

# PRE-HOSPITAL MEDICAL GUIDELINES

**August 2020**

**Christopher M Eberlein, MD**

Medical Director

Gundersen Health System

[cmeberle@gundersenhealth.org](mailto:cmeberle@gundersenhealth.org)

**Nick Eastman, NRP, CCEMTP**

Program Manager – Clinical Services

Gundersen Tri-State Ambulance, Inc.

[ndeastma@gundersenhealth.org](mailto:ndeastma@gundersenhealth.org)

**Steve Hensley, NRP**

Operations Supervisor – Clinical Services

Pediatric Emergency Care Coordinator

Gundersen Tri-State Ambulance, Inc.

[sdhensl1@gundersenhealth.org](mailto:sdhensl1@gundersenhealth.org)

**Tom Carpenter, NRP, CCEMTP**

EMS Education

Gundersen Health System

[tacarpem@gundersenhealth.org](mailto:tacarpem@gundersenhealth.org)

**Richard Barton, NRP, CCEMTP**

EMS Education

Gundersen Health System





[rkbarton@gundersenhealth.org](mailto:rkbarton@gundersenhealth.org)

## TABLE OF CONTENTS

<b>Table of Contents</b> .....	<b>2</b>
<b>Medical Director Statement of Affirmation</b> .....	<b>6</b>
<b>Foreword</b> .....	<b>7</b>
Foreword (Continued) .....	8
Foreword (Continued) .....	9
<b>General Principles of Patient Care</b> .....	<b>10</b>
General Principles of Patient Care (Continued) .....	11
General Principles of Patient Care (Continued) .....	12
<b>Airway</b> .....	<b>13</b>
Airway / Ventilatory Management .....	14
Airway Management Checklist .....	15
Airway Obstruction .....	16
Asthma / COPD.....	17
<b>Assessment</b> .....	<b>18</b>
Interfacility Pre-Transport Care .....	19
<b>Cardiovascular</b> .....	<b>20</b>
Cardiovascular - Universal .....	21
Cardiovascular - Adult.....	22
Asystole.....	23
Automatic Implantable Cardiac Defibrillator (AICD) Deactivation .....	24
Bradycardia .....	25
Cardiac Arrest (Benchmark) .....	26
Coronary Insufficiency (Benchmark).....	29
Narrow Complex Tachycardia .....	31
Post Arrest (ROSC) .....	32
Pulmonary Edema.....	33
Pulseless Electrical Activity .....	34
Ventricular Fibrillation / Pulseless Ventricular Tachycardia .....	35
Wide Complex Tachycardia.....	36
Cardiovascular - Pediatric .....	37
Pediatric Asystole/PEA.....	38
Pediatric Bradycardia .....	39
Pediatric Tachycardia with Adequate Perfusion.....	40
Pediatric Tachycardia with Poor Perfusion .....	41
Pediatric Ventricular Fibrillation / Pulseless Ventricular Tachycardia .....	42
<b>Environmental</b> .....	<b>43</b>
Decompression Sickness.....	44
Envenomation.....	45
Heat Related Illness.....	46
Hypothermia .....	47
<b>Medical</b> .....	<b>48</b>
Medical - Universal.....	49


# La Crosse Regional Pre-Hospital Guidelines – Iowa Version

---

Medical - Adult.....	50
Abdominal/Thoracic Aortic Aneurysm/Dissection .....	51
Altered Mental Status .....	52
Anaphylaxis/Allergic Reaction .....	53
General Medical .....	54
Hyperkalemia .....	55
Hypoglycemia/Hyperglycemia   .....	56
Nausea / Vomiting / Vertigo  .....	57
Poisoning and Overdose .....	58
Seizure.....	59
Sepsis / Septic Shock.....	60
Stroke / Cerebrovascular Accident (Benchmark).....	61
Medical - Pediatric .....	63
<b>Obstetrical/Newborn .....</b>	<b>64</b>
Abnormal Delivery.....	65
Childbirth.....	66
Neonatal Resuscitation .....	67
Postpartum Hemorrhage .....	68
Pre-Eclampsia / Eclampsia .....	69
<b>Special Operations .....</b>	<b>70</b>
Multiple Patient Incident .....	71
Pandemic Triage & Non-Transport.....	72
Pandemic Triage & Non-Transport (continued) .....	73
Scene Rehabilitation .....	74
Scene Rehabilitation (Continued) .....	75
<b>Trauma .....</b>	<b>76</b>
Amputation .....	77
Burns .....	78
Crush Syndrome .....	79
General Trauma  .....	80
Head Injury .....	81
Shock in Trauma.....	82
Trauma in Pregnancy .....	83
<b>Procedures.....</b>	<b>84</b>
Arterial Line, Central Line, and CVP Monitoring.....	85
Arterial Line, Central Line, and CVP Monitoring (Continued).....	86
Blood Pressure Management .....	87
Pediatric Blood Pressure Management .....	88
Blood Transfusion Continuation & Monitoring .....	89
Cancellation of Call .....	90
Chest Tube Monitoring .....	91
Critical Care Sedation (Adult) .....	92
Critical Care Sedation (Pediatrics) .....	93

# La Crosse Regional Pre-Hospital Guidelines – Iowa Version

---

EZ-IO® Intraosseous Vascular Access System .....	94
General Placement Principles .....	95
Adult Proximal Humerus Placement .....	98
Adult Proximal Tibia Placement .....	99
Adult Distal Tibia Placement** .....	100
Infant/Child Proximal Tibia Placement .....	101
Infant/Child Distal Tibia Placement** .....	102
Infant/Child Proximal Humerus Placement .....	103
Infant/Child Distal Femur Placement** .....	104
EZ-IO® Removal Technique .....	105
Foley Catheter Insertion .....	106
Hemostatic Agent Use .....	107
IFT of tPA (tissue plasminogen activator) .....	108
Intranasal Medication Administration .....	109
LifeVac .....	110
Mechanical CPR – LUCAS .....	111
Mechanical CPR – LUCAS (Continued) .....	112
Medical Personnel on Scene .....	113
Naloxone Leave-Behind .....	114
Nasogastric/Orogastric Tube .....	115
Needle Cricothyroidotomy .....	116
Needle Decompression .....	117
Non-Invasive Positive Pressure Ventilation (NIPPV) .....	118
Pain Management .....	119
PICC Line usage .....	120
Resuscitation Sequence Intubation .....	121
Refusal of Evaluation, Treatment, and/or Transport  .....	122
Restraint Use .....	123
Sedation .....	124
Selective Spinal Precautions .....	125
Spinal Examination .....	126
Spinal Precautions .....	127
Spit Hood .....	128
Supraglottic Airway – King LT-D/LTS-D .....	129
Supraglottic Airway – i-gel .....	130
Surgical Cricothyroidotomy .....	131
Tracheostomy Care .....	132
Transvenous Pacemaker .....	133
<b>References</b> .....	<b>134</b>
Air Ambulance Use .....	135
Alternative Destination Transport .....	136
Alternative Destination Transport (Continued) .....	137
Alternative Destination Transport (Continued) .....	138

## La Crosse Regional Pre-Hospital Guidelines – Iowa Version

---

Amiodarone Infusion.....	139
Dopamine Infusion .....	140
Epinephrine Infusion.....	141
Ideal Body Weight Chart .....	142
Ketamine Infusion (Adult).....	143
Ketamine Infusion (Pediatric) .....	144
Lidocaine Infusion .....	145
Medications.....	146
Midazolam Infusion (Adult).....	147
Midazolam Infusion (Pediatric).....	148
Nitroglycerin Infusion.....	149
Norepinephrine Infusion.....	150
Push Dose Epinephrine.....	151
Radio Report Outline .....	152
Telemedicine Evaluation .....	153
Telemedicine Evaluation (Continued).....	154
Trauma Activation .....	155
Trauma Destination Determination .....	156
Iowa Trauma Triage Destination - Adult.....	157
Iowa Trauma Triage Destination - Pediatric .....	158
Ventilator / BiPAP Use.....	159
Ventilator / BiPAP Use (continued).....	160
Ventilator / BiPAP Use (continued).....	161

## La Crosse Regional Pre-Hospital Guidelines – Iowa Version

---

### MEDICAL DIRECTOR STATEMENT OF AFFIRMATION

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 August 2020 for the authorized Iowa EMS Program(s):

- Tri-State Regional Ambulance, Inc. – West Union, IA.

Printed Name	Signature	Date
Christopher M. Eberlein, M.D.		

## 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 Tri-State Ambulance, Inc. and the Tri-State Regional Ambulance, Inc. EMS Systems.

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/ALS provider in the field.

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 is 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 telemetry physician 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 telemetry physician, of correctly performing the directed care. Whenever such care is provided, the telemetry physician 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 telemetry physician 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 of the week.”

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 the Tri-State Ambulance, Inc. and the Tri-State Regional Ambulance, Inc. EMS Systems and 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

- Program Manager – Clinical Services
  - Nick Eastman, NRP, CCEMTP
  - [ndeastma@gundersenhealth.org](mailto:ndeastma@gundersenhealth.org)
  - 608-784-8827 ext. 73271
- Medical Director
  - Christopher M. Eberlein, MD
  - [cmeberle@gundersenhealth.org](mailto:cmeberle@gundersenhealth.org)

### **Gundersen Lutheran Emergency Medical Services**

1900 South Ave

La Crosse, WI 54601

- Quality Assurance
  - Tom Carpenter, NRP, CCEMTP
  - [tacarpen@gundersenhealth.org](mailto:tacarpen@gundersenhealth.org)
  - 608-775-3218
- EMS Education
  - Rick Barton, B.S., NRP, CCEMTP
  - [rkbarton@gundersenhealth.org](mailto:rkbarton@gundersenhealth.org)

## GENERAL PRINCIPLES OF PATIENT CARE

**General Scope:** A majority 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
    - Infection control gown
    - Infection control shoe covers
    - Infection control bouffant cap
    - Surgical mask
    - N-95 mask
- 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 providers’ 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:
  - Vital signs including but not limited to:
    - Pulse
    - Blood Pressure
    - SpO<sub>2</sub>
    - Respiratory rate and effort
    - Temperature
  - S.A.M.P.L.E. history as possible
  - Rapid trauma and/or focused physical assessment
  - 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 nationally recognized.
- All patients shall receive treatment as is appropriate per guideline and on-line medical direction.
- All patients shall be re-assessed after an intervention is performed. The success, secondary effects, and possible side-effect of said intervention evaluated.
  - 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.
  - 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:
  - Equipment and medications must be appropriate for the size and weight of the patient. Use of the Broselow Tape or equivalent is encouraged.
  - The developmental age of the infant/child must be considered in the communication and evaluation for treatment.
  - Treatment priorities are similar to the adult patient.
  - When appropriate, family members should remain with pediatric patients.
  - Infants and children must be properly restrained prior to and during transport.
- For inter-facility transports:
  - 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 has no preference, the patient will be transported to the hospital providing on-line medical direction at that time.

# AIRWAY

## AIRWAY / VENTILATORY MANAGEMENT

**General Scope:** Guideline for airway management

**Guideline:**

1. Perform routine medical assessment
  - a. Consider EtCO<sub>2</sub> monitoring if appropriate for scope of practice
2. Titrate SpO<sub>2</sub> 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
  - SpO<sub>2</sub> <85% on 100% O<sub>2</sub>
  - Acutely rising EtCO<sub>2</sub>
  - Altered mental status
  - Hemodynamic instability
  - Paradoxical respiratory efforts
7. [EMR] Provide supplemental Oxygen via appropriate device
  - a. When providing ventilation via BVM, PEEP should be applied at 5-10 mmHg
    - i. Do not use PEEP in cardiac arrest
  - 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. [Paramedic] Assess expected success of intubation
9. [EMR] Have rescue airway available
10. [Paramedic] If endotracheal intubation success likely and patient is over eight years old
  - a. Consider intubation
    - i. If RSI necessary, see [Resuscitation Sequence Intubation Procedure](#)
11. [EMT] For patients eight years or younger, consider [Supraglottic Airway Procedure](#)
12. If failed intubation (two total unsuccessful attempts)
  - a. Consider BVM
  - b. Consider [Supraglottic Airway Procedure](#)
  - c. [CCP] For adults, consider [Surgical Cricothyroidotomy Procedure](#)
  - d. [Paramedic] For children under 10, consider [Needle Cricothyroidotomy Procedure](#)

