Utah EMS Protocol Guidelines

UTAH DEPARTMENT OF HEALTH

Bureau of Emergency Medical Services and Preparedness

January 2020

Revised: 11/18/2021

Table of Contents

Guidelines Changes Since Publication 5
General Patient Care Guidelines 6
AIRWAY AND TRACHEOSTOMY MANAGEMENT 7
ALTERED MENTAL STATUS 10
DEATH DETERMINATION AND TERMINATION OF RESUSCITATION 12
FAMILY CENTERED CARE 14
NAUSEA / VOMITING 15
PAIN & ANXIETY MANAGEMENT 16
PEDIATRIC ASSESSMENT 19
SHOCK, SEPSIS, & FLUID THERAPY 20
Cardiac Patient Care Guidelines 22
CARDIAC ARREST 23
BRADYCARDIA (Symptomatic) 27
CARDIAC CHEST PAIN (ACUTE CORONARY SYNDROME) 29
CONGESTIVE HEART FAILURE / PULMONARY EDEMA 31
NEWBORN RESUSCITATION 33
POST CARDIAC ARREST 35
RETURN OF SPONTANEOUS CIRCULATION (ROSC) 35
TACHYCARDIA (With a Pulse) 36
Medical Patient Care Guidelines 39
ALLERGIC REACTION / ANAPHYLAXIS 40
DROWNING OR SUBMERSION 42
FEVER MANAGEMENT 44
GLUCOSE EMERGENCIES 45
OBSTETRICAL EMERGENCIES 47
OPIOID OVERDOSE 49
RESPIRATORY DISTRESS 51
SEIZURES 53
SUSPECTED STROKE 55
TEMPERATURE AND ENVIRONMENTAL EMERGENCIES 58
Avalanche Patient Care Guidelines 60
AVALANCHE VICTIM MANAGEMENT 62

ALTITUDE RELATED ILLNESSES 63
TOXIC EXPOSURE - CARBON MONOXIDE 64
TOXIC EXPOSURE - CYANIDE 65
TOXIC EXPOSURE - HYDROFLUORIC ACID 66
TOXIC EXPOSURE - ORGANOPHOSPHATES / NERVE AGENTS 67
VIOLENT PATIENT / CHEMICAL SEDATION / TASER BARB REMOVAL 69
Trauma Patient Care Guidelines 71
Utah Trauma System Advisory Committee 73
GENERAL TRAUMA MANAGEMENT 74
AMPUTATIONS / TOOTH AVULSIONS 76
BURNS – THERMAL / ELECTRICAL / LIGHTNING 77
HEAD INJURY (TRAUMATIC BRAIN INJURY) 80
HEMORRHAGE CONTROL, EXTREMITY AND CRUSH INJURIES 82
NON-ACCIDENTAL TRAUMA/ABUSE 84
SNAKE BITES 85
SPINAL MOTION RESTRICTION (SMR) 86
Appendix 1 88
Acetaminophen (Tylenol) 90
Adenosine (Adenocard) 90
Albuterol (Ventolin/Proair/Proventil) 91
Amiodarone Hydrochloride (Cordarone) 91
Aspirin (Ecotrin) 92
Atropine 93
Calcium Chloride/ Calcium Gluconate 94
Diazepam (Valium) 95
Diphenhydramine (Benadryl) 96
Dextrose 96
Epinephrine (Adrenaline) 97
Epinephrine – "Push Dose" Pressor Administration 98
Glucagon (GlucaGen) 100
Oral Glucose 101
Ibuprofen (Motrin/Advil) 101
Ipratropium (Atrovent) 102

Ketamine HCL 103
Ketorolac (Toradol) 104
Lidocaine 105
Lorazepam 106
Magnesium Sulfate 107
Morphine 108
Midazolam 109
Naloxone (Narcan) 110
Nitroglycerin 111
Norepinephrine (Levophed) 111
Ondansetron 112
Oxytocin 113
Sodium Bicarbonate 114
Tranexamic Acid/TXA (Cyklokapron) 115

Guidelines Changes Since Publication

Date	Guideline	Change
08/11/2020	Appendix 1 - TXA	Typo indicated 1g/1000ml instead of 1g/10ml updated.
9/21/2020	Suspected Stroke	Two typos, no content change.
11/25/2020	Pain and Anxiety Management	**Intramuscular (IM)** – from 10mg once Changed to: **Intramuscular (IM)** – 2.5- 5 mg**.** May repeat q 10 min, max dose: 10mg
01/06/2021	Drowning or Submersion	Added Intermountain Medical Center as receiving facility for potential ECMO patients
01/15/2021	Temperature and Environmental Emergencies	Added Avalanche and Altitude Illness Guidelines
11/18/2021	Appendix 1 – Atropine	Typos corrected.

General Patient Care Guidelines

These guidelines were created to provide direction to each level of certified provider in caring for all types of patients. All of these directions, dosages and provisions are subject to change with a later notice or revision of the guidelines. The OLMC physician will always be the final word on treatment in the field. If there are ever any discrepancies between the guidelines and the OLMC physician these should be documented and brought to the attention of the physician at the receiving hospital. If the explanation is not sufficient, the provider should bring the issue to their medical director or the BEMSP for review.

General Approach to General Patient Care Guidelines

- Assess your patient prior to initiating a guideline.
- More than one guideline may apply.
- If conflicts arise between treatment guidelines, contact OLMC for clarification.
- Providers may provide treatment up to the level of their certification only.
- Air Medical Transport Service personnel function under their own clinical guidelines.
- Contact the receiving hospital and OLMC as soon as clinically possible for each patient.
- OLMC physician may change your treatment plan.
- Any variations to a guideline by the OLMC or physician should be clarified to ensure that the provider has properly characterized the situation.
- The OLMC Physician has the final word on treatment once contact is made.
- OLMC physician must approve usage of dosages in excess of the guideline.

General Pediatric Considerations

- Pediatric reference based tape dosing is preferred over calculated dosages for infants and children.
- Pediatric lowest acceptable systolic blood pressures are: birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

✆This symbol and yellow highlighted instructions precedes any treatment that requires OLMC prior to initiating the treatment unless otherwise specified.

AIRWAY AND TRACHEOSTOMY MANAGEMENT

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Assess ABC's for evidence of current apnea, airway reflex compromise or difficulty in ventilatory effort.
  - Assess medical conditions, burns or traumatic injuries that may have or will compromise the airway.
- ❑ Continuous cardiac, ETCO2, blood pressure, and pulse oximetry monitoring, when available.
- ❑ Obtain a 12 Lead EKG when available.
- ❑ **Treatment Plan**
  - Provide basic airway maneuvers to all compromised airways, i.e. jaw-thrust, airway adjuncts, and oxygen.
  - Identify and treat underlying reversible medical conditions (narcotic overdose, hypoglycemia, etc.).
  - Provide supplemental oxygen and assisted ventilation as needed for the patient to maintain an oxygen saturation 90-94% and ETCO2 of 35-45.
  - Always ensure proper care of the C-spine during airway treatment per the ***Spinal Motion Restriction Guideline***.
  - Keep NPO. Stop any GI Feedings and do not use GI tube during resuscitation except to vent tube if assisted ventilations being delivered
  - Infants and young children are primary nose breathers. Suction oral and nasal passages as needed to keep clear.
  - BVM is the preferred method of ventilation below the age of 10 years old.
  - Tracheostomy/Home Ventilator
    - Primary caretakers and families are your best resource for understanding the equipment they are using.
    - Disconnect the ventilator and assist ventilations with BVM if the patient is apneic, unresponsive, or has severe respiratory distress. (Disconnecting a vent poses a very HIGH risk for body fluid exposure and can be dangerous to the patient if done incorrectly, see appendix for more details)
    - If unable to ventilate, suction the tracheostomy, then reattempt ventilatory efforts.
    - If still unable to ventilate, attempt traditional BVM
    - If there is difficulty ventilating a tracheostomy patient, consider "D.O.P.E." (Dislodged? Obstruction? Pneumothorax? Equipment failure?)

ADULT

EMT

- ❑ Ventilate with BVM when apneic or exhibiting respiratory distress. Consider a nasal or oral airway when not contraindicated (facial fractures, intact gag response, etc).
- ❑ Avoid hyperventilation and maintain a ventilatory rate of 10-12 breaths per minute

AEMT

- ❑ Consider an appropriately sized supraglottic airway device if unable to ventilate with BVM

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ Ventilate with BVM when apneic or exhibiting respiratory distress. Consider a nasal or oral airway when not contraindicated (facial fractures, intact gag response, etc).
- ❑ Avoid hyperventilation - recommended pediatric ventilatory rates:
  - Infant (0-12 month): 25 breaths per minute
  - 1-3 yrs: 20 breaths per minute
  - 4-6 yrs: 15 breaths per minute
  - >6 years: 12 (Same as adult)

AEMT

- ❑ Consider an appropriately-sized supraglottic airway device if unable to ventilate with BVM

- ❑ **CPAP/BiPAP** – Consider when the patient is awake but needs assistance with oxygenation and ventilation such as in a CHF/pulmonary edema patient or COPD patient.
  - Explain the procedure to the patient
  - Initially apply the mask and begin the CPAP or BiPAP according to manufacturer instructions.
  - If unable to adequately ventilate return to BVM and consider insertion of supraglottic airway and bag ventilation.

  ✆ Contact OLMC to discuss further settings and treatment above the initial setup

- ❑ **CPAP/BiPAP** – Only use when the patient is on the machine at home. Maintain home settings and bring machine with the patient. If unable to adequately ventilate return to BVM and consider insertion of a supraglottic airway.

PARAMEDIC

- ❑ **Endotracheal Intubation** - Consider orotracheal intubation using an endotracheal tube (ETT) when indicated
  - Document TWO confirmation methods to verify endotracheal placement. (e.g. ETCO2, CO2 detection device, or esophageal intubation detector)
  - Secure the ETT for transport
  - Consider NG/OG tube placement or opening active G-tubes for all intubated patients
  - Consider sedation after intubation
  - If endotracheal intubation is unsuccessful revert to a supraglottic airway device or BVM with appropriate oral/nasal airway. Avoid multiple attempts at intubation.
- ❑ **Surgical Airway - Cricothyrotomy** - Consider only when all other methods of oxygenation, ventilation and securing the airway have failed.
  - Document TWO confirmation methods to verify endotracheal placement. (e.g. ETCO2, CO2 detection device, or esophageal intubation detector)
  - Gather all equipment before beginning the procedure
  - Once the procedure is done insert a 5.0 or 6.0 cuffed ETT, inflate cuff, and secure.
- ❑ **Tracheostomy Assistance**
  - Provide supplemental oxygen
  - Suction the patient appropriately (use in-line suction if available)
  - Replace Tracheostomy tube if needed
  - IF unable to ventilate, pass an appropriately sized ETT through the stoma 1-2 inches
  - IF unable to pass a tracheostomy tube or endotracheal tube use BVM, orotracheal

PARAMEDIC

- ❑ **Endotracheal Intubation** - Consider orotracheal intubation using an endotracheal tube (ETT) when indicated
  - BVM ventilations are the preferred method of ventilation in children, even for long transports. However, if oxygenation or ventilation is inadequate with BVM, a trial of a supraglottic airway is indicated. In the rare instance that a supraglottic airway is ineffective, then proceed to ETT
  - For longer transports, be aware of gastric distension during BVM, which may limit ventilation. An NG/OG tube can be placed to decompress the stomach
  - Pediatric ETT's are sized according to age and are in mm:
    - Preemie: 2.5
    - 0-3 months: 3.0
    - 3-7 months: 3.5
    - 7-15 months: 4.0
    - 15-24 months: 4.5
    - 2-15 years: Formula is (age+16) ⎮ 4
  - Document TWO confirmation methods to verify endotracheal placement. (e.g. ETCO2, CO2 detection device, or esophageal intubation detector)
  - Secure the ETT for transport
  - Consider NG/OG tube placement or opening active G-tubes for all intubated patients
  - Consider sedation after intubation
  - If endotracheal intubation is unsuccessful revert to a supraglottic airway device or BVM with appropriate oral/nasal airway. Avoid multiple attempts at intubation.

intubation or Supraglottic device to ventilate the patient.

✆ Contact OLMC for further instructions

❑ **Ventilator Management**

- Work with the family to troubleshoot the machine
- Address tracheostomy as above
- If you need to disconnect for transport provide adequate BVM ventilations similar to home respiratory rate settings

✆ Contact OLMC for further instructions as needed.

❑ **Surgical Airway – Cricothyrotomy -** Consider only when all other methods of oxygenation, ventilation and securing the airway have failed.

- Open Surgical Cricothyrotomy is contraindicated in ages < 12 years old.
- Needle Cricothyrotomy can be used below 12 years of age.
- Document TWO confirmation methods to verify endotracheal placement. (e.g. ETCO2, CO2 detection device, or esophageal intubation detector).
- Gather all equipment before beginning the procedure.
- Once the procedure is done insert an appropriately sized cuffed ETT and secure.

✆ Contact OLMC for further instructions as needed.

❑ **Tracheostomy Assistance**

- Provide supplemental oxygen
- Suction the patient appropriately (use in-line suction if available)
- Replace tracheostomy tube, with patient's back up tracheostomy tube if needed
- IF unable to ventilate, pass an appropriately sized ETT through the stoma 1-2 inches
- IF unable to pass a tracheostomy tube or ETT use BVM, orotracheal intubation or SGD

✆ Contact OLMC for further instructions

❑ **Ventilator Management**

- Work with the family to troubleshoot the machine
- Address tracheostomy as above
- If you need to disconnect for transport provide adequate BVM ventilations similar to home respiratory rate settings

✆ Contact OLMC for further instructions as needed.

ALTERED MENTAL STATUS

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Blood glucose, oxygen saturation and temperature assessment
- ❑ Continuous cardiac, ETCO2, blood pressure, and pulse oximetry monitoring, when available.
- ❑ Obtain a 12 Lead EKG when available
- ❑ **Treatment Plan**
  - Assess for trauma.
  - Assess for stroke and score per the ***Suspected Stroke Guideline***.
  - Assessment for possible overdose, substance abuse or other potential toxin exposure. Evaluate the scene for supportive evidence.
  - Gather and collect any evidence on scene that may assist in the treatment of the patient (medication bottles, pills, notes, etc.)
- ❑ **Key Considerations**
  - Consider non-accidental trauma, especially in pediatric and elderly patients
  - Consider hypoglycemia in pediatric patient
  - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.
  - If poisoning suspected, you may contact Utah Poison Center at 1-800-222-1222 for guidance.
  - When evaluating pediatric level of consciousness use **A.V.P.U.** Alert, Verbal, Pain, Unresponsive

A - Alcohol	T – Trauma/Temp
E - Electrolytes	I – Infection
I – Insulin	P – Psychogenic
O - Opiates	P – Poison
U - Uremia	S – Shock/Seizure

AEIOUTIPPS: Possible causes of Altered Mental Status

ADULT

EMT

- ❑ Apply supplemental oxygen as needed to maintain oxygen saturation of 90-94%
- ❑ Apply warming or cooling techniques as indicated
- ❑ Consider physical restraints as needed to protect the patient and/or rescue personnel
- ❑ **Naloxone** 0.4–2 mg (per dose) IM/IN (intranasal) for suspected narcotic overdose. May repeat once

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
- ❑ Consider chemical restraints per the ***Violent Patient/Chemical Sedation/Taser Barb Removal***

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ Apply supplemental oxygen as needed to maintain oxygen saturation of 90-94%
- ❑ Apply warming or cooling techniques as indicated
- ❑ Consider physical restraints as needed to protect the patient and/or rescue personnel
- ❑ **Naloxone** 0.1 mg/kg (max 2mg per dose) IM/IN (intranasal) for suspected narcotic overdose. May repeat once

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
- ❑ If evidence of poor perfusion, give NS 20mL/kg IV max 1 L

Guideline, as needed, to protect the patient and/or rescue personnel

- ❑ If patient is hypoglycemic, refer to hypoglycemia protocol

PARAMEDIC

- ❑ Consider chemical restraints per the ***Violent Patient/Chemical Sedation/Taser Barb Removal Guideline,*** as needed, to protect the patient and/or rescue personnel
- ❑ If patient is hypoglycemic, refer to hypoglycemia protocol

PARAMEDIC

DEATH DETERMINATION AND TERMINATION OF RESUSCITATION

ALL PROVIDERS

- ❑ ***General Crime Scene Management Principles*** as appropriate.
- ❑ **Treatment Plan**
  - **EMS may withhold initiation of resuscitation when:**
    - Bodily injury or condition incompatible with life such as:
      - Obvious death, decomposition, and/or rigor mortis
      - Obvious fatal wounds without signs of life
      - Dependent lividity
    - Any adult patient who is apneic, pulseless, and has an initial rhythm of asystole who also:
      - Had an unwitnessed arrest AND an estimated time interval of greater than 15 minutes from collapse to the initiation of CPR
      - Could not have resuscitation started within 15 minutes of arrest due to scene difficulties such as extrication, location, or unsafe environment
      - Is a patient in a multi-victim incident where insufficient resources preclude initiating resuscitative measures
      - Is a drowning victim with a reasonably determined submersion time of greater than one (1) hour prior to exam
      - Experienced a *traumatic arrest* AND all signs of life are absent, including pupillary reflexes, spontaneous movement, response to pain, spontaneous respirations, or organized electrical activity on the cardiac monitor.
    - Written or verbal orders that request no resuscitation:
      - A verbal order by a licensed physician in the State of Utah who is present on scene pronouncing the patient dead
      - A verbal order by the OLMC physician
      - A Do Not Resuscitate (DNR) written order, bracelet, or necklace from any U.S. state.
      - A signed Physician/Provider Order for Life-Sustaining Treatment (POLST) form from any U.S. state indicating that the patient does not desire resuscitative efforts
      - Immediate family member request honoring the patient's wishes to NOT start CPR, AND has had a known chronic or terminal illness, WITH the full agreement of all relatives AND EMS personnel on scene AND with concurrence of OLMC. If EMS is uncomfortable with the request, then resuscitative efforts should be started
      - OLMC should be consulted for any difficult or questionable case
  - **Termination of CPR** may be done in any or all of the following circumstances with the concurrence of OLMC:
    - A valid DNR or POLST form is discovered after resuscitative efforts were initiated
    - Resuscitative efforts were initiated when criteria to not resuscitate were present (as above)
    - A verbal order pronouncing the patient dead by a licensed physician in the state of Utah who arrives on scene
    - Order by the OLMC physician
    - Adult cardiac arrest - resuscitation attempts may be terminated if the patient is in asystole after 20 minutes of ACLS on scene if ALL of the following criteria are met:
      - Arrest was not witnessed by EMS personnel
      - No shockable rhythm was identified at any time during the resuscitation
      - No ROSC occurred at any time during the resuscitation

✆ Must contact OLMC for approval prior to termination of resuscitation efforts

- **Special Considerations for Resuscitation**
  - All traumatic and non-traumatic pediatric arrests should be transported to the hospital after 15 minutes of on- scene resuscitation with resuscitative efforts carried out en-route, unless it is an obvious death on scene
  - Arrests not due to cardiac cause or trauma. The following situations require hospital transport and/or prolonged resuscitation attempts:
    - Hypothermia
    - Active Internal Bleeding
    - Drug/toxin overdose
    - Drowning
    - Electrocution or Lightning Strike
  - Dangerous, violent or otherwise unsafe or difficult scene situation. EMS personnel safety and patient respect are of the utmost importance. Assessing the scene to insure a safe and secure environment to continue resuscitation is important. If any concerns about scene safety or personnel security, the patient should be promptly loaded and transported to the hospital.
  - Pregnant mother >25 weeks pregnant. Initiate early hospital transport for possible advanced care and possible delivery of the baby
- Following determination of obvious death or termination of resuscitative efforts:
  - Call dispatch to reduce any responding transport(s) to non-emergent
  - Document time of death and circumstances according to system and agency guidelines
  - Turn the body over to the appropriate law enforcement agency
  - Evaluate for, document, and report any indication of non-accidental trauma per the ***Non-Accidental Trauma/Abuse Guidelines***
  - Contact the closest patient receiving facility and make them aware of the actions taken, declare a time of death and explain the disposition of the patient

ADULT	PEDIATRIC (<15 years of Age) NOTE: Pediatric weight based dosing should not exceed Adult dosing.
EMT	EMT
AEMT	AEMT
PARAMEDIC	PARAMEDIC

KEY POINTS/CONSIDERATIONS

There will always be patients and circumstances that deserve special consideration (pediatric drowning or pregnant patients for instance). OLMC should be consulted if there are ever any questions. Always be sensitive to the patient's desires, family concerns, and on-scene environment to insure an understanding by all who observe your actions that everything that could and should have been done to resuscitate the patient was done.

FAMILY CENTERED CARE

ALL PROVIDERS

- ❑ Family Centered Care is a mutually collaborative health care effort between family, patient and provider and has proven to be the gold standard in dealing with the pediatric patient and their families.
- ❑ Demonstration of Family Centered Care is by one's actions and behaviors when caring for patients.
- ❑ **Treatment Plan**
  - Family centered care is demonstrated in practice, not just policy development.
    - Collaboration with Families: Empower the patient and the family by involving them in the care as well as the decision-making process.
    - Cultural Competency: Respect, sensitivity, and an understanding of the unique cultural and religious differences.
      - Be aware of any language barriers.
      - If at all possible, engage an interpreter that is able to understand some of the emotional issues as well as medical terminology associated with the patient.
      - An understanding of the hierarchy of the family is key to a positive outcome.
    - Developmental Competency: Use appropriate language for the age.
      - When in pain or hurt children often regress to childhood issues or more infantile responses. They may still need attachment items late in life.
      - Describe what you will be doing.
      - Use eye contact and touch when appropriate.
      - Be respectful at all times.
  - Infants: General calming measures (Soft voices, gentle pats, pacifiers or rocking), allowing parents to stay close and bonded with the child and help them to anticipate the situation if possible.
  - Toddlers: Use toys, teddy bear, blanket, etc. for comfort. Parents or family members are often a great source of comfort and nurturing, so allow them to be present.
  - School Age: Attachment objects, honesty about procedures, and imaginary/magical (e.g. "I made the car crash," "I told a lie, and this is why mom is hurt") perspective of young children. Include the child in conversations about his/her treatment when possible.
  - Adolescents: Physician and provider honesty is key as well as paying attention to pain. Help them to participate in their own care and take their views seriously. Focus on giving them some sense of control. Pain management is important. Adolescents as well as adults are afraid of pain. The anticipation of pain can be worse that the pain itself. Some transitional objects/toys/stuffed animals can also be useful. Respect their privacy and modesty as much as possible. Allow them to discuss what is happening both with and without caregivers around.
- ❑ **Key Considerations**
  - Family Centered Care = compassion
  - Include family members in resuscitation and care decision making as they desire and are capable. If possible, designate a crew member to be a liaison to the family in order to facilitate communication and continuity.

ADULT	PEDIATRIC (<15 years of Age) NOTE: Pediatric weight based dosing should not exceed Adult dosing.
EMT	EMT
AEMT	AEMT
PARAMEDIC	PARAMEDIC

NAUSEA / VOMITING

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
  - Blood glucose, temperature and oxygen saturation assessment
- ❑ Continuous cardiac, ETCO2, blood pressure, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan**
  - Nothing by mouth (NPO)
  - Place the patient in an upright or lateral recumbent position
  - Obtain a 12 lead EKG, if available, for:
    - Greater than 40 years old
    - Associated with chest or abdominal pain
  - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

AEMT

- ❑ Vascular access and fluid therapy
- ❑ Document level of consciousness before and after giving medication
- ❑ **Ondansetron** 4mg IV/IM/PO
- ❑ **Promethazine** 12.5–25 mg IV titrated to effect if SBP >100 or peripheral pulse present
  - Dilute with 5–10 mL of NS and administer over 30 seconds
  - Avoid in elderly patients due to potential for sedation
  - Should be given through AC or larger vessel due to extravasation risk
  - **Promethazine** 25 mg IM, if no vascular access

PARAMEDIC

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Vascular access and fluid therapy
- ❑ Document level of consciousness before and after giving medication.
- ❑ **Ondansetron (Zofran)**
  - **> 2 years old- 0.1mg/kg** IV/IM/PO once (max 4mg)
- ✆ **1-2 years old- 0.1 mg/kg IV/IM/PO Once**
- ✆ **Promethazine (Phenergan) – NOT recommended**, requires OLMC contact.

PARAMEDIC

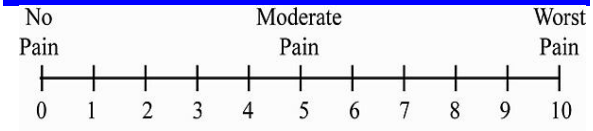
PAIN & ANXIETY MANAGEMENT

ALL PROVIDERS

- ❑ Focused history and physical exam
- ❑ Assess the patient's pain using verbal and non-verbal cues and appropriate pain scale
- ❑ Continuous cardiac, ETCO2, blood pressure, and pulse oximetry monitoring, when available
- ❑ Implement appropriate treatment guideline for the chief complaint.
- ❑ **Treatment Plan**
  - Consider non-pharmaceutical/family centered comfort measures as indicated, refer to the ***Family Centered Care Guideline.***
  - Immobilize any obvious injuries and place patient in a position of comfort
  - Consider ice packs
  - Implement pharmaceutical measures
    - Monitor patient vital signs every 5 minutes as this guideline is implemented
    - Have naloxone available in case of respiratory depression
    - Avoid or stop giving medications if SBP <100mmHg in adults, SBP <70 + (age in years x 2) mmHg for pediatrics, SaO2 < 90% without oxygen, or GCS <14
    - Stop pain medication dosing when the patient has adequate relief, pain score <5, adult SBP <100mmHg, peds SBP <70 + (age in years x 2) mmHg, SaO2<90% without oxygen, or GCS <14
    - If pain and anxiety are both present, attempt to treat pain fully with analgesics alone before using analgesics and sedatives concurrently
- ❑ **Key Considerations**
  - Use Wong-Baker Faces scale for pain assessment in patients 3-8 years old
  - A FLACC scale can be used to assess pain in infants

ADULT

EMT



PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

Categories		FLACC Scoring for Infants	
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking

Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or talking to, distractible	Difficult to console or comfort

AEMT

- ❑ Vascular access and fluid therapy
  - **The order in which medications below are listed is not intended to indicate hierarchy, order, or preference of administration**
  - **Dosages should be reduced by half when there is concern for drug or alcohol intoxication**
  - **Consider treating with antiemetic's prior to pain management**
  - **Maximize dosing of a single agent before using additional agents**

Pain Control

- ❑ **Acetaminophen** 650-1000mg PO, single dose only
- ❑ **Ibuprofen** 600mg PO, single dose only
- ❑ **Ketorolac** 15mg IV, single dose only
- ❑ **Morphine Sulfate** 2-10 mg q10 minutes IV/IO/IM titrated to effect
- ❑ **Fentanyl** 25-50 mcg q10 minutes IV/IO/IM/IN

Anxiety Control

- ❑ **Midazolam**
  - **IV/IO –** 2.5- 5 mg**,** may repeat once in 10 minutes, if needed. Total max dose: 10mg
  - **Intranasal (IN) –** 5 mg**,** may repeat once in 10 minutes to a max dose of 10mg
  - **Intramuscular (IM) –** 2.5- 5 mg**.** May repeat q 10 min, max dose: 10mg
- ❑ **Diazepam**
  - **IV/IO** – 5 mg every 10 min to the desired effect or max dosage of 20 mg
  - **Intramuscular (IM)** – 10 mg once (IM not preferred, unless no other options)
- ❑ **Lorazepam**
  - **IV/IO –** 2 mg every 5 min. to the desired effect or max dose of 4 mg
  - **Intramuscular (IM) –** 4 mg once

✆ Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters.

