GUNDERSEN MEDICAL DIRECTION PRE-HOSPITAL GUIDELINES

July 2023
Iowa Version

Christopher M Eberlein, MD
Medical Director
Gundersen Health System
cmeberle@gundersenhealth.org

Tom Carpenter, NRP, CCEMTP
EMS Education
Gundersen Health System
tacarpen@gundersenhealth.org

Sara Christiansen, NRP, CCEMTP
EMS Education
Gundersen Health System
smchris1@gundersenhealth.org
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# Gundersen Medical Direction Pre-Hospital Guidelines – Iowa Version

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As the physician medical director, I have reviewed these Pre-Hospital Guidelines and the Iowa Emergency Medical Care Provider Scope of Practice document. I approve the use of the skills and medications with these guidelines updated 2023 for the authorized Iowa EMS Program(s):

- Tri-State Regional Ambulance, Inc. dba Gundersen Health System Ambulance – West Union, IA.

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<td>CHRISTOPHER M. EBERLEIN, M.D.</td>
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Foreword

Optimal pre-hospital care results from a combination of careful patient assessment, essential pre-hospital emergency medical services, and appropriate medical consultation. The purpose of this manual is to provide guidance for ALL pre-hospital care providers and Emergency Department Physicians within the Gundersen Health System medical direction.

These protocols are initially based off WI scope of practice. They have been edited to reflect the current scope of practice in Iowa.

The goal of these guidelines is to standardize pre-hospital patient care. These guidelines are not intended to be absolute treatment doctrines, but to have sufficient flexibility to meet the complex challenges faced by the EMS providers.

These guidelines have been written in adherence with nationally recognized standards including but not limited to: DOT guidelines, American Heart Association’s “Advanced Cardiac Life Support” and “Pediatric Advanced Life Support”, state standards and practices manuals. All providers will adhere to these guidelines as appropriate for medical circumstance and provider agency level.

To maintain the life of a specific patient, it may be necessary, in rare instances, for the physician providing on-line medical consultation, as part of the EMS consultation system, to direct a pre-hospital provider in rendering care that is not explicitly listed within these guidelines. To proceed with such an order both the online medical control and the provider must acknowledge and agree that the patient’s condition and extraordinary care are not addressed elsewhere within these medical guidelines, and that the order is in the best interest of patient care. Additionally, the provider must feel capable, based on the instructions given by the online medical control, of correctly performing the directed care. Whenever such care is provided, the online medical control and the provider must immediately notify the QA/QI Committee of the extraordinary care situation. All such incidents will be entered into the Quality Improvement Review process.

Occasionally a situation may arise in which a physician's order cannot be carried out; e.g., the provider feels the administration of an ordered medication would endanger the patient, a medication is not available, etc. If this occurs, the provider must immediately notify the online medical control as to the reason the order cannot be carried out and indicate on the pre-hospital care report what was ordered, the time, and the reason the order could not be carried out. In addition, the provider must notify the Quality Assurance Office. All such incidents will be entered into the Quality Improvement Review process.

If “On-line Medical Control” cannot be obtained, the provider may initiate appropriate guidelines as deemed necessary.

Items in **BOLD** and **UNDERLINED** are hyperlinked to the corresponding guideline. Items in **BOLD** designate a medication or treatment.
Foreword (Continued)

Items in [brackets] and italicized designate treatments approved for a specific provider level. A provider level with ** indicates that that level must have additional training AND medical director approval to be able to perform the treatment. Treatments listed with a provider level followed by “Med Control” indicate that orders from online medical control must be obtained, except in situations where online medical control is unavailable. Gundersen Health System is the default and preferred on-line medical control for patient care questions and authorizations. This alone does not affect destination determination. Patients without a destination preference and not meeting any activation/diversion criteria should be transported to the hospital based on agency policy.

It is to be understood all treatments listed for a specific level can be used by a provider trained to a more advanced level, but only within the scope of practice to the level of care that the agency they are responding for is licensed/certified by the respective state EMS licensing agency.

Examples:

[EMT] Indicates that all EMTs and every provider level above EMT may provide the treatment if the agency they are responding with are licensed/certified at that level. This includes AEMT, EMT-I, Paramedic, and Critical Care Paramedic.

[EMT**, AEMT] Indicates that only EMTs who have received additional training AND Medical Director approval may provide the treatment and that all AEMTs and every provider level above AEMT may provide the treatment as long as the agency they are responding with are licensed/certified at that level. This includes EMT-I, Paramedic, and Critical Care Paramedic.

[Paramedic/Med Control] Indicates that Paramedics and provider levels above may provide the treatment after obtaining orders from online medical control, except in situations where online medical control is unavailable.

These guidelines have been developed specifically for all EMS and first response agencies for which medical direction is provided by Gundersen Health System, and represent consensus amongst the Medical Director, QA/QI Committee, EMS Education Department, Clinical Departments and Management Teams for these EMS Systems. The guidelines demonstrate a commitment to a consistent approach to quality patient care.
Foreword (Continued)

From time to time, guidelines may be added or revised upon recommendation by the parties previously listed. Additional recommendations are welcome and appreciated at any time. They may be submitted to any of the parties listed below for consideration.

**Tri-State Ambulance, Inc.**
235 Causeway Boulevard
La Crosse, WI 54603
➢ Medical Director
  o Christopher M. Eberlein, MD
  o cmeberle@gundersenhealth.org

**Gundersen Lutheran Emergency Medical Services**
1900 South Ave
La Crosse, WI 54601
➢ Quality Assurance
  o Tom Carpenter, NRP, CCEMTP
  o tacarpen@gundersenhealth.org
  o 608-775-3218
➢ EMS Education
  o Sara Christiansen, NRP, CCEMTP
  o smchris1@gundersenhealth.org
  o 608-775-6315
General Principles of Patient Care

General Scope: Most of the following guidelines will begin with “Perform routine medical assessment”. A thorough assessment is needed for treatment of complex medical conditions. It is understood that at times the assessment will need to be interrupted to perform life-saving treatment. Providers shall resume assessment as soon as they are able, after performing life-saving interventions. This shall serve as a general guideline for principles that apply to the assessment of all patients.

Applies to: All Medical Staff

Guideline:

- Universal precautions and personal protective equipment shall be utilized at all times as is appropriate for the situation.
  - PPE can include, but is not limited to:
    - Fluid barrier gloves
    - Safety eye protection/Face shield
    - Infection control gown
    - Infection control shoe covers
    - Infection control bouffant cap
    - Surgical mask
    - N-95 mask/PAPR/respirator

- A patient is an individual requesting or potentially needing medical evaluation or treatment. The patient-provider relationship is established upon personal contact. It is the provider’s responsibility to ensure all potential patients are offered evaluation, treatment, and/or transport. (See Refusal of Evaluation, Treatment, and/or Transport Guideline)

- All patients shall receive a primary assessment to include, but not limited to, the following:
  - Airway patency
  - Breathing (rate and quality)
  - Circulation
    - Pulse
    - Skin color, temp, and condition
    - Assess for and treat life threatening bleeding
  - Level of consciousness
General Principles of Patient Care (Continued)

• All patients shall receive a secondary assessment to include, but not limited to, the following:
  o Vital signs including, but not limited to:
    ▪ Pulse
    ▪ Blood Pressure
    ▪ SpO2
    ▪ Respiratory rate and effort
    ▪ Temperature
  o S.A.M.P.L.E. history as possible
  o Rapid trauma and/or focused physical assessment
  o Secondary head-to-toe physical assessment

• Receiving facilities of patients being transported should be notified as soon as practicable.
• All Primary and initial Secondary assessments shall be performed or supervised by the EMS provider with the most advanced level of training.
• All patients shall receive treatment as is appropriate per guideline and on-line medical direction.
• All patients shall be reassessed after an intervention is performed. The success, secondary effects, and possible side-effects of said intervention evaluated.
  o i.e., if a guideline gives a medication dose such as Fentanyl 25-50 mcg Q 5 minutes; the care provider shall give the initial appropriate dose of 25-50 mcg and perform a re-assessment of the patient to include pain level, level of consciousness, and vital signs prior to giving a second dose.
  o The same principle applies to the titration of a medication. Titration is the adjustment of medication dosing until the desired endpoint is reached. The endpoint is the point at which the titration is complete as determined by an indicator.
• Medication dosing is considered acceptable within 20% of the calculated dose due to factors such as estimation of patient weight and difficulty in measuring exact volumes.
• For pediatric patients (1-8 years) and infants (newborn - 1 year):
  o Equipment and medications must be appropriate for the size and weight of the patient. Use of a length-based tape is required.
  o The developmental age of the infant/child must be considered in the communication and evaluation for treatment.
  o Treatment priorities are similar to the adult patient.
  o When appropriate, family members should remain with pediatric patients.
  o Infants and children must be properly restrained prior to and during transport.
• For inter-facility transports:
  O Review interventions already in place for appropriateness, accuracy, and effect.
General Principles of Patient Care (Continued)

- For unfamiliar medications that are infusing, ordered, and/or are to be administered by EMS, consult with physician(s), nurse(s), and/or refer to the provided resources such as the drug reference book and/or online resources.
- Patients will be transported to the closest appropriate facility per local, state, and federal laws and guidelines.
  - If two hospitals are of similar distance and have similar capabilities/resources for the patient’s nature of illness, mechanism of injury, or clinical impression, the patient will be transported to the hospital of their preference. If the patient is unable to answer, follow local department policy on where to transport patient.
Airway
Airway / Ventilatory Management

**General Scope:** Guideline for airway management.

**Guideline:**

1. Perform routine medical assessment
   a. Consider EtCO₂ monitoring if appropriate for scope of practice

2. Titrate SpO₂ to ≥94%
   a. Use the least amount of supplemental oxygen as necessary
   b. Patients on home Oxygen should remain on at least their minimum prescribed rate

3. If patient presents with bronchospasm
   a. See Asthma / COPD Guideline

4. If patient presents with pulmonary edema
   a. See Pulmonary Edema Guideline

5. If patient has a tracheostomy that requires replacement or suction, see Tracheostomy Care Procedure

6. Observe for signs and symptoms of respiratory failure
   - Failure to oxygenate and/or ventilate
   - Severe respiratory fatigue
   - Inability to successfully use CPAP
   - RR <8 or >35 breaths per minute
   - SpO₂ <85% on 100% O₂
   - Acutely rising EtCO₂
   - Altered mental status
   - Hemodynamic instability
   - Paradoxical respiratory efforts

7. [EMR] Provide supplemental Oxygen via appropriate device
   a. [EMT**] When providing ventilation via BVM, PEEP should be applied at 5-10 mmHg
      i. Generally PEEP is contraindicated in cardiac arrest, but may be considered in patients with pulmonary edema
   b. Tidal volumes of 6-8 cc/kg of ideal body weight should be attempted. Higher tidal volumes may be harmful to the patient.

8. [EMR**] Consider Supraglottic Airway Procedure


10. [Paramedic] If endotracheal intubation success likely and patient is >8y/o
    a. Consider intubation
       i. If RSI is necessary, see Resuscitation Sequence Intubation Procedure

11. If failed intubation (two total unsuccessful attempts)
    a. Consider BVM
    b. Consider Supraglottic Airway Procedure
    c. [Paramedic] consider Needle Cricothyroidotomy Procedure
    d. [CCP] For adults, consider Surgical Cricothyroidotomy Procedure
       i. For children under 10, consider Needle Cricothyroidotomy Procedure
Airway Management Checklist

(ZOLL EVENT MARKERS)

**LEMON**
- Assess airway for difficulty - **LEMON**/HEAVEN
- Perform neurologic exam before med administration
- Monitor vitals signs (HR, SpO2, ECG, ETCO2)
- Use TurboCuf & consider defibrillator pads (RSI)
- Prepare suction - turn on, check function (suction as needed using large bore suction catheter)
- Place basic airway adjunct (NPA or OPA)
- Ensure sniffing positioning - RAMP if obese
- Pre-oxygenate - goal is ≥95% SpO2
- Perform apneic oxygenation (regular nasal cannula at 15 lpm)
- Prepare bag-mask valve
- Prepare intubation equipment (laryngoscope, bougie, ETT, syringe, securing device)
- Ready primary airway device (test, lubricate)
- Ready backup airway device
- Ensure IV access (patent, appropriate size/location)
- Administer vasopressors if indicated (VPRES)

**HEAVEN**
- Hypoxemia (SpO2 <95% at epiglottoscopy)
- Extremes of size (clinical obesity)
- Anatomic challenge (trauma, mass, swelling, foreign body, other structural abnormality)
- Vomit/Blood/Fluid (fluid present in pharynx at epiglottoscopy)
- Exsanguination (suspected anemia potentially accelerating desaturation during RSI associated apnea)
- Neck (limited cervical range of motion)

- RSI: [Paramedic] Administer induction agents (SED/PAR)
  0.5-2mg/kg KETAMINE & 1mg/kg ROCURONIUM
  (WAIT 60 seconds after each medication)
- Intubation: Lead with suction & perform epiglottoscopy
- Place airway without hypoxia (START/END)

**NOTES**
- Ketamine doses as low as 0.5mg/kg should be used with hemodynamic compromise
- Standard dose is 1.5-2mg/kg

**DOPES**
- Displacement or Disconnect
- Obstruction
- Pneumothorax
- Equipment failure
- Stacked breaths if asthmatic

**GOAL:** FIRST PASS SUCCESS WITHOUT HYPOXIA
Airway Obstruction

**General Scope:** Guideline for airway obstruction.

**Guideline:**

1. Perform routine medical assessment
2. If patient is unable to speak and is conscious
   a. Perform abdominal thrusts until the foreign body is expelled or the victim becomes unconscious.
3. If patient is unconscious
   a. Perform CPR per current AHA guidelines
5. [Paramedic] If unable to ventilate consider direct laryngoscopy and removal with Magill forceps
6. [Paramedic] If unsuccessful in removing foreign body or relieving upper airway obstruction
   a. see Needle Cricothyroidotomy Guideline
7. [CCP] If unsuccessful in removing foreign body or relieving upper airway obstruction
   a. For adult patients, see Surgical Cricothyroidotomy Guideline
   b. For pediatric patients (< 10 y/o), see Needle Cricothyroidotomy Guideline
Asthma / COPD

General Scope: Guideline for treatment of asthma and chronic obstructive pulmonary disease.

Guideline:

1. Perform routine medical assessment
2. Begin initial treatment per Airway / Ventilatory Management Guideline
3. If severe attack (Respiratory rate more than twice normal, loud wheezes or silent chest, patient anxious, and/or gray or ashen skin color)
   a. ALBUTEROL via nebulizer
      i. [EMT] 2.5-5.0mg
   b. [AEMT] Consider IV TKO
   c. [EMT/AEMT] DUO-NEB nebulizer treatment
   d. [Paramedic] METHYLПREDНИСОЛONE 125mg IV/IO
      i. Pediatric (< 8 y/o) – 1 mg/kg
   e. [Paramedic/Med Control] MAGNESIUM SULFATE 2 grams/100mL NS IV/IO over 15 minutes
      a. [AEMT] EPINEPHRINE 0.3mg (1mg/mL [1:1,000]) IM
         i. Pediatric (< 8 y/o) – 0.15mg
   f. For impending respiratory failure
      i. Consider CPAP
         1. See NIPPV Procedure
         2. See Airway / Ventilatory Management Guideline
4. If moderate attack (Marked increase in respiratory rate, wheezes easily heard, and accessory muscle use)
   a. Consider ALBUTEROL via nebulizer
      i. [EMT] 2.5-5.0mg
   b. [AEMT] Consider IV TKO
5. If mild attack (Slight increase in respiratory rate, mild wheezes, and good skin color)
   a. Consider ALBUTEROL via nebulizer
      i. [EMT] 2.5-5.0mg
   b. [AEMT] Consider IV TKO
6. For patients with advanced airway and bronchoconstriction
   a. ALBUTEROL via in-line MDI (Critical Care IFT)
      i. [Paramedic] For chronic bronchoconstriction, 360 mcg (four puffs) every two hours (1 puff = 90 mcg)
      ii. [Paramedic] For severe bronchoconstriction, 360 mcg (four puffs) as needed until improvement (1 puff = 90 mcg)
      iii. [Paramedic] Consider continuous nebulizer
Assessment
Interfacility Pre-Transport Care

**General Scope:** Establishment of pre-transport standards of care for all intra/inter-facility transports.

**Guideline:**

1. Establish contact with referring facility and patient
   a. Patients with respiratory distress being treated by bilevel CPAP should be triaged to critical care transport.
2. Complete “Primary Survey”
   a. Resuscitate if necessary
3. Complete “Secondary Survey”
   a. To include vital signs, SpO₂ and cardiac monitor (if indicated)
4. Assess pre-arrival diagnostics and interventions
   a. Paramedics can continue all antibiotics and electrolyte solutions. They can also transport other medications not found in the guideline with online Medical Control approval. If you are unfamiliar with any medication, consult with physician(s), nurses(s), and/or refer to the provided resources such as the drug reference book and/or online resources like drugs.com to insure you have a general understanding of the medication order, dose, and side effects.
5. Confirm correct placement and position of ETT, NG/OG, PEG/PEJ, IVs, urinary catheter, etc.
6. Review X-rays, lab results, CT results, and EKG’s
7. Review/confirm written orders from the referring physician are within your SOP and the PCS form has been properly filled out.
   a. Special attention should be paid to blood pressure and/or heart rate management, ventilator settings, and medications to be infused.
8. Prepare to load patient, consider spinal immobilization for trauma patients
Cardiovascular – Adult
Asystole

**General Scope:** Guideline for treatment of a patient in asystolic cardiac arrest.

**Guideline:**

1. Perform routine medical assessment
   a. Refer to [Cardiac Arrest Guideline](#)

Initiate CPR and continue throughout resuscitation with minimal interruptions

2. [Paramedic] Confirm asystole in two leads
   a. If rhythm is unclear, see [V-Fib/Pulseless V-Tach Guideline](#)

3. [AEMT] Establish IV/IO

4. [AEMT] **EPINEPHRINE** (1mg/10mL [1:10,000]) 1mg every 3-5 minutes

5. Establish airway per [Airway / Ventilatory Management Guideline](#)

6. Consider possible causes and treatments (H’s & T’s)
   a. Hypoxia – see [Airway / Ventilatory Management Guideline](#)
   b. Hypoglycemia – see [Hypoglycemia/Hyperglycemia Guideline](#)
   c. Hypothermia – see [Hypothermia Guideline](#)
   d. Hyperkalemia – [Paramedic] see [Hyperkalemia Guideline](#)
   e. Hypovolemia – consider IV **NORMAL SALINE** bolus
   f. (H+) Pre-existing acidosis – Ventilate and for adults only, consider [Paramedic]
      **SODIUM BICARBONATE** 25mEq
   g. (Toxins) Drug overdose – see [Poisoning and Overdose Guideline](#)
   h. Tension pneumothorax – consider [Paramedic] **Needle Decompression Procedure**
   i. Tamponade (Cardiac Tamponade)
   j. Thrombosis – PE/MI

7. After three doses of **EPINEPHRINE** (1mg/10mL [1:10,000])
   a. [Paramedic] Consider **CALCIUM GLUCONATE** 1gram
   b. [Paramedic] Consider **SODIUM BICARBONATE** 25mEq

8. After the above, may consider termination of resuscitation – see [2. Termination of Resuscitation](#)
Automatic Implantable Cardiac Defibrillator (AICD) Deactivation

**General Scope:** Guideline for deactivating AICDs.

**Guideline:**

1. Perform routine medical assessment
2. Patient must remain on cardiac monitor until transfer of care
3. *[Paramedic]* If patient has an AICD that is inappropriately discharging (for a non-shockable rhythm)
   a. Place magnet directly over AICD
   b. Secure magnet in place
   c. Document time of application, underlying rhythm, and if procedure is successful
4. If the patient develops a shockable rhythm, remove the magnet
   a. If AICD does not begin working, see appropriate arrhythmia guideline

**Notes:**
This magnet will not stop a pacemaker from functioning
Keep magnet away from computers, credit cards, electronics, etc.
Bradycardia

**General Scope:** Guideline for treatment of an adult patient with symptomatic bradycardia.

**Guideline:**

1. Perform routine medical assessment
2. Monitor SpO₂
3. Airway support as needed per Airway / Ventilatory Management Guideline
4. Identify patient as having serious signs or symptoms
   a. [EMT**] Obtain and transmit a 12-Lead ECG
   b. [Paramedic] Review ECG if available
5. [AEMT] Establish IV/IO
6. If patient is asymptomatic, observe closely
7. [Paramedic] If symptomatic or IV/IO not readily available
   a. Begin TRANSCUTANEOUS PACING per monitor manufacture’s guidelines
      i. Consider Pain Management Procedure and/or Sedation Procedure as needed
   b. [Paramedic] Administer ATROPINE 1mg every 3-5 minutes to a max of 3mg
   c. [Paramedic] Consider EPINEPHRINE infusion (1mg/100ml D₅W or NS—10mcg/ml)
      i. Initiate infusion at 2-10 mcg/min
      ii. Titrate every 5 minutes by increments of no more than 1 mcg/min
      iii. Maximum of 10 mcg/min
Cardiac Arrest (Benchmark)

**General Scope:** Guideline for initiating, performing, and/or terminating resuscitation of a cardiac arrest.

**Guideline:**

**INITIATION OF RESUSCITATION**

a. *[EMR]* Resuscitation must be initiated unless one of the following conditions exist
   
i. Valid DNR
      1. The presence of the uniform OOH DNR order or uniform OOH DNR identifier, or
      2. The presence of the attending physician to provide direct verbal orders for care of the patient.
   
ii. Written order from physician

iii. Order from Medical Control physician

iv. Pulseless and apneic with one or more of the following:
   1. Decomposition
   2. Rigor mortis
   3. Dependent lividity
   4. Decapitation
   5. MCI
   6. Traumatic death with extrication >20 minutes with no CPR

b. *[Paramedic]* For adult patients only, BLS resuscitation may be discontinued, including when performed by an ALS unit, without ALS intervention in the following conditions:

<table>
<thead>
<tr>
<th>Arrest was not witnessed</th>
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<tbody>
<tr>
<td>AND</td>
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<tr>
<td>There is no return of spontaneous circulation (ROSC) after three full rounds of CPR and AED analysis AND</td>
</tr>
<tr>
<td>No AED shocks were delivered at any time AND</td>
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<tr>
<td>Cardiac rhythm is asystole as verified on cardiac monitor in multiple leads</td>
</tr>
</tbody>
</table>
1. PERFORMANCE OF RESUSCITATION
   a. [EMR] Resuscitation of the cardiac arrest patient should be performed utilizing current ECC guidelines
      i. Utilize a team approach and pre-plan rotations & interventions
      ii. Emphasis on quality chest compressions with minimal interruptions
          1. Consider use of mechanical CPR when available
      iii. Provide appropriate ventilation without PEEP – avoid hyperventilation
      iv. Place advanced airway with no interruption of chest compressions
      v. Refer to appropriate dysrhythmia guideline as needed
   b. [Paramedic] For patients with refractory ventricular fibrillation or ventricular tachycardia (three or more defibrillations without or with transient conversion), consider replacing defibrillation pads with pads in a different vector.

