production by blocking the parasympathetic signals that would otherwise cause bronchoconstriction.

Mechanism in Detail:

Ipratropium bromide is a short-acting anticholinergic bronchodilator. It works by blocking muscarinic (M_3) receptors in the smooth muscle lining of the airways. These M_3 receptors are normally activated by acetylcholine released from the parasympathetic nervous system, which causes both bronchoconstriction and increased mucus secretion.

By antagonizing these receptors, ipratropium:

- Prevents bronchoconstriction by inhibiting the effect of acetylcholine on airway smooth muscle which in turn causes relaxation and bronchodilation.
- And reduces excessive mucus production in the bronchi. By preventing the mucus production, ipratropium helps keep the airways clearer and reduces the risk of mucus plugging.

13.19: Ketamine

Revised 08/19/2025

Side Effects

- Hypertension and tachycardia
- Hypersalivation and hyperlacrimation
- Nausea/vomiting
- Laryngospasm
- Apnea

Notes

- Potentiates respiratory depression and sedative effects of other CNS depressants.
- Use in caution in extremes of age.
- If available utilize concentration of 50mg/mL for nebulizing.
- Consider adjunct use of benzodiazepines when ketamine is not fully effective.
- Do NOT re-dose based on tearing/lacrimation alone - this is a side effect of the medication not necessarily a sign a reemergence.

Mechanism of Action

At a Glance:

At lower doses (Analgesia):

- Subdissociative doses reduce pain perception without causing unconsciousness. It does this by altering pain processing in the spinal cord and thalamus.
- Ketamine decreases central sensitization and enhances descending inhibitory pain pathways.
- There is typically minimal respiratory depression at lower doses.

At higher doses (Disassociation/Anesthesia):

- Dissociative doses produce a trance-like state by functionally disconnecting the thalamocortical and limbic systems.
- The patient is unaware of and unresponsive to the environment but may retain airway reflexes and spontaneous breathing. This is true dissociation: the brain no longer processes external sensory input in a meaningful way.

Mechanism in Detail:

Ketamine exerts its effects primarily by blocking NMDA receptors in the CNS. It does so in two places: First at the GABAergic inhibitory interneuron preventing GABA production and signaling. Second on the NDMA receptors on the post synaptic glutamatergic neurons blocking any breakthrough glutamate. This prevents glutamate-driven excitatory signaling, which is essential for both pain transmission and higher sensory integration. At lower doses, all of this provides analgesia by disrupting spinal and supraspinal pain processing. At higher doses, it causes dissociation by interrupting communication between sensory input and conscious awareness.

13.20: Ketorolac

Revised 08/05/2025

Side Effects

- Increased risk of bleeding
- Headache or dizziness

Notes

- Potent NSAID commonly used for short-term management of moderate to severe pain

Mechanism of Action

At a Glance:

Ketorolac is a potent NSAID that blocks the COX enzymes responsible for producing prostaglandins which are chemicals that cause pain, swelling, and inflammation. By reducing prostaglandin production at injury or inflammation sites, it decreases pain, eases tissue irritation, and relieves smooth muscle spasms such as those seen in kidney stones. Its effects
are primarily peripheral, making it highly effective for any inflammation-driven pain.

Mechanism in Detail:

Ketorolac is a nonsteroidal anti-inflammatory drug (NSAID) that works by non-selectively inhibiting cyclooxygenase (COX) enzymes, both COX-1 and COX-2, at peripheral sites. These enzymes convert arachidonic acid into prostaglandins, which are lipid-based chemical messengers involved in pain signaling, inflammation, fever, and vascular regulation. By preventing prostaglandin production peripherally, ketorolac exerts strong analgesic and anti-inflammatory effects.

The primary effects are:

- First, ketorolac reduces pain by blocking prostaglandin formation at the site of injury or inflammation, which in turn reduces the sensitization of peripheral nociceptors. This means less pain signal is generated and transmitted to the central nervous system.
- Second, its systemic inhibition of prostaglandins also decreases vascular permeability and local inflammation, helping reduce swelling, redness, and tissue irritation.
- Provides strong peripheral analgesia by reducing prostaglandin-mediated smooth muscle spasm and inflammation in the ureters, helping relieve pain from kidney stones.

Unlike acetaminophen, which acts primarily in the CNS, ketorolac exerts its effects more peripherally, making it useful in treating inflammation-related pain such as musculoskeletal injuries or post-operative discomfort.

13.21: Labetalol

Revised 08/05/2025

Side Effects

- Hypotension
- Bradycardia
- Bronchospasm and wheezing
- Exacerbates CHF

Notes

- Nitroglycerin ingestion may exacerbate hypotensive effects.

Mechanism of Action

At a Glance:

Labetalol lowers blood pressure by relaxing blood vessels and slowing the heart. It causes vasodilation and reduces heart rate and contractility. Together, these effects not only decrease systemic vascular resistance and cardiac output but also limit the effects of the sympathetic system.

Mechanism in Detail:

Labetalol works by blocking multiple adrenergic receptors located in the heart and vascular smooth muscle, providing a dual mechanism that reduces blood pressure by slowing the heart rate, decreasing cardiac output, and causes peripheral vasodilation. All of this ultimately helps
to reduce blood pressure and limit the effects of excessive sympathetic stimulation.

It accomplishes this through several receptors:

- Alpha-1 receptor antagonism leads to systemic vasodilation, decreasing systemic vascular resistance (SVR), and lowering blood pressure. This helps reduce afterload without triggering reflex tachycardia.
- Beta-1 receptor antagonism reduces not only heart rate (chronotropy) but also contractility (inotropy) and conduction velocity (dromotropy) which ultimately lowers cardiac output and decreases myocardial oxygen demand.
- Beta-2 receptor antagonism is relatively minimal but may slightly blunt bronchodilation, so caution is advised in reactive airway disease.

13.22: Lactated Ringer's

Revised 08/05/2025

Side Effects

• Fluid overload, especially in patients with heart or kidney dysfunction

• Electrolyte shifts (e.g., hyperkalemia or alkalosis in patients with impaired metabolism)

• Should be used cautiously in patients with liver disease due to impaired lactate metabolism

Notes

• Frequently reassess lung sounds and patient status during infusion. If signs of fluid overload develop, stop fluids immediately.

Mechanism of Action

At a Glance:

Lactated Ringer's is an isotonic fluid that closely resembles the body's natural plasma, containing a balanced mix of electrolytes. It expands the extracellular space, increasing blood volume and improving perfusion. The lactate is even metabolized into bicarbonate which helps to buffer mild acidosis. Compared to normal saline, it better maintains electrolyte balance during large-volume resuscitation.

Mechanism in Detail:

Lactated Ringer's is a balanced isotonic crystalloid that expands the extracellular fluid space. In comparison to normal saline, Lactated Ringer's contains a more physiologic mixture of electrolytes such as sodium, chloride, potassium, calcium and lactate. The lactate specifically is metabolized primarily by the liver into bicarbonate, which helps buffer mild acidosis. Because of its composition, LR is more closely aligned with the body's natural plasma than other isotonic solutions.

By increasing intravascular volume:

• It raises blood pressure and improves perfusion to critical organs

• Supports circulatory volume as a whole

• Helps correct mild metabolic acidosis through lactate metabolism

• And maintains electrolyte balance better than saline in large-volume resuscitation

13.23: Lidocaine

Revised 08/05/2025

Side Effects

• Dizziness, confusion and drowsiness
• Hypotension and reduced cardiac output
• Seizures (especially with high doses)
• Signs of toxicity include bradycardia and heart blocks, decreased hearing in awake patients, twitching and seizures.

Notes

• Consider reduction in dosage when administering to patients >70 or presenting with decreased cardiac output such as CHF or shock.
• Metabolized by the liver; use with caution in hepatic impairment/disease. Again, consider reduction in dose.
• Local anesthetic formulations must not be used IV for cardiac indications

Mechanism of Action

At a Glance:

Lidocaine is a fast-acting sodium channel blocker, making it useful as not only an antiarrhythmic but also a local anesthetic. In the heart, it slows conduction and shortens the action potential in ventricular cells which helps to suppress ventricular arrhythmias, especially in damaged or irritable tissue. As a local anesthetic, it blocks nerve signals at the site of
injection, quickly numbing the area by preventing pain signals from ever reaching the brain.

Mechanism in Detail:

Lidocaine is a versatile medication that works by blocking voltage-gated sodium channels, a key component in both nerve and cardiac electrical activity. While its primary mechanism is consistent, sodium channel inhibition, the effects differ based on the tissue targeted, allowing lidocaine to serve as both an antiarrhythmic and an anesthetic agent.

Antiarrhythmic Use: Class IB Sodium Channel Blocker

• Lidocaine binds to voltage-gated sodium channels in their open or inactivated states, primarily in ventricular tissue.
• This action slows phase 0 depolarization, reducing the speed of electrical conduction (especially through damaged or ischemic myocardium).
• It shortens the action potential duration and the effective refractory period in ventricular cells. By suppressing abnormal automaticity and stabilizing the cardiac membrane, it can help terminate ventricular arrhythmias. Because it has minimal effects on atrial tissue and the AV
node, it is not useful for any type of supraventricular arrhythmias.