AEMT

- ❑ Vascular access and fluid therapy
  - **The order in which medications below are listed is not intended to indicate hierarchy, order, or preference of administration**
  - **Dosages should be reduced by half when there is concern for drug or alcohol intoxication**
  - **Consider treating with antiemetic's prior to pain management**
  - **Maximize dosing of a single agent before using additional agents**

Pain Control

- ❑ **Acetaminophen** 15mg/kg PO, single dose only. Max dose 650mg
- ❑ **Ibuprofen 10mg/kg** PO ONLY FOR USE in patients over the age of 6 months, single dose only. Max dose 600mg
- ❑ **Ketorolac** 0.5mg/kg IV (max 15mg), single dose only, ONLY FOR USE in patients over the age of 2.
- ❑ **Fentanyl** 1 mcg/kg (max 50 mcg per dose) IV/IM/IO. Use 2 mcg/kg for IN (intranasal) (max 100mcg per dose). May repeat x 1 if needed after 10-15 min
- ❑ **Morphine Sulfate** 0.1 mg/kg (max of 4mg per dose) IV/IM/IO titrated to effect

✆ For additional doses, contact OLMC

Anxiety Control

- ❑ **Midazolam**
  - **IV/IO -** 0.1 mg/kg (max 5 mg), may repeat once in 10 minutes, if needed. Total max dose: 10 mg
  - **Intranasal (IN) -** 0.2 mg/kg (max 5 mg), may repeat once in 10 minutes, if needed. Total max dose: 10 mg
  - **Intramuscular (IM) –** 0.2 mg/kg (max 10 mg) once
- ❑ **Diazepam**
  - **IV/IO -** 0.1 mg/kg (max 5 mg), may repeat once in 10 minutes, if needed. Total max dose: 10 mg

- **Intramuscular (IM) –** 0.2 mg/kg (max 10 mg) once (IM not preferred unless no other options)

❑ **Lorazepam**

- **IV/IO –** 0.05 mg/kg (max 2 mg), may repeat once in 10 minutes, if needed. Total max dose: 4 mg
- **Intramuscular (IM) –** 0.05 mg/kg (max 4 mg) once

✆ Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters.

PARAMEDIC

❑ **Ketamine** 30mg diluted in 100mL of normal saline IV/IO infused over 15 minutes OR until analgesia is attained.

PARAMEDIC

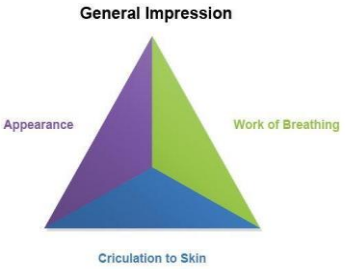
❑ **Ketamine** 0.15-0.3 mg/kg (max 30mg) diluted in 100mL of normal saline IV/IO infused over 15 minutes ONLY FOR USE in patients over the age of 2 years.

❑ May halt infusion if pain relief obtained before full dose administered.

PEDIATRIC ASSESSMENT

ALL PROVIDERS / EMT

- ❑ The pediatric assessment should be modified for the developmental level of each patient
- ❑ Continuous cardiac, ETCO2, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan** (develop and implement plan based on assessment findings, resources, and training.)
  - Use the Pediatric Assessment Triangle (defined by the AAP) to form a general impression of the:



  - ○ Appearance: Evaluate tone, interactiveness, consolability, gaze, and speech or cry
  - ○ Breathing: Evaluate abnormal airway sounds, abnormal positioning, retractions, and nasal flaring.
  - ○ Circulation/Skin Color: Evaluate for pallor, mottling, delayed capillary refill and cyanosis

  - If the patient looks ill and has poor perfusion, start CPR when the heart rate is less than:
    - 80bpm for infants (up to 1 year of age)
    - 60bpm for children (1 year to 8 years)
  - Look on scene for the CHIRP red bag. It contains current medical information on the child with special healthcare needs.
  - Perform the pediatric assessment with guidance from the ***Family Centered Care Guideline***.
  - Pay careful attention to the wide variety of normal vital signs. Do not assume that the pediatric patient is fine when they have vitals meeting the normal adult parameters.

Normal Pediatric Vital Signs

Age of Patient	HR		RR		Systolic BP	Temp	
0 days - < 1 mo	<80	>205	<30	>60	<60	<36	>38
> 1mo - < 3 mo	<80	>205	<30	>60	<70	<36	>38
> 3 mo - < 1 yr	<75	>190	<30	>60	<70	<36	>38.5
> 1 yr - < 2 yrs	<75	>190	<24	>40	<70+ (age x 2)	<36	>38.5
> 2 yrs - < 4 yrs	<60	>140	<24	>40	<70+ (age x 2)	<36	>38.5
> 4 yrs - < 6 yrs	<60	>140	<22	>34	<70+ (age x 2)	<36	>38.5
> 6 yrs - < 10 yrs	<60	>140	<18	>30	<70+ (age x 2)	<36	>38.5
> 10 yrs - < 13 yrs	<60	>100	<18	>30	<90	<36	>38.5
> 13 yrs - < 18 yrs	<60	>100	<12	>16	<90	<36	>38.5

- ❑ **Key Considerations**
  - Obtaining a full set of vital signs, **including blood pressure,** should be a priority.
  - Parents are often the best resource for a baseline understanding of their child, especially in the case of the child with special healthcare needs.

ADULT

AEMT
PARAMEDIC

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT
PARAMEDIC

SHOCK, SEPSIS, & FLUID THERAPY

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
  - Blood glucose, oxygen saturation and temperature assessment
  - Consider shock in patients with one or more of the following:
    - Vital signs: HR >100, SBP of <90mmHg for adults, SBP <70 + (age in years x 2) mmHg for children, or RR >20 BPM
    - Skin signs: cold clammy skin, febrile, or delayed capillary refill
    - Mental status: altered, lethargic, or irritable (esp. in infants).
- ❑ Evaluate for the source of shock including distributive (e.g. infection, anaphylaxis), hypovolemic (e.g. hemorrhagic, vomiting/diarrhea, heat exposure), neurologic (i.e. spinal injury), or cardiogenic
- ❑ **Sepsis Alert** – Contact the hospital and initiate a Sepsis Alert if:
  - Suspected or documented Infection AND EITHER
  - Two or more of the following criteria are met:
    - Temp >100.4 °F (38°C) or <96.8°F (36°C)
    - RR >20 BPM
    - Heart Rate >90 bpm

  OR
  - Signs of hypoperfusion – SBP <90mmHg or MAP <65mmHg or ETCO2 <25
- ❑ Continuous cardiac, ETCO2, and pulse oximetry monitoring, when available
- ❑ Obtain a 12 Lead EKG when available
- ❑ **Treatment Plan**
  - Address the underlying cause of shock, if possible
  - Administer oxygen as needed to keep oxygen saturations between 90-94%.
  - Ensure patient warmth, resuscitate with warm IV fluids when available
  - Pregnancy >20 weeks gestation - Transport in partial left lateral decubitus position. Place wedge-shaped cushion or multiple pillows under patient's right hip and shoulders to elevate R side 30-45 degrees
  - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

AEMT

- ❑ Vascular access
  - Insert 2 large bore IVs
- ❑ **Traumatic Shock** – **Permissive Hypotension**
  - If SBP >80-90 (intact radial pulse):
    - No IV fluid bolus
    - Place saline locks on IVs or run at TKO rate
  - If SBP <80-90:
    - Give fluid bolus 500mL at a time, reassess and repeat as needed to:
      - Maintain SBP to 80-90 mmHg **WITHOUT** a CLOSED HEAD INJURY.

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Vascular access
  - Insert 2 large bore IVs
- ❑ **Traumatic Shock** – Give fluid bolus of NS 20 mL/kg at a time (max 1L) reassess and repeat up to a maximum of 60 mL/kg total (Max 3L); Reassess for reversal of the signs of shock

  ✆ If the patient remains hypotensive after 60mL/kg (max 3L) of NS call OLMC
- ❑ **Non- Traumatic Shock** - Provide 20mL/kg (max 2 L) boluses up to a maximum of 60mL/kg and reassess for reversal of the signs of shock

  ✆ If the patient remains hypotensive after 60mL/kg (max 3L) of NS call OLMC
- ❑ **Cardiogenic Shock** - In patients with CHF, pulmonary edema and cardiogenic shock, IV

- Maintain SBP to 110-120 mmHg **WITH** a CLOSED HEAD INJURY.

- Once minimum blood pressures have been achieved the patient should have a saline lock and no further fluid boluses should be administered unless the BP falls below the limits.

❑ **Non-Traumatic Shock** – Give IV NS bolus 500 ml at a time, reassess and repeat up to a maximum of 2 liters as required for reversal of signs of shock

✆ Call OLMC if the patient remains hypotensive after 2 liters has been administered

❑ **Cardiogenic Shock** - In patients with CHF, pulmonary edema, and cardiogenic shock, IV fluids should be withheld, to avoid worsening shock

- Rapidly transport to hospital

❑ **Kidney Failure (i.e. dialysis patients**) - Give 500mL fluid boluses up to a maximum of 1 liter and reassess for reversal of the signs of shock

fluids should be withheld, to avoid worsening shock

- Apply high-flow oxygen
- Rapidly transport to the hospital

❑ **Kidney Failure (i.e. dialysis patients**) - Give 10 mL/kg fluid boluses(max 500mL) up to a maximum of 20mL/kg (max 1L) and reassess for reversal of the signs of shock

✆ Call OLMC if the patient remains hypotensive after 20 ml/kg has been administered

PARAMEDIC

FOR USE ONLY IN NON-TRAUMATIC SHOCK

❑ **Epinephrine 2–10 mcg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg

❑ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP >100 mmHg after fluid bolus

❑ **Norepinephrine** initial dose: **0.05 – 1 mcg/kg/min** IV/IO for hypoperfusion. Titrate to maintain a SBP > 100 mmHg. For patients in refractory shock: 8-30 mcg/minute

PARAMEDIC

FOR USE ONLY IN NON-TRAUMATIC SHOCK

✆ **Epinephrine 0.1–1 mcg/kg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg

✆ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP>70 + (age in years x 2) mmHg after fluid bolus

✆ **Norepinephrine** initial dose: **0.05 - 0.1 mcg/kg/min**, titrate to max of 2 mcg/kg/min to maintain SBP >70 + (age in years x 2) mmHg

Cardiac Patient Care Guidelines

These guidelines were created to provide direction for each level of certified provider in caring for cardiac patients. All of these directions, dosages and provisions are subject to change with a later notice or revision of the guidelines. The OLMC physician will always be the final word on treatment in the field. If there are ever any discrepancies between the guidelines and the OLMC physician these should be documented and brought to the attention of the physician at the receiving hospital. If the explanation is not sufficient to the provider, then they may bring the issue to their medical director or the BEMSP for review.

General Approach to Cardiac Patient Care Guidelines

- Assess your patient prior to initiating a guideline.
- More than one guideline may apply.
- If conflicts arise between treatment guidelines, contact OLMC for clarification.
- Providers may provide treatment up to the level of their certification only.
- Air Medical Transport Service personnel function under their own clinical guidelines.
- Contact your receiving hospitals and OLMC as soon as clinically possible for each patient.
- OLMC with a physician may change your treatment plan.
- Any variations to a guideline by the OLMC or physician should be clarified to ensure that the provider has properly characterized the situation.
- The OLMC Physician has the final word on treatment once contact is made.
- The OLMC Physician must approve usage of dosages in excess of the guidelines.

General Pediatric Considerations

- Pediatric lowest acceptable systolic blood pressures are: birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

CARDIAC ARREST

ALL PROVIDERS / EMT

For Traumatic Arrest refer to General Trauma Management Guidelines

- ❑ Focused history and physical exam
  - Assess for evidence that resuscitation should not be attempted per the ***Death Determination Guideline***.
- ❑ Continuous ECG, ETCO2, CO2, and Pulse Oximetry monitoring when available
- ❑ **Treatment Plan**
  - **Assess for presence of a pulse, respirations, and consciousness. If absent:**
    - **Begin chest compressions for 2 min**
    - **Apply AED and shock if advised.**
  - AEMT/PM: Apply cardiac monitor/defibrillator and shock if Vtach/Vfib
- ❑ **Key Considerations**
  - Effective chest compressions are critical
    - Minimize interruptions in chest compressions
      - Precharge the defibrillator and countdown to rhythm check/defibrillation
      - Use a verbal 10 second countdown during any pause to limit hands-off time
    - Rate: 100-120/min
    - Depth: 2-2.5 inches (adult) / 1/3 of chest depth (pediatric)
    - Allow full chest recoil after each compression
    - After each shock, immediately perform 2 minutes of chest compressions before checking rhythm/pulse
    - Rotate compressors every 2 minutes
    - If using mechanical CPR:
      - Apply device with minimum interruption in CPR
      - Check rhythm/pulse every 2 min (5 seconds only, use a verbal countdown)
      - Duration of resuscitation as below
  - Consider the Pit Crew model as an approach to treatment
    - Pre-defined roles, as determined by a specific EMS agency, for members of an integrated team of first responders, BLS, and ALS.
    - Designated individuals for chest compressions
    - Designated individual for overall code leadership/management
    - Designated individual for airway management
    - Additional roles to be assigned as determined by specific agency based on provider availability include: IO/IV access, medication administration, CPR quality monitoring, cardiac rhythm monitoring, defibrillation
    - Consider transition of roles as additional providers become available to ensure maximal use of resources
    - Treatment of the adult cardiac arrest patient in the field is preferred in the majority of cases and is associated with improved outcomes
    - Assume cardiac origins for all adult arrests unless evidence to the contrary. Consider underlying causes and treat when possible.
    - Duration of resuscitation. Consider prolonged attempts in patients with an initial shockable rhythm and a witnessed collapse
    - Initial shockable/PEA rhythms: <1% survival after 40 minutes of resuscitation attempt
    - Initial Asystole: <1% survival after 20 minutes of resuscitation attempt
  - **H's & T's** - Treat as appropriate with confirmed or suspected Hypovolemia, Hypoxia, Hydrogen ion (Acidosis), Hyperkalemia, Hypothermia, Hypoglycemia, or specific Toxins.
- ❑ Pregnancy >20 weeks gestation

- Perform manual displacement of the uterus to the patients left. If unable to perform manual displacement, place wedge-shaped cushion or multiple pillows under patient's right hip to achieve 30 degree lateral tilt.
- Transport pregnant patients to the nearest emergency department without delay while attempting to provide continuous compressions and defibrillation (if applicable). There is potential to perform emergency cesarean section in the ED, which may save the fetus and is associated with maternal survival.

❑ Pediatric Population
- Consider transport in pediatric arrest after 15 minutes of field resuscitation, including high-quality CPR, effective ventilations, and IV/IO access
- Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years = 70mmHg + (age x 2), >10 years = 90mmHg.
- Pediatric Defibrillation:
  - Age < 1 year: Manual defibrillator with pediatric paddles/pads preferred in patients <1. If not available, an AED may be used, preferably with pediatric pads.
  - Age 1 – 8 years: AED may be used with pediatric pads preferred

❑ As nationally-established cardiac care guidelines (e.g. ACLS, PALS) are updated, these may be integrated into performance, as per agency medical director.

ADULT

EMT

❑ **AED**
- Defibrillate immediately if AED advises shock.
- Resume CPR immediately after each shock and continue for 2 minutes
- Check pulse and repeat shock if prompted by AED

❑ **Witnessed arrest**, presumed cardiac etiology: Place an NP / OP airway and a non-rebreather mask during the first 2-3 cycles of CPR/defibrillation. After 2-3 cycles, apply asynchronous BVM breaths at a rate of 1 breath every 6-8 seconds *or* use a 30:2 compressions to ventilations ratio

❑ **Unwitnessed arrest or evidence of a non-cardiac cause**: Apply asynchronous BVM breaths at a rate of 1 breath every 6-8 seconds *or* use a 30:2 compressions to ventilations ratio

AEMT

ALL RHYTHMS
- Begin CPR, as above

❑ Vascular access and fluid therapy**.**

❑ Consider placement of a supraglottic device after 2-3 cycles of CPR/defibrillation without interrupting CPR

❑ **Epinephrine:** 1 mg (10 ml of 0.1 mg/ml/1:10,000) IV/IO push every 3-5 min as long as the patient remains pulseless.

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed adult dosing.

EMT

❑ **AED**
- Defibrillate immediately if AED advises shock
- Resume CPR immediately after each shock and continue for 2 minutes
- Check pulse and repeat shock if prompted by AED

❑ **Respiratory Management:**
- Place an NP or OP airway and apply asynchronous BVM breaths at a rate of 1 breath every 4-6 seconds

AEMT

ALL RHYTHMS
- Begin CPR, as above

❑ BVM, supraglottic airway, vascular access and fluid therapy

❑ **Epinephrine:** 0.01 mg/kg (0.1 mg/ml / 1:10,000) IV/IO every 3-5 min as long as the patient remains pulseless.
- Max dose = 1 mg (10 ml)
- Unless a clear response to epinephrine is observed, consider a limit of 3 total doses.

- Unless a clear response to epinephrine is observed, consider a ***limit of 3 total doses***.

❑ Consider NS 1000 mL IV/IO bolus if hypovolemia suspected

SHOCKABLE RHYTHM (VF/VT) PRESENT

❑ **Defibrillation**

❑ **360J** for a monophasic defibrillator or **120-360J** for a biphasic, with escalating energy for subsequent shocks (Follow manufacturer's recommendations)

❑ Resume CPR immediately after shock and continue for 2 minutes

❑ Check rhythm and pulse every 2 min

❑ **Anti-arrhythmics are indicated for shockable rhythms that are unresponsive to defibrillation**

- May administer either **ONE** of these anti-arrhythmics:
  - **Amiodarone** 300 mg IV/IO, second dose is 150 mg IV/IO after 5 min
  - **Lidocaine** 1 mg/kg IV/IO/ET. May repeat every 3-5 min up as needed up to 3 mg/kg.
    - Follow with continuous infusion (1 to 4 mg/minute) after return of perfusion.

✆ Contact OLMC before terminating resuscitative efforts in the field

PARAMEDIC

ALL RHYTHMS

❑ May consider endotracheal intubation, if unable to adequately ventilate with BVM (preferred) or supraglottic airway, ***per Airway and Tracheostomy Management Guideline.***

❑ Intubation must not interfere with chest compressions.

❑ Special Circumstances

- Known or Suspected Hyperkalemia
  - Calcium Chloride 1 gram IV/IO over 2 min. May repeat every 5 min X2 OR Calcium Gluconate 3 grams IV/IO over 2 min
  - Sodium Bicarbonate 1 mEq/kg IV/IO may repeat every 5 min X2
- Polymorphic VT associated with long QT
  - Magnesium 2 gm IV/O over 2 min

✆ Contact OLMC for further orders or therapies

- Consider NS 20 ml/kg IV/IO bolus if hypovolemia suspected, reassess and repeat if needed to a Max of 60 mL/kg

SHOCKABLE RHYTHM (VF/VT) PRESENT

❑ **Defibrillation**

❑ **2 J/kg** for the first shock with either a monophasic or biphasic defibrillator. Second and subsequent shocks increase by 2 J/kg, up to a max dose 10 J/kg

❑ Resume CPR immediately after shock and continue for 2 minutes

❑ Check rhythm and pulse every 2 min

❑ **Anti-arrhythmics are indicated for shockable rhythms that are unresponsive to defibrillation**

- May administer either **ONE** these antiarrhythmics:
  - **Amiodarone** 5 mg/kg IV/IO (max 300mg/dose). May repeat 2 more times every 5 min as needed. (Total max 450mg)
  - **Lidocaine** 1 mg/kg IV/IO/ET. May repeat every 3-5 min up to 3 mg/kg.
    - Maintenance 20-50 mcg/kg/min

✆ Contact OLMC before terminating resuscitative efforts in the field

PARAMEDIC

ALL RHYTHMS

❑ May consider endotracheal intubation, if unable to adequately ventilate with BVM (preferred) or supraglottic airway, ***per Airway and Tracheostomy Management Guideline.***

❑ Intubation must not interfere with chest compressions.

❑ Special Circumstances

- Known or Suspected Hyperkalemia
  - Calcium Chloride 20 mg/kg IV/IO may repeat in 10 min (max 2 grams) OR Calcium Gluconate 100 mg/kg IV/IO may repeat in 10 min (max 3 grams)
  - Sodium Bicarbonate 1 mEq/kg IV/IO (Max of 50 mEq). For <2 years of age use 4.2% concentration.
- Polymorphic VT associated with long QT
  - Magnesium 50 mg/kg (Max = 2,000 mg) IV/O over 2 min

- Contact OLMC for further orders or therapies

BRADYCARDIA (Symptomatic)

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
  - Assess for signs of poor perfusion, hypotension or other signs of shock, altered mental status, chest pain, or acute heart failure.
  - Obtain a blood glucose level.
- ❑ Continuous ECG, ETCO2, CO2, 12 lead ECG, and pulse oximetry monitoring, blood pressure, when available
- ❑ **Treatment Plan**
  - Only treat bradycardia **IF** the patient is unstable (hypotension or signs of poor perfusion).
  - If patient is a newborn, follow the ***Newborn Resuscitation Guideline***.
  - Identify and treat the underlying cause, if possible. Potential causes include:
    - Hypoxia
    - Shock
    - 2nd or 3rd degree heart block
    - Toxin exposure (beta-blocker, calcium channel blocker, organophosphate, digoxin)
    - Electrolyte disorder (hyperkalemia)
    - Increased intracranial pressure (ICP)
    - Hypothermia
    - Acute MI
    - Pacemaker failure
  - Maintain airway - assist with breathing, and provide oxygen as necessary
  - Ensure patient warmth.
- ❑ **Pediatric patient** (<8-year-old)
  - Aggressive oxygenation with high flow oxygen and assisted ventilations with a BVM, as indicated.
  - Persistent heart rate <60/min and signs of poor perfusion following aggressive oxygenation and ventilation: **begin chest compressions**
- ❑ **Key Considerations**
  - In pregnant patients of >20 weeks' gestation: place wedge-shaped cushion or multiple pillows under patient's right hip to displace uterus to the left, off of the vena cava.
  - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

AEMT

- ❑ Vascular access and fluid therapy
- ❑ **Atropine 0.5 mg** IV/IO
  - Repeat as needed every 3 minutes
  - Maximum total dose of 3 mg
- ✆ **Epinephrine 0.1 mg** IV/IO push
  - Repeat as needed every 3-5 min

PARAMEDIC

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Vascular access and fluid therapy
- ❑ **Epinephrine** 0.01 mg/kg IV/IO
  - Repeat as needed every 3 minutes
  - Maximum total dose of 1 mg
- ❑ **If indicated, consider Atropine** 0.02 mg/kg IV/IO
  - Maximum single dose of 0.5 mg
  - Repeat Atropine every 3-5 minutes as needed until Max 1 mg for child and 2 mg for adolescents.

PARAMEDIC

SYMPTOMATIC BRADYCARDIA

- ❑ **Transcutaneous pacing (TCP)** at an initial rate of 80 beats per minute if the patient does not respond to medications. Ensure mechanical and electrical capture.
- ❑ Consider Procedural related anxiety management (refer to the **Pain/Anxiety Management Protocol**)
- ❑ **Epinephrine 2–10 mcg/min** IV/IO infusion for persistent hypoperfusion. Titrate to maintain a SBP >100 mmHg. **And/or**
- ❑ **Norepinephrine initial dose: 0.01-3 mcg/kg/min** IV/IO. Titrate to maintain a SBP >100 mmHg.
- ✆ **Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters**.

SYMPTOMATIC BRADYCARDIA

- ✆ **Transcutaneous pacing (TCP)** at an initial rate of 100 beats per minute, if the patient does not respond to medications. Ensure mechanical and electrical capture.
- ✆ Consider Procedural related anxiety management (refer to the **Pain/Anxiety Management Protocol**)
- ✆ **Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters**
- ✆ **Epinephrine 0.1–1 mcg/kg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg
- ✆ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP>70 + (age in years x 2) mmHg after fluid bolus

CARDIAC CHEST PAIN (ACUTE CORONARY SYNDROME)

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Assess for signs or symptoms suggestive of ischemia or infarction.
  - Ask patient to describe the pain utilizing the O-P-Q-R-S-T mnemonic.
    - Onset of the event, Provocation or Palliation, Quality of the pain, Region and Radiation, Severity, Time/Trend (history)
  - Determine whether the patient (male or female) has taken erectile dysfunction medications such as Viagra, Levitra or Cialis within the last 24 hours.
- ❑ Continuous ECG, CO2, and pulse oximetry monitoring, blood pressure, when available.
- ❑ For prolonged transports >15 minutes: serial 12 lead ECGs should be obtained every 10 minutes until ED arrival
- ❑ **Treatment Plan**
  - Chest pain patients should only receive oxygen therapy as needed to target O2 saturations ~94%
- ❑ **Key Considerations**
  - Assess blood glucose level.

ADULT

EMT

- ❑ **Aspirin:** 325 mg PO chewed if patient is >18 years old and no reported allergies to aspirin
  - Administer even if patient takes a daily dose
- ❑ Assist patient with prescribed nitroglycerin SL every 5 minutes, up to 3 doses, as long as dyspnea or chest pain persist and SBP >90 mmHg
  - Do not administer nitroglycerin if the patient (male or female) has taken erectile dysfunction medications within the last 24 hours

AEMT

- ❑ Vascular access and fluid therapy
- ❑ IV access prior to administration of nitroglycerin is preferable, if possible
- ❑ 12 Lead EKG (If available). Acquire and transmit.
- ❑ If the patient has a STEMI then transport to the closest available STEMI/PCI receiving center (if available) and give advanced notification of ECG findings and transmission of ECG if possible.
  - Confirm that a catheterization lab will be available for the patient. If NOT then

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

AEMT

- ❑ Chest pain with cardiac origin is rare in children, consider other causes;
  - Asthma
  - Foreign body
  - Infection
  - Trauma

consider transporting to a different STEMI/PCI receiving center
    - Confirm with online medical control if needed **Nitroglycerin:** 0.4 mg (every 5 minutes) (max of 3 doses) SL as long as chest symptoms persist *and* SBP >90 mmHg
    - Administer with caution in patients with known inferior ST-Elevation MI
    - Do not administer nitroglycerin if the patient (male of female) has taken erectile dysfunction medications within the last 24 hours
    - If hypotension occurs following nitroglycerin administration, administer 500mL bolus of NS and withhold further nitroglycerin.
- ❑ Pain medications per ***Pain and Anxiety Management Guideline***
- ❑ **Fentanyl** appears to have less effect on the effectiveness of antiplatelet agents than morphine and may be preferred in patients with ACS

PARAMEDIC

✆ Contact OLMC for further instructions.

PARAMEDIC

✆ Contact OLMC for further instructions.

CONGESTIVE HEART FAILURE / PULMONARY EDEMA

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Determine whether the patient (male or female) has taken erectile dysfunction medications such as Viagra, Levitra or Cialis within the last 24 hours.
  - Assess blood glucose level.
- ❑ Continuous cardiac monitoring, ETCO2, 12 lead ECG, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan**
  - Maintain airway; assist with breathing as necessary, provide oxygen as needed to target SpO2 90-94%.
- ❑ **Key Considerations**
  - Do not use nitroglycerin if the patient has taken erectile dysfunction medications in the last 24 hours.
  - In pregnant patients of >20 weeks gestation: Place wedge-shaped cushion or multiple pillows under patient's right hip and manually displace the uterus.
  - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

EMT

- ❑ Assist patient with prescribed nitroglycerin SL every 5 minutes, up to 3 doses, as long as dyspnea or chest pain persist and SBP >90 mmHg
  - Do not administer nitroglycerin if the patient (male or female) has taken erectile dysfunction medications within the last 24 hours
- ❑ **CPAP/BiPAP** – Consider when the patient is awake, cooperative and SBP>90 mmHg
  - Explain the procedure to the patient
  - **CPAP** - Provide 10 L/min oxygen and PAP at 10 cm H2O
  - **BIPAP** – Provide 10 L/min oxygen and IPAP at 10 cm H2O with EPAP at 5 cm H2O
- ✆ Contact OLMC to discuss further settings and treatment above the initial setup.

AEMT

- ❑ Supraglottic device, vascular access and fluid
  - IV access prior to nitrates is preferred if possible
  - Limit fluid bolus to 250–500 mL NS
- ❑ **Nitroglycerin 0.4 mg** SL every 5 minutes (max of 3 doses) if dyspnea or chest pain persist and SBP >90 mmHg.

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ **CPAP/BiPAP** – ONLY use when the patient is on the machine at home. Maintain home settings and bring machine with the patient. If unable to adequately ventilate, return to BVM

AEMT

- ❑ Supraglottic device, vascular access and fluid

PARAMEDIC

- ❑ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP>100 mmHg after fluid bolus
- ❑ **Epinephrine 2 mcg/min** IV/IO infusion for shock. Titrate up to 10 mcg/min to maintain a SBP >100 mmHg
- ❑ **Norepinephrine 1 mcg/min** IV/IO for shock. Titrate up to 30 mcg/min to maintain SBP >100 mmHg.