2. TERMINATION OF RESUSCITATION
   a. [EMR] Resuscitation should be continued until one of the following occurs
      i. Valid DNR is provided
      ii. Resuscitation efforts have been transferred to other persons of at least equal skill and training
      iii. Effective ROSC and ventilation have been restored
      iv. The rescuers are physically unable, or it is unsafe to continue efforts
      v. ALS determines termination of resuscitation is appropriate per 2b
      vi. Medical Control orders efforts to stop
   b. [Paramedic] Resuscitation should be continued until the following criteria are met
      i. High quality CPR has been administered
      ii. Adequate ventilation has been provided via BVM or advanced airway
      iii. IV or IO access has been achieved
      iv. Appropriate cardiac dysrhythmia guidelines have been followed
      v. Persistent asystole or agonal rhythm is present
      vi. No reversible causes are identified
      vii. A minimum of 20 minutes of ALS resuscitation and 30 minutes total
          1. May consider earlier termination in traumatic arrest with consultation from Medical Control prior to termination.
   c. If transport has been initiated, efforts must continue until patient care has been turned over to the receiving hospital
   d. If resuscitation is not initiated or continued, or is terminated, ensure Coroner/Medical Examiner is notified
# Cardiac Arrest Benchmarks

## CLINICAL BENCHMARKS

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>□</td>
<td>No interruptions of chest compressions &gt; 10 seconds</td>
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<tr>
<td>□</td>
<td>Rhythm interpreted every two minutes and defibrillation administered as needed</td>
</tr>
<tr>
<td>□</td>
<td>First dose of epinephrine administered within five minutes in asystole</td>
</tr>
<tr>
<td>□</td>
<td>Advanced airway successfully placed on first attempt</td>
</tr>
<tr>
<td>□</td>
<td>Obtain 12-lead ECG &lt; 10 minutes after ROSC</td>
</tr>
<tr>
<td>□</td>
<td>If STEMI, transport directly to PCI center</td>
</tr>
<tr>
<td>□</td>
<td>Compliance with medical guidelines/MD orders</td>
</tr>
</tbody>
</table>

## DOCUMENTATION BENCHMARKS

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>□</td>
<td>Document patient demographics - age and gender</td>
</tr>
<tr>
<td>□</td>
<td>Document estimated patient weight</td>
</tr>
<tr>
<td>□</td>
<td>Attach acquired ECGs &amp; rhythm strips</td>
</tr>
<tr>
<td>□</td>
<td>Document vital signs every five minutes after ROSC</td>
</tr>
<tr>
<td>□</td>
<td>Document hospital notification time</td>
</tr>
<tr>
<td>□</td>
<td>Document disposition (ER or Cath Lab)</td>
</tr>
</tbody>
</table>
Coronary Insufficiency (Benchmark)

**General Scope:** Guideline for treatment of patients who present with signs or symptoms of possible cardiac events.

**Guideline:**

1. Perform routine medical assessment
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
3. [EMT] Obtain and transmit a 12-Lead ECG
4. [Paramedic] Review ECG
   a. [Paramedic] If 12-Lead ECG is consistent with STEMI contact Medical Communications (MedComm) to activate STEMI Alert
      i. [Paramedic] Transport to nearest PCI center is recommended if travel time is expected to be 60 minutes or less
5. [AEMT] Establish IV/IO
6. [EMT] Give ASPIRIN 324mg PO
7. [EMT] Assist the patient with their own NITROGLYCERIN 0.4mg sublingual every 3-5 minutes until pain free (see below)
8. [AEMT] Give NITROGLYCERIN 0.4mg sublingual every 3-5 minutes until pain free or infusion established. (see below)
   a. IF SBP <120 See [Blood Pressure Management Procedure](#)
      i. Do not administer sublingual nitroglycerin until SBP >120
   b. [Paramedic] If SBP >90 consider NITROGLYCERIN INFUSION (20mg/100ml NS or D5W—200mcg/ml)
      i. For patients <75kg, start at 10mcg/min
      ii. For patients >75kg, start at 20mcg/min
         1. Titrte by 5-10mcg/min every 5-10 minutes to desired response
   c. Discontinue NITROGLYCERIN INFUSION if SBP <90
9. [Paramedic] If STEMI Alert, administer anti-platelet agent
   a. Administer only one anti-platelet agent
   b. Do not administer if already received by the patient (IFT)
      i. Option 1: 180 mg TICAGRELOR (BRILINTA) PO
      OR
      ii. Option 2: 600 mg CLOPIDOGREL (PLAVIX) PO
10. [Paramedic] If SBP >100 consider FENTANYL 25-50mcg for refractory pain
11. [Paramedic] Consider MIDAZOLAM 0.5-1mg

**Note:**

**Nitroglycerin**
- Avoid if any history of PDE 5 inhibitor (Viagra, Levitra, Cialis) use in the past 48 hours
# STEMI Benchmarks

## CLINICAL BENCHMARKS

- Obtain **12-lead ECG** < 10 minutes from patient side
- Notify **receiving facility** of STEMI < 15 minutes from patient side
- Transmit ECG to receiving facility
- Perform “right-sided” ECG for suspected inferior infarcts
- Maintain **O<sub>2</sub> saturation** of ≥94% with minimum Oxygen necessary
- Administer **Aspirin** to eligible STEMI patients
- Administer **Nitroglycerin** to eligible STEMI patients
- Administer **analgesic** to eligible STEMI patients
- Prep patient for cath lab (remove clothing/jewelry and place pads/patches appropriately)

## DOCUMENTATION BENCHMARKS

- Document **patient demographics - age and gender**
- Document estimated **patient weight**
- Attach all acquired ECGs
- Document **vital signs every 15 minutes**
- Document **pain scores with vital signs**
- Document **hospital notification time**
- Document **disposition (ER or Cath Lab)**
Narrow Complex Tachycardia

**General Scope:** Guideline for treatment of an adult patient with symptomatic narrow complex tachycardia.

**Guideline:**

1. If patient ≤ 8 years old, refer to appropriate Pediatric Tachycardia Guideline
2. Perform routine medical assessment
   a. Consider underlying causes of tachycardia (i.e., sepsis, dehydration, shock, DKA)
3. Determine cardiac rhythm and assess for stability
   a. [AEMT] Attempt IV/IO (antecubital IV preferred)
4. If ventricular rate is >180 beats/minute and patient is unstable:
   a. Consider sedation per Sedation Procedure
   b. [Paramedic] Perform SYNCHRONIZED CARDIOVERSION
      i. Utilize dose range of 100-200J
   c. Consider pharmacological intervention (see #6ci)
5. If ventricular rate is ≥150 beats/minute and patient is stable, and rhythm is atrial fibrillation or atrial flutter
   a. [Paramedic] Perform MODIFIED VALSALVA MANEUVER [YouTube Link]
   b. [EMT] Obtain 12-lead ECG if not converted
   c. [Paramedic] DILTIAZEM 5mg over 2 minutes
      i. [Paramedic] If inadequate response, consider repeat doses; max total 25mg
   d. [Paramedic] Consider AMIODARONE 150mg/100mL NS over 10 minutes
6. If ventricular rate is >180 beats/minute and patient is stable, and rhythm is SVT
   a. [Paramedic] Perform MODIFIED VALSALVA MANEUVER [YouTube Link]
   b. [EMT] Obtain 12-lead ECG if not converted
   c. [Paramedic/Med Control] If patient is ≥50 years old – PRIOR to treatment below, contact Medical Control
      i. [Paramedic] ADENOSINE 12mg rapid push
         1. Adolescent (8-16 y/o) – 0.1mg/kg up to 12mg
         ii. [Paramedic] Consider AMIODARONE 150mg/100mL NS over 10 minutes

**Notes:**

Diltiazem is contraindicated:
- 2nd or 3rd degree heart block
- WPW or short PR syndrome

Common side effects of diltiazem: Symptomatic hypotension, flushing, burning or itching at injection site.

Amiodarone precautions:
- Hypotension secondary to vasodilation
- May prolong QT interval
- Negative inotropic effects
- Use with caution in renal failure
Post Arrest (ROSC)

**General Scope:** Guideline for treatment of a patient who has regained a pulse following cardiac resuscitation.

**Guideline:**

1. Perform routine medical assessment
2. [AEMT] Establish IV/IO if not previously initiated
3. Establish airway per [Airway / Ventilatory Management Guideline](#)
4. [Paramedic] Consider titration of Oxygen to maintain saturation $\geq 94$
5. [AEMT] Monitor EtCO$_2$
   a. Target range is 30-35mmHg with RR $\geq 10$
   b. **DO NOT HYPERVENTILATE**
6. [Paramedic] If patient received $>2$ minutes of CPR consider NG per [Nasogastric Tube Procedure](#)
7. Continuous monitoring of vital signs
8. If patient is hypotensive see [Blood Pressure Management Procedure](#)
9. If patient has significant cardiac dysrhythmia see appropriate guideline
10. If patient has bradycardia see [Bradycardia Guideline](#)
11. [EMT] Obtain and transmit a 12-Lead ECG to the receiving facility
   a. [Paramedic] If 12-Lead is consistent with STEMI contact Medical Communications (MedComm) to activate STEMI Alert
   b. If STEMI, consider transport directly to PCI center
12. If arrest reoccurs revert to appropriate guideline
Pulmonary Edema

**General Scope:** Guideline for management of patients with suspected pulmonary edema.

**Guideline:**

1. Perform routine medical assessment
2. Position patient in upright sitting position
3. If respiratory arrest is imminent

See [Airway / Ventilatory Management Guideline](#)

   a. Add PEEP 5-10mmHg
4. If moderate to severe respiratory distress
   a. [**EMT**] Consider [CPAP](#)
      i. Administration of sublingual nitroglycerin noted below should be performed prior to placement of CPAP.
   b. [**Paramedic**] See [Sedation Procedure](#) as needed
5. [**AEMT**] IV NS TKO
6. If SBP<90 mmHg
   a. See [Blood Pressure Management Procedure](#)
7. If SBP>120 mm Hg
   a. [**AEMT**] [**NITROGLYCERIN**](#) 0.4mg SL Q 3-5 minutes to desired response or SBP ≤140
   b. [**Paramedic**] [**NITROGLYCERIN INFUSION**](#) (20mg/100ml D$_2$W or NS—200mcg/ml)
      i. Start at 20 mcg/min
      ii. Titrate by 10mcg/min every 5-10 minutes to desired response or SBP ≤140
8. If SBP>180 mm Hg
   a. [**AEMT**] [**NITROGLYCERIN**](#) 0.4-0.8 mg SL every 3-5 minutes to desired response or SBP ≤140
   b. [**Paramedic**] [**NITROGLYCERIN INFUSION**](#) (20mg/100ml D$_2$W or NS—200mcg/ml)
      i. Start at 50 mcg/min
      ii. Titrate by 10 mcg/min every 5-10 minutes to desired response or SBP ≤140

---

1 If use of PDE 5 inhibitor (Viagra, Levitra, Cialis) in the past 48 hours, contact medical control for direction on nitroglycerin administration.
Pulseless Electrical Activity

**General Scope:** Guideline for treatment of a patient presenting with PEA in cardiac arrest.

**Guideline:**

1. Perform routine medical assessment
2. **Initiate CPR and continue throughout resuscitation with minimal interruptions**
3. Consider possible causes and treatments (H’s & T’s)
   a. Hypoxia – ventilation see [Airway / Ventilatory Management Guideline](#)
   b. Hypoglycemia – see [Hypoglycemia/Hyperglycemia Guideline](#)
   c. Hypothermia – see [Hypothermia Guideline](#)
   d. Hyperkalemia – see [Hyperkalemia Guideline](#)
   e. Hypovolemia – consider 250-500mL IV NORMAL SALINE boluses
   f. (H+) Preexisting acidosis – Ventilate and for adults only, consider [Paramedic] SODIUMBICARBONATE 25mEq
   g. (Toxins) Drug overdose – see [Poisoning and Overdose Guideline](#)
   h. Tension pneumothorax – consider [Paramedic] Needle Decompression Procedure
   i. Tamponade (Cardiac Tamponade)
   j. Thrombosis – PE/MI
4. [AEMT] Establish IV/IO
5. [AEMT] Administer EPINEPHRINE 1mg every 3-5 minutes
6. Establish airway per [Airway / Ventilatory Management Guideline](#)
7. After three doses of EPINEPHRINE
   a. [Paramedic] Consider CALCIUM GLUCONATE 1gram
   b. [Paramedic] Consider SODIUM BICARBONATE 25mEq
8. After the above, may consider termination of resuscitation – see 2. **Termination of Resuscitation**
Ventricular Fibrillation / Pulseless Ventricular Tachycardia

**General Scope:** Guideline for treatment of a patient presenting with ventricular fibrillation or pulseless ventricular tachycardia in cardiac arrest.

**Guideline:**

1. Perform routine medical assessment
2. Initiate high-quality CPR and continue throughout resuscitation with minimal interruptions
   a. *Paramedic* May administer precordial thump if witnessed arrest
3. Apply defibrillator or AED
   a. *Paramedic* If manual; defibrillate at manufacturer recommended energy settings, typically 120J-200J
   b. Repeat defibrillation (consider escalating energy if available) every 2 minutes with medications administered as listed below
4. *AEMT* Establish IV/IO
5. Establish airway per [Airway / Ventilatory Management Guideline](#)
6. *AEMT* Administer **EPINEPHRINE** (1mg/10mL [1:10,000]) 1mg Q 3-5 minutes
7. If torsades de pointes¹
   a. *Paramedic* Administer **MAGNESIUM SULFATE** 2 grams (2G in 100ml D5W or NS)over 1-2 minutes
8. If NOT torsades de pointes
   a. *Paramedic* Administer anti-arrhythmic:
      i. Option 1: **LIDOCAINE** 1-1.5mg/kg
         • May repeat with 0.5-0.75mg/kg
         **OR**
      ii. Option 2: **AMIODARONE** 300mg
         • May repeat with 150mg
   b. *Paramedic* Consider **MAGNESIUM SULFATE** 2 grams (2G in 100ml D5W or NS)over 1-2 minutes
9. *Paramedic* Consider **CALCIUM GLUCONATE** ¹ 1 gram and flush with normal saline³
10. *Paramedic* Consider **SODIUM BICARBONATE** 25mEq and flush with normal saline³
11. If pulse is returned see [Post Arrest Guideline](#)

**Notes:**

¹ Risk factors for torsades include alcohol abuse, malnourishment, and QT prolongation
² Priority administration in known or suspected cases of hyperkalemia
³ **CALCIUM GLUCONATE** and **SODIUM BICARBONATE** are not compatible so flush line well if using the same IV between administrations
Wide Complex Tachycardia

**General Scope:** Guideline for treatment of a patient in presenting in a wide or ventricular tachycardic rhythm.

**Guideline:**

1. Perform routine medical assessment
2. \[AEMT\] Establish IV/IO
3. If patient is hemodynamically unstable
   a. \[Paramedic\] Consider sedation per Sedation Procedure
   b. \[Paramedic\] SYNCHRONIZED CARDIOVERSION starting at 100J – 200J
      i. \[Paramedic\] If successful begin AMIODARONE infusion (150 mg in 100 D\(_5\)W or NS=1.5mg/ml) at 1mg/min (40cc/hr = 1mg/min)
4. If patient is hemodynamically stable
   a. \[EMT\] Obtain 12-lead ECG
   b. \[Paramedic\] If rhythm is regular & monomorphic consider ADENOSINE 12 mg
   c. \[Paramedic\] Administer AMIODARONE 150 mg over 10 minutes
      i. \[Paramedic\] If successful begin AMIODARONE infusion (150 mg in 100 D\(_5\)W or NS=1.5mg/ml) at 1mg/min
      ii. \[Paramedic\] If unsuccessful consider cardioversion (see #3)
5. \[Paramedic\] Consider MAGNESIUM SULFATE 2 grams (2G in 100ml D\(_5\)W or NS) over 1-2 minutes for polymorphic wide complex tachycardia (Torsades de Pointes)

**Note:**

- For rates less than 150 bpm, evaluate for non-cardiac causes of the tachycardia (hypovolemia, infection, bleeding, pain, etc.)
- Amiodarone Precautions
  - Hypotension secondary to vasodilation
  - May prolong QT interval
  - Negative inotropic effects
  - Use with caution in renal failure; long T\(_{1/2}\) life
Cardiovascular – Pediatric
Pediatric Asystole / PEA

**General Scope:** Guideline for treatment of a pediatric patient in asystolic cardiac arrest

**Guideline:**

1. Perform routine medical assessment
2. Initiate CPR and continue throughout resuscitation with minimal interruptions
3. Consider possible causes and treatments
   - Hypoxia – ventilation see Airway / Ventilatory Management Guideline
   - Preexisting acidosis – Increase ventilations
   - Drug overdose – see Poisoning and Overdose Guideline
   - Hypothermia – see Hypothermia Guideline
   - Hyperkalemia – see Hyperkalemia Guideline
4. [Paramedic] Confirm asystole in two leads
   - If rhythm is unclear, see Pediatric V-Fib/Pulseless V-Tach Guideline
5. [AEMT] Establish IV/IO
6. Establish airway per Airway / Ventilatory Management Guideline
7. [AEMT] Administer EPINEPHRINE (1mg/10mL [1:10,000]) 0.01mg/kg every 3-5 minutes
Pediatric Bradycardia

General Scope: Guideline for treatment of a pediatric patient with symptomatic bradycardia

Guideline:

1. Perform routine medical assessment
2. Monitor SpO₂
   a. Airway support as needed per Airway / Ventilatory Management Guideline
3. If heart rate <60; start CPR
4. Identify patient as having serious signs or symptoms
   a. [EMT] Consider obtaining and transmitting ECG
      i. [Paramedic] Review ECG
5. [AEMT] Establish IV/IO
6. [Paramedic] Administer EPINEPHRINE (1mg/10mL [1:10,000]) 0.01mg/kg every 3-5 minutes
7. [Paramedic] Consider TRANSCUTANEOUS PACING (rate at 100-120)
Pediatric Tachycardia with Adequate Perfusion

**General Scope:** Guideline for treatment of a pediatric patient with tachycardia.

**Guideline:**

1. Perform routine medical assessment
2. *Paramedic* Determine cardiac rhythm and assess for stability/significant tachycardia
   a. HR >180 for ages 1-8 years
   b. HR >220 for ages newborn – 1 year
3. *AEMT* Attempt IV/IO
4. If QRS≥0.09 seconds:
   a. *Paramedic* Evaluate rhythm
   b. If likely ventricular tachycardia:
      i. *Paramedic* AMIODARONE 5mg/kg over 10 minutes
      ii. *Paramedic/Med Control* Perform SYNCHRONIZED CARDIOVERSION 0.5-1J/kg
   c. If likely SVT with aberrancy:
      i. Attempt Modified Valsalva Maneuver if possible
      ii. *Paramedic* ADENOSINE 0.1mg/kg rapid push
         1. *Paramedic* Repeat at 0.2mg/kg (May repeat twice)
5. If QRS≤0.09 seconds:
   a. *Paramedic* Evaluate rhythm
   b. If likely SVT:
      i. Attempt Modified Valsalva Maneuver if possible
      ii. *Paramedic* ADENOSINE 0.1mg/kg rapid push
         1. *Paramedic* Repeat at 0.2mg/kg (May repeat twice)
   c. If likely Sinus Tachycardia:
      i. Search for and treat causes
Pediatric Tachycardia with Poor Perfusion

**General Scope:** Guideline for treatment of a pediatric patient with symptomatic tachycardia.

**Guideline:**

1. Perform routine medical assessment
2. [*Paramedic*] Determine cardiac rhythm and assess for stability/significant tachycardia
   a. HR >180 for ages 1-8 years
   b. HR >220 for ages newborn – 1 year
3. [*AEMT*] Attempt IV/IO
4. If QRS≥0.09 seconds and cardiopulmonary compromise:
   a. Consider sedation per [Sedation Procedure](#)
   b. [*Paramedic*] Perform SYNCHRONIZED CARDIOVERSION 0.5-1 J/kg
      i. Repeat as needed at 2-4 J/kg
5. If QRS≤0.09 seconds:
   a. [*Paramedic*] Evaluate rhythm
   b. If SVT:
      i. Consider sedation per [Sedation Procedure](#)
      ii. [*Paramedic*] Perform SYNCHRONIZED CARDIOVERSION 0.5-1 J/kg
         1. Repeat as needed at 2-4 J/kg
      iii. [*Paramedic*] AMIODARONE 5mg/kg over 10 minutes
   c. If likely sinus tachycardia:
      i. Search for and treat causes
Pediatric Ventricular Fibrillation / Pulseless Ventricular Tachycardia

**General Scope:** Guideline for treatment of a pediatric patient presenting with ventricular fibrillation or pulseless ventricular tachycardia in cardiac arrest.

**Guideline:**

1. Perform routine medical assessment
2. Initiate CPR and continue throughout resuscitation with minimal interruptions
3. Apply defibrillator or AED
   a.  *Paramedic* Defibrillate at 2 - 4J/kg
4.  *[AEMT]* Establish IV/IO
5. Establish airway per [Airway / Ventilatory Management Guideline](#)
6.  *[AEMT]* Administer EPINEPHRINE (1mg/10mL [1:10,000]) 0.01mg/kg every 3-5 minutes
7.  *Paramedic* Defibrillate at 4J/kg
   a. Any time a shockable rhythm is present at pulse check
8.  *Paramedic* Administer AMIODARONE 5mg/kg
    a.  *[Paramedic]* May repeat 5mg/kg up to two times
9. If pulse is returned see [Post Arrest Guideline](#)
Environmental
Decompression Sickness

**General Scope:** Guideline for treatment of patients with potential decompression sickness.

**Guideline:**

1. Perform routine medical and trauma assessment
2. Place patient on 100% O₂ via tight fitting mask if spontaneously breathing, see [Airway/Ventilatory Management Guideline](#)
3. [AEMT] Establish IV/IO
4. Evaluate for hypothermia, see [Hypothermia Guideline](#)
5. See [Blood Pressure Management Procedure](#)
6. See [Pain Management Procedure](#)
7. Transport to the nearest hyperbaric chamber (consider air transport). Medical Control must call to ensure chamber is available and working and establish an accepting physician
   a. Contact:
      i. Diver’s Alert Network, 919-694-8111, ask for diving emergencies
      ii. Hennepin County Medical Center
         1. 800-424-4262 ED Physician
         2. 612-873-3132 ED
         3. 612-873-7420 Hyperbaric Department
      iii. St. Lukes, Milwaukee 414-649-6577
      iv. University of IA, Iowa City
         1. 319-356-7706 (8-5)
         • 319-356-2233 (after hours)
         • 319-356-8220 HBO Physician

**Notes:**

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<tr>
<th>A. Decompression illness occurs when the gas dissolved in the body fluids separates from those fluids to form bubbles.</th>
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<tr>
<td>B. In a rapid ascent, the pressure differential between the body tissues and blood and alveoli becomes great enough to cause separation of nitrogen from the liquid phase resulting in the formation of bubbles in the tissues or blood.</td>
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<tr>
<td>C. Predisposing factors that increase the incidence of decompression illness</td>
</tr>
<tr>
<td>1. Dehydration</td>
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<td>2. Cold temperatures</td>
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<td>3. Obesity</td>
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<td>4. Exercise during the dive</td>
</tr>
<tr>
<td>5. Older individuals</td>
</tr>
<tr>
<td>6. Previous joint injury</td>
</tr>
<tr>
<td>7. Previous recent dives</td>
</tr>
<tr>
<td>8. Flying after recent dive</td>
</tr>
</tbody>
</table>

| D. Decompression illness can occur during ascent or up to 72 hours after a dive (especially if multiple dives/day) |
| E. Manifestations |
| 1. Pain |
| i. Limb pain |
| ii. Girdle pain |
| 2. Cutaneous e.g., itching, lymphedema |
| 3. Neurological (including audio-vestibular, i.e., loss of balance) |
| 4. Pulmonary e.g., CHF, cough, dyspnea |
| 5. Constitutional (malaise, anorexia, fatigue) |
| 6. Hypotension |
| 7. Barotraumas (lung, sinus, ear, dental) |
| F. Important information |
| 1. Time of onset |
| 2. Gas burden (depth-time profile): Depth of dive, dive time and number of dives. |
Envenomation

**General Scope:** Guideline for treatment of patients with potential envenomation.

**Guideline:**

1. Perform routine medical and trauma assessment
2. Obtain and document history of time and type of bite (bring offending agent if safe to do so)
3. Remove any constrictive items (clothing, jewelry) on effected extremity
4. [AEMT] Establish IV/IO in non-effected extremity
5. See **Blood Pressure Management Procedure**
6. See **Pain Management Procedure**
Heat Related Illness

**General Scope:** Guideline for treatment of all patients with potential heat related illnesses.

**Guideline:**

1. Perform routine medical assessment
   a. Obtain temperature
2. Remove from heat source
3. Remove clothing as necessary
4. Maintain cool air flow over patient
5. Determine Heat Exhaustion vs Heat Stroke and treat accordingly

<table>
<thead>
<tr>
<th>Heat Exhaustion</th>
<th>Heat Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Core temperature 98.6°F – 104°F</td>
<td>• Core temperature &gt; 104°F</td>
</tr>
<tr>
<td>• Anxiety</td>
<td>• Altered mental status</td>
</tr>
<tr>
<td>• Confusion</td>
<td>• Anhidrosis</td>
</tr>
<tr>
<td>• Hypotension</td>
<td>• Arrhythmia</td>
</tr>
<tr>
<td>• Oliguria</td>
<td>• Hyperventilation</td>
</tr>
<tr>
<td>• Tachycardia</td>
<td>• Pulmonary Edema</td>
</tr>
<tr>
<td>• Vomiting</td>
<td>• Shock</td>
</tr>
</tbody>
</table>

**Signs**

**Treatment**

- Oral fluids as tolerated
- [AEMT] IV fluids TKO if transporting
- Consider blood pressure management as needed
- [AEMT] Establish IV/IO & administer room temperature NORMAL SALINE
- Consider blood pressure management as needed
- [Paramedic] If shivering, consider MIDAZOLAM 2mg
- For seizures, see Seizure Guideline

**Notes:**

1. Consider hyperthermia from overdose – specifically sympathomimetics
2. Extremes of age are more prone to heat related illness
3. Patients on tricyclic antidepressants, anticholinergics, and diuretics are more susceptible to heat related illness
4. Cocaine, amphetamines, and salicylates may elevate body temperature or interfere with autoregulation
Hypothermia

General Scope: Guideline for treatment of all patients with potential hypothermia.

