

# Iowa County EMS

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2026 Patient Care Protocols | Procedures | Formulary



Iowa County Ambulance Service  
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# INTRODUCTION

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# Iowa Administrative Code

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Iowa Administrative Code 641 – Chapter 132: Emergency Medical Services – Service Program Authorization

## **132.3(2) Medical Director:**

- (4) Develop, approve, and update service program protocols that meet or exceed the minimum EMS clinical guidelines approved by the department.
- (5) Ensure that the emergency medical care providers rostered with the service program are credentialed in the emergency medical skills to be provided and the duties of that emergency medical care provider do not exceed the provider's scope of practice as referenced in 641—subrule 131.5(2) and the service program's EMS service level of authorization.

### **Purpose**

The completed protocol approval page allows a physician medical director to implement service-specific protocols based on the NASEMSO National Model EMS Clinical Care Guidelines for one or more service programs where they serve as the program's medical director. Any changes to these protocols will follow the protocol development guidelines. All applicable EMS providers shall review any changes to these protocols.

### **Instructions**

The service program will post the completed protocol approval document in the AMANDA folder.

### **Scope of Practice**

The Iowa Emergency Medical Care Providers Scope of Practice document outlines the skills each level of certified EMS provider can perform. Some skills will require the approval of the service program's physician medical director as well as documentation of training. Iowa EMS providers may not perform skills outside of their identified scope of practice as documented in the Iowa Emergency Medical Care Provider Scope of Practice. The most current version of the scope of practice document can be viewed and downloaded at: <https://hhs.iowa.gov/media/197/download?inline=>

### **Recommendations**

It is recommended that each service program maintain records that document the review/education of all staff members on the program's most current protocols and the most current version of the Iowa Emergency Medical Care Provider Scope of Practice document.

### **Addendums**

In the event that a medication listed in Iowa County EMS Patient Care Protocols becomes unavailable due to circumstances beyond the service's control, a suitable alternative may be substituted until the original medication becomes accessible. This substitution will be expressly documented in an addendum attached to the patient care protocols and will persist until either the original medication is reinstated or new patient care protocols are established, whichever occurs first. Any substitutions will require approval from the medical director, who will endorse the attached addendum.

## System Structure

Service(s) Name	Service Type		Service Level of Authorization			
	Transport	Non-Transport	EMR	EMT	AEMT	Paramedic
Iowa County Ambulance	x					x
Amana QRS		x		x		
Kinze QRS		x		x		
Ladora QRS		x		x		
Millersburg QRS		x		x		
North English QRS		x		x		
Victor QRS		x		x		
Williamsburg QRS		x		x		
Marengo QRS		x		x		

## Authorized Medications

Medications Carried by the Service		
<i>Medication kit should contain <u>only</u> medications approved by the service's Medical Director</i>		
OTC Medications	Medications	
Aspirin	Adenosine	Ketorolac
Glucose Paste	Albuterol	Labetalol
Naloxone (IN)	Amiodarone	Lidocaine
Patient Assisted Medications	Atropine	Methylprednisolone
Auto-injector Epinephrine	Dextrose	Metoprolol
Nitroglycerin	Diazepam	Midazolam
Metered Dose Inhaler	Diphenhydramine	Naloxone
IV Fluids & Infusions	DuoNeb	Nitroglycerin
D5W & D10W	Epinephrine	Norepinephrine
Lactated Ringers	Etomidate	Ondansetron
Nitroglycerin Infusion	Fentanyl	Rocuronium
Normal Saline	Ketamine	Tranexamic Acid

## EMT/AEMT Skills Approval

Mark "yes" if the skill is approved by the medical director to be performed by the identified certification level	Certification Level	Yes	No
Nebulized Beta Agonist	EMT, AEMT	x	
Ventilator	EMT, AEMT		x
CPAP (12 years or >)	EMT, AEMT	x	

**Note:** Iowa Emergency Medical Care Providers may only perform the skills and procedures authorized (indicated by an X in the chart) within their active Iowa certification level and approved by the medical director.