PARAMEDIC

- ✆ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP>70 + (age in years x 2) mmHg after fluid bolus
- ✆ **Epinephrine 0.1–1mcg/kg/min** IV/IO infusion for shock. Titrate to maintain a SBP >70 + (age in years x 2) mmHg.

NEWBORN RESUSCITATION

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam: Term baby? Breathing? Tone?
- ❑ Continuous ECG, CO2, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan**
  - **If the newborn is apneic, slow to respond, has slow or gasping respirations, or persistent central cyanosis**
  - **First 30 seconds**: Warm, dry, and stimulate the baby. Consider suction (bulb syringe) mouth, then nose.
    - Evaluate respirations, heart rate, and activity
  - **Next 30 seconds:** If after first 30 seconds the baby remains apneic, lethargic, and/or has HR <100, then perform 30 seconds of positive pressure ventilation (PPV) with BVM with a rate of 40-60 breaths/minute
    - Watch for chest rise to ensure adequate ventilation. If none, reposition mask seal and increase pressure slightly
    - Target O2 saturations to 90 – 92%; excessive oxygenation can be harmful to the newborn brain
    - Target PPV efforts to improving tone and increasing heart rate; titrate up O2 if HR remains <100 despite adequate PPV
  - **Next 30 seconds:** If after an additional 30 seconds of effective PPV the baby continues to have a HR<60, begin CPR with a breath/compression ratio of 1:3.
    - Use 2 thumb encircling technique for CPR, rate of 120 compressions/min
  - Check glucose and treat if <30 mg/dl
- ❑ **Key Considerations**
  - As nationally-established neonatal resuscitation guidelines (NALS, NRP, etc.) are updated, these may be integrated into performance, as per agency medical director
  - **Keep baby as warm as possible**

AEMT

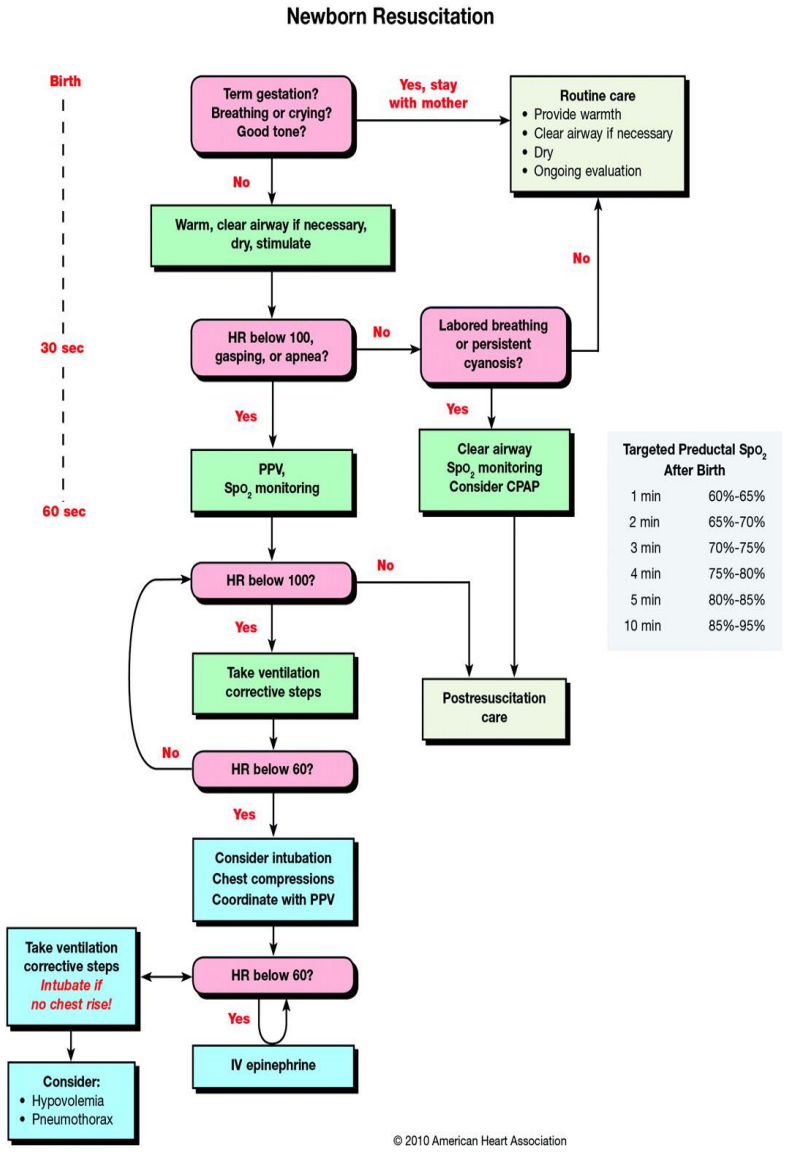
- ❑ Supraglottic airway device placement may be indicated when:
  - BVM has been ineffective despite repositioning infant and checking equipment
  - Chest compressions are necessary
- ❑ IV or IO at a keep open rate (approx. 10ml/hr) after boluses to avoid volume overload
  - IV required only when required for fluid resuscitation or parenteral medication
  - IO infusions are only indicated when life-threatening conditions are present
- ❑ **Epinephrine**
  - **IV/IO- 0.01-0.03 mg/kg = 0.1-0.3 ml/kg (0.1 mg/ml/1:10,000)** for HR <60/min despite 30 seconds of effective CPR with PPV. Repeat every 3-5 minutes until spontaneous heart rate remains >60 bpm

EVIDENCE OF HYPOPERFUSION OR HYPOVOLEMIA

- ❑ NS (IV or IO) @ 10 mL/kg syringe bolus over 5-10 min
- ❑ Run D10 if available for maintenance fluid at 10 ml/hr after bolus
- ✆ Additional boluses require physician approval

PARAMEDIC

- ❑ **Endotracheal intubation**:
  - May be indicated if BVM has been ineffective despite repositioning infant and checking equipment and/or chest compressions are necessary.
  - AFTER intubation considerations:
    - Insert a gastric tube in all intubated patients
    - Suction the trachea using a suction catheter through the endotracheal tube. If there is no chest rise despite a successful intubation then apply a meconium aspirator with appropriate pressure and remove the endotracheal tube. Repeat intubation may be indicated if this process is unsuccessful.
- ❑ **Epinephrine**: Endotracheal ET: (IV/IO route preferred) 0.05 to 0.1 mg/kg (0.5 to 1 mL/kg of 0.1 mg/mL (1:10,000) solution) every 3 to 5 minutes until IV access established or return of spontaneous circulation
- ❑ **Dextrose 10%** per ***Glucose Emergencies - Hypoglycemia/Hyperglycemia Guidelines***



POST CARDIAC ARREST

RETURN OF SPONTANEOUS CIRCULATION (ROSC)

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
  - Blood glucose assessment
- ❑ Continuous ECG, ETCO2, and pulse oximetry monitoring, when available
- ❑ Assist ventilations to maintain ETCO2 35-45mmHg
- ❑ Document blood pressure after establishing ROSC
- ❑ Prepare for transport while maintaining monitoring and re-checking for pulse periodically
- ❑ Acquire and transmit a 12L EKG after establishing ROSC

- ❑ Consider putting mechanical CPR device in place for transport if available for use in case of re-arrest
- ❑ **Treatment Plan**
  - Preferential transport to a STEMI/PCI receiving center, if available.

ADULT	PEDIATRIC (<15 years of Age) NOTE: Pediatric weight based dosing should not exceed Adult dosing.
AEMT	**AEMT**
❑ Supraglottic, vascular access and fluid therapy ❑ **Prepare Vasopressors for possible hypotension** ✆ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP >100 mmHg after fluid bolus	❑ Supraglottic, vascular access and fluid therapy ✆ Monitor closely for hypotensive shock. Consult with OLMC for direction if blood pressure is less than pediatric lowest acceptable systolic blood pressures • Birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg. ❑ **Prepare Vasopressors for possible hypotension** ✆ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP>70 + (age in years x 2) mmHg after fluid bolus
PARAMEDIC	**PARAMEDIC**
❑ **Epinephrine (1:1000) 0.1-0.5 mcg/kg/min** (7 to 35 mcg/minute in a 70 kg patient) IV/IO infusion for hypoperfusion. Titrate to maintain SBP >100 mmHg ❑ **Norepinephrine 1 mcg/min** IV/IO for shock. Titrate up to 30 mcg/min to maintain SBP >100 mmHg.	

TACHYCARDIA (With a Pulse)

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Assess blood glucose level
- ❑ Continuous ECG, ETCO2, blood pressure, and pulse oximetry monitoring when available
- ❑ Acquire and transmit a 12L EKG if possible.
- ❑ **Key Considerations**
  - Pregnancy >20 weeks gestation - Place wedge-shaped cushion or multiple pillows under patient's right hip.

- Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

AEMT

❑ Vascular access and fluid therapy

Supraventricular Tachycardia (SVT)

❑ Obtain a 12 Lead EKG, if possible

❑ Maneuvers to increase vagal tone: Valsalva, ice pack to face, Trendelenburg, urination, etc.)

PARAMEDIC

Supraventricular Tachycardia (SVT)

❑ **Adenosine**
- Indicated for patients with prior SVT who have responded to adenosine previously
- **Initial dose: 6 mg IV**
- **May repeat once: 12mg IV**

Stable Wide Complex (QRS > 120 msec) Tachycardia

❑ Transport to ED with IV in place and careful monitoring

Unstable Tachycardia – Synchronized Cardioversion

Signs/Symptoms of Unstable Tachycardia
- Acute cardiac chest pain
- Acute congestive heart failure / pulmonary edema
- Altered mental status
- SBP <90 mm Hg
- Signs of shock:
  - Cool, clammy, or pale skin
  - Weak or thready pulse

Synchronized Cardioversion
- ***Indicated for unstable patients***
- These are initial doses:
  - Narrow Regular: 50-100J (mono- or bi-phasic)

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

❑ Vascular access and fluid therapy

Supraventricular Tachycardia (SVT)
- Infants: rate usually greater than 220 bpm with no variation
- Children: rate usually greater than 180 bpm with no variation

❑ Obtain a 12 Lead EKG is possible, if possible

❑ Maneuvers to increase vagal tone: Valsalva, ice pack to face, Trendelenburg, urination, etc.)

PARAMEDIC

Supraventricular Tachycardia (SVT)

❑ **Adenosine**
- Indicated for patients with prior known SVT who have responded to adenosine previously
- **Initial dose: 0.1mg/kg IV (to max 6mg)**
- **May repeat once: 0.2mg/kg IV (to max 12mg)**

Stable Wide Complex (QRS > 120 msec) Tachycardia

❑ Transport to ED with IV in place and careful monitoring

Unstable Tachycardia – Synchronized Cardioversion

Signs/Symptoms of Unstable Tachycardia
- Acute congestive heart failure / pulmonary edema
- Altered mental status
- Low BP for age
- Signs of shock:
  - Cool, clammy, or pale skin
  - Weak or thready pulse

Synchronized Cardioversion
- Indicated for unstable patients
- Initial energy dose is 0.5-1 J/kg
- If no response, double energy dose to 2 J/kg

- Narrow Irregular: 120-200J biphasic and 200J monophasic
- Wide Regular: 100J (mono- or bi-phasic)
- Wide Irregular: defibrillate without synchronization

- Consider Procedural related anxiety management (refer to the **Pain/Anxiety Management Protocol**)

- Consider Procedural related anxiety management (refer to the **Pain/Anxiety Management Protocol**)

Medical Patient Care Guidelines

These guidelines were created to provide direction for each level of certified provider in caring for medical patients. All of these directions, dosages and provisions are subject to change with a later notice or revision of the guidelines. The OLMC physician will always be the final word on treatment in the field. If there are ever any discrepancies between the guidelines and the OLMC physician these should be documented and brought to the attention of the physician at the receiving hospital. If the explanation is not sufficient, the provider should bring the issue to their medical director or the BEMSP for review.

General Approach to Medical Patient Care Guidelines

- Assess your patient prior to initiating a guideline.
- More than one guideline may apply.
- If conflicts arise between treatment guidelines, contact OLMC for clarification.
- Providers may provide treatment up to the level of their certification only.
- Air Medical Transport Service personnel function under their own clinical guidelines.
- Contact the receiving hospital and OLMC as soon as clinically possible for each patient
- OLMC physician may change your treatment plan.
- Any variations to a guideline by the OLMC physician should be clarified to ensure that the provider has properly characterized the situation.
- The OLMC physician has the final word on treatment once contact is made.
- The OLMC physician must approve usage of dosages in excess of the guidelines.

General Pediatric Considerations

- Pediatric reference based tape dosing is preferred over calculated dosages for infants and children.

ALLERGIC REACTION / ANAPHYLAXIS

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam.
- ❑ Cardiac monitor, ETCO2, and pulse oximetry monitoring, when available.
- ❑ **Treatment Plan**
  - Eliminate the source of exposure, if possible. May require moving the patient to another location
  - Maintain airway.
  - Apply a cold pack to bite or sting site as necessary.
  - Monitor closely for hypotension.
- ❑ Key Considerations
  - If the patient has any respiratory distress and is conscious, treat and transport them in a position of comfort, including leaving a child in parent's lap.
  - Determine if anaphylaxis is present:
    - **Non-anaphylactic allergic reaction:** Symptoms involving only **one** organ system (i.e. itching, rash, or localized angioedema that does not involve the airway and is not associated with vomiting)
    - **Anaphylaxis:** More severe and is characterized by an acute onset involving:
      - **Hypotension** after exposure to a likely allergen OR
      - **Two or more** of the following occurring rapidly after exposure to a likely allergen:
        - Skin and/or mucosal involvement (urticaria, itching, face/lips/tongue swelling
        - Respiratory compromise (dyspnea, wheezing, stridor, hypoxemia)
        - Persistent gastrointestinal symptoms, particularly in infants/young children (vomiting, abdominal pain)
  - **Do not delay administering epinephrine.** Give IM epinephrine as soon as the diagnosis of anaphylaxis has been established.

ADULT (>25 kg / 55lbs)

EMT

- ❑ **Administer epinephrine 1 mg/ml (1:1000)** for anaphylaxis by either:
  - **Epinephrine autoinjector IM (0.3 mg)**
  - **Epinephrine 0.5mg IM** (0.5 mL of 1 mg/mL (1:1000)
- ❑ May repeat epinephrine dose every 10 minutes as needed
- ❑ May repeat epinephrine every 10 minutes as needed
- ❑ If WHEEZING is present: Assist patient albuterol inhaler if wheezing is present (2 puffs). May repeat in 10 minutes
- ❑ O2 as needed to maintain SaO2 above 90%.

AEMT

- ❑ Advanced airway, vascular access and fluid therapy

PEDIATRIC (< 25 kg / 55 lbs)

EMT

- ❑ Give or assist patient with **epinephrine autoinjector ("Jr." 0.15 mg)** IM for severe respiratory distress and/or shock from anaphylaxis.
  - If >25kg, use adult autoinjector (0.3 mg) IM
- ❑ Administer **epinephrine 1 mg/ml (1:1000) 0.15 mL** IM.
  - If > 25 kg, then give 0.3 mL IM
- ❑ May repeat epinephrine dose every 10 minutes, as needed
- ❑ If WHEEZING is present: Assist patient with own albuterol inhaler if wheezing is present (2 puffs). May repeat in 10 minutes
- ❑ O2 as needed to maintain SaO2 above 90%.

AEMT

- ❑ Advanced airway, vascular access and fluid therapy

- ❑ **Diphenhydramine 50 mg** IV/IO/IM for allergic reaction with urticaria/itching
- ❑ If **WHEEZING** is present:
  - **Albuterol 2.5 mg** nebulized every 10 minutes until symptoms improve
- ❑ If **STRIDOR** is present:
  - **Epinephrine (1:1000) 2mL** mixed with 3 mL of NS nebulized every 10 minutes until symptoms improve

PARAMEDIC

- ✆ **Epinephrine 2–10 mcg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg
- ✆ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP >100 mmHg after fluid bolus
- ✆ **Norepinephrine** initial dose: **0.05 – 1 mcg/kg/min** IV/IO for hypoperfusion. Titrate to maintain a SBP > 100 mmHg. For patients in refractory shock: 8-30 mcg/minute

- ❑ **Diphenhydramine 1 mg/kg to max of 50 mg** IV/IO/IM for allergic reaction with urticaria/itching
- ❑ If **WHEEZING** is present:
  - **Albuterol 2.5 mg** nebulized every 10 minutes until symptoms improve.
- ❑ If **STRIDOR** is present:
  - **Epinephrine (1:1000) 2mL** mixed with 3 mL of NS nebulized every 10 minutes until symptoms improve

PARAMEDIC

- ✆ **Epinephrine 0.1–1 mcg/kg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg
- ✆ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP>70 + (age in years x 2) mmHg after fluid bolus
- ✆ **Norepinephrine** initial dose: **0.05 - 0.1 mcg/kg/min**, titrate to max of 2 mcg/kg/min to maintain SBP >70 + (age in years x 2) mmHg

DROWNING OR SUBMERSION

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Blood glucose, core body temperature and oxygen saturation assessment.
  - Assess the scene for other environmental issues or possible toxins.
- ❑ Cardiac monitor, ETCO2, pulse oximetry monitoring, blood pressure when available.
- ❑ **Treatment Plan**
  - Safely remove patient from the water
  - Place patient supine
  - Remove wet clothing and wrap in blankets
  - Ensure patient warmth
  - If concern for spinal injury refer to ***Spinal Motion Restriction Guideline.***
  - Scuba divers "Dive Computer" or Dive Log Book should be transported with the patient.
- ❑ **Key Considerations**
  - Airway maintenance is the primary consideration.
  - Unlike the "CAB" strategy used in standard cardiac arrest, patients suffering cardiac arrest from drowning require an "ABC" approach with emphasis prompt airway management and supplemental ventilations.
  - There can be co-existing conditions depending on the type of submersion injury including trauma, hypothermia, and intoxication.
  - Hypotension is associated with a worse outcome, monitor closely and treat with ***Shock, Sepsis, and Fluid Therapy Guideline***
  - Initiation of in-water ventilations may increase survival; however, in-water chest compressions are futile.
  - Submersion in cold water will often cause severe hypothermia, notify receiving hospital so that appropriate resources can be mobilized.
  - Pediatric cardiac arrest due to drowning and hypothermia (temperature <30 C/86 F): consider direct transport to Primary Children's Medical Center for ECMO and do NOT rewarm this patient.
  - Adult cardiac arrest due to drowning and hypothermia (temperature <30 C/86 F): consider direct transport to University of Utah Medical Center or Intermountain Medical Center for ECMO and do NOT rewarm this patient.

ADULT

EMT

- ❑ If breathing spontaneously apply oxygen at 15 LPM via non-rebreather mask to maintain oxygen saturations >95%
- ❑ Ventilate with BVM when apneic or exhibiting respiratory distress. Consider a nasal or oral airway
- ❑ Initiate 5 rescue breaths followed by 30 chest compressions, then use a 30:2 compression: ventilation ratio

AEMT

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ If breathing spontaneously apply oxygen at 15 LPM via non-rebreather mask to maintain oxygen saturations >95%
- ❑ Ventilate with BVM when apneic or exhibiting respiratory distress. Consider a nasal or oral airway
- ❑ Initiate 5 rescue breaths followed by 30 chest compressions, then use a 15:2 compression: ventilation ratio

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
  - Albuterol 2.5 every 10 minutes via nebulization for bronchospasm/wheezing until symptoms subside
  - Reassess patient after each dose to determine need for additional dosing
- ❑ Consider CPAP in awake patients with respiratory distress

PARAMEDIC

- ✆ **Epinephrine 2–10 mcg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg
- ✆ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP >100 mmHg after fluid bolus
- ✆ **Norepinephrine** initial dose: **0.05 – 1 mcg/kg/min** IV/IO for hypoperfusion. Titrate to maintain a SBP > 100 mmHg. For patients in refractory shock: 8-30 mcg/minute

- ❑ Advanced airway, vascular access and fluid therapy
  - Albuterol 2.5 every 10 minutes via nebulization for bronchospasm/wheezing until symptoms subside. Start with 1.25 mg if age <1yr
  - Reassess patient after each dose to determine need for additional dosing
- ❑ Consider CPAP in awake patients with respiratory distress

PARAMEDIC

- ✆ **Epinephrine 0.1–1 mcg/kg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg
- ✆ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP>70 + (age in years x 2) mmHg after fluid bolus
- ✆ **Norepinephrine** initial dose: **0.05 - 0.1 mcg/kg/min**, titrate to max of 2 mcg/kg/min to maintain SBP >70 + (age in years x 2) mmHg

FEVER MANAGEMENT

ALL PROVIDERS

- ❑ Focused history and physical exam
- ❑ Assess temperature.
- ❑ Cardiac monitor, ETCO2, and pulse oximetry monitoring, when available.
- ❑ **Treatment Plan**
  - If temperature is >100.4°F (>38.0°C) and the patient does not have any contraindications, consider antipyretic medications.
    - Contraindications include abdominal pain, allergy to medications, vomiting, active bleeding or concern from parents.
    - Avoid acetaminophen in patients with liver disease.
    - Ibuprofen is contraindicated in children <6 months old.
    - Ibuprofen is contraindicated in the immune-compromised patient (on chemotherapy, with autoimmune disorders, etc.)
  - For temperatures greater than 103°F or 39.5°C
    - Begin passive cooling techniques including removing excess clothing.
  - For temperatures greater than 106°F or 41°C
    - Refer to the ***Temperature and Environmental Emergencies Guideline***.

ADULT

EMT

- ❑ **Acetaminophen 650-1000 mg** by mouth once
- ❑ **Ibuprofen 600 mg** by mouth once

AEMT

- ❑ Advanced Airway, IV/IO Access, and Fluid Therapy

PARAMEDIC

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ **Acetaminophen 15mg/kg** (max 650mg) by mouth or rectum once
- ❑ **Ibuprofen 10mg/kg** (max 600mg) by mouth once **Contraindicated in children under 6 months old**

AEMT

- ❑ Advanced Airway, IV/IO Access, and Fluid Therapy

PARAMEDIC

GLUCOSE EMERGENCIES
HYPOGLYCEMIA / HYPERGLYCEMIA

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Blood glucose assessment (heel stick is preferred in newborns or infants).
  - Hypoglycemia is defined as blood glucose level <50 mg/dl for adults, <60 mg/dl for children, and <40 mg/dl for the term neonate (<30days of age) with any degree of altered mentation.
- ❑ **Treatment Plan**
  - Insulin pump in place: Hypoglycemic patient with altered mentation -
    - Care is directed at treating hypoglycemia first, then stopping administration of insulin.
    - Turn off insulin pump, if able.
    - If no one familiar with the device is available to assist, disconnect pump from patient by either:
      - Using quick-release where the tubing enters the dressing on patient's skin.
      - Completely remove the dressing, thereby removing the subcutaneous needle and catheter from under patient's skin.
    - When mental status returns to normal, patient should be strongly encouraged to eat.
  - Criteria for scene release of hypoglycemic patient:
    - Patient does not want to be transported.
    - Return to apparent normal mental capacity following treatment.
    - Insulin only. The patient does not have access to oral hypoglycemic (e.g. Glyburide or Glipizide) medications for diabetes.
    - No suicidal ideations or recent suicide attempt.
    - There is at least one responsible party that can assist them in their recovery and is comfortable in their care.
    - Children should be considered for transport for evaluation regardless of improvement in the field due to other possible etiologies for the episode.
- ❑ **Key Considerations**
  - Do NOT attempt to give oral glucose to those who are unconscious, cannot swallow or whose gag reflex is diminished.
  - Transport any patient who is at risk for prolonged or recurrent hypoglycemia such as long acting insulin or oral hypoglycemic overdose.
  - If the patient is hypoglycemic and has a seizure, recheck blood glucose every 15 minutes to check for recurrent low blood sugar that may need treatment.

ADULT

EMT

- ❑ **Dextrose Oral glucose 15 grams** if patient is able to protect airway
  - Repeat in 15 minutes as needed

AEMT

- ❑ Vascular access and fluid therapy

HYPOGLYCEMIA

- ❑ **Dextrose 50% 12.5 grams** (25mL) IV/IO. May repeat as necessary

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ **Dextrose Oral glucose 7.5 grams** if patient is able to protect airway
  - Repeat in 15 minutes as needed

AEMT

- ❑ Vascular access and fluid therapy

HYPOGLYCEMIA

- ❑ <u>Infants up to 1 year</u>

- ❑ **Dextrose 10%:** Infuse **125 mL** (12.5 grams), then recheck blood sugar. If still low, may repeat
- ❑ **Glucagon 1 mg** IM if no IV/IO access available

HYPERGLYCEMIA (BS >300 mg/dL)

- ❑ **Normal Saline 1000 mL** IV/IO over 30–60 minutes

PARAMEDIC

- **Dextrose 10% 5 mL/kg** (0.5 grams/kg) IV/IO. May repeat as necessary up to a MAX of 125 mL (12.5 grams).

- ❑ <u>Children greater than 1 year</u>
  - **Dextrose 25% 2 mL/kg** IV/IO: repeat as necessary (max 12.5G/ 50mL)
  - **Dextrose 10% 5 mL/kg** (0.5 grams/kg) IV/IO. May repeat as necessary up to a MAX of 125 mL (12.5 grams).
  - **Glucagon 0.01 mg/kg (max dose of 1 mg)** IM if no IV/IO access available

HYPERGLYCEMIA (BS >300 mg/dL)

- ❑ **Normal Saline 20 mL/kg IV/IO** over 30–60 minutes for hyperglycemic patient

PARAMEDIC

OBSTETRICAL EMERGENCIES

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
  - Do not perform pelvic exam
- ❑ Cardiac monitor, ETCO2, and pulse oximetry monitoring when available.
- ❑ **Treatment Plan**
  - Imminent Deliveries: normal delivery procedures
    - Attempt to prevent explosive delivery.
    - As delivery occurs, do not suction nose and mouth. Wipe nose and mouth to clear excess secretions
    - Place one umbilical cord clamp 2 inches away from baby, place second clamp 2 inches further, cut cord between the clamps.
    - Keep newborn warm and dry with vigorous stimulation.
    - Allow infant to nurse (unless multiple births when babies should not be allowed to nurse until all have been delivered)
    - Calculate APGAR score at 1 minute and again at 5 minutes
  - Special Situations – **TRANSPORT TO THE CLOSEST HOSPITAL**
    - **Excessive hemorrhage** following delivery or delayed placenta delivery.
      - Begin fundal massage immediately after placental delivery
      - Paramedics should begin oxytocin after placental delivery – see below.
    - **Nuchal cord**: cord is wrapped around the infant's neck
      - Attempt to slip cord over the head.
      - If cord is too tight to remove, immediately clamp in two places and cut between clamps.
    - **Prolapsed cord or limb presentation**: cord or limb out of the vagina before the baby – DO NOT ATTEMPT DELIVERY
      - Maintaining a pulsatile cord is the objective: insert two fingers of gloved hand into vagina to raise presenting portion of newborn off the cord.
      - If possible, place mother in Trendelenburg position. Otherwise, use knee-chest position.
      - Keep cord moistened with sterile saline.
      - Continue to keep pressure off cord throughout transport.
    - **Breech presentation** (coming buttocks first)
      - Position mother with her buttocks at edge of bed, legs flexed.
      - Support baby's body as it delivers.
      - As the head passes the pubis, apply gentle upward pressure until the mouth appears over the perineum. Immediately suction mouth, then nose.
      - If head does not deliver, but newborn is attempting to breath, place gloved hand into the vagina, palm toward newborn's face, forming a "V" with the index and middle finger on either side of the nose. Push the vaginal wall from the face. Maintain position throughout transport.
    - **Shoulder Dystocia**: head is out but shoulder will not pass
      - Position mother with buttocks off the edge of the bed and thighs flexed upward as much as possible.
      - Apply firm, open hand pressure above the symphysis pubis.
      - If delivery does not occur, maintain airway patency as best as possible, immediately transport.
    - **Stillborn/Abortion**
      - All products of conception should be carefully collected and transported with the mother to the hospital. Anything other than transport should be coordinated with on-line medical consultation and/or law enforcement.
- ❑ **Key Considerations**
  - Attempt to create a sanitary environment
  - Transport in left lateral decubitus position

ADULT

AEMT

- ❑ Vascular access and fluid therapy
- ❑ Treat seizures as per ***Seizure Guideline***

PARAMEDIC

- ❑ **Oxytocin 10 units IM** for post-partum hemorrhage after placental delivery
- ❑ **Transexamic Acid (TXA) 1 gram IV** if within 3 hours of delivery for post-partum hemorrhage.
- ❑ **Oxytocin Infusion may be started if bleeding continues:**
  - **IM 10 units followed by IV/IO Infusion by adding 10-40 units to 500mL or 1000mL NS** and titrating the infusion to decrease bleeding and patient comfort
- ✆ In the event of uterine inversion, cover uterus with moistened sterile gauze. Contact OLMC for surgical preparations

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Vascular access and fluid therapy
- ❑ Treat seizures as per ***Seizure Guideline***

PARAMEDIC

- ❑ Refer to the ***Newborn Resuscitation Guideline***

- ✆ **High-risk preterm labor when delivery is imminent:** (1) Rapidly infuse 1 liter of NS, (2) Albuterol 2.5 mg via nebulization, (3) Magnesium Sulfate 1gram IV and titrate per OLMC.

