Iowa

EMS Clinical Treatment & Interventions

Guidelines

**From the**

|  |  |
| --- | --- |
|  | National Model EMS Clinical Guidelines |
|  | The guidelines listed in this document include only the treatment guidelines. This content is meant to be used within the context of the entire National Model EMS Clinical Guidelines version 2.1. The entirety of the Guidelines includes contextual, assessment-based, referenced information to consider. The intent of this document is to provide an overview of the treatment recommendations. |

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Contents

[Purpose and Notes 5](#_Toc526858422)

[New in the 2017 Edition 5](#_Toc526858423)

[Universal Care 6](#_Toc526858424)

[Universal Care Guideline 6](#_Toc526858425)

[Functional Needs 11](#_Toc526858426)

[Patient Refusals 12](#_Toc526858427)

[Cardiovascular 13](#_Toc526858428)

[Adult and Pediatric Syncope and Presyncope 13](#_Toc526858429)

[Chest Pain/Acute Coronary Syndrome (ACS)/ST-segment Elevation Myocardial Infarction (STEMI) 14](#_Toc526858430)

[Bradycardia 15](#_Toc526858431)

[Implantable Ventricular Assist Devices 17](#_Toc526858432)

[Tachycardia with a Pulse 18](#_Toc526858433)

[Suspected Stroke/Transient Ischemic Attack 21](#_Toc526858434)

[General Medical 22](#_Toc526858435)

[Abdominal Pain 22](#_Toc526858436)

[Abuse and Maltreatment 23](#_Toc526858437)

[Agitated or Violent Patient/Behavioral Emergency 24](#_Toc526858438)

[Anaphylaxis and Allergic Reaction 27](#_Toc526858439)

[Altered Mental Status 28](#_Toc526858440)

[Back Pain 29](#_Toc526858441)

[End-of-Life Care/Palliative Care 30](#_Toc526858442)

[Hyperglycemia 31](#_Toc526858443)

[Hypoglycemia 32](#_Toc526858444)

[Nausea-Vomiting 34](#_Toc526858445)

[Pain Management 35](#_Toc526858446)

[Seizures 40](#_Toc526858447)

[Shock 41](#_Toc526858448)

[Sickle Cell Pain Crisis 42](#_Toc526858449)

[Resuscitation 43](#_Toc526858450)

[Cardiac Arrest (VF/VT/Asystole/PEA) 43](#_Toc526858451)

[Adult Post-ROSC (Return of Spontaneous Circulation) Care 46](#_Toc526858452)

[Determination of Death/Withholding Resuscitative Efforts 47](#_Toc526858453)

[Do Not Resuscitate Status/Advance Directives/Healthcare Power of Attorney (POA) Status 49](#_Toc526858454)

[Termination of Resuscitative Efforts 50](#_Toc526858455)

[Pediatric-Specific Guidelines 52](#_Toc526858456)

[Brief Resolved Unexplained Event (BRUE) 52](#_Toc526858457)

[Pediatric Respiratory Distress (Bronchiolitis) 53](#_Toc526858458)

[Pediatric Respiratory Distress (Croup) 54](#_Toc526858459)

[Neonatal Resuscitation 55](#_Toc526858460)

[OB/GYN 56](#_Toc526858461)

[Childbirth 56](#_Toc526858462)

[Eclampsia/Pre-Eclampsia 59](#_Toc526858463)

[Obstetrical and Gynecological Conditions 60](#_Toc526858464)

[Respiratory 61](#_Toc526858465)

[Airway Management 61](#_Toc526858466)

[Bronchospasm (due to Asthma and Obstructive Lung Disease) 63](#_Toc526858467)

[Pulmonary Edema 65](#_Toc526858468)

[Trauma 66](#_Toc526858469)

[General Trauma Management 66](#_Toc526858470)

[Blast Injuries 69](#_Toc526858471)

[Burns 70](#_Toc526858472)

[Crush Injury 72](#_Toc526858473)

[Extremity Trauma/External Hemorrhage Management 73](#_Toc526858474)

[Facial/Dental Trauma 74](#_Toc526858475)

[Head Injury 75](#_Toc526858476)

[High Threat Considerations/Active Shooter Scenario 77](#_Toc526858477)

[Spinal Care 78](#_Toc526858478)

[Toxins and Environmental 79](#_Toc526858479)

[Poisoning/Overdose Universal Care 79](#_Toc526858480)

[Acetylcholinesterase Inhibitors (Carbamates, Nerve Agents, Organophosphates) Exposure 82](#_Toc526858481)

[Radiation Exposure 88](#_Toc526858482)

[Topical Chemical Burn 89](#_Toc526858483)

[Stimulant Poisoning/Overdose 91](#_Toc526858484)

[Cyanide Exposure 92](#_Toc526858485)

[Beta Blocker Poisoning/Overdose 93](#_Toc526858486)

[Bites and Envenomation 94](#_Toc526858487)

[Calcium Channel Blocker Poisoning/Overdose 95](#_Toc526858488)

[Carbon Monoxide/Smoke Inhalation 96](#_Toc526858489)

[Opioid Poisoning/Overdose 97](#_Toc526858490)

[Airway Respiratory Irritants 99](#_Toc526858491)

[Riot Control Agents 100](#_Toc526858492)

[Hyperthermia/Heat Exposure 101](#_Toc526858493)

[Hypothermia/Cold Exposure 103](#_Toc526858494)

[Drowning 106](#_Toc526858495)

[Dive (SCUBA) Injury/Accidents 107](#_Toc526858496)

[Altitude Illness 108](#_Toc526858497)

[Conducted Electrical Weapon Injury (e.g. TASER®) 110](#_Toc526858498)

[Electrical Injuries 111](#_Toc526858499)

[Lightning/Lightning Strike Injury 112](#_Toc526858500)

[APPENDICES 113](#_Toc526858501)

[I. Author, Reviewer and Staff Information 113](#_Toc526858502)

[II. Public Review Comment Contributors 113](#_Toc526858503)

[III. Universal Documentation Guideline 113](#_Toc526858504)

[IV. Medications 113](#_Toc526858505)

[V. Approved Abbreviations V. Approved Abbreviations 114](#_Toc526858506)

[VI. Burn and Burn Fluid Charts 118](#_Toc526858507)

[VII. Neurologic Status Assessment 124](#_Toc526858508)

[VIII. Abnormal Vital Signs 125](#_Toc526858509)

[IX. Evidence-Based Guidelines: GRADE Methodology 126](#_Toc526858510)

[X. 2011 Guidelines for Field Triage of Injured Patients 126](#_Toc526858511)

# Purpose and Notes

[**Universal Care**](#_Toc526850701) and [**Poisoning/Overdose Universal Care**](#_Toc461189109) guidelines are included to reduce the need for extensive reiteration of basic assessment and other considerations in every guideline.

While some specific guidelines have been included for pediatric patients, considerations of patient age and size (pediatric, geriatric and bariatric) have been interwoven in the guidelines throughout the document.

**Where IV access and drug routing is specified, it is intended to include IO access and drug routing when IV access and drug routing is not possible.**

Generic medication names are utilized throughout the guidelines.

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# Universal Care

## Universal Care Guideline

**Patient Management**

**Assessment**

1. Assess scene safety
   1. Evaluate for hazards to EMS personnel, patient, bystanders
   2. Determine number of patients
   3. Determine mechanism of injury
   4. Request additional resources if needed and weigh the benefits of waiting for additional resources against rapid transport to definitive care
   5. Consider declaration of mass casualty incident if needed
2. Use appropriate personal protective equipment (PPE)
3. Wear high-visibility, retro-reflective apparel when deemed appropriate (e.g. operations at night or in darkness, on or near roadways)
4. Consider cervical spine stabilization and/or spinal care if trauma
5. Primary survey

(**A**irway**, B**reathing, **C**irculation is cited below; although there are specific circumstances where **C**irculation, **A**irway, **B**reathing may be indicated such as cardiac arrest or major arterial bleeding)

* 1. Airway (assess for patency and open the airway as indicated)
     1. Patient is unable to maintain airway patency—open airway
        1. Head tilt chin lift
        2. Jaw thrust
        3. Suction
        4. Consider use of the appropriate airway management adjuncts and devices: oral airway, nasal airway, blind insertion, or supraglottic airway device, laryngeal mask airway, endotracheal tube
        5. For patients with laryngectomies or tracheostomies, remove all objects or clothing that may obstruct the opening of these devices, maintain the flow of prescribed oxygen, and reposition the head and/or neck
     2. Obstructed airway, laryngectomy, or tracheostomy – go to [**Airway Management**](#Airway)guideline
  2. Breathing
     1. Evaluate rate, breath sounds, accessory muscle use, retractions, patient positioning
     2. Administer oxygen as appropriate with a target of achieving 94-98% saturation for most acutely ill patients
     3. Apnea (not breathing) – go to [**Airway Management**](#Airway)guideline
  3. Circulation
     1. Control any major external bleeding [see [**Extremity Trauma/External Hemorrhage Management**](#ExtremTraum)guideline]
     2. Assess pulse
        1. If none – go to [**Cardiac Arrest**](#CardiacAr) guideline
        2. Assess rate and quality of carotid and radial pulses
     3. Evaluate perfusion by assessing skin color and temperature
        1. Evaluate capillary refill
  4. Disability
     1. Evaluate patient responsiveness: AVPU scale (Alert, Verbal, Pain, Unresponsive)
     2. Evaluate gross motor and sensory function in all extremities
     3. Check blood glucose in patients with altered mental status
     4. If acute stroke suspected – go to [**Suspected Stroke/Transient Ischemic Attack**](#Stroke) guideline
  5. Expose patient as appropriate to complaint
     1. Be considerate of patient modesty
     2. Keep patient warm

1. Secondary survey

The performance of the secondary survey should not delay transport in critical patients. See also secondary survey specific to individual complaints in other protocols. Secondary surveys should be tailored to patient presentation and chief complaint. The following are suggested considerations for secondary survey assessment:

* 1. Head
     1. Pupils
     2. Naso-oropharynx
     3. Skull and scalp
  2. Neck
     1. Jugular venous distension
     2. Tracheal position
     3. Spinal tenderness
  3. Chest
     1. Retractions
     2. Breath sounds
     3. Chest wall deformity
  4. Abdomen/Back
     1. Flank/abdominal tenderness or bruising
     2. Abdominal distension
  5. Extremities
     1. Edema
     2. Pulses
     3. Deformity
  6. Neurologic
     1. Mental status/orientation
     2. Motor/sensory

1. Obtain Baseline Vital Signs (An initial full set of vital signs is required: pulse, blood pressure, respiratory rate, neurologic status assessment)
   1. Neurologic status assessment [see [**Appendix VII**](#NeuroAssess)]involves establishing a baseline and then trending any change in patient neurologic status
      1. Glasgow Coma Score (GCS) is frequently used, but there are often errors in applying and calculating this score. With this in consideration, a simpler field approach may be as valid as GCS. Either AVPU (**A**lert, **V**erbal, **P**ainful, **U**nresponsive) or only the motor component of the GCS may more effectively serve in this capacity
   2. Patients with cardiac or respiratory complaints
      1. Pulse oximetry
      2. 12-lead EKG should be obtained early in patients with cardiac or suspected cardiac complaints
      3. Continuous cardiac monitoring, if available
      4. Consider waveform capnography (essential for patients who require invasive airway management) or digital capnometry
   3. Patient with altered mental status
      1. Check blood glucose
      2. Consider waveform capnography (essential for patients who require invasive airway management) or digital capnometry
   4. Stable patients should have at least two sets of pertinent vital signs. Ideally, one set should be taken shortly before arrival at receiving facility
   5. Critical patients should have pertinent vital signs frequently monitored
2. Obtain OPQRST history:
   1. **O**nset of symptoms
   2. **P**rovocation – location; any exacerbating or alleviating factors
   3. **Q**uality of pain
   4. **R**adiation of pain
   5. **S**everity of symptoms – pain scale
   6. **T**ime of onset and circumstances around onset
3. Obtain SAMPLE history:
   1. **S**ymptoms
   2. **A**llergies – medication, environmental, and foods
   3. **M**edications – prescription and over-the-counter; bring containers to ED if possible
   4. **P**ast medical history
4. look for medical alert tags, portable medical records, advance directives
5. look for medical devices/implants (some common ones may be dialysis shunt, insulin pump, pacemaker, central venous access port, gastric tubes, urinary catheter)
   1. **L**ast oral intake
   2. **E**vents leading up to the 911 call

In patients with syncope, seizure, altered mental status, or acute stroke, consider bringing the witness to the hospital or obtain their contact phone number to provide to ED care team

**Treatment and Interventions**

1. Administer oxygen as appropriate with a target of achieving 94-98% saturation
2. Place appropriate monitoring equipment as dictated by assessment – these may include:
   1. Continuous pulse oximetry
   2. Cardiac rhythm monitoring
   3. Waveform capnography or digital capnometry
   4. Carbon monoxide assessment
3. Establish vascular access if indicated or in patients who are at risk for clinical deterioration.
   1. If IO is to be used for a conscious patient, consider the use of .5 mg/kg of lidocaine 0.1mg/mL with slow push through IO needle to a maximum of 40 mg to mitigate pain from IO medication administration
4. Monitor pain scale if appropriate
5. Reassess patient

**Normal Vital Signs**

|  |  |  |  |
| --- | --- | --- | --- |
| Age | Pulse | Respiratory  Rate | Systolic  BP |
| Preterm less than 1 kg | 120-160 | 30-60 | 36-58 |
| Preterm 1 kg | 120-160 | 30-60 | 42-66 |
| Preterm 2 kg | 120-160 | 30-60 | 50-72 |
| Newborn | 120-160 | 30-60 | 60-70 |
| Up to 1 year | 100-140 | 30-60 | 70-80 |
| 1-3 years | 100-140 | 20-40 | 76-90 |
| 4-6 years | 80-120 | 20-30 | 80-100 |
| 7-9 years | 80-120 | 16-24 | 84-110 |
| 10-12 years | 60-100 | 16-20 | 90-120 |
| 13-14 years | 60-90 | 16-20 | 90-120 |
| 15 years or older | 60-90 | 14-20 | 90-130 |

**Glasgow Coma Scale**

|  |  |  |  |
| --- | --- | --- | --- |
| **ADULT GLASGOW COMA SCALE** | | **PEDIATRIC GLASGOW COMA SCALE** | |
| **Eye Opening (4)** |  | **Eye Opening (4)** |  |
| Spontaneous | 4 | Spontaneous | 4 |
| To Speech | 3 | To Speech | 3 |
| To Pain | 2 | To Pain | 2 |
| None | 1 | None | 1 |
| **Best Motor Response (6)** |  | **Best Motor Response (6)** |  |
| Obeys Commands | 6 | Spontaneous Movement | 6 |
| Localizes Pain | 5 | Withdraws to Touch | 5 |
| Withdraws from Pain | 4 | Withdraws from Pain | 4 |
| Abnormal Flexion | 3 | Abnormal Flexion | 3 |
| Abnormal Extension | 2 | Abnormal Extension | 2 |
| None | 1 | None | 1 |
| **Verbal Response (5)** |  | **Verbal Response (5)** |  |
| Oriented | 5 | Coos, Babbles | 5 |
| Confused | 4 | Irritable Cry | 4 |
| Inappropriate | 3 | Cries to Pain | 3 |
| Incomprehensible | 2 | Moans to Pain | 2 |
| None | 1 | None | 1 |
| **Total** |  | **Total** |  |

## Functional Needs

**Patient Treatment and Interventions**

Medical care should not intentionally be reduced or abbreviated during the triage, treatment, and transport of patients with functional needs, although the manner in which the care is provided may need to be modified to accommodate the specific needs of the patient.

## Patient Refusals

**Patient Treatment and Interventions**

* + - 1. Obtain a complete set of vital signs and complete an initial assessment, paying particular attention to the individual’s neurologic and mental status
      2. Determine the individual’s capacity to make a valid judgment concerning the extent of his/her illness or injury; if the EMS provider has doubts about whether the individual has the mental capacity to refuse or if the patient lacks capacity, the EMS provider should contact direct medical oversight
      3. If patient has capacity, clearly explain to the individual and all responsible parties the possible risks and overall concerns with regards to refusing care
      4. Perform appropriate medical care with the consent of the individual
      5. Complete the patient care report clearly documenting the initial assessment findings and the discussions with all involved individuals regarding the possible consequences of refusing additional prehospital care and/or transportation

# Cardiovascular

## Adult and Pediatric Syncope and Presyncope

**Patient Treatment and Interventions**:

1. Should be directed at abnormalities discovered in the physical exam or on additional examination and may include management of cardiac dysrhythmias, cardiac ischemia/infarct, hemorrhage, shock, and the like
   1. Manage airway as indicated
   2. Oxygen as appropriate
   3. Evaluate for hemorrhage and treat for shock if indicated
   4. Establish IV access
   5. Fluid bolus if appropriate
   6. Cardiac monitor
   7. 12-lead EKG
   8. Monitor for and treat arrhythmias (if present refer to appropriate guideline)

## Chest Pain/Acute Coronary Syndrome (ACS)/ST-segment Elevation Myocardial Infarction (STEMI)

**Patient Management**

**Assessment**

1. Signs and symptoms include chest pain, congestive heart failure, syncope, shock, symptoms similar to a patient’s previous MI
2. Assess the patient’s cardiac rhythm - treat pulseless rhythms, tachycardia, or symptomatic bradycardia [see **[Cardiovascular](#Cardio)** and [**Resuscitation**](#Resus)guidelines]
3. If the patient is dyspneic, hypoxemic, or has obvious signs of heart failure, EMS providers should administer oxygen as appropriate with a target of achieving 94-98% saturation [see [**Universal Care**](#Universal) guideline]
4. The 12-lead EKG is the primary diagnostic tool that identifies a STEMI; It is imperative that EMS providers routinely acquire a 12-lead EKG within 10 minutes for all patients exhibiting signs and symptoms of ACS
   1. The EKG may be transmitted for remote interpretation by a physician or screened for STEMI by properly trained EMS providers with or without the assistance of computer-interpretation
   2. Advance notification should be provided to the receiving hospital for patients identified as having STEMI
   3. Performance of serial EKGs is suggested
   4. All EKGs should be made available to treating personnel at the receiving hospital, whether brought in or transmitted from the field

**Patient Treatment and Interventions**

1. Administer aspirin; chewable, non-enteric-coated aspirin preferred (162 to 325 mg)
2. Establish IV access
3. Nitroglycerin 0.4 mg SL, can repeat q 3-5 minutes as long as SBP greater than 100 mmHg (if range not desired use q 3 minutes)
   1. The use of nitrates should be avoided in any patient who has used a phosphodiesterase inhibitor within the past 48 hours
   2. Examples are: sildenafil (Viagra®, Revatio®), vardenafil (Levitra®, Staxyn®), tadalafil (Cialis®, Adcirca®) which are used for erectile dysfunction and pulmonary hypertension. Also avoid use in patients receiving intravenous epoprostenol (Flolan®) or treporstenil (Remodulin®) which is used for pulmonary hypertension
   3. Administer nitrates with extreme caution, if at all, to patients with inferior-wall STEMI or suspected right ventricular (RV) involvement because these patients require adequate RV preload
4. Analgesia is indicated in STEMI when chest discomfort is unresponsive to nitrates; Morphine should be used with caution in unstable angina (UA)/non-STEMI due to an association with increased mortality
5. Transport and destination decisions should be based on local resources and system of care

## Bradycardia

**Patient Treatment, and Interventions**

1. Adult Management
   1. Manage airway as necessary
   2. Administer oxygen as appropriate with a target of achieving 94-98% saturation
   3. Initiate monitoring and perform 12-lead EKG
   4. Establish IV access
   5. Check blood glucose and treat hypoglycemia per the [**Hypoglycemia**](#Hypogly) and[**Hyperglycemia**](#Hypergly) guidelines
   6. Consider the following additional therapies if bradycardia and symptoms or hemodynamic instability continue:
      1. Atropine 0.5 mg IV q 3-5 minute (maximum total dose of 3 mg)
      2. Vasopressor medications (in order of preference)
         1. Epinephrine IV drip 0.02-0.2 mcg/kg/min titrated to a MAP greater than65 mmHg   
            **OR**
         2. Epinephrine by push dose (dilute boluses)
            1. Prepare 10 mcg/mL by adding 1 mL 0.1mg/mL Epinephrine to 9 mL normal saline, then administer 10-20 mcg boluses (1-2mL) every 2 minutes titrated MAP greater than 65mmHg

**OR**

* + - 1. Norepinephrine 0.02-0.4 mcg/kg/minute IV titrated to a MAP greater than65 mmHg
    1. Transcutaneous Pacing – If pacing is performed, consider sedation or pain control

1. Pediatric Management   
   Treatment is only indicated for patients who are symptomatic (pale/cyanotic, diaphoretic, altered mental status, hypoxic)
2. Initiate chest compressions for heart less than 60 and signs of poor perfusion (altered mental status, hypoxia, hypotension, weak pulse, delayed capillary refill, cyanosis)
3. Manage airway and assist ventilations as necessary with minimally interrupted chest compressions using a compression to ventilation ratio 15:2 (30:2 if single provider is present)
4. Administer oxygen as appropriate with a target of achieving 94-98% saturation
5. Initiate monitoring and perform 12-lead EKG
6. Establish IV access
7. Check blood glucose and treat hypoglycemia per the [**Hypoglycemia**](#Hypogly) guideline
8. Consider the following additional therapies if bradycardia and symptoms or hemodynamic instability continue:
   * 1. Epinephrine by push dose (dilute boluses). Prepare 10 mcg/mL by adding 1 mL 0.1mg/mL Epinephrine to 9 mL Normal Saline, then administer 0.01mg/kg (0.1ml/kg) maximum single dose 10mcg (1ml) every 3-5 minutes titrated to MAP greater than65mmHg
     2. Also consider atropine 0.01-0.02 mg/kg IV with minimum dose of 0.1 mg if increased vagal tone or cholinergic drug toxicity to maximum initial dose of 0.5mg (maximum total dose of 3 mg)
     3. Transcutaneous pacing – If pacing is performed, consider sedation or pain control
     4. Epinephrine may be used for bradycardia and poor perfusion unresponsive to ventilation and oxygenation
        1. It is reasonable to administer atropine for bradycardia caused by increased vagal tone or cholinergic drug toxicity

## Implantable Ventricular Assist Devices

**Patient Management**

**Assessment**

1. Assess for possible pump malfunction
   1. Assess for alarms
   2. Auscultate for pump sound “hum”
   3. Signs of hypoperfusion including pallor, diaphoresis, altered mental status
2. If the VAD pump has malfunctioned:
   1. Utilize available resources to troubleshoot potential VAD malfunctions and to determine appropriate corrective actions to restore normal VAD function:
      1. Contact the patient’s VAD-trained companion, if available
      2. Contact the patient’s VAD coordinator, using the phone number on the device
      3. Check all the connections to system controller
      4. Change VAD batteries, and/or change system controller if indicated
      5. Have patient stop all activity and assess for patient tolerance
      6. Follow appropriate cardiovascular condition-specific protocol(s) as indicated

**Patient Treatment and Interventions**

1. Manage airway as indicated
2. Cardiac monitoring
3. IV access
4. Acquire 12-lead EKG
5. If patient is experiencing VAD-related complications or cardiovascular problems, expedite transport to the medical facility where VAD was placed if patient’s clinical condition and time allows
6. If patient has a functioning VAD and is experiencing a non-cardiovascular-related problem, transport to a facility that is appropriate for the patient’s main presenting problem without manipulating the device
7. If patient has a functioning VAD andis hypoperfusing:
   1. Administer IV fluids (30 mL/kg isotonic fluid; maximum of 1 liter) over less than 15 minutes, using a push-pull method of drawing up the fluid in a syringe and pushing it through the IV
   2. May repeat up to 3 times based on patient’s condition and clinical impression for a total cumulative dose not exceed 3 L
8. If patient is in full cardiac arrest:
   1. CPR should not be performed if there is any evidence the pump is still functioning, the decision whether to perform CPR should be made based upon best clinical judgment in consultation with the patient’s VAD-trained companion and the VAD coordinator (or direct medical oversight if VAD coordinator unavailable)
   2. CPR may be initiated only where:
      1. You have confirmed the pump has stopped and troubleshooting efforts to restart it have failed, and
      2. The patient is unresponsive and has no detectable signs of life