## AIRWAY MANAGEMENT CHECKLIST

### (ZOLL EVENT MARKERS)

### NOTES

<p>Assess airway for difficulty. (LEMON/HEAVEN)</p> <p>(RSI) Perform neurologic exam before medication administration.</p> <p>Monitor vital signs (HR, SpO2, ECG, ETCO2).</p> <p>Consider defibrillator pads. (RSI) Use TurboCuf.</p> <p>Prepare suction. Turn on &amp; check function. Suction as needed using large bore suction catheter.</p> <p>Place basic airway adjunct. (Nasopharyngeal airway or oropharyngeal airway)</p> <p>Ensure sniffing positioning. RAMP if obese. (Ear to sternal notch/face parallel to ceiling) Pre-oxygenate – goal is <math>\geq 95\%</math> SPO2</p> <p>Perform apneic oxygenation. (Regular nasal cannula at 15 L/min)</p> <p>Prepare bag-valve mask. (Attach to oxygen, mask present, use PEEP valve)</p> <p>Prepare intubation equipment. (Laryngoscope, bougie, ETT, syringe, securing device)</p> <p>Ready primary airway device – test, lubricate, etc.</p> <p>Ready backup airway device.</p> <p>Ensure IV access. (Patent, appropriate size/location)</p> <p>Administer vasopressors if indicated. (VPRES)</p>	<p><b>LEMON</b></p> <p>Assess indicators of a difficult airway</p> <ul style="list-style-type: none"> <li>Look externally (obesity, retracted mandible, beard, abnormal dentition, etc.)</li> <li>Evaluate the 3-2-2 rule (mouth opening, chin to hyoid and mandible to thyroid)</li> <li>Mallampati classification (how much of the posterior pharynx is able to be seen)</li> <li>Obstruction (epiglottitis, tumor, trauma, abscess, etc.)</li> <li>Neck mobility (c-spine immobilization, arthritis, previous stabilization)</li> </ul> <p><b>HEAVEN</b></p> <p>Assess indicators of a difficult airway</p> <ul style="list-style-type: none"> <li>Hypoxemia (SPO2 &lt; 95% at epiglottoscopy)</li> <li>Extremes of Size (Clinical obesity)</li> <li>Anatomic Challenge (Trauma, mass, swelling, foreign body, other structural abnormality)</li> <li>Vomit/Blood/Fluid (Fluid present in pharynx at epiglottoscopy)</li> <li>Neck (Limited cervical range of motion)</li> </ul>
<p>Administer induction agents. (SED / PAR) (RSI) (1-2 mg/kg ketamine, 1 mg/kg rocuronium) WAIT 60 seconds after each medication</p> <p>Intubation: Lead with suction. Perform epiglottoscopy.</p> <p>Place airway without hypoxia. (START / END)</p>	<ul style="list-style-type: none"> <li>Ketamine doses as low as 0.5 mg/kg should be used with hemodynamic compromise. Standard dose is 1.5-2mg/kg.</li> </ul>
<p>Retain necessary equipment in case of problem. (Syringe, BVM mask, laryngoscope, and medications)</p> <p>Confirm placement with waveform capnometry &amp; print strip. Obtain snapshot on monitor.</p> <p>Confirm lack of epigastric sounds and presence of lung sounds.</p> <p>Secure endotracheal tube using commercial device or properly placed tape. Stabilize head.</p> <p>Provide continued hemodynamic support as needed.</p> <p>Provide sedation and pain management as needed. Re-paralyze if necessary.</p> <p>Re-assess through completion of patient contact. (Vital signs and interventions)</p> <p>Use DOPES mnemonic to troubleshoot if necessary.</p>	

GOAL: FIRST PASS SUCCESS WITHOUT HYPOXIA

v 08.2020

## 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 Heimlich maneuver until the foreign body is expelled or the victim becomes unconscious
3. If patient is unconscious
  - a. Perform tongue-jaw lift
  - b. Use finger sweep if object is visible
  - c. Attempt ventilation
  - d. If obstruction persists, reposition and re-attempt ventilation
  - e. Give up to five abdominal thrusts
  - f. If obstruction persists, perform CPR per current ECC guidelines
4. [EMR] Consider use of non-powered manual suction device for the removal of foreign body airway obstruction. See [LifeVac Procedure](#).
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. [CCP] 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 routing 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
    - ii. [Paramedic] Continuous administration
  - b. [AEMT] Consider IV TKO
  - c. [EMT] **DUO-NEB** nebulizer treatment
  - d. [Paramedic] **METHYL-PREDNISOLONE** 125mg IV/IO
    - i. Pediatric (< 8 y/o) – 1 mg/kg
  - e. [Paramedic/Med Control] **MAGNESIUM SULFATE** 2 grams 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 (CC 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. Patient's 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, SpO<sub>2</sub>, cardiac monitor
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 the use of **Patient Side Training Report**
  - b. If you are unfamiliar with any medication please utilize the tools provided (**patient side training report, RN on scene, MD on scene, drug handbook located in each ambulance**) to insure you have a general understanding of the medication order, dose, and side effects.
5. Confirm correct placement and position of ETT, NGT, IVs, Foley catheter, etc.
6. Review X-rays, lab results, CT results, and EKG's
7. Review/confirm written orders from sending physician
  - 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

# CARDIOVASCULAR - UNIVERSAL

## 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](#)
2. **Initiate CPR and continue throughout resuscitation with minimal interruptions**
3. [*Paramedic*] Confirm asystole in two leads
  - a. If rhythm is unclear, see [V-Fib/Pulseless V-Tach Guideline](#)
4. [*AEMT*] Establish IV/IO
5. [*AEMT*] **EPINEPHRINE** (1mg/10mL [1:10,000]) 1mg every 3-5 minutes
6. Establish airway per [Airway / Ventilatory Management Guideline](#)
7. 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** 25 mEq
  - 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
8. After three doses of **EPINEPHRINE** (1mg/10mL [1:10,000])
  - a. [*Paramedic*] Consider **CALCIUM GLUCONATE** 1gram
  - b. [*Paramedic*] Consider **SODIUM BICARBONATE** 25mEq

### 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 SpO<sub>2</sub>
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**
    - i. Consider [Pain Management Procedure](#) and/or [Sedation Procedure](#) as needed
  - b. [Paramedic] Administer **ATROPINE** 0.5mg every 3-5 minutes to a max of 0.04mg/kg
  - c. [Paramedic] Consider **EPINEPHRINE** infusion (1mg/100ml D<sub>5</sub>W 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:**

### 1. INITIATION OF RESUSCITATION

- a. [EMR] Resuscitation must be initiated unless one the following conditions exist
  - i. Valid DNR
    1. DNR bracelet
    2. Valid POST/POLST/IPOST form with DNR orders
      - a. Copy on canary paper is acceptable for SNF transports
  - 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:

Arrest was not witnessed
<b>AND</b>
There is no return of spontaneous circulation (ROSC) after three full rounds of CPR and AED analysis
<b>AND</b>
No AED shocks were delivered at any time
<b>AND</b>
Cardiac rhythm is asystole as verified on cardiac monitor in multiple leads

## CARDIAC ARREST (CONTINUED)

### 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 1b
  - 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	
<input type="checkbox"/>	No interruptions of <b>chest compressions</b> > 10 seconds
<input type="checkbox"/>	Rhythm interpreted <b>every two minutes</b> and defibrillation administered as needed
<input type="checkbox"/>	First dose of <b>epinephrine</b> administered within five minutes in asystole
<input type="checkbox"/>	<b>Advanced airway</b> successfully placed on first attempt
<input type="checkbox"/>	Obtain <b>12-lead ECG</b> < 10 minutes after ROSC
<input type="checkbox"/>	If STEMI, <b>transport directly to PCI center</b>
<input type="checkbox"/>	Compliance with medical guidelines/MD orders

DOCUMENTATION BENCHMARKS	
<input type="checkbox"/>	Document <b>patient demographics - age and gender</b>
<input type="checkbox"/>	Document estimated <b>patient weight</b>
<input type="checkbox"/>	<b>Attach</b> acquired ECGs & rhythm strips
<input type="checkbox"/>	Document <b>vital signs every five minutes after ROSC</b>
<input type="checkbox"/>	Document <b>hospital notification time</b>
<input type="checkbox"/>	Document <b>disposition (ER or Cath Lab)</b>

## 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 with the patient's own **NITROGLYCERIN** 0.4mg sublingual every 3-5 minutes until pain free
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 D<sub>5</sub>W—200mcg/ml)
    - i. For patients <75kg, start at 10mcg/min
    - ii. For patients >75kg, start at 20mcg/min
      1. Titrate 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**

1. Avoid if any history of PDE 5 inhibitor (Viagra, Levitra, Cialis) use in the past 48 hours

### STEMI BENCHMARKS

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

DOCUMENTATION BENCHMARKS	
<input type="checkbox"/>	Document <b>patient demographics - age and gender</b>
<input type="checkbox"/>	Document estimated <b>patient weight</b>
<input type="checkbox"/>	<b>Attach</b> all acquired ECGs
<input type="checkbox"/>	Document <b>vital signs every 15 minutes</b>
<input type="checkbox"/>	Document <b>pain scores with vital signs</b>
<input type="checkbox"/>	Document <b>hospital notification time</b>
<input type="checkbox"/>	Document <b>disposition (ER or Cath Lab)</b>

## NARROW COMPLEX TACHYCARDIA

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

**Guideline:**

1. If patient  $\leq 8$  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 #6d)
5. If ventricular rate is  $\geq 150$  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 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 over 50 – PRIOR to treatment below
    - i. [Paramedic] **ADENOSINE** 12mg rapid push
      1. Adolescent (8-16 y/o) – 0.1mg/kg up to 12mg
    - ii. [Paramedic] Consider **AMIODARONE** 150mg over 10 minutes

**Notes:**

1. Diltiazem is contraindicated:
  - i. 2<sup>nd</sup> or 3<sup>rd</sup> degree heart block
  - ii. WPW or short PR syndrome
2. Common side effects of diltiazem: Symptomatic hypotension, flushing, burning or itching at injection site.
3. Amiodarone precautions:
  - i. Hypotension secondary to vasodilation
  - ii. May prolong QT interval
  - iii. Negative inotropic effects
  - iv. 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. [EMT] Monitor EtCO<sub>2</sub>
  - 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
  - a. See [Airway / Ventilatory Management Guideline](#)
  - b. 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**<sup>1</sup> 0.4mg SL Q 3-5 minutes until infusion is established
  - b. [Paramedic] [NITROGLYCERIN INFUSION](#)<sup>1</sup> (20mg/100ml D<sub>5</sub>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**<sup>1</sup> 0.4-0.8 mg SL every 3-5 minutes until infusion is established or IV bolus given
  - b. [Paramedic] **NITROGLYCERIN**<sup>1</sup> 0.5-1 mg IV/IO every 5 minutes
    - i. Max of 2 mg IV bolus – if patient remains hypertensive, establish infusion
  - c. [Paramedic] [NITROGLYCERIN INFUSION](#)<sup>1</sup> (20mg/100ml D<sub>5</sub>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

<sup>1</sup> 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 – Ventilations, 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
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

## 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 pointes<sup>1</sup>
  - a. [Paramedic] Administer **MAGNESIUM SULFATE** 2 grams (2G in 100ml D<sub>5</sub>W 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 D<sub>5</sub>W or NS) over 1-2 minutes
9. [Paramedic] Consider **CALCIUM GLUCONATE**<sup>2</sup> 1 gram and flush with normal saline
10. [Paramedic] Consider **SODIUM BICARBONATE** 25mEq and flush with normal saline
11. If pulse is returned see [Post Arrest Guideline](#)

**Notes:**

<sup>1</sup> Risk factors for torsades include alcohol abuse, malnourishment, and QT prolongation.

<sup>2</sup> Priority administration in known or suspected cases of hyperkalemia

## 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<sub>5</sub>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<sub>5</sub>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<sub>5</sub>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 vasodilatation
  - May prolong QT interval
  - Negative inotropic effects
  - Use with caution in renal failure; long T<sub>1/2</sub> 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
  - a. Hypoxia – ventilation see [Airway / Ventilatory Management Guideline](#)
  - b. Preexisting acidosis – Increase ventilations
  - c. Drug overdose – see [Poisoning and Overdose Guideline](#)
  - d. Hypothermia – see [Hypothermia Guideline](#)
  - e. Hyperkalemia – see [Hyperkalemia Guideline](#)
4. [*Paramedic*] Confirm asystole in two leads
  - a. 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 SpO<sub>2</sub>
  - 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** 0.01mg/kg (1mg/10mL [1:10,000]) 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** 0.5-1 J/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% O<sub>2</sub> 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. Divers' 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)
      2. 319-356-2233 (after hours)
      3. 319-356-8220 HBO Physician

**Note:**

- |   |  |
|---|--|
| <p>A. Decompression illness occurs when the gas dissolved in the body fluids separates from those fluids to form bubbles.</p> <p>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.</p> <p>C. Predisposing factors that increase the incidence of decompression illness</p> <ol style="list-style-type: none"><li>1. Dehydration</li><li>2. Cold temperatures</li><li>3. Obesity</li><li>4. Exercise during the dive</li><li>5. Older individuals</li><li>6. Previous joint injury</li><li>7. Previous recent dives</li><li>8. Flying after recent dive</li></ol> | <p>D. Decompression illness can occur during ascent or up to 72 hours after a dive (especially if multiple dives/day)</p> <p>E. Manifestations</p> <ol style="list-style-type: none"><li>1. Pain<ol style="list-style-type: none"><li>i. Limb pain</li><li>ii. Girdle pain</li></ol></li><li>2. Cutaneous eg. itching, lymphedema</li><li>3. Neurological (including audio-vestibular, i.e. loss of balance)</li><li>4. Pulmonary eg. CHF, cough, dyspnea</li><li>5. Constitutional (malaise, anorexia, fatigue)</li><li>6. Hypotension</li><li>7. Barotraumas (lung, sinus, ear, dental)</li></ol> <p>F. Important information</p> <ol style="list-style-type: none"><li>1. Time of onset</li><li>2. Gas burden (depth-time profile): Depth of dive, dive time and number of dives.</li></ol> |
|---|--|

### 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. [AEMT] Establish IV/IO
4. See [Blood Pressure Management Procedure](#)
5. 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

	Heat Exhaustion	Heat Stroke
Signs	<ul style="list-style-type: none"> <li>• Core temperature 98.6° F – 104° F</li> <li>• Anxiety</li> <li>• Confusion</li> <li>• Hypotension</li> <li>• Oliguria</li> <li>• Tachycardia</li> <li>• Vomiting</li> </ul>	<ul style="list-style-type: none"> <li>• Core temperature &gt; 104° F</li> <li>• Altered mental status</li> <li>• Anhidrosis</li> <li>• Arrhythmia</li> <li>• Hyperventilation</li> <li>• Pulmonary Edema</li> <li>• Shock</li> </ul>
Treatment	<ul style="list-style-type: none"> <li>• Oral fluids as tolerated</li> <li>• [AEMT] IV fluids TKO if transporting</li> <li>• Consider <a href="#">blood pressure management</a> as needed</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Airway support</a> as needed</li> <li>• Provide active cooling (cool packs to chest wall, groin, or axilla)</li> <li>• Sponge with cool water or cover with wet sheet and fan body</li> <li>• [AEMT] Establish IV/IO &amp; administer room temperature <b>NORMAL SALINE</b></li> <li>• Consider <a href="#">blood pressure management</a> as needed</li> <li>• [Paramedic] If shivering, consider <b>MIDAZOLAM 2mg</b></li> <li>• For seizures, see <a href="#">Seizure Guideline</a></li> </ul>