## Elective QRS Skills

Skill	Amana QRS	Kinze QRS	Ladora QRS	Millersburg QRS	North English QRS	Victor QRS	Williamsburg QRS	Marengo QRS
CPAP	x	x	x	x	x	x	x	x
CLIA					x		x	

## Medical Director Statement of Approval

As the physician medical director, I have reviewed both the *2022 Iowa Approved EMS NASEMSO Treatment Guidelines* and the *Iowa Emergency Medical Care Provider Scope of Practice* document and approve the use of the skills, medications, and protocols as documented herein, for the authorized Iowa EMS program(s) listed within this document.

Medical Director's Printed Name	Signature	Date
Daniel Kinker, D.O.		

# IOWA COUNTY EMS TREATMENT PROTOCOLS

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# Universal Patient Care

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This protocol reduces the need for extensive reiteration of initial assessments and other considerations in each protocol when not directly included in those protocols.

## Scene and Patient Assessment

1. Assess scene safety:
  - a. Evaluate for hazards to EMS personnel, patient(s), bystanders
  - b. Safely move patient away from all hazards prior to beginning medical care
  - c. Determine number of patients
  - d. Determine mechanism of injury or potential source of illness
  - e. Request additional resources if needed and weigh the benefits of waiting for additional resources against rapid transport to definitive care
  - f. 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 (operations at night or in darkness, on or near roadways)
4. Consider cervical spine stabilization or spinal motion restriction if traumatic in nature; refer to [Spinal Motion Restriction](#)

## Primary Assessment

1. **Airway, Breathing, Circulation (ABC)** is cited below; (although there are specific circumstances where **Circulation, Airway, Breathing (CAB)** may be indicated, such as cardiac arrest, or **Massive hemorrhage, Airway, Respirations, Circulation, Hypothermia**, and head injury (**MARCH**) may be indicated for trauma or major arterial bleeding:
  - a. Airway (assess for patency and open the airway as indicated):
    - i. 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:
        - a. Oral airway
        - b. Nasal airway
        - c. Supraglottic airway device
        - d. Endotracheal tube

- b. Breathing:
  - i. Evaluate rate, breath sounds, accessory muscle use, retractions, patient positioning, and oxygen saturation, treat if indicated; refer to [Difficulty Breathing](#)
  - ii. Apnea (not breathing) – open airway; refer to #4 above
- c. Circulation:
  - i. Control any major external bleeding; refer to [Hemorrhage Control](#)
  - ii. Assess pulse:
    - 1. No pulse; refer to [Cardiac Arrest](#)
    - 2. Assess rate and quality of carotid and radial pulses
  - iii. Evaluate perfusion by assessing skin color and temperature:
    - 1. Evaluate capillary refill time
- d. Disability:
  - i. Evaluate patient responsiveness using **AVPU** (**A**lert, **V**erbal, **P**ainful, **U**nresponsive)
  - ii. Evaluate gross motor and sensory function in all extremities
  - iii. Check blood glucose in patients with altered mental status and treat if indicated; refer to [Diabetic Emergencies](#)
  - iv. For suspected stroke; refer to [Stroke \(CVA\)](#)
- e. Expose patient for exam as appropriate to complaint:
  - i. Be considerate of patient modesty
  - ii. Keep patient warm
- f. Assess for urgency of transport

## Secondary Assessment

1. The performance of the secondary assessment should not delay transport of critical patients. Secondary assessments should be tailored to patient presentation and chief complaint. The following are suggested considerations for secondary survey assessment:
  - a. Head:
    - i. Pupils
    - ii. Ears
    - iii. Nasopharynx/oropharynx
    - iv. Skull and scalp
  - b. Neck:
    - i. Jugular venous distension (JVD)
    - ii. Tracheal position
    - iii. Spinal tenderness