Local Anesthetic Use: Peripheral Nerve Blockade

• Lidocaine blocks voltage-gated sodium channels in sensory neurons at the site of administration. This works very quickly, typically within minutes.

• This blockade prevents the initiation and conduction of nerve impulses therefore numbing the area by halting signal transmission.

13.24: Magnesium Sulfate

Revised 08/05/2025

Side Effects

- Hypotension and circulatory collapse
- Bradycardia
- Respiratory depression or paralysis
- Decreased deep tendon reflexes (early sign of toxicity) up to paralysis
- Lethargy and confusion

Notes

- Side effects are almost always from rapid administration.
- Assess and monitor for signs of magnesium toxicity before, during and after administration.
- If either depressed cardiac function, low respiratory rate or NO reflex activity is noted consider Calcium Chloride for potential reversal of effects.

Mechanism of Action

At a Glance:

Magnesium sulfate helps calm irritable and overactive muscles and nerves in different parts of the body. In the heart, it helps stop dangerous rhythms by stabilizing heart cells and making it harder for abnormal beats to start. In eclampsia, it prevents seizures by calming the brain and nerves. In severe asthma, it relaxes the airways and reduces inflammation, especially when other treatments aren't working.

Mechanism in Detail:

Magnesium sulfate is a multifunctional electrolyte that acts as a calcium antagonist and membrane stabilizer. It works by modulating ion transport across cell membranes, particularly influencing calcium and potassium channels. Because of this, it plays a vital role in controlling muscle contraction, nerve conduction, and cardiac excitability. However, its mechanism changes depending on the system being targeted as listed below:

In Torsade's de Pointes/Refractory VF/VT:

- Suppresses early afterdepolarizations, which are one of the key triggers of torsade's.
- Stabilizes the cardiac membranes by regulating calcium and potassium ion movement. (Primarily in phase 2)
- Increases the threshold for ventricular depolarization which greatly helps reduce ectopic beats and stabilize rhythms.

In Eclampsia:

- Inhibits neuromuscular transmission by reducing acetylcholine release.
- Exerts CNS depressant effects, reducing seizure activity.
- Also has vasodilatory effects reducing cerebral vasospasm and improves perfusion to the placenta.

In Severe Asthma and wheezing:

• Blocks calcium channels in bronchial smooth muscle which then promotes relaxation and bronchodilation.

• Inhibits mast cell degranulation by preventing calcium influx thereby reducing histamine release and airway inflammation.

• Works extremely well in life-threatening asthma that is not responding to beta agonists.

13.25: Methylprednisolone

Revised 10/06/2025

Side Effects

- Hyperglycemia
- GI irritation
- Immunosuppression

Notes

- Onset of action is delayed, it does not provide immediate relief, but helps reduce long term inflammation

Mechanism of Action

At a Glance:

Methylprednisolone is a powerful anti-inflammatory steroid that works by not only blocking the body's production of inflammatory chemicals but also boosting the ones that help reduce it. Ultimately this works to lower fluid buildup, help open up the lungs and even make breathing treatments more effective.

Mechanism in Detail:

Methylprednisolone is a synthetic glucocorticoid that mimics the effects of cortisol, a naturally occurring steroid hormone. Rather than targeting a single molecule or receptor, methylprednisolone influences dozens of pathways simultaneously, reducing inflammation at its source and modulating the immune system's activity across multiple levels.

When administered it:

- Passes through cell membranes and binds to intracellular glucocorticoid receptors
- Inhibits pro-inflammatory genes, such as those that ultimately produce cytokines, prostaglandins, leukotrienes, and adhesion molecules. This ultimately reduces the body's inflammatory response
- Promotes anti-inflammatory proteins which blocks the arachidonic acid pathway, reducing both prostaglandins and leukotrienes
- Stabilizes cell membranes, including mast cells and lysosomes, reducing release of histamine and other inflammatory enzymes
- Reduces capillary permeability and leukocyte migration, limiting local tissue edema and inflammation
- Helps prevent or reverse beta-agonist tachyphylaxis by restoring beta-2 receptor sensitivity, improving bronchodilator effectiveness in severe or chronic respiratory conditions.

13.26: Midazolam

Revised 08/05/2025

Side Effects

- Respiratory depression
- Hypotension
- Drowsiness, confusion or amnesia

Notes

- Causes anterograde amnesia, which can help reduce psychological trauma in procedures
- Ensure full utilization of SNORES after administering

Mechanism of Action

At a Glance:

Midazolam is a fast-acting benzodiazepine that calms the brain by making nerve cells less excitable. Its administration ultimately leads to sedation, relaxation, and seizure control. Midazolam is a short and fast-acting benzodiazepine that works by enhancing the effects of GABA, the brain's main calming chemical. As it binds to these receptors it causes them to
hyperpolarize which ultimately makes the brain cells less likely to fire. The result is a calming effect that includes sedation, anxiety reduction, muscle relaxation and seizure control.

Mechanism in Detail:

Midazolam is a short-acting benzodiazepine that enhances the activity of gamma-aminobutyric acid (GABA), the primary inhibitory neurotransmitter in the brain. It binds to a specific site on the GABA-A receptor complex, which increases the receptor's affinity for GABA and enhances
its effects.

More specifically:

- It works by binding to the GABA-A receptor complex and increasing the receptor's sensitivity to GABA
- When GABA binds, this allows more chloride ions into the neuron, causing hyperpolarization of the neurons.
- Hyperpolarization makes neurons less excitable, AKA less likely to fire, reducing activity and promoting widespread suppression of brain activity.
- This results in sedation, anxiolysis, muscle relaxation, anticonvulsant effects as well as anterograde amnesia

13.27: Naloxone

Revised 08/05/2025

Side Effects

• Acute opioid withdrawal symptoms (nausea, vomiting, agitation, tremors, sweating, tachycardia, hypertension)
• Anxiety, irritability, headache

Notes

• Rapid administration should be avoided as rapid reversal may cause severe withdrawal or agitation.
• Keep in mind that opiates have a longer duration of action and repeat doses of Naloxone may be needed to maintain desired effect, especially in the presence of large quantity overdoses

Mechanism of Action

At a Glance:

Naloxone is a competitive opioid antagonist that primarily targets opiate receptors, quickly reversing the life-threatening effects of opioid overdose like respiratory depression and sedation. By displacing opioids from these receptors without activating them, naloxone rapidly restores breathing and alertness.

Mechanism in Detail:

Naloxone is a competitive opioid receptor antagonist, meaning it binds to opioid receptors, primarily mu (μ)-opioid receptors, without activating them, thereby either displacing or blocking opioids that are already bound.

Specifically, it:
• Competitively binds and antagonizes mu-receptors, reversing the effects caused by opioid overdoses such as respiratory depression, sedation and hypotension.
• Also binds (to a lesser extent) to kappa (κ) and delta (δ) receptors, helping counteract other opioid-related effects on these receptors. The binding to these receptors is less impactful clinically but rather just supportive in the treatment.
• And by reversing receptor activation, naloxone rapidly restores normal breathing and consciousness in opioid overdose.

13.28: Nitroglycerin

Revised 08/05/2025

Side Effects

- Headache
- Hypotension
- Dizziness or lightheadedness
- Flushing

Notes

- Use caution in patients with right ventricular infarction as they rely on preload, which nitro reduces
- Blood pressure should be monitored closely after administration
- Do NOT give if patient is intubated or about to be intubated

Mechanism of Action

At a Glance:

Nitroglycerin is a vasodilator that relaxes blood vessels, reducing the heart's workload. At low doses, it mainly opens up veins, which lowers how much blood returns to the heart (preload), decreasing oxygen demand and improving coronary blood flow. At higher doses, it also dilates arteries, reducing both preload and afterload. This helps relieve pressure on the heart and lungs, improve breathing in heart failure, and boost blood flow out of the heart.

Mechanism in Detail:

Nitroglycerin is a nitrate that acts as a vasodilator, primarily affecting the venous system but also the arterial system at higher doses. It works by being converted into nitric oxide (NO) in the body, which activates guanylate cyclase in smooth muscle cells. This increases cyclic GMP
(cGMP) levels, leading to smooth muscle relaxation and vasodilation. While nitroglycerin's physiologic effects remain consistent the therapeutic goal differs depending on the amount given as described below.

In low doses:

- The goal is to reduce preload via venodilation, ultimately decreasing myocardial oxygen demand
- It dilates coronary arteries, potentially improving blood flow to ischemic myocardium
- It's thought that it helps relieve chest pain by improving oxygen delivery and decreasing workload on the heart

In high doses:

- It reduces preload (venodilation) and afterload (arteriodilation) which ultimately lowers ventricular filling pressures and systemic resistance
- This decrease reduces the amount of blood returning to the heart and thereby the lungs which reduces pulmonary edema.