## Tachycardia with a Pulse

**Patient Treatments and Interventions**

1. Adult Management
   1. Manage airway as necessary
   2. Administer oxygen as appropriate with a target of achieving 94-98% saturation.
   3. Initiate monitoring and perform 12-lead EKG
   4. Establish IV access
   5. Check blood glucose and treat hypoglycemia per the [**Hypoglycemia**](#Hypogly)guideline
   6. Consider the following additional therapies if tachycardia and symptoms or hemodynamic instability continue:
      1. **Regular Narrow Complex Tachycardia – Stable** (SVT)
         1. Perform vagal maneuvers
         2. Adenosine 6 mg IV (proximal site) followed by 10 mL fluid bolus
            1. If tachycardia continues, give adenosine 12 mg IV
            2. A third dose of adenosine,12 mg IV, can be given
         3. Diltiazem 0.25 mg/kg slowly IV over 2 minutes
            1. After 15 minutes, a second dose of diltiazem 0.35 mg/kg IV may be given if needed
            2. For patients older than 65, recommend initial dose of diltiazem 10 mg IV and a second dose of 20mg. For patients 65 and under, recommend a single dose of 20 mg
         4. Metoprolol 5 mg IV given over 1-2 minutes. May repeat as needed every 5 minutes for a total of 3 doses
      2. **Regular Narrow Complex Tachycardia – Unstable**
         1. Deliver a synchronized shock based on manufacturer’s recommendations
         2. For responsive patients, consider sedation and analgesia
      3. **Irregular Narrow Complex Tachycardia – Stable** (atrial fibrillation, atrial flutter, multifocal atrial tachycardia)
         1. Diltiazem 0.25 mg/kg slowly IV over 2 minutes
            1. After 15 minutes, a second dose of diltiazem 0.35 mg/kg IV may be given if needed
            2. For patients older than 65, recommend initial dose of diltiazem 10 mg IV and a second dose of 20mg. For patients 65 and under, recommend a single dose of 20 mg
         2. Metoprolol 5 mg IV given over 1-2 minutes

May repeat as needed every 5 minutes for a total of 3 doses

* + 1. **Irregular Narrow Complex Tachycardia – Unstable**
       1. Deliver a synchronized shock based on manufacturer’s recommendation
       2. For responsive patients, consider sedation
    2. **Regular Wide Complex Tachycardia – Stable** (ventricular tachycardia, supraventricular tachycardia, atrial fibrillation/flutter with aberrancy, accelerated idioventricular rhythms, pre-excited tachycardias with accessory pathways,)
       1. Amiodarone 150 mg IV over 10 minutes
          1. May repeat
       2. Procainamide 20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increases greater than50%, or maximum dose 17 mg/kg given
          1. Maintenance infusion: 1-4 mg/min
          2. Avoid if prolonged QT or CHF
       3. Lidocaine 1-1.5 mg/kg IV
          1. May be repeated at 5-minute intervals for a maximum dose of 3 mg/kg IV
       4. Adenosine 6 mg IV (proximal site) followed by 10 mL fluid bolus
          1. If monomorphic tachycardia continues, give adenosine 12 mg IV
    3. **Regular Wide Complex Tachycardia – Unstable**
       1. Deliver a synchronized shock based on manufacturer’s recommendation
       2. For responsive patients, consider sedation
    4. **Irregular Wide Complex Tachycardia – Stable** (atrial fibrillation with aberrancy, pre-excited atrial fibrillation (i.e. atrial fibrillation using an accessory pathway), MAT or polymorphic VT/torsades de pointes.
       1. Procainamide 20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increases 50%, or maximum dose 17 mg/kg given
          1. Maintenance infusion: 1-4 mg/min
          2. Avoid if prolonged QT or CHF
       2. If torsades, give magnesium 1-2 g IV over 10 minutes
       3. Amiodarone 150 mg IV over 10 minutes
          1. May repeat if needed
          2. Administration of amiodarone, if needed, should follow procainamide in patients with Wolff–Parkinson–White syndrome
    5. **Irregular Wide Complex Tachycardia – Unstable**
       1. Deliver a synchronized shock based on manufacturer’s recommendation
       2. For responsive patients, consider sedation

1. Pediatric Management
   1. Manage airway as necessary
   2. Administer oxygen as appropriate with a target of achieving 94-98% saturation
   3. Initiate monitoring and perform 12-lead EKG
   4. Establish IV access
   5. Check blood glucose and treat hypoglycemia per the[**Hypoglycemia**](#Hypogly)guideline
   6. Consider the following additional therapies if tachycardia and symptoms or hemodynamic instability continue:
      1. **Regular Narrow Complex Tachycardia – Stable** (SVT)
         1. Perform vagal maneuvers
         2. Adenosine 0.1 mg/kg (maximum of 6 mg)
            1. If unsuccessful, may repeat with 0.2 mg/kg (maximum of 12 mg)
      2. **Regular Narrow Complex Tachycardia – Unstable**
         1. Deliver a synchronized shock: 0.5-1 J/kg for the first dose
         2. Repeat doses should be 2 J/kg
      3. **Regular, Wide Complex Tachycardia - Stable**
         1. Consider adenosine 0.1 mg/kg (maximum of 6 mg) for SVT with aberrancy
         2. Otherwise give amiodarone 5 mg/kg IV (maximum of 150 mg) over 10 minutes
      4. **Regular, Wide Complex Tachycardia – Unstable**
         1. Synchronized cardioversion 0.5-1.0 J/kg

## Suspected Stroke/Transient Ischemic Attack

**Patient Management**

**Assessment**

1. Use a validated prehospital stroke scale and neurologic status assessment [see [**Appendix VII**](#NeuroAssess)]

**Treatment and Interventions**

1. Determine “last known well” time
2. Administer oxygen as appropriate with a target of achieving 94-98% saturation
3. If seizure activity present, treat per [**Seizures**](#Seiz) guideline
4. Check blood glucose level
   1. Treat only if glucose less than 60 mg/dL
5. Acquire 12-lead EKG, if possible
6. Hospital notification per local stroke plan

# General Medical

## Abdominal Pain

**Patient Treatment and Interventions**

1. Medication Administration:
2. Provide analgesia per the [**Pain Management**](#PnMan) guideline
3. Administer antiemetics per the [**Nausea-Vomiting**](#NV) guideline
4. Provide transport to an appropriate receiving facility. Consider specialty destination centers for conditions such as suspected abdominal aortic aneurysm
5. Reassess vital signs and response to therapeutic interventions throughout transport

## Abuse and Maltreatment

**Patient Treatment and Interventions**

1. Address life-threatening issues
2. Remove the patient to a safe place even if no medical indication for transport
3. Report concerns about potential abuse/maltreatment to law enforcement immediately, in accordance with state law, about:
   1. Caregivers impeding your ability to assess/transport patient
   2. Caregivers refusing care for the patient
4. For patients transported, report concerns to hospital and/or law enforcement personnel per mandatory reporting laws

## Agitated or Violent Patient/Behavioral Emergency

**Patient Treatment and Interventions**

1. Establish patient rapport
   1. Attempt verbal reassurance and calm patient prior to use of pharmacologic and/or physical management devices
   2. Engage family members/loved ones to encourage patient cooperation if their presence does not exacerbate the patient’s agitation
   3. Continued verbal reassurance and calming of patient following use of chemical/physical management device
2. Pharmacologic management
   1. Notes:
      1. Selection of medications for pharmacologic management should be based upon the patient’s clinical condition, current medications, and allergies in addition to EMS resources and medical oversight
      2. The medications are annotated to indicate when they are preferred for patients that are particularly high risk for violence as assessed by a validated scale – note that the dosing can be adjusted to achieve different levels of sedation
      3. The numbering of medications below is not intended to indicate a hierarchy/preference of administration
   2. Benzodiazepines
      1. Diazepam
         1. Adults:
            1. 5 mg IV; 2-5 minute onset of action  
               **OR**
            2. 10 mg IM; 15-30 minute onset of action
         2. Pediatrics:
            1. 0.05-0.1 mg/kg IV (maximum dose is 5 mg)  
               **OR**
            2. 0.1-0.2 mg/kg IM(maximum dose is 10 mg)
      2. Lorazepam
         1. Adults:
            1. 2 mg IV; 2-5 minute onset of action  
               **OR**
            2. 4 mg IM; 15-30 minute onset of action
         2. Pediatrics:
            1. 0.05 mg/kg IV (maximum dose is 2 mg)  
               **OR**
            2. 0.05 mg/kg IM (maximum dose is 4 mg)
      3. Midazolam
         1. Adults:
            1. 5 mg IV; 3-5 minute onset of action  
               **OR**
            2. 5 mg IM; 10-15 minute onset of action  
               **OR**
            3. 5 mg IN; 3-5 minute onset of action
         2. Pediatrics:
            1. 0.05-0.1 mg/kg IV (maximum dose 5 mg)  
               **OR**
            2. 0.1-0.15 mg/kg IM (maximum dose is 5 mg)  
               **OR**
            3. 0.3 mg/kg IN (maximum dose is 5 mg)
   3. Antipsychotics
      1. Droperidol (option for high violence risk)
         1. Adults:
            1. 2.5 mg IV; 10 minute onset of action  
               **OR**
            2. 5 mg IM; 20 minute onset of action
         2. Pediatrics: Not routinely recommended
      2. Haloperidol (Limited data available, optimal dose not established)
         1. Adults:
            1. 5 mg IV; 5-10 minute onset of action  
               **OR**
            2. 10 mg IM; 10-20 minute onset of action
         2. Pediatrics: Age 6-12 yo: 1-3 mg IM (maximum dose 0.15 mg/kg)
      3. Olanzapine   
         (*Note: Concurrent use of IM/IV benzodiazepines and olanzapine IM is not recommended as fatalities have been reported)*
         1. Adults: 10 mg IM; 15-30 minute onset of action
         2. Pediatrics:
            1. Age 6-11 yo: 5 mg IM *(limited data available for pediatric use)*
            2. Age 12-18 yo: 10 mg IM
      4. Ziprasidone
         1. Adults: 10 mg IM; 10 minute onset of action
         2. Pediatrics:
            1. Age 6-11 yo: 5 mg IM *(limited data available for pediatric use)*
            2. Age 12-18 yo: 10 mg IM
   4. Dissociative Agents (Provide Sedation and Anesthesia)
      1. Ketamine (option for high violence risk)
         1. Adults:
            1. 2 mg/kg IV; 1 minute onset of action  
               **OR**
            2. 4 mg/kg IM; 3-5 minute onset of action
         2. Pediatrics:
            1. 1 mg/kg IV  
               **OR**
            2. 3 mg/kg IM
   5. Antihistamines
      1. Diphenhydramine
         1. Pediatrics: 1 mg/kg IM/IV/PO (maximum dose of 25 mg)
3. Physical Management Devices
   1. Body
      1. Stretcher straps should be applied as the standard procedure for all patients during transport
      2. Physical management devices, including stretcher straps, should never restrict the patient’s chest wall motion
      3. If necessary, sheets may be used as improvised supplemental stretcher straps. Other forms of improvised physical management devices should be discouraged
      4. Supplemental straps or sheets may be necessary to prevent flexion/extension of torso, hips, legs by being placed around the lower lumbar region, below the buttocks, and over the thighs, knees, and legs
   2. Extremities
      1. Soft or leather devices should not require a key to release them
      2. Secure all four extremities to maximize safety for patient, staff, and others
      3. Secure all extremities to the stationary frame of the stretcher
      4. Multiple knots should not be used to secure a device

## Anaphylaxis and Allergic Reaction

**Patient Treatment and Interventions**

1. If signs of allergic reaction without signs of anaphylaxis, go to [**Step 4**](#_Hlk526862187)
2. If signs of anaphylaxis, administer epinephrine 1mg/mL at the following dose and route:
   1. Adult (25kg or more) 0.3 mg IM in the anterolateral thigh
   2. Pediatric (less than 25kg) 0.15 mg in the anterolateral thigh
   3. Epinephrine 1mg/mL may be administered from a vial or via auto-injector, if available
3. For urticaria or pruritus, administer a diphenhydramine 1 mg/kg, up to maximum dose of 50 mg IM, IV, or PO)
   1. The IV route is preferred for the patient in severe shock
   2. As a supplement to diphenhydramine given for urticaria, any H2-blocking antihistamine (e.g. famotidine, cimetidine) can be given IV or PO in conjunction with diphenhydramine
4. If respiratory distress with wheezing is present, consider administering
   1. Albuterol 2.5-5 mg nebulized   
      **AND/OR**
   2. Epinephrine 1mg/mL, 5mL nebulized
5. If stridor is present, consider administering epinephrine 1mg/mL, 5mL nebulized
6. If signs of anaphylaxis and hypoperfusion persist following the first dose of epinephrine, additional IM epinephrine can be repeated every 5-15 minutes at above noted doses
7. For signs of hypoperfusion, also administer 20 mL/kg isotonic fluid (normal saline or lactated Ringer’s) rapidly (over 15 minutes) via IV or IO, and repeat as needed for ongoing hypoperfusion
8. Consider an epinephrine IV drip (0.5 mcg/kg/minute) when cardiovascular collapse (hypotension with altered mental status, pallor, diaphoresis and/or delayed capillary refill) is present despite repeated IM doses of epinephrine in conjunction with at least 60 mL/kg isotonic fluid boluses
9. Transport as soon as possible, and perform ongoing assessment as indicated. Cardiac monitoring is not required, but should be considered for those with known heart problems or who received multiple doses of epinephrine

## Altered Mental Status

**Patient Treatment and Interventions**

1. Oxygen [see [**Universal Care**](#Universal) guideline]
2. Glucose [see [**Hypoglycemia**](#Hypogly) or[**Hyperglycemia**](#Hypergly)guidelines]
3. Naloxone [see [**Opioid Poisoning/Overdose**](#OD)guideline]
4. Restraint: physical and chemical [see [**Agitated or Violent Patient/Behavioral Emergency**](#Agitation) guideline]
5. Anti-dysrhythmic medication [see [**Cardiovascular**](#Cardio)section guidelines for specific dysrhythmia guidelines]
6. Active cooling or warming [see [**Hypothermia/Cold Exposure**](#Hypotherm)or [**Hyperthermia/Heat Expsoure**](#Hypertherm) guidelines]
7. IV fluids [see fluid administration doses in [**Shock**](#Shck)and [**Hypoglycemia**](#Hypogly) or [**Hyperglycemia**](#Hypergly) guidelines]
8. Vasopressors [see [**Shock**](#Shck)guideline]

## Back Pain

**Patient Treatment and Interventions**

1. Medication Administration
   1. Provide analgesia, per [**Pain Management**](#PnMan)guideline
   2. Administer antiemetics, per [**Nausea-Vomiting**](#NV)guideline
   3. Provide transport to an appropriate receiving facility – Consider specialty destination centers for conditions such as suspected aortic emergency
   4. Reassess vital signs and response to therapeutic interventions throughout transport

## End-of-Life Care/Palliative Care

**Patient Management**

**Assessment**

1. Perform general patient management
2. If the patient is able to communicate and has the capacity to make decisions regarding treatment and transport, consult directly with the patient before treatment and/or transport
3. If the patient lacks the capacity to make decisions regarding treatment and/or transport, identify any advanced care planning in place for information relating to advanced care planning and consent for treatment
   1. Advanced care directives
   2. MOLST/POLST or similar forms
   3. Guardian, power of attorney, or other accepted healthcare proxy

**Patient Treatment, and Interventions**

1. If the patient requires pain relief [see [**Pain Management**](#PnMan)guideline]
2. If the adult patient is experiencing severe respiratory distress, consider:
   1. Midazolam 2 to 5 mg IV  
      **OR**
   2. Fentanyl 25 mcg mixed in 2 mL saline nebulized or other analgesics
3. If the patient has nausea [see [**Nausea and Vomiting**](#NV)guideline]
4. If the patient has excessive secretions, provide suctioning
5. If the adult patient is anxious, consider:
   1. Benzodiazepines

**OR**

* 1. Haldol 5 mg IV  
     **OR**
  2. Geodon 20 mg IM

1. If the patient appears dehydrated
   1. Encourage PO fluid intake if patient is able to swallow
   2. If available, offer ice chips and swabs soaked in ice water
   3. Consider administration of normal saline at 10 to 20 mL/kg IV
2. In collaboration with hospice or palliative care provider, coordinate with guardian, power of attorney, or other accepted healthcare proxy if non-transport is considered

## Hyperglycemia

**Patient Treatment and Interventions**

1. If altered level of consciousness, stroke, or sepsis/septic shock, treat per [**Altered Mental Status**](#AMS), [**Suspected Stroke/Transient Ischemic Attack**](#Stroke)**,** or[**Shock**](#Shck) guidelines accordingly
2. If findings of hyperkalemia are present, administer IV fluids and consider administration of:
   1. Calcium chloride – 1 gm IV/IO over 5 minutes, ensure IV patency and do not exceed 1 mL per minute

**OR**

* 1. Calcium gluconate – 2 gm IV/IO over 5 minutes, with constant cardiac monitoring

1. If findings of hyperkalemia, administer sodium bicarbonate 1 mEq /kg (max dose of 50 mEq) IV bolus over 5 minutes and consider albuterol 5.0 mg via small volume nebulizer
2. If glucose greater than 250 mg/dL with symptoms of dehydration, vomiting, abdominal pain, or altered level of consciousness:
   1. Provide volume expansion with normal saline bolus
      1. Adult: Normal saline 1 L bolus IV; reassess and rebolus 1L if indicated
      2. Pediatric: Normal saline 10 mL/kg bolus IV, reassess, and repeat up to 40 mL/kg total
3. Reassess patient
   1. Reassess vital signs, mental status, and signs of dehydration
   2. If mental status changes, reassess blood glucose level and provide appropriate treatment if hypoglycemia has developed
4. Disposition
   1. Transport to closest appropriate receiving facility

## Hypoglycemia

**Patient Treatment and Interventions**

1. If altered level of consciousness or stroke, treat per [**Altered Mental Status**](#AMS) or [**Suspected Stroke/Transient Ischemic Attack**](#Stroke)guidelines accordingly
2. If blood glucose is 60 mg/dL or less administer one of the following:
   1. Conscious patient with a patent airway:
      1. Glucose, oral (in form of glucose tablets, glucose gel, tube of cake icing, etc.)
         1. Adult Dosing: 25 g
         2. Pediatric Dosing: 0.5-1 g/kg
   2. Unconscious patient, or patients who are unable to protect their own airway:
      1. Dextrose IV – administer in incremental doses until mental status improves or maximum field dosing is reached
         * 1. Maximum field adult dosing: 25 g of 10-50% dextrose IV

50 mL of 50% dextrose

100 mL of 25% dextrose

250 mL of 10% dextrose

* + - * 1. Maximum field pediatric dosing: 0.5-1 g/kg of 10-25% dextrose IV

2 – 4 mL/kg of 25% dextrose

4 – 8 mL/kg of 12.5% dextrose

5 – 10 mL/kg of 10% dextrose

* + 1. Glucagon IM/IN
       1. Adult dosing: 1 mg IM/IN
       2. Pediatric dosing:

1. 1 mg IM/IN if 20 kg (or 5 yo)
2. 0.5 mg IM/IN if less than 20 kg (or less than 5 yo)
3. Remove or disable insulin pump if above treatments cannot be completed
4. For patients with an insulin pump who are hypoglycemic with associated altered mental status (GCS <15):

Stop the pump, disconnect or remove at insertion site if patient cannot ingest oral glucose or ALS is not available

Leave the pump connected and running if able to ingest oral glucose or receive ALS interventions

1. Reassess patient
   1. Reassess vital signs and mental status
   2. Repeat check of blood glucose level if previous hypoglycemia and mental status has not returned to normal
      1. It is not necessary to repeat blood sugar if mental status has returned to normal
   3. If maximal field dosage of dextrose solution does not achieve euglycemia and normalization of mental status:
      1. Initiate transport to closest appropriate receiving facility for further treatment of refractory hypoglycemia
      2. Evaluate for alternative causes of altered mental status
      3. Continue treatment of hypoglycemia using dextrose solutions as noted above
2. Disposition
   1. If hypoglycemia with continued symptoms, transport to closest appropriate receiving facility
   2. Hypoglycemic patients who have had a seizure should be transported to the hospital regardless of their mental status and response to therapy
   3. If symptoms of hypoglycemia resolve after treatment, release without transport should only be considered if **all** of the following are true:
      1. Repeat glucose is greater than 80 mg/dL
      2. Patient takes insulin or metformin to control diabetes
      3. Patient returns to normal mental status, with no focal neurologic signs/symptoms after receiving glucose/dextrose
      4. Patient can promptly obtain and will eat a carbohydrate meal
      5. Patient or legal guardian refuses transport and EMS providers agree transport not indicated
      6. A reliable adult will be staying with patient
      7. No major co-morbid symptoms exist, like chest pain, shortness of breath, seizures, intoxication
      8. A clear cause of the hypoglycemia is identified (e.g. missed meal)

## Nausea-Vomiting

**Patient Treatment and Interventions**

1. Anti-emetic medication administration (optional, if available; any that can be given IV can be given IO):
   1. Ondansetron (contraindicated for suspected or known diagnosis of prolonged QT syndrome)
2. Adult:
   * + 1. 4mg IV/PO/SL  
          **OR**
       2. 4 mg SL of the ODT formulation
3. Pediatric (6 months old –14 yo): 0.15 mg/kg IV/PO (maximum dose of 4 mg)
   1. Metoclopramide
4. Adult: 10 mg IV/IM
5. Pediatric (over 2 yo only and greater than12kg):
   * + 1. 0.1 mg/kg IM   
          **OR**
       2. IV (maximum 10 mg)
          1. May repeat x 1 in 20 -30 minutes if no relief
   1. Prochlorperazine
6. Adult: 5 mg IV/IM
7. Pediatric (over 2 yo only and greater than12kg):
   * + 1. 0.1 mg/kg slow IV   
          **OR**
       2. Deep IM (maximum 10 mg)
   1. Diphenhydramine
8. Adult: 12.5-25 mg IV/IM/PO
9. Pediatric (over 2 yo only and greater than12kg): 0.1 mg/kg IV (maximum 25 mg)
   1. Isopropyl alcohol – Allow patient to inhale vapor from isopropyl alcohol wipe 3 times every 15 minutes as tolerated
10. If signs of hypovolemia, administer Normal Saline
    1. Adult: 500 mL IV/IO unless contraindicated (e.g. h/o CHF, renal failure)
    2. Pediatric: Consider 10-20 mL/kg IV fluid unless contraindicated (e.g. by potential fluid overload)
    3. May repeat as indicated

## Pain Management

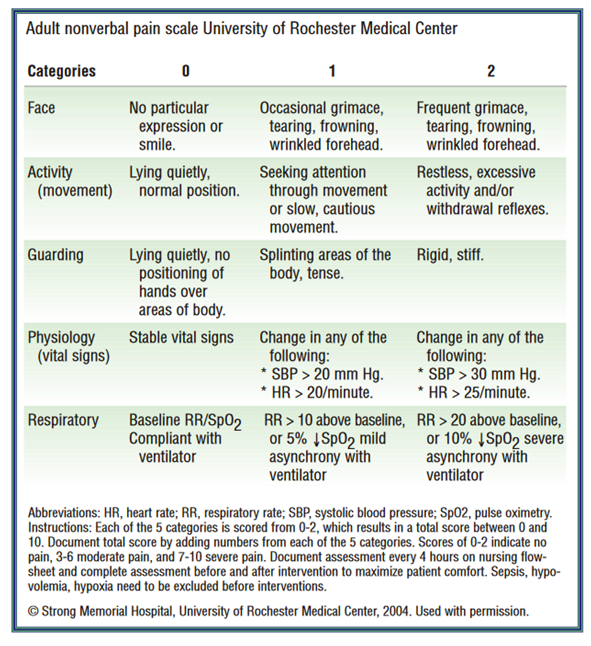
**Patient Management**

**Assessment**

1. Determine patient’s pain score assessment using standard pain scale.
   1. Less than 4 yo: Observational scale (e.g. Faces, Legs, Arms, Cry, Consolablity [FLACC] or Children’s Hospital of Eastern Ontario Pain Scale (CHEOPS)
   2. 4-12 yo: Self-report scale (e.g. Wong Baker Faces, Faces Pain Scale [FPS], Faces Pain Scale Revised [FPS-R])
   3. Greater than 12 yo: Self-report scale (Numeric Rating Scale [NRS])

**Treatment and Interventions**

1. Place patient on cardiac monitor per patient assessment
2. If available, consider use of non-pharmaceutical pain management techniques
   1. Placement of the patient in a position of comfort
   2. Application of ice packs and/or splints for pain secondary to trauma
   3. Verbal reassurance to control anxiety
3. If not improved and patient is experiencing moderate discomfort consider use of analgesics as available and as permitted by direct medical oversight
   1. Acetaminophen 15 mg/kg PO (maximum dose 1 g)
   2. Ibuprofen 10 mg/kg PO for patients greater than 6 months of age (maximum dose 800 mg)
   3. Fentanyl 1 mcg/kg IN or IM (maximum initial dose of 100 mcg)
   4. Ketorolac (one-time dose only):
      1. Adult: 30 mg IM in adults who are not pregnant
      2. Pediatric: (2-16 yo) 1mg/kg IM (maximum dose 30 mg)
      3. Geriatric: 1mg/kg IM (maximum dose 30 mg)
   5. Morphine sulfate: 0.1 mg/kg IM (maximum initial dose 15 mg)
   6. Ketamine: 0.5mg/kg IN (maximum initial dose 25mg; maximum cumulative dose of 100mg)
   7. Nitrous Oxide
4. Establish IV of normal saline per patient assessment
5. If the patient is experiencing severe to excruciating pain, administer analgesics
6. Ketorolac (one-time dose only):
   1. Adult: 15 mg IV in adults who are not pregnant
   2. Pediatric: (2-16 yo) 0.5mg/kg (maximum dose 15 mg)
7. Morphine sulfate: 0.1 mg/kg IV or IO (maximum initial dose 10 mg)
8. Fentanyl: 1 mcg/kg IV or IO (maximum initial dose 100 mcg)
9. Hydromorphone: 0.015mg/kg IM, IV, or IO (maximum initial dose 2 mg; maximum cumulative dose of 4 mg)
10. Ketamine: 0.25mg/kg IM, IV, IO (maximum initial dose 25mg; maximum cumulative dose 100mg)
11. Consider administration of oral, sublingual, or IV antiemetics to prevent nausea in high risk patients [see [**Nausea/Vomiting**](#NV) guideline]
12. If indicated based on pain assessment, and vital signs allow, repeat pain medication administration (excluding ketorolac) after 5 minutes of the previous dose
13. Transport in position of comfort and reassess as indicated



From: Odhner M, Wegman D, Freeland N, Ingersoll G. Evaluation of a newly developed non-verbal pain scale (NVPS) for assessment of pain in sedated critically ill patients. Available at: http://www.aacn.org /AACN/NTIPoster.nsf/vwdoc/2004NTI Posters. Accessed July 18, 2017.