Guideline:

1. Perform routine medical and trauma assessment
2. If patient is responsive
   a. Remove wet clothing, cover with warm blankets, apply heat packs to axilla, groin, neck, and thorax
   b. If signs of frostbite:
      i. Protect injured part (blisters) with light sterile dressings. Avoid pressure to area
      ii. Cover affected part with warm blankets and prevent re-exposure to cold or refreezing of part
   c. [AEMT] Establish IV/IO
   d. [AEMT] Give up to 2 liters of warmed NORMAL SALINE
3. If patient is unresponsive
   a. Airway support as needed, see Airway / Ventilatory Management Guideline
   b. [AEMT] Establish IV/IO
   c. [AEMT] Give up to two liters of warmed NORMAL SALINE
   d. If bradycardic do not start CPR
   e. If patient is pulseless
      i. Check for pulse, respirations, and/or viable rhythm for at least 1 minute
      ii. If patient is pulseless:
         1. Start CPR
         2. Follow appropriate cardiac arrest guideline
         3. Consider transport as soon as possible for rewarming

**The field resuscitation may be withheld if the victim has obvious lethal injuries or if the body is frozen so that nose and mouth are blocked by ice and chest compression is impossible.**
Medical
Medical - Adult
Abdominal/Thoracic Aortic Aneurysm/Dissection

**General Scope**: Guideline for treatment of patients who present with signs and symptoms consistent with that of an aortic aneurysm.

**Guideline**:

1. Perform routine medical assessment
2. Airway support as needed, see Airway / Ventilatory Management Guideline
3. [AEMT] Establish IV/IO (Two large bore lines if possible)
4. Treat pain per Pain Management Procedure
5. If patient SBP >130:
   a) [Paramedic/Med Control] NITROGLYCERIN INFUSION (20mg/100ml D$_2$W or NS—200mcg/ml)
      i. For patients <75kg, start at 10mcg/min
      ii. For patients >75kg, start at 20mcg/min
      iii. Titrated by 5-10mcg/min every 5-10 minutes to SBP~110
      iv. Monitor BP every 3-5 minutes
   b) [Paramedic/Med Control] LABETALOL 20mg slow push
      i. May repeat at 40mg every 10 minutes to a max of 300mg
6. If patient SBP <90
   a) [AEMT] 250-500ml NORMAL SALINE bolus up to 2-3 liters total
   b) [Paramedic] Consider NOREPINEPHRINE infusion
      i. Initiate at 0.1 mcg/kg/min via IV pump
         1. Titrate by 0.01-0.05 mcg/kg/min every 3-5 minutes
         2. Maximum of 0.3 mcg/kg/min

**Notes**:

1. History:
   a. Thoracic:
      i. Relatively sudden onset
      ii. Severe "tearing" chest pain with possible radiation to back
   b. Abdominal:
      i. Intermittent or constant abdominal pain commonly localized to left middle or lower quadrant
      ii. Back pain and flank pain are the next most common symptoms
2. Physical exam:
   a. Possible hypotension
   b. Pulse discrepancy side-to-side or upper versus lower extremities
   c. Pulsatile abdominal or groin mass with or without a pulse
Altered Mental Status (AMS)

**General Scope:** Guideline for treatment of patients who present with altered mental status.

**Guideline:**

1. Perform routine medical assessment (with frequent rechecks every 5-10 minutes)
   a. Attempt to identify cause
      i. Consider, among other causes, hypoxia, hypovolemia, trauma, diabetes, poisoning/overdose, etc.
   b. If suspected trauma, see **General Trauma Guideline**
   c. If suspected overdose, see **Poisoning and Overdose Guideline**
      i. Consider opiate overdose in patients with respiratory depression/compromise, SBP < 90, and decreased LOC.
   d. If hypo/hypertensive see **Blood Pressure Management Procedure**
2. Provide airway support as needed, see **Airway / Ventilatory Management Guideline**
   a. [Paramedic] Consider intubation for GCS <8, see **Resuscitation Sequence-Intubation Procedure** as needed
3. [AEMT] Establish IV/IO
4. If blood glucose <60 or >250 see **Hypoglycemia/Hyperglycemia Guideline**
Anaphylaxis/Allergic Reaction

General Scope: Guideline for treatment of patients who present with severe allergic reaction.

Guideline:

1. Perform routine medical assessment
   a. Remove offending agent
2. Airway support as needed, see Airway/ Ventilatory Management Guideline

ANAPHYLAXIS

a. EPINEPHRINE (use with caution in elderly/patients with coronary artery disease)
   i. [EMT] Epinephrine auto-injector if available
   ii. [AEMT] 0.3mg (1mg/mL [1:1,000]) IM
      1. Pediatric (< 8 y/o) – 0.15mg
   iii. May repeat IM epinephrine every 5 minutes up to 3 times if needed
3. If bronchospasm is present:
   a. ALBUTEROL via nebulizer
      i. [EMT] Consider 2.5 - 5.0mg
      ii. [Paramedic] Consider continuous albuterol nebulizer (10-20mg)
4. [AEMT] Establish IV/IO but do not delay administration of EPINEPHRINE
   a. [Paramedic] If continued signs of anaphylaxis after three doses of IM epinephrine, establish EPINEPHRINE INFUSION (1mg/100ml D5W or NS—10mcg/ml)
      i. Initiate IV infusion at 2-5 mcg/min
         1. Titrate by 1 mcg/min every 5 minutes up to 10 mcg/min
      ii. Pediatric (< 8 y/o) - Initiate at 0.1 mcg/kg/min
         1. Titrate by increments of up to 0.2 mcg/kg/min every 5-10 minutes as needed, up to 1 mcg/kg/min
   b. [Paramedic] DIPHENHYDRAMINE 25-50mg IV/IO or 50mg IM
      i. Pediatric (< 8 y/o) – 1 mg/kg IV/IO/IM
   c. [Paramedic] METHYLPRERIDNISOLONE 125mg
      i. Pediatric (< 8 y/o) – 1 mg/kg (Max 125mg)

ALLERGIC REACTION

d. Ice and elevate affected area as practical

e. [Paramedic] Consider DIPHENHYDRAMINE 25-50mg IV/IO or 50mg IM
   i. Pediatric (< 8 y/o) – 1 mg/kg IV/IM

Notes:

a. Symptoms may begin immediately or be delayed up to several hours from exposure
b. Localized swelling and redness are not anaphylaxis
General Medical

**General Scope:** Guideline for treatment of patients with medical emergencies.

**Guideline:**

1. Perform routine medical assessment
2. Check respirations, SpO₂, and apply oxygen if needed, see [Airway / Ventilatory Management Guideline](#)
3. Check pulse and apply cardiac monitor, see appropriate [Cardiac Dysrhythmia Guideline](#)
4. Check blood pressure, see [Blood Pressure Management Procedure](#)
5. Consider checking blood glucose, see [Hypoglycemia/Hyperglycemia Guideline](#)
6. [AEMT] Establish IV/IO
Hyperkalemia

General Scope: Guideline for treatment of patients who are or suspected to be hyperkalemic.

Guideline:

1. Perform routine medical assessment
2. Identify as symptomatic: Patients with profound weakness or shock with EKG changes as below AND history of any of the following: dialysis, renal failure, rhabdomyolysis, hyperglycemia, or laboratory confirmed diagnosis of hyperkalemia
3. Airway support as needed, see Airway / Ventilatory Management Guideline
4. [EMT] Obtain 12-lead EKG
5. [AEMT] Establish IV/IO
6. [Paramedic] CALCIUM GLUCONATE 1 Gram
   a. Pre-Arrest: Mix in 100ml D5W or NS and administer over 10 minutes
   b. Cardiac Arrest: Administer rapidly as IV/IO bolus
   c. Do not mix this with sodium bicarbonate
      i. Do not administer in same line without flushing with at least 20 mL
7. [Paramedic] ALBUTEROL – continuous nebulizer
8. [Paramedic] SODIUM BICARBONATE 50mEq over 10 minutes
   a. May repeat up to 2 total doses
   b. Avoid in dialysis and CHF patients
   c. Do not mix with calcium gluconate
      i. Do not administer in same line without flushing with at least 20 mL

Cardiac effects (may or may not be present):
5.6-6.0mEq/L - peaked T waves due to increased repolarization
6.0-6.5mEq/L - prolonged PR & QT intervals
6.5-7.0mEq/L - diminished P waves and depressed ST segments; may result in an intracardiac block affecting in the following order: atria, AV node, ventricles
7.5-8.0mEq/L - P waves disappear, QRS complex widens, S & T waves tend to merge
10-12mEq/L - classic sine wave occurs which represents loss of P wave and wide QRS complexes.

Other effects:
Skeletal muscle weakness to flaccid paralysis with preservation of diaphragm muscle function
Paresthesias
Respiratory depression

ECG/EKG changes in hyperkalemia

- Sine wave pattern
- Ventricular fibrillation
- Wide QRS
- Loss of P waves
**General Scope:** Guideline for treatment of patients who present with diabetic emergencies.

**Guideline:**

1. Perform routine medical assessment with blood glucose check
2. Airway support as needed, see *Airway / Ventilatory Management Guideline*
3. [AEMT] Establish IV/IO with 10% dextrose solution (D10) if hypoglycemic. Use normal saline if hyperglycemic.
4. If blood glucose < 60 mg/dL
   a. Assess patient for insulin pump and suspend if found
      i. Be sure to resume or advise patient of your intervention after treatment
   b. [EMT] Consider ORAL GLUCOSE if patient is conscious and able to follow commands
   c. [AEMT] GLUCAGON 1mg IM/SQ or 2mg IN
      i. [EMT] May only assist with a patient prescribed auto-injector
      ii. Pediatric (< 8 y/o) – 0.5mg IM/SQ or 1mg IN
      iii. **First response agencies:** Contact responding transport ambulance for ETA to the scene prior to glucagon administration. **Glucagon may be administered only if transport ambulance ETA is > 10 minutes.**
   d. [AEMT] Administer 10% dextrose solution (D10) to achieve improved blood glucose level and mental status (GCS)

<table>
<thead>
<tr>
<th>Patients under 20 kg</th>
<th>Patients over 20 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Administer bolus of 5 mL/kg D10. Slow infusion to TKO and evaluate response for at least two minutes. Reassess blood glucose level and mental status.</td>
<td>1. Administer 100mL bolus of D10 (10 G dextrose). Slow infusion to TKO and evaluate response for at least two minutes. Reassess blood glucose level and mental status.</td>
</tr>
<tr>
<td>2. If desired results are not achieved, administer additional 2 mL/kg boluses of D10 every two minutes until improvement in blood glucose level and mental status.</td>
<td>2. If desired results are not achieved, administer additional 50mL boluses of D10 (5 G dextrose) every two minutes until improvement in blood glucose level and mental status.</td>
</tr>
</tbody>
</table>

   a. Determine any prescribed anti-diabetic medications and recent history of administration.
      i. If patient is prescribed and uses an oral hypoglycemic agent, transport is strongly encouraged due to potential for rebound hypoglycemia.
2. If blood glucose > 350 mg/dL
   a. [AEMT] NORMAL SALINE 1 L bolus
      i. Pediatric (< 8 y/o) – 20ml/kg/hr
   b. [Paramedic] Acquire 12-lead ECG and assess for signs of electrolyte derangement
Nausea / Vomiting / Vertigo

General Scope: Guideline for treatment of patients who have complaints of nausea, vomiting, or vertigo.

Guideline:

1. Perform routine medical assessment
2. Airway support as needed, see Airway / Ventilatory Management Guideline
3. Suction as needed
4. [AEMT] Consider IV/IO
5. [AEMT] ONDANSETRON 4mg IV or SL tablet
   a. Pediatric (< 2 y/o) - 0.1 mg/kg IV up to 2mg
      i. (2 y/o – 8 y/o) – 2mg IV or approximately ½ SL tablet (~2mg)
      ii. (> 8 y/o) – 4mg IV or SL tablet
6. [Paramedic] MIDAZOLAM 0.5-1mg after failure of ondansetron (Adult Only)

Notes:

1. If suspected vertigo, concurrent administration of ONDANSETRON and MIDAZOLAM is preferred.
Poisoning and Overdose

**General Scope:** Guideline for treatment of patients who have been exposed to a toxic substance or have experienced an accidental or intentional overdose.

**Guideline:**

1. Perform routine medical assessment
   a. Special consideration given to time of exposure
   b. Obtain blood glucose level to rule in/out Hypoglycemia/Hyperglycemia
2. Airway support as needed, see Airway / Ventilatory Management Guideline
3. Check blood pressure. See Blood Pressure Management Procedure
4. Frequently reassess level of consciousness throughout patient care
5. Determine type of toxic agent
6. Eliminate source
   a. If agent is on skin and can possibly be dermally absorbed
      i. Remove clothing
      ii. Brush any remaining toxic agent off skin
      iii. Flush affected areas with water for a minimum of 15 minutes prior to transport
   b. If agent has been inhaled
      i. Remove patient from environment
      ii. Remove clothing
      iii. Provide high concentration oxygen, see Airway / Ventilatory Management Guideline
      iv. If bronchospasm present, see Asthma / COPD Guideline
7. [AEMT] Establish IV/IO
8. If agent is potentially an opioid and patient is exhibiting respiratory depression with inadequate oxygenation/ventilation
   a. [EMR] Give NALOXONE
      i. auto dose IN and repeat every 5 minutes as needed (Adult and Pediatric)
      ii. auto inject IM and repeat every 5 minutes as needed (Adult and Pediatric)
   b. [AEMT] Give NALOXONE
      i. 1-4mg IN and repeat every 5 minutes as needed (Adult & Pediatric)
      ii. 0.4-4mg IV/IO and repeat every 5 minutes as needed (Adult & Pediatric)
         1. Titrate to adequate ventilation & oxygenation
   c. If patient responds to naloxone and refuses transport, consider utilizing Naloxone Leave-Behind Procedure if your agency participates in the program.
9. If agent is a tricyclic antidepressant and patient exhibiting toxicity (HR>120, SBP<90, decreased LOC, and/or widening of QRS)
   a. [Paramedic] Give SODIUM BICARBONATE 25mEq followed by 25mEq in 1000ml normal saline over 1 hour
Seizure

**General Scope:** Guideline for treatment of patients who are or suspected to be experiencing seizures.

**Guideline:**

1. Perform routine medical assessment
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
3. Consider pregnancy, see [Pre-Eclampsia / Eclampsia Guideline](#)
4. Rule out hypoglycemia, trauma, infection, hypoxia, withdrawal, or toxins
   a. If blood glucose < 60 or > 250 see [Hypoglycemia/Hyperglycemia Guideline](#)
   b. See [Altered Mental Status Guideline](#)
5. If actively seizing:
   a. [AEMT] Establish IV/IO
   b. [Paramedic] MIDAZOLAM
      i. Adult
         1. 5mg IM if no IV/IO access
         2. 1-3mg IV/IO
         3. Do not delay IM administration for IV access
      ii. Pediatric (< 8 y/o)
         1. 0.1 mg/kg IM (Max single dose 5mg) if no IV/IO access
         2. 0.05 mg/kg IV/IO (Max single dose 3mg)
         3. Do not delay IM administration for IV access
      iii. May repeat administration every 5 minutes as needed
   c. [Paramedic] If convulsions continue after 15mg midazolam has been administered, consider KETAMINE administration
      i. Adult – 0.5-2 mg/kg IV/IO
      ii. Pediatric (< 8 y/o) – 0.5-1 mg/kg IV/IO
   d. If seizure has resolved and patient is postictal
      i. [AEMT] Establish IV/IO
Gundersen Medical Direction Pre-Hospital Guidelines – Iowa Version

Sepsis / Septic Shock

**General Scope:** Guideline for identification and treatment of adult patients with sepsis and septic shock. For children, contact medical direction if concerns of sepsis.

**Guidelines:**

1. Perform routine medical assessment
2. Compare assessment results in chart below to help determine sepsis vs septic shock

<table>
<thead>
<tr>
<th>SEPSIS</th>
<th>SEPTIC SHOCK</th>
</tr>
</thead>
</table>
| **Known or suspected infection, or patient is at high risk of infection**  
  - i.e., Immunocompromised, residents of SNFs, and those with indwelling devices (PICC line, Foley, trach, etc.)  
  **AND**  
  **Two or more of the following:**  
  - Acutely altered mental status  
  - Temperature >100.4°F or <96.8°F  
  - Respiratory Rate > 20 breaths/min  
  - Heart Rate >90 beats/min | **Presence or suspicion of sepsis**  
  **AND**  
  At least one of the following in each category:  
  - **Perfusion**  
    - Systolic blood pressure <90  
    - Mean Arterial Pressure (MAP) <65  
  - **Cellular Metabolism**  
    - ETCO₂ ≤ 25mmHg  
    - Lactate >4mmol |

3. Administer Oxygen to maintain SpO₂ ≥94%
   a. Establish airway per [AEMT] Airway/Ventilatory Management Guideline if necessary
4. [AEMT] Establish IV/IO
5. [AEMT] Treat as described in chart below. ALS intercept recommended if septic shock.

<table>
<thead>
<tr>
<th>SEPSIS</th>
<th>SEPTIC SHOCK</th>
</tr>
</thead>
</table>
| **Administer NORMAL SALINE at a rate of 500mL/hr** | **Establish a second IV per guideline**  
  **Administer 1-2L NORMAL SALINE bolus over 60 mins if not contraindicated**  
  **[Paramedic] If inadequate response, concurrently administer NOREPINEPHRINE INFUSION at 0.1 mcg/kg/min; titrated by 0.01-0.05 mcg/min every 3-5 minutes to reach a MAP >65mmHg (max of 0.3 mcg/kg/min** |

6. **Notify hospital of sepsis/septic shock patient as soon as possible.** If transporting to Gundersen and patient meets criteria in chart below, state that patient is a Sepsis Alert in the radio report.

**SEPSIS ALERT CRITERIA** (Gundersen transports only)

- **Patient will need to meet ALL 3 criteria:**
- 1. Suspected or known infection
- 2. Two or more of the following:
  - Temperature >100.4°F or <96.8°F
  - Respiratory Rate >20 breaths/min
  - Heart Rate >90 beats/min
- 3. ETCO₂ ≤25mmHg (used as a surrogate for lactate; evidence shows this helps eliminate false positives)
Stroke / Cerebrovascular Accident (Benchmark)

**General Scope:** Guideline for treatment of patients who present with signs or symptoms of a stroke.

**Guideline:**

1. Perform routine medical assessment with FAST-ED scale and determine time **last known well**.
   a. If stroke scale is positive, and time last known well is within 24 hours, transport service to notify receiving hospital within 10 minutes of being at patient side
      i. If FAST-ED score is 1-3, activate STROKE ALERT
      ii. If FAST-ED score is ≥4, activate LVO STROKE ALERT
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
   a. [Paramedic] Consider intubation for GCS <8
3. Rule out **hypoglycemia, hypoxia, hypovolemia**, trauma, or **poisoning/overdose**
4. [AEMT] Establish IV/IO (≥18ga AC Preferred)
5. [Paramedic/Med Control] On a 911 call or otherwise unknown type of stroke, if patient is hypertensive with SBP >220 or DBP >120 consider slowly lowering blood pressure. If patient has a severe headache or vomiting, consider contacting Medical Control for lower parameters. On interfacility transport, obtain goal blood pressure parameters from sending facility or contact Medical Control.
   a. See [Blood Pressure Management Procedure](#)
6. Evaluate vital signs and FAST-ED Stroke Scale every fifteen minutes.

<table>
<thead>
<tr>
<th>FAST-ED SCORE</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial weakness</td>
<td>Normal or minor paralysis</td>
<td>Partial or complete paralysis</td>
<td>N/A</td>
</tr>
<tr>
<td>Arm weakness</td>
<td>No drift</td>
<td>Unilateral drift with effort against gravity</td>
<td>No effort against gravity or movement</td>
</tr>
<tr>
<td>Speech changes</td>
<td>No Changes</td>
<td>Mild to moderate</td>
<td>Severe aphasia or mute</td>
</tr>
<tr>
<td>Eye deviation</td>
<td>Absent</td>
<td>Gaze preference</td>
<td>Forced deviation</td>
</tr>
<tr>
<td>Denial/neglect</td>
<td>Absent</td>
<td>Extinction to bilateral simultaneous stimulation</td>
<td>No recognition of own hand; orients to one side only</td>
</tr>
</tbody>
</table>

**Note:**

**Signs of Herniation:** Sudden decrease in level of consciousness, ipsilateral papillary dilation, contralateral hemiparesis, and decerebrate or decorticate posturing
## Stroke / Cerebrovascular Accident Benchmarks

### CLINICAL BENCHMARKS
- Obtain and report **last known well time**
- Perform **FAST-ED Stroke Scale every 15 minutes**
- Notify hospital of stroke alert **within 10 minutes** of patient side
- Obtain and document **blood glucose level**
- Obtain and document **vital signs every 15 minutes**
- Maintain **O₂ saturation** of ≥94% with minimum Oxygen necessary
- Establish IV (AC preferred - 18ga or larger); do not delay transport for additional IV access
- Transport with **head of bed elevated 30°**

### DOCUMENTATION BENCHMARKS
- Document patient **demographics - age and gender**
- Document estimated **patient weight**
- Document **last known well time**
- Document **FAST-ED Stroke Scale every 15 minutes**
- Document **blood glucose level**
- Document **vital signs every 15 minutes**
- Document hospital **notification time**
- Document **disposition (ER or CT)**
Obstetrical/Newborn
Abnormal Delivery

**General Scope:** Guideline for delivering infants presenting with ominous signs.

**Guideline:**

1. Perform routine medical assessment
2. [AEMT] Establish IV without delaying transport or other care
3. If prolapsed cord is present:
   a. Prepare for immediate transport while performing care described below
   b. Do not push cord back in
   c. Place mother in Trendelenburg knee to chest position
   d. With gloved hand, push presenting part off cervix to decompress cord and maintain this position en route to hospital
4. If infant is breech (buttocks or feet first):
   a. Never pull on a breech infant, wait until maternal efforts deliver infant past umbilicus before touching infant
   b. Once infant is delivered past umbilicus if baby is not already rotated so they are facing the mother’s back, gently rotate the infant to this position
   c. If arms do not deliver on their own over the course of a couple of contractions help to deliver them once axilla are visible by sweeping the arms across the chest by hooking them one at a time with your finger
   d. Being careful not to extend the neck, create breathing space around baby’s face with gloved hand (middle and index finger along the baby’s face and up to its nose)
   e. Suprapubic pressure may help to maintain head flexion and facilitate delivery
5. If other part is presenting (arm, foot, etc):
   a. Do not pull on part and place mother in left lateral position
6. Multiple births:
   a. After initial delivery, clamp and cut cord after 1-2 minutes
   b. Proceed with subsequent deliveries
7. After delivery refer to [Neonatal Resuscitation Guideline](#). If neonate is extremely premature (known to be less than 24 weeks), resuscitation efforts are unlikely to be successful. Contact Medical Control for further direction. If available, utilize Telehealth.
8. [Paramedic] After delivery, administer OXYTOCIN 10u IM to prevent postpartum hemorrhage

**APGAR SCORING:**

<table>
<thead>
<tr>
<th>Sign</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse</td>
<td>Absent</td>
<td>&lt;100</td>
<td>&gt;100</td>
</tr>
<tr>
<td>Respiration</td>
<td>Absent</td>
<td>Slow or Irregular</td>
<td>Good Crying</td>
</tr>
<tr>
<td>Muscle Tone</td>
<td>Limp</td>
<td>Some flexion</td>
<td>Active motion</td>
</tr>
<tr>
<td>Reflex irritability</td>
<td>None</td>
<td>Grimace</td>
<td>Cough or sneeze</td>
</tr>
<tr>
<td>Color</td>
<td>Pale or Blue</td>
<td>Pink body/blue</td>
<td>Completely pink</td>
</tr>
</tbody>
</table>

extremities
Childbirth

**General Scope:** Guideline for delivering infants.

**Guideline:**

1. Perform routine medical assessment
   a. Systolic & Diastolic BP may be decreased by 5-15 mmHg
   b. Respirations may increase by 1-2 breaths per minute
   c. Resting HR may increase by 15-20 beats per minute
2. If signs of abnormal delivery, see Abnormal Delivery Guideline
3. If imminent delivery:
   a. [AEMT] Establish IV (Consider IO if unstable and unable to obtain IV)
   b. Place mother in lateral position or position of mother’s choosing and prepare delivery equipment
   c. Have mother pant through contractions and relax between, do not tell her not to push or coach pushing
   d. As head crowns, apply slight pressure to prevent explosive delivery
   e. If umbilical cord is wrapped around the infant’s neck, unloop it gently with your finger while waiting for shoulders to deliver. If cord is too tight to unloop easily, angle infant’s forehead toward mother’s thigh to allow baby’s body to deliver while keeping head close to perineum and unwrap the cord after delivery.
   f. [Paramedic] After the shoulders are delivered, administer OXYTOCIN 10u IM to prevent postpartum hemorrhage
   g. Place baby on mother’s abdomen and cover with a dry towel to prevent heat loss
      i. Baby should be lying on its stomach
   h. Take APGAR scores at 1 and 5 minutes
   i. If HR <100 see Neonatal Resuscitation Guideline
   j. Wait 3-5 minutes before clamping and cutting the cord >6in from the infant between two clamps
   k. If placenta delivers, place cord and placenta in container and bring to receiving facility
   l. Massage uterus if bleeding is brisk after delivery of the placenta (not before)
   m. If heavy bleeding is present, see Postpartum Hemorrhage Guideline

**APGAR SCORING:**

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse</td>
<td>Absent</td>
<td>&lt;100</td>
<td>&gt;100</td>
</tr>
<tr>
<td>Respiration</td>
<td>Absent</td>
<td>Slow or irregular</td>
<td>Good crying</td>
</tr>
<tr>
<td>Muscle Tone</td>
<td>Limp</td>
<td>Some flexion</td>
<td>Active motion</td>
</tr>
<tr>
<td>Reflex Irritability</td>
<td>None</td>
<td>Grimace</td>
<td>Cough or sneeze</td>
</tr>
<tr>
<td>Color</td>
<td>Pale or blue</td>
<td>Pink body and blue extremities</td>
<td>Completely pink</td>
</tr>
</tbody>
</table>
Neonatal Resuscitation

**General Scope:** Guideline for resuscitation of a neonatal patient. If neonate is extremely premature (known to be less than 24 weeks), resuscitation efforts are unlikely to be successful. Contact Medical Control for further direction. If available, utilize Telehealth.