- c. Chest:
  - i. Retractions
  - ii. Breath sounds
  - iii. Chest wall tenderness, deformity, crepitus, and excursion
- d. Abdomen/Pelvis:
  - i. Tenderness or bruising
  - ii. Abdominal distension, rebound or guarding, pulsating mass
  - iii. Pelvic stability
- e. Extremities:
  - i. Pulses
  - ii. Deformities, contusions, abrasions, punctures/penetrations, burns, tenderness, lacerations, and swelling
- f. Back:
  - i. Spinal abnormalities, deformities, or tenderness
  - ii. Bruising, tenderness, discoloration, swelling
  - iii. Auscultation of lung sounds, if indicated
- g. Neurologic:
  - i. Mental status/orientation
  - ii. Motor/sensory
- h. Evaluate for medical equipment (pacemaker/defibrillator, left ventricular assist device (LVAD), insulin pump, dialysis fistula)
- 2. Obtain baseline vital signs (an initial complete set of vital signs is required: pulse, blood pressure, respiratory rate, pulse oximetry, and neurologic status assessment):
  - a. Stable patients should have at least two sets of pertinent vital signs recorded (ideally, one set should be taken shortly before arrival at the receiving facility)
  - b. Critical patients should have pertinent vital signs frequently monitored
  - c. Neurologic status assessment:
    - i. Establish a baseline and note any change in patient's neurologic status:
      - 1. AVPU (Alert, Verbal, Pain, Unresponsive)
      - 2. Glasgow Coma Score (GCS)
      - 3. Richmond Agitation Sedation Scale (RASS)
- 3. Patients with cardiac or respiratory complaints:
  - a. A 12-Lead electrocardiogram should be obtained and monitored continuously in patients with cardiac or suspected cardiac complaints
  - b. Waveform capnography should be monitored in patients with respiratory complaints (essential for critical patients and those who require invasive airway management)

4. Obtain **OPQRST** history:
  - a. **O**nset of symptoms
  - b. **P**rovocation:
    - i. Location
    - ii. Exacerbating or alleviating factors
  - c. **Q**uality
  - d. **R**adiation
  - e. **S**everity:
    - i. Pain scale
  - f. **T**ime:
    - i. How long symptoms have been going on
    - ii. Any changes since onset
5. Obtain **SAMPLE** history:
  - a. **S**ymptoms
  - b. **A**llergies:
    - i. Medication, environmental, and food
  - c. **M**edications:
    - i. Prescription and OTC
  - d. **P**ertinent past medical history:
    - i. Medical alert tags, portable medical records, advance directives
    - ii. Medical devices/implants (dialysis shunt, insulin pump, pacemaker, central venous access port, gastric tubes, urinary catheter)
  - e. **L**ast oral intake
  - f. **E**vents leading up to 911 call

### **Treatment and Interventions**

1. Maintain airway
2. Administer oxygen as appropriate to achieve the target of 94-98% oxygen saturation (SPO2) based on clinical presentation and assessment of ventilation (EtCO2)
3. Establish vascular access if indicated or in patients who are at risk for clinical deterioration:
  - a. If IO is used for a conscious patient, consider Lidocaine; refer to [Intraosseous Vascular Access](#)
4. Monitor pain if appropriate and treat if indicated; refer to [Pain Management](#)
5. Follow approved protocols to treat assessment findings
6. Reassess patient

## Cardiovascular

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# Bradycardia

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## 1. Universal Patient Care

### Basic Care Guidelines

2. If capability exists, obtain a 12-Lead ECG and transmit it to the receiving facility for interpretation as soon as possible
3. Pediatric bradycardia with a heart rate less than 60 despite attempts at adequate ventilation, begin CPR
4. Check blood glucose and treat if indicated; refer to [Diabetic Emergencies](#)

### Advanced Care Guidelines

5. Monitor ECG
6. Establish IV/IO access
7. If symptomatic (hypotension, acutely altered mental status, signs of shock, ischemic chest discomfort, acute heart failure), administer Atropine:
  - a. Adult:
    - i. 1 mg IV/IO, every 3-5 minutes if indicated, up to 3 mg:
      1. If Atropine is ineffective or systolic blood pressure is less than 90 mmHg, initiate:
        - a. Transcutaneous Pacing
        - b. Consider Epinephrine infusion:
          - i. 2-10 mcg/min IV/IO [2 mg of 1:1000 or 1:10,000 in 500 mL NS (4 mcg/mL)]:
            1. Use infusion pump
            2. Initiate 2-10 mcg/min, titrate to response
            3. Label bag with orange medication label
  - b. Pediatric:
    - i. Epinephrine: 0.01 mg/kg (0.1 mL of 1:10,000 concentration) IV/IO, every 3-5 minutes if indicated
8. For increased vagal tone or primary AV block, administer Atropine:
  - a. Pediatric: 0.02 mg/kg (minimum 0.1 mg / maximum 0.5 mg) IV/IO, repeat once if indicated