##### Universal Pain Assessment Tool

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Verbal Descriptor Scale** |  | | | | | |
| No Pain | Mild Pain | Moderate Pain | Severe Pain | Very Severe Pain | Excruciating Pain |
|  |  |  |  |  |  |  |
| **Wong-Baker FACES®** | The Wong-Baker FACES® Foundation has permitted the use of the Wong-Baker FACES® Pain Rating Scale in this Guidelines publication. However, this diagram has been removed from this distribution version of the Guidelines, because NASEMSO does not have permission to allow others to reproduce it. If you wish to use the Scale in your guidelines/protocols publication, please go to www.wongbakerfaces.org where you will find instructions on the use of this diagram. | | | | | |
|  |  |  |  |  |  |  |
| **Descriptive Scale** | Alert  Smiling | No Humor  Serious, Flat | Furrowed Brow  Pursed Lips  Breath Holding | Wrinkled Nose  Raised Upper Lip  Rapid Breathing | Slow Blink  Open Mouth | Eyes Closed  Moaning  Crying |
|  |  |  |  |  |  |  |
| **Activity Tolerance Scale** | No Pain | Can be Ignored | Interferes with Tasks | Interferes with Concentration | Interferes with Basic Needs | Bed Rest Required |
| **Spanish** | Nada de Dolor | Un Poquito de Dolor | Un Dolor Leve | Dolor Fuerte | Dolor Desmasiado Fuerte | Un Dolor Insoportable |
|  |  |  |  |  |  |  |
| **Source:** Hybrid of scales by authors. Reproduction of the Wong-Baker FACES® material requires licensing at www.wongbakerfaces.org. | | | | | | |

##### Pediatric-Appropriate Pain Assessment Tools

**Faces, Legs, Activity, Cry, Consolability (FLACC) Behavioral Scale**

Appropriate age for use (per guideline): less than 4 years

|  |  |  |  |
| --- | --- | --- | --- |
| Categories | Scoring | | |
| **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 being talked to, distractible | Difficult to console or comfort |
| *Each of the five categories (F) Face; (L) Legs; (A) Activity; (C) Cry; (C) Consolability is scored from 0-2, which results in a total score between zero and ten.* | | | |

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***Instructions:***

* **Patients who are awake:** Observe for at least 1-2 minutes. Observe legs and body uncovered. Reposition patient or observe activity, assess body for tenseness and tone. Initiate consoling interventions if needed
* **Patients who are asleep:** Observe for at least 2 minutes or longer. Observe body and legs uncovered. If possible reposition the patient. Touch the body and assess for tenseness and tone.

**F**ace

* Score 0 point if patient has a relaxed face, eye contact and interest in surroundings
* Score 1 point if patient has a worried look to face, with eyebrows lowered, eyes partially closed, cheeks raised, mouth pursed
* Score 2 points if patient has deep furrows in the forehead, with closed eyes, open mouth and deep lines around nose/lips

**L**egs

* Score 0 points if patient has usual tone and motion to limbs (legs and arms)
* Score 1 point if patient has increase tone, rigidity, tense, intermittent flexion/extension of limbs
* Score 2 points if patient has hyper tonicity, legs pulled tight, exaggerated flexion/extension of limbs, tremors

**A**ctivity

* Score 0 points if patient moves easily and freely, normal activity/restrictions
* Score 1 point if patient shifts positions, hesitant to move, guarding, tense torso, pressure on body part
* Score 2 points if patient is in fixed position, rocking, side-to-side head movement, rubbing body part

**C**ry

* Score 0 points if patient has no cry/moan awake or asleep
* Score 1 point if patient has occasional moans, cries, whimpers, sighs
* Score 2 points if patient has frequent/continuous moans, cries, grunts

**C**onsolability

* Score 0 points if patient is calm and does not require consoling
* Score 1 point if patient responds to comfort by touch or talk in ½ - 1 minute
* Score 2 points if patient require constant consoling or is unconsoled after an extended time

Whenever feasible, behavioral measurement of pain should be used in conjunction with self-report.

When self-report is not possible, interpretation of pain behaviors and decision-making regarding treatment of pain requires careful consideration of the context in which the pain behaviors were observed.

Each category is scored on a 0-2 scale, which results in a total score of 0-10

**Assessment of Behavioral Score:**

0 = Relaxed and comfortable

1-3 = Mild discomfort

4-6 = Moderate pain

7-10 = Severe discomfort/pain

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**Source:** *The FLACC: A behavioral scale for scoring postoperative pain in young children*, by S Merkel and others, 1997, *Pediatr Nurse* 23(3), p. 293–297.

**Faces Pain Scale – Revised (FPS-R)**

*Diagram Removed for this Distribution Version of the Guidelines*

The International Association for the Study of Pain® (IASP) has permitted NASEMSO to reproduce the Faces Pain Scale Revised (FPS-R) for the NASEMSO website PDF version of the Guidelines. However, this diagram has been removed from this distribution version of the Guidelines, because NASEMSO does not have permission to allow others to reproduce it. To obtain permission to reproduce this diagram for your guidelines/protocols, please write to: iaspdesk@iasp-pain.org

## Seizures

**Patient Treatment and Interventions**

* + - 1. If signs of airway obstruction are present and a chin-lift, jaw thrust, positioning, and/or suctioning does not alleviate it, place oropharyngeal airway (if gag reflex is absent) or nasopharyngeal airway
      2. Place pulse oximeter and/or waveform capnography to monitor oxygenation/ventilation
      3. Administer oxygen as appropriate with a target of achieving 94-98% saturation. Use bag-valve-mask ventilation if oxygenation/ventilation are compromised
      4. Assess perfusion
      5. Assess neurologic status
      6. Routes for treatment
         1. IN/IM routes are preferred over rectal (PR), IV, or IO routes, if within the provider’s scope of practice

If none of these routes (IN/IM/IV/IO) of medication administration are in provider’s scope of practice, diazepam 0.2 mg/kg PR (maximum dose 10 mg) is an acceptable route of administration

* + - * 1. IV placement is not necessary for treatment of seizures, but could be obtained if needed for other reasons
      1. Anticonvulsant Treatment

1. If vascular access is absent: midazolam 0.2 mg/kg (maximum dose 10 mg), IM preferred, or IN
2. If vascular access (IV or IO) is present:
3. Diazepam 0.1mg/kg IV or IO, maximum 4mg
4. Lorazepam 0.1mg/kg IV or IO, maximum 4mg
5. Midazolam 0.1mg/kg IV or IO, maximum 4mg
6. Glucometry
   1. If still actively seizing, check blood glucose level
   2. If less than 60 mg/dL, treat per the [**Hypoglycemia**](#Hypogly) guideline
7. Consider magnesium sulfate in the presence of seizure in the third trimester of pregnancy or post-partum [see the [**Eclampsia/Pre-eclampsia**](#Eclamp) guideline]
8. For febrile seizures, consider the following interventions after stopping the seizure, since the following interventions provide symptomatic relief for fevers but do not stop the seizure:
   1. Acetaminophen 15 mg/kg, maximum dose 650 mg, PR/IV/IO (if unable to swallow) or PO (if able to swallow)   
      **AND/OR**
   2. Ketorolac 1 mg/kg, maximum dose 15 mg, IV (if unable to swallow) OR Ibuprofen 10 mg/kg, maximum dose 600 mg, PO (if able to swallow)   
      **AND/OR**
   3. Removing excessive layers of clothing   
      **AND/OR**
   4. Applying cool compresses to the body
9. Consider acquiring a 12-lead EKG following cessation of seizure in patients without a history of seizure to determine possible cardiac cause

## Shock

**Patient Treatment and Interventions**

1. Check vital signs
2. Administer oxygen as appropriate with a target of achieving 94-98% saturation
3. Cardiac monitor
4. Pulse oximetry and ETCO2 (reading of less than 25 mmHg may be sign of poor perfusion)
5. Check blood sugar, and correct if less than 60 mg/dl
6. EKG
7. Check lactate, if available (greater than 2.0 mmol/L is abnormal)
8. Establish IV access - if unable to obtain within 2 attempts or less than 90 seconds, place an IO needle
9. IV fluids (30 mL/kg isotonic fluid; maximum of 1 liter) over less than 15 minutes, using a push-pull method of drawing up the fluid in a syringe and pushing it through the IV (preferred for pediatric patients) - may repeat up to 3 times based on patient’s condition and clinical impression
10. If there is a history of adrenal insufficiency or long-term steroid dependence, give:
    1. Hydrocortisone succinate, 2 mg/kg (maximum 100 mg) IV/IM (preferred)   
       **OR**
    2. Methylprednisolone 2 mg/kg IV (maximum 125 mg)
11. Vasopressors (shock unresponsive to IV fluids)
    1. Cardiogenic shock, hypovolemic shock, obstructive shock:
12. Norepinephrine - there is recent evidence that supports the use of norepinephrine as the preferred intervention. Although dopamine is often recommended for the treatment of symptomatic bradycardia, recent research indicates that patients in cardiogenic or septic shock treated with norepinephrine have a lower mortality rate compared to those treated with dopamine (initial norepinephrine dose: 0.05 – 0.5 mcg/minute titrated to effect)
13. Give epinephrine, 0.05-0.3 mcg/kg/minute
14. Give dopamine, 2-20 mcg/kg/minute
    1. Distributive shock (with the exception of anaphylactic shock):
15. Give norepinephrine, 0.05-0.5 mcg/kg/minute
16. Norepinephrine is the first-line drug of choice for neurogenic shock
17. For anaphylactic shock, treat per the [**Anaphylaxis and Allergic Reaction**](#Anaphyl) guideline
18. Provide advanced notification to the hospital
19. Consider empiric antibiotics for suspected septic shock if transport time is anticipated to be greater than 1 hour, if blood cultures can be obtained in advance, and/or EMS has coordinated with regional receiving hospitals about choice of antibiotic therapy
20. Antipyretics for fever
    1. Acetaminophen (15 mg/kg; maximum dose of 1000 mg)
    2. Ibuprofen (10 mg/kg; maximum dose of 800 mg)

## Sickle Cell Pain Crisis

**Patient Treatment and Interventions**

1. Medication Administration:
2. Provide analgesia per the [**Pain Management**](#PnMan)guideline
3. Start oxygen by nasal cannula
4. Start an IV and provide saline 10ml/kg normal saline bolus (up to 1L)
5. Provide transport to an appropriate receiving facility.
6. Reassess vital signs and response to therapeutic interventions throughout transport
7. Comfort measures:
   1. Keep patient warm and dry
   2. Transport in a position of comfort unless clinical condition requires otherwise

# Resuscitation

## Cardiac Arrest (VF/VT/Asystole/PEA)

**Patient Treatment and Interventions**

The most important therapies for patients suffering from cardiac arrest are prompt cardiac defibrillation and minimally interrupted effective chest compressions

1. Initiate chest compressions in cases with no bystander chest compressions or take over compressions from bystanders while a second rescuer is setting up the AED or defibrillator
   1. If adequate, uninterrupted bystander CPR has been performed or if the patient arrests in front of the EMS providers, immediately proceed with rhythm analysis and defibrillation, if appropriate
   2. It is realistic for EMS providers to tailor the sequence of rescue actions to the most likely cause of arrest
   3. There is insufficient evidence to recommend for or against delaying defibrillation to provide a period of CPR for patients in VF/pulseless VT out-of-hospital cardiac arrest
   4. For adults and children with unmonitored cardiac arrest or for whom an AED is not immediately available, it is reasonable that CPR be initiated while the defibrillator equipment is being retrieved and applied and that defibrillation, if indicated, be attempted as soon as the device is ready for use
2. The maximum setting on the defibrillator should be used for initial and subsequent defibrillation attempts. Defibrillation dosing should follow manufacturer’s recommendation in the case of biphasic defibrillators. If the manufacturer’s recommendation is unknown, use highest setting possible. In the case of monophasic devices, the setting should be 360 J (or 4 J/kg for children)
3. Chest compressions should resume immediately after defibrillation attempts with no pauses for pulse checks for 2 minutes regardless of the rhythm displayed on the cardiac monitor
4. All attempts should be made to prevent avoidable interruptions in chest compressions, such as pre-charging the defibrillator and hovering over the chest, rather than stepping away during defibrillations
5. If feasible, IV or IO access should be obtained. Administer epinephrine during the first or second round of compressions
6. Continue the cycle of chest compressions for 2 minutes, followed by rhythm analysis and defibrillation of shockable rhythms; during this period of time, the proper strategy of airway management is currently not defined and many options for airway management exist – Regardless of the airway management and ventilation strategy, consider the following principles:
   1. The airway management strategy should not interrupt compressions
   2. Successful resuscitation from cardiac arrest depends primarily on effective, minimally-interrupted chest compressions and prompt defibrillation; airway management is of secondary importance and should not interfere with compressions and defibrillation – Options for airway management include:
7. Passive ventilation:
   * + 1. High flow oxygen is applied via a non-rebreather mask with an oropharyngeal airway
       2. Some oxygen will be entrained with each decompression of the chest
       3. This may be applied for the first 3-4 compression cycles (6-8 minutes), after which one may consider BVM ventilation or placement of an advanced airway (as below).
8. BVM ventilation at 10 breaths per minute (1 breath every 10 compressions), applied during the upstroke between compressions, without interrupting the compressions
9. BVM ventilation with 30:2 ventilation to compression ratio: Each 30 compressions, the compressions are paused briefly to allow 2 BVM ventilations, then compressions immediately resumed
   * + 1. **Pediatric Consideration:** For multiple rescuer CPR in children, 15:2 is the recommended compression to ventilation ratio. (30:2 for single rescuer).
       2. **Pediatric Consideration:** For neonates, 3:1 is the recommended compression to ventilation ratio.
10. Advanced airway placement:
    * + 1. Either a supraglottic airway or an endotracheal tube may be placed without interruption of compressions
        2. Ventilations are provided at 10 breaths/minute for adults
        3. **Pediatric Consideration:** for children, 1 breath every 3-5 seconds is recommended (12-20 breaths/minute)
    1. **Pediatric** **Consideration:** deliver volume needed to achieve chest rise
11. Consider use of antiarrhythmic for recurrent VF/Pulseless VT
    1. The principal objective of antiarrhythmic drug therapy in shock-refractory VF and pulseless VT is to facilitate the restoration and maintenance of a spontaneous perfusing rhythm in concert with the shock termination of VF/VT; some antiarrhythmic drugs have been associated with increased rates of ROSC and hospital admission, but none have yet been proven to increase long-term survival or survival with good neurologic outcome
       1. Amiodarone (5 mg/kg IV, max of 300 mg) may be considered for VF/pulseless VT that is unresponsive to CPR, defibrillation, and a vasopressor therapy
       2. Lidocaine (1 mg/kg IV) may be considered as an alternative to amiodarone for VF/pulseless VT that is unresponsive to CPR, defibrillation, and vasopressor therapy
       3. The routine use of magnesium for VF/pulseless VT is not recommended in adult patients
    2. There is inadequate evidence to support the routine use of lidocaine and beta blockers after cardiac arrest by EMS – There is insufficient evidence to recommend for or against the routine initiation or continuation of other antiarrhythmic medications after ROSC from cardiac arrest
    3. For torsades de pointes, give magnesium sulfate 2 g IV (or 25-50 mg/kg for **pediatrics**). There is insufficient evidence to recommend for or against the routine administration during cardiac arrest
12. Consider reversible causes of cardiac arrest which include the following:
    1. Hypothermia – additions to care include attempts at active rewarming [see[**Hypothermia/Cold Exposure**](#Hypotherm)guideline]
    2. The dialysis patient/known hyperkalemic patient – Additions to care include the following:
13. Calcium gluconate 10% 1 g IV (for **pediatrics** the dose is 100 mg/kg) OR
14. Calcium chloride 10% 10ml IV (for **pediatrics**, the dose is 20 mg/kg which is 0.2 mL/kg)
15. Sodium bicarbonate 1 mEq/kg IV
    1. Tricyclic antidepressant overdose - Additions to care include sodium bicarbonate 1 mEq/kg IV
    2. Hypovolemia - Additions to care include normal saline 2 L IV (or 20 mL/kg, repeated up to 3 times for **pediatrics**)
    3. If the patient is intubated at the time of arrest, assess for tension pneumothorax and misplaced ETT
    4. If tension pneumothorax suspected, perform needle decompression. Assess ETT, if misplaced, replace ETT
16. If at any time during this period of resuscitation the patient regains return of spontaneous circulation, treat per [**Adult Post-ROSC Care**](#ROSC) guideline
17. If resuscitation remains ineffective, consider termination of resuscitation [see [**Termination of Resuscitative Efforts**](#Term) guideline]

## Adult Post-ROSC (Return of Spontaneous Circulation) Care

**Patient Treatment, and Interventions**

1. Perform general patient management
2. Support life-threatening problems associated with airway, breathing, and circulation. Monitor closely for reoccurrence of cardiac arrest
3. Administer oxygen as appropriate with a target of achieving 94-98% saturation. Do not hyperoxygenate
4. Do not hyperventilate. Maintain a ventilation rate of 6-8 per minute and ETCO2 of 30-40 mmHg
5. For hypotension (SBP less than 90 mmHg or MAP less than 65) [see [**Shock**](#Shck) guideline]
6. Perform 12-lead EKG
7. Check blood glucose
   1. If hypoglycemic, treat per [**Hypoglycemia**](#Hypogly) guideline
   2. If hyperglycemic, notify hospital on arrival
8. If patient seizes, treat per [**Seizures**](#Seiz) guideline
9. Post-cardiac arrest patients with evidence or interpretation consistent with ST elevation myocardial infarction (STEMI/Acute MI) should be transported to any hospitals which offer percutaneous coronary intervention in their cardiac catheterization laboratory
10. Consider transporting patients to facility which offers specialized post-resuscitative care
11. Do not allow patient to become hyperthermic

## Determination of Death/Withholding Resuscitative Efforts

**Patient Presentation**

A clinically dead patient is defined as any unresponsive patient found without respirations and without a palpable carotid pulse.

**Inclusion/Exclusion Criteria:**

1. Resuscitation should be started on all patients who are found apneic and pulseless unless the following conditions exist (does not apply to victims of lightning strikes, drowning, or hypothermia):
   1. Medical cause or traumatic injury or body condition clearly indicating biological death (irreversible brain death), limited to:
2. Decapitation: the complete severing of the head from the remainder of the patient’s body
3. Decomposition or putrefaction: the skin is bloated or ruptured, with or without soft tissue sloughed off. The presence of at least one of these signs indicated death occurred at least 24 hours previously
4. Transection of the torso: the body is completely cut across below the shoulders and above the hips through all major organs and vessels. The spinal column may or may not be severed
5. Incineration: 90% of body surface area with full thickness burns as exhibited by ash rather than clothing and complete absence of body hair with charred skin
6. Injuries incompatible with life (such as massive crush injury, complete exsanguination, severe displacement of brain matter)
7. Futile and inhuman attempts as determined by agency policy/protocol related to “compelling reasons” for withholding resuscitation
8. In blunt and penetrating trauma, if the patient is apneic, pulseless, and without other signs of life upon EMS arrival including, but not limited to spontaneous movement, EKG activity, or pupillary response
9. Nontraumatic arrest with obvious signs of death including dependent lividity or rigor mortis

**OR**

* 1. A valid DNR order (form, card, bracelet) or other actionable medical order (e.g. POLST/ MOLST form) present, when it:

1. Conforms to the state specifications for color and construction
2. Is intact: it has not been cut, broken or shows signs of being repaired
3. Displays the patient’s name and the physician’s name

**Patient Treatment and Interventions**

1. If all the components above are confirmed, no CPR is required
2. If CPR has been initiated but all the components above have been subsequently confirmed, CPR may be discontinued and direct medical oversight contacted as needed
3. If any of the findings are different than those described above, clinical death is not confirmed and resuscitative measures should be immediately initiated or continued. The [**Termination of Resuscitative Efforts**](#Term) guideline should then be implemented
4. Do Not Resuscitate order (DNR/MOLST/POLST) with signs of life:
   1. If there is a DNR bracelet or DNR transfer form and there are signs of life (pulse and

respirations), provide standard appropriate treatment under existing protocols matching the patient’s condition

* 1. To request permission to withhold treatment under these conditions for any reason obtain direct medical oversight
  2. If there is documentation of a Do Not Intubate (DNI/MOLST/POLST) advanced directive, the patient should receive full treatment per protocols with the exception of any intervention specifically prohibited in the patient’s advanced directive
  3. If for any reason an intervention that is prohibited by an advanced directive is being considered, direct medical oversight should be obtained

## Do Not Resuscitate Status/Advance Directives/Healthcare Power of Attorney (POA) Status

**Patient Treatment and Interventions**

1. If there is a valid exclusion to resuscitation and there are signs of life (pulse and

respirations), EMS providers should provide standard appropriate treatment under existing protocols according to the patient’s condition

1. If the patient has a MOLST or POLST, it may provide specific guidance on how to proceed in this situation
2. Directives should be followed as closely as possible and direct medical oversight contacted as needed
3. The patient should receive full treatment per protocols with the exception of any intervention specifically prohibited in the patient’s valid exclusion to resuscitation
4. If for any reason an intervention that is prohibited by an advanced directive is being considered, direct medical oversight should be obtained

## Termination of Resuscitative Efforts

**Patient Management**

Resuscitation may be terminated under the following circumstances:

1. Non-traumatic arrest
   1. Patient is at least 18 years of age
   2. Patient is in cardiac arrest at the time of arrival of advanced life support
2. No pulse
3. No respirations
4. No evidence of meaningful cardiac activity (e.g. asystole or wide complex PEA less than 60 BPM, no heart sounds)
   1. Advanced life support resuscitation is administered appropriate to the presenting and persistent cardiac rhythm.
      1. Resuscitation may be terminated in asystole and slow wide complex PEA if there is no return of spontaneous circulation after 20 minutes in the absence of hypothermia and the ETCO2 is less than 20mmHg
      2. Narrow complex PEA with a rate above 40 or refractory and recurrent ventricular fibrillation/ventricular tachycardia:
         1. Consider resuscitation for up to 60 minutes from the time of dispatch.
         2. Termination efforts may be ceased before 60 minutes based on factors including but not limited to ETCO2 less than 20mmHg, age, co-morbidities, distance from, and resources available at the closest hospital. Termination before this timeframe should be done in consultation with direct medical oversight
   2. There is no return of spontaneous pulse and no evidence of neurological function (non-reactive pupils, no response to pain, no spontaneous movement)
   3. No evidence or suspicion of hypothermia
   4. All EMS personnel involved in the patient’s care agree that discontinuation of the resuscitation is appropriate
   5. Consider direct medical oversight before termination of resuscitative efforts
5. Traumatic arrest
   1. Patient is at least 18 years of age.
   2. Resuscitation efforts may be terminated in any blunt trauma patient who, based on thorough primary assessment, is found apneic, pulseless, and asystolic on an EKG or cardiac monitor upon arrival of emergency medical services at the scene
   3. Victims of penetrating trauma found apneic and pulseless by EMS should be rapidly assessed for the presence of other signs of life, such as pupillary reflexes, spontaneous movement, response to pain, and electrical activity on EKG
6. Resuscitation may be terminated with direct medical oversight if these signs of life are absent
7. If resuscitation is not terminated, transport is indicated
   1. Cardiopulmonary arrest patients in whom mechanism of injury does not correlate with clinical condition, suggesting a non-traumatic cause of arrest, should have standard ALS resuscitation initiated
   2. All EMS personnel involved in the patient’s care agree that discontinuation of the resuscitation is appropriate
   3. Consider direct medical oversight before termination of resuscitative efforts

**Patient Treatment and Interventions**

1. Focus on continuous, quality CPR that is initiated as soon as possible
2. Focus attention on the family and/or bystanders. Explain the rationale for termination
3. Consider support for family members such as other family, friends, clergy, faith leaders, or chaplains
4. For patients that are less than 18 yo, consultation with direct medical oversight is recommended

# Pediatric-Specific Guidelines

## Brief Resolved Unexplained Event (BRUE)

**Patient Treatment and Interventions**

1. Monitoring
   1. Cardiac monitor
   2. Continuous pulse oximetry
   3. Check blood glucose
   4. Serial observations during transport for change in condition
2. Airway
   1. Give supplemental oxygen for signs of respiratory distress or hypoxemia - Escalate from a nasal cannula to a simple face mask to a non-rebreather mask as needed [see [**Airway Management**](#Airway) guideline]
   2. Suction the nose and/or mouth (via bulb, suction catheter) if excessive secretions are present
3. Utility of IV placement and fluids
   1. Routine IVs should not be placed on all BRUE patients
   2. IVs should only be placed in children for clinical concerns of shock, or when administering IV medications

## Pediatric Respiratory Distress (Bronchiolitis)

**Patient Treatment and Interventions**

1. Pulse oximetry and end-tidal CO2 (ETCO2) should be routinely used as an adjunct to other forms of respiratory monitoring
2. Perform EKG only if there are no signs of clinical improvement after treating respiratory distress
3. Airway
   1. Give supplemental oxygen – escalate from a nasal cannula to a simple face mask to a non-breather mask as needed, in order to maintain normal oxygenation
   2. Suction the nose and/or mouth (via bulb, Yankauer®, or suction catheter) if excessive secretions are present
4. Inhaled medications – nebulized epinephrine (3 mg in 3 mL of normal saline) should be administered to children in severe respiratory distress with bronchiolitis (e.g. coarse breath sounds) in the prehospital setting if other treatments (e.g. suctioning, oxygen) fail to result in clinical improvement
5. Utility of IV placement and fluids - IVs should only be placed in children with respiratory distress for clinical concerns of dehydration, or when administering IV medications
6. Steroidsare generally not efficacious, and not given in the prehospital setting
7. Improvement of oxygenation and/or respiratory distress with non-invasive airway adjuncts
8. Continuous positive airway pressure (CPAP) or high flow nasal cannula (HFNC) should be administered, when available, for severe respiratory distress
9. Bag-valve-mask ventilation should be utilized in children with respiratory failure
10. Supraglottic devices and intubation
    1. Supraglottic devices and intubation should be utilized only if bag-valve-mask ventilation

fails

* 1. The airway should be managed in the least invasive way possible

## Pediatric Respiratory Distress (Croup)

**Patient Treatment and Interventions**

1. Monitoring
   1. Pulse oximetry and end-tidal CO2 (ETCO2) should be routinely used as an adjunct to other forms of respiratory monitoring
   2. Perform EKG only if there are no signs of clinical improvement after treating respiratory distress
2. Airway
   1. Give supplemental oxygen. Escalate from a nasal cannula to a simple face mask to a non-breather mask as needed, in order to maintain normal oxygenation
   2. Suction the nose and/or mouth (via bulb, Yankauer®, or suction catheter) if excessive secretions are present
3. Inhaled medications
   1. Epinephrine 5 mL of 1 mg/mL (5 mg) nebulized, should be administered to all children with croup in respiratory distress with signs of stridor at rest - this medication should be repeated at this dose with unlimited frequency for ongoing distress
   2. Humidified oxygen or mist therapy is **not** indicated
4. Medications – dexamethasone 0.6 mg/kg oral, IV, or IM to maximum dose of 16 mg should be administered to patients with suspected croup
5. Utility of IV placement and fluids - IVs should only be placed in children with respiratory distress for clinical concerns of dehydration, or when administering IV medications
6. Improvement of oxygenation and/or respiratory distress with non-invasive airway adjuncts
   1. Heliox for the treatment of croup can be considered for severe distress not responsive to more than 2 doses of epinephrine
   2. Continuous positive airway pressure (CPAP) should be administered for severe respiratory distress
   3. Bag-valve-mask ventilation should be utilized in children with respiratory failure
7. Supraglottic devices and intubation - supraglottic devices and intubation should be utilized only if bag-valve-mask ventilation fails. The airway should be managed in the least invasive way possible

## Neonatal Resuscitation

**Patient Treatment and Interventions**

1. If immediate resuscitation is required and the newborn is still attached to the mother, clamp the cord in two places and cut between the clamps. If no resuscitation is required, warm/dry/stimulate the newborn and then cut/clamp the cord after 60 seconds or the cord stops pulsating
2. Warm, dry, and stimulate
   1. Wrap infant in dry towel or thermal blanket to keep infant as warm as possible during resuscitation; keep head covered if possible
   2. If strong cry, regular respiratory effort, good tone, and term gestation, infant should be placed skin-to-skin with mother and covered with dry linen
3. If weak cry, signs of respiratory distress, poor tone, or preterm gestation then position airway (sniffing position) and clear airway as needed - if thick meconium or secretions present *and* signs of respiratory distress, suction mouth then nose
4. If heart rate greater than 100 beats per minute
   1. Monitor for central cyanosis - provide blow-by oxygen as needed
   2. Monitor for signs of respiratory distress. If apneic or in significant respiratory distress:
5. Initiate bag-valve-mask ventilation with room air at 40-60 breaths per minute
6. Consider endotracheal intubation as per local guidelines
7. If heart rate less than 100 beats per minute
   1. Initiate bag-valve-mask ventilation with room air at 40-60 breaths per minute
8. Primary indicator of effective ventilation is improvement in heart rate
9. Rates and volumes of ventilation required can be variable, only use the minimum necessary rate and volume to achieve chest rise and a change in heart rate
   1. If no improvement after 90 seconds, change oxygen delivery to 30% FiO2 if blender available, otherwise 100% FiO2 until heart rate normalizes
   2. Consider endotracheal intubation per local guidelines if bag-valve-mask ventilation is ineffective
10. If heart rate less than 60 beats per minute
    1. Ensure effective ventilations with supplementary oxygen and adequate chest rise
    2. If no improvement after 30 seconds, initiate chest compressions - two-thumb-encircling-hands technique is preferred
    3. Coordinate chest compressions with positive pressure ventilation (3:1 ratio, 90 compressions and 30 breaths per minute)
    4. Consider endotracheal intubation per local guidelines
    5. Administer epinephrine (0.1mg/mL) 0.01 mg/kg IV/IO (preferable if access obtained) or 0.1 mg/kg via the ETT (if unable to obtain access)
11. Consider checking a blood glucose for ongoing resuscitation, maternal history of diabetes, ill appearing or unable to feed
12. Administer 20 mL/kg normal saline IV/IO for signs of shock or post-resuscitative care

# OB/GYN

## Childbirth

**Patient Treatment and Interventions**

1. If patient in labor but no signs of impending delivery, transport to appropriate receiving facility
2. Delivery should be controlled so as to allow a slow controlled delivery of infant – This will prevent injury to mother
   1. Support the infant’s head as needed
3. Check for cord around the baby’s neck
   1. If present, slip it over the head
   2. If unable to free the cord from the neck, double clamp the cord and cut between the clamps
4. Do not routinely suction the infant’s airway (even with a bulb syringe) during delivery
5. Grasping the head with hand over the ears, gently guide head down to allow delivery of the anterior shoulder
6. Gently guide the head up to allow delivery of the posterior shoulder
7. Slowly deliver the remainder of the infant
8. After 1-3 minutes, clamp cord about 6 inches from the abdomen with 2 clamps; cut the cord between the clamps
   1. If resuscitation is needed, clamp cord and cut as soon as possible
9. Record APGAR scores at 1 and 5 minutes
   1. After delivery of infant, suctioning (including suctioning with a bulb syringe) should be reserved for infants who have obvious obstruction to the airway or require positive pressure ventilation (follow [**Neonatal Resuscitation**](#Neonate) guideline for further care of the infant)
10. Dry and warm infant, wrap in towel and place on maternal chest unless resuscitation needed
11. The placenta will deliver spontaneously, often within 5-15 minutes of the infant
    1. Do not force the placenta to deliver; do not pull on umbilical cord
    2. Contain all tissue in plastic bag and transport
12. After delivery, massaging the uterus and allowing the infant to nurse will promote uterine contraction and help control bleeding
    1. Estimate maternal blood loss
    2. Treat for hypovolemia as needed
13. Transport infant secured in seat or isolette unless resuscitation needed
14. Keep infant warm during transport
15. Most deliveries proceed without complications – If complications of delivery occur, the following are recommended:
    1. Shoulder dystocia – if delivery fails to progress after head delivers, quickly attempt the following
16. Hyperflex mother’s hips to severe supine knee-chest position
17. Apply firm suprapubic pressure to attempt to dislodge shoulder
18. Apply high-flow oxygen to mother
19. Transport as soon as possible
20. Contact direct medical oversight and/or closest appropriate receiving facility for direct medical oversight and to prepare team
    1. Prolapsed umbilical cord
21. Placed gloved hand into vagina and gently lift head/body off of cord
    * + 1. Assess for pulsations in cord
        2. Maintain until relieved by hospital staff.
22. Consider placing mother in prone knee-chest position or extreme Trendelenburg
23. Apply high-flow oxygen to mother
24. Transport as soon as possible
25. Contact/transport to closest appropriate receiving facility for direct medical oversight and to prepare team
    1. Breech birth
26. Place mother supine, allow the buttocks and trunk to deliver spontaneously, then support the body while the head is delivered
27. If head fails to deliver, place gloved hand into vagina with fingers between infant’s face and uterine wall to create an open airway
28. Apply high-flow oxygen to mother
29. Transport as soon as possible
30. Contact direct medical oversight and/or closest appropriate receiving facility for direct medical oversight and to prepare team
31. The presentation of an arm or leg through the vagina is an indication for immediate transport to hospital
32. Assess for presence of prolapsed cord and treat as above
    1. Excessive bleeding during active labor may occur with placenta previa
33. Obtain history from patient
34. Placenta previa may prevent delivery of infant vaginally
35. C-Section needed – transport urgently
    1. Maternal cardiac arrest
36. Apply manual pressure to displace uterus from right to left
37. Treat per the [**Cardiac Arrest**](#CardiacAr) guideline for resuscitation care (defibrillation and medications should be given for same indications and doses as if non-pregnant patient)
38. Transport as soon as possible if infant is estimated to be over 24 weeks gestation (perimortem Cesarean section at receiving facility is most successful if done within 5 minutes of maternal cardiac arrest)
39. Contact direct medical oversight and/or closest appropriate receiving facility for direct medical oversight and to prepare team

**APGAR Score**

|  |  |  |  |
| --- | --- | --- | --- |
| Sign | 0 | 1 | 2 |
| Appearance: | Blue,  Pale | Body pink,  Extremities blue | Completely pink |
| Pulse: | Absent | Slow  (less than l00) | 100 |
| Grimace: | No  response | Grimace | Cough or  Sneeze |
| Activity: | Limp | Some flexion | Active motion of extremities |
| Respirations: | Absent | Slow,  Irregular | Good,  Crying |

## Eclampsia/Pre-Eclampsia

**Patient Treatment and Interventions**

1. Severe hypertension (SBP greater than160 or DBP greater than 110) lasting more than 15 min with associated preeclampsia symptoms
   1. Labetalol 20mg IV over 2 min
2. May repeat every 10 min X 2 for persistent severe hypertension with preeclampsia symptoms
3. Goal is to reduce MAP by 20-25% initially
4. Ensure that HR is 60 bpm prior to administration

**OR**

* 1. Hydralazine 5 mg IV

1. May repeat 10mg after 20 min for persistent severe hypertension with preeclampsia symptoms
2. Goal is to reduce MAP by 20-25%

**OR**

* 1. Nifedipine 10 mg. p.o.

1. May repeat 10 - 20 mg p.o. every 20 minutes X 2 for persistent severe hypertension with pre-eclampsia symptoms
2. Goal is to reduce MAP by 20-25%
   1. Magnesium sulfate - 4 g IV (20% solution) over 20 min, followed by 1 g/hr IV if available
   2. Reassess vital signs every 10 min during transport
3. Seizures associated with pregnancy greater than 20-weeks gestation
   1. Magnesium sulfate
4. 4 g IV (50% solution) over 10-20 min, followed by 1 g/hr IV if available
5. Contact direct medical oversight for additional orders if persistent seizure despite initial magnesium (may give additional 1-2 g IV over 5 min)
   1. Benzodiazepine, per [**Seizures**](#Seiz)guideline, for active seizure not responding to magnesium - Caution: respiratory depression
6. IV fluids:
   1. NS or LR at KVO rate but restrict maximum rate of fluids to 80 mL/hr   
      **OR**
   2. Saline lock
7. Disposition
   1. Transport to closest appropriate receiving facility
   2. Patients in second or third trimester of pregnancy should be transported on left side or with uterus manually displaced to left if hypotensive

## Obstetrical and Gynecological Conditions

**Patient Presentation**

**Inclusion Criteria**

1. Female patient with vaginal bleeding in any trimester
2. Female patient with pelvic pain or possible ectopic pregnancy
3. Maternal age at pregnancy may range from 10 to 60 years of age

**Exclusion Criteria**

1. Childbirth and active labor [see [**Childbirth**](#Birth)guideline]
2. Post-partum hemorrhage [see [**Childbirth**](#Birth) guideline]

**Patient Treatment and Interventions**

1. If signs of shock or orthostasis:
   1. Position patient supine and keep patient warm
   2. Volume resuscitation - crystalloid 1-2 liters IV
   3. Reassess vital signs and response to fluid resuscitation
2. Disposition - transport to closest appropriate receiving facility

# Respiratory

## Airway Management

**Patient Presentation**

**Inclusion Criteria**

1. Children and adults with signs of severe respiratory distress/respiratory failure
2. Patients with evidence of hypoxemia or hypoventilation

**Exclusion Criteria**

1. Patients with tracheostomies
2. Chronically ventilated patients
3. Newborn patients
4. Patients in whom oxygenation and ventilation is adequate with supplemental oxygen alone, via simple nasal cannula or face mask

**Patient Treatment and Interventions**

1. Non-invasive ventilation techniques
   1. Maintain airway and administer oxygen as appropriate with a target of achieving 94-98% saturation
   2. For severe respiratory distress or impending respiratory failure, use continuous positive airway pressure (CPAP), bilevel positive airway pressure (BiPAP), intermittent positive pressure breathing (IPPB), humidified high-flow nasal cannula (HFNC), and/or bilevel nasal CPAP
   3. Use bag-valve mask (BVM) ventilation in the setting of respiratory failure or arrest. Two-person, two-thumbs-up BVM ventilation is more effective than one-person technique and should be used when additional providers are available
2. Oropharyngeal airways (OPA) and nasopharyngeal airways (NPA) - Consider the addition of an OPA and/or NPA to make BVM ventilation more effective, especially in patients with altered mental status
3. Supraglottic airways (SGA) or extraglottic devices (EGD) - Consider the use of a SGA or EGD if BVM is not effective in maintaining oxygenation and/or ventilation. Examples include, but are not limited to the laryngeal mask airway (LMA) or King**®** laryngeal tube. This is especially important in children since endotracheal intubation is an infrequently performed skill in this age group and has not been shown to improve outcomes
4. Endotracheal intubation
   1. When less-invasive methods (BVM, SGA/EGD placement) are ineffective, use endotracheal intubation to maintain oxygenation and/or ventilation
   2. Other indications may include potential airway obstructions, severe burns, multiple traumatic injuries, altered mental status or loss of normal protective airway reflexes
   3. Monitor clinical signs, pulse oximetry, cardiac rhythm, blood pressure, and capnography for the intubated patient
   4. Video laryngoscopy may enhance intubation success rates, and should be used when available. Consider using a bougie, especially when video laryngoscopy is unavailable and glottic opening is difficult to visualize with direct laryngoscope
5. Post-intubation management
   1. Confirm placement of advanced airway (endotracheal tube, SGA, or EGD) with waveform capnography, absent gastric sounds, and bilateral breath sounds
   2. Continuously monitor placement with waveform capnography during treatment and transport
   3. Continuously secure tube manually until tube secured with tape, twill, or commercial device
6. Note measurement of tube at incisors or gum line and monitor frequently for tube movement/displacement
7. Cervical collar and/or cervical immobilization device may help reduce neck movement and risk of tube displacement
   1. Inflate endotracheal tube cuff with minimum air to seal airway - an ETT cuff manometer can be used to measure and adjust the ETT cuff pressure to a recommended 20 cm H2O pressure
   2. Ventilation
8. Tidal volume
   * + 1. Ventilate with minimal volume to see chest rise, approximately 6-7 mL/kg ideal body weight
       2. Over-inflation may be detrimental
     1. Rate
        1. Adult: 10-12 breaths/minute
        2. Child: 20 breaths/minute
        3. Infant: 30 breaths/minute
     2. Continuously monitor ETCO2 to maintain ETCO2 of 35-40 mmHg - in head injury with signs of herniation (unilateral dilated pupil or decerebrate posturing), modestly hyperventilate to ETCO2 30 mmHg
   1. Consider sedation with sedative or opioid medications if agitated
9. Gastric decompression may improve oxygenation and ventilation, so it should be considered when there is obvious gastric distention
10. When patients cannot be oxygenated/ventilated effectively by previously mentioned interventions, the provider should consider cricothryoidotomy if the risk of death for not escalating airway management seems to outweigh the risk of a procedural complication
11. Transport to the closest appropriate hospital for airway stabilization when respiratory failure cannot be successfully managed in the prehospital setting

## Bronchospasm (due to Asthma and Obstructive Lung Disease)

**Patient Presentation**

**Inclusion Criteria**

* + - 1. Respiratory distress with wheezing or decreased air entry in patients 2 yo or older, presumed to be due to bronchospasm from reactive airway disease, asthma, or obstructive lung disease – These patients may have a history of recurrent wheezing that improves with beta-agonist inhalers/nebulizers such as albuterol or levalbuterol
         1. Symptoms/signs may include:

1. Wheezing - will have expiratory wheezing unless they are unable to move adequate air to generate wheezes
2. May have signs of respiratory infection (e.g. fever, nasal congestion, cough, sore throat)
3. May have acute onset after inhaling irritant
4. This includes:
5. Asthma exacerbation
6. Chronic obstructive pulmonary disease (COPD) exacerbation
7. Wheezing from suspected pulmonary infection (e.g. pneumonia, acute bronchitis)

**Exclusion Criteria**

1. Respiratory distress due to apresumed underlying cause that includes one of the following:
   1. Anaphylaxis
   2. Bronchiolitis (wheezing less than 2 yo)
   3. Croup
   4. Epiglottitis
   5. Foreign body aspiration
   6. Submersion/drowning
   7. Congestive heart failure
   8. Trauma

**Patient Treatment and Interventions**

1. Monitoring
   1. Pulse oximetry and end-tidal CO2 (ETCO2) should be routinely used as an adjunct to other forms of respiratory monitoring
   2. Check an EKG only if there are no signs of clinical improvement after treating respiratory distress
2. Airway
   1. Give supplemental oxygen. Escalate from a nasal cannula to a simple face mask to a non-rebreather mask as needed, in order to maintain normal oxygenation
   2. Suction the nose and/or mouth (via bulb, Yankauer, suction catheter) if excessive secretions are present
3. Inhaled Medications
   1. Albuterol 5 mg nebulized (or 6 puffs metered dose inhaler) should be administered to all patients in respiratory distress with signs of bronchospasm (e.g. known asthmatics, quiet wheezers) either by BLS or ALS providers - this medication should be repeated at this dose with unlimited frequency for ongoing distress
   2. Ipratropium 0.5 mg nebulized should be given up to 3 doses, in conjunction with albuterol
4. Utility of IV Placement and Fluids - IVs should be placed when there are clinical concerns of dehydration in order to administer fluids, or when administering IV medications
5. Steroids – methylprednisolone (2 mg/kg, maximum dose 125 mg) IV/IM or dexamethasone (0.6 mg/kg, maximum dose of 16 mg) IV/IM/PO may be administered in the prehospital setting**.** Other steroids at equivalent doses may be given as alternatives
6. Magnesium sulfate (40 mg/kg IV, maximum dose of 2 g) over 10-15 minutes should be administered for severe bronchoconstriction and concern for impending respiratory failure
7. Epinephrine (0.01 mg/kg of 1 mg/mL IM, maximum dose of 0.3 mg) should only be administered for impending respiratory failure as adjunctive therapy when there are no clinical signs of improvement
8. Improvement of oxygenation and/or respiratory distress with non-invasive airway adjuncts
   1. Non-invasive positive pressure ventilation via continuous positive airway pressure (CPAP) or bi-level positive airway pressure (BiPAP) should be administered for severe respiratory distress
   2. Bag-valve-mask ventilation should be utilized in children with respiratory failure
9. Supraglottic devices and intubation – should be utilized only if bag-valve-mask ventilation fails - the airway should be managed in the least invasive way possible

## Pulmonary Edema

**Patient Treatment and Interventions**

1. Manage airway as necessary
2. Administer oxygen as appropriate with a target of achieving 94-98% saturation
3. Initiate monitoring and perform 12-lead EKG
4. Establish IV access
5. Nitroglycerin 0.4 mg SL, can repeat q 3-5 minutes as long as SBP greater than 100 mmHg (if range not desired use q 3 minutes)
6. CPAP/BiPAP Consider advanced airway for severe distress or if not improving with less invasive support
7. If suspect high altitude pulmonary edema, treat per the [**Altitude Illness**](#AltIll) guideline