**Guideline:**

1. Perform routine medical assessment  
   a. Oxygen saturation should be measured on right extremity (See SpO\textsubscript{2} targets below)  
   b. Obtain blood glucose level from heel (See Glucose target below)
2. Cord clamping should be delayed for 3-5 minutes unless it interferes with resuscitation. Perform resuscitation on mother’s abdomen if possible.
3. Provide tactile stimulation, assess tone, breathing, and crying  
   a. If normal: maintain temperature and dry infant, position airway, clear secretions  
   b. If abnormal: maintain normal temperature and dry infant, place head in sniffing position, suction mouth then nose  
      1. Routine intubation for tracheal suction is no longer recommended in meconium staining
4. If cardiac arrest – **GO DIRECTLY TO 7b(i)**
5. If labored breathing or cyanosis and heart rate above 100  
   a. Provide supplemental Oxygen as needed
6. If apnea, gasping or heart rate below 100  
   a. Begin positive pressure ventilations at a rate of 40-60 breaths/min with a tidal volume of 8-10 ml/kg  
   b. If condition unchanged after one minute of ventilation, consider supraglottic airway
7. If heart rate below 60  
   a. Initiate positive pressure ventilations  
   b. If after 30 seconds of positive pressure ventilation the heart rate remains below 60  
      i. Perform chest compressions and continue positive pressure ventilation  
         1. 3 compressions & 1 ventilation every 2 seconds  
      ii. **[Paramedic]** Administer EPINEPHRINE (1mg/10mL [1:10,000]) 0.01-0.03mg/kg  
      iii. **[AEMT]** Consider NORMAL SALINE bolus of 10 ml/kg  
      iv. **[Paramedic]** Consider NEEDLE DECOMPRESSION if suspected tension pneumothorax

<table>
<thead>
<tr>
<th><strong>SpO\textsubscript{2} Targets</strong></th>
<th><strong>Glucose Target</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 minute</td>
<td>60%</td>
</tr>
<tr>
<td>2 minutes</td>
<td>65%</td>
</tr>
<tr>
<td>3 minutes</td>
<td>70%</td>
</tr>
<tr>
<td>4 minutes</td>
<td>75%</td>
</tr>
<tr>
<td>5 minutes</td>
<td>80%</td>
</tr>
<tr>
<td>10 minutes</td>
<td>85%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Glucose Target</strong></th>
<th>Treat hypoglycemia with 2-3 mL/kg D\textsubscript{10} repeated every five minutes as needed</th>
</tr>
</thead>
</table>
Postpartum Hemorrhage

General Scope: Guideline for post-delivery hemorrhage.

Guideline:

1. Perform routine medical assessment
2. [Paramedic] Administer OXYTOCIN 10u IM if not given already
3. Perform uterine massage after delivery of the placenta to promote uterine tone
4. Apply direct pressure to any area of lower genital tract trauma
5. If hemorrhage remains uncontrolled with brisk bleeding, decreasing blood pressure and increasing heart rate:
   a. [AEMT] Establish IV/IO
   b. Airway support as needed, see Airway / Ventilatory Management Guideline
   c. If birth has occurred within 3 hours, see Shock in Trauma Guideline for Tranexamic acid (TXA) administration instructions
   d. Maintain blood pressure, see Blood Pressure Management Procedure
Pre-Eclampsia / Eclampsia

**General Scope:** Guideline for pre-eclamptic or eclamptic patients (SBP >160/DBP >110).

**Guideline:**

1. Perform routine medical assessment
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
3. [AEMT] Establish IV/IO
4. If patient is seizing:
   a. [Paramedic] Give **MAGNESIUM SULFATE** 4 grams/100mL NS over 10 minutes
   b. [Paramedic] Give **MIDAZOLAM** 2 mg every 2 minutes
      i. See [Seizure Guideline](#)
   c. [Paramedic/Medical Control] Consider more **MAGNESIUM SULFATE**
5. If patient is no longer seizing prior to the administration of **MAGNESIUM SULFATE**:
   a. Place patient in position of comfort
   b. [Paramedic] Give **MAGNESIUM SULFATE** 4 grams/100mL NS over 20 minutes
   c. See [Blood Pressure Management Procedure](#)

**Notes:**

1. Preeclampsia: Toxic state which occurs in the last half of pregnancy or early postpartum period in which mother exhibits the following:
   a. Can still be present after delivery
   b. Hypertension (SBP > 160, DBP > 110 or an increase in DBP of 15 mmHg from previous baseline)
   c. Hyperreflexia
   d. Generalized peripheral edema
   e. Proteinuria
2. Hyperreflexia and visual changes indicate imminent seizure
3. Magnesium
   a. Stop or decrease if knee jerk reflex absent, respiratory depression occurs, or cardiac arrest
   b. Antidote is [Paramedic] **CALCIUM GLUCONATE** 1G in 100ml over 10 minutes
      i. Caution if maternal renal disorder or history of Myasthenia Gravis
Special Operations
Multiple Patient Incident

**General Scope:** Procedure for MCI.

**Guideline:**

1. Incident with three or more patients
2. Utilize SALT triage system & triage tags
3. Implement Incident Command System as appropriate
4. Notify possible receiving facilities as soon as possible
   a. Notification should be done by designated “officer” within ICS system
Pandemic Triage and Non-Transport

THIS GUIDELINE IS ONLY ACTIVE WITH WRITTEN ORDER AND NOTIFICATION BY THE MEDICAL DIRECTOR

General Scope: Procedure for Triage & Non-Transport of patients and provision of stay-at-home instructions during pandemic situations. For transport providers & LCFD paramedics.

Procedure:

Patients with influenza-like illness (ILI) and no emergency warning signs may be considered for non-transport with instructions for self-care. Err on the side of caution when, despite a symptom match, clinical impression is that of something other than ILI. Patients who demand transport despite inclusion criteria and urging of non-transport from EMS providers should be transported or have Medical Control consultation via phone or telemedicine.

Criteria for inclusion

- Patients over eight years old with symptoms of influenza-like illness, including COVID-19
  - Symptoms may include cough, fever, body aches, nasal congestion, headache, nausea, and diarrhea
    - Patients must not have emergency warning signs described below
    - Patients with a history of respiratory disease (COPD/Asthma), active cancer, diabetes, morbid obesity, heart disease, neuromuscular disorders, or are immunocompromised must have Medical Control consultation via phone or telemedicine for inclusion
    - Patients eight or younger must have Medical Control consultation via phone or telemedicine for inclusion
  - Patients or responsible adults must have the capacity to understand stay at home instructions.
  - Vital signs at the time of release (see below for normal):
    - Heart rate under 110 or upper limit of age based normal
    - MAP of 65 or higher (or systolic at lower limit of normal)
    - Respiratory rate under 24 or upper limit of age based normal
    - SpO₂ > 92%
    - Temperature under 103°F (39.4°C)

Determining capacity of understanding instructions

- Patients and responsible adults are considered capable of understanding instructions if they are oriented to person, place, time, and event (or to their baseline mental status) and can express understanding of the instructions provided.
- If the patient is a resident of a long-term care facility and staff are available to review and carry out the stay-at-home instruction.
Provide stay at home instructions

- Provide patient or responsible adult with stay-at-home instruction form
- In addition, the following information must be provided to the patient or responsible adult:
  - If you develop emergency warning signs for COVID-19, get medical attention immediately. Emergency warning signs*:
    - Difficulty breathing or shortness of breath
    - Persistent pain or pressure in the chest
    - New confusion or inability to arouse
    - Bluish lips or face

* Please consult your medical provider or appropriate flu line for any other symptoms that are severe or concerning.

<table>
<thead>
<tr>
<th>Normal Vital Sings Reference (Low-High)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Category</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>Adult</td>
</tr>
<tr>
<td>Adolescent (13-18 years)</td>
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<tr>
<td>School Age (5-12 years)</td>
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<tr>
<td>Preschool (3-5 years)</td>
</tr>
<tr>
<td>Toddler (12-36 months)</td>
</tr>
<tr>
<td>Newborn/Infant (Birth-12 months)</td>
</tr>
</tbody>
</table>
Scene Rehabilitation

**General Scope:** Guideline for rehabilitation of rescue personnel when requested to a standby.

**Guideline:**

1. Establish/join rehab area in consultation with incident command
2. Encourage removal of all PPE including bunker pants pushed down to boots
3. Perform rehabilitation screening & sort after five minutes of rest
   a. Vital Signs

<table>
<thead>
<tr>
<th></th>
<th>Level 0</th>
<th>Level 1</th>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>&lt; 70% Max</td>
<td>≥ 70% Max</td>
<td>≥ 85% Max</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>≤ 180 Systolic</td>
<td>&gt; 180 Systolic</td>
<td>&gt; 200 Systolic</td>
</tr>
<tr>
<td>Temperature</td>
<td>≤ 99.5°F</td>
<td>99.6°F – 103°F</td>
<td>&gt; 103°F</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>8 – 24</td>
<td>25 – 40</td>
<td>&lt; 8 or &gt; 40</td>
</tr>
<tr>
<td>SpO₂</td>
<td>&gt; 94%</td>
<td>91 – 94%</td>
<td>&lt; 91%</td>
</tr>
<tr>
<td>Carbon monoxide (if available)</td>
<td>&lt; 6%</td>
<td>6-10%</td>
<td>&gt; 10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Max HR</th>
<th>Age</th>
<th>Max HR</th>
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<tbody>
<tr>
<td>20</td>
<td>200</td>
<td>45</td>
<td>175</td>
</tr>
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<td>25</td>
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<td>40</td>
<td>180</td>
<td>65</td>
<td>155</td>
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</table>

b. Assessment

<table>
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<th></th>
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<tbody>
<tr>
<td>Cramping</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dizziness or syncope</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Confusion or altered mental status</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Chest pain</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Shortness of breath</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Vomiting</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Scene Rehabilitation (Continued)

4. After screening, the following rehabilitation activities should be performed for a minimum of 20 minutes

<table>
<thead>
<tr>
<th>Level 0</th>
<th>Level 1</th>
<th>Level 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oral rehydration</td>
<td>Oral and IV rehydration</td>
</tr>
<tr>
<td></td>
<td>Passive cooling</td>
<td>Passive &amp; active cooling</td>
</tr>
<tr>
<td></td>
<td>Vital sign evaluation at 10 minutes</td>
<td>Vital sign evaluation every five minutes</td>
</tr>
<tr>
<td></td>
<td>Rest</td>
<td>Routine medical assessment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Follow appropriate guidelines</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transport recommended</td>
</tr>
</tbody>
</table>

5. Participants must reach the following vital signs after a minimum of 20 minutes of rehabilitation prior to return to duty (NFPA 1584 [2015])

<table>
<thead>
<tr>
<th>Vital sign</th>
<th>Requirement</th>
</tr>
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<tbody>
<tr>
<td>Heart rate</td>
<td>&lt; 100 bpm</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>&lt; 160 systolic AND &lt; 100 diastolic</td>
</tr>
<tr>
<td>Temperature</td>
<td>≤ 99°F</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>12 – 20</td>
</tr>
<tr>
<td>SpO₂</td>
<td>&gt; 94%</td>
</tr>
<tr>
<td>Carbon monoxide (if available)</td>
<td>&lt; 6%</td>
</tr>
</tbody>
</table>

Notes:
Consider rehabilitation for EMS personnel, law enforcement, or other responders, after 45 minutes of duty
Trauma
Amputation

**General Scope:** Guideline for treatment of patients who have experienced an amputation.

**Guideline:**

1. Perform routine trauma assessment
2. Consider tourniquet for uncontrolled bleeding
3. [AEMT] Establish IV/IO
4. See [General Trauma Guideline](#)
5. See [Pain Management Procedure](#)
6. Irrigate amputated part with NS to remove gross contaminants (do not debrand)
7. Place amputated part in sterile gauze moistened in NS
8. Place amputated part in sterile waterproof container if available
9. Place sealed container in ice or place activated cold packs around container
Burns

**General Scope:** Guideline for treatment of patients who have experienced a burn.

**Guideline:**

1. Perform routine trauma assessment
2. Consider activation of air ambulance for transport to medical center with a specialized burn center
3. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
4. [AEMT] Establish IV/IO
5. See [General Trauma Guideline](#)
6. See [Blood Pressure Management Procedure](#)
7. See [Pain Management Procedure](#)
8. If burn is thermal in nature:
   a. Stop the burning process without causing hypothermia
   b. Remove clothing and jewelry (Do not pull away clothing that is stuck to burn)
   c. [AEMT] If burn is >10% BSA and ETA to hospital >15 minutes, **NORMAL SALINE 150ml/hr**
   d. [Paramedic] Consider early intubation if signs of airway burns are present
9. If burn is chemical in nature:
   a. Remove agent as appropriate
   b. Irrigate for at least 15 minutes with NS
      i. Use at least 1000ml for eye irrigation
      ii. Use continuous irrigation for alkali burns
10. If burn is electrical in nature (severe high voltage injury):
    a. Once scene is safe, remove the patient from the source
    b. See Cardiac Dysrhythmia Guidelines as needed
    c. [AEMT] Establish IV/IO
       i. Consider 500-1000ml bolus
       ii. [Paramedic/Med Control] Consider **SODIUM BICARBONATE 50mEq per liter at 500-1000ml/hr**
11. Dress burned area with non-adhesive plastic wrap (“Saran Wrap”)
12. Consider using burn sheet with additional clean, dry sheet and blanket to conserve body heat
13. **DO NOT BREAK BLISTERS. DO NOT APPLY CREAMS, OINTMENTS OR ANTIDOTES TO BURNS**
Crush Syndrome

**General Scope:** Guideline for treatment of patients with prolonged (over one hour) crush/pinning. This guideline is also appropriate for suspension trauma.

**Guideline:**

1. Perform routine medical and trauma assessment
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
3. [AEMT] Establish IV/IO (initiate volume replacement prior to extrication if possible)
   a. [AEMT] IV/IO NORMAL SALINE up to 2L bolus
4. See [General Trauma Guideline](#)
5. Evaluate for hypothermia, see [Hypothermia Guideline](#)
6. Apply direct pressure to control external bleeding
7. [EMR] Consider using a tourniquet on affected limb before extrication if possible
   a. Leave the tourniquet in place for the transport
   b. [Paramedic] If transport >20 minutes, consider slowly releasing the tourniquet
8. Early stabilization of all extremity fractures aids in controlling blood loss
9. [Paramedic/Med Control] Consider NORMAL SALINE with SODIUM BICARBONATE infusion (50mEq per liter) at 500-1000ml/hr
10. See [Pain Management Procedure](#)
11. If signs or symptoms of hyperkalemia are present, refer to [Hyperkalemia Guideline](#)
General Trauma

**General Scope:** Guideline for treatment of all patients with potential traumatic injuries.

**Guideline:**

1. Perform routine trauma assessment
2. Consider [Trauma Activation](#) with transport to nearest appropriate trauma center as per state trauma guidelines
3. Consider spinal precautions. See [Selective Spinal Precautions Procedure](#)
4. Control massive hemorrhage
   a. Consider tourniquet
   b. Consider pressure points, wound packing and hemostatic agent per [Hemostatic Agent Procedure](#)
5. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
   a. If suspected tension pneumothorax, see [Needle Decompression Procedure](#)
6. Apply occlusive dressing for sucking chest wound
   a. Consider intubation
7. Control bleeding with direct pressure
8. [AEMT] Establish IV/IO
   a. Avoid excessive fluid administration
   b. Goal of maintaining SBP~90mmHg
   c. See [Blood Pressure Management Procedure](#)
9. See [Shock in Trauma Guideline](#)
10. Splint extremity fractures
11. For suspected unstable pelvis fracture, consider placement of pelvic binder or wrap
12. See [Pain Management Procedure](#)
Head Injury

**General Scope:** Guideline for treatment of all patients with potential head injuries.

**Guideline:**

1. Perform routine medical and trauma assessment
2. See [General Trauma Guideline](#)
3. Consider spinal precautions. See [Selective Spinal Precautions Procedure](#)
4. Prevent hypotension
5. Prevent hypoxemia
6. Prevent hyperventilation
7. [AEMT] Establish IV/IO
8. If no signs of herniation
   a. Maintain normal EtCO\(_2\) of 35-45mmHg
   b. See guidelines as needed
      i. [Nausea/Vomiting/Vertigo Guideline](#)
         1. [AEMT] ONDANSETRON 4 mg IV or SL tablet
            a. Pediatric (< 2 y/o) - 0.1 mg/kg IV up to 2mg
               i. (2 y/o – 8 y/o) – 2mg IV or approximately ½ SL tablet (~2mg)
               ii. (> 8 y/o) – 4mg IV or SL tablet
   ii. [Seizure Guideline](#)
9. If signs of herniation\(^1\) are present
   a. Mildly hyperventilate patient (14-16 breaths/minute) to maintain EtCO\(_2\) 30- 35mmHg

**Note:**
Elevate head of bed approximately 30° for transport if possible.

1. **Signs of Herniation:** Sudden decrease in level of consciousness, ipsilateral papillary dilation, contralateral hemiparesis, and decerebrate or decorticate posturing
Shock in Trauma

**General Scope:** Guideline for management of shock in all patients.

**Guideline:**

1. Control obvious hemorrhage
2. Position patient supine when possible
3. [AEMT] Establish IV/IO
   a. Two access points if evidence of ≥Class II shock; do not delay transport for access
   b. Titrate NORMAL SALINE with a SBP goal of ≥ 90 in trauma patients (permissive hypotension except in patients with significant head injuries)
4. [Paramedic] For hemorrhagic shock in patients ≥12 years of age: Tranexamic acid (TXA) 2g in 100mL D5W or NS over 10 minutes (faster may result in hypotension); use filter needle to draw up. Optional: Administer Tranexamic acid (TXA) 2g as a slow IV push over 10 minutes.
   a. Indications: Evidence of acute blood loss – Class II or greater
   b. One-time administration as soon as possible, but no later than 3 hours after initial surgery
   c. Considerations:
      i. Contact Medical Control for patients <12 years of age. If order is given, administer Tranexamic acid (TXA) 15mg/kg (max 1g) in 100mL of D5W or NS over 10 minutes (faster may result in hypotension); use filter needle to draw up. Optional: Administer Tranexamic acid (TXA) 15mg/kg (max 1g) as a slow push over 10 minutes. The receiving facility should follow with an infusion of 2mg/kg/hr in NS over 8 hours (max 1g).
      ii. Contact Medical Control for non-traumatic hemorrhagic shock (≥ Class II)
   d. Exclusions:
      i. Known time of injury greater than 3 hours or unknown time
      ii. Known DIC
      iii. Recent history of thrombosis or thromboembolism (DVT, PE, embolic stroke)
5. Shock Classifications

<table>
<thead>
<tr>
<th></th>
<th>CLASS I</th>
<th>CLASS II</th>
<th>CLASS III</th>
<th>CLASS IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Loss (mL)</td>
<td>Up to 750</td>
<td>750-1500</td>
<td>1500-2000</td>
<td>&gt;2000</td>
</tr>
<tr>
<td>Blood Loss (%BV)</td>
<td>Up to 15%</td>
<td>15-30%</td>
<td>30-40%</td>
<td>&gt;40%</td>
</tr>
<tr>
<td>Pulse Rate</td>
<td>&lt;100</td>
<td>&gt;100</td>
<td>&gt;120</td>
<td>&gt;140</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>Normal</td>
<td>Normal</td>
<td>Decreased</td>
<td>Decreased</td>
</tr>
<tr>
<td>Pulse Pressure (mmHg)</td>
<td>Normal or increased</td>
<td>Decreased</td>
<td>Decreased</td>
<td>Decreased</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>14-20</td>
<td>20-30</td>
<td>30-40</td>
<td>&gt;35</td>
</tr>
<tr>
<td>Urine Output (mL/hr)</td>
<td>&gt;30</td>
<td>20-30</td>
<td>5-15</td>
<td>Negligible</td>
</tr>
<tr>
<td>CNS/ Mental Status</td>
<td>Slightly anxious</td>
<td>Mildly anxious</td>
<td>Anxious and confused</td>
<td>Confused and lethargic</td>
</tr>
<tr>
<td>Fluid Replacement (3:1)</td>
<td>Crystalloid</td>
<td>Crystalloid</td>
<td>Crystalloid and blood</td>
<td>Crystalloid and blood</td>
</tr>
</tbody>
</table>
Trauma in Pregnancy

**General Scope:** Guideline for treatment of all potentially pregnant patients with potential trauma.

**Guideline:**

1. Perform routine medical and trauma assessment
2. See [General Trauma Guideline](#)
3. Position patient on left side (minimize uterine compression on the inferior vena cava)
4. [AEMT] Establish IV/IO
5. Maintain blood pressure, see [Blood Pressure Management Procedure](#)
   a. SBP & DBP is usually 5-15mmHg less starting in second trimester
   b. HR is usually 15-20 BPM more during third trimester
   c. Shock is not always obvious in the pregnant patient (because of an increase in circulating blood volume during pregnancy, the pregnant female will show signs of hypovolemia later in their course)
Procedures
Arterial Line, Central Line, and CVP Monitoring

**General Scope:** Guideline and criteria for accessing central lines and monitoring arterial lines and central venous pressure.

**Applies to:** All Critical Care Staff

**Procedure:**

**Arterial Line Monitoring**

1. Ensure the pressure bag is pressurized to 300 mm Hg
2. Use steps 3-6 if using arterial line to measure arterial blood pressure
3. With the transducer connected to the monitor, select arterial monitor, and perform a transducer check by fast flushing the line. As you do this, you should see a change in the waveform. This is called a square wave test.
4. Zero the transducer and monitor
   a. Place the transducer at the phlebostatic axis of the patient.
   b. Close the line off to patient and open to air.
   c. Press zero on the monitor.
   d. To monitor pressure, close the port off to air and open to patient.
5. Connect the catheter and fast flush to clear the catheter of blood.
6. Check for good waveform.