**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, 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](#)  
[AEMT] Establish IV/IO
  - b. [AEMT] Give up to two liters of warmed **NORMAL SALINE**
  - c. If bradycardic do not start CPR
  - d. 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 - UNIVERSAL

# 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<sub>5</sub>W or NS—200mcg/ml)
    - i. For patients <75kg, start at 10mcg/min
    - ii. For patients >75kg, start at 20mcg/min
    - iii. Titrate 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

**Note:**

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

**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 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
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 D<sub>5</sub>W 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] **METHYLPREDISOLONE** 125mg
    - i. Pediatric (< 8 y/o) – 1 mg/kg (Max 125mg)

### **ALLERGIC REACTION**

- b. Ice and elevate affected area as practical
- c. [Paramedic] Consider **DIPHENHYDRAMINE** 25-50mg IV/IO or 50mg IM
  - ii. 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 is not anaphylaxis

## GENERAL MEDICAL

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

**Guideline:**

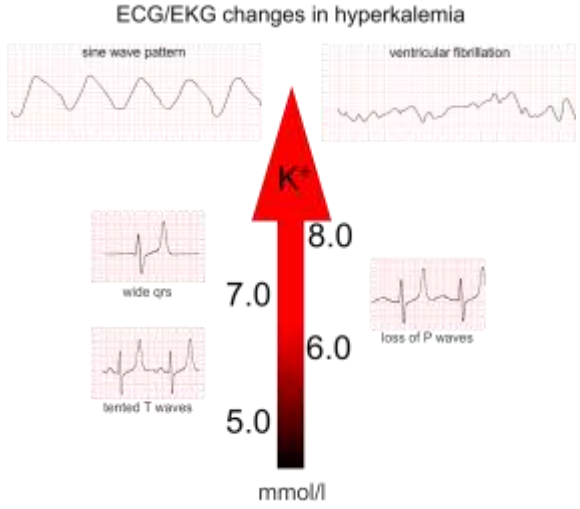
1. Perform routine medical assessment
2. Check respirations, SpO<sub>2</sub>, and apply oxygen if needed, see [Airway / Ventilatory Management Guideline](#)
3. Check pulse and apply cardiac monitor, see appropriate [Cardiac Dysrhythmia Guideline](#)
4. Check blood pressure, see [Blood Pressure Management 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 D<sub>5</sub>W 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

<ol style="list-style-type: none"> <li>1. Cardiac effects (may or may not be present)               <ol style="list-style-type: none"> <li>a. 5.6-6.0mEq/L - peaked T waves due to increased repolarization</li> <li>b. 6.0-6.5mEq/L - prolonged PR &amp; QT intervals</li> <li>c. 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</li> <li>d. 7.5-8.0mEq/L - P waves disappear, QRS complex widens, S &amp; T waves tend to merge</li> <li>e. 10-12mEq/L - classic sine wave occurs which represents loss of P wave and wide QRS complexes.</li> </ol> </li> <li>2. Other effects</li> <li>3. Skeletal muscle weakness to flaccid paralysis with preservation of diaphragm muscle function               <ol style="list-style-type: none"> <li>a. Paresthesias</li> <li>b. Respiratory depression</li> </ol> </li> </ol>	<p style="text-align: center;"><b>ECG/EKG changes in hyperkalemia</b></p> 
--	--

## HYPOGLYCEMIA/HYPERGLYCEMIA

**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. Establish IV/IO with 10% dextrose solution (D<sub>10</sub>) 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. Consider **ORAL GLUCOSE** if patient is conscious and able to follow commands
  - c. [AEMT] **GLUCAGON** 1mg IM/SQ or 2mg IN
    - i. Pediatric (< 8 y/o) – 0.5mg IM/SQ or 1mg IN
  - d. [AEMT] Administer 10% dextrose solution (D<sub>10</sub>) to achieve improved blood glucose level and mental status (GCS)

Patients under 20 kg	Patients over 20 kg
1. Administer bolus of 5 mL/kg D <sub>10</sub> . Slow infusion to TKO and evaluate response for at least two minutes. Re-assess blood glucose level and mental status.	1. Administer 100mL bolus of D <sub>10</sub> (10 G dextrose). Slow infusion to TKO and evaluate response for at least two minutes. Re-assess blood glucose level and mental status.
2. If desired results not achieved, administer additional 2 mL/kg boluses of D <sub>10</sub> every two minutes until improvement in blood glucose level and mental status.	2. If desired results not achieved, administer additional 50mL boluses of D <sub>10</sub> (5 G dextrose) every two minutes until improvement in blood glucose level and mental status.

- 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 4mg
    - 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 assess of 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** 1-4mg IN (Adult & Pediatric)
  - b. [AEMT] Give **NALOXONE** 0.4-4mg IV/IO or 1-4mg IN every 5 minutes PRN (Adult & Pediatric)
    - i. Titrate to adequate ventilation & oxygenation
  - c. [Paramedic] If patient responds to naloxone and refuses transport, consider utilizing [Naloxone Leave-Behind Procedure](#)
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 1000 ml 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. 1-3 mg IV/IO
    - ii. 5 mg IM
    - iii. Pediatric (< 8 y/o) – 0.1 mg/kg IM (Max single dose 5mg)
      1. 0.05 mg/kg IV/IO (Max single dose 3mg)
      2. Do not delay IM administration for IV access
    - iv. May repeat administration every 5 minutes as needed
  - c. [Paramedic] If convulsions continue after 15mg midazolam has been administered, consider **KETAMINE** administration
    - i. Adult – 100 mg IV/IO
    - ii. Pediatric (< 8 y/o) – 1 mg/kg IV/IO
  - d. If seizure has resolved and patient is postictal
    - i. [AEMT] Establish IV/IO

## SEPSIS / SEPTIC SHOCK

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

### Guidelines:

1. Perform routine medical assessment
  - a. Special attention should be paid to mental status, blood pressure, heart rate, and respiratory rate
  - b. Additional vital signs to be obtained include **temperature and ETCO<sub>2</sub>**
2. Compare assessment results to below chart to help determine **sepsis vs septic shock**

SEPSIS	SEPTIC SHOCK
<b>Known or suspected infection or patient is at high risk of infection.</b> <ul style="list-style-type: none"> <li>○ i.e., Immunocompromised, residents of SNFs, and those with indwelling devices (PICC line, Foley, trach, etc.)</li> </ul> <b>AND</b> <b>Two or more of the following:</b> <ul style="list-style-type: none"> <li>○ Acutely altered mental status</li> <li>○ Temperature &gt; 100.4 F OR &lt; 96.8 F</li> <li>○ Respiratory Rate &gt; 22 breaths/min</li> <li>○ Heart Rate &gt; 90 beats/min</li> </ul>	<b>Presence or suspicion of sepsis.</b> <b>AND</b> <b>At least one of the following in each category:</b> <p><b>Perfusion</b></p> <ul style="list-style-type: none"> <li>○ Systolic blood pressure &lt; 90</li> <li>○ Mean Arterial Pressure (MAP) &lt; 65</li> </ul> <p><b>Cellular Metabolism</b></p> <ul style="list-style-type: none"> <li>○ ETCO<sub>2</sub> of ≤ 25 mmHg</li> <li>○ Lactate &gt; 4 mMol</li> </ul>

3. Administer Oxygen to maintain SpO<sub>2</sub> ≥94%
  - a. Establish airway per [Airway / Ventilatory Management Guideline](#) if necessary
4. [AEMT] Establish IV/IO
5. **Treat as described in chart below.** (Intercept recommended if BLS & septic shock)

SEPSIS	SEPTIC SHOCK
<ul style="list-style-type: none"> <li>• Administer <b>NORMAL SALINE</b> at rate of 500 mL/hr</li> </ul>	<ul style="list-style-type: none"> <li>• Establish second IV per guideline</li> <li>• Administer fluid bolus of one to two liters over 60 minutes if not contraindicated</li> <li>• If inadequate response; concurrently administer <a href="#">NOREPINEPHRINE INFUSION</a><sup>1</sup>; titrated to reach MAP of &gt; 65 mmHg</li> </ul>

6. **Notify hospital of sepsis/septic shock patient as soon as possible.**

<sup>1</sup> **NOREPINEPHRINE:** Initiate at 0.1 mcg/kg/min; titrate by 0.01-0.05 mcg/min every 3-5 minutes (Max: 0.3 mcg/kg/min)

## 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  $\geq 4$ , 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 ( **$\geq 18$ g AC Preferred**)
5. [Paramedic/Med Control] If patient is hypertensive with SBP  $> 180$  or DBP  $> 110$  consider slowly lowering blood pressure.
  - a. See [Blood Pressure Management Procedure](#)

**Note:**

5. Evaluate vital signs and FAST-ED Stroke Scale every fifteen minutes.

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

2. **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	
<input type="checkbox"/>	Obtain and report <b>last known well</b> time
<input type="checkbox"/>	Perform <b>FAST-ED Stroke Scale</b> every <b>15 minutes</b>
<input type="checkbox"/>	<b>Notify</b> hospital of stroke alert <b>within 10 minutes</b> of patient side
<input type="checkbox"/>	Obtain and document <b>blood glucose level</b>
<input type="checkbox"/>	Obtain and document <b>vital signs every 15 minutes</b>
<input type="checkbox"/>	<b>Maintain O<sub>2</sub> saturation</b> of ≥94% with minimum Oxygen necessary
<input type="checkbox"/>	<b>Establish IV (AC preferred - 18gu or larger);</b> do not delay transport for additional IV access
<input type="checkbox"/>	Transport with <b>head of bed elevated 30°</b>

DOCUMENTATION BENCHMARKS	
<input type="checkbox"/>	Document <b>patient demographics - age and gender</b>
<input type="checkbox"/>	Document estimated <b>patient weight</b>
<input type="checkbox"/>	Document <b>last known well time</b>
<input type="checkbox"/>	Document <b>FAST-ED Stroke Scale</b> every <b>15 minutes</b>
<input type="checkbox"/>	Document <b>blood glucose level</b>
<input type="checkbox"/>	Document <b>vital signs every 15 minutes</b>
<input type="checkbox"/>	Document <b>hospital notification time</b>
<input type="checkbox"/>	Document <b>disposition (ER or CT)</b>

## MEDICAL - PEDIATRIC

# 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<sup>1</sup>
  - 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<sup>2</sup>
  - 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<sup>2</sup> (King et al., 2019)
  - 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)<sup>1</sup>
  - e. Suprapubic pressure may help to maintain head flexion and facilitate delivery<sup>1</sup>
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 within 30 seconds<sup>1</sup>
  - b. Proceed with subsequent deliveries
7. After delivery refer to [Neonatal Resuscitation Guideline](#)

**APGAR SCORING:**

Sign	0	1	2
Pulse	Absent	<100	>100
Respirations	Absent	Slow or Irregular	Good Crying
Muscle Tone	Limp	Some flexion	Active motion
Reflex irritability	None	Grimace	Cough or sneeze
Color	Pale or Blue	Pink body/blue extremities	Completely pink

<sup>1</sup> (Gabbe et al., 2017) | <sup>2</sup> (King et al., 2019)

## 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 (Schuiling & Likis, 2017)
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 (Gabbe et al., 2017)
  - c. Have mother pant through contractions and relax between, do not tell her not to push or coach pushing (King, Brucker, Osborne, & Jevitt, 2019)
  - d. As head crowns, apply slight pressure to prevent explosive delivery (King et al., 2019)
  - 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. (King et al., 2019)
  - f. Place baby on mother's abdomen and cover with a dry towel to prevent heat loss
    - i. Baby should be lying on its stomach. (King et al., 2019)
  - g. Take APGAR scores at 1 and 5 minutes
  - h. If HR <100 see [Neonatal Resuscitation Guideline](#)
  - i. Wait until umbilical cord is white and pulseless before clamping and cutting the cord >6in from the infant between two clamps. There is no need to keep baby below the level of the placenta before cutting the cord (Gabbe et al., 2017)
  - j. If placenta delivers, place cord and placenta in container and bring receiving facility
  - k. Massage uterus if bleeding is brisk after delivery of the placenta (not before)
  - l. If heavy bleeding present, see [Postpartum Hemorrhage Guideline](#)

**APGAR SCORING:**

Sign	0	1	2
Pulse	Absent	<100	>100
Respirations	Absent	Slow or Irregular	Good Crying
Muscle Tone	Limp	Some flexion	Active motion
Reflex irritability	None	Grimace	Cough or sneeze
Color	Pale or Blue	Pink body/blue extremities	Completely pink

## NEONATAL RESUSCITATION

**General Scope:** Guideline for resuscitation of a neonatal patient.

**Guideline:**

1. Perform routine medical assessment
  - a. Oxygen saturation should be measured on right extremity (See SPO<sub>2</sub> targets below)
  - b. Obtain blood glucose level from heel (See Glucose target below)
2. Cord clamping should be delayed for as long as possible (cord is white/pulseless) 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
    - i. Routine intubation for tracheal suction is no longer recommended in meconium staining (NRP 865)
4. If cardiac arrest – **GO DIRECTLY TO 6b(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. [AEMT] Administer **EPINEPHERINE** (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

SPO <sub>2</sub> Targets	
1 minute	60%
2 minutes	65%
3 minutes	70%
4 minutes	75%
5 minutes	80%
10 minutes	85%

Glucose Target
> 45 mg/dL
Treat hypoglycemia with 2-3 mL/kg D <sub>10</sub> repeated every five minutes as needed

## POSTPARTUM HEMORRHAGE

**General Scope:** Guideline for post-delivery hemorrhage.

**Guideline:**

1. Perform routine medical assessment
2. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
3. Maintain blood pressure, see [Blood Pressure Management Procedure](#)
4. [AEMT] Establish IV/IO
5. Attempt to identify cause of postpartum hemorrhage
6. Apply direct pressure to any area of genital tract trauma
7. Perform uterine massage to promote uterine tone

## 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 over 20 minutes
  - b. [Paramedic] Give **MIDAZOLAM** 2 mg every 2 minutes
    - i. See [Seizure Guideline](#)
  - c. [Paramedic] Consider more **MAGNESIUM SULFATE**
5. If patient is not seizing:
  - a. Place patient in position of comfort
  - b. [Paramedic] Give **MAGNESIUM SULFATE** 4 grams over 20 minutes
  - c. See [Blood Pressure Management Procedure](#)
    - i. **\*Nitroglycerin should not be given to a pregnant patient**

**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 & 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 capacity of understanding 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
  - SPO<sub>2</sub> > 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.