# Trauma

## General Trauma Management

**Patient Treatment and Interventions**

1. Hemorrhage control
   1. Stop severe hemorrhage [see [**Extremity Trauma/External Hemorrhage Management**](#ExtremTraum) guideline]
2. Airway
   1. Establish patent airway with cervical spine precautions, per the [**Airway Management**](#Airway) and [**Spinal Care**](#Spine) guidelines
   2. If respiratory efforts are inadequate, assist with bag-mask ventilation and consider airway adjuncts. If patient is unable to maintain airway, consider oral airway (nasal airway should not be used with significant facial injury or possible basilar skull fracture)
   3. If impending airway obstruction or altered mental status resulting in inability to maintain airway patency, secure definitive airway
3. Breathing
   1. If absent or diminished breath sounds in a hypotensive patient, consider tension pneumothorax and perform needle decompression
   2. For open chest wound, place semi-occlusive dressing
   3. Monitor oxygen saturation and, if indicated, provide supplemental oxygen
4. Circulation
   1. If pelvis is unstable and patient is hypotensive, place pelvic binder or sheet to stabilize pelvis
   2. Establish IV access
   3. Fluid resuscitation
5. Adults
   * + 1. If SBP greater than 90 mmHg, no IV fluids required
       2. If SBP less than 90 mmHg or HR greater than 120, administer IV fluids and reassess
       3. Penetrating trauma: target SBP 90mmHg (or palpable radial pulse)
       4. Head injury: target SBP 110-120 mmHg. Hypotension should be avoided to maintain cerebral perfusion
6. Pediatrics
   * + 1. If child demonstrates tachycardia for age with signs of poor perfusion (low BP, greater than 2-second capillary refill, altered mental status, hypoxia, weak pulses, pallor, or mottled/cool skin), give 20ml/kg crystalloid bolus and reassess.
       2. Target normal BP for age [see [**Appendix VIII –Abnormal Vital Signs**](#AbnormalVS)]
7. Disability
   1. If clinical signs of traumatic brain injury [see [**Head Injury**](#HeadInj) guideline]
8. Exposure
   1. Avoid hypothermia
9. Remove wet clothing
10. Cover patient to prevent further heat loss
11. **NOTE**: Patients with major hemorrhage, hemodynamic instability, penetrating torso trauma, or signs of traumatic brain injury often require rapid surgical intervention. Minimize scene time (goal is under 10 minutes) and initiate rapid transport to the highest level of care within the trauma system.
12. Decisions regarding transport destination should be based on the CDC Field Triage Guidelines for Injured Patients [see [**Appendix X**](#Triage)]

**Secondary Assessment, Treatment, and Interventions**

1. Assessment
   1. Obtain medical history from patient or family including:
2. Allergies
3. Medications
4. Past medical and surgical history
5. Events leading up to the injury
   1. Secondary survey: Head to toe physical exam
6. Head
   * + 1. Palpate head and scalp and face and evaluate for soft tissue injury or bony crepitus
       2. Assess pupils
7. Neck
   * + 1. Check for:
          1. Contusions
          2. Abrasions
          3. Hematomas
          4. JVD
          5. Tracheal deviation
       2. Palpate for crepitus
       3. Spinal assessment per the [**Spinal Care**](#Spine)guideline
8. Chest
   * + 1. Palpate for instability/crepitus
       2. Listen to breath sounds
       3. Inspect for penetrating or soft tissue injuries
9. Abdomen
   * + 1. Palpate for tenderness
       2. Inspect for penetrating or soft tissue injuries
10. Pelvis
    * + 1. Inspect for penetrating or soft tissue injuries
        2. Palpate once for instability by applying medial pressure on the iliac crests bilaterally
11. Back
    * + 1. Maintain spinal alignment. Refer to [**Spinal Care**](#Spine) guideline
        2. Inspect for penetrating or soft tissue injuries
12. Neurologic status assessment [see [**Appendix VII**](#NeuroAssess)]
    * + 1. Serial assessment of mental status
        2. Gross exam of motor strength and sensation in all four extremities
13. Extremities
    * + 1. Assess for fracture/deformity
        2. Assess peripheral pulses/capillary refill
    1. Additional treatment considerations
14. Maintain spine precautions per the [**Spinal Care**](#Spine) guideline
15. Splint obvious extremity fractures per the [**Extremity Trauma/External Hemorrhage Management**](#ExtremTraum) guideline
16. Provide pain medication per the [**Pain Management**](#PnMan) guideline

## Blast Injuries

**Patient Treatment and Interventions**

* + - 1. Hemorrhage control:
         1. Control any severe external hemorrhage [see [**Extremity Trauma/External Hemorrhage Management**](#ExtremTraum) guideline]
      2. Airway:
         1. Secure airway, utilizing airway maneuvers, airway adjuncts, supraglottic device, or endotracheal tube [see [**Airway Management**](#Airway) guideline]
         2. If thermal or chemical burn to airway is suspected, early airway control is vital
      3. Breathing:
         1. Administer oxygen as appropriate with a target of achieving 94-98% saturation.
         2. Assist respirations as needed
         3. Cover any open chest wounds with semi-occlusive dressing
         4. If patient has evidence of tension pneumothorax, perform needle decompression
      4. Circulation:
         1. Establish IV access with two large bore IVs or IOs

1. Administer NS or LR, per the [**General Trauma Management**](#GenlTrauma) guideline
2. If patient is burned, administer NS or LR per the [**Burns**](#Burn) guideline
   * + 1. Disability:
          1. If evidence of head injury, treat per the [**Head Injury**](#HeadInj)guideline
          2. Apply spinal precautions, per the [**Spinal Care**](#Spine) guideline
          3. Monitor GCS during transport to assess for changes
       2. Exposure:
          1. Keep patient warm to prevent hypothermia

## Burns

**Patient Presentation**

**Inclusion Criteria**

Patients sustaining thermal burns

**Exclusion Criteria**

Electrical, chemical, and radiation burns [see [**Toxins and Environmental**](#Toxin) section]

**Patient Treatments and interventions**

1. Stop the burning
   1. Remove wet clothing (if not stuck to the patient)
   2. Remove jewelry
   3. Leave blisters intact
2. Minimize burn wound contamination
   1. Cover burns with dry dressing or clean sheet
   2. Do not apply gels or ointments
3. Monitor SPO2, ETCO2 and cardiac monitor – Consider SPCO monitoring, if available
4. High flow supplemental oxygen for all burn patients rescued from an enclosed space
5. Establish IV access, avoid placement through burned skin
6. Evaluate distal circulation in circumferentially burned extremities
7. Consider early management of pain and nausea/vomiting
8. Initiate fluid resuscitation – Use lactated Ringer’s or normal saline
   1. If patient in shock:
      1. Consider other cause, such as trauma or cyanide toxicity
      2. Administer IV fluid per the [**Shock**](#Shck) guideline
   2. If patient not in shock:
9. Begin fluids based on estimated TBSA [see [**Appendix VI – Initial Fluid Rate Chart for Burns**](#BurnChart) as appropriate to patient weight]
10. Pediatric patients weighing less than 40 kg, use length-based tape for weight estimate and follow
    1. For persons over 40 kg, the initial fluid rate can also be calculated using the “Rule of 10”:
11. Calculate the TBSA (round to nearest 10%)
12. Multiply TBSA x 10 = initial fluid rate (mL/hr) {for persons between 40 – 80 kg}
13. Add 100 mL/hr for every 10 kg of body weight over 80 kg
14. Prevent systemic heat loss and keep the patient warm

**Special Treatment Considerations**

1. If blast mechanism, treat per the [**Blast Injury**](#BlastInj) guideline
2. Airway burns can rapidly lead to upper airway obstruction and respiratory failure
3. Have a high index of suspicion for cyanide poisoning in a patient with depressed GCS, respiratory difficulty and cardiovascular collapse in the setting of an enclosed-space fire. Give the antidote (hydroxocobalamin),if available, in this circumstance
4. Particularly in enclosed-space fires, carbon monoxide toxicity is a consideration and pulse oximetry may not be accurate [see [**Carbon Monoxide/Smoke Inhalation**](#CO)guideline]
5. For specific chemical exposures (cyanide, hydrofluoric acid, other acids and alkali) [see [**Topical Chemical Burn**](#TopChem) guideline]
6. Consider decontamination and notification of receiving facility of potentially contaminated patient (e.g. methamphetamine (meth) lab incident)

## Crush Injury

**Patient Treatment and Interventions**

1. The treatment of crushed casualties should begin as soon as they are discovered
2. If severe hemorrhage is present, see [**Extremity Trauma/External Hemorrhage Management**](#ExtremTraum) guideline
3. Administer high-flow oxygen
4. Intravenous access should be established with normal saline initial bolus of 10-15 ml/kg (prior to extrication if possible)
5. For significant crush injuries or prolonged entrapment of an extremity, consider sodium bicarbonate 1 mEq/kg (maximum dose of 50 mEq) IV bolus over 5 minutes
6. Attach cardiac monitor. Obtain/interpret 12-lead EKG, if available. Carefully monitor for dysrhythmias or signs of hypokalemia before and immediately after release of pressure and during transport (e.g. peaked T waves, wide QRS, lengthening QT interval, loss of P wave)
7. For pain control, consider analgesics [see [**Pain Management**](#PnMan) guideline]
8. Consider the following post extrication
   1. Continued resuscitation with normal saline (500-1000 cc/hr for adults, 10 cc/kg/hr for children)
   2. If EKG suggestive of hyperkalemia, If findings of hyperkalemia, administer IV fluids and consider administration of:
      1. Calcium chloride – 1 gm IV/IO over 5 minutes, ensure IV patency and do not exceed 1 mL per minute

**OR**

* + 1. Calcium gluconate – 2 gm IV/IO over 5 minutes with constant cardiac monitoring
  1. If not already administered, for significant crush injuries with EKG suggestive of hyperkalemia, administer sodium bicarbonate 1 mEq /kg (max dose of 50 mEq) IV bolus over 5 minutes
  2. If EKG suggestive of hyperkalemia, consider albuterol 5 mg via small volume nebulizer

## Extremity Trauma/External Hemorrhage Management

**Patient Treatments and Interventions**

1. Manage bleeding
   1. Apply direct pressure to bleeding site followed by pressure dressing.
   2. If direct pressure/pressure dressing is ineffective or impractical:
2. If the bleeding site is amenable to tourniquet placement, apply tourniquet to extremity
   * + 1. Tourniquet should be placed 2-3 inches proximal to wound, not over a joint, and tightened until bleeding stops and distal pulse is eliminated
       2. If bleeding continues, place a second tourniquet proximal to the first
       3. For thigh wounds, consider placement of two tourniquets, side-by-side, and tighten sequentially to eliminate distal pulse
3. If the bleeding site is not amenable to tourniquet placement (i.e. junctional injury), pack wound tightly with a hemostatic gauze and apply direct pressure
   1. Groin/axillary injury
4. Apply direct pressure to wound
5. If still bleeding, pack wound tightly with hemostatic gauze and apply direct pressure
6. Consider using a junctional hemostatic device if available
7. Manage pain [see [**Pain Management**](#PnMan)guideline]
   1. Pain management should be strongly considered for patients with suspected fractures
   2. If tourniquet placed, an alert patient will likely require pain medication to manage tourniquet pain
8. Stabilize suspected fractures/dislocations
   1. Strongly consider pain management before attempting to move a suspected fracture
   2. If distal vascular function is compromised, gently attempt to restore normal anatomic position
   3. Use splints as appropriate to limit movement of suspected fracture
   4. Elevate extremity fractures above heart level whenever possible to limit swelling
   5. Apply ice/cool packs to limit swelling in suspected fractures or soft tissue injury - do not apply ice directly to skin
   6. Reassess distal neurovascular status after any manipulation or splinting of fractures/dislocations

## Facial/Dental Trauma

**Patient Presentation**

**Inclusion Criteria**

Isolated facial injury, including trauma to the eyes, nose, ears, midface, mandible, dentition

**Exclusion Criteria**

1. General Trauma [see [**General Trauma Managment**](#GenlTrauma)guideline]
2. Burn trauma [see [**Burns**](#Burn) guideline]

**Patient Treatment and Interventions**

1. Administer oxygen as appropriate with a target of achieving 94-98% saturation - use ETCO2 to help monitor for hypoventilation and apnea
2. IV access, as needed, for fluid or medication administration
3. Pain medication per the [**Pain Management**](#PnMan) guideline
4. Avulsed tooth:
   1. Avoid touching the root of the avulsed tooth. Do not wipe off tooth
   2. Pick up at crown end. If dirty, rinse off under cold water for 10 seconds
   3. Place in milk or saline as the storage medium. Alternatively, an alert and cooperative patient can hold tooth in mouth using own saliva as storage medium
5. Eye trauma:
   1. Place eye shield for any significant eye trauma
   2. If globe is avulsed, do not put back into socket. Cover with moist saline

dressings and then place cup over it

1. Mandible unstable:
   1. Expect patient cannot spit/swallow effectively and have suction readily available
   2. Preferentially transport sitting up with emesis basin/suction available (in the absence of a suspected spinal injury, see [**Spinal Care**](#Spine)guideline)
2. Epistaxis - squeeze nose (or have patient do so) for 10-15 minutes continuously
3. Nose/ear avulsion:
   1. Recover tissue if it does not waste scene time
   2. Transport with tissue wrapped in dry sterile gauze in a plastic bag placed on ice
   3. Severe ear and nose lacerations can be addressed with a protective moist sterile dressing

## Head Injury

**Patient Treatment and Interventions**

*NOTE: These are not necessarily the order they are to be done, but are grouped by conceptual areas*

1. Airway:
   1. Administer oxygen as appropriate with a target of achieving 94-98% saturation
   2. If patient unable to maintain airway, consider oral airway (nasal airway should not be used with significant facial injury or possible basilar skull fracture)
   3. Oral endotracheal intubation or supraglottic airway insertion can be used if BVM ventilation ineffective in maintaining oxygenation or if airway is continually compromised
   4. Nasal intubation should not be used in patients with head injury
2. Breathing:

a. For patients with a moderate or/severe head injury who are unable to maintain their airway: use continuous waveform capnography, and EtCO2 measurement if available, with a target EtCO2 of 35-40 mmHg

b. Supraglottic airway placement or/endotracheal intubation should only be performed if BVM ventilation is inadequate to maintain adequate oxygenation with a target EtCO2 of 35-40 mmHg

c. For patients with a severe head injury with signs of herniation: hyperventilate to a target EtCO2 of 30-35 mmHg as a short-term option, and only for severe head injury with signs of herniation

1. Circulation:
   1. Wound care
2. Control bleeding with direct pressure if no suspected open skull injury
3. Moist sterile dressing to any potential open skull wound
4. Cover an injured eye with moist saline dressing and place cup over it
   1. Moderate/severe closed head injury
5. Blood pressure: avoid hypotension
   * + 1. Adult (age greater than 10 yo): maintain SBP greater than or equal to 110 mmHg
       2. Pediatric: maintain SBP:
          1. less than 1 month: greater than 60 mmHg
          2. 1-12 months: greater than 70 mmHg
          3. 1-10 yo: greater than 70 + 2x age in years
   1. Closed head injury
      1. consider administering NS/LR fluid bolus to maintain blood pressure to above numbers and maintain cerebral perfusion
   2. Do not delay transport to initiate IV access
6. Disability:
   1. Evaluate for other causes of altered mental status - check blood glucose
   2. Spinal assessment and management, per [**Spinal Care**](#Spine) guideline
   3. Perform and trend neurologic status assessment (moderate/severe: GCS 3-13, P {pain} or U {unresponsive} on AVPU scale)
7. Early signs of deterioration:
   * + 1. Confusion
       2. Agitation
       3. Drowsiness
       4. Vomiting
       5. Severe headache
8. Monitor for signs of herniation
   1. Severe head injury – Elevate head of bed 30 degrees
9. Transport destination specific to head trauma
   1. Preferential transport to highest level of care within trauma system:
10. GCS 3-13, P (pain) or U (unresponsive) on AVPU scale
11. Penetrating head trauma
12. Open or depressed skull fracture

## High Threat Considerations/Active Shooter Scenario

**Patient Assessment, Treatment, and Interventions**

1. Hot Zone/Direct Threat care considerations:
   1. Defer in depth medical interventions if engaged in ongoing direct threat (e.g. active shooter, unstable building collapse, improvised explosive device, hazardous material threat)
   2. Threat mitigation techniques will minimize risk to patients and providers
   3. Triage should be deferred to a later phase of care
   4. Prioritization for extraction is based on resources available and the situation
   5. Minimal interventions are warranted
   6. Encourage patients to provide self-first aid or instruct aid from uninjured bystander
   7. Consider hemorrhage control:
2. Tourniquet application is the primary “medical” intervention to be considered in Hot Zone/Direct Threat
3. Consider instructing patient to apply direct pressure to the wound if no tourniquet available (or application is not feasible)
4. Consider quickly placing or directing patient to be placed in position to protect airway, if not immediately moving patient
5. Warm Zone/Indirect Threat care considerations:
   1. Maintain situational awareness
   2. Ensure safety of both responders and patients by rendering equipment and environment safe (firearms, vehicle ignition)
   3. Conduct primary survey, per the [**General Trauma Management**](#GenlTrauma)guideline, and initiate appropriate life-saving interventions
6. Hemorrhage control
   * + 1. Tourniquet
       2. Wound packing if feasible
7. Maintain airway and support ventilation [see [**Airway Management**](#Airway)guideline]
   1. Do not delay patient extraction and evacuation for non-life-saving interventions
   2. Consider establishing a casualty collection point if multiple patients are encountered
   3. Unless in a fixed casualty collection point, triage in this phase of care should be limited to the following categories:
8. Uninjured and/or capable of self-extraction
9. Deceased/expectant
10. All others

## Spinal Care

**Patient Treatment and Interventions**

1. Place patient in cervical collar if there are any of the following:
   1. Patient complains of midline neck or spine pain
   2. Any midline neck or spinal tenderness with palpation
   3. Any abnormal mental status (including extreme agitation)
   4. Focal or neurologic deficit
   5. Any evidence of alcohol or drug intoxication
   6. Another severe or painful distracting injury is present
   7. Torticollis in children
   8. A communication barrier that prevents accurate assessment
   9. If none of the above apply, patient may be managed without a cervical collar
2. Patients with penetrating injury to the neck should not be placed in a cervical collar or other spinal precautions regardless of whether they are exhibiting neurologic symptoms or not. Doing so can lead to delayed identification of injury or airway compromise, and has been associated with increased mortality
3. If extrication is required:
4. From a vehicle: After placing a cervical collar, if indicated, children in a booster seat and adults should be allowed to self-extricate. For infants and toddlers already strapped in a car seat with a built-in harness, extricate the child while strapped in his/her car seat
5. Other situations requiring extrication: A padded long board may be used for extrication, using the lift and slide (rather than a logroll) technique
6. Helmet removal
   1. If a football 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 the neck manually immobilized - occipital and shoulder padding should be applied, as needed, with the patient in a supine position, in order to maintain neutral cervical spine positioning
   2. Evidence is lacking to provide guidance about other types of helmet removal
7. Do not transport patients on rigid long boards, unless the clinical situation warrants long board use. An example of this 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 situations, long boards should ideally be padded or have a vacuum mattress applied to minimize secondary injury to the patient
8. Patients should be transported to the nearest appropriate facility, in accordance with the Centers for Disease Control “Guidelines for Field Triage of Injured Patients” [[**Appendix X**](#Triage)]
9. Patients with severe kyphosis or ankylosing spondylitis may not tolerate a cervical collar. These patients should be immobilized in a position of comfort using towel rolls or sand bags

# Toxins and Environmental

## Poisoning/Overdose Universal Care

**Patient Treatment and Interventions**

1. Assure a patent airway
2. Administer oxygen as appropriate with a target of achieving 94-98% saturation and, if there is hypoventilation noted, support breathing
3. Initiate IV access for infusion treatment medication and/or lactated Ringer’s or normal saline if indicated, and obtain blood samples if EMS management might change value (e.g. glucose, lactate, cyanide)
4. Fluid bolus (20 mL/kg) if evidence of hypoperfusion
5. Administration of appropriate antidote or mitigating medication (refer to specific agent guideline if not listed below)
   1. Acetaminophen overdose:
6. Consider activated charcoal without sorbitol (1 g/kg) PO only if within the first hour of ingestion and prolonged transport to definitive care
7. Based on suspected quantity and timing, consider acetylcysteine (pediatric and adult)
   * + 1. Loading dose is acetylcysteine 150 mg/kg IV; mix in 200 mL of D5W and infuse over 1 hr
       2. Then dose acetylcysteine 50 mg/kg IV in 500 mL D5W over 4 hrs
       3. If IV is not available, acetylcysteine 140 mg/kg PO
8. If risk of rapidly decreasing mental status, do not administer oral agents
   1. Aspirin overdose:
9. Consider activated charcoal without sorbitol (1 gm/kg) PO
   * + 1. As aspirin is erratically absorbed, charcoal is highly recommended to be administered early
       2. If altered mental status or risk of rapid decreasing mental status from polypharmacy, do not administer oral agents including activated charcoal
10. In salicylate poisonings, let the patient breath on their own, even if tachypnea, until there is evidence of decompensation or dropping oxygen saturation. Acid/base disturbances and outcomes worsen when the patient is manually ventilated
    1. Benzodiazepine overdose:
11. Respiratory support
12. Consider fluid challenge (20 mL/kg) for hypotension
13. Consider vasopressors after adequate fluid resuscitation (1-2 liters of crystalloid) for the hypotensive patient
    1. Caustic substances ingestion (e.g. acids and alkali):
14. Evaluate for airway compromise secondary to spasm or direct injury associated with oropharyngeal burns
15. In the few minutes immediately after ingestion, consider administration of water or milk if available. Adults: maximum 240 mL (8 ounces); Pediatrics: maximum 120 mL (4 ounces) to minimize risk of vomiting
    * + 1. Do not attempt dilution in patients with respiratory distress, altered mental status, severe abdominal pain, nausea or vomiting, or patients who are unable to swallow or protect their airway.
        2. Do not force fluids in anyone who refuses to drink.
    1. Dystonia (symptomatic), extrapyramidal signs or symptoms, or mild allergic reactions
16. Consider administration of diphenhydramine
    * + 1. Adult: diphenhydramine 25- 50 mg IV or IM
        2. Pediatric: diphenhydramine 1- 1.25 mg/kg IVP/IO or IM (maximum single dose of 25 mg)
    1. Monoamine oxidase inhibitor overdose (symptomatic; e.g. (MAOI; isocarboxazid (Marplan®), phenelzine (Nardil®), selegiline (Emsam®), tranylcypromine (Parnate®))
17. Consider administration of midazolam (benzodiazepine of choice) for temperature control
18. Adult and Pediatric: Midazolam 0.1 mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg - reduce by 50% for patients 69 years or older
    1. Opiate overdose, treat per the [**Opioid Poisoning/Overdose**](#OD)guideline
    2. Oral ingestion unknown poisoning:
19. If there is a risk of rapidly decreasing mental status or for petroleum-based ingestions, do not administer oral agents
20. Consider administration of activated charcoal without sorbitol (1 g/kg) PO particularly if it is within the first 1 hour after ingestion (including acetaminophen) or prolonged transport to definitive care.
21. Patients who have ingested medications with extended release or delayed absorption should also be administered activated charcoal
    1. Selective serotonin reuptake inhibitors (SSRIs)
22. Consider early airway management
23. Treat arrhythmias following ACLS guidelines
24. Aggressively control hyperthermia with cooling measures
25. Consider fluid challenge (20 mL/kg) for hypotension
26. Consider vasopressors after adequate fluid resuscitation (1-2 liters of crystalloid) for the hypotensive patient [see [**Shock**](#Shck) guideline]
27. For agitation, consider midazolam (benzodiazepine of choice)
    * + 1. Adult: midazolam 0.1 mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg
           1. Reduce by 50% for patients 69 years or older
        2. Pediatric: midazolam 0.1 mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg or midazolam 0.2 mg/kg IN to maximum dose of 4 mg
      1. For seizures, treat per [**Seizures**](#Seiz) guideline
    1. Tricyclic Antidepressant (TCA) Overdose:
28. Consider early airway management
29. If widened QRS (100 msec or greater), consider sodium bicarbonate 1-2 meq/kg IV, this can be repeated as needed to narrow QRS and improve blood pressure
30. Consider fluid challenge (20 mL/kg) for hypotension
31. Consider vasopressors after adequate fluid resuscitation (1-2 liters of crystalloid) for the hypotensive patient [see [**Shock**](#Shck) guideline]
32. For agitation, consider midazolam (benzodiazepine of choice)
    * + 1. Adult: midazolam 0.1 mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg
           1. Reduce by 50% for patients 69 years or older
        2. Pediatric: midazolam 0.1 mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg or midazolam 0.2 mg/kg IN to maximum dose of 4 mg
      1. For seizure, treat per [**Seizures**](#Seiz) guideline