- This also reduces myocardial oxygen demand, helping the failing heart pump more efficiently
- Lastly it improves forward cardiac output through the decreased SVR

13.29: Nitrous Oxide

Revised 08/05/2025

Side Effects

- Dizziness or lightheadedness
- Nausea and vomiting
- Euphoria or disinhibition

Notes

- Commonly called “laughing gas,” it’s fast-acting and wears off very quickly after discontinuation
- If any side effects are noted, discontinue immediately and apply 100% oxygen

Mechanism of Action

At a Glance:

Nitrous oxide is a fast-acting gas that helps with pain, anxiety, and light sedation. It works by blocking signals in the brain that cause pain and overexcitement, triggering the release of natural opioids and calming the nervous system. It also supports blood pressure and heart function, making it useful during stressful or painful situations.

Mechanism in Detail:

Nitrous oxide is a fast-acting inhaled anesthetic that exerts multiple effects through its action on the central nervous system. It engages several receptor systems at both supraspinal and spinal levels, producing a combination of anxiolysis, analgesia, and anesthesia. Each effect is tied to a different mechanism of action:

Anesthetic effect:

- Nitrous oxide acts as a non-competitive antagonist of NMDA receptors, which are responsible for excitatory neurotransmission via glutamate.
- By blocking these receptors in the brain and spinal cord, nitrous oxide reduces the overall excitability of the CNS.
- This ultimately results in a dissociative, sedative-like state but doesn’t cause complete unconsciousness like deeper anesthetics rather it dulls awareness and perception of external stimuli.

Analgesic effect:

- Nitrous oxide stimulates the release of endogenous opioids, such as endorphins, which then bind to mu-opioid receptors in the brain and spinal cord.
- This opioid activity blunts the pain pathway at multiple levels, decreasing both the perception of pain and the emotional distress associated with it.
- Its analgesic potency is considered to be similar to morphine but without the same degree of respiratory depression or risk of overdose.

Anxiolytic/sedative effect:

- It also enhances GABA-A receptor activity, increasing inhibitory signaling in the CNS.

This calms neural firing, producing mild sedation and reducing anxiety, making it particularly useful during painful or stressful procedures.

Autonomic and cardiovascular effects:

• Nitrous oxide stimulates central sympathetic activity, which can help maintain blood pressure and cardiac output. This is useful in scenarios where other sedatives may cause hypotension.

13.30: Norepinephrine

Revised 08/05/2025

Side Effects

- Reflex bradycardia
- Arrhythmias (especially tachycardia or ventricular ectopy)

Notes

- Titrate to maintain MAP ≥ 65 mmHg in shock states
- Use with caution in pregnant patients as fetal anoxia can occur with use.

Mechanism of Action

At a Glance:

- Alpha-1 stimulation causes systemic vasoconstriction, which leads to an increase in SVR and a resulting rise in MAP.
- Beta-1 stimulation may slightly increase heart rate and myocardial contractility, though this effect is often offset by reflex bradycardia triggered by the rising blood pressure.

Mechanism in Detail:

Norepinephrine is a potent alpha-adrenergic agonist with some beta-1 adrenergic activity. It works primarily by stimulating alpha-1 receptors in vascular smooth muscle, leading to intense peripheral vasoconstriction. This increases systemic vascular resistance (SVR) and thereby raises blood pressure. It also stimulates beta-1 receptors in the heart, which can increase myocardial contractility and heart rate, although these effects are often muted due to reflex vagal tone from the rising blood pressure. Norepinephrine is endogenously produced by the adrenal medulla and sympathetic neurons, but in shock states, endogenous levels are often insufficient to maintain perfusion.

13.31: Normal Saline

Revised 08/05/2025

Side Effects

- Fluid overload, especially in patients with heart or kidney dysfunction
- Electrolyte imbalances if given in large volumes

Notes

- Frequently reassess lung sounds for rates and if they develop stop fluids immediately.

Mechanism of Action

At a Glance:

Normal saline is an isotonic fluid used to rapidly increase blood volume and improve circulation. The increase in blood pressure ultimately helps to support organ function when in a state of hypoperfusion and help restore homeostasis.

Mechanism in Detail:

Normal saline is an isotonic fluid and works by expanding the extracellular fluid space. Because it closely mimics the body's natural sodium and chloride concentrations, it remains within the intravascular and interstitial compartments after infusion. This makes it ideal for increasing blood pressure by increasing circulating blood volume.

By increasing intravascular volume:

- It raises blood pressure with the goal of improving perfusion
- The increased blood pressure supports organ function in states of hypotension or shock
- Helps flush out toxins or dilute certain medications/drugs in overdose settings

13.32: Ondansetron

Revised 08/05/2025

Side Effects

- Headache
- Constipation
- Dizziness
- Fatigue
- QT interval prolongation

Notes

- When giving ODT ensure the patient allows it to fully dissolve and does not swallow it for the best effects.

Mechanism of Action

At a Glance:

Ondansetron is a serotonin-blocking antiemetic that prevents nausea and vomiting by stopping serotonin from activating receptors in both the gut and brain. It primarily works in the GI tract, stopping the signal to the brain's vomiting center. It also acts on parts of the brainstem that is not fully protected by the blood-brain barrier, providing central antiemetic effects.

Mechanism in Detail:

Ondansetron is a selective serotonin (5-HT_3) receptor antagonist used to prevent and treat nausea and vomiting. It works primarily by interrupting the communication between the gastrointestinal tract and the brain that initiates the vomiting reflex. While its strongest effects occur peripherally via the vagus nerve, it also exerts secondary effects at the brainstem level. More specifically, it acts by:

Blocking 5-HT_3 receptors on vagal afferent nerves in the gut:

- When the GI tract is effected by irritation or toxins, serotonin released and activates these nerves ultimately sending a signal to the brain's vomiting center.
- Ondansetron blocks this pathway, preventing the initiation of the emetic reflex.

Acting on the chemoreceptor trigger zone (CTZ):

- Though primarily peripheral in action, ondansetron also reaches parts of the CTZ and nucleus tractus solitarius, areas that are not fully protected by the blood-brain barrier which contributes to its central antiemetic effect.
- By reducing nausea signals from both peripheral and central sources ondansetron helps control nausea whether it originates from the gut, toxins or circulating signals detected by the brainstem.

13.33: Oxygen

Revised 08/05/2025

Side Effects

- Oxygen toxicity (with prolonged high concentrations)
- Respiratory depression in CO_2-retaining patients
- Dry mucous membranes

Notes

- Oxygen should be titrated to effect as overuse can be harmful.

Mechanism of Action

At a Glance:

Oxygen increases the amount of oxygen available for delivery to tissues by raising alveolar and arterial oxygen levels. This supports vital cellular functions and improves tissue oxygenation in hypoxic states.

Mechanism in Detail:

Oxygen is essential for aerobic metabolism and cellular respiration. When administered, it increases the partial pressure of oxygen in the alveoli (PAO_2), which enhances diffusion into the blood and increases the arterial oxygen content (PaO_2). This improved oxygenation allows for greater delivery to tissues, especially in hypoxic states. Oxygen doesn't directly alter the body's physiology but rather supports critical processes like ATP production and cellular repair by ensuring adequate oxygen availability to meet metabolic demand.

- In respiratory distress, oxygen helps compensate for impaired gas exchange.
- In shock, it supports oxygen delivery when perfusion is limited.
- In CO poisoning, high-flow O_2 directly competes with carbon monoxide for hemoglobin binding, accelerating CO elimination.

Oxygen delivery amounts and percentages:

- End-Tidal Capnography: 1-6 LPM (delivers between 24-44% oxygen)
- Nasal Cannula: 1-15 LPM (delivers between 24-70% oxygen)
- Simple Mask (with nebulizer): 6-10 LPM (delivers between 40-60% oxygen)
- Non-Rebreather: 10-15 LPM (delivers between 90-100% oxygen)
- Bag Valve Mask: 15 LPM (delivers between 90-100% oxygen)
- CPAP/BiPAP/Vent: Delivers 21-100% oxygen depending on settings)

13.34: Rocuronium Bromide

Revised 08/05/2025

Side Effects

- Apnea
- Prolonged paralysis in patients with hepatic dysfunction

Notes

- Ensure adequate sedation throughout the time that Rocuronium is being used. It is imperative that wakeful paralysis be avoided.

Mechanism of Action

At a Glance:

Rocuronium bromide is a non-depolarizing neuromuscular blocker that causes temporary skeletal muscle paralysis by competing binding to and blocking the nerves that trigger muscle movements. Importantly, rocuronium provides no pain relief, sedation, or anxiolysis so it must always be used alongside sedative medications before and after administration.

Mechanism in Detail:

Rocuronium bromide is a non-depolarizing neuromuscular blocker that causes temporary skeletal muscle paralysis by competitively inhibiting the action of acetylcholine at nicotinic receptors on the motor endplate. This action leads to complete paralysis and because it is non-depolarizing it does so smoothly and without muscle fasciculations.