OPIOID OVERDOSE

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Assess blood glucose, temperature, and oxygen saturation.
  - Assess the time and circumstances of the ingestion.
  - Assess patient and scene for possible trauma and additional information on possible toxins, poisons, medications or other related concerns.
- ❑ Cardiac monitor, ETCO2, and pulse oximetry monitoring, when available.
- ❑ 12-lead ECG, if available
- ❑ **Treatment Plan**
  - **Opioid Overdose:** Initial focus is on providing/assisting with adequate ventilation with BVM immediately.
  - Initial dose of naloxone should be given IN (intranasal) while preparing for IV placement by AEMT/PM.
  - Dosing of naloxone should be focused on restoration of adequate spontaneous ventilation, not restoration of full consciousness. Excessive naloxone use can precipitate an acute withdrawal syndrome, putting both the patient and the emergency personnel at risk for injury.
  - Begin with small doses of naloxone (0.4 mg IN/IV) and titrate to adequate spontaneous ventilation.
- ❑ **Key Considerations**
  - Transport any pill bottles, open containers, or potential chemicals that may have been ingested.
  - Transport suicide notes or other pre-ingestion communications.
  - In cases of reported heroin-only overdose, patients should be offered ED transport, but they may refuse and be left at scene after naloxone administration.
  - All oral opioid overdoses should be transported, as re-sedation will occur after naloxone administration.
  - May contact Poison Control 1-800-222-1222
  - With some new opiates, very large doses of naloxone may be required to restore respirations. If no results with 2-3 0.4 mg doses, consider a trial of 2 mg doses.
  - If other drugs are ingested in addition to opiates (such as alcohol or benzodiazepines), the response to naloxone may be incomplete.
  - Patients who have attempted suicide by overdose CANNOT be released and MAY be taken in against their will. Police may need to assist in ensuring the transport by providing "pink sheet" and assisting with patient control during transport.

ADULT

EMT

- ❑ **Naloxone 0.4–2 mg** (per dose) IN (intranasal) for suspected opioid overdose. May repeat as necessary to maintain respirations.
- ❑ IM route may be used if unable to administer IN

AEMT

- ❑ Advanced airway, vascular access and fluid therapy

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ **Naloxone 0.1 mg/kg (max 2mg per dose**) IN (intranasal) for suspected opioid overdose. May repeat as needed to maintain respirations
- ❑ IM route may be used if unable to administer IN

AEMT

- ❑ Advanced airway, vascular access and fluid therapy

- ❑ **Naloxone 0.4–2 mg** (per dose) IV/IM/IO/IN for suspected narcotic overdose. May repeat as needed to maintain respirations

PARAMEDIC

- ❑ **Sodium bicarbonate 1 mEq/kg** slow IV/IO push **for tricyclic antidepressant overdose** with sustained HR >120 bpm, QRS >0.10, hypotension unresponsive to fluids, or ventricular dysrhythmias
- ✆ **Epinephrine 2–10 mcg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg
- ✆ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP >100 mmHg after fluid bolus
- ✆ **Norepinephrine** initial dose: **0.05 – 1 mcg/kg/min** IV/IO for hypoperfusion. Titrate to maintain a SBP > 100 mmHg. For patients in refractory shock: 8-30 mcg/minute

- ❑ **Naloxone 0.1 mg/kg (max 2mg per dose)** IV/IM/IO/IN for suspected narcotic overdose. May repeat as needed to maintain respirations

PARAMEDIC

- ✆ Sodium bicarbonate for tricyclic antidepressant overdose: Contact OLMC
- ✆ **Epinephrine** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg
- ✆ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP >70 + (age in years x 2) mmHg after fluid bolus
- ✆ **Norepinephrine** initial dose: **0.05 – 1 mcg/kg/min** IV/IO for hypoperfusion. Titrate to maintain a SBP >100 mmHg. For patients in refractory shock: 8-30 mcg/minute

RESPIRATORY DISTRESS

ALL PROVIDERS

- ❑ Focused history and physical exam:
  - Determine the need to treat under the ***Allergic Reaction/Anaphylaxis Guideline***
  - Determine the need to treat under the ***Congestive Heart Failure Guideline***
  - Assess blood glucose, temperature and oxygen saturation
- ❑ Cardiac monitor, ETCO2, and pulse oximetry monitoring, when available
- ❑ Consider a 12 lead EKG
- ❑ **Treatment Plan**
  - **Choking**: Attempt to alleviate any obvious obstructions to the airway
    - For choking infants apply a sequence of 5 back blows and 5 chest thrusts until the item is dislodged
    - For choking adults and children, use the abdominal thrust ("Heimlich") maneuver.
  - Maintain airway, administer 10-15 lpm of oxygen via NRB
- ❑ **Key Considerations**
  - Recall that infants and small children are primarily nose breathers, consider oral and nasal suctioning for copious secretions
  - Keep patient NPO for any respiratory distress and if children have a RR >60

ADULT

EMT

- ❑ Administer prescribed metered dose inhaler or nebulizer medication per dosing instructions. If MDI dosing instructions are not available, give second dose at 20 minutes if needed

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
- ❑ For **ANAPHYLAXIS**:
  - See ***Anaphylaxis/Allergic Reaction Guideline***
- ❑ For **WHEEZING** (Asthma):
  - **Ipratropium 0.5mg** x1 nebulized treatment.
  - **Albuterol 2.5 mg/3cc NS** nebulized
  - Repeat nebs every 10 min as needed
  - Ipratropium and Albuterol may be combined (Duoneb)
  - Patient respiratory status must be reassessed after each dose to determine need for additional treatment
  - **Epinephrine 0.5 mg(1:1000 1mg/mL) IM** every 20 minutes as needed for acute

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ Administer prescribed metered dose inhaler or nebulizer medication per dosing instructions. If MDI dosing instructions are not available, give second dose at 20 minutes if needed
- ❑ Allow the patient to achieve and remain in a position of comfort (the parents arms if desired) and keep them as calm as possible.

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
- ❑ For **ANAPHYLAXIS**:
  - See ***Anaphylaxis/Allergic Reaction Guideline***
- ❑ For **WHEEZING**:
  - **Duoneb 3mL (0.5mg ipratropium/2.5mg Albuterol) x1 nebulized treatment.**
  - **Albuterol 2.5 mg** nebulized
  - For infants < 1yr: **albuterol 2.5 mg** nebulized if wheezing persists after nasal suctioning
  - **Epinephrine IM (1:1000 1mg/mL) 0.01 mg/kg** every 20 minutes as needed for Acute severe asthma unresponsive to inhaled beta-agonist
- ❑ For **STRIDOR**:

severe asthma unresponsive to multiple doses of inhaled beta-agonists

- ❑ For **STRIDOR** (Croup):
  - **Epinephrine (1:1000 1mg/mL) 2 ml (2mg)** mixed with 3mL of normal saline nebulized
- ❑ **CPAP/BiPAP** – Consider when the patient is awake but needs assistance with oxygenation and ventilation such as in a CHF/Pulmonary Edema patient or COPD patient.
  - Explain the procedure to the patient
  - Initially apply the mask and begin the CPAP or BiPAP according to training instructions.
  - CPAP - Provide 10 L/min oxygen and PAP of 5 cm H2O to begin.
  - BiPAP – Provide 10 L/min oxygen and IPAP at 15 cm H2O with EPAP at about 5 cm H2O
  - **Epinephrine (1:1000 1mg/mL) 2mL (2mg)** added to 3mL of Normal Saline via nebulizer
- ❑ **BIPAP/CPAP** – ONLY use when the patient is on the machine at home. Maintain home settings and bring machine with the patient. If unable to adequately ventilate return to BVM or advance to intubation
- ✆ Patient respiratory status must be reassessed after each dose to determine need for additional treatment. Call OLMC for additional doses.

PARAMEDIC

- ❑ **Magnesium sulfate 2gm** IV over 15-30 minutes for severe wheezing unresponsive to albuterol
- ❑ For patients not tolerating CPAP/BiPAP Consider Procedural related anxiety management (refer to the **Pain/Anxiety Management Protocol**)
- ✆ Contact OLMC to discuss further settings and treatment above the initial setup
- ✆ **Lidocaine 2% 40-60 mg** (2–3 mL) added to Albuterol for adult patients with "cough variant asthma" with severe coughing inhibits respiratory function (with or without audible wheezes)

PARAMEDIC

- **Magnesium sulfate 50 mg/kg (max 2 gm)** IV over 15-30 minutes for severe wheezing unresponsive to albuterol

SEIZURES

ALL PROVIDERS

- ❑ Focused history and physical exam
  - Blood glucose, temperature and oxygen saturation assessment
  - Determine possibility of third trimester pregnancy, if appropriate
  - Assess scene for possible toxin, overdose or trauma
- ❑ Cardiac monitor, ETCO2, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan**
  - Do not restrain, but do provide protection from injury during the tonic-clonic phase
  - Spinal motion restriction per ***Spinal Motion Restriction Guideline***
  - Ensure patients experiencing febrile seizures are not excessively dressed or bundled
  - Any child <12 months old with seizure activity should be encouraged to be transported
- ❑ **Key Considerations:**
  - Intranasal (IN) and intramuscular (IM) routes are preferred for first line administration of benzodiazepines
  - Intravenous (IV) administration of benzodiazepines is appropriate once an IV is in place
  - Rectal administration is not recommended

ADULT

EMT

- ❑ Maintain open airway with patient in the recovery position
- ❑ Assist patient's family or caretaker with any home medication treatments

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
- ❑ **Benzodiazepines**: is cut dose in half if the patient is under the influence of narcotics or alcohol
  - **Midazolam**
    - **IN/IM/IV/IO – 5 mg**, may repeat once in 5 minutes, if needed. Total max dose: 10mg
  - **Diazepam**
    - **IV/IO – 5 mg,** may repeat every 5 minutes, if needed. Total max dose: 20mg
    - **Intramuscular (IM) – 10 mg,** may repeat once in 10 minutes, if needed. Total max dose: 20 mg (IM not preferred unless no other options)
  - **Lorazepam**
    - **IV/IO/IM – 4mg, may repeat** every 5 minutes, if needed. Total max dose: 8mg

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

- ❑ Maintain open airway with patient in the recovery position
- ❑ Assist patient's family or caretaker with any home medication treatments

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
- ❑ **Benzodiazepines**: is cut in half if the patient is under the influence of narcotics or alcohol
  - **Midazolam**
    - **IN/IM: 0.2 mg/kg** (max 5 mg), may repeat once in 5 minutes, if needed. Total max dose: 10 mg
    - **IV/IO - 0.1 mg/kg** (max 5 mg), may repeat once in 5 minutes, if needed. Total max dose: 10 mg
  - **Diazepam**
    - **IV/IO - 0.1 mg/kg** (max 5 mg), may repeat every 5 minutes, if needed. Total max dose: 10 mg
    - **Intramuscular (IM): 0.2 mg/kg** (max 10 mg), may repeat every 10 minutes, if needed. Total max dose: 20 mg (IM not preferred unless no other options)

- **Lorazepam**
  - **IV/IO/IM – 0.1mg/kg** (max 4 mg per dose), may repeat every 5 minutes, if needed. Total max dose: 8 mg.

✆ Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters

✆ Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters

PARAMEDIC

PARAMEDIC

❑ Pregnant females with eclampsia/seizures
- **Magnesium sulfate - 5 gm IM/IV/IO** gm. Give infusion over 15 to 30 min.

✆ **Magnesium Sulfate** – For pediatric patients who are pregnant and having a seizure contact OLMC

SUSPECTED STROKE

ALL PROVIDERS/EMT

- ❑ Focused history and physical exam
  - Blood glucose, temperature and oxygen saturation assessment.
  - Keep NPO.
  - Document symptom onset time or time last seen normal.
- ❑ Continuous cardiac, blood pressure, ETCO2, and pulse oximetry monitoring when available.
- ❑ 12 Lead EKG, if available and does not delay transport.
- ❑ **Treatment Plan**
  - Perform **Cincinnati Stroke Scale (CSS)** to determine if a stroke is likely present (below)
  - If **CSS** positive, perform a **Cincinnati Stroke Triage Assessment Tool (C-STAT)** to determine if a large vessel occlusion (LVO) stroke is likely present (below). An LVO stroke may be best treated with an endovascular thrombectomy (direct clot removal) at a specialized stroke center (TSC or CSC, below).
  - Determine Last Known Well (LKW) time (the time when the patient was last seen without new stroke symptoms)
  - Destination guidelines for stroke patients:
    - If **LVO score (C-STAT) is positive** AND you will arrive at the destination hospital within:
      - 0-4 hours since LKW: Transport to nearest IV tPA-capable hospital (with pre-notification and possible LVO transport protocol activated by hospital).
      - 4-24 hours since LKW: Transport to thrombectomy-capable center if no more than 30 minutes of added transport time over transport to a closer SRF / PSC.
      - > 24 hours since LKW: Transport to closest stroke center (any level of certification)
    - If **LVO scale (C-STAT) is negative**, EMS to transport to closest stroke center (any level of certification.
  - Consider air medical transport to facilitate rapid transport when needed.
  - Acquire the cell phone number of family members/next of kin to provide to clinicians so they can call them and ask questions if needed.
  - Alert the receiving emergency department that you are transporting a suspected stroke patient as soon as you have made a destination decision. Inform them if the patient is "C-STAT" positive and of their presenting symptoms.
- ❑ **Pediatric Considerations**
  - Children can have strokes too. Some risk factors include; sickle cell disease, congenital and acquired heart disease, head and neck infections, systemic conditions, (e.g. inflammatory bowel disease and autoimmune disorders), head trauma or dehydration.

ADULT	PEDIATRIC (<15 years of Age) NOTE: Pediatric weight-based dosing should not exceed Adult dosing.
EMT	**EMT**
❑ Apply oxygen to maintain oxygen saturation 90 - 95%	❑ Apply oxygen to maintain oxygen saturation 90 - 95%
❑ Evaluate and Document **Cincinnati Stroke Scale (CSS)** during assessment. The scale is	❑ Evaluate and Document **Cincinnati Stroke Scale** (CSS) during assessment. The scale is

positive (a stroke is likely) if ANY of following are abnormal:

- **Facial Droop**
  - Normal: Both sides of face move equally
  - Abnormal: One side of face does not move as well as the other (or not at all)
- **Arm Drift**
  - Normal: Both arms move equally or not at all
  - Abnormal: One arm does not move, or drifts down compared to the other
- **Speech**
  - Normal: Patient uses correct words with no slurring
  - Abnormal: Slurred or inappropriate words or mute

❑ Evaluate and Document **Cincinnati Stroke Triage Assessment Tool (C-STAT)** during assessment. The scale is positive (a LVO stroke is likely) if the score is **2 or greater**:

- **2 points – Conjugate Gaze Deviation** (eyes deviated to one side and unable to track across the midline)
- **1 Point – Mental Status: Incorrectly performs *both* of the following:**
  - Tell correct age or current month
  - AND, is unable to follow at least one of two commands (e.g. close eyes, open or close hand)
- **1 Point – Weakness: Cannot hold up one arm for 10 seconds before it fall to the bed**

AEMT

❑ Advanced airway, vascular access and fluid therapy

PARAMEDIC

positive (a stroke is likely) if ANY of the following are abnormal:

- **Facial Droop**
  - Normal: Both sides of face move equally
  - Abnormal: One side of face does not move as well as the other (or not at all)
- **Arm Drift**
  - Normal: Both arms move equally or not at all
  - Abnormal: One arm does not move, or drifts down compared to the other
- **Speech**
  - Normal: Patient uses correct words with no slurring
  - Abnormal: Slurred or inappropriate words or mute

❑ Evaluate and Document **Cincinnati Stroke Triage Assessment Tool (C-STAT)** during assessment. The scale is positive (a LVO stroke is likely) if the score is **2 or greater**:

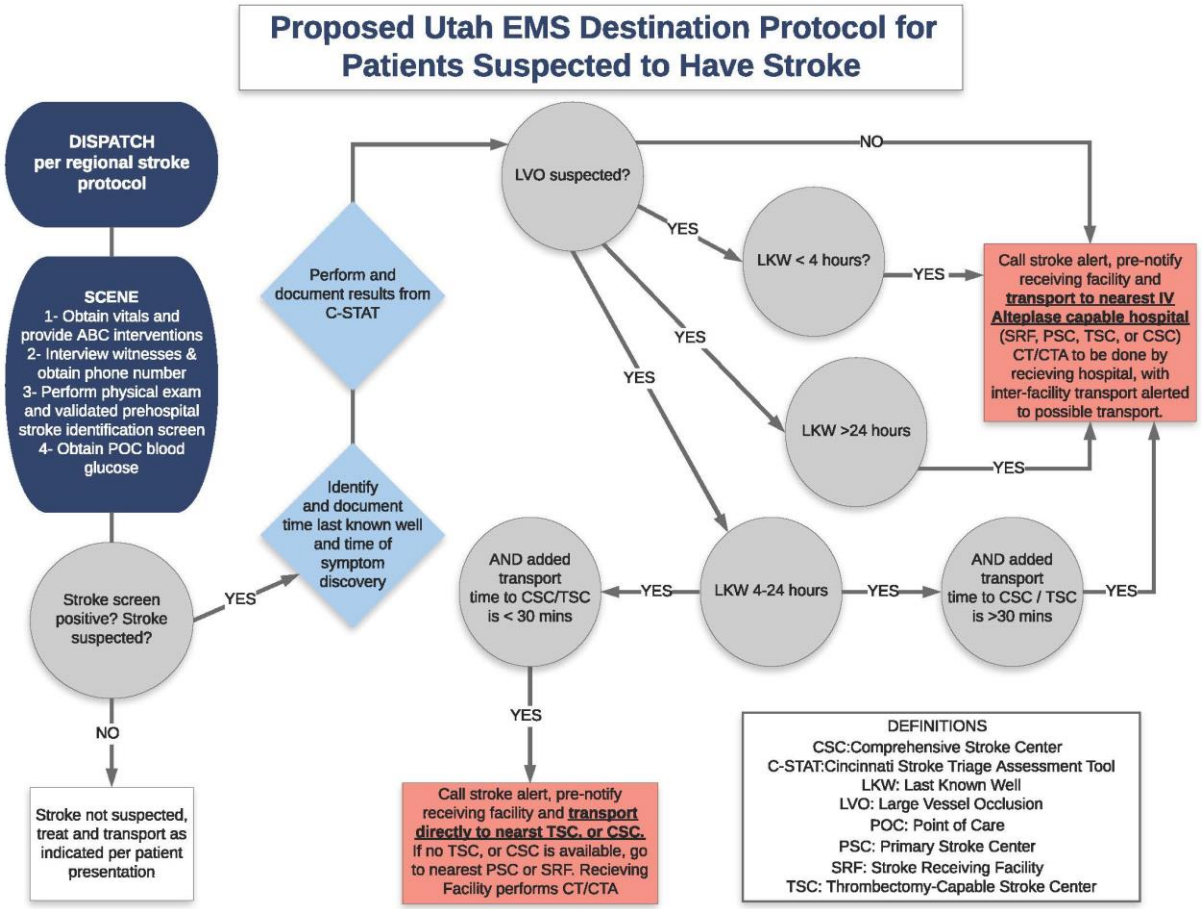
- **2 points – Conjugate Gaze Deviation** (eyes deviated to one side and unable to track across the midline)
- **1 Point – Mental Status: Incorrectly performs *both* of the following:**
  - Tell correct age or current month, if able by age and ability.
  - AND, is unable to follow at least one of two commands (e.g. close eyes, open or close hand)
- **1 Point – Weakness: Cannot hold up one arm for 10 seconds before it falls to the bed.**

AEMT

❑ Advanced airway, vascular access and fluid therapy

PARAMEDIC

Please see the graphic below regarding the Utah EMS Destination Protocol Guideline for Patients with Suspected Stroke


Proposed Utah EMS Destination Protocol for Patients Suspected to Have Stroke
DISPATCH per regional stroke protocol
SCENE
1- Obtain vitals and provide ABC interventions
2- Interview witnesses & obtain phone number
3- Perform physical exam and validated prehospital stroke identification screen
4- Obtain POC blood glucose
Stroke screen positive? Stroke suspected?
YES
NO
Stroke not suspected, treat and transport as indicated per patient presentation
Identify and document time last known well and time of symptom discovery
Perform and document results from C-STAT
LVO suspected?
NO
YES
LKW < 4 hours?
YES
Call stroke alert, pre-notify receiving facility and transport to nearest IV Alteplase capable hospital (SRF, PSC, TSC, or CSC) CT/CTA to be done by recieving hospital, with inter-facility transport alerted to possible transport.
YES
LKW >24 hours
YES
YES
AND added transport time to CSC/TSC is < 30 mins
YES
LKW 4-24 hours
YES
AND added transport time to CSC / TSC is >30 mins
YES
YES
Call stroke alert, pre-notify receiving facility and transport directly to nearst TSC, or CSC. If no TSC, or CSC is available, go to nearest PSC or SRF. Recieving Facility performs CT/CTA
DEFINITIONS
CSC:Comprehensive Stroke Center
C-STAT:Cincinnati Stroke Triage Assessment Tool
LKW: Last Known Well
LVO: Large Vessel Occlusion
POC: Point of Care
PSC: Primary Stroke Center
SRF: Stroke Receiving Facility
TSC: Thrombectomy-Capable Stroke Center

TEMPERATURE AND ENVIRONMENTAL EMERGENCIES

ALL PROVIDERS / EMT

- ❑ Scene and patient management
  - Remove patient from hot or cold environment, when possible
  - Focused history and physical exam
  - Body temperature and blood glucose assessment.
  - Assess level of consciousness; apply the ***Altered Mental Status Guideline*** if applicable.
  - Assess for underlying causes; medications, toxins, CNS lesions or other medical conditions.
- ❑ Cardiac monitor, ETCO2, and pulse oximetry monitoring when available
- ❑ **Treatment Plan**
  - **Heat Related**
    - Temperature elevation **WITHOUT** altered mental status (**Heat Exhaustion**)
      - Slow cooling with ice packs, wet towels, and/or fans to areas in the vicinity of carotid, femoral, brachial arteries.
      - If patient is alert and not nauseated, oral rehydration with water or balanced electrolyte solution.
      - Severe muscle cramps may be relieved by gentle stretching of the muscles.
    - Temperature elevation **WITH** altered mental status (**Heat Stroke**)
      - Aggressive cooling to unclothed patient utilizing fine mist water spray and fans in conjunction with ice packs to groin and axilla while maintaining modesty (NOT Recommended for children and infants)
      - Aggressive cooling should be stopped if shivering begins.
      - Monitor closely for dysrhythmia, recognize and treat with the appropriate ***Cardiac Patient Care Guideline***
    - Room temperature IV fluids should be administered for both heat exhaustion and heat stroke (AEMT and PM only)
    - Benzodiazepines may be used for shivering (AEMT and PM only)
  - **Cold Related**
    - Protect patient from further heat loss (application of blankets, removal of wet clothing, warm environment, etc.).
    - Suspicion of cardiac arrest in cold environment, assess for 30-45 seconds to confirm pulselessness.
    - Measure body temperature and treat accordingly
      - **Severe: <86°F (30°C)**
        - ➢ Use active external rewarming (heated oxygen, warm packs to neck, armpits, groin, etc.)
        - ➢ Administer warm IV fluids (AEMT/PM only)
        - ➢ Cardiac arrest: Chest compressions and ventilations. Limit defibrillation attempts to 3 and no external pacing. Likelihood of successful defibrillation improves as patient is warmed.
        - ➢ Pediatric cardiac arrest due to hypothermia (temperature <30 C/86 F): consider direct transport to Primary Children's Medical Center for ECMO and **do NOT rewarm** this patient.
        - ➢ Adult cardiac arrest due to hypothermia (temperature <30 C/86 F): consider direct transport to University of Utah Medical Center or Intermountain Medical Center for ECMO and **do NOT rewarm** this patient.
        - ➢ Handle the patient gently during transport because rough movement may precipitate dysrhythmias.
      - **Moderate: 86-93°F (30-34°C)**
        - ➢ Use warm packs to neck, armpits, and groin
        - ➢ Warm IV fluids (AEMT/PM only)
      - **Mild: >93°F (34°C)**

- Warm with blankets, warm environment, etc.
- Frostbite precautions – Do not rub or use dry external heat. Re-warm with 40°C water if possible.
- Warm IV fluids (AEMT/PM only)

❑ **Key Considerations**

- Avoid refreezing of cold extremities. If refreezing cannot definitely be avoided during transport, do not start the thawing process.

ADULT

AEMT

❑ Advanced airway, vascular access and fluid therapy

Heat Emergencies

- Cool fluid therapy: 500 – 1000 cc NS bolus
- Benzodiazepines for shivering:
  - **Midazolam**
    - **IN/IM/IV/IO – 5 mg**, may repeat once in 5 minutes, if needed. Total max dose: 10mg
  - **Diazepam**
    - **IV/IO – 5 mg,** may repeat every 5 minutes, if needed. Total max dose: 20mg
    - **Intramuscular (IM) – 10 mg,** may repeat once in 10 minutes, if needed. Total max dose: 20 mg (IM not preferred unless no other options)
  - **Lorazepam**
    - **IV/IO/IM – 1-2mg, may repeat** every 5 minutes, if needed. Total max dose: 4mg

Cold Emergencies

- Warm fluid therapy: 500 – 1000 cc NS bolus

PARAMEDIC

❑ **Cold emergencies**

- Withhold anti-arrhythmic meds until temperature >86°F (30°C)

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

❑ Advanced airway, vascular access and fluid therapy

Heat Emergencies

- Cool fluid therapy: 20 ml/kg IV bolus
- Benzodiazepines for shivering:
  - **Midazolam**
    - **IN/IM: 0.2 mg/kg** (max 5 mg), may repeat once in 5 minutes, if needed. Total max dose: 10 mg
    - **IV/IO - 0.1 mg/kg** (max 5 mg), may repeat once in 5 minutes, if needed. Total max dose: 10 mg
  - **Diazepam**
    - **IV/IO - 0.1 mg/kg** (max 5 mg), may repeat every 5 minutes, if needed. Total max dose: 10 mg
    - **Intramuscular (IM): 0.2 mg/kg** (max 10 mg), may repeat every 10 minutes, if needed. Total max dose: 20 mg (IM not preferred unless no other options)
  - **Lorazepam**
    - **IV/IO/IM – 0.1mg/kg** (max 2 mg), may repeat every 5 minutes, if needed. Total max dose: 4 mg.