**Central Line Access**

1. To access the line first clamp off the hub line you intend to use.
   a. It’s important to clamp off the line to prevent air from being sucked into the line and blood stream.
   b. Any of the hub lines can be used; they all go to the same place and work the same way.
2. Once you have the line clamped off, expose the end of the hub (it may have a cap or be taped over) clean it well with an alcohol prep and put an INT hub on it.
3. With the INT hub in place, unclamp the tubing and let the INT hub seal out air.
4. Clean the INT hub and attach an empty 10 cc syringe to the INT hub
   a. Aspirate about 5ml of blood and heparin to confirm the line is in place,
      i. There should be no resistance to aspiration.
   b. Discard the syringe and contents as biohazard waste.
5. Attach a saline flush syringe to INT hub and flush it gently.
6. Attach a flushed 60 drop set (or blood set if you think you need volume replacement) andsaline bag and run it into the line at a TKO rate.
7. Use the y-sites on the IV tubing to give meds as needed; make sure to clean the y-site correctly and flush with the saline IV line after each med.
Continuous Venous Pressure Monitoring:

1. Assemble A-line set up as per arterial line monitoring system or Swan-Ganz multi-lumen monitoring system instructions.
2. Make sure there are no air bubbles in the system.
3. Connect pressurized tubing to central venous catheter.
4. Zero and calibrate transducer system.
5. Validate waveform on monitor. Obtain 'mean' pressure reading.
# Blood Pressure Management

**General Scope:** Guideline for treatment of patients who present with abnormally high or low blood pressure.

**Procedure:**

1. Perform routine medical assessment
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
3. [AEMT] Establish IV/IO

## Hypotension

1. If patient is hypotensive and symptomatic with no signs of fluid overload
   a. [AEMT] 250-500ml NORMAL SALINE bolus up to two liters total
2. If NORMAL SALINE unsuccessful and vasopressor is indicated, norepinephrine is preferred except in anaphylaxis, symptomatic bradycardia, and hypotensive pulmonary edema
   a. [Paramedic] Consider **PUSH DOSE EPINEPHRINE** 10-20mcg as a bridge to infusion
   b. [Paramedic] Consider **NOREPINEPHRINE INFUSION** (4mg/250ml D5W or NS — 16mcg/ml)
      i. Initiate at 0.1 mcg/kg/min via IV pump
         1. Titrated by 0.01-0.05 mcg/kg/min every 3-5 minutes
         2. Maximum of 0.3 mcg/kg/min
   c. [Paramedic] Consider **EPINEPHRINE INFUSION** (1mg/100ml D5W or NS—10mcg/ml) when norepinephrine is not the preferred vasopressor
      i. Initiate IV infusion at 2-5 mcg/min
      ii. Titrated by increments of no more than 1 mcg/min every 5 minutes
      iii. Maximum of 10 mcg/min

## Hypertension

1. If patient is hypertensive per applicable guidelines
   a. [Paramedic/Med Control] **LABETALOL** 20 mg slow push
      i. May repeat at 40 mg every 10 minutes to a max of 300mg
2. [Paramedic/Med Control] Consider **NITROGLYCERIN INFUSION** (20mg/100mL D5W or NS — 200 mcg/mL)
   a. For patients <75kg, start at 10 mcg/min
   b. For patient >75kg, start at 20 mcg/min
   c. Titrate by 5-10 mcg/min every 5-10 minutes to desired response
   d. Monitor BP every 3-5 minutes

**Notes:**

1. Nitroglycerine
   a. Specifically indicated in patients with acute hypertensive pulmonary edema or myocardial ischemia
   b. Consider lower doses in the elderly
   c. Avoid if any history of PDE 5 inhibitor (Viagra, Levitra, Cialis) use in the past 48 hours
2. Norepinephrine / Epinephrine
   a. May worsen underlying ischemia, tachycardia or acidosis
   b. Increases peripheral vascular resistance
Pediatric Blood Pressure Management

**General Scope:** Guideline for treatment of pediatric patients, age eight or under, who present with abnormally low blood pressure.

**Procedure:**

1. Perform routine medical assessment
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
3. [AEMT] Establish IV/IO
4. If hypotensive and patient is symptomatic with no signs of fluid overload
   a. [AEMT] Administer 20 ml/kg **NORMAL SALINE** over 10-20 minutes
      i. If suspected cardiogenic shock, consider 10 ml/kg **NORMAL SALINE** over 10-20 minutes
      ii. Repeat bolus once if needed
5. If patient has inadequate response to fluid
   a. [Paramedic/Med Control] Consider **EPINEPHRINE INFUSION** (1mg/100ml DsW orNS—10mcg/ml)
      i. Initiate at 0.1 mcg/kg/min
      ii. Titrate by increments of up to 0.2 mcg/kg/min every 5-10 minutes as needed, up to 1 mcg/kg/min
Blood Transfusion Continuation and Monitoring

**General Scope:** Guideline and criteria for transport infusion of blood product.

**Applies to:** Paramedics & Critical Care Paramedics

**Procedure:**

1. Obtain written order for rate and total volume of blood product to be infused, confirm with RN or physician.
2. Confirm with RN or physician that name on patient’s wristband matches the name on the infusing blood product. The patient must have a wristband, no exceptions.
3. Infusion of blood products
   a. [Paramedic] Blood product infusion must be initiated prior to transport of patient
      i. No additional infusions of blood products may be established during transport
   b. [Critical Care Paramedic] Blood product infusion may be initiated during transport
4. Vital signs (including body temperature) must be recorded pre-transport and q10 minutes during transport.
5. If the patient develops any sign of allergy/sensitivity reaction, including chills, fever, chest pain, flank pain, hives, wheezing, urticaria, or the patient shows signs of shock, the following actions should be taken immediately:
   a. Infusion of blood product must be immediately stopped, disconnected, and all tubing and product saved for delivery to the receiving facility.
   b. IV/IO NORMAL SALINE initiated
   c. See Blood Pressure Management Procedure
   d. See Anaphylaxis/Allergic Reaction Guideline
   e. Hemolytic reactions (fever, chills, chest pain, flank pain, and/or shock) may occur. Contact Medical Control if a hemolytic reaction is suspected.
6. Written orders must accompany patient and be included in the patient care report.

**Note:**
- Blood products that are not infusing at the time of transport should remain in a cooler; must be provided by sending facility.
Cancellation of Call

**General Scope:** Procedure for cancelling an ambulance or air transport while en route to a call. This applies to EMS agencies (EMR and above) who have approval from their leadership team or board.

**Procedure:**

1. When EMS is activated but a request to cancel is made, dispatch will advise responding transport crew to continue in a non-emergency fashion.
2. The responding crew may cancel under the following conditions:
   a. At the discretion of the service’s designated leadership with consideration given to call circumstances, system status, and/or weather
   b. No physical patient exists, or patient has left the scene
   c. The call or address has been determined to be false in nature
   d. The patient’s personal physician is in attendance and determines the ambulance is not needed
   e. Non transport EMS services have advised the patient is refusing further care and/or transport and non-transport EMS service will complete the refusal documentation. Refer to refusal protocol.

First responders on scene can assess and cancel auto-launched air transport based on their assessment, need of air transport, or safety issues, as long as transport ambulance is en route.
Triage Clearance

**General Scope:** Procedure for triage and clearance with limited EMS resources. This applies to EMS agencies (EMR and above) who have approval from their leadership team or board.

**Procedure:**

1. In the circumstance of simultaneous calls occurring without sufficient resources, the initial agency/unit at patient side may clear the scene after ALL of the following have been met:
   a. An assessment has been performed
   b. No immediate care or assistance is needed
   c. The patient’s condition is deemed low acuity after assessment
   d. Patient or patient representative is able to recontact 9-1-1 if conditions change
   e. Patient or patient representative is informed of the triage and reason for clearing
   f. Arrangements for secondary EMS resources to respond to complete the call have been made

2. Each agency will follow department policy for communicating with dispatch and the transporting agency.

3. Patient care report must be completed with an explanation for utilizing triage clearance procedure.
Chest Tube Monitoring

**General Scope:** Chest tube monitoring.

**Applies to:** Paramedics and Critical Care Paramedics

**Procedure:**

1. Routine Trauma and/or Medical Assessment.
2. Assure that the chest tube(s) is securely fastened to the patient.
3. Check chest tube(s) for patency and proper function prior to transport.
4. Assure that the long flexible tubing is securely fastened to the container that acts as a drainage device, water seal and suction control device. Assure that the tubing is free of kinks.
5. Make note of the fluid and blood levels in the drainage and water seal compartments.
6. Obtain orders as to the water seal level.
7. When suction is used, ensure that there is bubbling in the suction control chamber. (if not, check the suction unit).
8. If the water seal fails to stop bubbling after the lung is re-inflated or later begins to bubble:
   - Momentarily clamp the flexible tubing near the chest. If the bubbles quit emanating from the tube while it is clamped, then the problem is either a persistent air leak in the patient’s lung or the chest tube is not sealed at the chest wall.
   - Never leave the clamp on for more than a few seconds.
   - Evaluate the insertion site.
   - Apply occlusive dressings to the site.
   - Evaluate the patient for distress.
   - Consult physician immediately if needed.
   - If the bubbling does not cease during the clamping of the proximal end, then suspect a leak at a connection site in the tubing or the tubing itself.
     - Check all connections and secure with tape.
     - Seal the leak with occlusive dressing and tape or replace the tubing. When replacing the tubing, remember to clamp the distal end of the chest tube to avoid the formation of a pneumothorax.
9. If water seal device becomes damaged, a temporary water seal can be accomplished by putting flexible tubing into a bottle of sterile saline. Keep this device and tubing below chest level.
10. Consult with the physician/staff for the best patient positioning.
11. If the chest tube is not functioning and a tension pneumothorax is suspected, perform a needle decompression of the affected side.
Critical Care Sedation (Adult)

**General Scope:** Guideline for treatment of adult patients who require sedation during critical care transports. All patients who receive sedation should have continuous monitoring of vital signs including cardiac monitoring.

**Applies to:** Critical Care Paramedics

**Procedure:**

1. Perform routine medical assessment
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
3. Consider hypoxia or hypovolemia
4. If patient is combative, maintain adequate restraints, see [Restraint Guideline](#)
5. Establish IV/IO
6. For routine sedation see [Sedation Procedure](#)
7. If patient is intubated:

<table>
<thead>
<tr>
<th>MIDAZOLAM</th>
<th>KETAMINE</th>
<th>PROPOFOL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adult</strong></td>
<td><strong>Adult</strong></td>
<td><strong>Adult</strong></td>
</tr>
<tr>
<td>Bolus dosing</td>
<td>Bolus dosing</td>
<td>PROPOFOL may not be initiated and is only for continuation during IFTs</td>
</tr>
<tr>
<td>o 1-3mg IV/IO</td>
<td>o 0.5-2 mg/kg IV/IO/IM</td>
<td>Infusion dosing</td>
</tr>
<tr>
<td>o 5mg IM</td>
<td></td>
<td>o Use GENERIC calc function on pump</td>
</tr>
<tr>
<td>Infusion dosing</td>
<td>Infusion dosing</td>
<td>o Start at 0.8 mcg/kg/min</td>
</tr>
<tr>
<td>o Mix 10mg in 100mL NS</td>
<td>o Mix 100mg in 100mL NS</td>
<td>o Titrate by 0.4 mcg/kg/min; max of 6 mcg/kg/min</td>
</tr>
<tr>
<td>o Use MIDAZOLAM calc function on pump</td>
<td>o Use GENERIC calc function on pump</td>
<td></td>
</tr>
<tr>
<td>▪ Start at 1-2 mg/hr</td>
<td>▪ Start at 0.8 mcg/kg/min</td>
<td></td>
</tr>
<tr>
<td>▪ Titrate by 0.5 mg/hr; max of 7 mg/hr</td>
<td>▪ Titrate by 0.4 mcg/kg/min; max of 6 mcg/kg/min</td>
<td></td>
</tr>
</tbody>
</table>

***Infusions of controlled substances must be stopped and wasted by the transporting crew. Controlled substances in any form may not be turned over to receiving facilities.***

---

Adult

- May increase 5-10 mcg/kg/min every five minutes based on required sedation
- Bolus dosing 0.1-0.5 mg/kg IVP slowly to quickly increase depth of sedation for patients not at risk for hypotension
**Critical Care Sedation (Pediatrics)**

**General Scope:** Guideline for treatment of pediatric patients who require sedation during critical care transports. Pediatric patients are considered such between 5kg and 49.9kg. All patients who receive sedation should have continuous monitoring of vital signs including cardiac monitoring.

**Applies to:** Critical Care Paramedics

1. Perform routine medical assessment
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
3. Consider hypoxia or hypovolemia
4. If patient is combative, maintain adequate restraints, see [Restraint Procedure](#)
5. Establish IV/IO
6. For routine sedation see [Sedation Procedure](#)
7. If patient is intubated:

<table>
<thead>
<tr>
<th>MIDAZOLAM</th>
<th>KETAMINE</th>
<th>PROPOFOL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pediatric (&lt; 8 y/o)</strong></td>
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</tr>
<tr>
<td>• Bolus dosing</td>
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<td>• PROPOFOL may not be initiated and is only for continuation during IFTs</td>
</tr>
<tr>
<td>o 0.05 mg/kg IV/IO or 0.1 mg/kg IM</td>
<td>o 0.5-2 mg/kg IV/IO/IM</td>
<td></td>
</tr>
<tr>
<td>• Infusion dosing</td>
<td>• Infusion dosing</td>
<td>• Infusion dosing</td>
</tr>
<tr>
<td>o Mix 5mg in 100mL NS</td>
<td>o Mix 50mg in 100mL NS</td>
<td>o Use PROPOFOL calc function on pump</td>
</tr>
<tr>
<td>o Use GENERIC drug calc function on pump</td>
<td>o Use GENERIC drug calc function on pump</td>
<td>o Start at 125 mcg/kg/min</td>
</tr>
<tr>
<td>▪ Start at 1 mcg/kg/min</td>
<td>▪ Administer 1 mcg/kg/min</td>
<td>o May increase 5-10 mcg/kg/min every five minutes up to 300 mcg/kg/min</td>
</tr>
<tr>
<td>▪ Titrate by 0.5 mcg/kg/min; max of 5 mcg/kg/min</td>
<td>▪ Titrate by 0.5 mcg/kg/min; max of 6 mcg/kg/min</td>
<td>o Bolus dosing 0.1-0.5 mg/kg slowly to quickly increase depth of sedation for patients not at risk for hypotension</td>
</tr>
</tbody>
</table>

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EZ-IO® Intraosseous Vascular Access System

**General Scope:** Procedure for placement of EZ-IO Intraosseous Vascular Access System

**INDICATIONS FOR USE**

For adult and pediatric patients any time vascular access is difficult to obtain in emergent, urgent or medically necessary situations for up to 48 hours.

**APPROVED INSERTION SITES**

<table>
<thead>
<tr>
<th>Adults</th>
<th>Pediatrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximal humerus</td>
<td>Distal femur**</td>
</tr>
<tr>
<td>Proximal tibia</td>
<td>Proximal humerus</td>
</tr>
<tr>
<td>Distal tibia**</td>
<td>Proximal tibia</td>
</tr>
<tr>
<td></td>
<td>Distal tibia**</td>
</tr>
</tbody>
</table>

**MUST HAVE ADDITIONAL TRAINING AND MEDICAL DIRECTOR APPROVAL**

**CONTRAINDICATIONS**

- Fracture of the targeted bone
- Previous, significant orthopedic procedures at insertion site (e.g., prosthetic limb or joint)
- IO in the targeted bone within the past 48 hours
- Infection at area of insertion
- Excessive tissue or absence of adequate anatomical landmarks

**EQUIPMENT/SUPPLIES**

<table>
<thead>
<tr>
<th>Adults</th>
<th>Pediatrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>EZ-IO® Power Driver</td>
<td>Sharps container</td>
</tr>
<tr>
<td>EZ-IO® Needle Set and EZ-Connect® Extension Set</td>
<td>Intravenous 2% Lidocaine for placement inconscious patient</td>
</tr>
<tr>
<td>EZ-Stabilizer® Dressing</td>
<td>Intravenous fluid</td>
</tr>
<tr>
<td>Cleansing agent of choice</td>
<td>Infusion pressure pump or pressure bag, tubing, 3-way stop cock</td>
</tr>
<tr>
<td>Luer lock syringe with sterile Normal Saline flush (5-10 mL for adults, 2-5 mL for infant/child)</td>
<td></td>
</tr>
</tbody>
</table>
General Placement Principles

**INSERTION SITE IDENTIFICATION**

Palpate site to locate appropriate anatomical landmarks for needle set placement and to estimate soft tissue depth overlying the insertion site. Utilize the correct technique below based on patient and site selected:

**NEEDLE SET SELECTION**

Select EZ-IO® Needle Set based on patient weight, anatomy and clinical judgment. The EZ-IO® Catheter is marked with a black line 5 mm proximal to the hub. Prior to drilling, with the EZ-IO® Needle Set inserted through the soft tissue and the needle tip touching bone, adequate needle length is determined by the ability to see the 5 mm black line above the skin.

- EZ-IO® 45 mm Needle Set (yellow hub) should be considered for proximal humerus insertion in patients ≥ 40 kg and patients with excessive tissue over any insertion site
- EZ-IO® 25 mm Needle Set (blue hub) should be considered for patients 3 kg and greater
- EZ-IO® 15 mm Needle Set (pink hub) should be considered for patients 3-39 kg

**INSERTION INITIATION**

1. Use a clean, “no touch” technique, maintaining asepsis
2. Prepare supplies
3. Prepare site using antiseptic; stabilize extremity
4. See specific patient & site location

<table>
<thead>
<tr>
<th>Adults</th>
<th>Pediatrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximal humerus</td>
<td>Proximal tibia</td>
</tr>
<tr>
<td>Proximal tibia</td>
<td>Distal tibia**</td>
</tr>
<tr>
<td>Distal tibia**</td>
<td>Proximal humerus</td>
</tr>
<tr>
<td></td>
<td>Distal Femur**</td>
</tr>
</tbody>
</table>

**MUST HAVE ADDITIONAL TRAINING AND MEDICAL DIRECTOR APPROVAL**
EZ-IO® Intraosseous Vascular Access System
(Continued)

General Placement Principles (Continued)

INSERTION COMPLETION

1. Hold the hub in place and pull the driver straight off; continue to hold the hub while twisting the stylet off the hub with counterclockwise rotations; catheter should feel firmly seated in the bone (1st confirmation of placement);
   a. Dispose of all sharps and biohazard materials using standard biohazard practices and disposal containers.
   b. If using the NeedleVISE® 1 port sharps block, place on stable surface and use a one-handed technique.
2. Place the EZ-Stabilizer® Dressing over the hub
3. Attach a primed extension set to the catheter hub, firmly secure by twisting clockwise
4. Pull the tabs off the dressing to expose the adhesive, apply to the skin
5. Aspirate for blood/bone marrow (2nd confirmation of placement)
   a. Inability to withdraw/aspirate blood from the catheter hub does not mean the insertion was unsuccessful.
6. Proceed with technique below, based on situation:

   a. [AEMT] ADULT - RESPONSIVE TO PAIN
      i. Observe recommended cautions/contraindications to using 2% preservative and epinephrine-free lidocaine (intravenous lidocaine) and confirm lidocaine dose per institutional protocol
      ii. Prime extension set with lidocaine
      iii. Slowly infuse lidocaine 40 mg IO over 120 seconds
          1. Allow lidocaine to dwell in IO space 60 seconds
          2. Flush with 5 to 10 mL of normal saline
          3. Slowly administer an additional 20 mg of lidocaine IO over 60 seconds.
      iv. Repeat as needed; consider systemic pain control for patients not responding to IO lidocaine

   b. ADULT – UNRESPONSIVE TO PAIN
      i. Prime extension set with normal saline
      ii. Flush the IO catheter with 5-10 mL of normal saline
          1. If patient develops signs indicating responsiveness to pain, refer to adult - responsive to pain technique
EZ-IO® Intraosseous Vascular Access System  
(Continued)

General Placement Principles (Continued)

c. [Paramedic] INFANT/CHILD – RESPONSIVE TO PAIN

i. Observe recommended cautions/contraindications to using 2% preservative and epinephrine-free lidocaine (intravenous lidocaine)

ii. Prime extension set with lidocaine

iii. Slowly infuse lidocaine 0.5 mg/kg (max 40 mg) IO over 120 seconds
   1. Allow lidocaine to dwell in IO space 60 seconds
   2. Flush with 5 to 10 mL of normal saline
   3. Slowly administer an additional 0.25 mg/kg (max 20 mg) of lidocaine IO over 60 seconds.

iv. Repeat as needed; consider systemic pain control for patients not responding to IO lidocaine

d. INFANT/CHILD – UNRESPONSIVE TO PAIN

i. Prime extension set with normal saline

ii. Flush the IO catheter with 5-10 mL of normal saline
   1. If patient develops signs indicating responsiveness to pain, refer to infant/child – responsive to pain technique

7. Connect fluids if ordered and pressurize up to 300 mmHg for maximum flow

8. Verify placement/patency prior to all infusions. Use caution when infusing hypertonic solutions, chemotherapeutic agents, or vesicant drugs.

9. Stabilize and monitor site and limb for extravasation or other complications
   a. For proximal humerus insertions, apply arm immobilizer or another securement device
   b. For distal femur insertions, immobilize the leg to ensure the knee does not bend

10. Document date and time on wristband and place on patient
SITE IDENTIFICATION

1. Place the patient’s hand over the abdomen (elbow adducted and humerus internally rotated)
2. Place your palm on the patient’s shoulder anteriorly; the “ball” under your palm is the general target area
   a. You should be able to feel this ball, even on obese patients, by pushing deeply
3. Place the ulnar aspect of your hand vertically over the axilla and the ulnar aspect of your other hand along the midline of the upper arm laterally
4. Place your thumbs together over the arm; this identifies the vertical line of insertion on the proximal humerus
5. Palpate deeply up the humerus to the surgical neck
   a. This may feel like a golf ball on a tee – the spot where the “ball” meets the “tee” is the surgical neck
   b. The insertion site is 1 to 2 cm above the surgical neck, on the most prominent aspect of the greater tubercle

INSERTION

1. Aim the needle set at a 45-degree angle to the anterior plane and posteromedial
2. Push the needle set tip through the skin until the tip rests against the bone
   a. The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
3. Gently drill into the humerus approximately 2 cm or until the hub is close to the skin; the hub of the needle set should be perpendicular to the skin
EZ-IO® Intraosseous Vascular Access System (Continued)

Adult Proximal Tibia Placement

**SITE IDENTIFICATION**
1. Extend the leg.
2. Insertion site is approximately 2 cm medial to the tibial tuberosity, or approximately 3 cm below the patella and approximately 2 cm medial, along the flat aspect of the tibia.

**INSERTION**
1. Aim the needle set at a 90-degree angle to the bone
2. Push the needle set tip through the skin until the tip rests against the bone
   a. **The 5 mm mark must be visible above the skin for confirmation of adequate needle set length**
3. Gently drill, advancing the needle set approximately 1-2 cm after entry into the medullary space or until the needle set hub is close to the skin
EZ-IO® Intraosseous Vascular Access System (Continued)

Adult Distal Tibia Placement

**SITE IDENTIFICATION**

1. Insertion site is located approximately 3 cm proximal to the most prominent aspect of the medial malleolus.
2. Palpate the anterior and posterior borders of the tibia to assure insertion site is on the flat center aspect of the bone.

**INSERTION**

1. Aim the needle set at a 90-degree angle to the bone
2. Push the needle set tip through the skin until the tip rests against the bone
   a. The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
3. Gently drill, advancing the needle set approximately 1-2 cm after entry into the medullary space or until the needle set hub is close to the skin

**MUST HAVE ADDITIONAL TRAINING AND MEDICAL DIRECTOR APPROVAL**
EZ-IO® Intraosseous Vascular Access System (Continued)

Infant/Child Proximal Tibia Placement

SITE IDENTIFICATION
1. Extend the leg. Pinch the tibia between your fingers to identify the medial and lateral borders.
2. Insertion site is approximately 1 cm medial to the tibial tuberosity, or just below the patella (approximately 1 cm) and slightly medial (approximately 1 cm), along the flat aspect of the tibia.

INSERTION
3. Aim the needle set at a 90-degree angle to the bone
4. Push the needle set tip through the skin until the tip rests against the bone
   a. The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
5. Gently drill, immediately release the trigger when you feel the loss of resistance as the needle set enters the medullary space; avoid recoil – do NOT pull back on the driver when releasing the trigger.
**EZ-IO® Intraosseous Vascular Access System (Continued)**

Infant/Child Distal Tibia Placement

<table>
<thead>
<tr>
<th><strong>SITE IDENTIFICATION</strong></th>
<th><img src="image.png" alt="Image" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Insertion site is located approximately 1-2 cm proximal to the most prominent aspect of the medial malleolus.</td>
<td></td>
</tr>
<tr>
<td>2. Palpate the anterior and posterior borders of the tibia to assure insertion site is on the flat center aspect of the bone.</td>
<td></td>
</tr>
<tr>
<td><strong>INSERTION</strong></td>
<td><img src="image.png" alt="Image" /></td>
</tr>
<tr>
<td>3. Aim the needle set at a 90-degree angle to the bone</td>
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<tr>
<td>4. Push the needle set tip through the skin until the tip rests against the bone</td>
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<tr>
<td>a. <strong>The 5 mm mark must be visible above the skin for confirmation of adequate needle set length</strong></td>
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<tr>
<td>5. Gently drill, immediately release the trigger when you feel the loss of resistance as the needle set enters the medullary space; avoid recoil – do NOT pull back on the driver when releasing the trigger.</td>
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</table>

**MUST HAVE ADDITIONAL TRAINING AND MEDICAL DIRECTOR APPROVAL**
EZ-IO® Intraosseous Vascular Access System  
(Continued)

Infant/Child Proximal Humerus Placement

SITE IDENTIFICATION

1. Place the patient’s hand over the abdomen (elbow adducted and humerus internally rotated)

2. Place your palm on the patient’s shoulder anteriorly; the “ball” under your palm is the general target area
   a. You should be able to feel this ball, even on obese patients, by pushing deeply

3. Place the ulnar aspect of your hand vertically over the axilla and the ulnar aspect of your other hand along the midline of the upper arm laterally

4. Place your thumbs together over the arm
   a. This identifies the vertical line of insertion on the proximal humerus

5. Palpate deeply up the humerus to the surgical neck
   a. This may feel like a golf ball on a tee – the spot where the “ball” meets the “tee” is the surgical neck
   b. The insertion site is 1 to 2 cm above the surgical neck, on the most prominent aspect of the greater tubercle

INSERTION

6. Aim the needle set tip at a 45-degree angle to the anterior plane and posteromedial

7. Push the needle set tip through the skin until the tip rests against the bone
   a. The 5 mm mark must be visible above the skin for confirmation of adequate needle set length

8. Gently drill, immediately release the trigger when you feel the loss of resistance as the needle set enters the medullary space; avoid recoil – do NOT pull back on the driver when releasing the trigger.
EZ-IO® Intraosseous Vascular Access System (Continued)

Infant/Child Distal Femur Placement

**MUST HAVE ADDITIONAL TRAINING AND MEDICAL DIRECTOR APPROVAL.**

**SITE IDENTIFICATION**
1. Secure the leg outstretched to ensure the knee does not bend.
2. Identify the patella by palpation. The insertion site is just proximal to the patella (maximum 1 cm) and approximately 1-2 cm medial to midline.