### PANDEMIC TRIAGE & NON-TRANSPORT (CONTINUED)

#### 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.**

Normal Vital Signs Reference (Low-High)			
Age Category	Heart Rate	Respiratory Rate	Systolic BP
Adult	60-100	12-20	80-120
Adolescent (13-18 years)	55-105	12-20	100-120
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

## 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

	Level 0	Level 1	Level 2
Heart rate	< 70% Max	≥ 70% Max	≥ 85% Max
Blood pressure	≤ 180 Systolic	> 180 Systolic	> 200 Systolic
Temperature	≤ 99.5° F	99.6° - 103°	> 103° F
Respiratory rate	8 – 24	25 – 40	< 8 or > 40
SPO <sub>2</sub>	> 94%	91 – 94%	< 91%
Carbon monoxide (if available)	< 6%	6-10%	> 10%

Age	Max HR	Age	Max HR
20	200	45	175
25	195	50	170
30	190	55	165
35	185	60	160
40	180	65	155

- b. Assessment

	Level 0	Level 1	Level 2
Cramping		X	
Dizziness or syncope			X
Confusion or altered mental status			
Chest pain			X
Shortness of breath			X
Vomiting			X

# La Crosse Regional Pre-Hospital Guidelines – Iowa Version

## SCENE REHABILITATION (CONTINUED)

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

Level 0	Level 1	Level 2
	Rest	
	Oral rehydration	Oral and IV rehydration
	Passive cooling	Passive & active cooling
	Vital sign evaluation at 10 minutes	Vital sign evaluation every five minutes
		Routine medical assessment
		Follow appropriate guidelines
		Transport recommended

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

Heart rate	< 100 bpm
Blood pressure	< 160 systolic AND < 100 diastolic
Temperature	≤ 99° F
Respiratory rate	12 – 20
SPO <sub>2</sub>	> 94%
Carbon monoxide (if available)	< 6%

### 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 debride)
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 per
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 use of 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 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<sub>2</sub> of 35-45mmHg
  - b. See guidelines as needed
    - i. [Nausea/Vomiting/Vertigo Guideline](#)
      1. [AEMT] **ONDANSETRON** 4 mg
        - a. Pediatric (< 2 y/o) - 0.1 mg/kg up to 4mg
          - i. (2 y/o – 8 y/o) – 2mg
          - ii. (> 8 y/o) – 4mg
      - ii. [Seizure Guideline](#)
9. If signs of herniation<sup>1</sup> are present
  - a. Mildly hyperventilate patient (14-16 breaths/minute) to maintain EtCO<sub>2</sub> 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  $\geq$ Class II shock; do not delay transport for access
  - b. Titrate **NORMAL SALINE** with a SBP goal of  $\geq 90$  in trauma patients (permissive hypotension except in patients with significant head injuries)
4. [Paramedic] For hemorrhagic shock: **Tranexamic acid (TXA)** 1g in 100ml D<sub>5</sub>W or NS over 10 minutes (faster may result in hypotension); use a filter needle to draw up
  - a. Follow by an infusion of 1g in 500ml NS over 8 hours (*at receiving facility*)
  - b. Indications: Evidence of acute blood loss—Class II or greater
  - c. Administration as soon as possible but no later than 3 hours after initial injury
  - d. Considerations:
    - i. Contact Medical Control for patients  $<16$
    - ii. Contact Medical Control for non-traumatic hemorrhagic shock ( $\geq$  Class II)
  - e. 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

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

### 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 an 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 in to 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) and saline 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.

### ARTERIAL LINE, CENTRAL LINE, AND CVP MONITORING (CONTINUED)

#### **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

<u>Hypotension</u>	<u>Hypertension</u>
<ol style="list-style-type: none"> <li>1. If patient is hypotensive and symptomatic with no signs of fluid overload               <ol style="list-style-type: none"> <li>a. [AEMT] 250-500ml <b>NORMAL SALINE</b> bolus up to two liters total</li> </ol> </li> <li>2. If <b>NORMAL SALINE</b> unsuccessful and vasopressor is indicated, norepinephrine is preferred except in anaphylaxis, symptomatic bradycardia, and hypotensive pulmonary edema               <ol style="list-style-type: none"> <li>a. [Paramedic] Consider <a href="#">PUSH DOSE EPINEPHRINE</a> 10-20mcg as a bridge to infusion</li> <li>b. [Paramedic] Consider <b>NOREPINEPHRINE INFUSION</b> (4mg/250ml D<sub>5</sub>W or NS – 16mcg/ml)                   <ol style="list-style-type: none"> <li>i. Initiate at 0.1 mcg/kg/min via IV pump                       <ol style="list-style-type: none"> <li>1. Titrate by 0.01-0.05 mcg/kg/min every 3-5 minutes</li> <li>2. Maximum of 0.3 mcg/kg/min</li> </ol> </li> </ol> </li> <li>c. [Paramedic] Consider <b>EPINEPHRINE INFUSION</b> (1mg/100ml D<sub>5</sub>W or NS—10mcg/ml) when norepinephrine is not the preferred vasopressor                   <ol style="list-style-type: none"> <li>i. Initiate IV infusion at 2-5 mcg/min</li> <li>ii. Titrate by increments of no more than 1 mcg/min every 5 minutes</li> <li>iii. Maximum of 10 mcg/min</li> </ol> </li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. If patient is hypertensive per applicable guidelines               <ol style="list-style-type: none"> <li>a. [Paramedic/Med Control] <b>LABETALOL</b> 20 mg slow push                   <ol style="list-style-type: none"> <li>i. May repeat at 40 mg every 10 minutes to a max of 300mg</li> </ol> </li> </ol> </li> <li>2. [Paramedic/Med Control] Consider <b>NITROGLYCERIN INFUSION</b> (20mg/100mL D<sub>5</sub>W or NS – 200 mcg/mL)               <ol style="list-style-type: none"> <li>i. For patients &lt;75kg, start at 10 mcg/min</li> <li>ii. For patient &gt;75kg, start at 20 mcg/min</li> <li>iii. Titrate by 5-10 mcg/min every 5-10 minutes to desired response</li> <li>iv. Monitor BP every 3-5 minutes</li> </ol> </li> </ol>

### 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:**

2. Perform routine medical assessment
3. Airway support as needed, see [Airway / Ventilatory Management Guideline](#)
4. [AEMT] Establish IV/IO
5. If hypotensive and patient is symptomatic with no signs of fluid overload
  - a. [AEMT] Administer 20 ml/kg over 10-20 minutes
    - i. If suspected cardiogenic shock, consider 10 ml/kg over 10-20 minutes
    - ii. Repeat bolus once if needed
6. If patient has inadequate response to fluid
  - a. [Paramedic/Med Control] Consider **EPINEPHRINE INFUSION** (1mg/100ml D<sub>5</sub>W or NS—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 & 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 while en route to a call.

**Procedure:**

1. When EMS is activated but a request to cancel is made, dispatch will advise responding crew to continue in a non-emergency fashion
2. TSA/TSRA crew may cancel under the following conditions
  - a. At the discretion of the TSA/TSRA shift supervisor with consideration given to call circumstances, system status, and 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. LCFD paramedics advise the patient is refusing and they will complete a refusal

## 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, assure 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:
  - a. 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.
  - b. Never leave the clamp on for more than a few seconds.
  - c. Evaluate the insertion site.
  - d. Apply occlusive dressings to the site.
  - e. Evaluate the patient for distress.
  - f. Consult physician immediately if needed.
  - g. 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.
    - i. Check all connections and secure with tape.
    - ii. 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:

MIDAZOLAM	KETAMINE	PROPOFOL
*** 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. ***		
<b>Adult</b> <ul style="list-style-type: none"> <li>• Bolus dosing <ul style="list-style-type: none"> <li>○ 1-3mg IV/IO</li> <li>○ 5mg IM</li> </ul> </li> <li>• Infusion dosing <ul style="list-style-type: none"> <li>○ Mix 10mg in 100mL NS</li> <li>○ Use MIDAZOLAM calc function on pump <ul style="list-style-type: none"> <li>▪ Start at 1-2 mg/hr</li> <li>▪ Titrate by 0.5 mg/hr; max of 7 mg/hr</li> </ul> </li> </ul> </li> </ul>	<b>Adult</b> <ul style="list-style-type: none"> <li>• Bolus dosing <ul style="list-style-type: none"> <li>○ 1-2 mg/kg IV/IO/IM</li> </ul> </li> <li>• Infusion dosing <ul style="list-style-type: none"> <li>○ Mix 100mg in 100mL NS</li> <li>○ Use GENERIC calc function on pump <ul style="list-style-type: none"> <li>▪ Start at 0.8 mcg/kg/min</li> <li>▪ Titrate by 0.4 mcg/kg/min; max of 6 mcg/kg/min</li> </ul> </li> </ul> </li> </ul>	<b>Adult</b> <ul style="list-style-type: none"> <li>• Bolus dosing <ul style="list-style-type: none"> <li>○ Only infusion; see below</li> <li>○ See below</li> </ul> </li> <li>• Infusion dosing <ul style="list-style-type: none"> <li>○ Use PROPOFOL calc function on pump</li> <li>○ 5-50 mcg/kg/min. If greater than 50mcg is required, contact medical control. Absolute maximum dose is 80 mcg/kg/min</li> <li>○ May increase 5-10 mcg/kg/min every five minutes based on required sedation</li> <li>○ Bolus dosing 0.1-0.5 mg/kg IVP slowly to quickly increase depth of sedation for patients not at risk for hypotension</li> </ul> </li> </ul>

## 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:

MIDAZOLAM	KETAMINE	PROPOFOL
<b>*** 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. ***</b>		
<b>Pediatric (&lt; 8 y/o)</b> <ul style="list-style-type: none"> <li>• Bolus dosing <ul style="list-style-type: none"> <li>○ 0.05 mg/kg IV/IO or 0.1 mg/kg IM</li> </ul> </li> <li>• Infusion dosing <ul style="list-style-type: none"> <li>○ Mix 5mg in 100mL NS</li> <li>○ Use GENERIC drug calc function on pump <ul style="list-style-type: none"> <li>▪ Start at 1 mcg/kg/min</li> <li>▪ Titrate by 0.5 mcg/kg/min; max of 5 mcg/kg/min</li> </ul> </li> </ul> </li> </ul>	<b>Pediatric (&lt; 8 y/o)</b> <ul style="list-style-type: none"> <li>• Bolus dosing <ul style="list-style-type: none"> <li>○ 1-2 mg/kg IV/IO/IM</li> </ul> </li> <li>• Infusion dosing <ul style="list-style-type: none"> <li>○ Mix 50mg in 100mL NS</li> <li>○ Use GENERIC drug calc function on pump <ul style="list-style-type: none"> <li>▪ Administer 1 mcg/kg/min</li> <li>▪ Titrate by 0.5 mcg/kg/min; max of 6 mcg/kg/min</li> </ul> </li> </ul> </li> </ul>	<b>Pediatric (&lt; 8 y/o)</b> <ul style="list-style-type: none"> <li>• Bolus dosing <ul style="list-style-type: none"> <li>○ Only if infusion</li> </ul> </li> <li>• Infusion dosing <ul style="list-style-type: none"> <li>○ Use PROPOFOL calc function on pump</li> <li>○ Start at 125 mcg/kg/min</li> <li>○ May increase 5-10 mcg/kg/min every five minutes up to 300 mcg/kg/min</li> <li>○ Bolus dosing 0.1-0.5 mg/kg slowly to quickly increase depth of sedation for patients not at risk for hypotension</li> </ul> </li> </ul>

## 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 24 hours.

### APPROVED INSERTION SITES\*\*

Adults	Pediatrics
<ul style="list-style-type: none"><li>• Proximal humerus</li><li>• Proximal tibia</li><li>• Distal tibia**</li></ul>	<ul style="list-style-type: none"><li>• Distal Femur**</li><li>• Proximal humerus</li><li>• Proximal tibia</li><li>• Distal tibia**</li></ul>

**\*\* 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

<ul style="list-style-type: none"><li>• EZ-IO® Power Driver</li><li>• EZ-IO® Needle Set and EZ-Connect® Extension Set</li><li>• EZ-Stabilizer® Dressing</li><li>• Cleansing agent of choice</li><li>• Luer lock syringe with sterile Normal Saline flush (5-10 mL for adults, 2-5 mL for infant/child)</li></ul>	<ul style="list-style-type: none"><li>• Sharps container</li><li>• Intravenous lidocaine for placement in conscious patient</li><li>• Intravenous fluid</li><li>• Infusion pressure pump or pressure bag, tubing, 3-way stop cock</li><li>• 2% lidocaine</li></ul>
--	--

## EZ-IO® INTRAOSSEOUS VASCULAR ACCESS SYSTEM (CONTINUED)

### 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  $\geq 40$  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