Specifically:

- Normally, acetylcholine (ACh) binds to the nicotinic receptors and triggers muscle contraction by initiating depolarization
- Rocuronium mimics the shape ACh just enough to be able to competitively bind to these sites but not enough to activate it
- By binding to these sites rocuronium prevents depolarization and signal transmission to skeletal muscles
- This ultimately leads to flaccid paralysis without initial fasciculations

It is very important to note that Rocuronium only provides the paralysis and has no analgesic, anxiolytic or sedative effects so it must be preceded and followed by sedation medications.

13.35: Sodium Bicarbonate

Revised 08/05/2025

Side Effects

- Metabolic alkalosis
- Hypokalemia
- Hypernatremia
- Tetany or seizures

Notes

- Ensure thorough flushing of the IV line in between Calcium and Sodium Bicarbonate to prevent precipitation.

Mechanism of Action

At a Glance:

Sodium bicarbonate helps raise the body's pH by neutralizing excess acid in the blood, helping resolve metabolic acidosis. It also makes the urine more alkaline, helping to flush out certain toxins, improves blood pH and sodium levels, helps stabilize the heart and can also lower high potassium levels. While it doesn't treat the root cause, it's a useful temporary fix to support the body during critical situations.

Mechanism in Detail:

Sodium bicarbonate is an alkalinizing agent that acts as a physiological buffer. It primarily works by binding with hydrogen ions (H^+) to form carbonic acid, which then rapidly breaks down into carbon dioxide (CO_2) and water, thereby reducing acidity in the blood. It is important to note that it does not directly correct the underlying issue or medical problem but rather temporarily adjusts pH to stabilize the patient or enhance specific drug elimination pathways.

Specifically, it works to:

- Buffer systemic acidosis by binding with excess hydrogen ions (H^+) to raise serum pH. This is the quickest action of Sodium Bicarbonate and begins working instantly upon administration and works via the bicarbonate buffer system as shown below.
  - $HCO_3^- + H^+ \rightarrow H_2CO_3 \rightarrow CO_2 + H_2O$
- In cases of certain overdose it raises serum and urine pH helps reduce the ionization of the drug, decreasing its activity and increasing renal elimination. This is because in certain overdoses the toxins are weak acids and Sodium Bicarbonate makes the urine more alkaline. When urine is more alkaline (pH >7.5), these weak acids become ionized and cannot be reabsorbed by the renal tubules so they're trapped in the urine and then excreted.
- Sodium Bicarbonate also increases serum pH and sodium levels, both of which ultimately stabilize cardiac membranes and improve conduction.
- Lastly by shifting potassium into cells in exchange for hydrogen ions, Sodium Bicarbonate can help transiently lower serum potassium in cases of hyperkalemia.

13.36: Tetracaine

Revised 08/05/2025

Side Effects

- Localized burning or stinging at application site
- Conjunctival redness

Notes

- Subsequent dosing stoically results in diminished duration of anesthesia each time.

Mechanism of Action

At a Glance:

Tetracaine is a powerful local anesthetic that works by blocking the sodium channels inside nerve cells. By preventing sodium from entering the nerve, it stops electrical signals from starting or spreading which ultimately results in numbness and loss of sensation in the area.

Mechanism in Detail:

Tetracaine is a potent local anesthetic that works by blocking voltage-gated sodium channels on nerve membranes. This prevents the initiation and propagation of action potentials, effectively numbing the area by halting nerve signal transmission. It preferentially targets sensory neurons, especially those near the surface of mucous membranes.

More specifically:

- When administered Tetracaine enters nerve cells and binds to voltage-gated sodium channels in their active or inactivated state
- Unlike many medications, it does this not by competitively binding at the site but rather entering into the neuron itself and blocking the sodium channel from the inside preventing further influx
- By stabilizing the neuronal membrane and preventing sodium influx, it stops the initiation of electrical signals, thereby the pain signal is not able to reach the brain
- This ultimately results in numbness and loss of sensation in the treated area

13.37: Thiamine

Revised 08/05/2025

Side Effects

- Hypotension
- Nausea
- Sweating
- Weakness

Notes

- Thiamine deficiency can cause a multitude of issues throughout the body, some of the most serious including Wernicke's syndrome in alcoholics and Korsakoff's psychosis.

Mechanism of Action

At a Glance:

Thiamine (vitamin B1) helps your body turn food, especially sugars, into energy your cells can use. It also helps make important building blocks your body needs to stay healthy and protects cells from damage. In your brain and nerves, thiamine helps send signals so everything works
the way it should. Without enough thiamine, your body, especially your brain and heart, can struggle to make energy, which can lead to serious conditions.

Mechanism in Detail:

Thiamine is a B-complex (B1) vitamin that acts as a coenzyme in several critical metabolic processes. It does not act on a single receptor or enzyme but rather plays a vital structural and catalytic role in energy metabolism, especially in the Krebs cycle. The active form, thiamine
pyrophosphate (TPP), is essential for the function of multiple enzymes that metabolize carbohydrates and amino acids.

Specifically, thiamine:

- Is required for pyruvate dehydrogenase and α-ketoglutarate dehydrogenase, both of which convert glucose into usable energy (ATP)
- It also helps an enzyme called transketolase work properly in a pathway that your body uses to make important building blocks, like parts of DNA and a molecule called NADPH. NADPH is used for energy and protecting cells from damage.
- Lastly it supports the proper function of nerve cells by helping maintain ion channel activity and neurotransmitter release, both of which are vital for neural conduction.

Without thiamine, cells, especially in the brain and heart, cannot effectively generate ATP leading to lactic acidosis and neurologic dysfunction.

13.38: Tranexamic Acid

Revised 10/06/2025

Side Effects

• Hypotension (if given too quickly IV)

Notes

• Do not delay other critical interventions including transport to administer TXA.

Mechanism of Action

At a Glance:

Tranexamic Acid (TXA) helps control bleeding by preventing the body from breaking down clots
too quickly. It doesn't cause new clots to form; it simply protects the ones already forming at
the site of injury. Normally, the body breaks down clots by turning one protein into another that
dissolves the net holding the clot together. TXA stops this process by blocking that change.
This helps clots stay stable longer, reducing bleeding and giving the body more time to heal.

Mechanism in Detail:

Tranexamic Acid (TXA) is a synthetic analog of the amino acid lysine that exerts its antifibrinolytic effects by interfering with the body's natural process of breaking down blood clots. It is important to note that TXA does not cause any clots to form, it simply interferes with the body's natural ability to break them down, causing them to form more freely and relatively unhindered at sites of injury.

More specifically:

• Under normal conditions, fibrinolysis occurs when plasminogen is converted into plasmin. Plasmin then works to dissolve fibrin which is the structural protein or 'the net' that holds blood clots together.

• TXA works by attaching to lysine-binding sites on plasminogen which prevent its conversion into plasmin. If plasmin isn't formed then the body loses the ability to break down the clots.

• Even if some plasmin is able to form, TXA can still bind to it and reduce its ability to degrade fibrin.

• Ultimately by preserving the integrity of fibrin strands, TXA helps prevent premature clot
breakdown at sites of injury allowing for better clot formation and hopefully reduction or

cessation of bleeding.

14. Appendix

14.1: Administrative Phone Numbers

Revised 10/06/2025

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14.2: Confidentiality

Revised 08/19/2025

Under the Tex. Health § Safety Code Ann. § 773.091(g), the following items are not considered confidential information and may be disclosed:

• Information regarding the presence and nature of injury or illness

• Age

• Sex

• Occupation

• City of residence of a patient

Confidentiality is not absolute. Confidential patient information may be disclosed when patients or their legal guardians agree to the disclosure, when mandated by law, or when there exist compelling or overriding ground for the disclosure, such as prevention of substantial harm to identifiable other persons. See Tex. Health & Safety Code Ann. §773.091-095.

Disclosure of confidential patient information is a serious transgression. Employees that violate patient confidentiality should be called upon to justify their actions and may be subject to disciplinary action. Acquiring photographs on-scene has the potential to violate patient confidentiality. If a photograph is obtained because it is critical to patient care, the photograph must be attached to the permanent Patient Care Report. Once attached to the PCR, the photograph must be immediately deleted from all sources. Any photograph must be obtained on an MCHD owned device and immediately deleted once it has been attached.

14.3: DOPES (Ventilation Difficulty)

Revised 08/19/2025

Use this checklist to troubleshoot ventilation difficulties:

☐ **D:** Displacement

Check airway depth and ensure airway remains in place

☐ **O:** Obstruction

Consider airway suction, check if patient is biting airway

☐ **P:** Pneumothorax

Listen to lung sounds bilaterally

☐ **E:** Equipment

Ensure ventilator / BVM is operating correctly

☐ **S:** Stacked breaths

Evaluate for breath stacking, and remove ventilator/BVM and manually decompress chest if present

14.4: Ketamine Infusion Documentation

Revised 08/19/2025

Procedure for Documenting Waste or Transfer of a Ketamine Drip

Hospital Accepts Ketamine Infusion

Step 1

Add Ketamine Infusion (Post Intubation) to Your PCR

Upon the hospital's acceptance of the ketamine drip for continued use for the patient, ensure that before leaving the hospital destination, you add "Ketamine (Ketalar) - Infusion (Post-Intubation)" medication entry to the electronic Patient Care Report (ePCR).