# Chest Pain

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## 1. Universal Patient Care

### Basic Care Guidelines

2. If capability exists, obtain a 12-Lead ECG
3. Have patient chew non-enteric Aspirin 324 mg:
  - a. Amount may be reduced if patient has already taken Aspirin within the past 12 hours for a total of 324 mg
4. Evaluate if erectile dysfunction or pulmonary hypertension medications have been taken in the past 48 hours:
  - a. If the patient has not taken any erectile dysfunction or pulmonary hypertension medication in the past 48 hours and has a systolic blood pressure of 100 mmHg or above, assist the patient in self-administering one dose of their own Nitroglycerin:
    - i. Repeat one dose of Nitroglycerin in 5 minutes if pain continues and systolic blood pressure is 100 mmHg or above
    - ii. Reassess vital signs following each dose of Nitroglycerin

### Advanced Care Guidelines

5. Obtain 12 lead ECG (goal within 10 minutes)
6. Establish IV access
7. If STEMI is present, determine appropriate destination:
  - a. If transport time to a facility capable of providing emergency PCI care is 60 minutes or less, it is recommended that all of these patients be transported directly to the emergency PCI-capable facility
8. Administer Nitroglycerin:
  - a. 0.4 mg sublingually, every 3-5 minutes if indicated and if systolic blood pressure is 100 mmHg or above:
    - i. Reassess vital signs following each dose of Nitroglycerin
9. If ST segment changes exist, consider Nitroglycerin infusion:
  - a. Initiate 5-10 micrograms per minute:
    - i. Use infusion pump
    - ii. Titrate infusion in 5 microgram increments
    - iii. Discontinue infusion when:
      1. Pain is relieved
      2. Systolic blood pressure is below 100 mmHg
10. If pain continues after administration of Nitroglycerin and systolic blood pressure remains above 90 mmHg, administer:
  - a. Fentanyl 25-50 mcg IV, every 5 minutes if indicated, up to 200 mcg

# Hypertensive Emergencies

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## 1. Universal Patient Care

### Basic Care Guidelines

2. If capability exists, obtain a 12-Lead ECG and transmit it to the receiving facility for interpretation as soon as possible

### Advanced Care Guidelines

3. Monitor ECG
4. Establish IV access
5. Symptomatic hypertension (systolic blood pressure greater than 180 or diastolic blood pressure greater than 120), administer:
  - a. Labetalol:
    - i. Adult:
      1. 10 mg IV over 2 minutes, repeat once after 10 minutes for continued hypertension:
        - a. Goal is to reduce MAP by 20-25% initially
        - b. Ensure heart rate is greater than 60 beats per minute prior to administration
6. If concern for drug-induced hypertension, **do not use labetalol**
7. For pregnancy-related hypertension; refer to [Eclampsia/Pre-Eclampsia](#)

## Stroke (CVA)

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### 1. Universal Patient Care

#### Basic Care Guidelines

2. Complete a validated stroke exam and notify receiving facility as soon as possible if stroke is suspected
3. Attempt to determine time of onset or last known well time:
  - a. Positive stroke scale with time of onset or last known well time of less than 4½ hours may be eligible for thrombolytic agents
  - b. Positive stroke scale with time of onset or last known well time of less than 24 hours may be eligible for mechanical thrombectomy
4. Check blood glucose (if available):
  - a. Treat if below 60 mg/dL; refer to [Diabetic Emergencies](#)

#### Advanced Care Guidelines

5. Establish IV access
6. Acquire 12-Lead ECG
7. Allow permissive hypertension:
  - a. For blood pressure 220 or above contact medical control
8. Transport to a primary stroke center if possible; refer to [Stroke Destination Decision](#)

# Tachycardia

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## 1. Universal Patient Care