**INSERTION**
3. Aim the needle set at a 90-degree angle to the bone
4. Push the needle set tip through the skin until the tip rests against the bone.
   a. **The 5 mm mark must be visible above the skin for confirmation of adequate needle set length.**

Gently drill, immediately release the trigger when you feel the loss of resistance as the needle set enters the medullary space; avoid recoil – do NOT pull back on the driver when releasing the trigger.
EZ-IO® Intraosseous Vascular Access System (Continued)

EZ-IO® Removal Technique

1. Remove extension set and dressing
2. Stabilize catheter hub and attach a Luer lock syringe to the hub
3. Maintaining axial alignment, twist clockwise and pull straight out
   Do not rock the syringe
4. Dispose of catheter with syringe attached into sharps container
5. Apply pressure to site as needed to control bleeding and apply dressing as indicated

Maintain 90 degree angle, Rotate clockwise and gently Pull
Foley Catheter Insertion

General Scope: Guideline and criteria for foley catheter insertion.

Applies to: Critical Care Paramedics

Procedure:

1. Gather equipment.
2. Explain procedure to the patient
3. Assist patient into supine position with legs spread and feet together
4. Open catheterization kit and catheter
5. Prepare sterile field, apply sterile gloves
6. Check balloon for patency.
7. Generously coat the distal portion (2-5 cm) of the catheter with lubricant
8. Apply sterile drape
9. If female, separate labia using non-dominant hand. If male, hold the penis with the non-dominant hand. Maintain hand position until preparing to inflate balloon.
10. Using dominant hand to handle forceps, cleanse peri-urethral mucosa with cleansing solution. Cleanse anterior to posterior, inner to outer, one swipe per swab, discard swab away from sterile field.
11. Pick up catheter with gloved (and still sterile) dominant hand. Hold end of catheter loosely coiled in palm of dominant hand.
12. In the male, lift the penis to a position perpendicular to patient's body and apply light upward traction (with non-dominant hand)
13. Identify the urinary meatus and gently insert until 1 to 2 inches beyond where urine is noted
14. Inflate balloon, using correct amount of sterile liquid (usually 10 cc but check actual balloon size)
15. Gently pull catheter until inflation balloon is snug against bladder neck
16. Connect catheter to drainage system
17. Secure catheter to abdomen or thigh, without tension on tubing
18. Place drainage bag below level of bladder
19. Evaluate catheter function and amount, color, odor, and quality of urine
20. Remove gloves, dispose of equipment appropriately, wash hands
21. Document size of catheter inserted, amount of water in balloon, patient's response to procedure, and assessment of urine
Hemostatic Agent Use

**General Scope:** Procedure for use of hemostatic gauze.

**Procedure:**

1. Identify source of bleeding  
   a. Place proximal tourniquet if appropriate  
   b. Wipe pooled blood from wound if necessary  
2. Apply hemostatic gauze, packing into wound as per manufacturer’s instructions  
3. Pack entire length of gauze into wound  
4. Apply direct pressure for 1-3 minutes with hemostatic gauze  
   a. If bleed-through occurs the entire dressing must be removed before repacking  
5. Apply standard dressing and bandage

**Note:** Specific brand of hemostatic gauze must not cause thermal reaction.
IFT of TPA (Tissue Plasminogen Activator)

General scope: Guideline for the IFT transport of TPA infusion

Procedure:

1. Perform routine medical assessment with FAST-ED stroke severity scale, repeat stroke scale every 15 minutes
2. [Sending Hospital RN] Bolus – 0.09 mg/kg (10% of total), Max 9 mg via pump over a minute, USE DEDICATED LINE. NO IV fluids running with Alteplase during bolus or infusion.
3. [Sending Hospital RN] Continuous Infusion: 0.81 mg/kg (90% of total), Max 81 mg via pump over 60 minutes beginning immediately following the bolus.
4. Verify total dose given. Document total tPA dose to be administered, start and stop times; Start tPA on IVAC pump. Half set may be needed to insure no medication loss.
5. BP goal during and after TPA SBP <180 and DBP <105
6. [Paramedic/Med Control] Start with 10 mg LABETALOL IV push over 1-2 minutes if BP is not within range. Re-contact Med Control for further orders if needed
7. If excess medication remains in the bag after correct amount is given do not flush primary tubing. Disconnect Alteplase tubing from the patient, then remove from the pump and discard immediately.
8. If the complete bag needs to be given in order to receive the correct dose, follow tPA administration with a NS infusion at the same rate. Make sure this is done before the pump alarms “air in line”.

Stop Infusion if:

   a. Neurologic deterioration and / or new headache
   b. SBP >180 or DBP > 105 – after treatment with medication. Contact Medical Control
   c. Symptoms of internal bleeding. See Stroke/Cerebrovascular Accident Guideline
   d. Nausea / Vomiting
   e. Allergic reaction including: rash, itching, anaphylaxis or angioedema

Notify Medical control:

1. If infusion was stopped
2. Change in patient’s condition (improved or deteriorating)
3. Temp > 38.5
4. Pulse <50 or >100
5. RR <10 or >24

Notes:

1. Ensure patient has two IVs [at least one AC if possible] – do not delay transport to establish
2. If receiving hospital does not have a half set ready you may need to wait or leave IVAC pump.

Never discard TPA if you are unsure if complete dose was given. TPA has a significant cost and should never be discarded in error.
Intranasal Medication Administration

**General Scope**: Procedure for administration of intranasal medications via the Mucosal Atomization Device (MAD).

**Procedure**:

1. Determine MAD/Intranasal indications
2. Rule out contraindications
   a. Epistaxis
   b. Nasal trauma
   c. Nasal septal abnormalities
   d. Significant nasal congestion/discharge
3. Draw up medication not to exceed 2ml total volume
4. Attach MAD to syringe and place MAD in nostril
5. Briskly compress syringe to administer atomized medication
   a. Point outwards and upwards
   b. Do not exceed 1ml total volume per nostril
      i. Medications may be repeated in 5-10 minutes as needed and indicated
LifeVac

**General Scope:** Procedure for use of LifeVac non-powered manual suction device for the removal of foreign body airway obstruction.

**Procedure:**

1. Use only if failure of standard BLS procedures
2. Insert mask into the unit with a twisting motion while applying pressure
3. Place mask over nose and mouth, holding chin upwards. Mask must be held firmly over nose and mouth with hand(s). If two rescuers are available, use two thumbs down technique to hold mask in place.
4. While mask is held in place and chin held upwards, push handle down to compress unit.
5. Once handle is depressed, pull handle upward with a short, swift tug, while holding mask firmly in place.
6. Roll patient on side and sweep mouth to clear any debris. Also check unit for debris.
7. Repeat until relief of obstruction or five times.
8. If unsuccessful, return to standard **Airway Obstruction Guideline.**
Mechanical CPR – LUCAS

**General Scope:** Procedure for use of LUCAS mechanical CPR device.

**Procedure:**

1. **DO NOT DELAY MANUAL CHEST COMPRESSIONS FOR PLACEMENT OF MECHANICAL CPR**
2. Be sure to turn device on immediately upon opening case to allow for self-test
3. Ensure that defibrillator pads, CPR feedback devices, and ECG cables will not interfere with suction cup placement
4. Stage backplate and stabilization strap superior to the patient’s head prior to placement
5. Place backplate at the next natural pause in the resuscitation
   a. Coordinate placement of backplate with compressor to ensure minimal interruption of chest compressions.
   b. Lift patient’s shoulders and slide backplate under patient’s head until the top of the backplate is just below the patient’s armpits (center of shoulder align with nipple line)
      i. May also roll patient side to side and place backplate as described above.
6. Resume manual chest compressions immediately upon placement of backplate
7. Remove LUCAS from case and pull on both release rings to assure that claw locks are open
8. Attach claw to backplate on opposite side of compressor while chest compressions continue
9. Coordinate with compressor to place the device at the next natural pause in resuscitation
   a. Pivot the device through the manual compressors arms and lock the opposite claw
   b. Pull up on device once to ensure that claws are locked
10. Position the suction cup so that the lower edge is just proximal to the xiphoid process
    a. Assure that nothing interferes with placement of suction cup
11. Push suction cup down with two fingers until pressure pad touches the patient’s chest
12. Press 2 (PAUSE) button to lock the start position and remove fingers from suction cup
    a. Verify position is correct. If not, press 1 (ADJUST), pull suction cup up, and reposition.
    b. If patient is too large or too small, remove device and immediately restart manual compressions
13. Press appropriate 3 (ACTIVE) button
    a. Use 30:2 when no advanced airway is present and CONTINUOUS when one is
14. Secure stabilization strap and mark superior location of suction cup on patient’s chest
15. Place patient’s wrists/arms in appropriate straps on device
LUCAS considerations

- Defibrillation can and should be performed with the LUCAS device in place and in operation
- If the pressure pad and suction cup are incorrectly positioned, there is an increased risk of damage to the rib cage and the internal organs, and cardiac output is further decreased.
- If the position of the suction cup changes during operation, immediately press 2 (ADJUST) and adjust the position. Always use the stabilization strap to help maintain the correct position.
- The upper part of the device must remain vertical relative to the patient’s chest at all times. Reposition if the device goes off-axis.

LUCAS troubleshooting

- A red alarm LED will illuminate, and a high priority alarm will sound if there is any malfunction during operation.
  - In the event of an alarm, remove the battery for one to three seconds and replace.
    - If alarm condition is no longer present, follow steps 10-13 above.
    - If alarm condition remains, immediately remove LUCAS and resume manual chest compressions.

LUCAS references
Medical Personnel on Scene

**General Scope:** Guideline for dealing with extraneous medical professionals on the scene of a call.

**Procedure:**

1. If bystander is non-physician they may assist as crew deems appropriate, but may not direct care
2. If bystander is a physician, involvement options include:
   a. Assist and/or offer suggestions while EMS act under guideline and medical control
   b. Request to talk to medical control and directly offer medical advice and assistance if medical control deems it appropriate
   c. Request to direct patient care (must meet ALL the following criteria):
      i. Show valid state medical license unless known to crew
      ii. Contact medical control who must relinquish control to on scene physician
      iii. Physically accompany patient to hospital
      iv. Give orders which are reasonable, accurate, and within the scope of practice for the EMS crew

If orders are given that the crew members feel to be unreasonable, medically inaccurate, and/or not within their capabilities, the crew members DO NOT have to do that which they know by their training, skill, and experience would be detrimental to the patient.
Naloxone Leave-Behind

**General Scope:** Agencies that participate in the Naloxone Leave-Behind Procedure may distribute naloxone kits intended for layperson use after refusal of transport by suspected opioid overdoses.

**Guideline:**

1. Participating agencies will obtain or create naloxone kits intended for layperson use as available
2. Participating agencies will provide a naloxone kit if available to patient and/or bystander involved in a suspected opioid overdose case
3. Participating agencies can use their discretion and clinical judgement to distribute naloxone kits to a patient and/or bystander that may benefit from the program
4. Distribution of naloxone kits must be documented in an ePCR (RescueNet users should use “Naloxone Kit” under Interventions)
5. Naloxone from regular EMS supply shall not be distributed to patients or bystanders
Orogastric Tube

**General Scope:** Procedure for OG tube placement with an advanced airway.

**Guideline:**

1. With an advanced airway, consider orogastric tube (OG) placement if assessment reveals the following:
   a. Vomiting
   b. Distended abdomen after resuscitative efforts (air-filled stomach)
   c. Avoid in patients with significant facial and head injuries
2. Determine length of insertion
   a. Mouth: center of lips → earlobe → bottom of sternum
   b. King LTS-D: nose → earlobe → bottom of sternum
   c. iGel: proximal end → earlobe → bottom of sternum
3. Lubricate OG with water-based lubricant
4. If spinal precautions are not applicable, carefully place patient’s head in a neutral or slightly flexed position
5. Insert OG through mouth (ETT) or gastric channel (King LTS-D or iGel) to determined length
6. Inspect for coiled OG
7. Inject air through OG and auscultate over epigastrium
8. Tape OG to mouth or advanced airway and connect to intermittent suction set at 40-60mmHg (max 80mmHg). If intermittent suction is not available, set suction unit at 40-60mmHg (max of 80mmHg) and suction in intervals of 30-60 seconds every 3-5 minutes.
Needle Cricothyroidotomy

**General Scope:** Procedure for needle cricothyroidotomy. Preferred for children under 10.

**Guideline:**

1. Determine need
2. Palpate cricothyroid membrane and clean area with antiseptic wipe
3. Puncture membrane with 14ga catheter, advance caudally, drawing back on syringe until air return
4. Withdraw needle and attach 3.0mm pediatric ETT adapter with BVM
5. Auscultate chest and secure device
Needle Decompression

**General Scope:** Procedure for needle chest decompression

**Guideline:**

1. Determine need
   a. Suspected TENSION pneumothorax (hypoxia with hypotension)
   b. Traumatic cardiac arrest with suspected chest injury
2. If conscious see [Sedation Procedure](#)
3. Cleanse site with antiseptic wipe
   a. 5th intercostal space mid-axillary is preferred
   b. 2nd intercostal space mid-clavicular is secondary
4. Insert 10g - 14g catheter
5. Listen for rush of air
6. Remove needle leaving catheter in place
7. Auscultate chest and secure device
Non-Invasive Positive Pressure Ventilation (NIPPV)

**General Scope:** Procedure for disposable CPAP / Bi-Level CPAP** (not ventilator driven)

**Applies to:** EMTs**/Paramedics (EMTs & AEMTs must have additional training and approval for CPAP and/or Bi-Level CPAP; paramedics must have additional training and approval for Bi-Level CPAP only)

**Guideline:**

1. Determine need (Clinical Indications):
2. Moderate to severe respiratory distress with signs and symptoms of pulmonary edema, CHF, or COPD, refractory to initial interventions, and all of the following apply:
   a. Awake and able to follow commands
   b. Over 12 years old and is able to fit the CPAP mask
   c. Has the ability to maintain an open airway
      i. **And** exhibits **two** or more of the following:
         1. A respiratory rate > 26 breaths per minute
         2. SPO$_2$ < 92% on high flow oxygen
         3. Use of intercostal or accessory muscles during respirations
         4. Wheezing or wet lung sounds
3. **[AEMT]** Establish IV/IO
4. Talk patient through procedure and cautiously sedate as needed, see [Sedation Procedure]
5. Start CPAP at 5-7 cmH$_2$O or pre-set level (verify with manometer)
   a. If using Bi-Level CPAP, start with 8-10 cmH$_2$O IPAP
   b. Using manometer, verify at least 4-5 cmH$_2$O of EPAP
   c. Adjust IPAP and EPAP as necessary

**Note:**

<table>
<thead>
<tr>
<th>Indications</th>
<th>Exclusion criteria</th>
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<tbody>
<tr>
<td>• Acute pulmonary edema as a bridge device</td>
<td>• Recurrent aspiration</td>
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<tr>
<td>• Patients already on CPAP</td>
<td>• Large volumes of secretions</td>
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<tr>
<td>• Mild respiratory failure due to muscle fatigue</td>
<td>• Inability to protect the airway</td>
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<tr>
<td>• COPD</td>
<td>• Vomiting</td>
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<td>• Obstructed bowel</td>
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<td>• Upper airway obstruction</td>
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<td>• Uncooperative, confused or combative patient</td>
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<td>• Inability to tolerate a tight mask</td>
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<td>• Orofacial abnormalities which interfere with mask/face interface</td>
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<td>• Untreated pneumothorax</td>
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</table>
Pain Management

**General Scope:** Guideline for treatment of patients who are or suspected to be experiencing pain

**Guideline:**

1. Perform routine medical assessment
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
3. Treat underlying cause of pain
   a. Splint and pad known or suspected fractures and dislocations
   b. Apply ice packs to suspected fractures and dislocations
   c. Elevate injured extremities when possible
4. Consider the chart below for determining pain management options
5. [AEMT] Consider IV/IO

### MILD – MODERATE PAIN

1. [EMT] IBUPROFEN
   a. 400 mg PO one time
   b. Pediatric (> 6 months) 10 mg/kg PO one time (Max 400mg)

**OR**

2. [AEMT] KETOROLAC¹
   a. 15 mg IV/IO/IM one time
   b. Pediatric (>1 y/o) – 0.5 mg/kg IV/IO/IM ONLY one time (Max 15 mg)

**AND**

3. [EMT] ACETAMINOPHEN²
   a. 600mg-650mg PO one time
   b. Pediatric (> 1 y/o) – 10 mg/kg PO one time (Max 650 mg)

Evidence suggests that the administration of an NSAID + acetaminophen is as effective as opiate medications. It is OK to administer only one if other is contraindicated

### SEVERE PAIN

1. [Paramedic] FENTANYL
   a. 25-50mcg IV/IO/IN
   b. Pediatric (< 8 y/o) - 1 mcg/kg IV/IO/IN
   c. May repeat every 10 minutes as needed
      i. Recheck vital signs between doses

2. [Paramedic] KETAMINE 0.25 mg/kg (Adult & Pediatric)
   a. May repeat every 15 minutes as needed

3. Recheck vital signs between doses

4. [Paramedic] Consider MIDAZOLAM 1-2 mg IV/IO/IM
   a. Pediatric (< 8 y/o) 0.1 mg/kg up to 1 mg
   b. May repeat every 15 minutes as needed

1. For transports >15 minutes, patients treated with FENTANYL, KETAMINE, or MIDAZOLAM should have end tidal CO₂ monitoring

**Notes:**

Ketorolac is **contraindicated for all patients over 49**, or any patient with known renal insufficiency, any patient in third trimester of pregnancy, any patient with hypersensitivity to NSAIDs, or concern for intracranial bleeding.

Ibuprofen is **contraindicated for all patients over 49**, any patient with known renal insufficiency, any patient in third trimester of pregnancy, patients with inability to swallow, known sensitivity to NSAIDs, or if patient has taken NSAIDS in last four hours.

Acetaminophen is contraindicated for use in patients with inability to swallow, known sensitivity to acetaminophen, or if patient has taken anything containing acetaminophen in last four hours.
PICC Line Usage

**General Scope:** Guideline and criteria for accessing and using PICC lines.

**Applies to:** Paramedic

**Procedure:**

1. May administer medications through previously placed PICC lines when no other option is available.
   a. Maintenance of aseptic technique is of significant importance.
   b. If inter-facility transport, consult with referral facility RN for port selection
   c. If cardiac arrest, use any port
   d. Flush medication with 10ml NS using at least a 10cc syringe.
      i. Syringes smaller than 10cc can exert excessive pressure on PICC lines.
   e. Maintain dressing at PICC site.
Resuscitation Sequence Intubation

**General Scope:** Procedure for resuscitation sequence intubation. This procedure may only be initiated when two paramedics are at patient side unless single medic RSI is approved by the Medical Director and EMS service policy.

**Applies to:** Paramedics

**Procedure:**

1. Ensure adequate ventilation/pre-oxygenation via appropriate adjunct
2. High flow (15L/min) O2 via nasal cannula for apneic oxygenation
3. Prepare equipment, medication, and patient
   a. See [Airway Management Checklist](#)
4. If systolic blood pressure <90 and symptomatic, see [Blood Pressure Management Procedure](#). Pressor infusion is preferred over push dose epinephrine if time allows.
   a. Consider [PUSH DOSE EPINEPHRINE** (10mcg/1mL)](#)
   b. Administer 10-20mcg (1-2mL) [PUSH DOSE EPINEPHRINE** (10mcg/1mL)](#) atleast one minute prior to sedation and every 2-5 minutes as needed
5. Administer [KETAMINE 0.5-2mg/kg](#)
   a. For patients with systolic blood pressure <90, use 0.5 mg/kg dose
   b. Pediatric (< 8 y/o) – 0.5-2mg/kg
6. Administer [ROCURONIUM 1mg/kg (~20 min duration)](#)
7. Secure airway
8. Confirm placement with waveform capnography and auscultation
9. Monitor EtCO₂, SpO₂, and secure ETT
10. Consider, at least every 15 minutes, re-sedation & pain management as needed; consider lower doses in patients with continued hemodynamic compromise
   a. [KETAMINE 0.5-1mg/kg](#)
      i. Pediatric (< 8 y/o) – 0.5-1mg/kg
   b. [MIDAZOLAM 1-2mg](#)
      i. Pediatric (< 8 y/o) – 0.05mg/kg
   c. [FENTANYL 25-50mcg](#)
      i. Pediatric (< 8 y/o) – 1mcg/kg

Only re-paralyze with [ROCURONIUM 0.5mg/kg](#) if sedation/pain management fails.
Refusal of Evaluation, Treatment, and/or Transport

**General Scope:** Procedure for patient refusal of evaluation, treatment and/or transport. This applies to EMS agencies (EMR and above) who have approval from their leadership team or board.

**Procedure:**

**Determining capacity to refuse**

Patients are considered to be capable of refusing care if they do not endorse suicidal or homicidal ideation, are oriented to person, place, time, and event (or to their baseline mental status) and can express understanding of the risks of refusal. The use of alcohol or other drugs should not be used solely as a criterion for rendering a person incapable of making a medical decision. Rather, the circumstances of the event should be taken into account. For example, the patient who has used alcohol or other drugs with a potential for head trauma and altered mental status will be transported under implied consent whereas the substance-using patient in their home with no evidence of trauma who meets the capacity criteria above may be capable of making a medical decision.

1. Upon identification of a patient, recommend evaluation, treatment, and/or transport
2. Determine mental status and extent of illness and/or injury
   a. If subject is believed to lack capacity to refuse
      i. Treat/transport under implied consent if possible
      ii. Consider law enforcement involvement for possible chapter hold
3. Provide appropriate assessment and treatment as allowed
4. Advise patient and/or representative of potential risks of refusal and obtain acknowledgement of understanding and acceptance of risks and responsibility
5. Consider contacting Medical Control for consultation about and/or with the patient and/or representative
6. Read to the patient and/or representative the General Refusal Statement below
7. Advise the patient and/or representative call 911 for additional service if needed
8. If refusal obtained, ePCR/run report must be completed with a copy of the signed refusal form

**General Refusal Statement**

You understand that the EMS personnel are not physicians, and our care is not a substitute for that of a physician. You recognize that you may have a serious injury or illness which could get worse without medical attention even though you (or the patient on whose behalf I legally sign this document) may feel fine at the present time.
Restraint Use

**General Scope:** Physical restraints are permitted for patients who have a potential or recognized medical emergency, are exhibiting violent or combative behavior, where less restrictive means of gaining patient cooperation have failed, and are at immediate risk for harming themselves or others because they are incapable of making appropriate healthcare decisions.

**Procedure:**

1. Choose appropriate/approved restraints in combination with cot seatbelts
   a. **Under no circumstances are patients to be restrained in prone position**
   b. Patient must be restrained in position where continual assessment of patient’s airway, breathing, circulation can be maintained and not obstructed.

2. Physical
   a. Soft restraints
      i. Restrain all extremities to cot
      ii. Assess to ensure airway patency
      iii. Assure adequate distal circulation of all extremities
   b. Handcuffs
      i. Law enforcement must always accompany a patient in handcuffs
      ii. Transition to soft restraints if adequate help is available
   c. **Spit Hood**

3. Chemical
   a. [Paramedic] **MIDAZOLAM**
      i. Adult
         1. 1-3mg IV/IO or 5mg IM
      ii. Pediatric (< 8 y/o)
         1. 0.5 mg/kg IV/IO or 0.1mg/kg IM
   b. [Paramedic] Consider antipsychotic administration
      i. **ZIPRASADONE (GEODON)** (≥ 12 y/o) 10-20mg IM
      ii. Use with caution in the elderly
         iii. Postural hypotension can result, patients receiving antipsychotic should remain supine or lateral recumbent position
   c. [Paramedic] consider **KETAMINE** 0.5-2mg/kg IV/IO/IM
   d. For continued sedation (infusion), see **Sedation Procedure**

4. Document
   a. Reason for restraint
   b. Method used
   c. Document LOC, vital signs (including SpO2 and EtCO2) and distal circulation at least every 5 minutes
Sedation

**General Scope:** Guideline for treatment of patients who require sedation in the prehospital setting. All patients who receive sedation should have continuous monitoring of vital signs including cardiac monitoring.