Step 2

In the ePCR, select "Yes" for the query "Was possession of the Ketamine drip transferred to the hospital staff?

Step 3

Controlled Substances Transfer Worksheet

Following this selection, the "Controlled Substances Transfer" worksheet will appear on the right side of the ePCR interface. Click to select this worksheet and proceed to all in the required details. Specifically, for the "Amount transferred (mg or mcg)" section, input "500mg."

Step 4

Verify Completion of Worksheet

Verify the completeness and accuracy of the information provided in the worksheet. It is crucial that the worksheet is properly filled out and signed by a member of the receiving hospital staff to ensure a clear transfer of responsibility

Hospital Rejects Ketamine Infusion

Step 1

Add Ketamine Infusion (Post Intubation) to Your PCR

In instances where the hospital decides against the continuation of the ketamine drip for the patient, add "Ketamine (Ketalar) - Infusion (Post-Intubation)" medication to the ePCR before departing from the hospital.

Step 2

For the question "Was possession of the Ketamine drip transferred to the hospital staff?" on the ePCR, select "No."

Step 3

Waste Procedure

Proceed to Operative IQ, and perform the waste procedure for the remaining ketamine infusion. This involves withdrawing the remaining ketamine from the infusion bag into a syringe to accurately measure the remaining dose. Input the calculated milligrams (mg) of ketamine administered into Operative IQ as Dose 1(mg).

Step 4

Administrative Form

Finalize the process by completing the Administration Form in Operative IQ as Controlled Substance Administration Form - reflects the necessary information documented for each administration of an individual controlled substance. After administration of a controlled substance, the administering paramedic should complete the form immediately after transferring care to the receiving facility. The In-Charge is responsible for ensuring the completion of the Administration Form(s) before placing the unit in-service following the incident where the controlled substance was administered.

14.5: MCI Triage

Revised 08/19/2025

MCHD Triage	
M	Mobile
C	Concerned
H	High-Life Threats
D	Deceased

Triage Tag Color	Transport Priority
Green	Low
Yellow	Delayed
Red	Immediate
Black	None

Category	Definition	Triage Tag Color
Mobile	Patient is able to walk, respond to commands, no obvious life-threats identified.	Green
Concerned	Unable to Walk And **ALL** of the Following • Normal Respirations • Normal Perfusion (radial pulse present) • Normal Mental Status (follows commands) • No Immediate Life Threats Identified	Yellow
High-Life Threat	ANY of the Following • Abnormal Respirations • Abnormal Perfusion (radial pulse absent) • Abnormal Mental Status (unable to follows commands) • Any Immediate Life Threats Identified	Red
Deceased	Injuries Incompatible with Life OR No Spontaneous Breathing after positioning of airway and no pulse.	Black

14.6: Medication Pump Setup

Revised 09/30/2025

Reference Adult Medication Pump Setup

Reference Pediatric Medication Pump Setup

Reference Pump Setup: Acetaminophen

Reference Pump Setup: Magnesium Sulfate

14.7: Minimum Inventory List

Revised 10/23/2025

Airway and Oxygen Supplies			
Oropharyngeal airways 5 total	1 set	Vent circuit tubing	1
Nasopharyngeal airways 6 total	1 set	Lidocaine jelly	1
BVM adult, child, neonate	1 ea	KY jelly	4
PEEP valve	1	Laryngoscope handle	1
Nasal cannula	2	Mac blades #1,3,4	1 ea
Non-rebreather mask	2	Miller blades #0,1,3,4	1 ea
Pedi face mask	2	Magill forceps, adult, pedi	1 ea
Infant face mask	1	Sp0 2 sensor	1
Oxygen tubing	1	NG tube	1
Adult nitronox mask	1	Rigid suction catheter with tubing	1
Pedi nitronox mask	1	Suction catheters 6, 8, 10, 14, 18fr	1 ea
Nebulizer	1	60 cc syringe with cath tip	1
Nebulizer mask adult	1	On board suction and liner/canister	1
Nebulizer mask pedi	1	Portable suction unit	1
Endotracheal tube 4.0-8.0	1 ea	On board 02 cylinder with regulator	1
Endotracheal tube securing device	1	Spare portable 02 cylinder	1
Scalpel	1	Portable 02 cylinder with regulator	1
02 "Christmas tree"	1	Ohio wall adaptor	1
Pneumothorax kit	1	Portable ventilator with Ohio adapter	1
Portable 02 key	1	Nitronox with Ohio adapter	1
		ETC02 filterline	1 ea
		Supraglottic Airway	1
IV Equipment			
0.9% NaCl fluid (500 or 1,000 ml)	4	Intraosseous needle	1
0.9% NaCl fluid (100 ml)	1	EZ 10 Driver	1 ea
IV start kit	4	10 cc 0.9% NaCl flush	4
5" extension	3	18 ga needle	5
Alcohol swabs/chlorohexidine	15	22 ga needle	1
20 gtt/ml primary IV set	3	25 ga needle	1
60 gtt/ml primary IV set	1	14 ga IV Catheter	1
1 cc Syringe	2	16 ga IV Catheter	1
3 cc Syringe	4	18 ga IV Catheter	3
5 cc Syringe	3	20 ga IV Catheter	3
10 cc Syringe	2	22 ga IV Catheter	1
20 cc Syringe	1	24 ga IV Catheter	1
30 cc Syringe	1		

Medications			
Acetaminophen	975 mg	Ketamine	250 mg
Adenosine	24mg	Ketorolac	30mg
Albuterol	2.5 mg	Labetalol	10mg
Amiodarone	450mg	Lidocaine 2%	100 mg
Atropine sulfate	4mg	Magnesium sulfate	2g
Baby aspirin	324mg	Midazolam	10mg
Calcium Chloride	1 gm	Naloxone	6mg
Dextrose 10%	25 g	Nitroglycerin	12mg
Diphenhydramine	50mg	Oral glucose	15 g
Norepinephrine	4mg	Sodium bicarbonate 4.2%	5 mEq
Epinephrine 1:1,000	1 mg	Sodium bicarbonate 8.4%	50 mEq
Epinephrine 1:10,000	4mg	Methylprednisolone	125 mg
Fentanyl	100 mcg	Rocuronium	100mg
Glucagon	1mg	Thiamine	100 mg

Monitoring Devices			
Monitor/defibrillator with cable	1	BP cuff adult	1
EKG electrode	10	BP cuff large adult	1
EKG paper	1	BP cuff thigh cuff	1
Defib/pacer pads (adults)	1	BP cuff child	1
Defib/pacer pads (pedi)	1	BP cuff infant	1
Prep razor	1	Stethoscope	1
Spare monitor battery	1	Lancets	5
Oral Thermometer	1	Glucometer	1
		Glucometer test strips	1

BLS Equipment			
Kerlex	2	4x4 nonsterile loaf	½ loaf
Triangular bandages	3	Triage tags	25
Bandaids	5	OB kit	1
Cold packs	3	Sterile saline/water for irrigation	1
Heat packs	3	Disposable rescue blanket	1
Tape 3"	1	KED	1
Tape 1"	1	Traction splint (adult/pedi)	1 ea
4x4 sterile tubs	4	ABD pads	2
Multi-trauma dressings	1	Flexible splint	2
Chest Seals	2	Backboard	1
Burn sheets	1	Multi-size C-collar adult	2
Trauma shears	1	Multi-size C-collar pedi	2
Disposable head immobilizer	2	Tourniquet	1
Webbing	2		
Miscellaneous Equipment			
Stretcher/stretcher mount	1	Medium sharps container	1
Penlight	1	Biohazard bag	1 bag
Towels	2	Traffic triangle set	1
Whisk broom	1	EMS safety vests	2
Fitted sheets	2	Flashlight	1
Disinfectant/cleaning solution	1	Fire extinguisher	1
Gloves x-small	1 box	Montgomery County key map	1
Gloves small	1 box	No smoking signs	2
Gloves medium	1 box	Two-way radio	1
Gloves large	1 box	Hazardous materials quick reference	1
Gloves x-large	1 box	Inventory lists	1
Hand sanitizer	1	Toughbook or clipboard with reports	1
Safety glasses	3	SDO manual	1
Emesis bags	1		
N95 Masks	2		
Personal Protection Packs	2		

14.8: Psychiatric Facility Transport Criteria

Revised 10/03/2025

Reference document 12.11 / Destination Determination

Inclusion Criteria

Patient transport to a psychiatric facility requires ALL of the following conditions be met:

☐ Patient is capable and willing to admit voluntarily for services

☐ Patient is 13 years or older

☐ Patient **does NOT** have a developmental delay or dementia

☐ Patient **is NOT** medically fragile or require nursing care and medical monitoring

☐ Patient **does NOT** have a recent or ongoing aggressive behavior

☐ Patient is capable of performing all ADLs (eating, dressing, in/out bed, etc.) independently

☐ Patient reports suicidal/homicidal thoughts AND/OR Severe Depression AND/OR Non- Agitated Acute Psychosis with a known history of Psychosis with similar presentation