## Acetylcholinesterase Inhibitors (Carbamates, Nerve Agents, Organophosphates) Exposure

**Patient Management**

1. Don the appropriate PPE
2. Remove the patient’s clothing and wash the skin with soap and water
   1. Acetylcholinesterase inhibitor agents can be absorbed through the skin
   2. Contaminated clothing can provide a source of continued exposure to the toxin
3. Rapidly assess the patient’s respiratory status, mental status, and pupillary status
4. Administer the antidote immediately for confirmed or suspected acetylcholinesterase inhibitor agent exposure
5. Administer oxygen as appropriate with a target of achieving 94-98% saturation and provide airway management
6. Establish intravenous access (if possible)
7. Apply a cardiac monitor (if available)
8. The heart rate may be normal, bradycardic, or tachycardic
9. Clinical improvement should be based upon the drying of secretions and easing of respiratory effort rather than heart rate or pupillary response.
10. Continuous and ongoing patient reassessment is critical

**Patient Treatment and Interventions** (see dosing tables below)

1. Medications:
   1. Atropine
2. Atropine is the primary antidote for organophosphate, carbamate, or nerve agent exposures, and repeated doses should be administered liberally to patients who exhibit signs and symptoms of exposure or toxicity
3. Atropine may be provided in multi-dose vials, pre-filled syringes, or auto-injectors
4. Commercially available atropine auto-injectors include:
   * + 1. Atro-Pen® 1 mg of atropine (dark red container)
       2. Atro-Pen® 2 mg of atropine (green container)
       3. Pediatric Atro-Pen® 0.25 mg of atropine (yellow container)
       4. Pediatric Atro-Pen® 0.5 mg of atropine (blue container)
   1. Pralidoxime chloride (2-PAM)
5. Pralidoxime chloride is a secondary treatment and should be given concurrently in an effort to reactivate the acetylcholinesterase
6. Pralidoxime chloride may be provided in a single dose vial, pre-filled syringes, or auto-injectors
7. Auto-injectors contain 600 mg of pralidoxime chloride
8. In order to be beneficial to the victim, a dose of pralidoxime chloride should be administered shortly after the nerve agent or organophosphate poisoning as it has minimal clinical effect if administration is delayed
   1. Benzodiazepines
9. Benzodiazepines are administered as an anticonvulsant for those patients who exhibit seizure activity [see [**Seizures**](#Seiz) guideline for doses and routes of administration]
10. Lorazepam, diazepam, and midazolam are the most frequently used benzodiazepines in the prehospital setting
11. In the scenario of an acetylcholinesterase inhibitor agent exposure, the administration of diazepam or midazolam is preferable due to their more rapid onset of action
12. Benzodiazepines may be provided in multi-dose or single-dose vials, pre-filled syringes, or auto-injectors
13. CANA® (Convulsive Antidote Nerve Agent) is a commercially available auto-injector that contains 10 mg of diazepam
    1. Mark I® Kits
14. A commercially available kit of nerve agent/organophosphate antidote auto-injectors. These are being phased out and replaced with Duodote by the CDC
15. A Mark I® kit consists of one auto-injector containing 2 milligrams of atropine and a second auto-injector containing 600 milligrams of pralidoxime chloride
    1. Duodote®
16. A commercially available auto-injector of nerve agent/organophosphate antidote
17. Duodote® is one auto-injector that contains 2.1 milligrams of atropine and 600 milligrams of pralidoxime chloride
    1. ATNAA® (Antidote Treatment Nerve Agent Auto-injector)
18. An auto-injector of nerve agent/organophosphate antidote that is typically in military supplies
19. ATNAA® is one auto-injector that contains 2.1 milligrams of atropine and 600 milligrams of pralidoxime chloride
20. ATNAA® may be seen in civilian supplies assets when Duodote® is unavailable or in short supply
    1. CHEMPACK
21. Federally-owned cache of nerve agent antidotes that is managed by the Centers for Disease Control and Prevention (CDC) and offered to states that voluntarily agree to maintain custody and security of CHEMPACK assets
22. These are forward-deployed at sites determined by states that are part of the program such as hospitals and EMS centers
23. Deployment of CHEMPACKs are reserved for events where the nerve agent/organophosphate exposure will deplete the local or regional supply of antidotes
24. There are two types of CHEMPACK containers:
    * + 1. EMS Containers: CHEMPACK assets for EMS contain a large portion of auto-injectors for rapid administration of antidotes by EMS providers of all levels of licensure/certification – They contain enough antidote to treat roughly 454 patients
        2. Hospital Containers: CHEMPACK assets contain a large portion of multidose vials and powders for reconstitution – they contain enough antidote to treat roughly 1000 patients
25. Medication Administration:
    1. Atropine in extremely large, and potentially multiple, doses is the antidote for an acetylcholinesterase inhibitor agent poisoning
    2. Atropine should be administered immediately followed by repeated doses until the patient’s secretions resolve
    3. Pralidoxime chloride (2-PAM) is a secondary treatment and, when possible, should be administered concurrently with atropine
    4. The stock of atropine and pralidoxime chloride available to EMS providers is usually not sufficient to fully treat the victim of an acetylcholinesterase inhibitor agent exposure; however, EMS providers should initiate the administration of atropine and, if available, pralidoxime chloride
    5. Seizures should be treated with benzodiazepines. There is some emerging evidence that, for midazolam, the intranasal route of administration may be preferable to the intramuscular route. However, intramuscular absorption may be more clinically efficacious than the intranasal route in the presence of significant rhinorrhea
    6. The patient should be emergently transported to the closest appropriate medical facility as directed by direct medical oversight
26. Recommended Doses (see dosing tables below)

The medication dosing tables that are provided below are based upon the severity of the clinical signs and symptoms exhibited by the patient. There are several imperative factors to note:

* 1. For organophosphate or severe acetylcholinesterase inhibitor agent exposure, the required dose of atropine necessary to dry secretions and improve the respiratory status is likely to exceed 20 mg. Atropine should be administered rapidly and repeatedly until the patient’s clinical symptoms diminish. Atropine must be given until the acetylcholinesterase inhibitor agent has been metabolized. It may require up to 2000 mg of atropine over several days to weeks
  2. Since the antidotes in the Mark I® kit are in two separate vials, the atropine auto-injector in the kit can be administered to the patient in the event that Atro-Pen® or generic atropine auto-injectors are not available and/or intravenous atropine is not an immediate option
  3. Due to the fact that Duodote® auto-injectors contain pralidoxime chloride, they should not be used for additional dosing of atropine beyond the recommended administered dose of pralidoxime chloride
  4. All of the medications below can be administered intravenously in the same doses cited for the intramuscular route. However, due to the rapidity of onset of signs, symptoms, and potential death from acetylcholinesterase inhibitor agents, intramuscular administration is highly recommended to eliminate the inherent delay associated with establishing intravenous access
  5. The antidotes can be administered via the intraosseous route. However, due to the rapidity of onset of signs, symptoms, and potential death from acetylcholinesterase inhibitor agents, intramuscular administration remains the preferable due to the inherent delay associated with establishing intraosseous access and the limited use of this route of administration for other medications

**Mild Acetylcholinesterase Inhibitor Agent Exposure**

|  |  |
| --- | --- |
| Patient  (Weight) | Atropine Dose  IM or via Auto-injector |
| **Infant:**  0-2 yo | 0.05 mg/kg IM or via auto-injector (*e.g. 0.25 and/or 0.5 mg auto-injector(s)*) |
| **Child:** 3-7 yo (13-25 kg) | 1 mg IM or via auto-injector (*e.g. one 1 mg or two 0.5 mg auto-injectors)* |
| **Child:** 8-14 yo (26-50 kg) | 2 mg IM or via auto-injector (*e.g. one 2 mg or two 1 mg auto-injectors)* |
| **Adolescent/ Adult** | 2 mg IM or via auto-injector |
| **Pregnant  Women** | 2 mg IM or via auto-injector |
| **Geriatric/ Frail** | 1 mg IM or via auto-injector |

**Mild to Moderate Acetylcholinesterase Inhibitor Agent Exposure**

|  |  |  |
| --- | --- | --- |
| Patient (Weight) | Atropine Dose IM or via Auto-injector | Pralidoxime Chloride Dose IM  or via 600 mg Auto-injector |
| **Infant:** 0-2 years | 0.05 mg/kg IM or via auto-injector  (*e.g. 0.25 mg and/or 0.5 mg auto-injector*) | 15 mg/kg IM |
| **Child:**  3-7 yo (13-25 kg) | 1 mg IM or via auto-injector  (*e.g. one 1 mg auto-injector or two 0.5 mg auto-injectors*) | 15 mg/kg IM  **OR** One auto-injector (600 mg) |
| **Child:**  8-14 yo (26-50 kg) | 2 mg IM or via auto-injector  (*e.g. one 2 mg auto-injector or two 1 mg auto-injectors)* | 15 mg/kg IM **OR**  One auto-injector (600 mg) |
| **Adolescent/ Adult** | 2-4 mg IM or via auto-injector | 600 mg IM **OR** One auto-injector (600 mg) |
| **Pregnant Women** | 2-4 mg IM or via auto-injector | 600 mg IM  **OR**  One auto-injector (600 mg) |
| **Geriatric/  Frail** | 2 mg IM or via auto-injector | 10 mg/kg IM  **OR** One auto-injector (600 mg) |

**Severe Acetylcholinesterase Inhibitor Agent Exposure**

|  |  |  |
| --- | --- | --- |
| Patient (Weight) | Atropine Dose IM or via Auto-injector | Pralidoxime Chloride Dose IM or via 600 mg Auto-injector |
| Infant:  0-2 yo | 0.1 mg/kg IM or via auto-injector  (*e.g. 0.25 mg an/or 0.5 mg auto-injector*) | 45 mg/kg IM |
| Child:  3-7 yo (13-25 kg) | 0.1 mg/kg IM **OR** 2 mg via auto-injector  (*e.g. one 2 mg auto-injector or four 0.5 mg auto-injectors*) | 45 mg/kg IM  **OR** One auto-injector (600mg) |
| Child:  8-14 yo (26-50 kg) | 4 mg IM or via auto-injector  (*e.g. two 2 mg auto-injectors or four 1 mg auto-injectors*) | 45 mg/kg IM **OR** Two auto-injectors (1200 mg) |
| Adolescent: 14 yo or older | 6 mg IM or via auto-injector  (*e.g. three 2 mg audto-injectors*) | Three auto-injectors (1800 mg) |
| Adult | 6 mg IM or via auto-injector  (*e.g. three 2 mg auto-injectors*) | Three auto-injectors (1800 mg) |
| Pregnant Women | 6 mg IM or via auto-injector  (*e.g. three 2 mg auto-injectors*) | Three auto-injectors (1800 mg) |
| Geriatric/  Frail | 2-4 mg IM or via auto-injector  (*e.g. one to two 2 mg auto-injectors*) | 25 mg/kg IM **OR** two to three auto-injectors  (1200 mg-1800 mg) |

**Guidance for the Treatment of Seizures Secondary to Acetylcholinesterase Inhibitor Agent Exposure**

|  |  |  |
| --- | --- | --- |
| Patient | Diazepam | Midazolam |
| Infant (0-2 yo) | 0.2-0.5 mg/kg IM Repeat every 2-5 minutes | 0.2 mg/kg IM Repeat prn in 10 minutes |
| 0.2-0.5 mg/kg IV every 15-30 minutes May repeat twice as needed | May repeat dose once |
| Total maximum dose: 5 mg | Total maximum dose: 0.4 mg/kg |
| Child (3-13 yo) | 0.2-0.5 mg/kg IM  Repeat every 2-5 minutes | 0.2 mg/kg IM Not to exceed 10 mg Repeat prn in 10 minutes |
| 0.2-0.5 mg/kg IV every 15-30 minutes May repeat dose twice if needed | May repeat dose once |
| Total maximum dose: 5 mg if less than 5 years | Total maximum dose: 0.4 mg/kg Not to exceed 20 mg |
| Total maximum dose: 10 mg if age 5 years or younger 1 CANA® auto-injector |
| Adolescent (14 yos or older) | 2-3 CANA® auto-injectors | 0.2 mg/kg IM  Total maximum dose of 10 mg Repeat prn in 10 minutes |
| 5-10 mg IV every 15 minutes | May repeat dose once |
| Total maximum dose: 30 mg | Total maximum dose: 20 mg |
| Adult | 2-3 CANA® auto-injectors | 10 mg IM Repeat prn in 10 minutes |
| 5-10 mg IV every 15 minutes | May repeat dose once |
| Total maximum dose: 30 mg | Total maximum dose: 20 mg |
| Pregnant Women | 2-3 CANA® auto-injectors | 10 mg IM Repeat prn in 10 minutes |
| 5-10 mg IV every 15 minutes | May repeat dose once |
| Total maximum dose: 30 mg | Total maximum dose: 20 mg |
| Geriatric | 2-3 CANA® auto-injectors | 10 mg IM Repeat prn in 10 minutes |
| 5-10 mg IV every 15 minutes | May repeat dose once |
| Total maximum dose: 30 mg | Total maximum dose: 20 mg |

**Tables adapted from**: U.S. Department of Health and Human Services, ASPR, National Library of Medicine, *Chemical Hazards Emergency Medical Management: Nerve Agents- Prehospital Management*, www.chemm.nlm.nih.gov

## Radiation Exposure

**Patient Treatment and Interventions**

1. If patient experiences nausea, vomiting, and/or diarrhea:
   1. Provide care, per [**Nausea-Vomiting**](#NV)guideline
   2. Document the time gastrointestinal symptoms started
2. If seizure occurs:
   1. Consider a primary medical cause or exposure to possible chemical agents unless indicators for a large whole body radiation dose (greater than 20Gy), such as rapid onset of vomiting, are present
   2. Treat per [**Seizures**](#Seiz)guideline

## Topical Chemical Burn

**Patient Treatment and Interventions**

1. If dry chemical contamination, carefully brush off solid chemical prior to flushing the site as the irrigating solution may activate a chemical reaction
2. If wet chemical contamination, flush the patient’s skin (and eyes, if involved) with copious amounts of water or normal saline
3. Provide adequate analgesia per the [**Pain Management**](#PnMan)guideline
4. Consider the use of topical anesthetic eye drops (e.g. tetracaine) for chemical burns of the eye
5. For eye exposure, administer continuous flushing of irrigation fluid to eye - Morgan lens may facilitate administration
6. Early airway intervention for airway compromise or spasm associated with oropharyngeal burns
7. Take measures to minimize hypothermia
8. Initiate intravenous fluid resuscitation if necessary to obtain hemodynamic stability

**Hydrofluoric Acid**

Hydrofluoric acid (HF) is a highly corrosive substance that is primarily used for automotive cleaning products, rust removal, porcelain cleaners, etching glass, cleaning cement or brick, or as a pickling agent to remove impurities from various forms of steel. Hydrofluoric acid readily penetrates intact skin and there may be underlying tissue injury. It is unlikely that low concentration HF will cause an immediate acid-like burn however there may be delayed onset of pain to the exposed area. Higher concentration HF may cause immediate pain as well as more of a burn appearance that can range from mild erythema to an obvious burn. An oral or large dermal exposure can result in significant systemic hypocalcemia with possible QT prolongation and cardiovascular collapse.

1. For all patients in whom a hydrofluoric acid exposure is confirmed or suspected:
   1. Vigorously irrigate all affected areas with water or normal saline for a minimum of 15 minutes
   2. Apply a cardiac monitor for oral or large dermal exposures significant HF exposures
   3. Apply calcium preparation:
2. Calcium prevents tissue damage from hydrofluoric acid
3. Topical calcium preparations:
   * + 1. Commercially manufactured calcium gluconate gel
       2. If commercially manufactured calcium gluconate gel is not available, a topical calcium gluconate gel preparation can be made by combining 150 mL (5 ounces) of a sterile water-soluble gel (e.g. Surgilube® or KY® jelly) with one of the following:
          1. 35 mL of calcium gluconate 10% solution
          2. 10 g of calcium gluconate tablets (e.g. Tums®)
          3. 3.5 g calcium gluconate powder or
       3. If calcium gluconate is not available, 10 mL of calcium chloride 10% solution in 150 mL in sterile water soluble gel (e.g. Surgilube® or KY® jelly)
       4. Apply generous amounts of the calcium gluconate gel to the exposed skin sites to neutralize the pain of the hydrofluoric acid
          1. Leave in place for at least 20 minutes then reassess
          2. This can be repeated as needed
       5. Although generally low yield, there may be benefit to intravenous pain medication along with the topical calcium gluconate gel for pain control
       6. If fingers are involved, apply the calcium gel to the hand, squirt additional calcium gel into a surgical glove, and then insert the affected hand into the glove
       7. For patients who have ingested hydrofluoric acid or who have a large dermal exposure consider intravenous calcium gluconate, 1-2 amps of 10% solution, as symptomatic hypocalcemia can precipitate rapidly as manifest by muscle spasms, seizures, hypotension ventricular arrhythmias and QT prolongation

## Stimulant Poisoning/Overdose

**Patient Treatment and Interventions**

1. IV access for any fluids and meds
2. Give fluids for poor perfusion; cool fluids for hyperthermia [see [**Shock**](#Shck)and[**Hyperthermia/Heat Exposure**](#Hypertherm) guidelines]
3. Treat chest pain as ACS and follow STEMI protocol if there is EKG is consistent with STEMI
4. Consider treating shortness of breath as atypical ACS
   1. Administer oxygen as appropriate with a target of achieving 94-98% saturation
5. Consider soft physical management devices especially if law enforcement has been involved in getting patient to cooperate [see [**Agitated or Violent Patient/Behavioral Emergency**](#Agitation) guideline]
6. Consider medications to reduce agitation and other significant sympathomimetic findings for the safety of the patients and providers. This may improve behavior and compliance [see [**Agitated or Violent Patient/Behavioral Emergency**](#Agitation)guideline]
   1. If haloperidol or droperidol is used, monitor 12-lead for QT-interval if feasible
7. Consider prophylactic use of anti-emetic:
   1. Adult: administer ondansetron 8 mg SLOW IV over 2–5 minutes or 4–8 mg IM or 8 mg orally disintegrating tablet
   2. Pediatric: Administer ondansetron 0.15 mg/kg SLOW IV over 2–5 minutes.
   3. Do not use promethazine if haloperidol or droperidol are to be or have been given. They all increase QT prolongation but ondansetron has less seizure risk
8. If hyperthermia suspected, begin external cooling

## Cyanide Exposure

**Patient Treatment and Interventions**

There is no widely available, rapid, confirmatory cyanide blood test. Many hospitals will not be able to rapidly assess cyanide levels. Therefore, treatment decisions must be made on the basis of clinical history and signs and symptoms of cyanide intoxication. For the patient with an appropriate history and manifesting one or more significant cyanide exposure signs or symptoms, treat with:

1. 100% oxygen via non-rebreather mask or bag valve mask
2. Collect a pre-treatment blood sample in the appropriate tube for lactate and cyanide levels
3. Administer one of the following medication regimes
   1. Hydroxocobalamin (the preferred agent)
4. Adult: Administer hydroxocobalamin
   * + 1. Initial dose is 5 g administered over 15 minutes slow IV
       2. Each 5 g vial of hydroxocobalamin for injection is to be reconstituted with 200 mL of LR, NS or D5W (25 mg/mL) and administered at 10-15 mL/minute
       3. An additional 5 g dose may be administered with medical consultation.
5. Pediatric: Administer hydroxocobalamin 70 mg/kg (reconstitute concentration is 25 mg/mL)
   * + 1. Each 5 g vial of hydroxocobalamin for injection is to be reconstituted with 200 mL of LR, NS or D5W (25 mg/mL) and administered at 10-15 mL/minute
6. Maximum single dose is 5 g

**OR**

* 1. Sodium thiosulfate

1. Adult: Sodium thiosulfate 12.5 g IV (50 mL of 25% solution)
2. Pediatric: Sodium thiosulfate 0.5 g/kg IV (2 mL/kg of 25% solution)
3. If seizure, treat per [**Seizures**](#Seiz) guideline

## Beta Blocker Poisoning/Overdose

**Patient Treatment and Interventions**

1. Consider activated charcoal without sorbitol (1 g/kg) PO
   1. If risk of rapid decreasing mental status, do not administer oral agent without adequately protecting the airway
2. Check blood glucose level on all patients but especially on pediatric patients as beta blockers can cause hypoglycemia in pediatric population
3. Consider atropine sulfate for symptomatic bradycardia
   1. Adult: Atropine 1 mg IV q 5 minutes to maximum of 3 mg
   2. Pediatric: Atropine 0.02 mg/kg (0.5 mg maximum) q 5 minutes, maximum total dose 1 mg
4. Consider fluid challenge (20 mL/kg) for hypotension with associated bradycardia
5. For symptomatic patients with cardiac effects (i.e. hypotension, bradycardia) consider:
   1. Adult: Glucagon – initial dose 5 mg IVP - this can be repeated in 5-10 minutes for a total of 10 mg
   2. Pediatric:
      1. Glucagon 1 mg IVP (25-40 kg) – every 5 minutes as necessary
      2. Glucagon 0.5 mg IVP (less than 25 kg) – every 5 minutes as necessary
6. Consider vasopressors after adequate fluid resuscitation (1-2 liters of crystalloid) for the hypotensive patient [see [**Shock**](#Shck) guideline for pediatric vs. adult dosing]
7. Consider transcutaneous pacing if refractory to initial pharmacologic interventions
8. If seizure, treat per [**Seizures**](#Seiz) guideline
9. If widened QRS (100 msec or greater), consider sodium bicarbonate 1-2meq/kg IV. This can be repeated as needed to narrow QRS

## Bites and Envenomation

**Patient Treatment and Interventions**

1. Consider an IV fluid bolus (normal saline or lactated Ringer’s) 20 mL/kg up to 2 liters
2. Consider vasopressors after adequate fluid resuscitation for the hypotensive patient [for adult vs. pediatric dosing see[**Shock**](#Shck) guideline]
3. If seizure, treat per [**Seizures**](#Seiz) guideline
4. Specific therapy for select bites, stings, or envenomation
   1. Envenomations that are known to antivenom readily available in the USA (e.g. black widow spider, bark scorpions, crotalid snakes, coral snakes)
      1. For these envenomations, consider transport to hospital that has access to antivenom, if feasible
   2. Jellyfish (*Medusozoan cnidarians*):
      1. As there is a significant variety and diversity of Jellyfish, it is important to be familiar with the species and the appropriate treatment for your local aquatic creatures
      2. Generally, scrape off any remaining tentacles or nematocysts, then immerse affected body part in hot water (113°F/45°C). Except for certain species of jellyfish (e.g. *Physalia*, a species found in Australian waters) which may have mematocysts activated by vinegar (acetic acid), it may be used to reduce pain due to deactivation of the nematocysts remaining in the skin. Vinegar may also activate the nematocysts of sea nettles and is not recommended after this type of jellyfish exposure.
   3. Lionfish, scorpionfish, stingray:
      1. Immerse affected body part in hot water to reduce the pain associated with the toxin
5. Provide adequate analgesia per the [**Pain Management**](#PnMan)guideline

## Calcium Channel Blocker Poisoning/Overdose

**Patient Treatment and Interventions**

1. Consider activated charcoal without sorbitol (1 g/kg) PO. If risk of rapid decreasing mental status, do not administer oral agent without adequately protecting the airway
2. Consider atropine sulfate for symptomatic bradycardia
   1. Adult: atropine 1 mg IV q 5 minutes to maximum of 3 mg
   2. Pediatric: atropine 0.02 mg/kg (0.5 mg maximum) q 5 minutes, maximum total dose 1 mg
3. Consider calcium gluconate or calcium chloride
   1. Calcium gluconate
      1. Adult: Calcium gluconate 2-6 g slow IVP over 10 minutes
      2. Pediatric: Calcium gluconate 60 mg/kg IVP over 10 minutes
   2. Calcium chloride
4. Adult: Calcium chloride 0.5 - 1 g slow IVP (50 mg/minute)
5. Pediatric: Calcium chloride 20 mg/kg (0.2 mL/kg) slow IVP/IO (50 mg/mL) Maximum dose 1 g or 10 mL (Calcium gluconate is preferred as Calcium chloride has increased risk of tissue damage in pediatrics)
6. Consider IV fluid bolus (normal saline or lactated Ringer’s) 20 mL /kg up to 2 liters
7. Consider vasopressors after adequate fluid resuscitation for the hypotensive patient [see [**Shock**](#Shck) guideline for adult vs. pediatric dosing]
8. If atropine, calcium, and vasopressors have failed in the symptomatic bradycardia patient, consider
   1. Adult: Glucagon initial 5 mg then 1 mg every 5 minutes IVP (may require 5-15 mg to see effect)
   2. Pediatric:
9. Glucagon 1 mg IVP (25-40 kg); every 5 minutes as necessary
10. Glucagon 0.5 mg IVP (less than 25 kg); every 5 minutes as necessary
11. Consider transcutaneous pacing if refractory to initial pharmacologic interventions
12. If seizure, consider midazolam (benzodiazepine of choice)
    1. Adult: Midazolam 0.1 mg/kg IV in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg (Reduce by 50% for patients 69 years or older)
    2. Pediatric: Midazolam 0.1 mg/kg IV in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg or midazolam 0.2 mg/kg IN to maximum dose of 4 mg