### Basic Care Guidelines

2. If capability exists, obtain a 12-Lead ECG and transmit it to the receiving facility for interpretation as soon as possible

### Advanced Care Guidelines

3. Monitor ECG and establish IV/IO access
4. Adults who are symptomatic with rates greater than 150 bpm, children with rates greater than 180 bpm or infants with rates greater than 220 bpm:
  - a. Stable with Narrow QRS:
    - i. Perform vagal maneuvers, if vagal maneuvers do not resolve the issue, administer Adenosine:
      1. Adult: 6 mg rapid IV push, repeat at 12 mg after 2 minutes if indicated
      2. Pediatric: 0.1 mg/kg rapid IV push (maximum 6 mg), repeat at 0.2 mg/kg if indicated (maximum 12 mg)
  - b. Unstable with Narrow QRS:
    - i. Perform synchronized cardioversion:
      1. Consider procedural sedation; refer to [Midazolam](#)
  - c. Stable with Wide QRS (regular and monomorphic):
    - i. Consider Adenosine or Amiodarone:
      1. Adult: Adenosine 6 mg rapid IV push, repeat at 12 mg after 2 minutes if indicated *OR* Amiodarone 150 mg in 100 mL NS or D5W over 10 minutes, repeat once if indicated
      2. Pediatric: Adenosine 0.1 mg/kg rapid IV push (maximum 6 mg) for SVT with aberrancy *OR* Amiodarone 5 mg/kg (maximum 150 mg) in 100 mL NS or D5W over 10 minutes
  - d. Unstable with Wide QRS:
    - i. Perform synchronized cardioversion:
      1. Consider procedural sedation; refer to [Midazolam](#)
5. For atrial fibrillation with rapid ventricular response (ventricular rate greater than 140 bpm), administer Metoprolol:
  - a. Adult: 5 mg slow IV push over 2 minutes

## General Medical

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## Abdominal Pain (Non-Traumatic)

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1. Universal Patient Care

### Basic Care Guidelines

2. Place patient in position of comfort

### Advanced Care Guidelines

3. Establish IV access if indicated
4. Consider a fluid bolus if indicated
5. Consider analgesia; refer to [Pain Management](#)
6. Consider antiemetic; refer to [Nausea and Vomiting](#)

# Allergic Reaction/Anaphylaxis

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## 1. Universal Patient Care

### Basic Care Guidelines

2. If the patient is complaining of shortness of breath, has signs of respiratory distress, or pulse oximetry is less than 94%, titrate oxygen for symptom improvement or to maintain oxygen saturation of 94-98%
3. Respiratory distress with wheezing:
  - a. Albuterol 2.5-5 mg (if available), nebulized at 8 lpm oxygen
4. Anaphylaxis:
  - a. If the patient has a physician-prescribed Auto-Inject Epinephrine, assist with administering it for signs of anaphylaxis

### Advanced Care Guidelines

5. Allergic reaction (urticaria or pruritus):
  - a. Diphenhydramine:
    - i. Adult: 25-50 mg IM/IV; Pediatric: 1 mg/kg IM/IV, up to 50 mg
6. Anaphylaxis:
  - a. Epinephrine (1:1000):
    - i. Over 25 kg: 0.3 mg IM; Under 25 kg: 0.15 mg IM:
      1. If signs of anaphylaxis and hypoperfusion persist following the first dose of epinephrine, repeat every 5-15 minutes.
      2. Dexamethasone 10mg IV/IM
7. Hypoperfusion (systolic blood pressure less than 90 mmHg):
  - a. NS or LR:
    - i. 20 mL/kg IV/IO
8. Anaphylaxis with hypotension refractory to IM Epinephrine, consider ONE of the following Epinephrine Infusions:
  - a. Adult: 0.05 mcg/kg/min IV/IO
    - i. Initiate 0.05 mcg/kg/min and titrate to maintain a systolic blood pressure of 90 mmHg or MAP of 65
  - b. Adult: 5-15 mcg/min IV/IO
    - i. Initiate 5 mcg/min and titrate to maintain a systolic blood pressure of 90 mmHg or MAP of 65 or max of 15 mcg/min is reached
9. If the patient is in peri-arrest, consider epinephrine push-dose 10-20 mcg