Exclusion Criteria

Patient transport to a psychiatric facility CANNOT OCCUR if ANY of the following are present:

• Decubitus ulcers

• Delirium or confusion

• Blood glucose ≥ 400 or patient has insulin pump

• Presence or need for ongoing IV therapy, including saline locks

• Indwelling tubing in place, such as foley catheter or feeding tubes

• Burns requiring daily dressing changes or use of sterile equipment

• Needs supplemental oxygen, suctioning, dialysis, telemetry or cardiac monitoring

• Burns requiring daily dressing changes or use of sterile equipment

• Wounds that the patient cannot manage themselves

• Temperature > 100.4

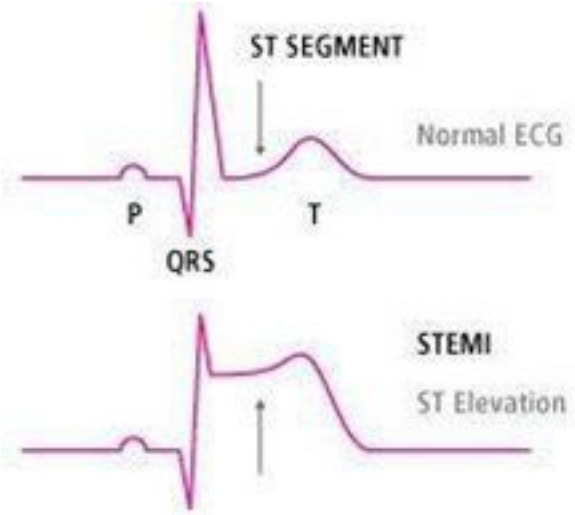
- Blood Pressure ≥ 200 systolic or ≥ 110 diastolic
- Symptoms of acute heart failure, unstable angina, or dyspnea
- Any known drug overdose
- Seizure within the last hour or new onset/uncontrolled seizure episode
- Use of chemical or physical restraint to prevent patient harm to self or others
- Recent history of multiple falls or risk for falls
- Acute intoxication OR signs of intoxication which limits the ability to give consent.

14.9: STEMI Alert Criteria

Revised 09/30/2025

The presence of all of the following criteria requires transport to a PCI-capable Hospital and STEMI Alert:

1. Age ≥ 18 years old
2. Patient presentation suggestive of AMI
   - Discomfort (chest, back, shoulder, neck, jaw, epigastric), dyspnea, nausea, diaphoresis, weakness
3. 12-lead EKG changes consistent with STEMI
   - ST elevation > 1mm in two or more contiguous limb leads
   - ST elevation > 2mm in contiguous precordial leads



14.10: Station Locations

Revised 10/03/2025

Contact: Administration
Phones:
- Phone: 936-523-5000
Address: 1400 S Loop 336 W, Conroe, TX, 77304
Note:

Contact: Station 10
Phones:
- Phone: 936-538-1310

Contact: Station 11
Phones:
- Phone: 936-538-1311
Address: 1300 S Loop 336 W, Conroe, TX, 77304

Contact: Station 12
Phones:
- Phone: 936-538-1312
Address: 14421 TX-105, Conroe, TX, 77306

Contact: Station 13
Phones:
- Phone: 936-538-1313
Address: 200 Kennedy St, Willis, TX, 77378

Contact: Station 14
Phones:
- Phone: 936-538-1314
Address: 1818 League Line Rd, Conroe, TX, 77304
Note:

Contact: Station 15
Phones:
- Phone: 936-538-1315
Address: 811 W Semands St, Conroe, TX, 77301

Contact: Station 20
Phones:
- Phone: 936-538-1320
Address: 250 Harpers Landing Blvd, Conroe, TX, 77385

Contact: Station 21
Phones:
- Phone: 936-538-1321
Address: 28830 Birnham Woods Dr, Spring, TX, 77386
Note:

Contact: Station 22
Phones:
- Phone: 936-538-1322
Address: 335 Volunteer Ln, Spring, TX, 77380
Note:

Contact: Station 23
Phones:
- Phone: 936-538-1323
Address: 9303 Gosling Rd, Spring, TX, 77381
Note:

Contact: Station 24
Phones:
- Phone: 936-538-1324
Address: 10100 Branch Crossing Dr, The Woodlands, TX, 77382

Contact: Station 25
Phones:
- Phone: 936-538-1325
Address: 9951 Grogans Mill Rd, Spring, TX, 77380

Contact: Station 27
Phones:
- Phone: 936-538-1327
Address: 5918 FM 1488, Magnolia, TX, 77354

Contact: Station 30
Phones:
- Phone: 936-538-1330
Address: 21084 TX-494 Loop, New Caney, TX, 77357

Contact: Station 31
Phones:
- Phone: 936-538-1331
Emails:
- :
Address: 14809 1st St, Splendora, TX, 77372

Contact: Station 32
Phones:
- Phone: 936-538-1332
Address: 14596 FM1314, Conroe, TX, 77302

Contact: Station 33
Phones:
- Phone: 936-538-1333
Address: 16723 FM 2090, Conroe, TX, 77306
Note:

Contact: Station 34
Phones:
- Phone: 936-538-1334

Address: 23550 Loop 494, Montgomery County, TX, 77365
Note:

Contact: Station 35
Phones:
- Phone: 936-538-1335
Address: 20515 FM1314, Montgomery County, TX, 77365

Contact: Station 40
Phones:
- Phone: 936-538-1340
Address: 14575 FM 1488, Magnolia, TX, 77354

Contact: Station 41
Phones:
- Phone: 936-538-1341
Address: 12527 Patridge Cir, Pinehurst, TX, 77362

Contact: Station 42
Phones:
- Phone: 936-538-1342
Address: 26555 Nichols Sawmill Rd, Magnolia, TX, 77355
Note:

Contact: Station 43
Phones:
- Phone: 936-538-1343
Address: 18960 Freeport Dr, Montgomery, TX, 77356

Contact: Station 44
Phones:
- Phone: 936-538-1344
Address: 18294 FM 1097, Montgomery, TX, 77356

Contact: Station 45
Phones:
- Phone: 936-538-1345
Address: 14344 TX-105, Conroe, TX, 77304

Contact: Station 46
Phones:
- Phone: 936-538-1346
Address: 2915 Woodforest Pkwy N, Montgomery, TX, 77316

Contact: Station 47
Phones:
- Phone: 936-538-1347
Address: 19530 Keenan Cut Off Rd, Montgomery, TX, 77316

14.11: Trauma Activation Criteria

Revised 10/03/2025

The presence of any one of the following criteria requires transport to Trauma Center and Trauma Activation:

- Hypotension
  - Adult: SBP < 90
  - Pediatric: SBP < 70 + (Age x 2)
- Gun Shot Wound to the head, neck, chest, torso, or extremity proximal to the knee or elbow
- GCS < 9
- Transfer patients receiving blood product to maintain vital signs
- Intubation patients or patients with respiratory compromise due to traumatic mechanism

Trauma Center Designations:

Reference document 12.11 / Destination Determination

References

Mechanical Ventilation Reference

Section: Premature

Name	Description
Ideal Body Weight (kg)	2
Tidal Volume (mL)	Do not use ventilator
Respiratory Rate	46

Section: Newborn

Name	Description
Ideal Body Weight (kg)	4
Tidal Volume (mL)	24
Respiratory Rate	40

Section: 4 Months

Name	Description
Ideal Body Weight (kg)	6
Tidal Volume (mL)	36
Respiratory Rate	40

Section: 6 Months

Name	Description
Ideal Body Weight (kg)	8
Tidal Volume (mL)	48
Respiratory Rate	40

Section: 1 Year

Name	Description
Ideal Body Weight (kg)	10
Tidal Volume (mL)	60
Respiratory Rate	36

Section: 2 Years

Name	Description
Ideal Body Weight (kg)	12
Tidal Volume (mL)	72
Respiratory Rate	36

Section: 3 Years

Name	Description
Ideal Body Weight (kg)	15
Tidal Volume (mL)	90
Respiratory Rate	30

Section: 4 Years

Name	Description
Ideal Body Weight (kg)	17
Tidal Volume (mL)	102
Respiratory Rate	30

Section: 5 Years

Name	Description
Ideal Body Weight (kg)	20
Tidal Volume (mL)	120
Respiratory Rate	30

Section: 6 Years

Name	Description
Ideal Body Weight (kg)	22
Tidal Volume (mL)	132
Respiratory Rate	24

Section: 7 Years

Name	Description
Ideal Body Weight (kg)	25
Tidal Volume (mL)	150
Respiratory Rate	24

Section: 8 Years

Name	Description
Ideal Body Weight (kg)	27
Tidal Volume (mL)	162
Respiratory Rate	24

Section: 9 Years

Name	Description
Ideal Body Weight (kg)	30

Tidal Volume (mL)	180
Respiratory Rate	24

Section: 10 Years

Name	Description
Ideal Body Weight (kg)	35
Tidal Volume (mL)	210
Respiratory Rate	24