Adults	Pediatrics
<ul style="list-style-type: none"><li>• <a href="#">Proximal humerus</a></li><li>• <a href="#">Proximal tibia</a></li><li>• <a href="#">Distal tibia**</a></li></ul>	<ul style="list-style-type: none"><li>• <a href="#">Proximal tibia</a></li><li>• <a href="#">Distal tibia**</a></li><li>• <a href="#">Proximal humerus</a></li><li>• <a href="#">Distal Femur**</a></li></ul>

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

## EZ-IO® INTRAOSSEOUS VASCULAR ACCESS SYSTEM (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 (2<sup>nd</sup> 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. **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

## La Crosse Regional Pre-Hospital Guidelines – Iowa Version

---

### **a. INFANT/CHILD – RESPONSIVE TO PAIN**

- iii. Observe recommended cautions/contraindications to using 2% preservative and epinephrine-free lidocaine (intravenous lidocaine)
- iv. Prime extension set with lidocaine
- v. 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.
- vi. Repeat as needed; consider systemic pain control for patients not responding to IO lidocaine

### **b. 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

## EZ-IO® INTRAOSSEOUS VASCULAR ACCESS SYSTEM (CONTINUED)

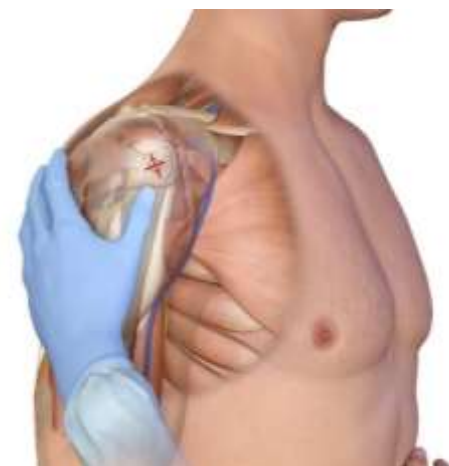
### ADULT PROXIMAL HUMERUS PLACEMENT

#### 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; 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

<p><b><u>SITE IDENTIFICATION</u></b></p> <ol style="list-style-type: none"><li>1. Extend the leg.</li><li>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.</li></ol> <p><b><u>INSERTION</u></b></p> <ol style="list-style-type: none"><li>1. Aim the needle set at a 90-degree angle to the bone</li><li>2. Push the needle set tip through the skin until the tip rests against the bone<ol style="list-style-type: none"><li>a. <b>The 5 mm mark must be visible above the skin for confirmation of adequate needle set length</b></li></ol></li><li>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</li></ol>	
--	--

## EZ-IO® INTRAOSSEOUS VASCULAR ACCESS SYSTEM (CONTINUED)

### ADULT DISTAL TIBIA PLACEMENT\*\*

<p><b><u>SITE IDENTIFICATION</u></b></p> <ol style="list-style-type: none"><li>1. Insertion site is located approximately 3 cm proximal to the most prominent aspect of the medial malleolus.</li><li>2. Palpate the anterior and posterior borders of the tibia to assure insertion site is on the flat center aspect of the bone.</li></ol> <p><b><u>INSERTION</u></b></p> <ol style="list-style-type: none"><li>3. Aim the needle set at a 90-degree angle to the bone</li><li>4. Push the needle set tip through the skin until the tip rests against the bone<ol style="list-style-type: none"><li>a. <b>The 5 mm mark must be visible above the skin for confirmation of adequate needle set length</b></li></ol></li><li>5. 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</li></ol>	
--	--

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

## EZ-IO® INTRAOSSEOUS VASCULAR ACCESS SYSTEM (CONTINUED)

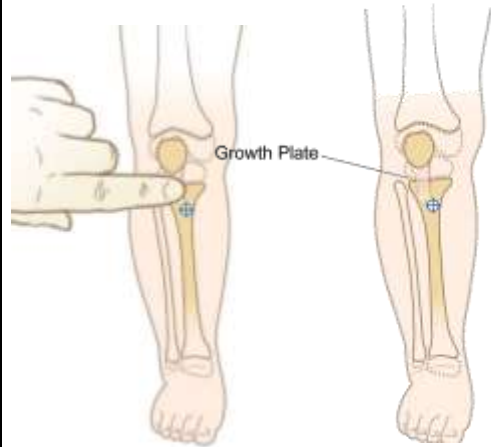
### INFANT/CHILD PROXIMAL TIBIA PLACEMENT

#### 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.

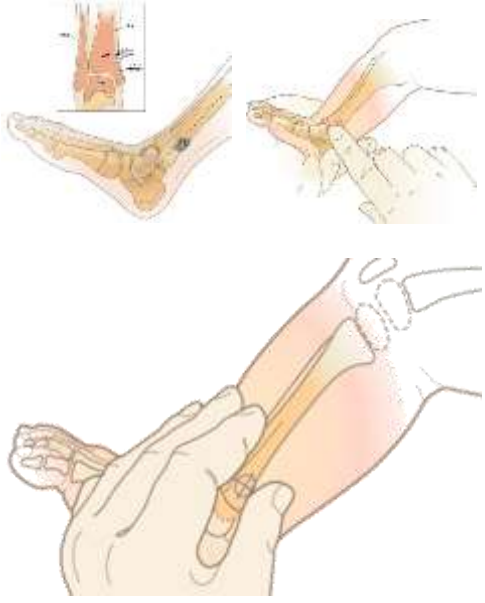
#### INSERTION

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\*\*

<p style="text-align: center;"><b><u>SITE IDENTIFICATION</u></b></p> <ol style="list-style-type: none"><li>1. Insertion site is located approximately 1-2 cm proximal to the most prominent aspect of the medial malleolus.</li><li>2. Palpate the anterior and posterior borders of the tibia to assure insertion site is on the flat center aspect of the bone.</li></ol> <p style="text-align: center;"><b><u>INSERTION</u></b></p> <ol style="list-style-type: none"><li>3. Aim the needle set at a 90-degree angle to the bone</li><li>4. Push the needle set tip through the skin until the tip rests against the bone<ol style="list-style-type: none"><li>a. <b>The 5 mm mark must be visible above the skin for confirmation of adequate needle set length</b></li></ol></li><li>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.</li></ol>	
---	--

**\*\* 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)

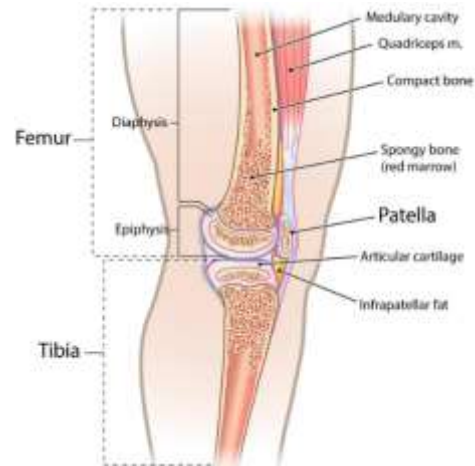
### INFANT/CHILD DISTAL FEMUR PLACEMENT\*\*

#### **SITE IDENTIFICATION**

1. Secure the leg out-stretched 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.**
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.



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

### EZ-IO® INTRAOSSEOUS VASCULAR ACCESS SYSTEM (CONTINUED)

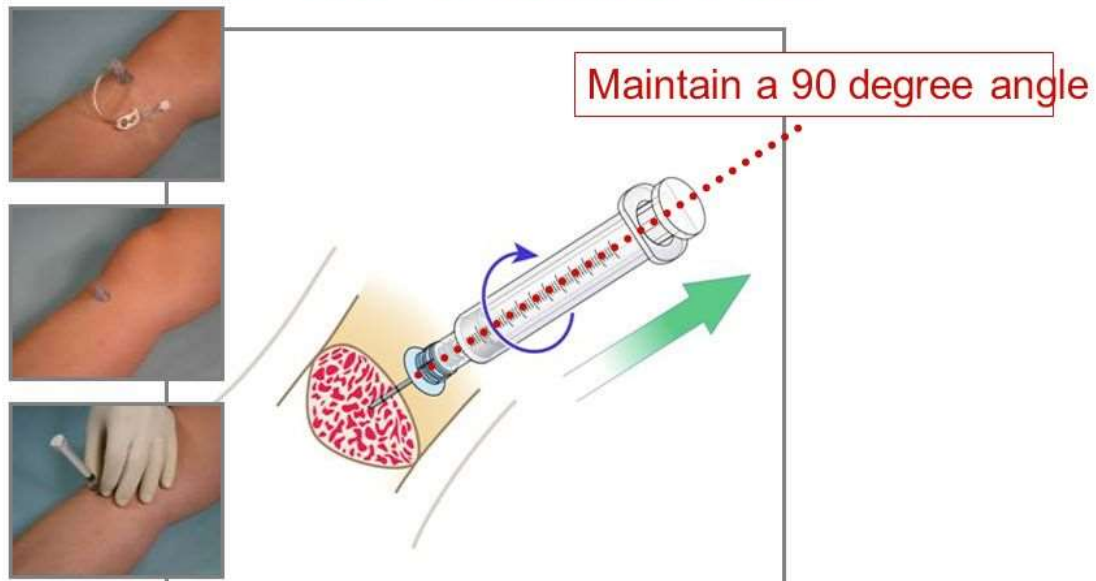
#### EZ-IO® REMOVAL TECHNIQUE

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



Immediate Vascular Access...  
When You Need It Most

## EZ-IO Removal



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 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 9mg 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 10mg **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:**

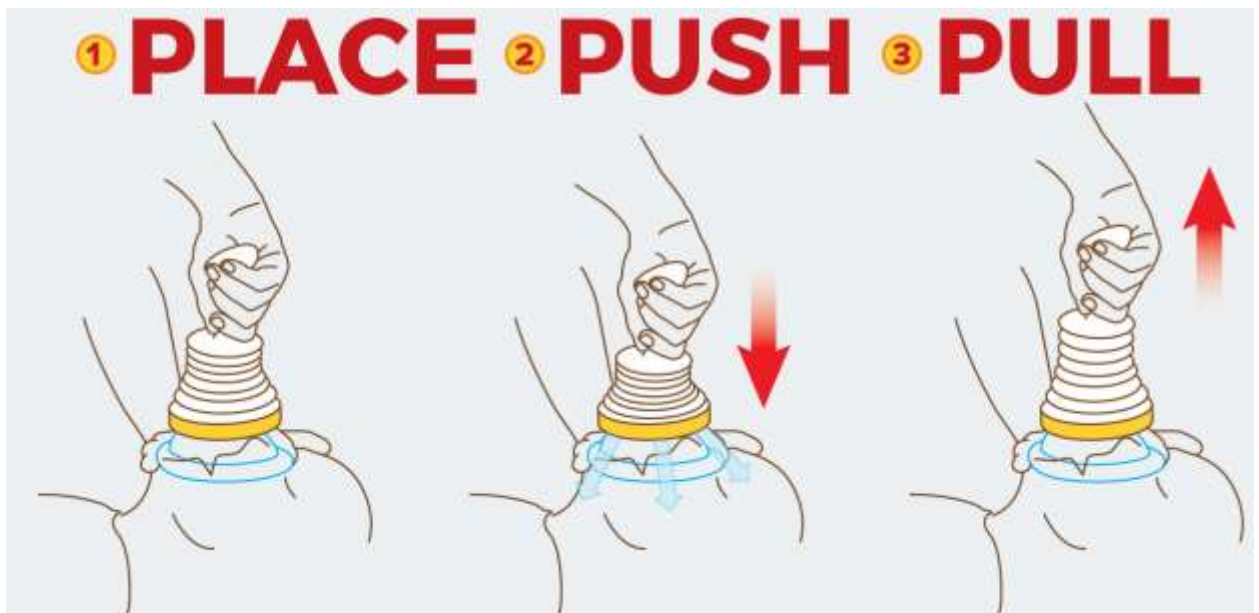
1. Determine MAD/Intranasal indications
2. Rule out contraindications
  - a. Epistaxis
  - b. Nasal trauma
  - c. Nasal septal abnormalities
  - d. Significant nasal congestion/discharge
3. Draw up medication not to exceed 2ml total volume
4. Attach MAD to syringe and place MAD in nostril
5. Briskly compress syringe to administer atomized medication
  - a. Point outwards and upwards
  - b. Do not to 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 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 should 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 on superior location of suction cup on patient's chest
15. Place patient's wrists/arms in appropriate straps on device

### MECHANICAL CPR – LUCAS (CONTINUED)

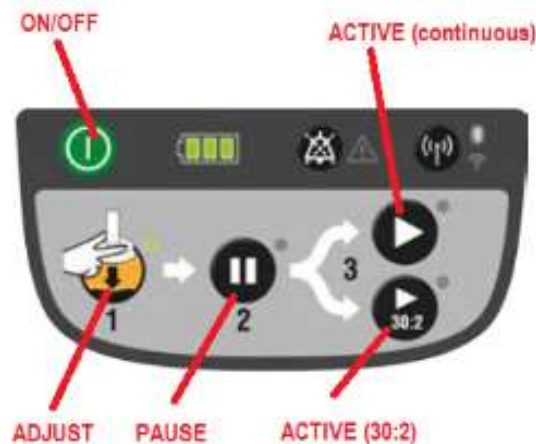
#### LUCAS considerations

- 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 of 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:** System paramedics may distribute naloxone kits intended for layperson use after refusal of transport by suspected opioid overdoses.