## Altered Mental Status

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### 1. Universal Patient Care

#### Basic Care Guidelines

2. Identify and treat possible causes:
  - a. Evaluate oxygen saturation
  - b. Evaluate the need for Naloxone; refer to [Poisoning](#)
  - c. Check blood glucose (if available):
    - i. Below 60 mg/dL or above 250 mg/dL; refer to [Diabetic Emergencies](#)

#### Advanced Care Guidelines

3. Establish IV access if indicated
4. Monitor ECG if indicated
5. Evaluate the need for advanced airway management

# Behavioral Emergencies

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## 1. Universal Patient Care

### Basic Care Guidelines

2. If there is evidence of immediate danger, ensure your safety and that of others by summoning law enforcement for help, if not already done so, and only enter the scene once it's safe to do so
3. Establish patient rapport:
  - a. Attempt verbal reassurance and calm patient prior to use of pharmacologic and/or physical management devices
4. Check blood glucose (if available)
5. Note medications/substances on scene that may contribute to the agitation or may be relevant to the treatment of a contributing medical condition

### Advanced Care Guidelines

6. For anxiety or agitation:
  - a. Diazepam:
    - i. Adult: 5 mg IV (2-5 minute onset of action)
    - ii. Adult: 10 mg IM (15-30 minute onset of action)
    - iii. Pediatric: 0.05-0.1 mg/kg IV, not to exceed 5 mg
    - iv. Pediatric: 0.1-0.2 mg/kg IM, not to exceed 10 mg
7. Severe agitation or a high risk of violence:
  - a. Ketamine:
    - i. Adult and Pediatric: 0.5-1 mg/kg IV (1 minute onset of action)
    - ii. Adult and Pediatric: 2-4 mg/kg IM (3-5 minute onset of action)
      1. Consider medical direction for patients under age 2
8. Monitor vital signs before and after each dose:
  - a. Consider EtCO<sub>2</sub> as an earlier predictor of hypoventilation

# Congestive Heart Failure

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## 1. Universal Patient Care

### Basic Care Guidelines

2. If capability exists, obtain a 12-Lead ECG and transmit it to the receiving facility for interpretation as soon as possible
3. Evaluate if erectile dysfunction or pulmonary hypertension medications have been taken in the past 24-48 hours:
  - a. If the patient has not taken any erectile dysfunction or pulmonary hypertension medication in the past 48 hours and has a systolic blood pressure of 100 mmHg or above, assist the patient in self-administering one dose of their own Nitroglycerin:
    - i. Repeat every 3-5 minutes if indicated and if systolic blood pressure is 100 mmHg or above, maximum of 3 doses
    - ii. Reassess vital signs following each dose of Nitroglycerin
4. Consider continuous positive airway pressure (CPAP)

### Advanced Care Guidelines

5. Monitor ECG and treat dysrhythmias if indicated
6. Administer Nitroglycerin:
  - a. 0.4 mg sublingually, every 3-5 minutes if indicated and if systolic blood pressure is 100 mmHg or above, maximum of 3 doses:
    - i. Reassess vital signs following each dose of Nitroglycerin
7. Consider Nitroglycerin infusion:
  - a. Initiate 10 micrograms per minute:
    - i. Use infusion pump
    - ii. Titrate infusion in 10 mcg/min increments, up to 50 mcg/min
    - iii. Discontinue infusion when:
      1. Systolic blood pressure is below 100 mmHg

# Diabetic Emergencies

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## 1. Universal Patient Care

### Basic Care Guidelines

2. Check blood glucose (if available)
3. If patient is conscious with a blood sugar of less than 60 mg/dL and able to swallow, administer:
  - a. Oral Glucose:
    - i. Adult: 15 g
    - ii. Pediatric: 0.5-1 g/kg