Cold Emergencies

- Warm fluid therapy: 20 cc/kg NS bolus

PARAMEDIC

❑ **Cold emergencies**

- Withhold anti-arrhythmic meds until temperature >86°F (30°C)

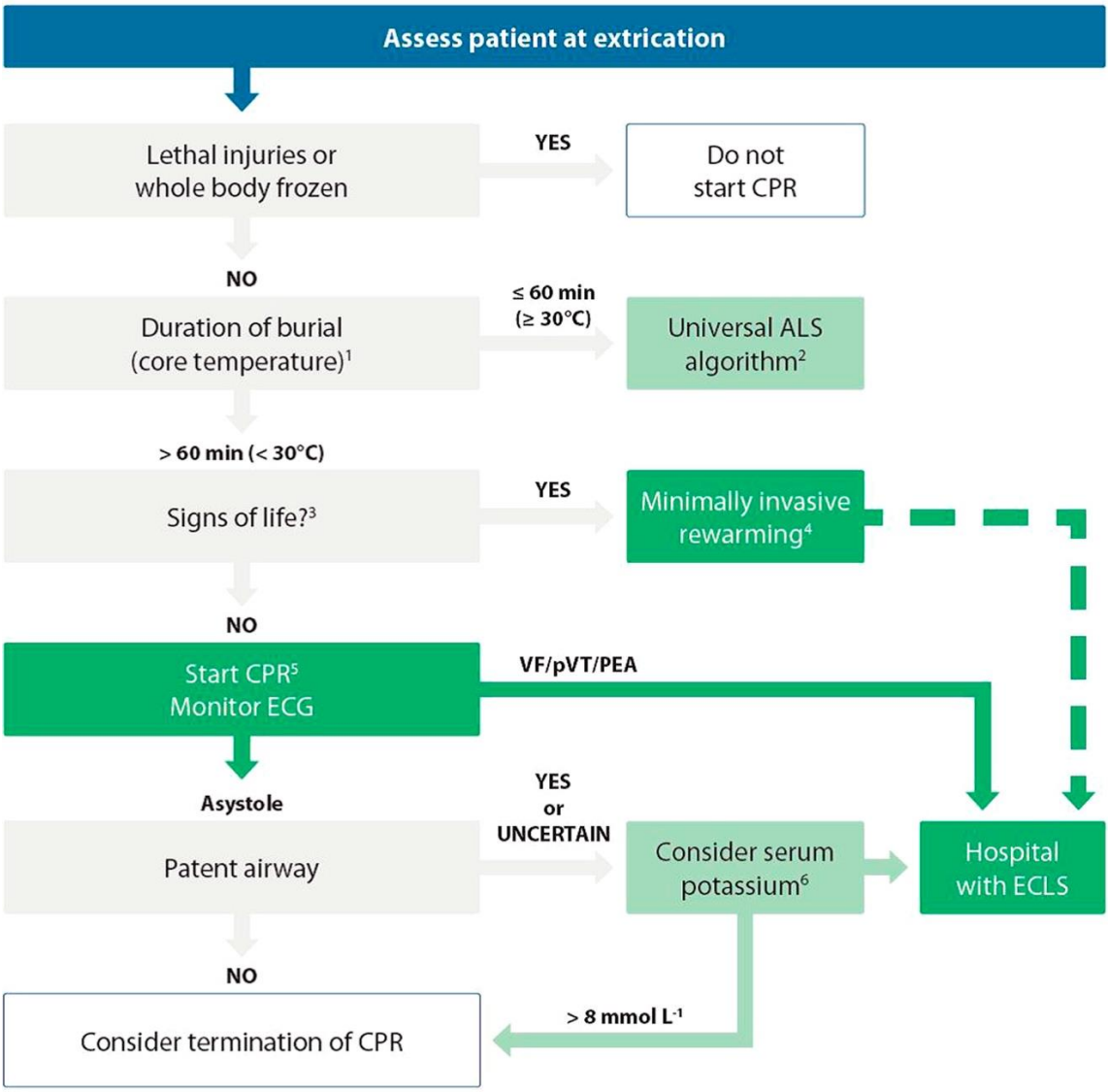
Avalanche Patient Care Guidelines

These guidelines were created to provide direction for each level of certified provider in caring for avalanche patients. All of these directions, dosages and provisions are subject to change with a later notice or revision of the guidelines. The OLMC physician will always be the final word on treatment in the field. If there are ever any discrepancies between the guidelines and the OLMC physician these should be documented and brought to the attention of the physician at the receiving hospital. If the explanation is not sufficient, the provider should bring the issue to their medical director or the BEMSP for review.

General Approach to the Avalanche Patient Care Guidelines

- Use of standard trauma or medical triage algorithms can lead to the under-resuscitation and under-transportation of avalanche victims.
- Assess scene safety prior to entering scene or initiating care
- Destination decisions should be in accordance with the ***Utah Avalanche Triage Guideline***
- Early notification allows the receiving physician to activate the receiving hospital's trauma alert and/or Extracorporeal Life Support (ECLS) alert system
- Providers should assess for and describe: vital signs (including GCS/AVPU), injuries, mechanism of injury and any complicating factors that will affect treatment (as per the Utah Trauma Field Triage Guidelines) so that the hospital may activate the appropriate level of ECLS and/or trauma response.
- Consider air transport for patient who meet ECLS criteria or critically injured patients with long transport times to a trauma center (over 60 minutes).
- Consider delivery to the nearest hospital if your patient is unstable for a prolonged transport or the patient has a compromised airway that you cannot secure.
- Consider that more than one guideline may apply.
- If conflicts arise between treatment guidelines, contact OLMC for clarification.
- Providers may provide treatment up to the level of their certification only.
- Air Medical Transport Service personnel function under their own clinical guidelines.
- Contact your receiving hospitals and OLMC as soon as clinically possible for each patient.
- OLMC with a physician may change your treatment plan.
- Any variations to a guideline by the OLMC physician should be clarified to ensure that the provider has properly characterized the situation.
- The OLMC Physician has the final word on treatment once contact is made.
- The OLMC Physician must approve usage of dosages in excess of the guidelines.

Utah Avalanche Triage Guideline



1. Core temperature may substitute if duration of burial is unknown
2. Transport patients with injuries or potential complications (e.g. pulmonary oedema) to the most appropriate hospital
3. Check for spontaneous breathing and pulse for up to 1 min
4. Transport patients with cardiovascular instability or core temperature < 28°C to a hospital with ECLS (extracorporeal life support)
5. Withold CPR if risk to the rescue team is unacceptably high
6. Crush injuries and depolarising neuromuscular blocking drugs may elevate serum potassium

Reference: Wilderness Environ Med. 2017 Mar; 28(1): 23-42.

AVALANCHE VICTIM MANAGEMENT

ALL PROVIDERS/EMT

- ❑ Scene and patient management
  - Assess scene safety including specific risk of further avalanche activity before accessing patient
  - Calculate Burial Time
  - Initiate care as soon as head and upper body are exposed
- ❑ Continuous cardiac monitoring, ETCO2, and pulse oximetry, when available
- ❑ **Treatment Plan**
  - Assess airway patency, and clear airway if applicable
  - Assess for evidence that resuscitation should not be attempted per the ***Death Determination Guideline*** and/or if whole body frozen, decapitation, or hemicorpectomy have occurred.
    - **Note: that contrary to *General Trauma Management Guidelines,* care should still be initiated in apneic, pulseless patients.**
  - Assess for presence of pulse, respirations, and consciousness. If absent, initiate chest compressions and CPR per ***Cardiac Arrest Guideline.***
  - Focused history and physical exam
  - Assess risk of cervical spine injury per ***Selective Spinal Immobilization Guideline*** (Note that most avalanches are a high-risk mechanism)
  - Obtain core temperature as soon as possible
- ❑ **Key Considerations**
  - Scene times should be as short as possible for ECLS candidate patients and any severely injured trauma patient (Goal: 10 minutes). Perform required procedures en-route to the ECLS or trauma center
  - Patients in cardiac arrest with core temperature <30°C (86°F), burial time > 60 minutes, AND patent airway at extraction should be preferentially transported to an ECLS facility, as per the ***Utah Avalanche Triage Guideline***
  - Otherwise, severely injured trauma patients should be preferentially transported to a trauma center, as per the ***Utah Trauma Field Triage Guideline***
  - Treat hypothermia per the ***Temperature and Environmental Emergencies Guideline***
  - Consider prolonged CPR (>30 minutes) until the patient is rewarmed to a core temperature ≥30°C
  - Withhold or terminate CPR if risk to the rescue team is unacceptably high

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
- ✆ **Contact OLMC before terminating resuscitative efforts in the field**

PARAMEDIC

- ❑ May consider endotracheal intubation

ALTITUDE RELATED ILLNESSES

ALL PROVIDERS/EMT

- ❑ Focused history and physical exam
  - Determine history of symptoms in relation to exposure to high altitude, rate of ascent, prior altitude illness, rapidity of symptom onset.
  - Determine the need to treat under ***Congestive Heart Failure/Pulmonary Edema Guideline*** and/or ***Respiratory Distress Guideline.***
  - Assess oxygen saturation, blood glucose, and temperature.
- ❑ Continuous cardiac monitoring, ETCO2, and pulse oximetry, when available
- ❑ Consider 12 lead ECG
- ❑ **Treatment Plan**
  - Provide supplemental oxygen to maintain peripheral oxygen saturation >90%.
  - **Acute Mountain Sickness (AMS):**
    - Sx: Headache + (one or all of the following) insomnia, anorexia, nausea, fatigue.
    - Descent of 1000-3300 feet may improve symptoms, but not required if symptoms are mild and no evidence of HAPE or HACE (see below)
    - Ondansetron for vomiting, acetaminophen or ibuprofen for headache.
    - 20 mL/kg NS bolus
  - **High Altitude Pulmonary Edema (HAPE):**
    - Sx: dyspnea, cough.
    - Descent recommended, at least 3300 feet or until symptoms improve.
    - O2 supplementation. Non-Rebreather preferred, nasal cannula if vomiting
    - Use positive pressure ventilation (CPAP) if available and no contraindications.
    - DO NOT give diuretics.
    - Airway management as indicated.
  - **High Altitude Cerebral Edema (HACE):**
    - Sx: ataxia, confusion, neuro deficits, seizure, coma, and headache.
    - Descent required.
    - Elevate head of bed.
    - Assess the need for airway protection.
- ❑ Key Considerations
  - Altitude related illness is most commonly seen in patients who ascended to above 8000 feet above sea level without appropriate acclimatization, and unlikely in patients at altitudes below 6500 feet above sea level.
  - Maintain a high level of suspicion for acute exacerbation of chronic medical conditions and non-altitude related illnesses.
  - HACE is rare at elevations in Utah. If AMS at high altitude, follow guidelines above, but consider all differential diagnoses for altered mental status.

AEMT

- ❑ Advanced airway, CPAP, vascular access and fluid therapy
- ❑ Ondansetron 4mg PO/IV for nausea/vomiting
- ✆ **Contact OLMC before terminating resuscitative efforts in the field**

PARAMEDIC

❑ May consider endotracheal intubation

TOXIC EXPOSURE - CARBON MONOXIDE

ALL PROVIDERS / EMT

❑ Scene and patient management
- Safely and rapidly remove patient from source of exposure.
- Collect environmental CO levels if equipment is available.

❑ Focused history and physical exam
- Estimation of exposure time.
- Pulse oximetry readings are unreliable in carbon monoxide exposures

❑ Cardiac monitor and ETCO2, when available

❑ **Treatment Plan**
- Administer 100% high-flow oxygen via non-rebreather mask.
- Any exposure to carbon monoxide related to a closed space fire (such as a house fire) often also results in cyanide exposure.

❑ **Key Considerations**
- Patients with symptoms of headache, nausea, tachycardia, neurologic changes, or a CO monitor reading >10% should be transported.
- Pregnant patients: the fetus is very sensitive to even low levels of CO. All pregnant patients exposed to CO should be transported, regardless of the symptoms or the CO level.

ADULT

AEMT

❑ Advanced airway management, vascular access and fluid therapy

❑ **Closed Space Fires: Consider hydroxocobalamin 5 g** (contained in a single vial), administered by IV/IO infusion over 15 minutes (approximately 15 mL/min)

PARAMEDIC

❑ **Epinephrine 2–10 mcg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg.

❑ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP >100 mmHg after fluid bolus

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

❑ Advanced airway management, vascular access and fluid therapy

❑ **Closed Space Fires: hydroxocobalamin 70mg/kg** over 15 minutes IV/IO (approximately 15ml/min) not to exceed a max dose of 5 grams under direction of OLMC or Poison Control

PARAMEDIC

❑ **Epinephrine 0.1–2 mcg/kg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg.

✓ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP>70 + (age in years x 2) mmHg after fluid bolus

TOXIC EXPOSURE - CYANIDE

ALL PROVIDERS / EMT

- ❑ Scene Management
  - If properly trained and equipped, safely and rapidly remove patient from the source of exposure.
  - Request HazMat response as appropriate.
  - Industries in which to consider cyanide exposure:
    - Electroplating and Metallurgy
    - Organic chemicals production
    - Photographic developing
    - Manufacture of plastics
    - Fumigation of ships
    - Some mining processes especially gold/copper
  - Patients and EMS providers may be exposed to cyanide in the following ways;
    - Breathing air, drinking water, touching soil, or eating foods that contain cyanide.
    - Breathing smoke during closed-space fires.
    - Breathing air near a hazardous waste site containing cyanide.
    - Eating foods naturally containing cyanide compounds, such as tapioca, lima beans, apricot seeds and almonds. However, the portions eaten in the United States contain relatively low amounts of cyanide.
- ❑ Focused history and physical exam
  - Be alert for exposure related signs and symptoms;
    - Acute dyspnea/tachypnea without cyanosis
    - Nausea/vomiting
    - Seizures
    - Hyper or hypotension
    - Total body erythema (redness)
    - Cardiac monitor, ETCO2, and Pulse Oximetry monitoring when available
- ❑ **Treatment Plan**
  - Administer high flow oxygen immediately and continuously
  - Pulse oximetry readings may not be accurate because of cyanide interaction
  - Cardiac monitor and ETCO2, when available

ADULT

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
- ❑ **Hydroxocobalamin (CYANOKIT®) for adults is 5 g** (contained in a single vial), administered by IV/IO infusion over 15 minutes (approximately 15 mL/min)

PARAMEDIC

- ❑ **Epinephrine 2–10 mcg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg.
- ❑ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP >100 mmHg after fluid bolus

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
- ✆ **Hydroxocobalamin (CYANOKIT®)** can be used in children. Administer **70mg/kg** over 15 minutes IV/IO (approximately 15ml/min) not to exceed a max dose of 5 grams under direction of OLMC or Poison Control

PARAMEDIC

- ❑ **Epinephrine 0.1–2 mcg/kg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg.

✆ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP>70 + (age in years x 2) mmHg after fluid bolus

TOXIC EXPOSURE - HYDROFLUORIC ACID

ALL PROVIDERS / EMT

- ❑ Scene Management
  - Industrial Exposures in which to consider hydrofluoric acid
    - Aluminum processing
    - Chemical plants
    - Construction – waste products
    - Creation of chlorofluorohydrocarbons for refrigerants, aerosols, foams, plastics, and specialty solvents
    - Dry Cleaning Spotting Solutions
    - Electroplating
    - Foundry cast sand removal
    - Glass etching or cleaning
    - Meat packing industry
    - Petroleum refineries for high octane gasoline
    - Semiconductor silicon etching or cleaning
    - Stainless steel "pickling"
    - Stone etching or polishing
    - Uranium processing
- ❑ Focused history and physical exam
- ❑ Cardiac monitor, ETCO2, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan**
  - **Skin Exposure**
    - Immediate irrigation. Clothing, jewelry etc., is removed as irrigation is taking place.
    - Soak burned skin in magnesium hydroxide antacid preparations (milk of magnesia, Mylanta, Maalox).
    - **Calcium Gluconate Gel** for application – Mix 25mL of 10% Calcium Gluconate in 75mL of a sterile water-soluble lubricant. Apply topically or if hand exposure possibly in a glove
  - **Eye Exposure**
    - Continuous rinsing for a minimum of 15 minutes or until a calcium ocular solution is available.
  - **Oral ingestion** – conscious/alert patient only – (OG Tube is recommended for the pediatric patient.)
    - If patient is able to swallow, administer any calcium or magnesium based antacid (milk of magnesia, Mylanta, Maalox). In the absence of these products, have patient drink approximately 8-16 oz. of water. Consult OLMC for questions.

ADULT

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
- ❑ **Calcium Gluconate Gel** for application – Mix 25mL of 10% Calcium Gluconate in 75mL of a sterile water-soluble lubricant. Apply topically or if hand exposure possibly in a glove

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Advanced airway, vascular access and fluid therapy
- ❑ **Calcium Gluconate Gel** for application – Mix 25mL of 10% Calcium Gluconate in 75mL of a sterile water-soluble lubricant. Apply topically or if hand exposure possibly in a glove

PARAMEDIC PARAMEDIC

TOXIC EXPOSURE - ORGANOPHOSPHATES / NERVE AGENTS

ALL PROVIDERS

- ❑ Scene management
  - If properly trained and equipped, safely and rapidly remove patient from the source of exposure.
  - Request HazMat response as appropriate
  - Be aware of exposure Level
    - Mild – miosis (constricted pupils) only or no symptoms
    - Moderate – Other "S.L.U.D.G.E.M." symptoms
    - Severe – Unconscious, in respiratory distress, seizing, flaccid or apneic
- ❑ Focused history and physical exam.
  - Assess for "S.L.U.D.G.E.M." presentation (Salivation, Lacrimation, Urination, Defecation, Gastrointestinal cramping, Emesis and Miosis).
- ❑ Cardiac monitor, CO2, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan**
  - Irrigate immediately
  - Remove clothing, jewelry etc. as irrigation is taking place
- ❑ **Key Considerations**
  - Always protect yourself from exposure before entering a treatment zone.
  - Nerve agents, organophosphates and carbamates are the general categories of these toxic substances.
  - These agents may be used in fertilizers or as pesticides, herbicides, fungicides, fire retardants, or biowarfare agents.

ADULT	PEDIATRIC (<15 years of Age) NOTE: Pediatric weight based dosing should not exceed Adult dosing.
EMT	**EMT**
❑ **Atropine/Pralidoxime kits** (Mark I, Duodote, etc.) • Mild Exposure with no symptoms may require no treatment • Moderate Exposure with evidence of SLUDGEM give 1-2 Kits • Severe Exposure with respiratory distress and SLUDGEM give 3 Kits	✆ Contact OLMC or Poison Control for instructions
AEMT **PARAMEDIC**	**AEMT** **PARAMEDIC**

❑ **Atropine sulfate 2 mg** rapid IV (preferred) or IM repeated every 10 minutes until you have:
- Control of bronchorrhea (excessive watery sputum)
- Control of bronchoconstriction, (as reflected by level of oxygenation and ease of ventilation)
- Reversed dangerous bradyarrhythmias or AV-blocks

✆ Contact OLMC or Poison Control for instructions

VIOLENT PATIENT / CHEMICAL SEDATION / TASER BARB REMOVAL

ALL PROVIDERS

- ❑ **Scene management**
  - Contact Law Enforcement if the patient is determined to be a threat to EMS providers, themselves, or others or if assistance with patient control is otherwise needed.
  - Remove patient from the stressful environment and remove any possible weapons from scene.
  - Before touching any patient that has been Taser'd, ensure law enforcement has disconnected the wires from the hand-held unit.
- ❑ Focused history and physical exam
  - Blood glucose, temperature and oxygen saturation assessment.
  - Always assess for a possible medical condition, exposure or trauma including possible abuse.
  - Note medications/substances on scene that may contribute to the agitation, or may be for treatment of a relevant medical condition
- ❑ Cardiac monitor, ETCO2, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan**
  - **Taser'd patient:** Removal of Taser probes
    - EMS providers may remove probes that are not embedded in the face, neck, groin, breast, or spinal area.
    - To remove probes:
      - Place one hand on the patient in the area where the probe is embedded and stabilize the skin surrounding the puncture site. Place other hand firmly around the probe.
      - In one fluid motion, pull the probe straight out from the puncture site and repeat procedure with second probe.
      - The following patients should be transported to an Emergency Department for evaluation:
        - Patient with probes embedded in the face, neck, groin, breast, or spinal area
        - Patient with significant cardiac history
        - Patient having ingested stimulants (including methamphetamines, phencyclidine/PCP, cocaine, spice, bath salts, designer drugs, etc).
        - Patients exhibiting bizarre behavior or those with abnormal vital signs
- ❑ **Key Considerations**
  - Chemical sedation should be considered for patients that cannot be calmed by non-pharmacologic methods and who are a danger to EMS providers, themselves, or others.
  - Selection of chemical restraint medications should be based upon the patient's clinical condition, current medications, and allergies. Consult OLMC when necessary to assist in the selection of medications in difficult cases.
  - Generally speaking, it is preferable to choose ONE drug for management of agitation and maximize dosing of that medication prior to adding another medication.
  - Consider a reduction in the initial dosage of chemical restraint medications if the patient has taken narcotics or alcohol (e.g. begin with 50% of the recommended initial dose to assess response).

The order in which medications below are listed is not intended to indicate hierarchy, order, or preference of administration

ADULT

EMT

❑ Attempt to calm or gently restrain the patient with verbal reassurance. Engage the assistance of any family or significant others in the process.

AEMT

❑ Vascular access and fluid therapy

❑ **Midazolam**
- **IV/IO – 5 mg,** may repeat once in 10 minutes, if needed. Total max dose: 10mg
- **Intranasal (IN) – 5 mg,** may repeat once in 10 minutes to a max dose of 10mg
- **Intramuscular (IM) – 10 mg** once

❑ **Diazepam**
- **IV/IO** – **5 mg** every 10 min to the desired effect or max dosage of 20 mg
- **Intramuscular (IM)** – **10 mg** once (IM not preferred, unless no other options)

❑ **Lorazepam**
- **IV/IO – 2 mg** every 5 min. to the desired effect or max dose of 4 mg
- **Intramuscular (IM) – 4 mg** once

✆ Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters.

PARAMEDIC

❑ **Ketamine**
- **Intramuscular (IM) – 4 mg/kg** once (max 300 mg)
- **IV/IO – 1 mg/kg** every 10 min to the desired effect (max dose 200 mg)

❑ **Haloperidol**
- **Intramuscular (IM) - 5-10mg** once
- **IV/IO – 2-5 mg** every 10 min to the desired effect (max dose 10 mg)

✆ Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters.

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT

❑ Attempt to calm or gently restrain the patient with verbal reassurance. Engage the assistance of any family or significant other's in the process.

AEMT

❑ Vascular access and fluid therapy

❑ **Midazolam**
- **IV/IO - 0.1 mg/kg** (max 5 mg), may repeat once in 10 minutes, if needed. Total max dose: 10 mg
- **IN/IM - 0.2 mg/kg (max** 5 mg), may repeat once in 10 minutes, if needed. Total max dose: 10 mg

❑ **Diazepam**
- **IV/IO - 0.1 mg/kg** (max 5 mg), may repeat once in 10 minutes, if needed. Total max dose: 10 mg
- **Intramuscular (IM) – 0.2 mg/kg** (max 10 mg) once (IM not preferred unless no other options)

❑ **Lorazepam**
- **IV/IO – 0.05 mg/kg** (max 2 mg), may repeat once in 10 minutes, if needed. Total max dose: 4 mg
- **Intramuscular (IM) – 0.05 mg/kg** (max 4 mg) once

✆ Contact OLMC for dosages above those provided or use of medication NOT fitting the guideline parameters.

PARAMEDIC

✆ Contact OLMC for consultation prior to giving ketamine or haloperidol to children

❑ **Ketamine**
- **Intramuscular (IM) – 3 mg/kg** once (max 300 mg)
- **IV/IO – 1 mg/kg** once (max dose 200 mg)

❑ **Haloperidol**
- <6 years old – NOT recommended
- 6-12 years old: **0.15 mg/kg IM (max 3 mg)** once
- 12 years and older: **5-10mg IM** once

Trauma Patient Care Guidelines

These guidelines were created to provide direction for each level of certified provider in caring for trauma patients. All of these directions, dosages, and provisions are subject to change with later notice or revision of the guidelines. The OLMC physician will always be the final word on treatment in the field. If there are ever any discrepancies between the guidelines and the OLMC physician these should be documented and brought to the attention of the physician at the receiving hospital. If the explanation is not sufficient, the provider should bring the issue to their medical director or the BEMSP for review.

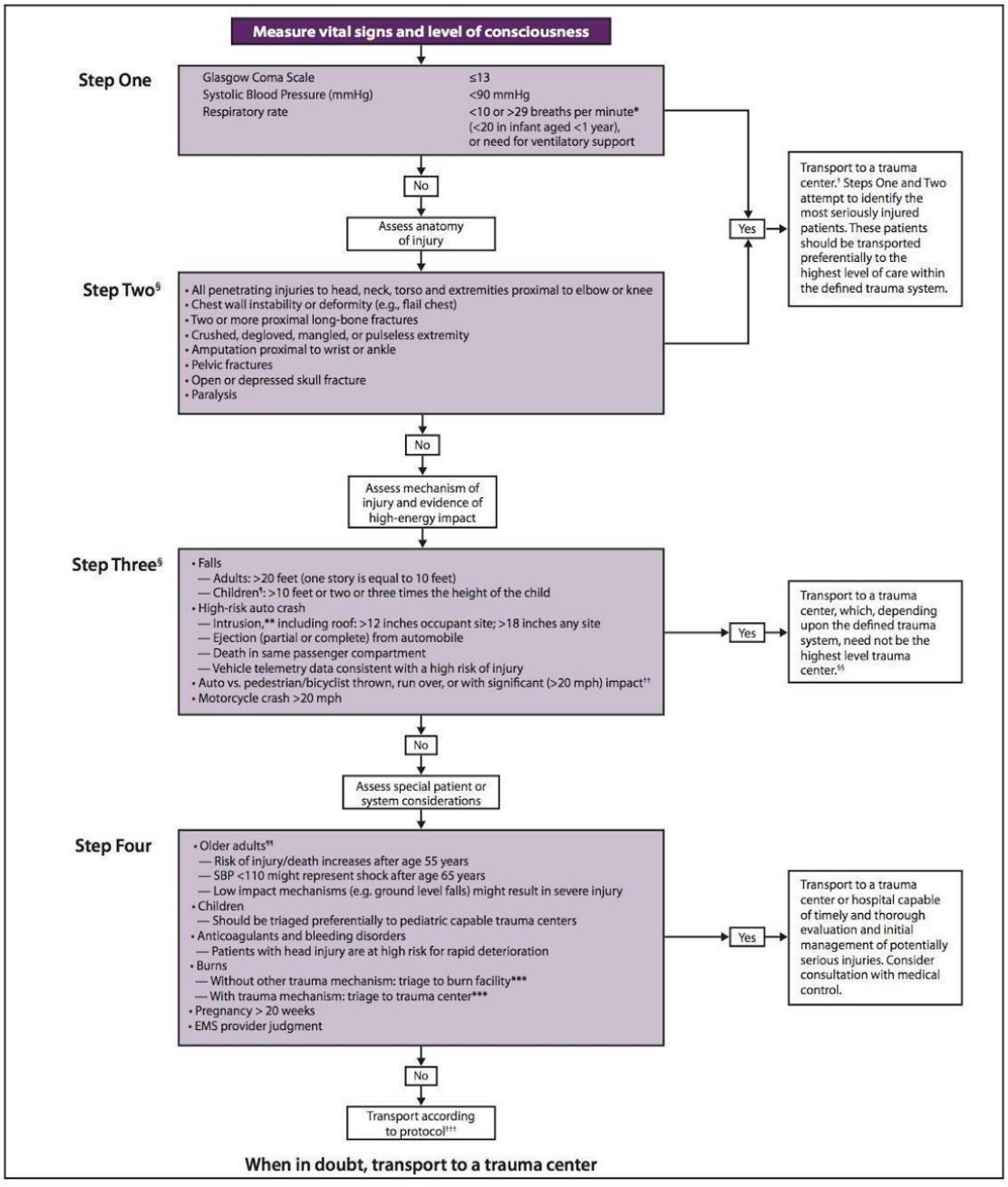
General Approach to Trauma Patient Care Guidelines

- Assess your patient prior to initiating a guideline.
- Destination decisions for trauma patients should be in accordance with the ***Utah Trauma Field Triage Guidelines***.
- Early notification allows the receiving physician to activate the receiving hospital's trauma alert system.
- Providers should describe: vital signs, including GCS/AVPU, injuries, mechanism of injury and any complicating factors that will affect treatment (as per the ***Utah Trauma Field Triage Guidelines***) so that the hospital may activate the appropriate level of trauma response.
- Consider air transport for critically injured patients with long transport times to a trauma center (over (60 minutes).
- Consider delivery to the nearest hospital if your patient is *too* unstable for a prolonged transport or the patient has a compromised airway that you cannot secure.
- More than one guideline may apply.
- If conflicts arise between treatment guidelines, contact OLMC for clarification.
- Providers may provide treatment up to the level of their certification only.
- Air Medical Transport Service personnel function under their own clinical guidelines.
- Contact your receiving hospitals and OLMC as soon as clinically possible for each patient.
- OLMC with a physician may change your treatment plan.
- Any variations to a guideline by the OLMC physician should be clarified to ensure that the provider has properly characterized the situation.
- The OLMC Physician has the final word on treatment once contact is made.
- The OLMC Physician must approve usage of dosages in excess of the guidelines.