**Guideline:**

1. Eligible agencies will obtain or create naloxone kits intended for layperson use as available
2. Naloxone kits will be distributed to EMS units as available
3. System paramedics will provide a naloxone kit if available to patients and/or bystanders involved in suspected opioid overdoses cases
4. Naloxone kits will not be limited to responses in which a suspected opioid overdose is the primary impression
  - a. System paramedics will use their discretion and clinical judgment to distribute naloxone kits to any patient and/or bystander that may benefit from the program
5. Distribution of naloxone kits must be documented in the PCR using the “Naloxone Kit” intervention
6. Naloxone from regular EMS supply shall not be distributed to patients or bystanders

## NASOGASTRIC/OROGASTRIC TUBE

**General Scope:** Procedure for NG/OG tube placement.

**Guideline:**

1. Assessment reveals the following:
  - a. Vomiting and/or abdominal pain with distended, tympanic abdomen and possible frequent high-pitched bowel sounds
  - b. Distended abdomen after resuscitative efforts (air-filled stomach)
  - c. Avoid in patients with significant facial and head injuries
2. If conscious see [Sedation Procedure](#) and [Pain Management Procedure](#) as needed
3. Determine length of insertion (tip of nose -> earlobe -> bottom of sternum)
4. Lubricate Gastric Tube (GT) with water-based lubricant
5. Nasogastric (NG) Tube Placement (typically conscious patients)
  - a. Maintain patient with head in neutral or slightly flexed position
  - b. Insert GT through nose to determined length
  - c. Visualize mouth for coiled GT
6. Orogastic (OG) Tube Placement (typically unconscious patients)
  - a. Carefully place patient's head in neutral or slightly flexed position
  - b. Insert GT through mouth to determined length
  - c. Inspect for coiled GT
7. Inject air through GT and auscultate over epigastrium
8. Tape GT to nose (NG) or mouth (OG) and connect to low continuous suction

### 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. 5<sup>th</sup> intercostal space mid-axillary is preferred
  - b. 2<sup>nd</sup> 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.  $\text{SPO}_2 < 92\%$  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  $\text{cmH}_2\text{O}$  or pre-set level (verify with manometer)
  - a. If using Bi-Level CPAP, start with 8-10 $\text{cmH}_2\text{O}$  IPAP
    - i. Using manometer, verify at least 4-5  $\text{cmH}_2\text{O}$  of EPAP
    - ii. Adjust IPAP and EPAP as necessary

### Note:

Indications	Exclusion criteria
<ul style="list-style-type: none"><li>• Acute pulmonary edema as a bridge device</li><li>• Patients already on CPAP</li><li>• Mild respiratory failure due to muscle fatigue</li><li>• COPD</li></ul>	<ul style="list-style-type: none"><li>• Recurrent aspiration</li><li>• Large volumes of secretions</li><li>• Inability to protect the airway</li><li>• Vomiting</li><li>• Obstructed bowel</li><li>• Upper airway obstruction</li><li>• Uncooperative, confused or combative patient</li><li>• Inability to tolerate a tight mask</li><li>• Orofacial abnormalities which interfere with mask/face interface</li><li>• Untreated pneumothorax</li></ul>

## 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 Wong Baker 1-6	SEVERE PAIN Wong Baker 7-10
a) [AEMT] <b>KETORALAC</b> <sup>1</sup> <ol style="list-style-type: none"> <li>a. 15 mg IV/IO/IM one time</li> <li>b. Pediatric (&gt;1 y/o) – 0.5 mg/kg IV/IO ONLY one time (Max 15 mg)</li> </ol> <p style="text-align: center;"><b>AND</b></p> b) [EMT] <b>ACETAMINOPHEN</b> <sup>2</sup> <ol style="list-style-type: none"> <li>a. 650mg PO one time</li> <li>b. Pediatric (&gt;1 y/o) – 10 mg/kg PO one time (Max 650 mg)</li> <li>c. Evidence suggests that the administration of an NSAID + acetaminophen is as effective as opiate medications.</li> <li>d. It is OK to administer only one if other is contraindicated</li> </ol>	a) [Paramedic] <b>FENTANYL</b> <sup>3-6</sup> <ol style="list-style-type: none"> <li>a. 25-50mcg               <ol style="list-style-type: none"> <li>i. 50 mcg IN</li> </ol> </li> <li>b. Pediatric (&lt; 8 y/o) - 1 mcg/kg               <ol style="list-style-type: none"> <li>i. 2 mcg/kg IN</li> </ol> </li> <li>c. May repeat every 10 minutes as needed               <ol style="list-style-type: none"> <li>i. Recheck vital signs between doses</li> </ol> </li> </ol> b) [Paramedic] <b>KETAMINE</b> 0.25 mg/kg (Adult & Pediatric) <ol style="list-style-type: none"> <li>a. May repeat every 15 minutes as needed</li> </ol> c) Recheck vital signs between doses           d) [Paramedic] Consider <b>MIDAZOLAM</b> 1-2 mg IV/IO/IM <ol style="list-style-type: none"> <li>a. Pediatric (&lt; 8 y/o) 0.1 mg/kg up to 1 mg</li> <li>b. May be administered one time</li> </ol>

6. For transports >15 minutes, patients treated with **FENTANYL, KETAMINE, or MIDAZOLAM** should have end tidal CO<sub>2</sub> monitoring

### NOTES

1. Ketorolac is contraindicated for all patients over 49, or any patient with known renal insufficiency, or any patient with hypersensitivity to NSAIDs.
2. Acetaminophen is contraindicated for use in patients with inability to swallow, known sensitivity to acetaminophen, or if patient has taken 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.

**Applies to:** Paramedics

**Procedure:**

1. Ensure adequate ventilation/pre-oxygenation via appropriate adjunct
2. High flow (15L/min) O<sub>2</sub> via nasal cannula for apneic oxygenation
3. Prepare equipment, medication, and patient
  1. 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.
  1. Consider [PUSH DOSE EPINEPHRINE\\*\\* \(10mcg/1mL\)](#)
  2. Administer 10-20mcg (1-2mL) [PUSH DOSE EPINEPHRINE\\*\\* \(10mcg/1mL\)](#) at least one minute prior to sedation and every 2-5 minutes as needed
5. Administer **KETAMINE** 1-2mg/kg
  1. For patients with systolic blood pressure <90, use 1mg/kg dose
  2. Pediatric (< 8 y/o) – 1-2mg/kg
6. Administer **ROCURONIUM** 1mg/kg (~20 min duration)
7. Secure airway
8. Confirm placement with waveform capnography and auscultation
9. Monitor EtCO<sub>2</sub>, SpO<sub>2</sub>, 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
  1. **KETAMINE** 1mg/kg
    - i. Pediatric (< 8 y/o) – 1mg/kg
  2. **MIDAZOLAM** 1-2mg
    - i. Pediatric (< 8 y/o) – 0.05mg/kg
  3. **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.

**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

**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:** Procedure for restraint of a combative or agitated patient

**Procedure:**

1. Routine medical and/or trauma assessment
2. Determine need (patient is danger to themselves or others)
3. Rule out hypoglycemia, hypoxia, hypovolemia, etc.
4. [AEMT] Establish IV/IO
5. Choose appropriate restraint or combination of restraints
6. 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. The goal is to transition to soft restraints when safe to do so
  - c. [Spit Hood](#)
7. 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] **KETAMINE** 1-2mg/kg IV/IO/IM
  - d. For continued sedation (infusion), see [Sedation Procedure](#)
8. Document
  - a. Reason for restraint
  - b. Method used
  - c. Frequent vital signs including SpO<sub>2</sub> and LOC

## 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

MIDAZOLAM	KETAMINE
*** 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. ***	
<b>Adult</b> <ul style="list-style-type: none"> <li>• Bolus dosing <ul style="list-style-type: none"> <li>○ 1-3mg IV/IO</li> <li>○ 5mg IM</li> </ul> </li> <li>• Infusion dosing <ul style="list-style-type: none"> <li>○ Mix 10mg in 100mL NS</li> <li>○ Use <b>MIDAZOLAM</b> calc function on pump <ul style="list-style-type: none"> <li>▪ Start at 1-2 mg/hr</li> <li>▪ Titrate by 0.5 mg/hr; max of 7 mg/hr</li> </ul> </li> </ul> </li> </ul> <b>Pediatric (&lt; 8 y/o)</b> <ul style="list-style-type: none"> <li>• Bolus dosing <ul style="list-style-type: none"> <li>○ 0.05 mg/kg IV/IO or 0.1 mg/kg IM</li> </ul> </li> <li>• Infusion dosing <ul style="list-style-type: none"> <li>○ Mix 5mg in 100mL NS</li> <li>○ Use GENERIC drug calc function on pump <ul style="list-style-type: none"> <li>▪ Start at 1 mcg/kg/min</li> <li>▪ Titrate by 0.5 mcg/kg/min; max of 5 mcg/kg/min</li> </ul> </li> </ul> </li> </ul>	<b>Adult</b> <ul style="list-style-type: none"> <li>• Bolus dosing <ul style="list-style-type: none"> <li>○ 1-2 mg/kg IV/IO/IM</li> </ul> </li> <li>• Infusion dosing <ul style="list-style-type: none"> <li>○ Mix 100mg in 100mL NS</li> <li>○ Use GENERIC calc function on pump <ul style="list-style-type: none"> <li>▪ Start at 0.8 mcg/kg/min</li> <li>▪ Titrate by 0.4 mcg/kg/min; max of 6 mcg/kg/min</li> </ul> </li> </ul> </li> </ul> <b>Pediatric (&lt; 8 y/o)</b> <ul style="list-style-type: none"> <li>• Bolus dosing <ul style="list-style-type: none"> <li>○ 1-2 mg/kg IV/IO/IM</li> </ul> </li> <li>• Infusion dosing <ul style="list-style-type: none"> <li>○ Mix 50mg in 100mL NS</li> <li>○ Use GENERIC drug calc function on pump <ul style="list-style-type: none"> <li>▪ Administer 1 mcg/kg/min</li> <li>▪ Titrate by 0.5 mcg/kg/min; max of 6 mcg/kg/min</li> </ul> </li> </ul> </li> </ul>

## 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 [spinal precautions 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:**

- a. 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
- b. With the patient’s spine supported to limit movement, begin palpation at the base of the skull at the midline of the spine
- c. Palpate the vertebrae individually from the base of the skull to the bottom of the sacrum
- d. 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
- e. 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) then, if pain free, to the other. If there is evidence of pain the patient should be immobilized
- f. With the head rotated back to its normal position, ask the patient to flex and extend their neck. If there is evidence of pain the patient 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/stretchers 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 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 < 5min, 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 is 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 may be 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 whom 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 whom 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.
  - e. See manufacturer instructions included in packaging for visual representation of procedure for use.
  - f. Patient should be transported in either left or right lateral position.
  - g. CONTINUOUSLY monitor patient's airway, respiratory status, and pulse oximetry.
  - h. 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 waveform capnography
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

Size	Patient Height	Color	Inflation LT-D	Inflation LTS-D
3	4-5 feet	Yellow	45-60 ml	40-55 ml
4	5-6 feet	Red	50-70 ml	50-70 ml
5	Greater than six feet	Purple	60-80 ml	60-80 ml

## 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 waveform capnography
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
    - i. Size 1.5 – 10 fr
    - ii. Size 2-4 – 12 fr
    - iii. 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

Size	Color	Patient Category	Patient Weight
1	Pink	Neonate	2-5 kg
1.5	Blue	Infant	5-12 kg
2	Gray	Small pediatric	10-25 kg
2.5	White	Large pediatric	25-35 kg
3	Yellow	Small adult	30-60 kg
4	Green	Medium Adult	50-90 kg
5	Orange	Large Adult	90+ kg

## SURGICAL CRICOTHYROIDOTOMY

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

**Applies to:** Critical Care Paramedics

**Guideline:**

1. Attempt to provide optimal O<sub>2</sub> 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 airway but do not suction deep into the tracheostomy
  - e. If patient's breathing is inadequate, 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
  - f. [Paramedic] Suction tracheostomy (approximately 2-3 inches) using no more than 100 mmHg suction pressure
    - i. [Paramedic] May use 2-3mL NORMAL SALINE flush to loosen secretions
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



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.

## Vital Signs

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

- Normal level of consciousness (per baseline)
- Heart rate under upper limit of age based normal
- MAP of 65 or higher (or systolic at lower limit of normal)
- Respiratory rate under upper limit of age based normal
- $SpO_2 > 92\%$
- Temperature under  $100.3^\circ$

Normal Vital Signs Reference (Low-High)			
Age Category	Heart Rate	Respiratory Rate	Systolic BP
Adult	60-100	12-20	80-120
Adolescent (13-18 years)	55-105	12-20	100-120
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

### ALTERNATIVE DESTINATION TRANSPORT (CONTINUED)



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

## ALTERNATIVE DESTINATION TRANSPORT (CONTINUED)



### 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

<b>Amiodarone Infusion</b> <b>150 mg / 100ml D<sub>5</sub>W or NS</b> <b>(1.5 mg/ml)</b>	
<b>Medication Dose</b>	<b>Infusion Rate</b>
1 mg/min	40 ml/hr

## DOPAMINE INFUSION

**200mg/250cc D<sub>5</sub>W (800 mcg/mL)**

Dose in mcg/kg /min	Weight in Kilograms													
	45	50	55	60	65	70	75	80	85	90	95	100	105	110
	Infusion Rate (ml/hr)													
<b>5</b>	17	19	21	23	24	26	28	30	32	34	36	38	39	41
<b>7</b>	24	26	29	32	34	37	39	42	45	47	50	53	55	58
<b>10</b>	34	38	41	45	49	53	56	60	64	68	71	75	79	83
<b>15</b>	51	56	62	68	73	79	84	90	96	101	107	113	118	124
<b>20</b>	68	75	83	90	98	105	113	120	128	135	143	150	158	165

**200mg/250cc D<sub>5</sub>W (800 mcg/mL)**

Dose in mcg/kg /min	Weight in Kilograms													
	115	120	125	130	135	140	145	150	155	160	165	170	175	180
	Infusion Rate (ml/hr)													
<b>5</b>	43	45	47	49	51	53	54	56	58	60	62	64	66	68
<b>7</b>	60	63	66	68	71	74	76	79	81	84	87	89	92	95
<b>10</b>	86	90	94	98	101	105	109	113	116	120	124	128	131	135
<b>15</b>	129	135	141	146	152	158	163	169	174	180	186	191	197	203
<b>20</b>	173	180	188	195	203	210	218	225	233	240	248	255	263	270