**Procedure:**

1. Perform routine medical assessment
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
3. Consider hypoxia or hypovolemia
4. If patient is combative, maintain adequate physical and/or chemical restraints, see [Restraint Use Procedure](#)
5. [AEMT] Establish IV/IO if possible
6. [Paramedic] Consider the following infusions

<table>
<thead>
<tr>
<th>MIDAZOLAM</th>
<th>KETAMINE</th>
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<tbody>
<tr>
<td>*** Infusions of controlled substances must be stopped and wasted by the transporting crew. Controlled substances in any form may not be turned over to receiving facilities. ***</td>
<td></td>
</tr>
<tr>
<td><strong>Adult</strong></td>
<td><strong>Adult</strong></td>
</tr>
<tr>
<td>• Bolus dosing</td>
<td>• Bolus dosing</td>
</tr>
<tr>
<td>o 1-3mg IV/IO</td>
<td>o 0.5-2 mg/kg IV/IO/IM</td>
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<tr>
<td>o 5mg IM</td>
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<tr>
<td>• Infusion dosing</td>
<td>• Infusion dosing</td>
</tr>
<tr>
<td>o Mix 10mg in 100mL NS</td>
<td>o Mix 100mg in 100mL NS</td>
</tr>
<tr>
<td>o Use MIDAZOLAM calc function on pump</td>
<td>o Use GENERIC calc function on pump</td>
</tr>
<tr>
<td>▪ Start at 1-2 mg/hr</td>
<td>▪ Start at 0.8 mcg/kg/min</td>
</tr>
<tr>
<td>▪ Titrate by 0.5 mg/hr; max of 7 mg/hr</td>
<td>▪ Titrate by 0.4 mcg/kg/min; max of 6 mcg/kg/min</td>
</tr>
<tr>
<td><strong>Pediatric (&lt; 8 y/o)</strong></td>
<td><strong>Pediatric (&lt; 8 y/o)</strong></td>
</tr>
<tr>
<td>• Bolus dosing</td>
<td>• Bolus dosing</td>
</tr>
<tr>
<td>o 0.05 mg/kg IV/IO or 0.1 mg/kg IM</td>
<td>o 0.5-2 mg/kg IV/IO/IM</td>
</tr>
<tr>
<td>• Infusion dosing</td>
<td>• Infusion dosing</td>
</tr>
<tr>
<td>o Mix 5mg in 100mL NS</td>
<td>o Mix 50mg in 100mL NS</td>
</tr>
<tr>
<td>o Use GENERIC drug calc function on pump</td>
<td>o Use GENERIC drug calc function on pump</td>
</tr>
<tr>
<td>▪ Start at 1 mcg/kg/min</td>
<td>▪ Administer 1 mcg/kg/min</td>
</tr>
<tr>
<td>▪ Titrate by 0.5 mcg/kg/min; max of 5 mcg/kg/min</td>
<td>▪ Titrate by 0.5 mcg/kg/min; max of 6 mcg/kg/min</td>
</tr>
</tbody>
</table>
Selective Spinal Precautions

**General Scope:** Criteria to exclude patients selectively from spinal precautions when a low index of suspicion of injury and reassuring assessment is present. Applies only to paramedics.

**Guideline:**

1. Perform routine trauma assessment while cervical spine is manually immobilized
2. **[Paramedic]** Determine if patient meets any of the following Spinal Precautions criteria. If referred to spinal precaution guidelines at any time, subsequent exams are unnecessary
   a. Altered level of consciousness? If YES see spinal precautions procedure
   b. >65 y/o or <5 y/o with significant mechanism of Injury? If YES see spinal precautions procedure
   c. Evidence of impairment by drugs/alcohol? If YES see spinal precautions procedure
   d. Painful distracting injuries? If YES see spinal precautions procedure
   e. Perform Neuro Exam: Does the patient have any focal deficit? If YES see spinalprecautions procedure
   f. Perform Spinal Exam: Point tenderness over the spinous process(es) or pain during range of motion? If YES see spinal precautions procedure
3. **[Paramedic]** If the answer is NO to all the above, spinal precautions may be deferred
   a. All deferred spinal precautions shall have the criteria above documented on the patient care report. When in doubt always refer to spinal precautions procedure.

**Pearls**

- You should not assume a walking patient has a clear C-Spine
- Consider precautions in any patient with arthritis, cancer, dialysis or other underlying spinal or bone disease.
- When present, the decision to NOT implement spinal precautions in a patient is the responsibility of the paramedic solely.
- In very old and very young, a normal exam may not be sufficient to rule out spinal injury.
- Range of motion should NOT be assessed if patient has midline spinal tenderness. Patient’s range of motion should not be assisted. The patient should touch his chin to his chest, extend his neck (look up), and turn his head from side to side (shoulder to shoulder) without spinal pain.
Spinal Examination

**General Scope:** This procedure details the spinal examination process and must be used in conjunction with the spinal precautions clearance guideline.

**Procedure:**

1. Explain to the patient the actions you are going to take. Ask the patient to immediately report any pain, and to answer questions with a “yes” or “no” rather than shaking the head.

2. With the patient’s spine supported to limit movement, begin palpation at the base of the skull at the midline of the spine.

3. Palpate the vertebrae individually from the base of the skull to the bottom of the sacrum.

4. On palpation of each vertebral body, look for evidence of pain and ask the patient if they are experiencing pain. If evidence of pain along the spinal column is encountered, the patient should be immobilized.

5. If the capable patient is found to be pain free, ask the patient to turn their head first to one side (so that the chin is pointing toward the shoulder on the same side as the head is rotating) and if pain free, to the other side. If there is evidence of pain the patient should be immobilized.

6. With the head rotated back to its normal position, ask the patient to flex and extend their neck. If there is evidence of pain use spinal precautions procedure.
Spinal Precautions

General Scope: Procedure for spinal precautions.

Procedure:

1. Explain the procedure to the patient
2. Assess CMS
3. Hold manual stabilization of the c-spine in neutral position until secured to movement device/stretcher or selective spinal precaution evaluation is performed.
4. Measure and place cervical collar.
   a. If cervical collar does not fit due to obesity or physical abnormality, attempt stabilization with blanket roll around neck.
5. If patient is supine or prone place the patient on a backboard/scoop by the safest method available (i.e., log-roll, lift, etc.). For the patient in a vehicle or seated position or otherwise unable to be placed prone or supine, and the patient condition does not allow them to self-extricate to adjacent cot (i.e., other injury, pain, altered level of consciousness), place him or her on a backboard/scoop stretcher by the safest method available that allows maintenance of in-line spinal stabilization.
   a. Patients may be moved to cot via chair stretcher with c-collar and all straps including head strap.
6. Using straps, secure patient to the movement device (backboard/scoop stretcher).
   a. If CIDs are used, manual stabilization may be discontinued.
7. Once extricated and moved, patients should be taken off the backboard or scoop stretcher if possible and be placed directly on the ambulance stretcher. It is acceptable to leave a patient on a backboard for transport (transports < 5 min, or life threatening patient condition), but every effort should be made to secure the patient to the stretcher and not the backboard/scoop during transport.
8. Once backboard/scoop is removed or patient self-extricates to adjacent ambulance stretcher, spinal precautions for at-risk patients are paramount. These include cervical collar, blanket/padding rolls around head, securing to stretcher with all cot straps (including shoulder belts), minimal movement/transfers, and maintenance of in-line spine stabilization during necessary movement/transfers.

Note:

- Spinal precautions may be achieved by many appropriate methods. In addition, some patients, due to size or age, will not be able to be immobilized through in-line stabilization with standard devices and C-collars. Never force a patient into a non-neutral position to immobilize him or her. Manual stabilization may be required during transport. Special situations such as athletes in full shoulder pads and helmet may remain immobilized with helmet and pads in place, unless a sports medicine trainer that is knowledgeable regarding the proper removal of that athletic equipment is present. The sports medicine trainer maybe the most appropriate person involved in the care of the athlete to properly remove athletic equipment.
Spit Hood

**General Scope:** Guideline for use of protective hoods. This guideline should be used for patients who are combative and/or aggressive, and *purposely* attempting to spit on providers or other public safety personnel. Spitting carries potential risk of disease transmission. Use of a protective hood minimizes said risk.

**Procedure:**

1. Use of one-piece surgical mask or oxygen mask is preferred for minimizing risk of disease transmission by patients who are purposely spitting.
2. CONDITIONS FOR USE
   a. DO NOT USE unless patient is under control and restrained.
   b. DO NOT USE on anyone that is vomiting, having difficulty breathing, or is bleeding profusely from the area around the mouth or nose.
   c. Patient must be under *constant* visual supervision and should *never* be left unattended.
   d. Remove patient’s jewelry and eyewear before application.
   e. If there is difficulty applying due to large size head, discontinue use.
   f. Conditions for use should be constantly monitored during patient encounter.
3. PROCEDURE FOR USE
   a. Open and remove the spit hood
   b. Place the spit hood over the head of the person with the mesh fabric positioned just below the eyes to allow the person to see.
   c. For the best fit, place the center elastic under the nose and over the ears. For better protection, the elastic may be placed above the nostrils.
   d. Carefully push the plastic Secure-Lock Tab down toward the top of the head while holding the top of the mesh fabric. This should take the slack out of the top and help secure the spit hood in position.
      i. **DO NOT** push so tightly as to be uncomfortable or impair the vision of the wearer.
4. See manufacturer instructions included in packaging for visual representation of procedure for use.
5. Patient should be transported in either left or right lateral position.
6. CONTINUOUSLY monitor patient’s airway, respiratory status, and pulse oximetry.
7. IMMEDIATELY remove surgical mask, oxygen mask, or spit hood if any question of airway patency or potential compromise.
Supraglottic Airway – King LT-D/LTS-D

General Scope: Procedure for placement of King LT-D/LTS-D.

Procedure:

1. Spinal precautions as needed
2. Select proper King Airway Device size (See table below)
3. Test cuff inflation (with volume as listed on table) and remove air prior to insertion
4. Apply water-based lubricant to beveled distal tip and posterior tube (avoid vent openings)
5. Position head as able
   a. “Sniffing position” is ideal but neutral position is acceptable
6. Open mouth and apply chin lift (unless suspected c-spine injury)
7. Insert King Airway Device rotated laterally 45-90°
8. Introduce tip into mouth and advance behind base of tongue
9. As tube passes tongue rotate back to midline
10. Advance until base of connector is aligned with teeth or gums
11. Inflate cuff with manufacturer recommended volume of air
12. Confirm proper position with auscultation and ETCO2 detection device
13. If unable to ventilate patient, gently and slowly pull back on King Airway Device until proper position is confirmed.
14. Upon verification of placement, secure using commercial device or tape
15. Reassess as needed
16. Suction as needed
17. For King LTS-D, decompress stomach as needed
   a. Gastric access lumen allows insertion of up to a 18Fr gastric tube
   b. Measure gastric tube from nose to earlobe to xiphoid process
   c. Lubricate gastric tube prior to insertion
   d. Advance gastric tube total distance noted in step b
   e. Use least amount of suction that effectively decompresses the stomach

<table>
<thead>
<tr>
<th>Size</th>
<th>Patient Height</th>
<th>Color</th>
<th>Inflation LT-D</th>
<th>Inflation LTS-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4-5 feet</td>
<td>Yellow</td>
<td>45-60 ml</td>
<td>40-55 ml</td>
</tr>
<tr>
<td>4</td>
<td>5-6 feet</td>
<td>Red</td>
<td>50-70 ml</td>
<td>50-70 ml</td>
</tr>
<tr>
<td>5</td>
<td>Greater than six feet</td>
<td>Purple</td>
<td>60-80 ml</td>
<td>60-80 ml</td>
</tr>
</tbody>
</table>
Supraglottic Airway – I-Gel

**General Scope:** Procedure for placement of i-gel

**Procedure:**

1. Consider spinal precautions as needed
2. Select proper i-gel size (See table below)
3. Apply water-based lubricant to the anterior, posterior, and lateral edges of the gel cuff
4. Position head as able
   a. “Sniffing position” is ideal but neutral position is acceptable
5. Hold the i-gel at the integrated bite block
6. Open mouth and apply chin lift, unless contraindicated
7. Position the device so the gel cuff outlet faces the patient’s chin
8. Advance tip into the patient’s mouth toward the midline of the hard palate
9. Without exerting excessive force, advance the device downward and backward along the hard palate until a definitive resistance is felt
10. Confirm proper position with auscultation and ETCO2 detection device
11. Upon verification of placement, secure using commercial device or tape
12. Reassess as needed
13. Suction as needed
14. For sizes 1.5-5, decompress stomach as needed
   a. Gastric channel allows insertion of the following sized gastric tubes
      Size 1.5 – 10 fr
      Size 2-4 – 12 fr
      Size 5 – 14 fr
   b. Measure gastric tube from tip of i-gel to earlobe to xiphoid process
   c. Lubricate gastric tube prior to insertion
   d. Advance gastric tube total distance noted in step b
15. Use least amount of suction that effectively decompresses the stomach

<table>
<thead>
<tr>
<th>Size</th>
<th>Color</th>
<th>Patient Category</th>
<th>Patient Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pink</td>
<td>Neonate</td>
<td>2-5 kg</td>
</tr>
<tr>
<td>1.5</td>
<td>Blue</td>
<td>Infant</td>
<td>5-12 kg</td>
</tr>
<tr>
<td>2</td>
<td>Gray</td>
<td>Small pediatric</td>
<td>10-25 kg</td>
</tr>
<tr>
<td>2.5</td>
<td>White</td>
<td>Large pediatric</td>
<td>25-35 kg</td>
</tr>
<tr>
<td>3</td>
<td>Yellow</td>
<td>Small adult</td>
<td>30-60 kg</td>
</tr>
<tr>
<td>4</td>
<td>Green</td>
<td>Medium Adult</td>
<td>50-90 kg</td>
</tr>
<tr>
<td>5</td>
<td>Orange</td>
<td>Large Adult</td>
<td>90+ kg</td>
</tr>
</tbody>
</table>
Surgical Cricothyroidotomy

**General Scope:** Procedure for surgical cricothyroidotomy.

**Applies to:** Critical Care Paramedics

**Guideline:**

1. Attempt to provide optimal O₂ saturation prior to starting
2. Palpate cricothyroid membrane and clean area with antiseptic wipe
3. Make midline incision with scalpel over cricothyroid membrane
4. Insert trach hook and provide upward and caudal traction
5. Use scalpel to open transversely into trachea keeping blade near or against trach hook
6. Introduce 6.0 mm ETT
   a. Inflate with 5-10ml air
7. Auscultate chest and secure device

**Notes:**

- [Needle Cricothyroidotomy](#) is recommended for children under 10 years old.
Tracheostomy Care

**General Scope:** General recommendations for tracheostomy care.

1. Consult with patient’s caregiver(s) for assistance
2. Do not remove tracheostomy tube unless obviously blocked or improperly placed
3. If patient with tracheostomy is in respiratory distress
   a. Look for possible causes of distress that may be easily correctable such as a detached Oxygen source
   b. Assess for causes of distress other than issues with tracheostomy (asthma, pneumonia, pulmonary edema, etc.)
   c. [EMR] If breathing is adequate but patient exhibits signs of respiratory distress, administer Oxygen via non-rebreather mask or blow-by over the tracheostomy
   d. [EMT] Suction any visible mucus to help clear the airway.
   e. [AEMT] If needed, suction tracheostomy (approx. 2-3 inches) using no more than 100mmHg of suction.
      i. [Paramedic] May use 2-3mL NORMAL SALINE flush to loosen secretions
   e. [EMT] If patient’s breathing remains inadequate after succioning, assist ventilations using BVM
      i. If on a ventilator and breathing is inadequate, remove patient from ventilator and use BVM to rule out problem with ventilator
4. [Paramedic] If tracheostomy tube has been removed or dislodged, replace with same (cleaned) or another tracheostomy tube or endotracheal tube
Transvenous Pacemaker

**General Scope:** Guideline and criteria for transporting a patient with a transvenous pacemaker.

**Applies to:** All Critical Care Staff

**Procedure:**

1. Locate pacemaker generator
2. Ensure battery is fresh
3. Identify each wire set as atrial or ventricular
   a. Epicardial ventricular wires exit from the left side of the chest
   b. Atrial wires exit from the right side of the chest generally
4. Verify wires are attached to the appropriate sites
5. Ensure power is on the pulse generator
6. Confirm set rate based on need and physician orders
7. Confirm amperage settings
8. Confirm sensitivity
   a. Start at 2-5mV
   b. If failure occurs turn sensitivity DOWN
   c. If pacer is sensing beats not present turn sensitivity UP
9. Observe patient for response
10. Secure all wires, connections, and pacemaker in a safe location
References
Air Ambulance Use

**General Scope:** Procedure and criteria for air ambulance request.

1. Routine medical and/or trauma assessment
2. Determine need for air transport
3. Assess appropriateness of air transport for distance/terrain
   a. Air ambulance is likely inefficient if ground transport time is <30 minutes or 30 miles
4. Request Gundersen AIR or appropriate air transport through agency communications center
5. Assure provision of a secure landing zone
Alternative Destination Transport

For Tri-State Ambulance only.

The most important factor in determination for appropriateness of transport to an alternate destination is the providers’ clinical impression. Use telemedicine if unsure.

Patients that are expected to utilize a high number of resources that are typically unavailable in a clinic setting should be transported to the emergency room. Examples include, but are not limited to, social services, psychiatric, and detoxification. Use telemedicine if unsure.

If telemedicine is unavailable for consultation, contact Medical Control by phone.

**VITALS**

Patients with vital signs outside these parameters should be transported to the emergency room.

- Normal level of consciousness (per baseline)

<table>
<thead>
<tr>
<th>Vital Sign</th>
<th>Lower Limit</th>
<th>Upper Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Rate</td>
<td>60</td>
<td>110</td>
</tr>
<tr>
<td>Systolic BP</td>
<td>90</td>
<td>210</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>SPO₂</td>
<td>92%</td>
<td>-</td>
</tr>
<tr>
<td>Temperature</td>
<td>96.8°</td>
<td>100.3°</td>
</tr>
</tbody>
</table>
Consider alternate destination transport for the following patient categories and criteria.

**Endocrine**
- Hypoglycemic incident with return to normal LOC after treatment
- Use telemedicine consult to determine need for transport and destination

**Lacerations**
- Simple isolated lacerations with controlled bleeding
- No evidence of self-harm

**Nausea/Vomiting/Diarrhea**
- Under 50
- Not pregnant
- No blood in stool or vomit
- Blood glucose between 60 and 200

**Medication Issues (Telemedicine Recommended)**
- Out of medication
- “Reaction” to medication
  - No signs of allergic reaction/anaphylaxis
- Took wrong medication/dose
Pain

- **Abdominal Pain**
  - Under 50 years old
  - Not pregnant
  - No recent trauma (72 hours)
  - Afebrile

- **Back Pain**
  - Under 50 years old
  - Not pregnant
  - Atraumatic
  - No new neuro deficits

- **Chest Pain**
  - Under 35 years old
  - Normal ECG
  - Not pregnant
  - Atraumatic
  - Normal lung sounds

- **Dental Pain - afebrile**
  - No swelling of floor of mouth or difficulty swallowing

- **Extremity Pain – excludes any potential femur/hip/pelvis injuries**
  - **Traumatic Injury**
    - Minor trauma with single extremity injury
    - CMS intact in injured extremity
    - No angulated deformity or sign of open fracture
  - **No traumatic injury**
    - History of same pain
    - No history of clotting disorder
    - CMS intact in same extremity

Syncope

- Under 35 years old
- Normal ECG
- Not pregnant
- Blood glucose level between 60 and 200
Amiodarone Infusion

<table>
<thead>
<tr>
<th>Amiodarone Infusion</th>
<th>Infusion Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 mg / 100ml D$_2$W or NS (1.5 mg/ml)</td>
<td></td>
</tr>
<tr>
<td>Medication Dose</td>
<td>Infusion Rate</td>
</tr>
<tr>
<td>1 mg/min</td>
<td>40 ml/hr</td>
</tr>
</tbody>
</table>
Critical Care Paramedic Medications

**General Scope:** Along with all medications included on the Paramedic Medication list, the following medications have been Medical Director approved to be transported at the Critical Care Paramedic level when initiated by the sending physician.

- Cisatracurium besilate (Nimbex)
- Clonidine (Catapres)
- Dexmedetomidine (Precedex)
- Eptifibatide (Integrisilin)
- Nitroprusside (Nipride)
- Propofol (Diprivan)
# Dopamine Infusion

**200mg/250cc D₅W (800 mcg/mL)**

<table>
<thead>
<tr>
<th>Dose in mcg/kg/min</th>
<th>Weight in Kilograms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>45</td>
</tr>
<tr>
<td>Infusion Rate (ml/hr)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>24</td>
</tr>
<tr>
<td>10</td>
<td>34</td>
</tr>
<tr>
<td>15</td>
<td>51</td>
</tr>
<tr>
<td>20</td>
<td>68</td>
</tr>
</tbody>
</table>

**200mg/250cc D₅W (800 mcg/mL)**

<table>
<thead>
<tr>
<th>Dose in mcg/kg/min</th>
<th>Weight in Kilograms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>115</td>
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<td>Infusion Rate (ml/hr)</td>
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<tr>
<td>5</td>
<td>43</td>
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<td>7</td>
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<td>10</td>
<td>86</td>
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<td>15</td>
<td>129</td>
</tr>
<tr>
<td>20</td>
<td>173</td>
</tr>
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</table>
Epinephrine Infusion

<table>
<thead>
<tr>
<th>Medication Dose</th>
<th>Infusion Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 mcg/min</td>
<td>12 ml/hr</td>
</tr>
<tr>
<td>3 mcg/min</td>
<td>18 ml/hr</td>
</tr>
<tr>
<td>4 mcg/min</td>
<td>24 ml/hr</td>
</tr>
<tr>
<td>5 mcg/min</td>
<td>30 ml/hr</td>
</tr>
<tr>
<td>6 mcg/min</td>
<td>36 ml/hr</td>
</tr>
<tr>
<td>7 mcg/min</td>
<td>42 ml/hr</td>
</tr>
<tr>
<td>8 mcg/min</td>
<td>48 ml/hr</td>
</tr>
<tr>
<td>9 mcg/min</td>
<td>54 ml/hr</td>
</tr>
<tr>
<td>10 mcg/min</td>
<td>60 ml/hr</td>
</tr>
</tbody>
</table>
## Ideal Body Weight Chart

### Male

<table>
<thead>
<tr>
<th>Height</th>
<th>LBS</th>
<th>KG</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'6&quot;</td>
<td>63-77</td>
<td>29-35</td>
</tr>
<tr>
<td>4'7&quot;</td>
<td>68-84</td>
<td>31-38</td>
</tr>
<tr>
<td>4'8&quot;</td>
<td>74-90</td>
<td>34-41</td>
</tr>
<tr>
<td>4'9&quot;</td>
<td>79-97</td>
<td>36-44</td>
</tr>
<tr>
<td>4'10&quot;</td>
<td>85-103</td>
<td>39-47</td>
</tr>
<tr>
<td>4'11&quot;</td>
<td>90-110</td>
<td>41-50</td>
</tr>
<tr>
<td>5'0&quot;</td>
<td>95-117</td>
<td>43-53</td>
</tr>
<tr>
<td>5'1&quot;</td>
<td>101-123</td>
<td>46-56</td>
</tr>
<tr>
<td>5'2&quot;</td>
<td>106-130</td>
<td>48-59</td>
</tr>
<tr>
<td>5'3&quot;</td>
<td>112-136</td>
<td>51-62</td>
</tr>
<tr>
<td>5'4&quot;</td>
<td>117-143</td>
<td>53-65</td>
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<td>5'5&quot;</td>
<td>122-150</td>
<td>55-68</td>
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<tr>
<td>5'6&quot;</td>
<td>128-156</td>
<td>58-71</td>
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<tr>
<td>5'7&quot;</td>
<td>133-163</td>
<td>60-74</td>
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<tr>
<td>5'8&quot;</td>
<td>139-169</td>
<td>63-77</td>
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<td>5'9&quot;</td>
<td>144-176</td>
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<td>5'10&quot;</td>
<td>149-183</td>
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<td>5'11&quot;</td>
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<td>70-86</td>
</tr>
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<td>6'0&quot;</td>
<td>160-196</td>
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</tr>
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<td>6'1&quot;</td>
<td>166-202</td>
<td>75-92</td>
</tr>
<tr>
<td>6'2&quot;</td>
<td>171-209</td>
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<td>6'3&quot;</td>
<td>176-216</td>
<td>80-98</td>
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<td>6'4&quot;</td>
<td>182-222</td>
<td>83-101</td>
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<td>6'5&quot;</td>
<td>187-229</td>
<td>85-104</td>
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<td>6'6&quot;</td>
<td>193-235</td>
<td>88-107</td>
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<td>6'7&quot;</td>
<td>198-242</td>
<td>90-110</td>
</tr>
<tr>
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## Ketamine Infusion (Adult)