### Advanced Care Guidelines

4. Establish IV access:
  - a. Ensure IV is patent to minimize the risk of infiltration
5. If patient is unconscious or unable to protect their own airway and blood sugar is less than 60 mg/dL, administer:
  - a. Dextrose (D10 is preferred):
    - i. Adult (25 g of 10-50%):
      1. D50 (50 mL) IV
      - OR
      2. D10 (250 mL) IV
    - ii. Pediatric (0.5-1 g/kg of 10-25%):
      1. D10 (5-10 mL/kg) IV
      - OR
      2. D10 (2 mL/kg) IV, newborns
6. If unable to gain vascular access, administer:
  - a. Glucagon:
    - i. Adult: 1 mg IM
    - ii. Pediatric: 1 mg IM (over 20 kg or more than 5 years old)
    - iii. Pediatric: 0.5 mg IM (less than 20 kg or less than 5 years old)
7. If blood sugar is greater than 250 mg/dL with symptoms of dehydration, vomiting, abdominal pain, or altered level of consciousness, administer:
  - a. NS or LR:
    - i. Adult: 20 mL/kg
    - ii. Pediatric: 10 mL/kg

# Hyperthermia

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Move to a cool area and shield from the sun or any external heat source
3. Loosen or remove clothing
4. Initially cool patient with cool mist and fanning (if available)
5. Cool patient with cold packs to neck, groin, and axilla if indicated:
  - a. Cooling efforts should continue until patient's temperature is less than 102.2°F (39°C) or mental status improves
6. If alert, stable, and not nauseous, you may have the patient slowly drink small sips of water or other fluids such as sports drinks (if available)

### Advanced Care Guidelines

7. Monitor ECG and treat dysrhythmias if indicated
8. Establish IV access and administer fluid bolus if indicated
9. For seizure activity; refer to [Seizures](#)

# Hypothermia

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Remove the patient from the environment to prevent further heat loss, remove wet clothes, and cover with blankets:
  - a. Handle patient gently and move only when necessary
3. Assess core temperature:
  - a. Mild Hypothermia: 32.1°-35°C or 89.8°-95°F
  - b. Moderate Hypothermia: 28.1°-32°C or 82.5°-89.7°F
  - c. Severe Hypothermia: 24°-28°C or 75.2°-82.4°F
  - d. Profound Hypothermia: less than 24°C or 75.2°F
4. Warm patient with hot packs to neck, groin, and axilla if indicated
5. With identified or suspected frostbite injuries:
  - a. Protect the cold injured extremity from further injury (manual stabilization)
  - b. Do not re-expose to the cold
  - c. Remove wet or restrictive clothing and jewelry
  - d. Do not rub or massage
  - e. Cover with dry dressings
6. For alterations in mental status, consider measuring blood sugar and treat as indicated; refer to [Diabetic Emergencies](#)

### Advanced Care Guidelines

7. Monitor ECG and treat dysrhythmias if indicated
8. Establish IV access and administer warm fluid bolus if indicated
9. Seizure activity; refer to [Seizures](#)
10. Consider analgesia; refer to [Pain Management](#)
11. For hypothermic arrest below 30°C or 86°F:
  - a. The mainstay of therapy in severe hypothermia and cardiac arrest should be effective chest compressions and attempts at rewarming
  - b. Defibrillation is indicated only once
  - c. Medications should be withheld until the patient's core temperature is greater than 30°C (86°F)
  - d. Contact Medical Control for further direction

# Nausea and Vomiting

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Limit oral intake
3. Transport patient in position of comfort
4. Consider having the patient smell an alcohol prep pad

### Advanced Care Guidelines

5. Establish IV access if indicated
6. Consider fluid bolus if evidence of hypovolemia
7. Nausea or vomiting, consider:
  - a. Ondansetron:
    - i. Adult: 4 mg SL/IV, repeat once after five minutes if indicated
    - ii. Pediatric: 0.15 mg/kg SL/IV, not to exceed 4 mg

# Pain Management

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Nonpharmacologic pain management:
  - a. Place patient in a position of comfort
  - b. Splint extremity injuries
  - c. Apply hot or cold packs if indicated