## EPINEPHRINE INFUSION

<b>Epinephrine Infusion 1mg / 100ml D<sub>5</sub>W or NS (10mcg/ml)</b>	
<b>Medication Dose</b>	<b>Infusion Rate</b>
2 mcg/min	12 ml/hr
3 mcg/min	18 ml/hr
4 mcg/min	24 ml/hr
5 mcg/min	30 ml/hr
6 mcg/min	36 ml/hr
7 mcg/min	42 ml/hr
8 mcg/min	48 ml/hr
9 mcg/min	54 ml/hr
10 mcg/min	60 ml/hr

## IDEAL BODY WEIGHT CHART

Male		Female	
Height	Ideal Weight	Height	Ideal Weight
4' 6"	63 - 77 lbs.	4' 6"	63 - 77 lbs.
4' 7"	68 - 84 lbs.	4' 7"	68 - 83 lbs.
4' 8"	74 - 90 lbs.	4' 8"	72 - 88 lbs.
4' 9"	79 - 97 lbs.	4' 9"	77 - 94 lbs.
4' 10"	85 - 103 lbs.	4' 10"	81 - 99 lbs.
4' 11"	90 - 110 lbs.	4' 11"	86 - 105 lbs.
5' 0"	95 - 117 lbs.	5' 0"	90 - 110 lbs.
5' 1"	101 - 123 lbs.	5' 1"	95 - 116 lbs.
5' 2"	106 - 130 lbs.	5' 2"	99 - 121 lbs.
5' 3"	112 - 136 lbs.	5' 3"	104 - 127 lbs.
5' 4"	117 - 143 lbs.	5' 4"	108 - 132 lbs.
5' 5"	122 - 150 lbs.	5' 5"	113 - 138 lbs.
5' 6"	128 - 156 lbs.	5' 6"	117 - 143 lbs.
5' 7"	133 - 163 lbs.	5' 7"	122 - 149 lbs.
5' 8"	139 - 169 lbs.	5' 8"	126 - 154 lbs.
5' 9"	144 - 176 lbs.	5' 9"	131 - 160 lbs.
5' 10"	149 - 183 lbs.	5' 10"	135 - 165 lbs.
5' 11"	155 - 189 lbs.	5' 11"	140 - 171 lbs.
6' 0"	160 - 196 lbs.	6' 0"	144 - 176 lbs.
6' 1"	166 - 202 lbs.	6' 1"	149 - 182 lbs.
6' 2"	171 - 209 lbs.	6' 2"	153 - 187 lbs.
6' 3"	176 - 216 lbs.	6' 3"	158 - 193 lbs.
6' 4"	182 - 222 lbs.	6' 4"	162 - 198 lbs.
6' 5"	187 - 229 lbs.	6' 5"	167 - 204 lbs.
6' 6"	193 - 235 lbs.	6' 6"	171 - 209 lbs.
6' 7"	198 - 242 lbs.	6' 7"	176 - 215 lbs.
6' 8"	203 - 249 lbs.	6' 8"	180 - 220 lbs.
6' 9"	209 - 255 lbs.	6' 9"	185 - 226 lbs.
6' 10"	214 - 262 lbs.	6' 10"	189 - 231 lbs.
6' 11"	220 - 268 lbs.	6' 11"	194 - 237 lbs.

## KETAMINE INFUSION (ADULT)

**100mg/100cc D<sub>5</sub>W (1,000 mcg/mL)**

Dose in mcg/kg/min	Weight in Kilograms															
	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
	Infusion Rate (ml/hr)															
0.8	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6
1.2	3	4	4	4	5	5	5	6	6	6	7	7	8	8	8	9
1.6	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12
2	5	6	7	7	8	8	9	10	10	11	11	12	13	13	14	14
2.4	6	7	8	9	9	10	11	12	12	13	14	14	15	16	17	17
2.8	8	8	9	10	11	12	13	13	14	15	16	17	18	18	19	20
3.2	9	10	11	12	12	13	14	15	16	17	18	19	20	21	22	23
3.6	10	11	12	13	14	15	16	17	18	19	21	22	23	24	25	26
4	11	12	13	14	16	17	18	19	20	22	23	24	25	26	28	29
4.6	12	14	15	17	18	19	21	22	23	25	26	28	29	30	32	33
5	14	15	17	18	20	21	23	24	26	27	29	30	32	33	35	36
5.4	15	16	18	19	21	23	24	26	28	29	31	32	34	36	37	39
5.8	16	17	19	21	23	24	26	28	30	31	33	35	37	38	40	42

**100mg/100cc D<sub>5</sub>W (1,000 mcg/mL)**

Dose in mcg/kg/min	Weight in Kilograms														
	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195
	Infusion Rate (ml/hr)														
0.8	6	6	6	7	7	7	7	8	8	8	8	9	9	9	9
1.2	9	9	10	10	10	11	11	12	12	12	13	13	13	14	14
1.6	12	12	13	13	14	14	15	15	16	16	17	17	18	18	19
2	15	16	16	17	17	18	19	19	20	20	21	22	22	23	23
2.4	18	19	19	20	21	22	22	23	24	24	25	26	27	27	28
2.8	21	22	23	24	24	25	26	27	28	29	29	30	31	32	33
3.2	24	25	26	27	28	29	30	31	32	33	34	35	36	36	37
3.6	27	28	29	30	31	32	33	35	36	37	38	39	40	41	42
4	30	31	32	34	35	36	37	38	40	41	42	43	44	46	47
4.6	35	36	37	39	40	41	43	44	46	47	48	50	51	52	54
5	38	39	41	42	44	45	47	48	50	51	53	54	56	57	59
5.4	41	42	44	45	47	49	50	52	53	55	57	58	60	62	63
5.8	44	45	47	49	50	52	54	56	57	59	61	63	64	66	68

## KETAMINE INFUSION (PEDIATRIC)

**50mg/100cc D<sub>5</sub>W (500 mcg/mL)**

Dose in mcg/kg/min	Weight in Kilograms															
	5	10	15	20	25	30	40	45	50	55	60	65	70	75	80	85
	Infusion Rate (ml/hr)															
1	1	1	2	2	3	4	5	5	6	7	7	8	8	9	10	10
1.5	1	2	3	4	5	5	7	8	9	10	11	12	13	14	14	15
2	1	2	4	5	6	7	10	11	12	13	14	16	17	18	19	20
2.5	2	3	5	6	8	9	12	14	15	17	18	20	21	23	24	26
3	2	4	5	7	9	11	14	16	18	20	22	23	25	27	29	31
3.5	2	4	6	8	11	13	17	19	21	23	25	27	29	32	34	36
4	2	5	7	10	12	14	19	22	24	26	29	31	34	36	38	41
4.5	3	5	8	11	14	16	22	24	27	30	32	35	38	41	43	46
5	3	6	9	12	15	18	24	27	30	33	36	39	42	45	48	51
5.5	3	7	10	13	17	20	26	30	33	36	40	43	46	50	53	56
6	4	7	11	14	18	22	29	32	36	40	43	47	50	54	58	61

## LIDOCAINE INFUSION

Lidocaine Infusion Premixed (4 mg/ml)	
Medication Dose	Infusion Rate
1 mg/min	15 ml/hr
2 mg/min	30 ml/hr
3 mg/min	45 ml/hr
4 mg/min	60 ml/hr

# La Crosse Regional Pre-Hospital Guidelines – Iowa Version

## MEDICATIONS

# / A - D	E - N	O - Z
0.45% sodium chloride ( ½ NS) 5% dextrose in 0.45% NaCl (D <sub>5</sub> ½ NS) 5% dextrose in LR 5% dextrose in water (D <sub>5</sub> W) <a href="#">Abciximab (Reopro)</a> <a href="#">Acetaminophen (Tylenol)</a> <a href="#">Acetylcysteine (Mucomyst)</a> <a href="#">Activated charcoal</a> <a href="#">Adenosine (Adenocard)</a> <a href="#">Aggrastat (Tirofiban)</a> <a href="#">Albuterol</a> <a href="#">Alteplase (Activase)</a> <a href="#">Amiodarone (Cordarone)</a> Antibiotics (if hung by facility) <a href="#">Argatroban</a> <a href="#">Aspirin</a> <a href="#">Atropine</a> Blood Blood products <a href="#">Calcium chloride</a> <a href="#">Calcium gluconate</a> <a href="#">Ceftriaxone(Rocephin)</a> <a href="#">Clonazepam (Klonopin)</a> <a href="#">Clopidogrel (Plavix) - oral only</a> <a href="#">Cyanide antidote package (Cyanokit)</a> Amyl nitrate Sodium nitrate Sodium thiosulfate <a href="#">Dexamethasone (Decadron)</a> Dextrose (50%, 25%, 10%) <a href="#">Diazepam (Valium)</a> <a href="#">Diltiazem (Cardizem)</a> <a href="#">Diphenhydramine (Benadryl)</a> <a href="#">Divalproex sodium (Depakote)</a> <a href="#">Dobutamine</a> <a href="#">Dopamine</a> <a href="#">Droperidol (Inapsine)</a> <a href="#">Enalaprilat</a> <a href="#">Epinephrine</a>	<a href="#">Esmolol</a> <a href="#">Etomidate (Amidate)</a> <a href="#">Famotidine (Pepcid)</a> <a href="#">Fentanyl (Sublimaze)</a> <a href="#">Flumazenil (Romazicon)</a> <a href="#">Fosphenytoin (Cerebyx)</a> <a href="#">Furosemide (Lasix)</a> <a href="#">Glucagon</a> Glucose <a href="#">Haloperidol (Haldol)</a> <a href="#">Heparin</a> <a href="#">Hydromorphone (Dilaudid)</a> <a href="#">Insulin</a> <a href="#">Ipratropium (Atrovent)</a> <a href="#">Ketamine (Ketalar)</a> <a href="#">Ketorolac (Toradol)</a> <a href="#">Labetalol</a> Lactated Ringer's <a href="#">Levalbuterol (Xopenex)</a> <a href="#">Levetiracetam (Keppra)</a> <a href="#">Lidocaine (xylocaine)</a> <a href="#">Lorazepam (Ativan)</a> <a href="#">Magnesium sulfate</a> <a href="#">Mannitol (Osmitrol)</a> <a href="#">Methylprednisolone (Solu-medrol)</a> <a href="#">Metoclopramide (Reglan)</a> <a href="#">Metoprolol (Lopressor)</a> <a href="#">Midazolam (Versed)</a> <a href="#">Milrinone</a> <a href="#">Morphine</a> <a href="#">Nalbuphine (Nubain)</a> <a href="#">Naloxone (Narcan)</a> <a href="#">Nicardipine</a> <a href="#">Nifedipine (Procardia)</a> <a href="#">Nitroglycerin</a> <a href="#">Nitrous oxide</a> <a href="#">Norepinephrine (Levophed)</a> Normal saline (0.9% sodium chloride)	<a href="#">Octreotide (Sandostatin)</a> <a href="#">Olanzapine (Zyprexa)</a> <a href="#">Ondansetron (Zofran)</a> Oxygen <a href="#">Oxytocin (Pitocin)</a> <a href="#">Pancuronium (Pavulon)</a> <a href="#">Phenergan (Promethazine)</a> <a href="#">Phenytoin (Dilantin)</a> <a href="#">Potassium</a> <a href="#">Pralidoxime (2-pam chloride)</a> <a href="#">Procainamide</a> <a href="#">Prochlorperazine (Compazine)</a> <a href="#">Propranolol</a> <a href="#">Protamine Sulfate</a> Proton Pump Inhibitors (ALL) <a href="#">Racemic Epinephrine</a> <a href="#">Reteplase (Retavase)</a> <a href="#">Rocuronium (Zemuron)</a> <a href="#">Sodium bicarbonate</a> <a href="#">Succinylcholine (Anectine)</a> <a href="#">Terbutaline (Brethine)</a> <a href="#">Ticagrelor (Brilinta)</a> <a href="#">Thiamine</a> <a href="#">Toradol</a> TPA(tissue plasminogen activator) <a href="#">TPN (total parental nutrition)</a> <a href="#">Tranexamic acid (TXA)</a> <a href="#">Vasopressin (Pitressin)</a> <a href="#">Vasotec</a> <a href="#">Vecuronium (Norcuron)</a> <a href="#">Ziprasidone (Geodon)</a>

## MIDAZOLAM INFUSION (ADULT)

Midazolam Infusion 10mg/100mL D <sub>5</sub> W or NS (100 mcg/mL)	
Medication Dose	Infusion Rate
1 mg/hr	10 ml/hr
1.5 mg/hr	15 ml/hr
2 mg/hr	20 ml/hr
2.5 mg/hr	25 ml/hr
3 mg/hr	30 ml/hr
3.5 mg/hr	35 ml/hr
4 mg/hr	40 ml/hr
4.5 mg/hr	45 ml/hr
5 mg/hr	50 ml/hr
5.5 mg/hr	55 ml/hr
6 mg/hr	60 ml/hr
6.5 mg/hr	65 ml/hr
7 mg/hr	70 ml/hr

## MIDAZOLAM INFUSION (PEDIATRIC)

**5mg/100cc D<sub>5</sub>W (50 mcg/mL)**

Dose in mcg/kg/min	Weight in Kilograms													
	5	10	15	20	25	30	40	45	50	55	60	65	70	75
	Infusion Rate (ml/hr)													
1	6	12	18	24	30	36	48	54	60	66	72	78	84	90
1.5	9	18	27	36	45	54	72	81	90	99	108	117	126	135
2	12	24	36	48	60	72	96	108	120	132	144	156	168	180
2.5	15	30	45	60	75	90	120	135	150	165	180	195	210	225
3	18	36	54	72	90	108	144	162	180	198	216	234	252	270
3.5	21	42	63	84	105	126	168	189	210	231	252	273	294	315
4	24	48	72	96	120	144	192	216	240	264	288	312	336	360
4.5	27	54	81	108	135	162	216	243	270	297	324	351	378	405
5	30	60	90	120	150	180	240	270	300	330	360	390	420	450