General Pediatric Considerations

- Pediatric reference tape-based dosing is preferred over calculated doses for infants and children.
- Pediatric lowest acceptable systolic blood pressures are: birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg. These are the blood pressures to use for Pediatrics (<15 years old) under step one of the Utah Trauma Field Triage Guidelines.

Utah Trauma Field Triage Guidelines



Reference: MMWR, January 13, 2012, Vol. 61 No. 1. 4/25/2012

Utah Trauma System Advisory Committee

Guidelines for Transport of Trauma Patients to Freestanding Emergency Departments

The following types of patients are NOT candidates for transport to a freestanding ED (FSED):

1. Critically-injured patients with unstable vital signs or other life-threatening conditions UNLESS the patient's airway is not maintainable with EMS advanced or basic airway management techniques and the FSED is the closest ED
2. Traumatic cardiac arrest patients
3. Patients meeting Steps 1-3 criteria of the Utah Trauma Field Triage Guidelines.
4. Patients with head injuries who are over 65 years old OR who are taking anticoagulants
5. Patients with angulated long bone fractures
6. Patients with suspected open fractures or dislocations
7. EMS provider judgement

These guidelines may be modified during a disaster situation

GENERAL TRAUMA MANAGEMENT

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
- ❑ Continuous cardiac monitoring, ETCO2, and pulse oximetry, when available
- ❑ **Treatment Plan**
- ❑ **Primary Survey:**
  - Hemorrhage Control: Assess for and stop severe hemorrhage
  - Airway:
    - Assess airway patency, ask patient to talk to assess stridor and ease of air movement
    - Evaluate for injuries that may lead to airway obstruction including unstable facial fractures, expanding neck hematoma, blood or vomitus in the airway, facial burns/inhalation injury
    - Evaluate mental status for ability to protect airway (AVPU="P" or "U" or GCS <8). These patients will require airway protection.
    - Establish a patent airway (with cervical spine precautions)
  - Breathing:
    - Assess respiratory rate and pattern, symmetry of chest wall movement, and presence of breath sounds bilaterally
    - If chest injury present in a hypotensive patient, consider tension pneumothorax
      - Needle Thoracostomy: The 5th intercostal space at the anterior axillary line is the preferred location for needle thoracostomy placement
      - If placing at the 5th ICS at the anterior axillary line, a 5 cm catheter should be the maximum length used to minimize risk of injury to vital structures
      - Minimum catheter length should be 5 cm (and 8 cm may be necessary) for 2nd ICS/mid-clavicular line needle thoracostomy placement
    - For open chest wound, place an occlusive dressing sealed on 3 sides
  - Circulation:
    - Assess vital signs / check for radial pulse
    - If pelvis is unstable (based on lateral compression), place pelvic binder to stabilize pelvis
  - Disability (quick neurologic evaluation)
    - Assess pupils, motor movement of extremities, and mental status (AVPU)
  - Exposure/Environment:
    - Rapid evaluation of entire body (including back) to assess for injuries
    - Prevent hypothermia by removing wet clothing, providing passive rewarming, and use of warmed IV fluids (if fluids indicated)
  - Treat for pain and anxiety per the ***Pain and Anxiety Management Guideline***.
- ❑ **Key Considerations**
  - Scene times should be as short as possible for severely injured patients (Goal: 10 minutes). Perform required procedures enroute to the trauma center.
  - Severely injured trauma patients should be preferentially transported to a state-certified trauma center, as per the ***Field Trauma Triage Guideline.***
  - **Withholding and termination of resuscitative efforts**
    - Resuscitative efforts should be withheld for trauma patients with the following:
      - Decapitation
      - Hemicorpectomy
      - Signs of rigor mortis or dependent lividity

        - Blunt trauma patients who are apneic, pulseless, and have no organized activity on the cardiac monitor
    - Resuscitative efforts may be terminated in patients with traumatic arrest who have no return to spontaneous circulation after 15-30 minutes of resuscitative efforts, including CPR
- Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT	PEDIATRIC (<15 years of Age) NOTE: Pediatric weight based dosing should not exceed Adult dosing.
AEMT	**AEMT**
❑ Vascular access and begin fluid therapy	❑ Vascular access and begin fluid therapy
❑ **Suspected Tension Pneumothorax:** Evidence of chest trauma + hypotension: • Immediate needle decompression of affected side	❑ **Suspected Tension Pneumothorax:** Evidence of chest trauma + hypotension: • Immediate needle decompression of affected side
❑ **Traumatic Arrest** • Consider bilateral needle decompression based on mechanism of injury	❑ **Traumatic Arrest** • Consider bilateral needle decompression based on mechanism of injury
PARAMEDIC	**PARAMEDIC**

AMPUTATIONS / TOOTH AVULSIONS

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
- ❑ Cardiac monitor, ETCO2, and pulse oximetry monitoring, when available
- ❑ **Treatment Plan**
  - Maintain airway, apply oxygen as needed to maintain SaO2 90-94%.
  - Unless this is an isolated injury, consider spinal motion restriction per the ***Spinal Motion Restriction Guideline.***
  - Treat for pain and anxiety per the ***Pain and Anxiety Management Guideline***.
  - Monitor closely for signs of shock, especially in amputations above the wrist or ankle.
- ❑ **Amputated Body Parts and/or Tissue**
  - Apply direct pressure to control hemorrhage. A tourniquet is frequently required to control hemorrhage from amputation or near-amputation, when direct pressure is ineffective or impractical.
    - If amputation is incomplete, cover stump with sterile dressing saturated in NS, splint affected digit or limb in baseline physiologic position.
    - All easily retrievable tissue should be transported.
    - Rinse part(s) with NS.
    - Wrap tissue in sterile gauze moistened with NS.
    - Place tissue into plastic bag or container.
    - Place bag/container into separate container filled with ice (if available)
    - Do not allow tissue to come into direct contact with ice, do not freeze, and do not submerge in water.
- ❑ **Tooth Avulsion**
  - If tooth is out over 30 minutes, broken, or cannot be re-implanted on scene.
    - Handle tooth by chewing surface only (avoid touching the root).
    - Rinse with water. Do not scrub, dry, or wrap tooth in tissue or cloth.
    - Place tooth in container of (**in order of preference**)
      - Patient's saliva (place in patient's mouth, if patient awake and alert)
      - Alternatively, it may be placed in a container with milk or normal saline
    - If tooth is out less than 30 min, you may attempt re-Implantation (only **permanent** teeth) on scene (primary or "baby" teeth should not be re-implanted).
      - Do not try to re-implant if more than 2 teeth are involved.
      - The tooth must be cleanly avulsed with the entire root present.
      - Only re-implant if it is one of the front 6 upper or lower teeth.
      - Patient must be conscious and cooperative.
      - Gently insert tooth back into the appropriate location without forcing it. Do not worry about positioning well.
- ❑ **Key Considerations**
  - Consider transportation of extremity amputation patients directly to a trauma center.

ADULT

AEMT

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

❑ Advanced airway, vascular access and fluid therapy

PARAMEDIC

❑ Advanced airway, vascular access and fluid therapy

PARAMEDIC

BURNS – THERMAL / ELECTRICAL / LIGHTNING

ALL PROVIDERS / EMT

❑ Scene and patient management
- Thermal Burns
  - Stop the burning process.
  - Do not pull material out of the wound but cut clothing around it.
- Electrical Burns
  - Safely evacuate patient from electrical source.
  - Do not touch the patient until you are sure that the electrical source is disconnected.
  - When multiple patients are struck simultaneously by lightning or a high voltage source, those in respiratory and/or cardiac arrest should be given the highest priority of care, even those who appear dead on initial evaluation. These patients may be in ventricular fibrillation and resuscitated with CPR and defibrillation.

❑ Focused history and physical exam
- Identify potential entry and exit wounds for electrical burns – both sites will generally be a full thickness burn site.

❑ Cardiac monitor, ETCO2, and pulse oximetry monitoring, when available. Avoid placing monitor attachments over burned skin if possible.

❑ **Treatment Plan**
- Initiate early oxygen therapy with high flow O2.
- In the unconscious patient, implement spinal motion restriction per the ***Spinal Motion Restriction Guideline***
- If patient is in shock, fluid resuscitation as per ***Shock and Fluid Therapy Guideline*** (AEMT/Paramedic)
- With electrical burns anticipate heart rhythm irregularities.
- Assess for circulatory compromise from circumferential extremity burns or ventilator compromise from circumferential chest burns.
- Remove items that may constrict swelling tissue.
- Estimate size and depth of burn using the percentage chart (below).
- Dressings: Cover burns with dry dressings.
- Closely monitor patient's temperature and prevent hypothermia.
- Treat for pain and anxiety per the ***Pain and Anxiety Management Guideline***.
- Burn patients with major trauma should be transported to a trauma center as per the Utah Trauma Field Triage Guideline
- Consider air ambulance transportation for long transport times, inability to control pain after maximal doses of analgesics, and airway concerns that might necessitate advanced airway management
- Consider transport directly to a designated burn center for the following:
  - Inhalation injuries
  - Partial or Full Thickness (2^{nd} or 3^{rd} degree) burns (>20% BSA in adults or >15% in pediatrics).
  - Circumferential burns
  - Partial or full thickness burns involving face, hands, or genitalia

❑ **Cyanide or carbon monoxide (CO) poisoning**
- Signs: muscular weakness, confusion, agitation, unconsciousness, or profound shock
- Most common in closed-space fires
- Apply 100% NRB oxygen

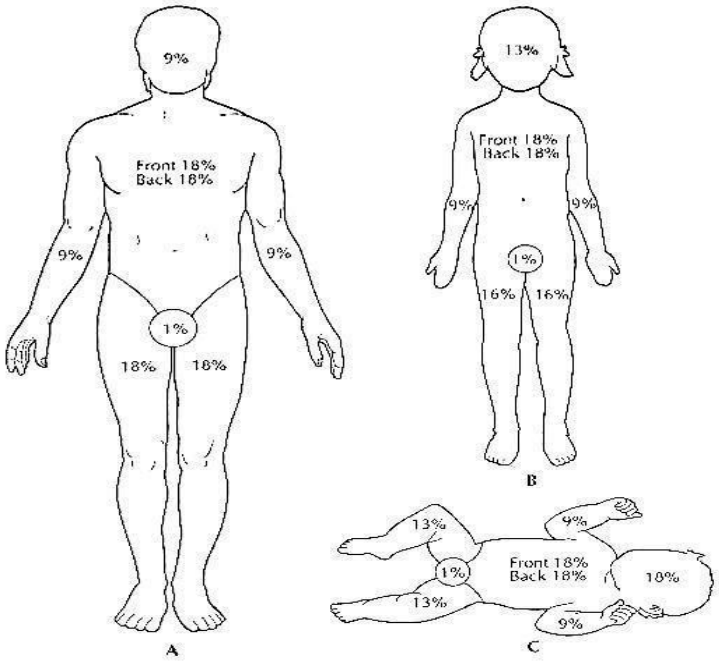
❑ **Key Considerations**

- Electrical Burns are frequently more serious than they appear.
- Identifying the source as AC or DC voltage with the amperage will be helpful in the treatment.
- Consider 12-lead ECG for patients with electrical burns
- Care for traumatic injuries should precede care for the burn.
- If patient is initially hypotensive after burn (first hour), it is NOT a result of the burn: strongly suspect underlying trauma.
- Keep patients warm! Patients are prone to hypothermia due to heat loss from the burns.
- Consider Child Abuse as a cause. Circumferential scald burn to hands, feet, buttocks, and genitalia are common burns seen in child abuse (especially in children <5 years old)
- Do not overhydrate patients with IV fluid. See proper fluid rates for burns below.
- Definitions:
  - Superficial (1st Degree) Burns – red, painful, without blisters.
  - Partial Thickness (2nd Degree) Burns – red, painful/hypersensitive, swollen, with either intact or ruptured blisters.
  - Full Thickness (3rd Degree) Burns – dark, leathery, painless, waxy, and does not blanch.

❑ **Parkland Formula**

- 4 ml X weight (kg) X %BSA = total fluid (ml) to be administered in 24 hrs
- 1/2 of total should be given in first 8 hrs, the remainder in the next 16 hrs

❑ **Calculation of Burn Surface Area (%BSA**): ***based only on 2nd and 3rd degree burn totals***



ADULT

AEMT

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Advanced airway, vascular access
  - If possible, avoid placing IV through burned skin
- ❑ **IV Fluid therapy:** If 2nd + 3rd degree >10% BSA begin:
  - LR or NS at 500 cc/hr (no bolus)
  - If time from burn is >30 min, begin fluids using Parkland Formula

PARAMEDIC

- ❑ If evidence of possible airway burn (singed nasal hair, carbonaceous sputum, hoarse voice, or stridor), consider early intubation
- ❑ If signs of cyanide toxicity present: **hydroxycobalamin (Cyanokit) 5 gm IV over 15 min**
- ❑ High voltage electrical injury or direct lightning strike
  - LR or NS at 500 ml/hr (no bolus)
  - If diagnosed with rhabdomyolysis prior to transport, increase fluid replacement to keep urine output >2 ml/kg/hr

- ❑ Advanced airway, vascular access
  - If possible, avoid placing IV through burned skin
- ❑ **IV Fluid therapy:** If 2nd or 3rd degree >10% BSA begin:
  - LR or NS infusion rates (no bolus)
    - <5 years old: 125 cc/hr
    - 5-13 years old: 250 cc/hr
    - >13 years old: 500 cc/hr
  - If time from burn is >30 min, begin fluids using Parkland Formula

PARAMEDIC

- ❑ If evidence of possible airway burn (singed nasal hair, carbonaceous sputum, hoarse voice, or stridor), consider early intubation
- ❑ If signs of cyanide toxicity present: **hydroxycobalamin (Cyanokit) 70 mg/kg IV over 15 min (max 5 gm)**
- ❑ High voltage electrical injury or direct lightning strike
- ❑ LR or NS infusion rates (no bolus)
- ❑ <5 years old: 125 ml/hr
- ❑ 5-13 years old: 250 ml/hr
- ❑ >13 years old: 500 ml/hr
- ❑ If diagnosed with rhabdomyolysis prior to transport, increase fluid replacement to keep urine output >2ml/kg/hr

HEAD INJURY (TRAUMATIC BRAIN INJURY)

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
- ❑ Cardiac monitor, ETCO2, and Pulse Oximetry monitoring when available
- ❑ **Treatment Plan**
  - Maintain airway. Administer oxygen to maintain SaO2 90-94%.
  - Consider spinal motion restrictions per the ***Spinal Motion Restriction Guideline***
  - Elevate head 30 degrees.
  - Monitor the level of consciousness during the transport
  - **Severe TBI** (GCS <8 or AVPU "P" or "U"):
    - Adult: Consider endotracheal intubation for airway protection (Paramedic only)
    - Pediatrics: Continue effective BVM. Utilize airway adjuncts, if needed to ensure adequate chest rise, ventilation, and oxygenation.
    - **Do not hyperventilate** unless patient shows signs of herniation: unilateral pupillary dilation or posturing. In this case, increase respiratory rate by ~10% above normal target respiratory rate (see Mild Hyperventilation Guide). Target ETCO2: 30-35 mmHg.

Mild Hyperventilation Guide for Signs of Herniation

Age	Normal Ventilation Rate	Mild Hyperventilation Rate
Neonate	40	44
Infant	30	33
Child	20	22
Adult	10	12

  - Open skull fractures should be covered with dry sterile dressings. Do not apply pressure unless needed to stop severe hemorrhage.
- ❑ **Key Considerations**
  - TBI may be painful. However, excessive pain medications can cloud serial neurological assessments. Pain medications should generally be avoided in a patient with altered mental status after TBI. If pain is severe, give small doses only until pain is manageable.
  - Patients with TBI may be confused or combative. Consider physical/chemical restraints if needed to protect patient or personnel.
  - Loss of memory, prolonged confusion or altered mental status associated with trauma may indicate a significant head injury.
  - Avoid hypoxia (SaO2 should be 90-94%).
  - Avoid over tightening of cervical collar (if placed) as this can cause increased intracranial pressure
  - Do not allow the patient to be hypotensive. Try to keep adult SBP >110 using the ***Shock and Fluid Therapy Guideline.***
  - Pediatric lowest acceptable systolic blood pressures are birth to 1 month = 60mmHg, 1 month to 1 year = 70mmHg, 1 year to 10 years is = 70mmHg + (age x 2) and over 10 years = 90mmHg.

ADULT

AEMT

- ❑ Advanced airway, vascular access, and fluid therapy
- ❑ Check blood pressure every 5-10 minutes.
- ❑ Follow the Traumatic Brain Injury pressure management under the ***Shock and Fluid Therapy Guideline***.

PARAMEDIC

- ❑ **Persistent hypotension unresponsive to fluids:**
- ❑ **Epinephrine 2–10 mcg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg
- ❑ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP >100 mmHg after fluid bolus
- ❑ **Norepinephrine** initial dose: **0.05 – 1 mcg/kg/min** IV/IO for hypoperfusion. Titrate to maintain a SBP > 100 mmHg. For patients in refractory shock: 8-30 mcg/minute

PEDIATRIC (<15 years)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Advanced airway, vascular access, and fluid therapy
- ❑ Check blood pressure every 5-10 minutes.
- ❑ Initiate NS 20ml/kg IV/IO for hypotension OR if unable to obtain blood pressure
- ❑ If hypotensive patient shows no improvement with initial treatment, may repeat NS 20 ml/kg IV/IO up to a total of 60 ml/kg

PARAMEDIC

- ❑ **Persistent hypotension unresponsive to fluids:**

- ✆ **Epinephrine 0.1–1 mcg/kg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg
- ✆ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP>70 + (age in years x 2) mmHg after fluid bolus
- ✆ **Norepinephrine** initial dose: **0.05 - 0.1 mcg/kg/min**, titrate to max of 2 mcg/kg/min to maintain SBP >70 + (age in years x 2) mmHg

HEMORRHAGE CONTROL, EXTREMITY AND CRUSH INJURIES

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
- ❑ **Treatment Plan**
  - Maintain airway, administer oxygen to maintain SaO2 90-94%.
  - Assess for deformity, swelling, tenderness, crepitus, open or closed fractures, hemorrhaging, lacerations, ecchymosis, instability, decreased function or pulses, loss of sensation of distal extremities.
  - **Epistaxis**: bleeding from the nose should be controlled by first having the patient sit and lean forward (unless there is a need for spinal motion restriction). Apply direct pressure by pinching the fleshy portion of the nostrils.
  - Cover lacerations or puncture wounds on the neck near the great vessels or trachea with an occlusive dressing.
  - **Crush syndrome** should be considered for the following patients:
    - Entrapped/compressed patients or limbs under a load for more than 30 minutes
    - Patients with little or no movement for more than 4 hours (e.g. older patient falls, overdoses, etc.)
    - Patients with crush syndromes are prone to cardiac dysrhythmias and electrolyte abnormalities. They should be placed on a cardiac monitor and the rescuer should be ready for possible cardiac arrest. If this happens then consider treatment for Hyperkalemia.
  - Cover **abdominal eviscerations** with a moist sterile dressing.
    - Do not attempt to replace organs.
  - Cover **extruded eye** or **deflated globe** with a moist sterile dressing and protective eye shield.
    - Do not apply pressure or attempt to replace in socket.
    - Cover both eyes, if the patient will tolerate it. This minimizes eye movements.
  - In large, partially attached **skin avulsions**, the tissue should be returned to its' original position and stabilized whenever possible.
  - Elevate the limb such that the wound is above the heart.
  - **Impaled objects** should be stabilized in place and covered with dry sterile dressings. The exceptions would be:
    - Objects through the cheek where there is the possibility of airway compromise.
    - Objects that would interfere with chest compressions.
- ❑ **Extremity hemorrhage control**:
  - Apply direct pressure to the bleeding site, followed by a pressure dressing
  - If direct pressure/pressure dressing is ineffective or impractical:
    - If the bleeding site is amenable to tourniquet placement, apply a tourniquet to the extremity
      - Tourniquet should be placed 2-3 cm proximal to the wound, not over a joint, and tightened until the bleeding stops *and* the distal pulse is eliminated. If bleeding or distal pulse still present, place a second tourniquet proximal to the first.
      - For thigh wounds, consider placement of two tourniquets, side by side, and tighten sequentially.
      - When a tourniquet is initially placed to stop obvious severe hemorrhage, an attempt may be made to replace it with a pressure dressing after patient is stabilized and bleeding is controlled. The tourniquet should NOT be removed/replaced if:
        - ➢ Amputation or near-amputation
        - ➢ Unstable or complex multiple-trauma patients

- Unstable clinical or tactical situation

- If the bleeding site is NOT amenable to tourniquet placement (for example groin or axillary wounds): tightly pack the wound with gauze followed by 3 minutes of direct pressure, then apply a tight pressure bandage.

❑ **Fractures/dislocations**:

- Stabilize suspected fractures/dislocations
  - If extremity is deformed and distal vascular status is compromised (poor distal pulse or capillary refill), gently attempt to restore normal anatomic position with gentle traction. Pain medication should be considered prior to any manipulation.
  - If extremity is deformed but vascular function is normal, splint in current position, to limit movement of suspected fracture.
  - If open fracture with exposed bone, place moist gauze over exposed bone
  - Elevate extremity above heart level, when possible, to minimize swelling.

❑ Treatment for pain and anxiety per the ***Pain and Anxiety Management Guideline***.

❑ **Key Considerations**

- Tourniquets are painful and the conscious patient will likely require pain medication.
- Commercial tourniquets are strongly preferred over improvised tourniquets.

ADULT	**PEDIATRIC (<15 years of Age)** **NOTE: Pediatric weight based dosing should not exceed Adult dosing.**
AEMT	**AEMT**
❑ Advanced airway, vascular access and fluid therapy ❑ For crush injury patients, when possible, initiate IV/IO access and consider administration of 1 liter NS bolus prior to release from entrapment ❑ Consider hemostatic agents if available	❑ Advanced airway, vascular access and fluid therapy ❑ For crush injury patients, when possible, initiate IV/IO access and consider administration of NS 20 mg/kg bolus prior to release from entrapment ❑ Consider hemostatic agents if available
PARAMEDIC	**PARAMEDIC**
For patients with severe hemorrhage and hypotension: ❑ Consider: Tranexamic Acid (TXA) 1g IV bolus, as per criteria noted in medication appendix ❑ Consider: A second TXA dose (1g IV infusion over 8 hours) as per criteria noted in medication appendix	

NON-ACCIDENTAL TRAUMA/ABUSE

ALL PROVIDERS

- ❑ Scene and patient management
  - Contact Law Enforcement if someone on scene is a threat to themselves or others.
  - Separate any possible assailants, including parents, from the patient.
  - Remove patient from the stressful environment and remove any possible weapons.
  - Non-accidental trauma includes any act of commission or omission that results in harm to a person's physical, developmental, or emotional state.
- ❑ Focused history and physical exam
  - Blood glucose, temperature and oxygen saturation assessment.
  - Always consider the possibility of abuse when evaluating any medical condition or trauma.
- ❑ Continuous cardiac monitor, ETCO2, and pulse oximetry, when available.
- ❑ **Treatment Plan**
  - Suspect: Look for suspicious circumstances or actions from patient or caregiver
    - Listen to and document circumstances of the event.
    - Evaluate the environment in which you find the patient.
  - Protect: Be the patient advocate
    - Make all efforts to remove patient from the situation.
  - Respect: Communicate appropriately with family
    - Avoid confrontation with caregivers.
    - Be nonjudgmental and avoid accusations.
    - Consider law enforcement assistance.
  - Collect: Provide good documentation of incident.
    - Document using direct quotation when possible. Describe the scene rather than interpret it. Example: "garbage on floor, spoiled food on counter" is more helpful than "dirty apartment.
    - Document objectively without speculation.
    - HIPAA-compliant photography may be considered for documentation.
  - Report: You have the responsibility to report suspected child or elder abuse and neglect **to law enforcement or the Division of Family Services.** 1-855-323-DCFS (3237)
- ❑ **Key Considerations**
  - Non-accidental trauma, abuse, or neglect can occur in patients of any age and in all ethnic and socio-economic groups.
  - TEN-4 Rule. For children 4 and younger bruising to the Torso, around the Ears or the Neck needs to be reported. Additionally, any bruising in a baby not yet pulling up or taking steps is highly suspicious.
  - Risk factors include children under age of 5, the elderly, drug or alcohol abuse, and a history of domestic violence.
  - In children under the age of two the most common form of child abuse is **Abusive Head Injury (AHI)**. Mortality of AHI is 25%. For those that live, there is significant morbidity, usually associated with traumatic brain injury.
  - Do not directly engage a hostile patient, parent, assailant or perpetrator. If situation becomes unsafe for EMS personnel, call for police assistance.
  - If anxious or agitated, attempt non-pharmacological options to calm a patient. Consider pain and anxiety management per the ***Pain and Anxiety Management Guideline***.

SNAKE BITES

ALL PROVIDERS / EMT

- ❑ Focused history and physical exam
  - Identify and document the type of snake, appearance, location, and distinguishing marks.
  - Obtain an accurate time of injury.
  - Clarify any first aid provided by friends or family prior to arrival.
  - Coral Snakes in North America – "Red on touches Yellow = Poison Fellow, Red on touches Black = Safe with attack".
  - Signs of envenomation include paresthesia, metallic taste, chills, nausea, vomiting, headache, dysphagia, cramps, hypotension, fever, local edema, blebs, and discoloration.
- ❑ Continuous cardiac monitor, ETCO2, and pulse oximetry, when available.
- ❑ **Treatment Plan**
  - Ensure scene safety by moving the patient to a safe distance, away from the snake.
  - Splint limb and place at the level of the heart.
  - Keep patient calm and movement to a minimum. You may need to treat for pain and/or anxiety to help achieve this goal per ***Pain and Anxiety Management Guideline***.
  - Remove items that may constrict swelling tissue, such as rings or bracelets.
- ❑ **Key considerations**
  - Do not start the IV in the affected limb.
  - Do not apply ice to the limb.
  - Do not try to capture the snake.
  - Do not bring a live snake to the ED.
  - Remember that snakes can reflexively envenomate up to 1 hour after death.
  - Pictures of the snake can be helpful.
  - Any snakebite can be dangerous and should be evaluated in the ED.
  - Watch for signs of shock and allergic reaction.

ADULT

AEMT

- ❑ Advanced airway, vascular access, and fluid therapy

PARAMEDIC

Persistent hypotension unresponsive to fluids

- ❑ **Epinephrine 2–10 mcg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg
- ❑ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP >100 mmHg after fluid bolus

PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

AEMT

- ❑ Advanced airway, vascular access, and fluid therapy

PARAMEDIC

Persistent hypotension unresponsive to fluids

- ✆ **Epinephrine 0.1–2 mcg/kg/min** IV/IO infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg.

❑ **Norepinephrine** initial dose: **0.05 – 1 mcg/kg/min** IV/IO for hypoperfusion. Titrate to maintain a SBP > 100 mmHg. For patients in refractory shock: 8-30 mcg/minute

✆ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP >70 + (age in years x 2) mmHg after fluid bolus.