Section: 11 Years

Name	Description
Ideal Body Weight (kg)	40
Tidal Volume (mL)	240
Respiratory Rate	24

Section: 12 Years

Name	Description
Ideal Body Weight (kg)	50
Tidal Volume (mL)	300
Respiratory Rate	20

Section: 13 Years

Name	Description
Ideal Body Weight (kg)	60
Tidal Volume (mL)	360
Respiratory Rate	20

Section: Adult

Name	Description
Tidal Volume Calculation	[(Patient's height in feet) – 1.5 feet] X 100
Obstructive / Post-ROSC	10
Normal pulmonary physiology or unknown	20
Metabolic acidosis	30

Pediatric Equipment Sizes

Section: Premie

Name	Description
Weight	2 kg
BVM	Infant
Blader	Miller 1
ETT Size	2.0 Cuffed
ETT @ Gum	7.5 - 9 cm
OPA	40 mm
NPA	14 Fr
i-gel	Size 1
NG Tube	5 Fr

Section: Newborn

Name	Description
Weight	4 kg
BVM	Infant
Blade	Miller 1
ETT Size	3.0 Cuffed
ETT @ Gum	9 - 10.5 cm
Suction Catheter	6 - 8 Fr
OPA Size	40 or 50 mm
NPA	14 Fr
i-gel	Size 1
NG Tube	5 - 8 Fr

Section: Infant (<1 year old)

Name	Description
Weight	6 - 8 kg
BVM	Infant
Blade	Miller 1
ETT Size	3.0 Cuffed
ETT @ Gum	10.5 - 11 cm
Suction Catheter	6 - 8 Fr
OPA	50 mm
NPA	14 Fr
i-gel	Size 1.5
NG Tube	5 - 8 Fr

Section: 1-Year-Old

Name	Description
Weight	10 kg
BVM	Child
Blade	Mac 2
ETT	3.5 Cuffed
ETT @ Gum/Teeth	11 - 12 cm
Suction Catheter	8 Fr
OPA	60 mm
NPA	14 - 18 Fr
i-gel Size	1.5
NG Tube	8 - 10 Fr

Section: 2-Year-Old

Name	Description
Weight	12 kg
BVM	Child
Blade	Mac 2
ETT Size	4.0 Cuffed
ETT @ Teeth	13.5 cm
Suction Catheter	10 Fr
OPA	60 mm
NPA	18 or 20 Fr
i-gel Size	2
NG Tube	10 Fr

Section: 3-Year-Old

Name	Description
Weight	15 kg
BVM	Child
Blade	Mac 2
ETT Size	4.5 Cuffed
ETT @ Teeth	14 - 15 cm
Suction Catheter	10 Fr
OPA	60 mm
NPA	20 or 22 Fr
NG Tube	10 Fr

Section: 4-Year-Old

Name	Description
Weight	17 kg
BVM	Child
Blade	Mac 2
ETT Size	4.5 Cuffed

ETT @ Teeth	14 - 15 cm
Suction Catheter	10 Fr
OPA	60 mm
NPA	20 or 22 Fr
i-gel Size	2
NG Tube	10 Fr

Section: 5-Year-Old

Name	Description
Weight	20 kg
BVM	Child / Adult
Blade	Mac 2 / Mac 3
ETT Size	5.0 Cuffed
ETT @ Teeth	16.5 cm
Suction Catheter	10 Fr
OPA	70 mm
NPA	22 or 24 Fr
i-gel Size	2
NG Tube	12 - 14 Fr

Section: 6-Year-Old

Name	Description
Weight	22 kg
BVM	Child / Adult
Blade	Mac 2 / Mac 3
ETT Size	5.0 Cuffed
ETT @ Teeth	16.5 cm
Suction Catheter	10 Fr
OPA	70 mm
NPA	22 or 24 Fr
i-gel Size	2
NG Tube	12 - 14 Fr

Section: 7-Year-Old

Name	Description
Weight	25 kg
BVM	Child / Adult
Blade	Mac 3
ETT Size	5.5 Cuffed
ETT @ Teeth	17 - 18 cm
Suction Catheter	10 Fr
OPA	80 mm
NPA	24 or 26 Fr
i-gel Size	2.5

NG Tube	14 - 18 Fr

Section: 8-Year-Old

Name	Description
Weight	27 kg
BVM	Child / Adult
Blade	Mac 3
ETT Size	6.0 Cuffed
ETT @ Teeth	17 - 18 cm
Suction Catheter	10 Fr
OPA	80 mm
NPA	24 - 26 Fr
i-gel Size	2.5
NG Tube	14 - 18 Fr

Section: 9-Year-Old

Name	Description
Weight	30 kg
BVM	Child / Adult
Blade	Mac 3
ETT Size	6.5 Cuffed
ETT @ Gum	18.5 - 19.5 cm
OPA	80 mm
NPA	24 - 26 Fr
i-gel Size	3
NG Tube	16 - 18 Fr

Section: 10-Year-Old

Name	Description
Weight	35 kg
BVM	Child / Adult
Blade	Mac 3
ETT Size	6.5 Cuffed
ETT @ Teeth	18.5 - 19.5 cm
Suction Catheter	10 - 12 Fr
OPA	80 mm
NPA	24 - 26 Fr
NG Tube	16 - 18 Fr

Section: 11-Year-Old

Name	Description
Weight	40 kg
BVM	Child / Adult

Blade	Mac 3
ETT Size	7.0 Cuffed
ETT @ Teeth	20 - 22 cm
Suction Catheter	14 Fr
OPA	80 - 90 mm
NPA	26 - 30 Fr
i-gel Size	3
NG Tube	16 - 18 Fr

Section: 12-Year-Old

Name	Description
Weight	50 kg
BVM	Child / Adult
Blade	Mac 3
Suction Catheter	14 Fr
ETT Size	7.0 Cuffed
ETT @ Teeth	20 - 22 cm
OPA	80 - 90 mm
NPA	26 - 30 Fr
NG Tube	16 - 18 Fr

Section: 13-Year-Old

Name	Description
Weight	60 kg
BVM	Adult
Blade	Mac 3
ETT Size	7.0 Cuffed
ETT @ Teeth	20 - 22 cm
Suction Catheter	14 Fr
OPA	80 - 90 mm
NPA	26 - 30 Fr
i-gel Size	4
NG Tube	16 - 18 Fr

CPR Guidelines

Section: Adult

Name	Description
Compression Rate	100-120 chest compressions per / minute for CPR continuously
Compression Depth	At least 2 inches (5 cm)
Hand Placement	2 hands-on the lower half of the breastbone (sternum)
Breathing Rate	1 Breath Every 6 Seconds (10 Breaths per minute)
Recognition of Cardiac Arrest	Check for responsiveness No breathing or only gasping (no normal breathing) No definite pulse felt within 10 seconds
Minimizing Interruptions	Limit interruptions in chest compressions to less than 10 seconds

Section: Child

Name	Description
Compression / Ventilation (without advanced airway)	1 rescuer — 30:2 2 or more rescuers — 15:2
Compression / Ventilation (with advanced airway)	Continuous compressions at a rate of 100-120/min Give 1 breath every 2-3 seconds (20-30 breaths/min)
Compression Rate	100-120 chest compressions per / minute for CPR
Compression Depth	At least one-third of the diameter of the chest. About 2 inches (5 cm)
Hand Placement	2 hands or 1 hand (optional for a very small child) on the lower half of the breastbone (sternum)
Rescue Breathing Rate	1 Breath every 2-3 seconds (20-30 breaths/min)
Recognition of Cardiac Arrest	Check for responsiveness No breathing or only gasping (no normal breathing) No definite pulse felt within 10 seconds
Minimizing Interruptions	Limit interruptions in chest compressions to less than 10 seconds

Section: Infant

Name	Description
Compression / Ventilation (without advanced airway)	1 rescuer — 30:2 2 or more rescuers — 15:2
Compression / Ventilation (with advanced airway)	Continuous compressions at a rate of 100-120/min Give 1 breath every 2-3 seconds (20-30 breaths/min)
Compression Rate	100-120 chest compressions per / minute for CPR
Compression Depth	At least one-third of the diameter of the chest About 1½ inches (4 cm)
Hand Placement	One rescuer: 2 fingers in the center of the chest, just below the nipple line Two or more rescuers: 2 thumbs — encircling hands in the center of the chest just below the nipple
Rescue Breathing Rate	1 Breath every 2-3 seconds (20-30 breaths/min)
Recognition of Cardiac Arrest	Check for responsiveness No breathing or only gasping (no normal breathing) No definite pulse felt within 10 seconds
Minimizing Interruptions	Limit interruptions in chest compressions to less than 10 seconds

Section: Neonate

Name	Description
Compression / Ventilation (without advanced airway)	1 rescuer — 30:2 2 or more rescuers — 15:2
Compression / Ventilation (with advanced airway)	Continuous compressions at a rate of 100-120/min Give 1 breath every 2-3 seconds (20-30 breaths/min)
Compression Rate	100-120 chest compressions per / minute for CPR
Compression Depth	At least one-third of the diameter of the chest About 1½ inches (4 cm)
Hand Placement	One rescuer: 2 fingers in the center of the chest, just below the nipple line Two or more rescuers: 2 thumbs — encircling hands in the center of the chest just below the nipple