## NITROGLYCERIN INFUSION

Nitroglycerin Infusion 20mg/100mL D <sub>5</sub> W or NS (200 mcg/mL)	
Medication Dose	Infusion Rate
5 mcg/min	2 ml/hr
10 mcg/min	3 ml/hr
15 mcg/min	4 ml/hr
20 mcg/min	6 ml/hr
25 mcg/min	8 ml/hr
30 mcg/min	9 ml/hr
35 mcg/min	11 ml/hr
40 mcg/min	12 ml/hr
45 mcg/min	14 ml/hr
50 mcg/min	15 ml/hr
60 mcg/min	18 ml/hr
70 mcg/min	21 ml/hr
80 mcg/min	24 ml/hr
100 mcg/min	30 ml/hr
120 mcg/min	36 ml/hr
140 mcg/min	42 ml/hr
160 mcg/min	48 ml/hr
180 mcg/min	54 ml/hr
200 mcg/min	60 ml/hr

## NOREPINEPHRINE INFUSION

**4mg/250cc D<sub>5</sub>W (16 mcg/mL)**

Dose in mcg/kg/min	Weight in Kilograms															
	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
	Infusion Rate (ml/hr)															
0.10	17	19	21	23	24	26	28	30	32	34	36	38	39	41	43	45
0.11	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	50
0.12	20	23	25	27	29	32	34	36	38	41	43	45	47	50	52	54
0.13	22	24	27	29	32	34	37	39	41	44	46	49	51	54	56	59
0.14	24	26	29	32	34	37	39	42	45	47	50	53	55	58	60	63
0.15	25	28	31	34	37	39	42	45	48	51	53	56	59	62	65	68
0.16	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72
0.17	29	32	35	38	41	45	48	51	54	57	61	64	67	70	73	77
0.18	30	34	37	41	44	47	51	54	57	61	64	68	71	74	78	81
0.19	32	36	39	43	46	50	53	57	61	64	68	71	75	78	82	86
0.20	34	38	41	45	49	53	56	60	64	68	71	75	79	83	86	90

**4mg/250cc D<sub>5</sub>W (16 mcg/mL)**

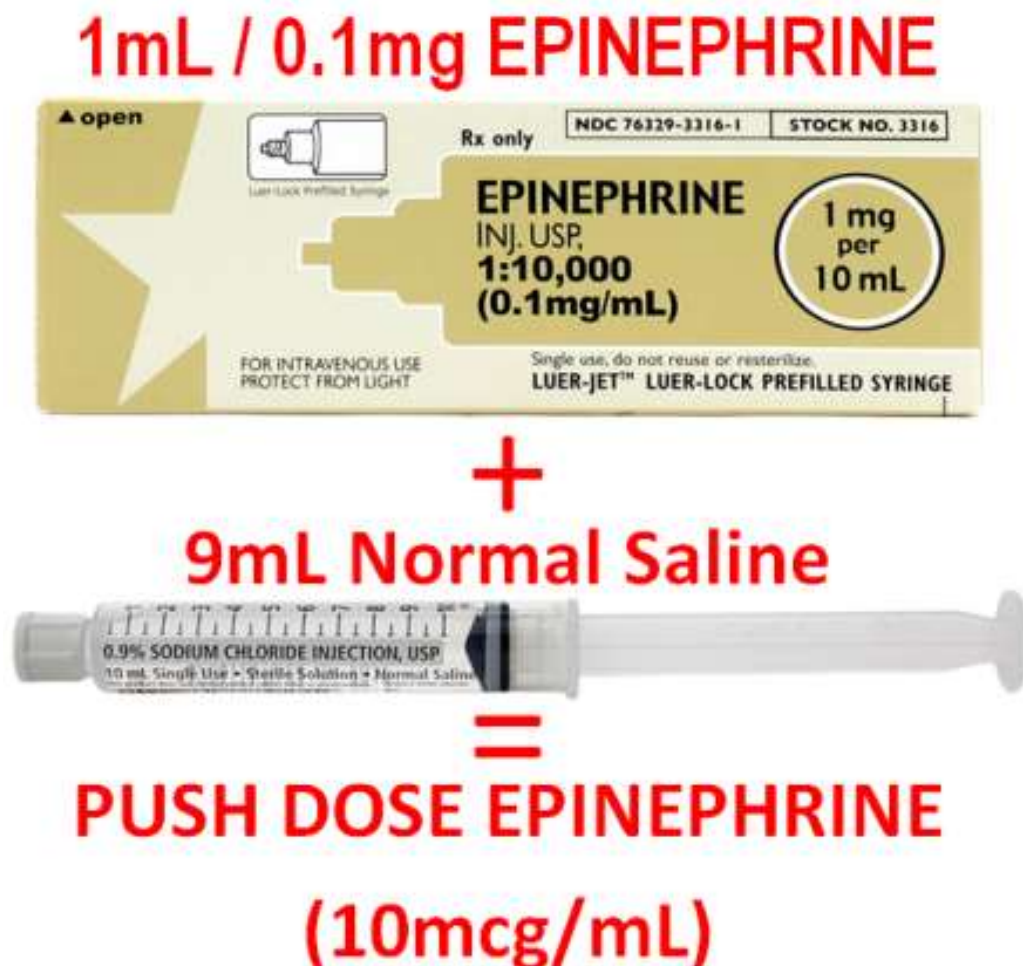
Dose in mcg/kg/min	Weight in Kilograms														
	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195
	Infusion Rate (ml/hr)														
0.10	47	49	51	52	54	56	58	60	62	64	66	68	69	71	73
0.11	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80
0.12	56	58	61	63	65	68	70	72	74	76	79	81	83	86	88
0.13	61	63	66	68	71	73	76	78	80	83	85	88	90	93	95
0.14	66	68	71	74	76	79	81	84	87	89	92	95	97	100	102
0.15	70	73	76	79	82	84	87	90	93	96	98	101	104	107	110
0.16	75	78	81	84	87	90	93	96	99	102	105	108	111	114	117
0.17	80	83	86	89	92	96	99	102	105	108	112	115	118	121	124
0.18	84	88	91	95	98	101	105	108	111	115	118	122	125	128	132
0.19	89	93	96	100	103	107	110	114	118	121	125	128	132	135	139
0.20	94	98	101	105	109	113	116	120	124	128	131	135	139	143	146

## PUSH DOSE EPINEPHRINE

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

**Procedure:**

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



### RADIO REPORT OUTLINE

**General Scope:** To Provide a general guideline for EMS to hospital patient report.

**Reference:**

1. Radio report should be provided as soon as practicable
2. Identify service, unit number, radio frequency
3. Communicate patient's age, sex, and level of consciousness
4. Communicate patient's chief complaint and/or primary impression
5. Communicate history of injury/illness and pertinent past medical history
6. Relate pertinent assessment and findings including vital signs
7. Communicate any treatment initiated
  - a. EMS staff can request orders from on-line medical control at this time, but it is often more expedient to initiate a request for orders prior to giving patient report
8. Give estimated time of arrival

## TELEMEDICINE EVALUATION



Telemedicine evaluation should be considered for patients with no obvious life threats whom 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
- SPO<sub>2</sub> > 92%
- Temperature under 100.3°

Normal Vital Signs Reference (Low-High)			
Age Category	Heart Rate	Respiratory Rate	Systolic BP
Adult	60-100	12-20	80-120
Adolescent (13-18 years)	55-105	12-20	100-120
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

### TELEMEDICINE EVALUATION (CONTINUED)



**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 includes, but is 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 Regional Ambulance Personnel (Reference for all other agencies)

<div><div>RED ACTIVATION</div><div><div>TRANSPORT TO HIGHEST LEVEL TRAUMA CENTER</div><ul style="list-style-type: none"><li>• Traumatic arrest: active or history of</li><li>• Intubated, advanced airway adjunct and/or respiratory compromise, obstruction, stridor, or grunting in children</li><li>• Systolic blood pressure, confirmed by sequential readings of:<ul style="list-style-type: none"><li>Adult &lt; 90 mmHg</li><li>Pediatric &lt; 60 mmHg (0-6 months)</li><li>&lt; 70 mmHg (6 months-5 yrs)</li><li>&lt; 80 mmHg (over 5 yrs – 14.9 yrs)</li></ul></li><li>• Penetrating injury to head, neck, torso, or extremity proximal to elbow/knee joints</li><li>• Tourniquet in place to control extremity hemorrhage</li><li>• Extremity injuries<ul style="list-style-type: none"><li>○ Complete or partial amputation proximal to wrist of ankle</li><li>○ Crushed, de-gloved or mangled proximal to wrist or ankle</li></ul></li><li>• Evisceration</li><li>• GCS &lt; 8 with mechanism attributed to trauma, including isolated hanging, traumatic asphyxia, or cold water drowning with signs of life</li><li>• Flail chest</li><li>• Unstable pelvis</li><li>• Severe hypothermia (core body temp &lt; 28° C [82.4° F])</li></ul></div></div>	<div><div>YELLOW ACTIVATION</div><div><div>TRANSPORT TO HIGHEST LEVEL TRAUMA CENTER</div><table><tr><td>Glasgow Coma Scale &lt; 14</td><td>≥ two long bone fractures*</td></tr><tr><td>Open/depressed skull fracture</td><td>New onset paralysis</td></tr></table><ul style="list-style-type: none"><li>• Extrication greater than 20 minutes</li><li>• Combination of trauma with burns</li><li>• Burns<ul style="list-style-type: none"><li>Adult &gt; 20% TBSA or involving face/airway</li><li>Pediatric &gt; 15% TBSA or involving face/airway</li></ul></li><li>• Ejection from <i>enclosed</i> vehicle</li><li>• Falls<ul style="list-style-type: none"><li>Adult &gt; 20 feet</li><li>Pediatric &gt; 15 feet</li></ul></li><li>• Auto-pedestrian/auto-bicycle with speeds &gt; 20 mph</li><li>• High-voltage electrocution</li><li>• Moderate hypothermia (core temp 28° C - 32.2° C [90° F])</li><li>• Transport by aeromedical crew</li></ul><div>* Involving femur/humerus</div></div></div>	Glasgow Coma Scale < 14	≥ two long bone fractures*	Open/depressed skull fracture	New onset paralysis
Glasgow Coma Scale < 14	≥ two long bone fractures*				
Open/depressed skull fracture	New onset paralysis				

## TRAUMA DESTINATION DETERMINATION

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

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

### Trauma Destination Determination

- Per the State of Iowa and CDC Guidelines, when in doubt, transport to a level 1 or 2 trauma center.
- Trauma patients who do not meet the above criteria may be transported to a level 3 or 4 center.

#### Notes:

- If the patient is not ventilating or cannot be ventilated, transport to the closest appropriate hospital or request ALS/Air Medical intercept for RSI/definitive airway management
- According to federal and state trauma guidelines, level 1 and 2 trauma centers are clinically equivalent
- Patients who meet Trauma Red or the four designated Trauma Yellow criteria and are requesting to be transported to a non-level 1 or 2 trauma center, should be advised that based on their injuries, state and federal guidelines recommend they go to the highest-level trauma center in the region. Transport to non-level 1 or 2 trauma center may then continue if the patient still wishes not to go to the highest level and the facility accepts the patient.

# La Crosse Regional Pre-Hospital Guidelines – Iowa Version

## IOWA TRAUMA TRIAGE DESTINATION - 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  $\leq 13$
- 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.

# La Crosse Regional Pre-Hospital Guidelines – Iowa Version

## 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 user 1 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 EtCO<sub>2</sub> between 30-35. Start at a rate of 10 and increase or decrease rate in increments of 2 to obtain desired EtCO<sub>2</sub>
  - ii. If RR 16-20, use no PEEP
- n. Be aware of pneumothorax risk (especially with traumatic chest injuries)
- o. Maintain EtCO<sub>2</sub> 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. PaCO<sub>2</sub> > 50mmHg
  - v. Hypoxemia
    - 1. Pneumonia
    - 2. Fluid overload
  - vi. CHF
  - vii. Moderate to severe respiratory failure
  - viii. Post-op patients with rising EtCO<sub>2</sub> 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

## VENTILATOR / BiPAP USE (CONTINUED)

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 EtCO<sub>2</sub> between 40-50)
    - v. PEEP of 4.
    - vi. FiO<sub>2</sub> 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 EtCO<sub>2</sub> between 40-50)
    - vi. PEEP of 4
    - vii. FiO<sub>2</sub> to maintain sats > 95%
    - viii. Monitor TV
5. Recommended settings for specific scenarios
  - a. Severely brain injured i.e. localizing signs such as dilated pupil and posturing
    - i. Assist control
    - ii. RR 8-12
    - iii. TV 6-8cc/kg ideal body weight
    - iv. PEEP 5 cm
    - v. FiO<sub>2</sub> 100% or adjust FiO<sub>2</sub> to maintain SaO<sub>2</sub> at >95%
  - b. 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. FiO<sub>2</sub> 100% or adjust FiO<sub>2</sub> to maintain SaO<sub>2</sub> at >95%
  - c. Acute bronchospasm
    - i. Assist control
    - ii. RR 8-10
    - iii. TV 6-8 cc/kg ideal body weight
    - iv. PEEP 5 cm
    - v. FiO<sub>2</sub> 100% or adjust FiO<sub>2</sub> to maintain SaO<sub>2</sub> at >95%
    - vi. May need to increase peak flow setting to 50-80 lpm
    - vii. Consider decreased inspiration time
  - d. Multilobar disease, eg., 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. FiO<sub>2</sub> 100% or adjust FiO<sub>2</sub> to maintain SaO<sub>2</sub> at >95%
    - vi. Set inspiratory flow rate above patient demand, usually greater than 80 lpm