✆ **Norepinephrine** initial dose: **0.05 - 0.1 mcg/kg/min**, titrate to max of 2 mcg/kg/min to maintain SBP >70 + (age in years x 2) mmHg

SPINAL MOTION RESTRICTION (SMR)

ALL PROVIDERS

❑ Assessment
- Assess the scene, to determine the risk of injury. Mechanism alone should not determine if a patient requires SMR. However, mechanisms that have been associated with a higher risk of cervical spine injury are the following:
  - Motor vehicle collisions, including automobiles, motorcycles, ATVs, and snowmobiles
  - Axial loading injuries to the spine, such as diving accidents
  - Severe injuries to the torso
  - Falls >10 feet
- Assess the patient in the position in which he/she was found. Initial assessment should focus on determining whether or not a cervical collar needs to be applied.
- Assess for mental status, neurologic deficits, spinal pain or tenderness, any evidence of intoxication, or other severe/painful injuries

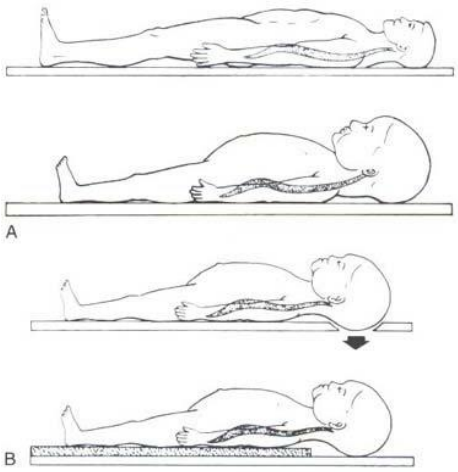
❑ **Treatment Plan**
- Perform full SMR if there are any of the following:
  - Patient complains of midline neck or back pain
  - Any midline neck or spinal tenderness with palpation
  - Any anatomic deformity of the spine
  - Any abnormal mental status (including extreme agitation)
  - Any neurologic deficit
  - Any evidence of alcohol or drug intoxication
  - Another severe or painful distracting injury is present
  - Torticollis in children
  - A communication barrier that prevents accurate assessment
- If none of the above apply, a cervical collar need not be placed on the patient, unless the treating medic otherwise feels there is a high risk of cervical spine injury.
- Patients with a penetrating injury to the neck should not have a cervical collar placed, regardless of whether they are exhibiting neurologic symptoms. Doing so can lead to delayed identification of injury or airway compromise and has been associated with increased mortality in such patients.
- Extrication:
  - From a vehicle: After placing a cervical collar, if indicated as above, adults and children in a booster seat should be allowed to self-extricate, if they are able. For infants and toddlers already strapped in a car seat with a built-in harness, remove the car seat and infant together, leaving the infant secured in the car seat.
  - Other situations requiring extrication: A padded long board may be used for extrications, using the lift and slide technique.
- Helmet removal: If a helmet needs to be removed, it is recommended to remove the face mask followed by manual removal (rather than the use of automated devices) of the helmet, while keeping neck motion manually restricted. Occipital padding should be applied, as needed, with the patient in a supine position, in order to maintain neutral cervical spine positioning.

- Patients should NOT routinely be transported on long boards, unless the clinical situation specifically warrants long board use. Padded scoop stretchers, vacuum splints, or a secured ambulance cot are all appropriate options for SMR. An example of an indication for long board use may be facilitation of immobilization of multiple extremity injuries or an unstable patient where removal of a board will delay transport and/or other treatment priorities. In these rare situations, long boards should be padded or have a vacuum mattress applied to minimize secondary injury to the patient.
- Assess neurological function before, during, and after application of SMR.

❑ Key Considerations
- Patients who have a low likelihood of spinal injury and are therefore not likely to benefit from SMR, should not be immobilized.
- Patients should be "log rolled," with maintenance of spinal alignment, for examination of the spine for tenderness and deformities.
- Ambulatory patients who are alert and cooperative may be safely immobilized on a gurney with cervical collar and straps and will not generally require a spine board.

❑ Pediatric Considerations
- Age <2 should be secured in a car seat or age appropriate papoose device.
- Children who are <5 years old should be secured with an appropriately-sized cervical collar or soft towel rolls and tape, if tolerated. If attempts at SMR result in more distress and fighting to get free, then the SMR should be minimized.
- Children under the age of 8 cannot have their cervical spines reliably assessed in the field and should have the cervical spine immobilized if the mechanism warrants it.
- Children do not require full SMR if isolated injury to the cervical spine is suspected as their risk for noncontiguous spinal injuries is much lower than adults.
- Use a pediatric specific backboard for those <8 years old OR use a towel or pad to raise the child's body (not their head) to insure appropriate spinal alignment on an adult board. (See figure below)

✆ Contact OLMC for further instructions if the patient refuses immobilization despite the provider's assessment for the need for SMR.



ADULT

EMT
AEMT
PARAMEDIC

PEDIATRIC (<15 years of Age)
NOTE: Pediatric weight based dosing should not exceed Adult dosing.

EMT
AEMT
PARAMEDIC

Appendix 1

EMS MEDICATIONS

Table of Contents

Acetaminophen (Tylenol) 90
Adenosine (Adenocard) 90
Albuterol (Ventolin/Proair/Proventil) 91
Amiodarone Hydrochloride (Cordarone) 91
Aspirin (Ecotrin) 92
Atropine 93
Calcium Chloride/ Calcium Gluconate 94
Diazepam (Valium) 86
Diphenhydramine (Benadryl) 96
Dextrose 96
Epinephrine (Adrenaline) 97
Epinephrine – "Push Dose" Pressor Administration 98
Glucagon (GlucaGen) 100
Oral Glucose 101
Ibuprofen (Motrin/Advil) 101
Ipratropium (Atrovent) 102
Ketamine HCL 103
Ketorolac (Toradol) 104
Lidocaine 105
Lorazepam 106
Magnesium Sulfate 107
Morphine 108
Midazolam 109
Naloxone (Narcan) 110
Nitroglycerin 111
Norepinephrine (Levophed) 111
Ondansetron 112
Oxytocin 113
Sodium Bicarbonate 114

Tranexamic Acid/TXA (Cyklokapron)..... 115

Acetaminophen (Tylenol)

Action/Mechanism:
An analgesic/antipyretic that has weak anti-inflammatory activity and no effects on platelets or bleeding time. Acetaminophen acts both centrally and peripherally via multiple enzymatic processes. The most significant appears to be peroxidase inhibition which yields COX-2 inhibitor-like effects.

Indication:
Fever. Minor pain.

Contraindication:
Known liver disease (relative). Hypersensitivity.

Precaution:
Do not administer if used in the last 4 hours.

Adverse Effects:
Gastric irritation (rare)

Dose:
- Adult: PO/Rectal 650-1000mg
- Pediatric: 15mg/kg PO/Rectal; Max 650 mg

Adenosine (Adenocard)

Action/Mechanism:
A naturally occurring nucleoside that acts on the AC node to slow conduction and inhibit reentry pathways. Useful in PSVT. Rapidly metabolized—Half-life is <5 seconds.

Indication:
To convert acute PSVT to normal sinus rhythm. Diagnostic agent for distinguishing supraventricular from ventricular tachycardia, as well as broad QRS complex tachycardia's.

Contraindication:
Patients with hypersensitivity to the drug. Those in second or third degree heart block, sick sinus syndrome, or symptomatic bradycardia. Unstable patient with SVT is treated with synchronized cardioversion.

Precaution:
Could produce bronchoconstriction in-patients with asthma. Patients who develop high level heart block after a single dose should not receive additional doses. Use with caution in-patients

receiving digoxin and verapamil in combination. Therapeutic levels of theophylline and methylxanthines affect the response of adenosine Dipyridamole potentiates its effect.

Adverse Effects:
Chest pain, PVC's, dizziness, dyspnea and or shortness of breath, facial flushing, headache, lightheadedness, blurred vision, nausea, metallic taste, and numbness. More serious symptoms are persistent arrhythmias, bronchospasm, and hypotension.

Dose:
Rapid bolus over 1-3 seconds. The dose should be followed quickly by a 20 ml saline flush

- Adult: The initial dose is 6-mg. rapid bolus over 1-3 seconds. The dose should be followed quickly by a 20-ml saline flush. Then elevate the extremity. Repeat 12mg. in 1-2 minutes if needed.
- Pediatric: Initial- 0.1 mg/kg (Max 6mg), if not effective- 0.2 mg/kg (Max 12mg)

Albuterol (Ventolin/Proair/Proventil)

Action/Mechanism:
Relaxes bronchial, uterine, and vascular smooth muscle by stimulating beta2-adrenergic receptors.

Indication:
For the relief of bronchospasm in patients two years of age and older with reversible obstructive airway disease and acute attacks of bronchospasm. Not for use in croup. High-risk preterm labor when delivery is imminent with medical control consulted.

Contraindication:
Hypersensitivity to the drug.

Precaution:
Used with caution in patients with cardiovascular disorders, especially coronary insufficiency, cardiac arrhythmias and hypertension. MAO inhibitors, tricyclic antidepressants, may potentiate action on CV system. Propranolol, and other beta blockers inhibit the effect of albuterol.

Adverse Effects:
Tachycardia, hypertension, bronchospasm, bronchitis, nasal congestion, tremors, dizziness, nervousness, headache, and sleeplessness.

Dose:

- Adult and pediatric: 2.5 mg nebulized every 10-20 minutes as needed, (Max total= 7.5 mg or 3 nebs) Nebulized solution will usually be delivered over approximately 5 to 15 minutes depending on flow rate.

Amiodarone Hydrochloride (Cordarone)

Action/Mechanism:
Blocks sodium channels at rapid pacing frequencies, causing an increase in the duration of the myocardial cell action potential and refractory period, as well as alpha- and beta-adrenergic blockade. The drug decreases sinus rate, increases PR and QT intervals, results in development of U waves, and changes T-wave contour. After IV use, amiodarone relaxes vascular smooth muscle, reduces peripheral vascular resistance (afterload), and increases cardiac index slightly.

Indication:
Used in a wide variety of atrial and ventricular tachyarrhythmia's and for rate control of rapid atrial arrhythmias in patients with impaired LV function when digoxin has proven ineffective

Contraindication:
Marked sinus bradycardia due to severe sinus node dysfunction, second- or third-degree AV block, syncope caused by bradycardia (except when used with a pacemaker). Cardiogenic shock. Lactation.

Precaution:
May produce vasodilation and hypotension. May have negative inotropic effects. May prolong QT interval. Do not routinely use with other drugs that prolong QT interval. Use with caution if renal failure is present.

Adverse Effects:
Cough and progressive dyspnea. Worsening of arrhythmias, symptomatic bradycardia, sinus arrest, SA node dysfunction, CHF edema, hypotension, cardiac conduction abnormalities, cardiac arrest, abnormal involuntary movements, headache, N&V, abdominal pain, flushing, and shock.

Dose:

- Adult: Cardiac Arrest: Anti-arrhythmics are indicated for shockable rhythms that are unresponsive to defibrillation: 300mg IV push. Consider repeating 150 mg IV push in 3-5 minutes. Wide complex tachycardia (stable): 150 mg rapid infusion IV (15 mg/min) over the first 10 minutes. May repeat 150 mg rapid infusion IV every 10 minutes as needed.
- Pediatric: Anti-arrhythmics are indicated for shockable rhythms that are unresponsive to defibrillation. IV/IO: 5 mg/kg (maximum: 300 mg/dose) rapid bolus; may repeat twice up to a maximum total dose of 15 mg/kg (total max 450 mg)

Aspirin (Ecotrin)

Action/Mechanism:
Irreversibly inhibits cyclooxygenase-1 and 2 (COX-1 and 2) enzymes, via acetylation, which results in decreased formation of prostaglandin precursors; irreversibly inhibits formation of prostaglandin derivative, thromboxane A2, via acetylation of platelet cyclooxygenase, thus inhibiting platelet aggregation; analgesic, and anti-inflammatory properties

Indication:
Cardiac chest pain patients fitting criteria

Contraindication:
Hypersensitivity to NSAIDs; patients with asthma, rhinitis, and nasal polyps; use in children or teenagers for viral infections, with or without fever.

Precaution:
Documentation of allergenic cross-reactivity for salicylates is limited. However, because of similarities in chemical structure and/or pharmacologic actions, the possibility of cross-sensitivity cannot be ruled out with certainty.

Adverse Effects:
Bleeding gums, signs of GI bleeding, and petechiae. Aspirin will increase bleeding time.

Dose:

- Adult: 162 mg-325 mg oral- chewed once (chewable tabs preferred)
- Pediatric: Do not use unless ordered by OLMC

Atropine

Action/Mechanism:
Anticholinergic that inhibits acetylcholine at the parasympathetic neuroeffector junction, blocking vagal effects on the SA and AV nodes; this enhances conduction through the AV node and speeds heart rate, increases heart contractility, improves automaticity, and dilates peripheral vessels which increases cardiac output. Atropine dries secretions by reversing the muscarinic effects of cholinergic poisoning due to agents with acetylcholinesterase inhibitor activity by acting as a competitive antagonist of acetylcholine at muscarinic receptors. The primary goal in cholinergic poisonings is reversal of bronchorrhea and bronchoconstriction. Atropine has no effect on the nicotinic receptors responsible for muscle weakness, fasciculations, and paralysis.

Indication:
Treatment of symptomatic sinus bradycardia, second and third degree heart block. Antidote in organophosphate poisoning.

Contraindication:
Hypersensitivity to the drug, unstable cardiovascular status, myocardial ischemia, glaucoma, and COPD

Precaution:
Use with caution in presence of myocardial ischemia and hypoxia. Avoid in hypothermic bradycardia. Usually not effective in second degree block type II and third degree blocks with wide QRS complexes. Antacids decrease absorption of med.

Adverse Effects:
Postural hypotension, Blurred vision, dryness of the mouth, GI reflux, nausea, vomiting, tachyarrhythmias, and urinary retention.

Dose:

- Adult: For bradycardia, 0.5mg IV/IO every three to five minutes as needed, up to a total of 3mg.
- Pediatric: 0.02 mg/kg IV/IO/ET up to 0.5 mg for child or 1mg for adolescent (minimum dose 0.1mg). May be repeated once in 5 minutes.

Organophosphate Poisonings:
Atropine sulfate 2 mg rapid IV (preferred) or IM repeated every 10 minutes until you have:

- Control of bronchorrhea (excessive watery sputum)
- Control of bronchoconstriction, (as reflected by level of oxygenation and ease of ventilation)
- Reversed dangerous bradyarrhythmias or AV-blocks

Calcium Chloride/ Calcium Gluconate

Action/Mechanism:
Electrolyte. Calcium is a positively charged ion involved in multiple physiologic functions. Calcium is required for muscle contraction, nerve impulse transmission, hormone secretion, blood coagulation, cell division, cell motility and wound healing. In vascular smooth muscle, calcium is involved in the maintenance of vascular tone. Calcium is also required for cardiac muscle contraction. The entry of calcium into cardiac cells during depolarization triggers additional intracellular calcium release from the sarcoplasmic reticulum, leading to myocardial contraction. The cardiac pacemaker cells of the SA and AV nodes depend on an inward calcium current for depolarization. Calcium antagonizes the effects of both potassium and magnesium at the cell membrane. In hyperkalemia, calcium antagonizes cardiac membrane excitability. It has no effect on the serum potassium level. The effect of cardiac membrane stabilization is temporary (20-40 min) and some patients may require a repeat dose.

Indication:
Hyperkalemia. Hydrofluoric acid (HF) exposure. Calcium channel blocker toxicity. Beta blocker toxicity. Cardiac Arrest with presumed hyperkalemic cause (i.e. dialysis patient overdue for dialysis). Hypermagnesemia.

Contraindication:
Known hypersensitivity. Digitalis toxicity

Precaution:
Calcium chloride contains three times more elemental calcium than calcium gluconate (1 gm of calcium chloride is equivalent to 3 gm of calcium gluconate). Administer slowly if not in cardiac arrest. **Calcium chloride and calcium gluconate are two commonly used parenteral formations of calcium. In the EMS setting, the two preparations may be used interchangeably, but it should be noted that calcium chloride contains three times more elemental calcium than does calcium gluconate (1 gm of calcium chloride is equivalent to 3 gm of calcium gluconate). Calcium chloride has greater bioavailability, but is more likely to cause tissue damage if extravasation

occurs. Ideally use AC or larger vessel. Sodium bicarbonate and calcium preparations are not compatible and should be given through separate IV lines if possible. If they must be administered via the same IV line, the line should be flushed in between the administration of each.

Adverse Effects:
Bradycardia. Ventricular fibrillation. Extravasation necrosis. Abdominal pain. Nausea/vomiting.

Dose:

- Adult:
  - **Calcium Chloride:** 1 gm SLOW PUSH IV/IO. May repeat once after 5 min.
  - **Calcium Gluconate:** 3 gm SLOW PUSH IV/IO. May repeat once after 5 min.
- Pediatric:
  - **Calcium Chloride:** 20mg/kg (max 1 gm/dose) SLOW PUSH IV/IO. May repeat once after 10 minutes
  - **Calcium Gluconate:** 100 mg/kg IV/IO (max 3 grams/dose). May repeat once after 10 min.

Diazepam (Valium)

Action/Mechanism:
Binds to stereospecific benzodiazepine receptors on the postsynaptic GABA neuron at several sites within the central nervous system, including the limbic system, reticular formation. Enhancement of the inhibitory effect of GABA on neuronal excitability results by increased neuronal membrane permeability to chloride ions. This shift in chloride ions results in hyperpolarization (a less excitable state) and stabilization. Benzodiazepine receptors and effects appear to be linked to the GABA-A receptors. Benzodiazepines do not bind to GABA-B receptors

Indication:
Anxiety, muscle spasms, neuroleptic malignant syndrome, seizures

Contraindication:
Hypersensitivity to diazepam or any component of the formulation; acute narrow-angle glaucoma; untreated open-angle glaucoma; infants <6 months of age (oral); myasthenia gravis, severe respiratory impairment, severe hepatic impairment, sleep apnea syndrome (oral tablet).

Precaution:
Use caution with patients that have received opiates due to additive CNS depression

Adverse Effects:
Drowsiness, hypotension, vasodilation, headache, ataxia, dizziness, euphoria, abnormality in thinking, agitation, confusion, emotional lability, nervousness, pain, speech disturbance, skin rash, diarrhea, abdominal pain, asthenia, asthma, rhinitis

Dose:

- Adult:
  - IV/IO – 5 mg every 10 min to the desired effect or max dosage of 20 mg
  - Intramuscular (IM) – 10 mg once (IM not preferred, unless no other options)
- Pediatric:
  - IV/IO - 0.1 mg/kg (max 5 mg), may repeat once in 10 minutes, if needed. Total max dose: 10 mg
  - Intramuscular (IM) – 0.2 mg/kg (max 10 mg) once Total max dose: 20 mg (IM not preferred unless no other options)

Diphenhydramine (Benadryl)

Action/Mechanism:
Competes with histamine for H1-receptor sites on effector cells. Prevents, but does not reverse, histamine-mediated responses. It also has anticholinergic (antispasmodic), antiemetic, and sedative effects. It has a rapid onset and is widely distributed throughout the body.

Indication:
Supplemental therapy to epinephrine in anaphylaxis and other uncomplicated allergic reactions requiring prompt treatment.

Contraindication:
Hypersensitivity to the drug, during acute asthmatic attacks, in newborns, premature neonates, or breastfeeding women. Avoid use in patients taking MAO inhibitors. Also patients with glaucoma, peptic ulcer, and COPD

Precaution:
Use with extreme caution in patients with asthma or COPD, increased intraocular pressure, hyperthyroidism, CV disease, hypertension. Drug and alcohol use causes increased CNS depression

Adverse Effects:
Palpitations, hypotension, tachycardia, confusion, decreased level of consciousness, insomnia, headache, vertigo, restlessness, tremor, seizures, blurred vision, nausea and vomiting, thickened bronchial secretions, and anaphylactic shock.

Dose:

- Adult: 50mg IV/IO/IM once
- Pediatric: 1 mg/kg IM/IV/PO (Max 50mg) Children may be more prone to paradoxical responses than adults

Dextrose

Action/Mechanism:
Dextrose provides calories and increases blood glucose concentrations.

Indication:
Diabetics who are unable to take oral fluids due to altered level of consciousness and low blood glucose. - Unknown, unconsciousness

Contraindication:
Hypersensitivity to dextrose, corn or corn products, or any component of the formulation; hypertonic solutions in patients with intracranial or intraspinal hemorrhage, diabetic coma, or delirium tremens, especially if dehydrated; severe dehydration; glucose-galactose malabsorption syndrome

Precaution:
Use with caution in patients with cardiac or pulmonary disease, hypertension, renal insufficiency, urinary obstruction, or hypovolemia. Avoid extravasation may cause tissue sloughing, necrosis, and phlebitis.

Adverse Effects:
Pulmonary edema, exacerbated hypertension, heart failure, Hyperglycemia, (during infusion), hyperosmolar syndrome (mental confusion, loss of consciousness), hypokalemia, reactive hypoglycemia (after infusion).

Dose:
- Adult: One prefilled syringe of D50W- 25mL(12.5 gm) IV—may repeat as appropriate
- Pediatric:
    - D10W 5 ml/kg (0.5 gm/kg) IV- Max 12.5 gm(125 ml) [Preferred for everyone]
    - D25W 2ml/kg (0.5 gm/kg) IV (only for >1year old) Max 12.5gm(50mL)

Note:
Vesicant (at concentrations ≥10%); ensure proper needle or catheter placement prior to and during IV infusion. Avoid extravasation. If extravasation occurs, stop infusion immediately and disconnect (leave needle/cannula in place); gently aspirate extravasated solution (do NOT flush the line); initiate hyaluronidase antidote; remove needle/cannula; apply dry cold compresses; elevate extremity.

Epinephrine (Adrenaline)

Action/Mechanism:
Stimulates alpha and beta-adrenergic receptors within the sympathetic nervous system. A potent cardiac stimulant, it strengthens the myocardial contraction (positive inotropic effect) and increases cardiac rate (positive chronotropic effect). Increases myocardial and cerebral blood flow during CPR.

Indication:

Cardiac arrest: VF, pulseless VT, asystole, pulseless electrical activity. Anaphylaxis, severe allergic reactions, and profound bradycardia or hypotension after other drugs tried may be used as a gtt.

Contraindication:
None when used in a life-threatening situation
Patients with angle-closure glaucoma, shock (other than anaphylactic shock), organic brain damage, cardiac dilation, coronary insufficiency, cerebral arteriosclerosis or labor and delivery. Do not use to treat overdose of adrenergic blocking agents.

Precaution:
High doses do not improve survival or neurologic outcome and may contribute to post-resuscitation myocardial dysfunction. Raising blood pressure and increasing heart rate may cause myocardial ischemia, angina and increased myocardial oxygen demand. Higher doses may be required to treat poison/drug-induced shock. The effects of the drug may be potentiated by tricyclic antidepressants.

Adverse Effects:
Nervousness, tremor, headache, agitation, dizziness, weakness, cerebral hemorrhage, palpitations, hypertension, tachycardia, anginal pain, nausea and vomiting, and dyspnea.

Dose:

- Adult: Cardiac Arrest Epinephrine 1mg (10ml of 1:10,000) every 3-5 min as long as the patient remains pulseless. Unless a clear response to epinephrine is observed, consider a limit of 3 total doses.
    - For WHEEZING(Asthma): Epinephrine 0.5 mg IM every 20 minutes as needed for acute severe asthma unresponsive to multiple doses of inhaled beta-agonists
    - For STRIDOR(Croup): Epinephrine 2mg (1 mg/mL; 1:1000) mixed with 3mL of normal saline nebulized
    - *Anaphylaxis:* 0.5 mg (1mg/mL; 1:1000) IM every 10 minutes as needed
- Pediatric: Cardiac arrest- Epinephrine 0.01 mg/kg (0.1 ml/kg of 0.1mg/mL; 1:10,000) push (Max dose= 1 mg or 10 mL) every 3-5 min as long as the patient remains pulseless. Unless a clear response to epinephrine is observed, consider a limit of 3 total doses.
    - For WHEEZING: Epinephrine IM 0.01 mg/kg every 20 minutes as needed for Acute severe asthma unresponsive to inhaled beta-agonist
    - For STRIDOR: Epinephrine 2mg (2mL of 1 mg/mL; 1:1000) added to 3mL of Normal Saline via nebulizer
    - *Anaphylaxis:* 0.01 mg/kg (0.01 mL/kg of 1 mg/mL; 1:1000) IM up to 0.3 mg if patient was exposed to commonly recognized allergen and has respiratory distress or hypotension.

Epinephrine – “Push Dose” Pressor Administration

Action/Mechanism:

Stimulates alpha and beta-adrenergic receptors within the sympathetic nervous system. A potent cardiac stimulant, it strengthens the myocardial contraction (positive inotropic effect) and increases cardiac rate (positive chronotropic effect). I

Indication:
Immediate/temporizing treatment of hypotension, not due to hypovolemia, while preparing IV pressors.

Contraindication:
None when used in a life-threatening situation. Patients with angle-closure glaucoma, shock (other than anaphylactic shock), organic brain damage, cardiac dilation, coronary insufficiency, cerebral arteriosclerosis or labor and delivery. Do not use to treat overdose of adrenergic blocking agents.

Precaution:
If patients condition continues to worsen (decreasing mental status, increasing breathing difficulty, decreasing blood pressure) obtain medical direction to administer additional dose of epinephrine, treat for shock (hypoperfusion) and prepare to initiate basic life support measures (CPR, AED) If patient's condition improves, provide oxygen and treat for shock. Transport immediately.

Adverse Effects:
Nervousness, tremor, headache, agitation, dizziness, weakness, cerebral hemorrhage, palpitations, hypertension, tachycardia, anginal pain, nausea and vomiting, and dyspnea.

Dose:
- Adult: 0.5-2 mL's (5-20mcg) every 2-5 minutes to maintain blood pressure.
- Pediatric: 1 mcg/kg (0.1mL/kg) IV every 2-5 minutes to maintain blood pressure

How to make:
- Recipe 1 =10mL
    - Take a 10 ml syringe with 9 ml of normal saline
    - Into this syringe, draw up 1 ml of epinephrine from the cardiac amp (Cardiac amp contains Epinephrine 100 mcg/ml)
    - Now you have 10 mls of Epinephrine 10 mcg/ml
- Recipe 2 =50mL
    - Take a 50 ml syringe with 45 ml of normal saline
    - Into this syringe, draw up 5 ml of epinephrine from the cardiac amp (Cardiac amp contains Epinephrine 100 mcg/ml)
    - Now you have 50 mls of Epinephrine 10 mcg/ml
- Recipe 3 = 100mL
    - Draw up epinephrine 1 mg (preferred 1mg/mL but can use Cardiac amp contains Epinephrine 100 mcg/ml)
    - Inject epinephrine 1mg into NS 100 mL bag
    - You now have 100 mL of epinephrine 10mcg/mL

Fentanyl

Action/Mechanism:
Fentanyl is a potent synthetic narcotic with similar actions to those of Morphine and Demerol, but action is more prompt (<5min) and less prolonged (half-life 90 min). Fentanyl exhibits less hemodynamic effects than does Morphine or Demerol. Fentanyl is also less likely to cause nausea/vomiting.

Indication:
Patients with significant pain due to injury or medical condition

Contraindication:
Known allergy to Fentanyl or hypersensitivity to opiates. Major trauma to head, chest, abdomen or pelvis. Airway compromise, respiratory depression/insufficiency. Evidence of shock (hypotension). Myasthenia Gravis

Precaution:
Continuously monitor vitals, oximetry, and mental status before and after administration. Fentanyl should be administered SLOWLY (over 2 minutes). High doses may cause chest wall and jaw muscular rigidity with resultant difficult ventilation. Respiratory depression may outlast pain control effects.

Adverse Effects:
Sedation/decreased level of consciousness, respiratory depression/arrest, bradycardia, hypotension or hypertension, mild nausea and/or vomiting, increased intracranial pressure. Rule out significant trauma prior to administration.

Dose:

- Adult: 1-2 mcg/kg slowly IV/IM. Expected dose: 25-50 mcg. Max Dose: 100 mcg
- Pediatric: 0.5-1 mcg/km slowly IV/IM. Max Dose: 50 mcg.
    - 2 mcg/kg Nasal Max Dose= 100 mcg (administer ½ in each nostril)

Glucagon (GlucaGen)

Action/Mechanism:
Induces liver glycogen breakdown, releasing glucose from the liver. Blood glucose is raised within 10 minutes. Has a half-life of 8 to 18 minutes.

Indication:
Treatment of severe hypoglycemia

Contraindication:
Known hypersensitivity to drug, and in patients with pheochromocytoma or with insulinoma (tumor of pancreas).