## Carbon Monoxide/Smoke Inhalation

**Patient Treatment and Interventions**

1. 100% oxygen via non-rebreather mask or bag valve mask or advanced airway as indicated
2. If seizure, treat per [**Seizures**](#Seiz) guideline
3. Consider transporting patients with severe carbon monoxide poisoning directly to a facility with hyperbaric oxygen capabilities if feasible and patient does not meet criteria for other specialty care (e.g. trauma or burn)

## Opioid Poisoning/Overdose

**Patient Treatments and Interventions**

1. Critical resuscitation (opening and/or maintaining the airway, provision of oxygen, ensuring adequate circulation) should be performed prior to naloxone administration
2. If the patient has respiratory depression from a confirmed or suspected opioid overdose, consider naloxone administration
   1. The administration of the initial dose or subsequent doses can be incrementally titrated until respiratory depression is reversed
3. Naloxone can be administered via the IV, IM, IN, or ETT routes
   1. Adults: The typical initial adult dose ranges between 0.4-2 mg IV, IM, or ETT or up to a dose of 4 mg IN
   2. Pediatrics: The pediatric dose of naloxone is 0.1 mg/kg IV, IM, IN, or ETT
4. Maximum dose of 2 mg IV, IM, or ETT
5. Maximum dose of 4 mg IN
   1. Naloxone provided to laypersons and non-medical first responders via public access programs or prescriptions may be provided as a pre-measured dose in an auto-injector or nasal spray or as a pre-measured, but variable, dose and/or concentration in a needleless syringe with a mucosal atomization device (MAD) on the hub
   2. Naloxone auto-injectors contain 0.4 mg/0.4 mL or 2 mg/0.4 mL
      1. The cartons of naloxone auto-injectors prescribed to laypersons contain two naloxone auto-injectors and one trainer
   3. Naloxone nasal spray is manufactured in a single-use bottle that contains 4 mg/0.1 mL
   4. For the intranasal route when naloxone is administered via a needleless syringe (preferably with MAD on the hub), divide administration of the dose equally between the nostrils to a maximum of 1 mL per nostril
   5. The administration of naloxone can be titrated until adequate respiratory effort is achieved if administered with a syringe IV, IM, IN, or ETT
6. High-potency opioids [see [**Key Considerations**](#_Hlk526858092)] may require higher and/or more frequently administered doses of naloxone to reverse respiratory depression and/or to maintain adequate respirations
7. Regardless of the doses of naloxone administered, airway management with provision of adequate oxygenation and ventilation is the primary goal in patients with confirmed or suspected opioid overdose

**Key Considerations**

1. The essential feature of opioid overdose requiring EMS intervention is respiratory depression or apnea
2. Some opioids have additional toxic effects (e.g. methadone can produce QT prolongation, and tramadol can produce seizures)
3. Overuse and abuse of prescribed and illegal opioids has led to an increase in accidental and intentional opioid overdoses
4. DEA and Opioids:
   1. Legally prescribed opioids are controlled under the Drug Enforcement Administration (DEA)
   2. Opioids have a high potential for abuse, but have an accepted medical use in patient treatment and can be prescribed by a physician
   3. Frequent legally prescribed opioids include codeine, fentanyl, hydrocodone, morphine, hydromorphone, methadone, morphine, oxycodone, and oxymorphone
   4. Opioid derivatives, such as heroin, are illegal in the United States
5. Opioid combinations:
   1. Some opioids are manufactured as a combination of analgesics with acetaminophen, acetylsalicylic acid (aspirin), or other substances
6. In the scenario of an overdose, there is a potential for multiple drug toxicities
7. Examples of opioid combination analgesics:
8. Vicodin® is a combination of acetaminophen and hydrocodone
9. Percocet® is a combination of acetaminophen and oxycodone
10. Percodan® is a combination of aspirin and oxycodone
11. Suboxone® is a combination of buprenorphine and naloxone
12. High-potency opioids:
    1. Fentanyl is 50-100 times more potent than morphine - it is legally manufactured in an injectable and oral liquid, tablet, and transdermal (worn as a patch) forms however much of the fentanyl adulterating the heroin supply are illegal fentanyl analogs such as acetyl fentanyl
    2. Carfentanil is 10,000 times more potent than morphine
13. It is legally manufactured in a liquid form – however, a powder or tablet is the most common form of this drug that is illegally produced
14. In the concentration in which it is legally manufactured (3 mg/mL), an intramuscular dose of 2 mL of carfentanil will sedate an elephant
    1. Synthetic opioids (e.g. W-18, are 10,000 times more potent than morphine) – many synthetic opioids are not detectable by routine toxicology screening assays
15. The IN route has the benefit of no risk of needle stick to the provider
16. Patients with opioid overdose from fentanyl or fentanyl analogs may rapidly exhibit chest wall rigidity and require positive end expiratory pressure (PEEP), in addition to multiple and/or larger doses of naloxone, to achieve adequate ventilation
17. PPE that provides additional cutaneous, respiratory, or ocular protection may be considered when providing care in jurisdictions experiencing an increased incidence of overdose from high potency opioids

## Airway Respiratory Irritants

**Patient Treatment and Interventions**

1. Assure a patent airway
2. Administer (humidified if available) oxygen and if hypoventilation, toxic inhalation or desaturation noted, support breathing
   1. Maintain the airway and assess for airway burns, stridor, or airway edema and if indicated, perform intubation early (recommendation to avoid supraglottic airways - cricothryoidotomy may be required in rarer severe cases
   2. Non-invasive ventilation techniques.
3. Use continuous positive airway pressure (CPAP), bilevel positive airway pressure (BiPAP), intermittent positive pressure breathing (IPPB), humidified high-flow nasal cannula (HFNC), and/or bilevel nasal CPAP for severe respiratory distress or impending respiratory failure
4. Use bag-valve-mask (BVM) ventilation in the setting of hypoventilation, respiratory failure or arrest
5. Albuterol 5 mg nebulized (or 6 puffs metered dose inhaler) should be administered to all patients in respiratory distress with signs of bronchospasm either by basic life support BLS or ALS providers. This medication should be repeated at this dose with unlimited frequency for ongoing distress
6. Ipratropium 0.5 mg nebulized should be given up to 3 doses, in conjunction with albuterol
7. Initiate IV access for infusion of lactated Ringer’s or normal saline and obtain blood samples in effort to record pre-treatment levels associated with EMS management (e.g. glucose, lactate, cyanide)
8. Fluid bolus (20 mL/kg) if evidence of hypoperfusion
9. If the patient is experiencing significant pain, administer IV/IO analgesics
   1. Morphine sulfate 0.1 mg/kg IV or IO
   2. Fentanyl 1 mcg/kg IV or IO
10. Eye irrigation early
11. Treat topical chemical burns [see appropriate [**Toxins and Environmental**](#Toxin)section guideline(s)]
12. In severe respiratory irritation, in particular hydrogen sulfide, with altered mental status and no improvement with removal from the toxic environment, administer oxygen (humidified if available) as appropriate with a target of achieving 94-98% saturation - consider consultation for transfer to a hyperbaric oxygen therapy

**Medication Administration**

1. If wheezing is present, consider administering inhaled albuterol (2.5-5 mg) as nebulized, or four to eight puffs metered dose inhaler
2. Ipratropium 0.5 mg nebulized should be given in conjunction with albuterol, up to three doses

## Riot Control Agents

**Patient Treatment and Interventions**

1. Move affected individuals from contaminated environment into fresh air if possible
2. Remove contaminated clothing as able
3. Have patient remove contact lenses if appropriate
4. Irrigation with water or saline may facilitate resolution of symptoms and is recommended for decontamination of dermal and ocular exposure
5. If patient is in respiratory distress, go to [**Respiratory**](#Resp) section
6. If patient is wheezing, go to [**Bronchospasm**](#Broncho) guideline
7. For persistent pain of the eye or skin, go to [**Topical Chemical**](#TopChem) guideline
8. Exposed individuals who are persistently symptomatic warrant further evaluation and treatment per local standards

## Hyperthermia/Heat Exposure

**Patient Treatment and Interventions**

1. Move victim to a cool area and shield from the sun or any external heat source
2. Remove as much clothing as is practical and loosen any restrictive garments
3. If alert and oriented, give small sips of cool liquids
4. If altered mental status, check blood glucose level
5. Manage airway as indicated.
6. Place on cardiac monitor and record ongoing vital signs and level of consciousness
7. If temperature is greater than 104°F (40°C) or if altered mental status is present, begin active cooling by:
   1. Ice bath immersion provides the most rapid cooling mechanism but may not be available to EMS - If shivering occurs during cooling:
8. Adult:
   * + 1. Midazolam
          1. 2.5mg IV/IN, may repeat once in 5 minutes  
             **OR**
          2. 5mg IM may repeat once in 10 minutes
       2. Lorazepam
          1. 1mg IV, may repeat once in 5 minutes  
             **OR**
          2. 2mg IM, may repeat once in 10 minutes
          3. Diazepam – 2mg IV, may repeat once in 5 minutes
9. Pediatric:
   * + 1. Midazolam (single maximum dose 1mg)
          1. 0.1mg/kg IV  
             **OR**
          2. 0.2mg/kg IN/IM
          3. ***NOTE***: a 5mg/mL concentration is recommended for IN/IM administration
       2. Lorazepam (single maximum dose 1mg)
          1. 0.1mg/kg IV/IM
       3. Diazepam
          1. 0.1 mg/kg IV (maximum single dose 2.5 mg)
          2. May repeat once, for maximum total IV/IM dose 5 mg  
             **OR**
          3. 0.5mg/kg PR (maximum single dose 10 mg)
          4. May repeat once for maximum total PR dose 20 mg
   1. Continually misting the exposed skin with tepid water while fanning the victim (most effective)
   2. Truncal ice packs may be used, but are less effective than evaporation
   3. DO NOT apply wet cloths or wet clothing, as they may trap heat and prevent evaporative cooling
10. Cooling efforts should continue until the patient’s temperature is less than 102.2°F (39°C) and the patient demonstrates improvement in mental status
11. Establish IV access for patients suffering from heat stroke - give cool fluids at 20 mL/kg boluses and reduce to 10 mL/kg/hr boluses when vitals are stable
12. Monitor for arrhythmia and cardiovascular collapse [see [**Cardiovascular**](#Cardio)section guidelines]
13. Treat seizures, per the [**Seizures**](#Seiz) guideline
14. All patients suffering from life threatening heat illness (including heat stroke) should be transported to the hospital

## Hypothermia/Cold Exposure

**Patient Treatment and Interventions**

1. Maintain patient and rescuer safety - the patient has fallen victim to cold injury and rescuers have likely had to enter the same environment. Maintain rescuer safety by preventing cold injury to rescuers
2. Manage airway per the [**Airway Management**](#Airway)guideline
3. Mild hypothermia:
   1. Remove the patient from the environment and prevent further heat loss by removing wet clothes and drying skin, insulate from the ground, shelter the patient from wind and wet conditions, and insulate the patient with dry clothing or a hypothermia wrap/ blanket. Cover the patient with a vapor barrier and, if available, move the patient to a warm environment
   2. Hypothermic patients have decreased oxygen needs and may not require supplemental oxygen
      1. If oxygen is deemed necessary, it should be warmed, to a maximum temperature between 104**-**108°F (40-42°C) and humidified if possible
   3. Provide beverages or foods containing glucose if feasible and patient is awake and able to manage airway independently
   4. Vigorous shivering can substantially increase heat production - shivering should be fueled by caloric replacement
   5. Consider field-rewarming methods such as placement of large heat packs or heat blankets (chemical or electric if feasible) to the anterior chest or wrapped around the patient’s thorax if large enough - forced air warming blankets (e.g. Bair Hugger®) can be an effective field rewarming method if available
   6. Monitor frequently - if temperature or level of consciousness decreases, refer to [Severe hypothermia](#_Hlk526857801), below
   7. Consider IV access
4. Indications for IV access and IV fluids in the mildly hypothermic patient are similar to those of the non-hypothermic patient
5. IV fluids, if administered, should be warmed, ideally to 42°C
6. Bolus therapy is preferable to continuous drip
7. The recommended fluid for volume replacement in the hypothermic patient is normal saline
   1. If alterations in mental status, consider measuring blood glucose and treat as indicated (treat per [**Hypoglycemia**](#Hypogly)or [**Hyperglycemia**](#Hypergly) guidelines) and assess for other causes of alterations of mentation
   2. Transport to a hospital capable of rewarming the patient
8. Moderate or severe hypothermia:
   1. Perform ABCs, pulse checks for patients suffering hypothermia should be performed for 60 seconds, and obtain core temperature if possible for patients exhibiting signs or symptoms of moderate/severe hypothermia
9. Core temperatures are best measured by esophageal probe, if one is available, the patient’s airway is secured, and the provider has been trained in its insertion and use.
10. If esophageal temperature monitoring is not available or appropriate, use an epitympanic thermometer designed for field conditions with an isolating ear cap
11. Rectal temperatures may also be used, but only once the patient is in a warm environment - rectal temperatures are not reliable or suitable for taking temperatures in the field and should only be done in a warm environment (such as a heated ambulance)
    1. Manage airway as needed
12. Care must be taken not to hyperventilate the patient as hypocarbia may reduce the threshold for ventricular fibrillation in the cold patient
13. Indications and contraindications for advanced airway devices are similar in the hypothermic patient as in the normothermic patient
    1. Prevent further heat loss by removing the patient from the environment and removing wet clothes and drying skin, insulate from the ground, shelter the patient from wind and wet conditions, and insulate the patient with dry clothing or a hypothermia wrap/ blanket. Cover the patient with a vapor barrier and, if available, move the patient to a warm environment
    2. Initiate field-rewarming methods such as placement of large heat packs or heat blankets (chemical or electric if feasible) to the anterior chest or wrapped around the patient’s thorax if large enough
14. Chemical or electrical heat sources should never be applied directly to the skin
15. Use a barrier between the skin and heat source to prevent burns
16. Forced air warming blankets (e.g. Bair Hugger®) can be an effective field rewarming method if available
    1. Handle the patient gently
17. Attempt to keep the patient in the horizontal position, especially limiting motion of the extremities to avoid increasing return of cold blood to the heart
18. Once in a warm environment, clothing should be cut off (rather than removed by manipulating the extremities)
19. Move the patient only when necessary such as to remove the patient from the elements
    1. Apply cardiac monitor or AED if available
    2. Establish IV and provide warmed NS bolus – Repeat as necessary
    3. If alterations in mental status, consider measuring blood glucose and treat as indicated (treat per [**Hypoglycemia**](#Hypogly)or[**Hyperglycemia**](#Hypergly) guidelines) and assess for other causes of alterations of mentation
    4. Transport as soon as possible to a hospital capable of resuscitation - if cardiac arrest develops consider transport to a center capable of extracorporeal circulation (ECMO) or cardiopulmonary bypass (if feasible)
    5. Warm the patient compartment of the ambulance to 24°C (75.2°F) during transport
20. Frostbite:
    1. If the patient has evidence of frostbite, and ambulation/travel is necessary for evacuation or safety, avoid rewarming of extremities until definitive treatment is possible. Additive injury occurs when the area of frostbite is rewarmed then inadvertently refrozen. Only initiate rewarming if refreezing is absolutely preventable.
21. If rewarming is feasible and refreezing can be prevented use circulating warm water (37 - 39°C /98.6 - 102°F) to rewarm effected body part, thaw injury completely. If warm water is not available, rewarm frostbitten parts by contact with non-affected body surfaces. Do not rub or cause physical trauma.
22. After rewarming, cover injured parts with loose sterile dressing. If blisters are causing significant pain, and the provider is so trained, these may be aspirated, however, should not be de-roofed. Do not allow injury to refreeze. Treat per the [**Pain Management**](#PnMan)guideline.

## Drowning

**Patient Treatment and Interventions**

1. Ensure scene safety for patient and rescuers. Remove patient from water as soon as possible
   1. Practice the safest water rescue technique possible, given circumstances on scene
   2. Evacuate to land or a water craft as soon as possible
   3. If there is a delay to accessing shore or a rescue boat, initiate in-water basic life support consisting of ventilation only
2. Manage airway per the [**Airway Management**](#Airway)guideline
3. Follow [**Cardiac Arrest**](#CardiacAr) guideline as indicated with consideration of ABC strategy for drowning victims in cardiac arrest
   1. Initiate 5 rescue breaths followed by 30 chest compressions
   2. After the initial 5 breaths, use a 2 breaths to 30 compression ratio
4. If mechanism or history suggest cervical spine injury, manage c-spine, per the [**Spinal Care**](#Spine)guideline
5. Monitor vital signs including oxygen saturations
6. If O2 saturations are less than 92%, administer oxygen as appropriate with a target of achieving 94-98% saturation. Consider positive pressure ventilation in patients with signs or symptoms of respiratory difficulty
7. Consider hypothermia, treat per[**Hypothermia/Cold Exposure**](#Hypotherm)guideline
8. If the victim was involved in underwater diving and uncertainty exists regarding the most appropriate therapy, consider contacting direct medical oversight and discussing need for hyperbaric treatment. Include discussion regarding:
   1. Submersion time
   2. Greatest depth achieved
   3. Ascent rate
   4. Gas mix
9. Establish IV access
10. Fluid bolus as indicated
11. Advanced airway management as indicated – Consider CPAP in awake patients with respiratory distress
12. Cardiac monitor

## Dive (SCUBA) Injury/Accidents

**Patient Treatment and Interventions**

1. If a SCUBA accident includes associated drowning/near-drowning [see [**Drowning**](#Drown) guideline]
2. Manage airway as indicated
3. If air embolism suspected, place in left lateral recumbent position (patient lying with the left side down, knees drawn upward, and flat)
   1. Trendelenburg position is sometimes recommended to help trap the air in the dependent right ventricle, and may be useful if a central venous catheter is being used to withdraw the air, but this position may increase cerebral edema
4. Monitor vital signs including oxygen saturations and cardiac rhythm (if possible)
5. Administer oxygen as appropriate with a target of achieving 94-98% saturation
   1. Use positive pressure ventilation (e.g. CPAP) carefully in patients for whom pulmonary barotrauma is a consideration [see [**Airway Management**](#Airway) guideline]
6. Patients with symptoms suspicious for decompression illness, should be placed on supplemental oxygen regardless of saturations to enhance washout of inert gasses
7. Assess for hypothermia, treat per [**Hypothermia/Cold Exposure**](#Hypotherm)guideline
8. Consider contacting direct medical oversight and discussing need for hyperbaric treatment and primary transport to facility with HBOT capability - include discussion regarding factors such as submersion time, greatest depth achieved, ascent rate, and gas mix
9. Establish IV access
10. Fluid bolus as indicated

## Altitude Illness

**Aliases**

Altitude sickness, High Altitude Cerebral Edema (HACE), High Altitude Pulmonary Edema (HAPE), Acute Mountain Sickness (AMS)

**Patient Treatment and Interventions**

1. Ensure scene safety for rescuers
2. Stop ascent
   1. Patients with acute mountain sickness only may remain at their current altitude and initiate symptomatic therapy
   2. Patients with HACE or HAPE should initiate descent
3. Perform ABCs and manage airway as necessary
4. Administer supplemental oxygen, if available, with goal to keep oxygen saturations 90%
5. Descend to lower altitude. Descent is the mainstay of therapy and is the definitive therapy for all altitude related illnesses. Descent should be initiated as soon as scene conditions permit.
   1. If severe respiratory distress is present and pulmonary edema is found on exam, provider should start positive pressure ventilation
   2. Establish IV and perform fluid bolus with goal to maintain systolic BP 90 mm Hg
   3. Monitor cardiac rhythm
6. Descent should always be the primary treatment strategy for patients suffering from altitude illness, especially patients suffering from HACE and HAPE. If descent is not possible, or if direct medical oversight permits, the EMS provider may consider the following possible therapies - portable hyperbaric chambers are effective for the management of severe altitude illness. However, they should not be used in lieu of descent, only as an alternative should descent be unfeasible.
   1. Acute mountain sickness
7. Ibuprofen or acetaminophen for pain
8. Ondansetron 4 mg IV, PO, or sublingual every 6 hours for vomiting
9. Acetazolamide – up to 250 PO mg twice a day
   * + 1. Pediatric dosing is 2.5 mg/kg up to a maximum of 250 mg twice a day
       2. Acetazolamide speeds acclimatization and therefore helps in treating acute mountain sickness
10. Dexamethasone – 4 mg IM, IV, or PO every 6 hours until symptoms resolve
    * + 1. Pediatric dosing is 0.15 mg/kg IM, IV, or PO every 6 hours
        2. Dexamethasone helps treat the symptoms of acute mountain sickness and may be used as an adjunctive therapy in severe acute mountain sickness when the above measures alone do not ameliorate the symptoms. In these circumstances, patients should also initiate descent, as dexamethasone does not facilitate acclimatization
    1. HACE - All therapies listed below should be considered as adjunctive to descent. Descent should always be the primary treatment modality
11. Dexamethasone – 8 mg IM, IV, or PO once followed by 4 mg every 6 hours
    * + 1. Pediatric dosing: 0.15 mg/kg/dose every 6 hours
        2. Dexamethasone helps treat the symptoms of HACE and should be initiated in HACE – In these circumstances, patients should also initiate descent
12. Consider use of acetazolamide at the above dosing
    1. HAPE - All therapies listed below should be considered as adjunctive to descent. Descent should always be the primary treatment modality
13. Nifedipine – 30 mg ER PO twice a day – If nifedipine is not available:
    * + 1. Tadalafil – 20-40 mg PO once daily may be used

**OR**

* + - 1. Sildenafil – 20 mg PO three times a day may be used

1. Multiple pulmonary vasodilators should not be used concurrently

## Conducted Electrical Weapon Injury (e.g. TASER®)

**Patient Treatment and Interventions**

1. Make sure patient is appropriately secured with assistance of law enforcement to protect the patient and staff. Consider psychologic management medications if patient struggling against physical devices and may harm themselves or others
2. Conservative programs treat all barbed darts as a foreign body and leave them for physician removal while more progressive programs allow EMS or law enforcement to remove barbed darts except for sensitive areas (head, neck, hands, feet or genitals)
3. Treat medical and traumatic injury

## Electrical Injuries

**Patient Treatment and Interventions**

1. Identify dysrhythmias or cardiac arrest – even patients who appear dead (particularly dilated pupils) may have good outcomes with prompt intervention [see appropriate guideline for additional information and patient assessment/treatment]
2. Immobilize if associated trauma suspected [see [**Trauma**](#Traum)sectionguidelines]
3. Apply dry dressing to any wounds
4. Remove constricting clothing and jewelry since additional swelling is possible
5. Administer fluid resuscitation per burn protocol - remember that external appearance will underestimate the degree of tissue injury
6. Electrical injuries may be associated with significant pain, treat per [**Pain Management**](#PnMan) guideline
7. Electrical injury patients should be taken to a burn center whenever possible since these injuries can involve considerable tissue damage
8. When there is significant associated trauma this takes priority, if local trauma resources and burn resources are not in the same facility

## Lightning/Lightning Strike Injury

**Patient Treatment and Interventions**

1. Assure patent airway - if in respiratory arrest only, manage airway as appropriate
2. If in cardiopulmonary arrest, treat per [**Cardiac Arrest**](#CardiacAr)guideline
3. Consider IV initiation – Avoid initiation through burned skin
4. Monitor EKG. Be alert for potential arrhythmias. Consider 12-lead EKG, when available
5. Consider early pain management for burns or associated traumatic injury [see[**Pain Management**](#PnMan) guideline]

# APPENDICES

## I. Author, Reviewer and Staff Information

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## II. Public Review Comment Contributors

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## III. Universal Documentation Guideline

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## IV. Medications

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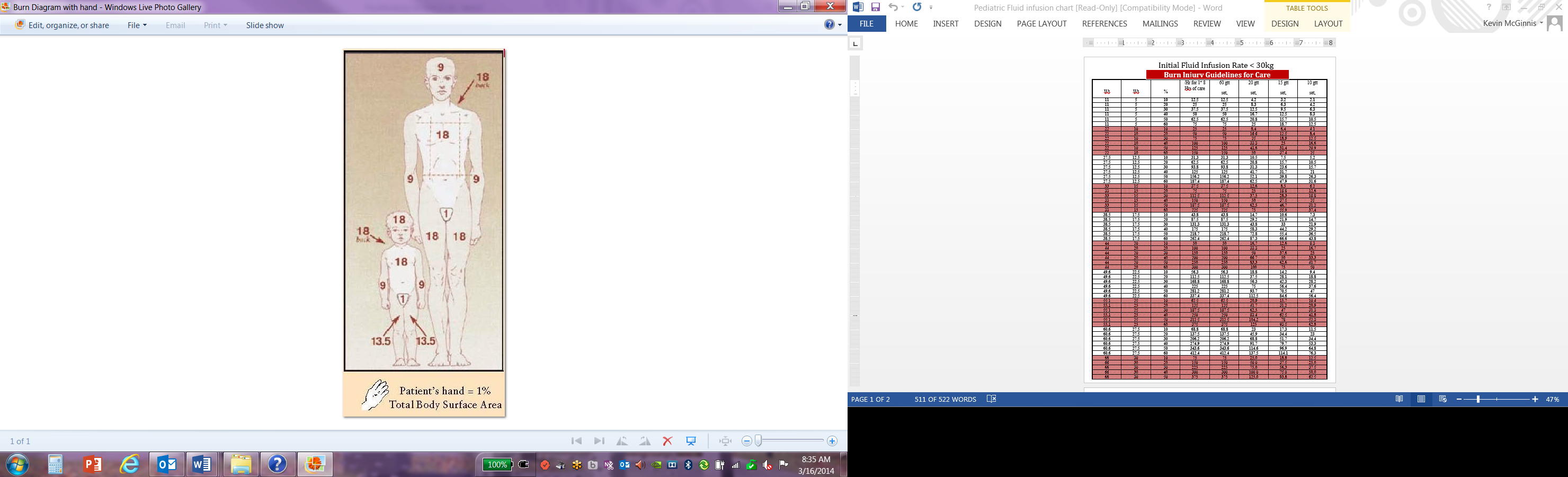
## V. Approved Abbreviations V. Approved Abbreviations

The following is the Project’s list of approved medical abbreviations used in this document. The Drug.com article “Medical Abbreviations on Pharmacy Prescriptions” at

<https://www.drugs.com/article/prescription-abbreviations.html> is considered the reference of authority.