Rescue Breathing Rate	1 Breath every 2-3 seconds (20-30 breaths/min)
Recognition of Cardiac Arrest	Check for responsiveness No breathing or only gasping (no normal breathing) No definite pulse felt within 10 seconds
Minimizing Interruptions	Limit interruptions in chest compressions to less than 10 seconds

Signs of Unstable Hypoperfusion

Questions

Systolic BP < 90

1. Yes (+10)
2. No (-0)

Altered Mental Status

1. Yes (+1)
2. No (-0)

Recent Syncopal Episode

1. Yes (+1)
2. No (-0)

Respiratory Distress

1. Yes (+1)
2. No (-0)

Diaphoresis

1. Yes (+1)
2. No (-0)

Results

11–99: Patient may be unstable

10–10: Patient may not be unstable

Normal Vitals by Age

Section: Adult

Name	Description
HR	50 - 100
RR	12 - 20
BP Low Normal	90/60

Section: Adolescent (12-15 years old)

Name	Description
HR	50 - 100
RR	12 - 20
BP Low Normal	90/60

Section: School age (6-11 years old)

Name	Description
HR	70 - 120
RR	18 - 25
BP Low Normal	90/50

Section: Preschool (3-5 years old)

Name	Description
HR	70 - 120
RR	20 - 30
BP Low Normal	90/45

Section: Toddler (1-2 years old)

Name	Description
HR	80 - 140
RR	20 - 40
BP Low Normal	80/40

Section: Infant (<1 year old)

Name	Description
HR	100 - 190
RR	30 - 50
BP Low Normal	70/35

Section: Newborn

Name	Description
HR	100 - 200
RR	30 - 50
BP Low Normal	60/30

RASS Score

Questions

Patient Presentation

1. Combative (+4)
2. Very agitated (+3)
3. Agitated (+2)
4. Restless (+1)
5. Alert and calm (-0)
6. Drowsy (+-1)
7. Light sedation (+-2)
8. Moderate sedation (+-3)
9. Deep sedation (+-4)
10. Unarousable sedation (+-5)

Results

RASS Score

qSOFA

Questions

Altered Mental Status (GCS < 15)

1. Yes (+1)
2. No (-0)

Respiratory Rate >= 22

1. Yes (+1)
2. No (-0)

SBP <= 100

1. Yes (+1)
2. No (-0)

Results

1–1: No Sepsis Alert

2–3: Sepsis Alert - Notify Hosp

LAMS Score

Los Angeles Motor Scale

Questions

Face

1. Both sides move normally (-0)
2. One side if weak or flaccid (+1)

Arm

1. Both sides move normally (-0)
2. One side is weak (+1)
3. One side if flaccid (+2)

Grip

1. Both sides grip normally (-0)
2. One side is weak (+1)
3. One side is flaccid (+2)

Results

Total Score

APGAR

Newborns

Questions

Activity

1. Absent (-0)
2. Flexed Limbs (+1)
3. Active (+2)

Pulse

1. Absent (-0)
2. < 100 BMP (+1)
3. > 100 BMP (+2)

Grimace

1. Floppy (-0)
2. Minimal response to stimulation (+1)
3. Prompt response to stimulation (+2)

Appearance

1. Blue or Pale (-0)
2. Pink body, blue extremities (+1)
3. Pink (+2)

Respirations

1. Absent (-0)
2. Slow and irregular (+1)
3. Vigorous cry (+2)

Results

APGAR Score

Freestanding ED Transport Criteria

Criteria to determine if a patient can be transported to a freestanding emergency department

Questions

Pregnant > 20 weeks gestation

1. Yes (+1)
2. No (-0)

Suspected STEMI/Stroke/Sepsis

1. Yes (+1)
2. No (-0)

Trauma with significant injury

1. Yes (+1)
2. No (-0)

Shock index >1 or suspected need for blood products

1. Yes (+1)
2. No (-0)

Ventilatory support required

1. Yes (+1)
2. No (-0)

Acute delirium or restraint required (physical or chemical)

1. Yes (+1)
2. No (-0)

Any psychiatric complaint or intentional drug overdose

1. Yes (+1)
2. No (-0)

Age ≥ 70

1. Yes (+1)
2. No (-0)

Snake envenomation

1. Yes (+1)
2. No (-0)

Results

1–99: NOT appropriate for FSED transport

0–0: IS appropriate for FSED transport

Trauma Activation Criteria

Criteria to determine if the patient requires transport to a trauma center

Questions

SBP < 90 at any time (or age specific hypotension)

1. Yes (+1)
2. No (-0)

GSW to the neck, chest, abdomen, or proximal extremities

1. Yes (+1)
2. No (-0)

GCS < 9

1. Yes (+1)
2. No (-0)

Patient receiving blood products

1. Yes (+1)
2. No (-0)

Intubated or respiratory compromise secondary to traumatic mechanism

1. Yes (+1)
2. No (-0)

Results

1–99: Transport to TRAUMA CENTER

0–0: Trauma center not required

Abnormal Vital Signs for High-Risk Refusals

Section: Patients >8 years old

Name	Description
Heart Rate	> 115 or < 50
Respiratory Rate	> 24
SpO2	< 94%
Glucose	< 70 or > 350
Systolic BP	< 100 or > 185

Section: Patients ≤ 8 years old

Name	Description
Heart Rate	> 130
Respiratory Rate	> 28
SpO2	< 94%
Glucose	< 70 or > 200

Adult Medication Pump Setup

Pump settings for various medications infused on the pump

Section: Acetaminophen

Name	Description
Mixing	Premixed
Dose Rate	N/A
VTBI (mL)	100
Time (minutes)	10

Section: Amiodarone Bolus

Name	Description
Mixing	300mg (6mL) in 100mL NS OR 150mg (3mL) in 100mL NS
Dose Rate	N/A
VTBI (mL)	100
Time (minutes)	10

Section: Amiodarone Infusion

Name	Description
Mixing	150mg (3mL) in 100mL NS
Dose Rate	1 mg/minute
VTBI (mL)	100
Time (minutes)	N/A

Section: Epinephrine

Name	Description
Mixing	1mg in 100mL NS
Dose Rate	2-20 mcg/min
VTBI (mL)	100
Time (minutes)	N/A

Section: Hydroxocobalamin

Name	Description
Mixing	Reconstitute with 200mL NS and invert
Dose Rate	N/A
VTBI (mL)	200
Time (minutes)	15

Section: Ketamine

Name	Description
Mixing	500mg in 100mL NS
Dose Rate	2mg/kg/hr
VTBI (mL)	100
Time (minutes)	N/A

Section: Lidocaine

Name	Description
Mixing	100mg in 100mL
Dose Rate	1-4 mg/min
VTBI (mL)	100
Time (minutes)	N/A

Section: Magnesium Sulfate

Name	Description
Mixing	4g (8mL) in 100mL NS
Dose Rate	N/A
VTBI (mL)	100
Time (minutes)	10

Section: NORepinephrine

Name	Description
Mixing	4mg (4mL) in 500mL NS
Dose Rate	2-20mcg/min
VTBI (mL)	500
Time (minutes)	N/A

Pediatric Medication Pump Setup

Pump settings for various medications infused on the pump

Section: Epinephrine

Name	Description
Mixing	1mg (1ml) in 100mL NS
Dose Rate	2-20 mcg/min
VTBI (mL)	100
Time (minutes)	N/A

Section: Ketamine

Name	Description
Mixing	500mg in 100mL NS
Dose Rate	2 mg/kg/hr
VTBI (mL)	100
Time (minutes)	N/A

Section: NORepinephrine

Name	Description
Mixing	4mg (4mL) in 500mL NS
Dose Rate	2-20 mcg/min
VTBI (mL)	500
Time (minutes)	N/A

Pump Setup: Acetaminophen

VTBI for Pediatric Acetaminophen administration

Section: VTBI based on age

Name	Description
6 Months	12 mL
1 Years	15 mL
2 Years	18 mL
3 Years	22.5 mL
4 Years	25.5 mL
5 Years	30 mL
6 Years	33 mL
7 Years	37.5 mL
8 Years	40.5 mL
9 Years	45 mL
10 Years	52.5 mL
11 Years	60 mL
12 Years	75 mL
13 Years	90 mL

Pump Setup: Magnesium Sulfate

VTBI for Pediatric Magnesium Sulfate administration

Section: VTBI based on age

Name	Description
Premature	5 mL
Newborn	10 mL
4 Months	15 mL
6 Months	20 mL
1 Years	25 mL
2 Years	30 mL
3 Years	37.5 mL
4 Years	42.5 mL
5 Years	50 mL
6 Years	55 mL
7 Years	62.5 mL
8 Years	67.5 mL
9 Years	75 mL
10 Years	87.5 mL
11 Years	100 mL
12 Years	100 mL
13 Years	100 mL