Precaution:
Give with caution to patients that have low levels of releasable glucose (e.g., adrenal insufficiency, chronic hypoglycemia, and prolonged fasting). Potentiates oral anticoagulants. Depletes glycogen stores especially in children and adolescents.

Adverse Effects:
Hyperglycemia (excessive dosage), nausea and vomiting hypersensitivity reactions (anaphylaxis, dyspnea, hypotension, rash), increased blood pressure, and pulse; this maybe greater in patients taking beta-blockers.

Dose:

- Adult: Give 1 mg. IM, after reconstituting powder and sterile water, for symptomatic diabetic patient whose IV access has been difficult.
- Pediatric: 0.01-0.02 mg/kg (max dose of 1 mg) IM if no IV/IO access after reconstituting powder and sterile water, for symptomatic diabetic patient whose IV access has been difficult.

Oral Glucose

Action/Kinetics: Increases blood sugar levels

Indications:
Patient meets all of the following criteria:

- Altered mental status - Known history of diabetes mellitus

Contraindications:
Unconsciousness, known diabetic who has not taken insulin for days, patient who is unable to swallow

Precaution:

Adverse Effects:
None when given properly. May be aspirated by the patient without gag reflex.

Dose: Administer one tube between the patient's cheek and gums.

Ibuprofen (Motrin/Advil)

Action/Mechanism:
Ibuprofen is a non-steroidal anti-inflammatory agent (NSAID) with analgesic effects, anti-inflammatory, and antipyretic effects. NSAIDs are thought to exert their effects by inhibiting

prostaglandin synthesis by inhibiting the cyclooxygenase (COX) enzyme, which catalyzes the conversion of arachidonic acid to prostaglandin and endoperoxide. Prostaglandins are a modulator of inflammation and are also involved in thermoregulation, pain transmission, and platelet aggregation.

Indication:
Mild to moderate pain. Fever Control.

Contraindication:
Avoid NSAIDS in women who are pregnant or could be pregnant. Not to be used in patients with history of GI Bleeding (ulcers) or renal insufficiency (i.e. chronic kidney disease). Not to be used in patients with allergies to aspirin or other NSAID drugs. Avoid in patients currently taking anticoagulants, such as Coumadin. Avoid use for immune-compromised patients (on chemotherapy, with autoimmune disorders, etc.) Not to be used in patients less than 6 months old.

Precaution:
Ibuprofen is not indicated for the treatment of abdominal pain.

Adverse Effects:
GI bleeding, Nausea/vomiting, Headache, Drowsiness, Abdominal pain, Dyspepsia, Diarrhea.

Dose:

- Adult: 400-600 mg PO q4-6h prn Max: 2400 mg/day)
- Pediatric 6 months and older: 10 mg/kg PO (q6-8h prn) Max: 600mg

Ipratropium (Atrovent)

Action/Mechanism:
Inhibits vagally mediated reflexes by antagonizing acetylcholine at muscarinic receptors on bronchial smooth muscle.

Indication:
Either Alone or with other bronchodilators, especially beta adrenergics, is used for treatment of bronchospasm associated with chronic obstructive pulmonary disease, including asthma, chronic bronchitis, and emphysema.

Contraindication:
Hypersensitivity to the drug, atropine and its derivatives, and those with a history of hypersensitivity to soy lecithin or related food products such as soybeans and peanuts.

Precaution:
Use cautiously in patients with angle-closure glaucoma, prostatic hyperplasia, and bladder-neck obstruction. Avoid leakage around the face mask, temporary blurring of vision or eye pain may occur.

Adverse Effects:
Dizziness, headache, nervousness, palpitations, hypertension, cough, blurred vision, rhinitis, epistaxis, GI distress, chest pain, flu-like symptoms.

Dose:

- Adult/Peds- 0.5mg added to the nebulized albuterol. May repeat neb of albuterol 2.5 mg with ipratropium 0.5mg x 1

Ketamine HCL

Action/Mechanism:
Ketamine is a dissociative anesthetic agent, structurally similar to phencyclidine (PCP). It is unique among sedative agents in that it provides analgesia along with its amnestic and sedative effects.

Indication:
As an induction agent in the performance of the Rapid Sequence Induction procedure. As a sedative in Excited Delirium. For pain and procedure-related anxiety management.

Contraindication:
Increased ICP, severe HTN, aneurysms, acute heart failure

Precaution:
Caution should be used in the hypertensive patient and in the patient with existing tachyarrhythmia

Adverse Effects:
Laryngospasm: this very rare adverse reaction presents with stridor and respiratory distress.

- After every administration of ketamine:
    - Prepare to provide respiratory support including bag-valve-mask ventilation and suction which are generally sufficient in rare cases of laryngospasm.
    - Institute cardiac monitoring, pulse oximetry and continuous waveform capnography
    - Establish IV or IO access, check blood glucose
    - Establish and maintain physical restraint.
- Emergence reaction: presents as anxiety, agitation, apparent hallucinations or nightmares as ketamine is wearing off. For severe reactions, consider benzodiazepine.
- Nausea and Vomiting: always have suction available after ketamine administration. Give antiemetic as needed.
- Hypersalivation: Suction usually sufficient. If profound hypersalivation causing airway difficulty, consult Medical Control for Atropine 0.5mg/IV.

Dose:

- Adult:
    - Violent patient:

        - Intramuscular (IM) – 4 mg/kg once (max 300 mg)
        - IV/IO – 1 mg/kg every 10 min to the desired effect (max dose 200 mg)
    - Pain or Procedural-related Anxiety:
        - IV/IO – 0.1-0.3 mg/kg (max 30mg) diluted in 100mL of normal saline IV/IO drip over 15 minutes
- Pediatric: ONLY FOR USE in patients over the age of 2.--move below to peds
    - Violent patient:
        - Intramuscular (IM) – 3 mg/kg once (max 300 mg)
        - IV/IO – 1 mg/kg once (max dose 200 mg)
    - Pain or Procedural-related Anxiety:
        - IV/IO – 0.1-0.3 mg/kg (max 30mg) diluted in 100mL of normal saline IV/IO drip over 15 minutes

Special Considerations:

- Some patients experience an "emergence phenomenon" in which a patient experiences disturbing dreams as they emerge from Ketamine induced dissociation.
- Emergence phenomena are less of a concern when Ketamine is used as an induction agent for RSI after which the patient is generally sedated with benzodiazepines for a substantial period.

Ketorolac (Toradol)

Action/Mechanism:
Inhibition of prostaglandin synthesis by competitive blocking of the enzyme cyclooxygenase (COX). Ketorolac is a non-selective COX inhibitor. Ketorolac is a potent non-steroidal anti-inflammatory drug (NSAID) often used as an analgesic.

Indication:
Moderate to severe acute pain management. Consider in isolated extremity injuries such as strains or sprains, non-complicated isolated fractures, known kidney stones, acute exacerbations of chronic back pain.

Contraindication:
Patients who are actively bleeding or have incomplete bleeding control, such as trauma. Patients at high risk for bleeding, including current use of Aspirin, NSAIDs, or blood thinners. Patients with known or suspected renal disease. Significant volume depletion or dehydration. History of peptic ulcer disease or GI bleed. Hypersensitivity to NSAIDS or ASA. Pregnant or nursing. Elderly (relative).

Precaution:
Separate use from other NSAIDs by 6 hours.

Adverse Effects:
Dyspepsia

Dose:

- Adult: 15mg IV/IO Single dose.
- Pediatric: 0.5mg/kg IV (max 15mg), single dose only, ONLY FOR USE in patients over the age of 2.

Lidocaine

Action/Mechanism:
Decreases ventricular excitability without depressing the force of ventricular contractions by increasing the stimulation threshold of the ventricle during diastole. Onset of action should occur within 2 minutes and last approximately 10 to 20 minutes. Metabolized in the liver and excreted in the urine

Indication:
Cardiac arrest from VF/VT (class II B) Stable VT, wide-complex tachycardias of uncertain type, wide-complex PSVT (class IIB). Used to stabilize patients converted from VT/VF. Occasionally used in control of symptomatic criteria PVC's.

Contraindication:
Hypersensitivity to the drug. Stokes-Adams syndrome, Wolff-Parkinson-White syndrome, severe degrees of SA, AV, or intraventricular block (when no pacemaker is present.).

Precaution:
Do not administer with sinus bradycardia, second or third degree AV blocks and idioventricular rhythms. Prophylactic use in AMI patients is not recommended. Discontinue infusion immediately if signs of toxicity develop. Elderly clients who have hepatic or renal disease or who weigh less than 45.5 kg. Should be watched closely for adverse side effects. Toxicity can occur due to reduced metabolism of lidocaine.

Adverse Effects:
Anaphylaxis, bradycardia, hypotension, cardiovascular collapse, seizures, malignant hyperthermia, respiratory depression, tremors, lightheadedness, confusion, tinnitus, blurred or double vision, and vomiting

Dose:
- Adult:
    - V tach - Lidocaine 100 mg. (1.0-1.5 mg/kg) IV over two minutes. Use 1⁄2 dose, i.e., 50 mg. if patient is over age 70 or if CHF or hepatic failure present. Repeat 0.5 to 0.75 mg/kg every 5 to 10 minutes; maximum total dose: 3 mg/kg.
    - Cardiac arrest from VF/VT - Lidocaine 100 mg. (1.5 mg/kg) may repeat lidocaine 100mg. IV or 200 mg. ET followed by defib. Drip – 2gm/500cc's administered 1-4 mg/min. Always preceded by a bolus.
- Pediatric:
    - Cardiac Arrest – 1 mg/kg IV/ET/IO. Maintenance IV/IO Follow bolus with continuous 20 to 50 mcg/kg/minute. Per manufacturer, do not exceed 20 mcg/kg/minute in patients with shock, hepatic disease, cardiac arrest, or CH

Lorazepam

Action/Mechanism:
Though the drug is still widely used as an anticonvulsant, it is relatively weak and of shorter duration than diazepam. Rapid IV administration may be followed by respiratory depression and excessive sedation. Lorazepam is frequently used to treat anxiety and stress. In emergency care, it is used to treat alcohol withdrawal and grand mal seizure activity. Benzodiazepines act on the limbic, thalamic, and hypothalamic regions of the CNS to potentiate the effects of inhibitory neurotransmitters, raising the seizure threshold in the motor cortex. It may also be used in conscious patients during cardioversion to induce amnesia and sedation.

Indication:
Status epilepticus, acute anxiety states, acute alcohol withdrawal, Procedural (cardioversion) anxiolysis

Contraindications:
Hypersensitivity to the drug, acute narrow & open angle glaucoma, Hypotension, Head injury, CNS depression, Respiratory depression

Precautions:
Lorazepam may precipitate CNS depression and psychomotor impairment when the patient is taking CNS depressant medications. Should not be administered with other drugs because of possible precipitation (incompatible with most fluids; should be administered into an IV of normal saline solution).

Adverse Effects:
Hypotension, Reflex tachycardia, Respiratory depression, Ataxia, Psychomotor impairment, Confusion, Nausea/Vomiting

Dose:
- Adult:
    - Status Epilepticus: 4 mg slow IV (<2 mg/min) or IM. Agitation / Anxiety Relief: 0.5 - 2 mg slow IV (<2 mg/min) or IM
- Pediatrics:
    - Status Epilepticus: 0.1 mg / kg (max 4 mg per dose) slow IV (<2 mg/min) or IM

Special Considerations:
- Pregnancy safety: Category D - dangerous to fetus, but benefits to mother MAY outweigh risks
- Must be diluted 1:1 with normal saline prior to IV administration, and given not more than 2mg/minute
- Has short duration of anticonvulsant effect
- Reduce dose by 50% in elderly patients
- Resuscitation equipment should be readily available, monitor respirations carefully! -

Magnesium Sulfate

Action/Mechanism:
Magnesium is an important cofactor for enzymatic reactions and plays an important role in neurochemical transmission and muscular excitability. Magnesium prevents or controls convulsions by blocking neuromuscular transmission and decreasing the amount of acetylcholine liberated at the end plate by the motor nerve impulse. Magnesium is said to have a depressant effect on the central nervous system, but it does not affect the mother, fetus or neonate when used as directed in eclampsia and pre- eclampsia. Magnesium acts peripherally to produce vasodilation.

Indication:
Parenteral anticonvulsant for the prevention and control of seizures in severe toxemia of pregnancy.

- Torsades de pointes
- Suspected hypomagnesemic state (eg. chronic alcoholism and chronic use of diuretics)
- Refractory ventricular fibrillation
- Asthma Refractory to other treatment

Contraindication:

Precaution:

Adverse Effects:
Signs of hypermagnesemia include: flushing, sweating, hypotension, depression of reflexes, flaccid paralysis, hypothermia, circulatory collapse, depression of cardiac function and central nervous system depression. These symptoms can precede fatal paralysis.

Dose:

- *Eclamptic seizures*: 4 gm IV (mixed in 50/100 ml of D5W/NS and administered over 4 minutes). May repeat once at 2 gm IV (mixed in 50/100 ml of D5W/NS and administered over 5 minutes)
- *Torsades de pointes and refractory VF*: 1-2 gm IV (mixed in 50/100 ml of D5W/NS and administered over 1-2 minutes) followed by a maintenance infusion (1 gm in 250 ml of D5W/NS administered at 30-60 gtt/min)
- *Asthma*
    - Adult: 2 grams in 50/100 ml of D5W/NS over 20 min
    - Pediatric: 50 mg/kg (Max dose = 2 gm) in 50/100 ml of D5W/NS over 20 min

Special Considerations:
Magnesium Sulfate Injections USP, 50% must be diluted to a concentration of 20% or less prior to IV infusion. Because magnesium is removed from the body solely by the kidneys, the drug should be used with caution in patients with renal impairment. Monitoring magnesium serum

levels and the patient's clinical status is essential to avoid the consequences of overdose in toxemia. Clinical indications that it is safe to give magnesium include the presence of patellar reflex (knee jerk) and absence of respiratory depression (approximately 16 breaths or more/ minute). Calcium Chloride should be immediately available to counteract the potential hazards of magnesium intoxication in eclampsia. Intravenous use of magnesium sulfate should not be given to mothers with toxemia of pregnancy during the two hours immediately preceding delivery.

Morphine

Action/Mechanism:
An opium-derivative, narcotic analgesic, which is a CNS depressant. Induces sleep and inhibits perception of pain by binding to opiate receptors, decreasing sodium permeability, and inhibiting transmission of pain pulses. Causes peripheral vasodilation, thereby decreasing venous blood return to the heart. Relieves pulmonary congestion, and lowers myocardial oxygen need. Metabolized in the liver and excreted in the urine. Onset 2-3 minutes, peak 30 minutes, and duration is 3-6 hours.

Indication:
Analgesic of choice in pain associated with myocardial infarction that is unresponsive to nitrates. Treatment of acute pulmonary edema associated with left ventricular failure, (if blood pressure is adequate). Used for sedation, to decrease anxiety and facilitate induction of anesthesia. Used for management of pain in trauma, kidney stones, etc...

Contraindication:
Hypersensitivity to opiates, acute bronchial asthma, heart failure secondary to lung disease, upper airway obstruction, acute alcoholism, convulsive states, and paralytic ileus.

Precaution:
Causes hypotension in volume-depleted patients. Administer slowly and titrate to effect. May cause apnea in asthmatic patients. May also cause increase ventricular response rate in presence of supraventricular tachycardias. Use with caution in the elderly, head injuries with increased intracranial pressure, COPD, severe hepatic or renal disease.

Adverse Effects:
Seizures (with large doses), hypotension, bradycardia, cardiac arrest, or may see tachycardia, and hypertension. Nausea and vomiting, rash, itching, urine retention, respiratory depression and arrest, hypothermia, and increased intracranial pressure may also been seen.

Dose:

- Adult: For persistent pain, 2-10 mg IV titrated to obtain pain relief (use caution in presence of COPD)

- Pediatric: 0.1mg/kg IV/IM (Max 4mg)

Midazolam

Action/Mechanism:
A short-acting benzodiazepine and CNS depressant 3-4 times as potent as diazepam. Depressant effects are dependent on dose, route of administration, presence of other medications, and age of patient. It can depress the ventilatory response to CO2 stimulation. It diminishes patient recall. Onset of action is 1-5 min with IV dosing, 5-15 min with IM dosing, and 10 min with IN dosing. Duration of action is generally less than 2 hours.

Indications:
Midazolam HCL can be given IV/IM/IN for:
- Anxiolysis / amnesia
- Sedation of intubated and mechanically ventilated patients
- Anticonvulsant effect in status epilepticus
- For procedure-related anxiety

Contraindications:
Hypersensitivity to midazolam or any component of the formulation; intrathecal or epidural injection of parenteral forms containing preservatives (ie, benzyl alcohol); use in premature infants for parenteral forms containing benzyl alcohol; acute narrow-angle glaucoma.

Precaution:
Use cautiously in patients with uncompensated acute illness and in elderly or debilitated patients. Administer slowly over at least 2 minutes. Use with caution in neonates. Versed does not protect against the intracranial pressure or against the pulse and blood pressure rise associated with intubation. Erythromycin may alter the metabolism of Versed. Oral contraceptives prolong the half-life. Sedatives effects may be antagonized by theophylline.

Adverse Effects:
Serious cardiac and respiratory events have been associated with the use of IV Midazolam HCl. These include airway obstruction, apnea, hypotension, depressed saturations, respiratory and cardiac arrest. Risk increases with patients over age 55, concomitant use of opioid analgesics, and rapid administration. It should only be given in the setting of continuous respiratory and cardiac monitoring. Other effects can include paradoxical behavior, excitement, coughing, headache, hiccups, nausea, vomiting, and nystagmus (especially in children)

Dose:
- *Status seizure*:
    - ADULT (>5min duration):
        - IV -- 2.5 - 5 mg slowly(1-2 min)
        - IM -- 5 - 10 mg
        - IN -- 10 mg, divide dose between nostrils (use atomizer)
    - PEDIATRIC (>5min duration):

        - IV -- 0.1 mg/kg with max 5 mg
        - IM -- 0.2 mg/kg with max 10 mg
        - IN -- 0.2 mg/kg, divide dose between nostrils (use atomizer) Max 10mg
- *Agitation* (intubated patient, behavioral emergencies):
    - 2.5 – 5 mg IV or 5 – 10 mg IM
- *Anxiety*
    - IV/IO -- 2.5- 5 mg, may repeat once in 10 minutes, if needed. Total max dose: 10mg
    - Intranasal (IN) -- 5 mg, may repeat once in 10 minutes to a max dose of 10mg
    - Intramuscular (IM) -- 2.5- 5 mg, may repeat every 10 minutes, if needed. Total max dose: 10mg
- *Cardioversion:*
    - 2.5 - 5 mg IV if patient alert

Naloxone (Narcan)

Action/Mechanism:
Overcomes effects of narcotic overdose including respiratory depression, sedation, and hypotension. It does not have any narcotic effect itself. It exhibits essentially no pharmacologic activity. Diagnostic agent in unconsciousness of unknown origin. Pure opioid antagonist that competes and displaces opioids at opioid receptor sites

Indication:
Suspected opioid overdose

Contraindication:
Hypersensitivity to the drug

Precaution:
May precipitate acute withdrawal symptoms in narcotic addicts. Effects of drug may not outlast effects of narcotics. Use with caution in patients with cardiac disease or those receiving cardiotoxic drugs. It is ineffective against respiratory depression caused by barbiturates, anesthetics, other non-narcotic agents, or pathologic conditions.

Adverse Effects:
VF, tachycardia, hypertension, nausea, vomiting, and diaphoresis, in higher doses. Tremors and withdrawal symptoms in narcotic-dependent patients

Dose:
- Adult: If suspected narcotic overdose consider 2 mg Narcan IV. For physical findings consistent with narcotics overdose, may give 2 mg. Narcan IV.
- Pediatric: 0.1 mg/kg IV/IM/IN Max 2mg

Nitroglycerin

Action/Mechanism:
Primary action is relaxation of the vascular smooth muscle and dilatation of peripheral arteries and veins. Although venous effects predominate, nitro produces dilation of both arterial and venous beds. Promotes peripheral pooling of blood and decreases venous return to the heart, reducing left ventricular pressure (preload). Arteriolar relaxation reduces systemic vascular resistance and arterial pressure (afterload). Also increases blood flow through the collateral coronary vessels.

Indication:

- Control of pain associated with angina pectoris/myocardial infarction
- Relief of pulmonary edema caused by left-sided heart failure.

Contraindication:
Hypersensitivity to nitroglycerin, other nitrates or nitrites, or any component of the formulation (includes adhesives for transdermal product); concurrent use with phosphodiesterase-5 (PDE-5) inhibitors (avanafil, sildenafil, tadalafil, or vardenafil); concurrent use with soluble guanylate cyclase (sGC) stimulators (eg, riociguat).

Precaution:
If patient is wearing a nitroglycerin patch or paste, an additional administration may not be appropriate. If patient is taking prescribed Viagra, consult medical control regarding nitro administration.

Adverse Effects:
Headache, transient episodes of lightheadedness related to blood pressure changes, hypotension, syncope, crescendo angina, rebound hypertension, and anaphylactoid reactions. Abd pain and vomiting may also be seen.

Dose:

- One tablet S.L. 0.4 mg
- May repeat same dosage every 5 minutes x 3 if SBP remains 100 or greater if medical control gives authorization.

Norepinephrine (Levophed)

Actions/Mechanism:
Stimulates beta1 and alpha1 receptors in sympathetic nervous system, causing vasoconstriction, increased blood pressure, enhanced contractility, and decreased heart rate.

Indications:
Severe hypotension- due to cardiogenic, septic, or neurogenic shock either refractory to intravascular fluid boluses or in which intravascular fluid bolusing is contraindicated (e.g. pulmonary edema).

Contraindications:
Hypersensitivity to drug, hypotension caused by blood volume deficit (except in emergencies until blood volume replacement is completed), profound hypoxia or hypercarbia, mesenteric or peripheral vascular thrombosis

Precautions:
- Use IV pump only to infuse
- Monitor IV site closely for extravasation
- Watch for signs of inadequate peripheral tissue perfusion, pale-cyanotic-black
- Never leave patient unattended during infusion
- Monitor VS Q 5 minutes
- Infusions should be reduced gradually, avoiding abrupt withdrawal

Adverse Effects:
- CNS: headache, anxiety
- CV: bradycardia, severe hypertension, arrhythmias
- Respiratory: respiratory difficulty
- Skin: irritation with extravasation, necrosis
- Other: ischemic injury

Dose:
- Adult dose: 1 to 4 mcg/min
- Maintenance dose: Adjust the rate for a low normal blood pressure (usually 80 to 100 mm Hg systolic). The average maintenance dose ranges from 1 to12 mcg/min (maximum dose 30 mcg/min)
- Pediatric dose:0.1 – 2 mcg/kg/min; 2 mcg/kg/min max

Note:
Overdosage with norepinephrine may result in headache, severe hypertension, reflex bradycardia, marked increase in peripheral resistance, and decreased cardiac output. In case of accidental overdosage, as evidenced by excessive blood pressure elevation, discontinue norepinephrine until the condition of the patient stabilizes.

Ondansetron

Action/Mechanism:
Selective 5-HT3 receptor antagonist which blocks serotonin, both peripherally on vagal nerve terminals and centrally in the chemotrigger zone

Indication:
When non-sedating antiemetic is desirable - Prevention and treatment of severe nausea

Contraindication:
Known hypersensitivity/allergy to Zofran, patient's <1 yrs. of age

Precaution:
Use with caution in patients with impaired liver function. Rate of administration should not be less than 30 seconds but preferably over 2 to 5 minutes. NOTE: Zofran has no effect on motion sickness.

Adverse Effects:
Headache, dizziness, diarrhea, may cause pain at injection site.

Dose:

- Adult: 4mg IV (over 2-5 minutes) OR 4 mg IM injection. May repeat up to 8 mg with medical control approval.
- Pediatric: 0.1 mg/kg IV/IM. Max dose 4mg. NOT TO BE USED IN PATIENT'S UNDER 1 YRS OF AGE

Oxytocin

Action/Mechanism:
Stimulates contraction of the smooth muscles in the uterus, thereby constricting uterine blood vessels and controlling excessive bleeding or hemorrhage.

Indication:
Control of postpartum hemorrhage Contraindications: In the field oxytocin should not be used until after the baby is fully delivered. Be sure there is only one baby.

Contraindication:

Precaution:

Adverse Effects

- Fetal bradycardia (should not be administered prior to delivery of the infant)
- Uterine rupture
- Maternal hypotension, bradycardia and cardiac arrhythmia
- Nausea/vomiting
- Anaphylaxis

Dose:
Oxytocin may be started if bleeding continues:

- IM 10 units followed by IV/IO Infusion by adding 10-40 units to 500ml or 1000mL NS and titrating the infusion to decrease bleeding and patient comfort.

Sodium Bicarbonate

Action/Mechanism:
Neutralizes excess acids, returning blood and body fluid to a more normal pH, in which metabolic processes and medications work more effectively.

Indication:
Metabolic acidosis caused by circulatory insufficiency resulting from shock or severe dehydration, severe renal disease, cardiac arrest w/prolonged CPR, tricyclic overdoses, and hyperkalemia.

Contraindication:
None

Precaution:
Not recommended for routine use in cardiac arrest patients. Sodium bicarbonate inactivates norepinephrine and forms a precipitate with calcium. Use with caution in the elderly with renal or cardiovascular insufficiency with or without CHF.

Adverse Effects:
Gastric distention, belching, flatulence, hypokalemia, metabolic alkalosis, hypernatremia, hyperosmolarity, hyperirritability or tetany. Extravasation of IV sodium bicarbonate may cause chemical cellulitis with tissue necrosis.

Dose:

- Adult
    - Drug overdose: Consider Na Bicarb 50 mEq IV in tricyclic ingestions.
    - Symptomatic renal patient: Consider Na Bicarb 50 mEq IV.
    - Cardiac arrest-asystole-PEA: Consider Na Bicarb 50 mEq (1 amp) or 1 mEq/kg if arrest interval long or return of circulation after prolonged resuscitation. All subsequent doses 1⁄2 dose every 10 minutes.
- Pediatrics
    - Cardiac arrest asystole-PEA: Consider (1 mEq/cc) if arrest interval long or upon spontaneous circulation. Give 1 mEq/kg or 1 mL/kg IV/IO up to 50 cc.

Tranexamic Acid/TXA (Cyklokapron)

Action/Mechanisms:
Tranexamic acid is an anti-fibrinolytic agent that inhibits the conversion of plasminogen to plasmin and at the same time acts as a weak non-competitive inhibitor of plasmin thus arresting fibrinolysis. As a result, a stable clot can be formed and blood loss is reduced. TXA needs to be given broadly to save the most lives, so clinical judgement based on assessment is crucial. **When given within 3 hrs** of injury risk of bleeding death drops by 1/3. Studies have demonstrated improved outcomes when the interval from injury to administration is decreased, therefore early administration is recommended.

Indications:

- Blunt or penetrating trauma patient's ≥ 14 years of age, at high risk of ongoing internal hemorrhage or significant external bleeding, that meet the following:
    - Injury sustained within 3 hrs prior to administration. TXA must be administered within 3 hrs of injury. Administer as early as possible following gross bleeding control and other lifesaving interventions.
    - Systolic BP < 90mmHg and signs of ongoing hemorrhage, AND/OR
    - Tachycardia > 110bpm with signs of hypoperfusion (altered mental status, pallor, cool extremities) and signs of ongoing hemorrhage.
    - Considered in paramedics judgement to be at high risk of significant hemorrhage.
- Also indicated for excessive hemorrhage following delivery or delayed placenta delivery if within 3 hours of delivery.

Contraindications:

- Injuries > 3 hours old
- Patients < 14 years of age.
- Known hypersensitivity to drug

Precautions:

- Notify receiving hospital of TXA administration.
- Clearly document mechanism of injury, time injury/incident occurred, indications for administration and time of administration of TXA.
- TXA should NEVER be administered at a "wide open" rate.

Adverse Effects:
Hypotension (with rapid IV injection), Seizures in high doses (>2-10 grams), allergic dermatitis, diarrhea, nausea, vomiting, blurred vision.

Dose:
Mix 1g/10 ml of TXA in 100ml NS. Infuse over 10 min.