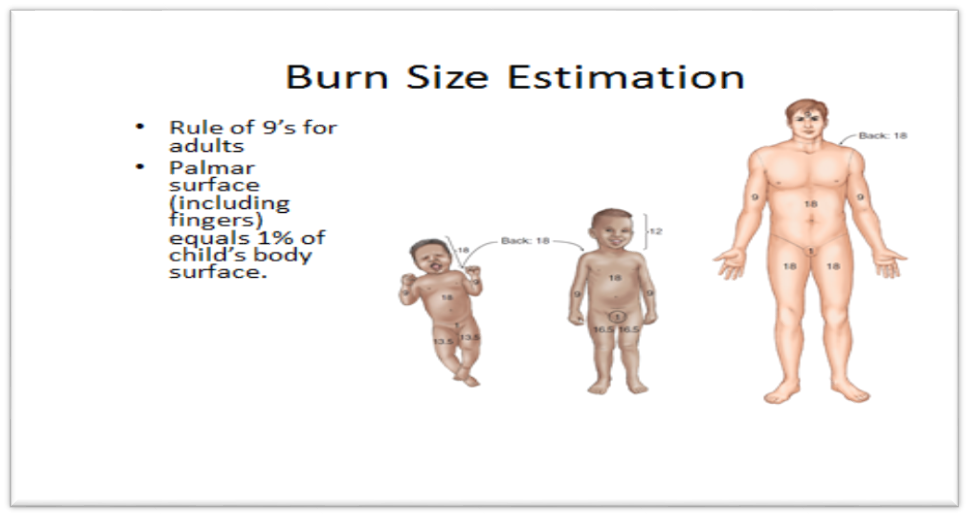
| Abbreviation | Description |
| --- | --- |
| ACS | acute coronary syndrome |
| AED | automatic external defibrillator |
| A-FIB | atrial fibrillation |
| ALS | advanced life support |
| AMS | altered mental status |
| ASA | Aspirin |
| AV | atrioventricular |
| AVPU | neurological status measure: alert, verbal, pain, unresponsive |
| BiPAP | bi-level positive airway pressure |
| BLS | basic life support |
| BP | blood pressure |
| BPM | beats per minute |
| BSA | body surface area |
| BSI | body substance isolation |
| BVM | bag-valve-mask |
| CABG | coronary artery bypass graft |
| CAD | coronary artery disease |
| CARES | Cardiac Arrest Registry to Enhance Survival |
| CC | chief complaint |
| CDC | Centers for Disease Control and Prevention |
| CHF | congestive heart failure |
| CNS | central nervous system |
| CO | carbon monoxide |
| CO2 | carbon dioxide |
| COPD | chronic obstructive pulmonary disease |
| CP | chest pain |
| CPAP | continuous positive airway pressure |
| CPI | continuous performance improvement |
| CPR | cardiopulmonary resuscitation |
| C-SECTION | caesarean section |
| C-SPINE | cervical spine |
| CT | cat scan, Cardiac Technician |
| CVA | cerebrovascular accident (stroke) |
| D5W | 5% dextrose in water |
| DKA | diabetic ketoacidosis |
| DNI | do not intubate |
| DNR | do not resuscitate |
| DT | delirium tremens |
| Dx | diagnosis |
| ECPR | extracorporeal cardiopulmonary resuscitation |
| EEG | electroencephalogram |
| EENT | eye, ear, nose, and throat |
| EGD | extraglottic device |
| EKG | electrocardiogram |
| EMS | emergency medical services |
| EMT | emergency medical technician |
| ePCR | electronic patient call/care record/report |
| ET | endotracheal |
| ETA | estimated time of arrival |
| ETCO2 | end-tidal CO2 |
| ETOH | ethanol (alcohol) |
| ETT | endotracheal tube |
| FBAO | foreign body airway obstruction |
| FiO2 | fraction of inspired oxygen |
| g | gram(s) |
| GI | gastrointestinal |
| gtts | Drops |
| GU | gastrourinary |
| GYN | gynecology (gynecological) |
| HFNC | high flow nasal cannula |
| HR | heart rate (hour) |
| ICU | intensive care unit |
| IM | intramuscular |
| IO | intraosseous |
| IPPB | intermittent positive pressure breathing |
| IV | Intravenous |
| IVP | intravenous push |
| J | Joules |
| JVD | jugular vein distension |
| kg | Kilogram |
| KVO | keep vein open |
| L | Liter |
| LMA | laryngeal mask airway |
| LPM | liters per minutes |
| LR | lactated Ringer’s |
| MAT | multifocal atrial tachycardia |
| mcg | microgram(s) |
| MED | Medicine |
| mg | milligram(s) |
| mg/dL | milligrams per deciliter |
| MI | myocardial infarction (heart attack) |
| mL | Milliliter |
| mmHg | millimeters of mercury |
| mmol | millimole |
| MOLST | medical orders for life-sustaining treatment |
| MS | mental status |
| msec | millisecond |
| MVC | motor vehicle crash |
| N/V | nausea/vomiting |
| NC | nasal cannula |
| NRB | non-rebreather |
| NS | normal saline |
| NSR | normal sinus rhythm |
| OB/GYN | obstetrics/gynecology |
| O2 | Oxygen |
| P | Pulse |
| PAC | premature atrial contraction |
| PCR | Patient call/care record/report |
| PE | pulmonary embolus |
| PEA | pulseless electrical activity |
| PO | Orally |
| POLST | physician orders for life-sustaining treatment |
| PPE | personal protection equipment |
| prn | as needed |
| PVC | premature ventricular contraction |
| q | every (e.g. q 3-5 minutes) |
| RR | respiratory rate |
| RSI | rapid sequence intubation |
| Rx | Medicine |
| sat | saturation |
| SBP | systolic blood pressure |
| SC | subcutaneous |
| SCBA | self-contained breathing apparatus |
| SCUBA | self-contained under-water breathing apparatus |
| SGD | supraglottic device |
| SL | sublingual |
| SOB | shortness of breath |
| ST | sinus tachycardia |
| SVT | supraventricular tachycardia |
| T | temperature |
| TBSA | total body surface area |
| TCA | tricyclic antidepressants |
| TIA | transient ischemic attack |
| TID | three times a day |
| TKO | to keep open |
| VF | ventricular fibrillation |
| VS | vital signs |
| VT | ventricular tachycardia |
| yo | years old (years of age) |

## VI. Burn and Burn Fluid Charts

**Burn Size Chart 1**

**Source**: Used with permission, University of Utah Burn Center

**Burn Size Chart 2**



**Source**: American Heart Association, *Pediatric Advanced Life Support* Textbook, 2013

**Percentage of Total Body Surface Area by Age, Anatomic Structure, and Body Habitus**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Adult*** | |  | ***Child*** | |
| **Anatomic Structure** | **Surface Area** |  | **Anatomic Structure** | **Surface Area** |
| Anterior head | 4.5% |  | Anterior head | 9% |
| Posterior head | 4.5% |  | Posterior head | 9% |
| Anterior torso | 18% |  | Anterior torso | 18% |
| Posterior torso | 18% |  | Posterior torso | 18% |
| Anterior leg, each | 9% |  | Anterior leg, each | 6.75% |
| Posterior leg, each | 9% |  | Posterior leg, each | 6.75% |
| Anterior arm, each | 4.5% |  | Anterior arm, each | 4.5% |
| Posterior arm, each | 4.5% |  | Posterior arm, each | 4.5% |
| Genitalia, perineum | 1% |  | Genitalia/perineum | 1% |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Adult – Obese 80 kg*** | |  | ***Infant 10 kg*** | |
| **Anatomic Structure** | **Surface Area** |  | **Anatomic Structure** | **Surface Area** |
| Head and neck | 2% |  | Head and neck | 20% |
| Anterior torso | 25% |  | Anterior torso | 16% |
| Posterior torso | 25% |  | Posterior torso | 16% |
| Leg, each | 20% |  | Leg, each | 16% |
| Arm, each | 5% |  | Arm, each | 8% |
| Genitalia/perineum | 0% |  | Genitalia/perineum | 1% |

**Parkland Formula**

For patients who require fluid resuscitation, consider use of the Parkland formula to calculate the volume of normal saline or lactated Ringer’s solution that should be administered intravenously to ensure hemodynamic stability.

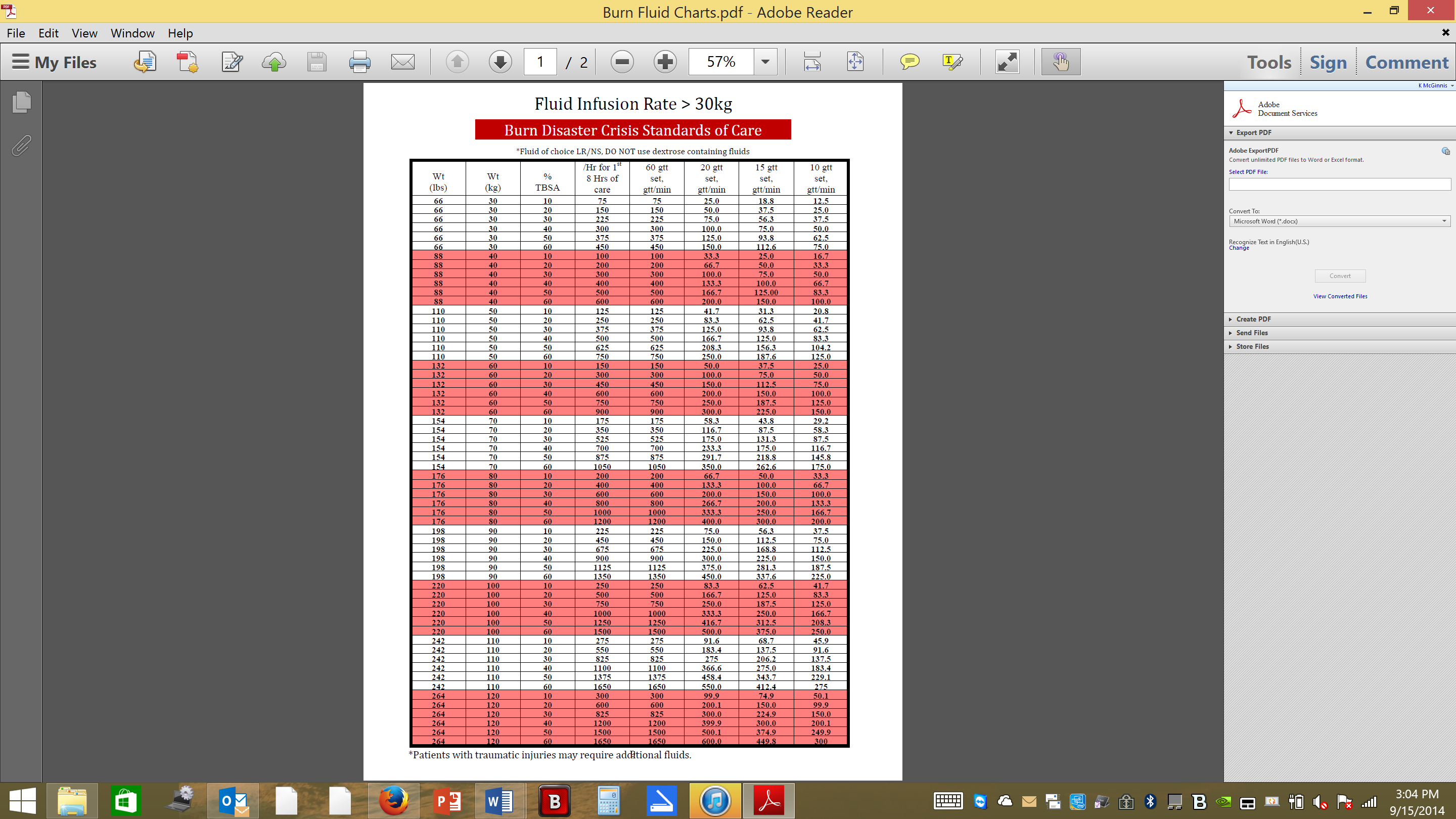
Volume of Intravenous Fluid required in the first 24 hours (in mL) =

(4 X patient weight in kg) X (Percentage of total body surface area burned)

The first half of the volume of fluid should be administered over the first 8 hours following the burn with the remaining fluid administered over the following 16 hours.

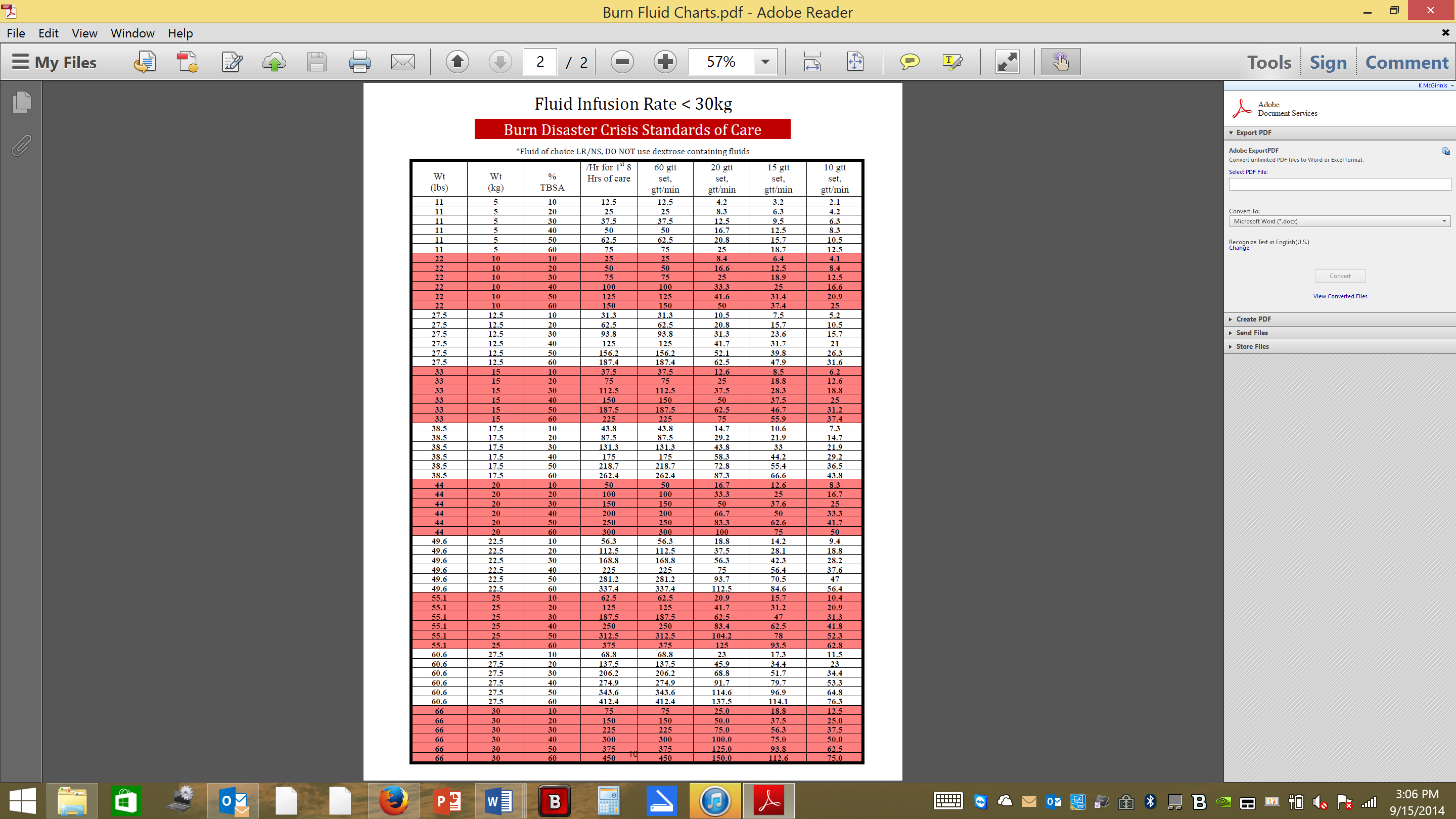
For pediatric patients, a weight-based assessment tool (length-based tape or other system) should be used to provide a more accurate estimate of the patient’s weight. Likewise, the total body surface area (BSA) estimates are different for pediatric patients compared to adults due to larger head and trunk size. For children, the palmar surface of the hand (not including the fingers is approximately equal to 1% BSA. The guidelines listed above will provide assistance during the estimation of the percentage of total body surface area burned for patients of various ages and body habitus.

**Burn Injury IV Fluid Rates**

**Infusion Rate 30 KG**

Patients with traumatic injuries may require additional fluids.

**Burn Injury IV Fluid Rates**

**Fluid Infusion Rate 30 KG**

Source: Used with permission, University of Utah Burn Center (https://crisisstandardsofcare.utah.edu).

## VII. Neurologic Status Assessment

Neurologic status assessment involves establishing a baseline and then trending any change in patient neurologic status. Glasgow Coma Score (GCS) is frequently used, but there are often errors in applying and calculating this score. With this in consideration, Glasgow Coma Score may not be more valid than a simpler field approach. Either AVPU (Alert, Verbal, Painful, Unresponsive – see below) or only the motor component of the GCS may more effectively serve in this capacity.

**Glasgow Coma Score**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Points | Pediatric | Adult |
| Eyes | 1 | No eye opening | |
| 2 | Eye opening to pain | |
| 3 | Eye opening to verbal | |
| 4 | Eyes open spontaneously | |
| Verbal | 1 | No vocalization | No verbal response |
| 2 | Inconsolable, agitated | Incomprehensible sounds |
| 3 | Inconsistently consolable, moaning | Inappropriate words |
| 4 | Cries but consolable, inappropriate interactions | Confused |
| 5 | Smiles, oriented to sounds, follows objects, interacts | Oriented |
| Motor | 1 | No motor response | |
| 2 | Extension to pain | |
| 3 | Flexion to pain | |
| 4 | Withdraws from pain | |
| 5 | Localizes pain | |
| 6 | Obeys commands | |

**AVPU**

**A:** The patient is alert

**V:** The patient responds to verbal stimulus

**P:** The patient responds to painful stimulus

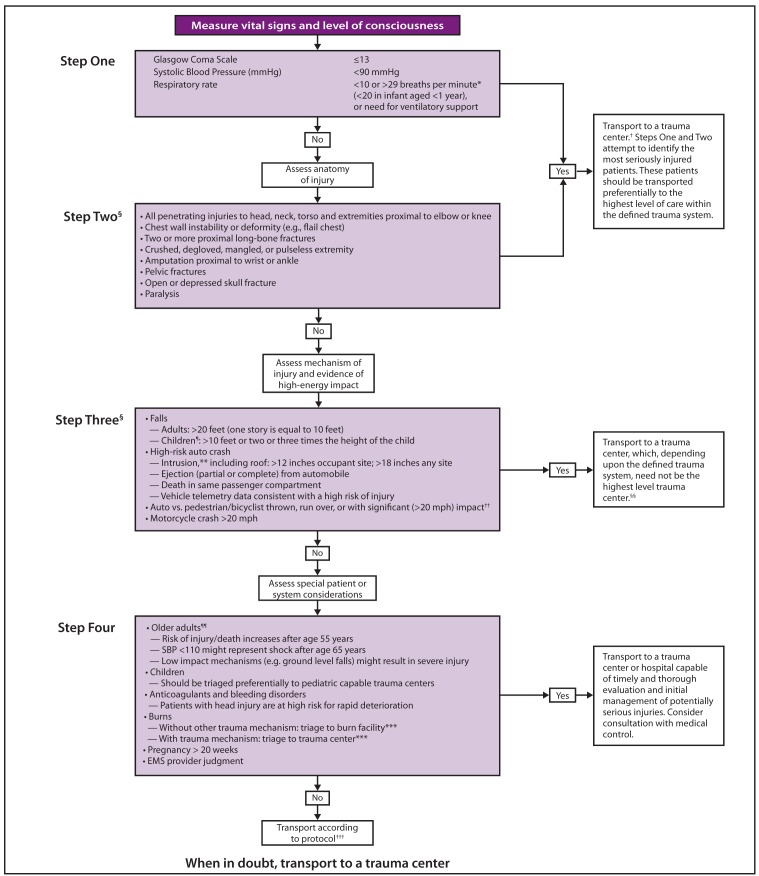
**U:** The patient is completely unresponsive

## VIII. Abnormal Vital Signs

## IX. Evidence-Based Guidelines: GRADE Methodology

Intentionally left blank.

## X. 2011 Guidelines for Field Triage of Injured Patients



**Source:** Adapted from American College of Surgeons. Resources for the optimal care of the injured patient. Chicago, IL: American College of Surgeons; 2006. Footnotes (see following page) have been added to enhance understanding of field triage by persons outside the acute injury care field.

https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6101a1.htm

\* The upper limit of respiratory rate in infants is greater than29 breaths per minute to maintain a higher level of overtriage for infants

† Trauma centers are designated Level I–IV, with Level I representing the highest level of trauma care available.

§ Any injury noted in Steps Two and Three triggers a "yes" response.

¶ Age less than15 years.

\*\* Intrusion refers to interior compartment intrusion, as opposed to deformation which refers to exterior damage.

†† Includes pedestrians or bicyclists thrown or run over by a motor vehicle or those with estimated impact greater than20 mph with a motor vehicle.

§§ Local or regional protocols should be used to determine the most appropriate level of trauma center; appropriate center need not be Level I.

¶¶ Age greater than55 years.

\*\*\* Patients with both burns and concomitant trauma for whom the burn injury poses the greatest risk for morbidity and mortality should be transferred to a burn center. If the nonburn trauma presents a greater immediate risk, the patient may be stabilized in a trauma center and then transferred to a burn center.

††† Injuries such as an open fracture or fracture with neurovascular compromise.

§§§ Emergency medical services.

¶¶¶ Patients who do not meet any of the triage criteria in Steps One through Four should be transported to the most appropriate medical facility as outlined in local EMS protocols.