### 100mg/100cc D$_5$W (1,000 mcg/mL)

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### 100mg/100cc D$_5$W (1,000 mcg/mL)

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### Ketamine Infusion (Pediatric)

**50mg/100cc D_{5}W (500 mcg/mL)**

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Midazolam Infusion (Adult)

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## Midazolam Infusion (Pediatric)

**5mg/100cc D₅W (50 mcg/mL)**

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Nitroglycerin Infusion

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Norepinephrine Infusion

### 4mg/250cc D5W (16 mcg/mL)

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### 4mg/250cc D5W (16 mcg/mL)

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**ACETAMINOPHEN**: Ped >1yo

Dose: 10mg/kg PO one time (max 600-650mg)

Concentration: 160mg/5mL or 650mg/20.3mL, 32mg/mL

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### Oral Pain Management - Ibuprofen

**IBUPROFEN:** Ped >6mo  
Dose: 10mg/kg PO one time (max 400mg)  
Concentration: 100mg/5mL, 20mg/mL

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## Paramedic Medications

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<th>E - N</th>
<th>O - Z</th>
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<td>0.45% sodium chloride (½ NS)</td>
<td>Esmolol</td>
<td>Octreotide (Sandozstatin)</td>
</tr>
<tr>
<td>5% dextrose in 0.45% NaCl (D3/2 NS)</td>
<td>Etomidate (Amidate)</td>
<td>Olanzapine (Zyprexa)</td>
</tr>
<tr>
<td>5% dextrose in LR</td>
<td>Famotidine (Pepcid)</td>
<td>Ondansetron (Zofran)</td>
</tr>
<tr>
<td>5% dextrose in water (D5W)</td>
<td>Fentanyl (Sublimaze)</td>
<td>Oxygen</td>
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<tr>
<td>Abciximab (Reopro)</td>
<td>Flunazemel (Ronazicon)</td>
<td>Oxytocin (Pitocin)</td>
</tr>
<tr>
<td>Acetaminophen (Tylenol)</td>
<td>Fosphenytoin (Cerebyx)</td>
<td>Pancuronium (Pavulon)</td>
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<tr>
<td>Acetylcysteine (Mucomyst)</td>
<td>Furosemide (Lasix)</td>
<td>Phenergan (Promethazine)</td>
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<td>Activated charcoal</td>
<td>Glucagon</td>
<td>Phenytoin (Dilantin)</td>
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<tr>
<td>Adenosine (Adenocard)</td>
<td>Glucose</td>
<td>Potassium</td>
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<tr>
<td>Aggrastat (Tirofiban)</td>
<td>Haloperidol (Haldol)</td>
<td>Pralidoxime (2-pam chloride)</td>
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<td>Albuterol</td>
<td>Heparin</td>
<td>Procainamide</td>
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<tr>
<td>Alteplase (Activase)</td>
<td>Hydromorphone (Dilaudid)</td>
<td>Prochlorperazine (Compazine)</td>
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<td>Amiodarone (Cordarone)</td>
<td>Ibuprofen</td>
<td>Propranolol</td>
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<td>Antibiotics (if hung by facility)</td>
<td>Insulin</td>
<td>Protamine Sulfate</td>
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<td>Argatroban</td>
<td>Ipratropium (Atrovent)</td>
<td>Proton Pump Inhibitors (ALL)</td>
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<td>Aspirin</td>
<td>Ketamine (Ketalar)</td>
<td>Racemic Epinephrine</td>
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<td>Atropine</td>
<td>KETOROLAC (Toradol)</td>
<td>Reteplase (Retavase)</td>
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<td>Rocuronium (Zemuron)</td>
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<td>Blood products</td>
<td>Lactated Ringer’s</td>
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<td>Calcium chloride</td>
<td>Levalbuterol (Xopenex)</td>
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<td>Levetiracetam (Keppra)</td>
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<td>Lidocaine (xylocaine)</td>
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<td>Clonazepam (Klonopin)</td>
<td>Lorazepam (Ativan)</td>
<td>Thiamine</td>
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<tr>
<td>Clopidogrel (Plavix) - oral only</td>
<td>Magnesium sulfate</td>
<td>Toradol</td>
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<td>Cyanide antidote package (Cyanokit)</td>
<td>Mannitol (Osmotrol)</td>
<td>TPA(tissue plasminogen activator)</td>
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<tr>
<td>Amyl nitrate</td>
<td>Methylprednisolone (Solu-medrol)</td>
<td>TPN (total parental nutrition)</td>
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<tr>
<td>Sodium nitrate</td>
<td>Metoclopramide (Reglan)</td>
<td>Tranexamic acid (TXA)</td>
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<td>Sodium thiosulfate</td>
<td>Metoprolol (Lopressor)</td>
<td>Vasopressin (Pitressin)</td>
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<td>Dexamethasone (Decadron)</td>
<td>Midazolam (Versed)</td>
<td>Vasotec</td>
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<td>Dextrose (50%, 25%, 10%)</td>
<td>Milrinone</td>
<td>Vecuronium (Norcuron)</td>
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<td>Diazepam (Valium)</td>
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<td>Diltilazem (Cardizem)</td>
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<td>Diphenhydramine (Benadryl)</td>
<td>Naloxone (Narcan)</td>
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<td>Divalproex sodium (Depakote)</td>
<td>Nicardipine</td>
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<td>Dobutamine</td>
<td>Nifedipine (Procardia)</td>
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<td>Dopamine</td>
<td>Nitroglycerin</td>
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<td>Droperidal (Inapsine)</td>
<td>Nitrous oxide</td>
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<td>Enalaprilat</td>
<td>Norepineprine (Levophed)</td>
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<tr>
<td>Epinephrine</td>
<td>Normal saline (0.9% sodium chloride)</td>
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</table>
Push Dose Epinephrine

**General Scope:** Reference for dilution/creation of “push dose epinephrine”

**Procedure:**

Expel one milliliter of **normal saline** from a 10 mL preloaded **normal saline** syringe
Attach needle to preloaded **normal saline** syringe and draw one milliliter of 1:10,000 epinephrine (1mg/10mL – “cardiac epinephrine”)
Verify syringe now contains 0.1mg epinephrine in 10mL of solution
Concentration is now 100 mcg/10mL or 10mcg/mL
Label syringe with appropriate notation
Radio Report Outline

**General Scope:** To provide a general guideline for the EMS to hospital patient report. The report should be provided as soon as practical. EMS can request on-line medical control orders during the report, but it is often more expedient to initiate a request for orders prior to giving the patient report.

### Medical Patients

- Identify service, unit number and radio frequency
- Patient age, sex and level of consciousness (GCS)
- Chief complaint and/or primary impression
- Pertinent medical history related to illness
- Pertinent assessment findings and most recent vitals (BP, HR, RR, SpO2)
- Treatments provided

#### Hospital to Hospital Transfer Checklist
- Any SBP less than 90mmHg?
- Any HR greater than 120 bpm?
- Supplemental O2 4lpm or more?
- GCS less than 15?
- New or persistent chest pain or concern for cardiac event?
- Any other concerns?

- Estimated time of arrival

### Trauma Patients

- Identify service, unit number and radio frequency
- Origin - transporting from the scene or another facility?
- Age, sex and level of consciousness (GCS)
- Weight (pediatric patient)
- Mechanism of injury including time of injury
- Injuries found, pertinent history and use of blood thinners
- Most recent vitals (BP, HR, RR, SpO2) including lowest BP and highest HR
- Treatments provided
- Estimated time of arrival
Telemedicine Evaluation

Telemedicine evaluation should be considered for patients with no obvious life threats who do not request transport. The most important factors in determination for appropriateness of telemedicine evaluation is the providers’ clinical impression and the ability of the patient and/or support persons to comply with instructions provided by a telemedicine physician (i.e., obtain prescription medication, monitor vital signs, eat/drink, etc.).

Patients that are expected to need resources that are unable to be provided via telemedicine should be transported to the emergency room. Examples include, but are not limited to, social services, psychiatric, and detoxification.

Vital Signs

Patients with vital signs outside these parameters should not be considered for telemedicine evaluation only. Telemedicine evaluation may be used in addition to standard assessment, treatment, and transport for patients with vital signs outside the parameters.

- Normal level of consciousness (per baseline)
- Heart rate at or under upper limit of age based normal
- MAP of 65 or higher (or systolic at or above lower limit of normal)
- Respiratory rate under upper limit of age based normal
- \( \text{SpO}_2 > 92\% \)
- Temperature under 100.3°

| Normal Vital Signs Reference (Low-High) |
|-----------------|--------|--------|----------|
| Age Category    | Heart Rate | Respiratory Rate | Systolic BP |
| Adult           | 60-110    | 12-20       | 90-180    |
| Adolescent (13-18 years) | 55-110    | 12-20       | 80-140    |
| School Age (5-12 years) | 70-110    | 20-30       | 80-120    |
| Preschool (3-5 years) | 80-120    | 20-30       | 80-110    |
| Toddler (12-36 months) | 80-130    | 20-30       | 70-100    |
| Newborn/Infant (Birth-12 months) | 100-160   | 40-60       | 70-90     |
Consider use of telemedicine evaluation for the following patient categories and criteria.

Endocrine

- Hypoglycemic incident with return to normal LOC after treatment
  - Use telemedicine consult to determine need for transport and destination

Medication Issues

- Out of medication
- “Reaction” to medication
  - No signs of allergic reaction/anaphylaxis
- Took wrong medication/dose

Refusal of Transport

- Falls with refusal of transport
- Refusals of transport involving initial or active complaints of emergency symptoms
  - Emergency symptoms include, but are not limited to, shortness of breath, persistent pain or pressure in the chest, new confusion, or altered mental status.
Trauma Activation

**General Scope:** Guideline/criteria for activation of trauma team at Gundersen Health System

**Applies to:** Tri-State Ambulance Personnel (Reference for all other agencies)

---

**RED ACTIVATION**

- Traumatic arrest: active or history of
- Intubated, advanced airway adjunct and/or respiratory compromise, obstruction, stridor, or grunting in children
- Systolic blood pressure, confirmed by sequential readings of:
  - Adult < 90 mmHg
  - Pediatric < 60 mmHg (0-6 months)
  - < 70 mmHg (6 months-5 yrs)
  - < 80 mmHg (over 5 yrs – 14.9 yrs)
- Penetrating injury to head, neck, torso to include axilla, shoulder, groin, and buttocks
- Tourniquet in place to control extremity hemorrhage
- Blood products in Emergency Department or prior to arrival
- Extremity injuries
  - Complete or partial amputation proximal to wrist or ankle
  - Crushed, de-gloved or mangled proximal to wrist or ankle
- Evisceration
- GCS < 9 with mechanism attributed to trauma, including isolated hanging, traumatic asphyxia, or cold water drowning with signs of life
- Flail chest
- Unstable pelvis
- Severe hypothermia (core body temp < 28˚C [82.4˚F])

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**YELLOW ACTIVATION**

- Systolic blood pressure, confirmed by sequential reading of:
  - **Adult over age 65** <110 mmHg
- Extrication greater than 20 minutes
- Combination of trauma with burns
- Burns
  - Adult > 20% TBSA or involving face/airway
  - Pediatric > 15% TBSA or involving face/airway
- Ejection from enclosed vehicle
- Falls
  - Adult > 20 feet
  - Pediatric > 15 feet
- Auto-pedestrian/auto-bicycle with speeds > 20 mph
- High-voltage electrocution
- Moderate hypothermia (core temp 28˚C - 32.2˚C [90˚ F])

---

**TRANSPORT TO HIGHEST LEVEL TRAUMA CENTER**

<table>
<thead>
<tr>
<th>Glasgow Coma Scale &lt; 14</th>
<th>≥ two long bone fractures*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open/depressed skull fracture</td>
<td>New onset paralysis</td>
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</tbody>
</table>

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* Involving femur/humerus
Iowa Trauma Triage - Adult

The following criteria shall be utilized to assist the EMS provider in the identification of time critical injuries, method of transport and trauma care facility resources necessary for treatment of those injuries.

**Step 1 - Assess for Time Critical Injuries: Level of Consciousness & Vital Signs**
- Glasgow Coma Score ≤13
- Respiratory rate <10 or >29 breaths per minute, or need for ventilatory support.
- Systolic B/P (mmHg) less than <90 mmHg

*If ground transport time to a Resource (Level I) or Regional (Level II) Trauma Care Facility is less than 30 minutes, transport to the nearest Resource (Level I) or Regional (Level II) Trauma Care Facility. If greater than 30 minutes, ground transport time to Resource (Level I) or Regional (Level II) Trauma Care Facility, transport to the nearest appropriate Trauma Care Facility. If time can be saved or level of care needs exist, tier with ground or air ALS service program.*

If step 1 does not apply, move on to step 2.

**Step 2 - Assess for Anatomy of an Injury**
- All penetrating injuries to head, neck, torso and extremities proximal to elbow or knee
- Chest wall instability or deformity (e.g., flail chest)
- Suspected two or more proximal long-bone fractures
- Crushed, degloved, mangled, or pulseless extremity
- Amputation proximal to wrist or ankle
- Partial or full thickness burns > 10% TBSA or involving face/airway
- Suspected pelvic fractures
- Open or depressed skull fracture
- Paralysis or Parasthesia

*If ground transport time to a Resource (Level I) or Regional (Level II) Trauma Care Facility is less than 30 minutes, transport to the nearest Resource (Level I) or Regional (Level II) Trauma Care Facility. If greater than 30 minutes ground transport time to Resource (Level I) or Regional (Level II) Trauma Care Facility, transport to the nearest appropriate Trauma Care Facility. If time can be saved or level of care needs exist, tier with ground or air ALS service program.*

If step 2 does not apply, move on to step 3.

**Step 3 - Consider Mechanism of Injury & High Energy Transfer**
- Falls
  - Adult: > 20 ft. (one story is equal to 10 feet)
- High-risk auto crash
  - Interior compartment intrusion, including roof: >12 inches occupant site; >18 inches any site
  - Ejection (partial or complete) from automobile
  - Death in same passenger compartment
  - Vehicle telemetry data consistent with high risk of injury
  - Auto vs. pedestrian/bicyclist thrown, run over, or with significant (>20 mph) impact
  - Motorcycle crash >20 mph

Transport to the nearest appropriate Trauma Care Facility, need not be the highest level trauma care facility.

If step 3 does not apply, move on to step 4.

**Step 4 - Consider risk factors:**
- Older adults
  - Risk of injury/death increases after age 55 years
  - SBP<110 might represent shock after age 65 years
  - Low impact mechanisms (e.g. ground level falls) might result in severe injury
- Anticoagulants and bleeding disorders
  - Patients with head injury are at high risk for rapid deterioration
- Pregnancy > 20 weeks
- EMS provider judgment
- ETOH/Drug use

Transport to the nearest appropriate Trauma Care Facility, need not be the highest level trauma care facility.

If none of the criteria in the above 4 steps are met, follow local protocol for patient disposition. When in doubt, transport to nearest trauma care facility for evaluation.

For all Transported Trauma Patients:
1. Patient report to include: MOI, Injuries, Vital Signs & GCS, Treatment, Age, Gender and ETA
2. Obtain further orders from medical control as needed.
Iowa Trauma Triage Destination - Pediatric

The following criteria shall be utilized to assist the EMS provider in the identification of time critical injuries, method of transport and trauma care facility resources necessary for treatment of those injuries.

**Step 1 - Assess for Time Critical Injuries: Level of Consciousness & Vital Signs**

Abnormal Responsiveness: abnormal or absent cry or speech. Decreased response to parents or environmental stimuli. Floppy or rigid muscle tone or not moving. Verbal, Pain, or Unresponsive on AVPU scale.

OR

Airway/Breathing Compromise: obstruction to airflow, gurgling, stridor or noisy breathing. Increased/excessive retractions or abdominal muscle use, nasal flaring, stridor, wheezes, grunting, gasping, or gurgling. Decreased/absent respiratory effort or noisy breathing. Respiratory rate outside normal range.

OR

Circulatory Compromise: cyanosis, mottling, paleness/pallor or obvious significant bleeding. Absent or weak peripheral or central pulses; pulse or systolic BP outside normal range. Capillary refill > 2 seconds with other abnormal findings. Glasgow Coma Score ≤13

If ground transport time to a Resource (Level I) or Regional (Level II) Trauma Care Facility is less than 30 minutes, transport to the nearest Resource (Level I) or Regional (Level II) Trauma Care Facility. If greater than 30 minutes, ground transport time to Resource (Level I) or Regional (Level II) Trauma Care Facility, transport to the nearest appropriate Trauma Care Facility. If time can be saved or level of care needs exist, tier with ground or air ALS service program.

If step 1 does not apply, move on to step 2

**Step 2 - Assess for Anatomy of an Injury**

- All penetrating injuries to head, neck, torso and extremities proximal to elbow or knee
- Chest wall instability or deformity (e.g., flail chest)
- Suspected two or more proximal long-bone fractures
- Crushed, degloved, mangled, or pulseless extremity
- Amputation proximal to wrist or ankle
- Partial or full thickness burns >10% TBSA or involving face/airway
- Suspected pelvic fractures
- Open or depressed skull fracture
- Paralysis or Parasthesia

If ground transport time to a Resource (Level I) or Regional (Level II) Trauma Care Facility is less than 30 minutes, transport to the nearest Resource (Level I) or Regional (Level II) Trauma Care Facility. If greater than 30 minutes ground transport time to Resource (Level I) or Regional (Level II) Trauma Care Facility, transport to the nearest appropriate Trauma Care Facility. If time can be saved or level of care needs exist, tier with ground or air ALS service program.

If step 2 does not apply, move on to step 3

**Step 3 - Consider Mechanism of Injury & High Energy Transfer**

- Falls
  - Pediatric: > 10 ft. or two times the height of the child
- High-risk auto crash
  - Interior compartment intrusion, including roof: >12 inches occupant site; >18 inches any site
  - Ejection (partial or complete) from automobile
  - Death in same passenger compartment
  - Vehicle telemetry data consistent with high risk of injury
  - Auto vs. pedestrian/bicyclist thrown, run over, or with significant (>20 mph) impact
  - Motorcycle crash >20 mph

Transport to the nearest appropriate Trauma Care Facility, need not be the highest level trauma care facility.

If step 3 does not apply, move on to step 4

**Step 4 - Consider risk factors:**

- Pregnancy > 20 weeks
- EMS Provider judgement
- ETOH/Drug use
- Anticoagulants and bleeding disorders
  - Patients with head injury are at high risk for rapid deterioration

Transport to the nearest appropriate Trauma Care Facility, need not be the highest level trauma care facility.

If none of the criteria in the above 4 steps are met, follow local protocol for patient disposition.

When in doubt, transport to nearest trauma care facility for evaluation.

For all Transported Trauma Patients:

1. Patient report to include: MOI, Injuries, Vital Signs & GCS, Treatment, Age, Gender and ETA
2. Obtain further orders from medical control as needed.
Ventilator / BiPAP Use

**General Scope:** Guideline and criteria for transport ventilator and BiPAP use.

**Applies to:** All Critical Care Staff

**Reference:**

1. **VENTILATOR SETTINGS**
   a. If time allows during response, turn on ventilator connected to test lung.
   b. Mode: Set at Assist Control or SIMV
   c. Go to Powerup setting. Change to Powerup with user 1. Go to Save Setting and save user1 settings. This should allow the vent to turn on with your recent settings. Note: This will only save the most basic settings, such as Mode, Vt and I:E ratio. This will not save high- and low-pressure alarm setting or Trigger level settings.
   d. Turn Vent off until patient side.
   e. Turn vent on
   f. Set High- and Low-pressure alarms to desired setting.
   g. Press menu button.
   h. Adjust trigger level to desired setting
   i. Adjust Contrast to desired setting
   j. Initial tidal volume: 6-8 cc/kg **IDEAL BODY WEIGHT**; max of 800cc.
   k. FiO2 100% or adjust FiO2 to maintain SaO2 at >95%
   l. PEEP: 5 cm. Titrate in increments of 2 cm (max of 10 cm) every 15 minutes to increase oxygenation saturations where other measures (sedation, paralysis) have failed and SBP is > 90mmHg.
   m. RR: 8-10
      i. If attempting to decrease intracranial pressure [ICP] hyperventilate keeping EtCO2 between 30-35. Start at a rate of 10 and increase or decrease rate in increments of 2 to obtain desired EtCO2
      ii. If RR 16-20, use no PEEP
   n. Be aware of pneumothorax risk (especially with traumatic chest injuries)
   o. Maintain EtCO2 between 35-40 for most patients; 30-35 if evidence of lateralizing signs
   p. Pressure alarm: monitor patient’s inspiratory pressure and set at 10 cm above Peak Inspiratory Pressure
   q. Increase sensitivity slowly if ventilator doesn’t capture inspiratory effort
   r. Monitor I:E ratio and maintain at a minimum of 1:2 if patient is prone to air-trapping
Ventilator / BiPAP Use (Continued)

2. NPPV (BiPAP)
   a. NPPV delivers CPAP but also senses when an inspiratory effort is being made and delivers a higher-pressure during inspiration. This positive pressure wave during inspirations unloads the diaphragm decreasing the work of breathing.
   b. Indications
      i. Recent and rapid worsening of dyspnea
      ii. Respiratory rate > 30
      iii. pH < 7.28
      iv. PaCO2 > 50mmHg
      v. Hypoxemia
         1. Pneumonia
         2. Fluid overload
      vi. CHF
      vii. Moderate to severe respiratory failure
      viii. Post-op patients with rising EtCO2 levels
      ix. COPD patients with acute-on-chronic respiratory failure
   c. Exclusion criteria
      i. Recurrent aspiration
      ii. Large volumes of secretions
      iii. Inability to protect the airway
      iv. Vomiting
      v. Obstructed bowel
      vi. Upper airway obstruction
      vii. Uncooperative, confused or combative patient
      viii. ARDS
      ix. Inability to tolerate a tight mask
      x. Orofacial abnormalities which interfere with mask/face interface
      xi. Hemodynamic instability
      xii. Untreated pneumothorax

3. Settings for Impact Ventilator BiPAP.
   a. Preset alarms and settings by turning the unit on: let the vent start in default mode.
   b. Select CPAP under the mode menu. Then change PPV to NPPV in the upper right-hand corner of the mode menu. Always make sure to use the green check mark when changing a setting.
   c. If the BiPAP setting are unknown start with 10 over 5. This is done by setting the PEEP at 5 and the pressure support to 5. Remember pressure support is found in the secondary PIP menu. This is achieved by pressing and holding the PIP menu button for greater than 5 seconds.
   d. Pressure support of 5 and PEEP of 5 is equal to BiPAP of 10/5
   e. Use a standard resuscitation mask with blue elbow and the head strap when providing BiPAP with the Impact ventilator.
   f. If improvement in ventilation and oxygenation is not achieved, discontinue NPPV and consider tracheal intubation
4. Pediatric recommendations
   a. Less than 1 year of age
      i. Assist control pressure ventilation mode
      ii. PIP 15 (increase pressure only if needed to get normal chest rise)
      iii. Inspiratory time 0.7 seconds
      iv. Rate of 15 (increase by increments of 5 to maintain EtCO2 between 40-50)
      v. PEEP of 4.
      vi. FiO2 to maintain sats > 95%
      vii. Monitor TV
   b. Greater than 1 year of age
      i. Assist control volume mode
      ii. Start with default Pediatric settings
      iii. Change to Volume Mode; calculate 10 ml/kg TV
      iv. Inspiratory time 0.7 seconds
      v. Rate of 15 (increase by increments of 5 to maintain EtCO2 between 40-50)
      vi. PEEP of 4
      vii. FiO2 to maintain sats > 95%
      viii. Monitor TV

5. Recommended settings for specific scenarios
   c. Severely brain injured i.e., localizing signs such as dilated pupil and posturing
      i. Assist control
      ii. RR 8-12
      iii. TV 6-8 cc/kg ideal body weight
      iv. PEEP 5 cm
      v. FiO2 100% or adjust FiO2 to maintain SaO2 at >95%
   d. Depressed respiratory drive, eg, intoxicated or overdose patient
      i. Assist control or SIMV
      ii. RR 6-15
      iii. TV 6-8 cc/kg ideal body weight
      iv. PEEP 5 cm
      v. FiO2 100% or adjust FiO2 to maintain SaO2 at >95%
   e. Acute bronchospasm
      i. Assist control
      ii. RR 8-10
      iii. TV 6-8 cc/kg ideal body weight
      iv. PEEP 5 cm
      v. FiO2 100% or adjust FiO2 to maintain SaO2 at >95%
      vi. May need to increase peak flow setting to 50-80 lpm
      vii. Consider decreased inspiration time
   f. Multilobar disease, e.g., pneumonia, pulmonary edema/ARDS, extensive disease patterns
      i. Assist control
      ii. RR 10-20
      iii. TV 6-8 cc/kg ideal body weight
      iv. PEEP 5 cm with titration to maintain oxygen saturations
      v. FiO2 100% or adjust FiO2 to maintain SaO2 at >95%

Set inspiratory flow rate above patient demand, usually greater than 80 lpm