### Advanced Care Guidelines

3. Monitor ECG
4. Consider Antiemetic; refer to [Nausea and Vomiting](#)
5. Pain management, consider:
  - a. Ketorolac (avoid in patients under 6 months or over 65):
    - i. Adult: 30 mg IM or 15 mg IV
    - ii. Pediatric: 0.5 mg/kg, not to exceed adult dose
  - b. Fentanyl:
    - i. Adult: 1 mcg/kg IM/IN/IV, maximum initial dose of 100 mcg, repeat if indicated as long as patient remains hemodynamically stable and GCS is intact
    - ii. Pediatric: 1 mcg/kg; refer to length-based tape
6. Severe pain, consider:
  - a. Ketamine:
    - i. Adult: 0.25 mg/kg IM/IV/IO, maximum initial dose of 25 mg, repeat if indicated, up to 100 mg; refer to [Ketamine Dose Table](#):
      1. If patient is presenting with hallucinations after administration, consider 1 mg Midazolam
    - ii. Pediatric: 0.1 mg/kg IM/IV/IO
7. Muscle spasm and/or anxiolytic pain exacerbation, consider:
  - a. Diazepam:
    - i. Adult: 2-5 mg IM/IN/IV, every 5 minutes if indicated, up to 10 mg
    - ii. Pediatric: 0.1 mg/kg IM/IN/IV, not to exceed adult dose
8. Monitor vital signs before and after each dose of medication:
  - a. Consider EtCO<sub>2</sub> as an earlier predictor of hypoventilation

# Poisoning

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Identify contaminate and engage Poison Control as early as reasonable to aid in appropriate therapy and track patient outcomes:
  - a. National 24-hour phone number: 1-800-222-1222
3. Consider Naloxone (if pre-filled atomizer device is available), repeat every 3 minutes if indicated

### Advanced Care Guidelines

4. Monitor ECG
5. Establish IV access if indicated
6. Bradycardia with unknown overdose, consider:
  - a. Atropine:
    - i. Adult: 1 mg IV, every 5 minutes if indicated, up to 3 mg
  - b. Transcutaneous cardiac pacing
7. Tachycardia with unknown overdose, consider one of the following:
  - a. Diazepam:
    - i. Adult: 2-5 mg IM/IN/IV, every 5 minutes if indicated, up to 10 mg
  - b. Midazolam:
    - i. Adult: 0.5-2.5 mg IM/IN/IV, every 5 minutes if indicated, up to 5 mg
8. Opioid overdose:
  - a. Naloxone:
    - i. Adult: 0.4-2 mg IM/IV OR 4 mg IN, repeat in 3 minutes if indicated
    - ii. Pediatric: 0.1 mg/kg IM/IN/IV, repeat in 3 minutes if indicated, up to 2 mg IM/IV OR 4 mg IN
9. Calcium Channel Blocker or Beta Blocker overdose, consider:
  - a. Glucagon:
    - i. Adult: 1-3 mg slow IV push over 1-2 minutes, repeat after 10-15 minutes if no response is seen
10. Digitalis overdose, consider:
  - a. Atropine:
    - i. Adult: 1 mg IV, every 5 minutes if indicated, up to 3 mg
    - ii. Transcutaneous cardiac pacing
11. Consider fluid bolus of 20 mL/kg for hypotension

# Seizures

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Monitor and protect airway
3. Administer oxygen as appropriate with a target saturation of 94-98%
4. Check blood glucose (if available); refer to [Diabetic Emergencies](#)

### Advanced Care Guidelines

5. Administer one of the following:
  - a. Diazepam:
    - i. Adult: 2-5 mg IM/IN/IV titrated until seizure stops or maximum dose of 10 mg is given
    - ii. Pediatric: 0.2 mg/kg IM/IN/IV, maximum 10 mg
  - b. Midazolam:
    - i. Adult: 2-5 mg IM/IN titrated until seizure stops or maximum dose of 10 mg is given
    - ii. Pediatric: 0.2 mg/kg IM/IN, maximum 10 mg
6. For febrile seizures, consider the following after stopping the seizure:
  - a. Remove excessive layers of clothing
  - b. Consider applying cool compresses to the body
  - c. Ketorolac (avoid in patients under 6 months):
    - i. 1 mg/kg IV/IM, not to exceed adult dose
7. Consider acquiring a 12-Lead ECG following cessation of seizure in patients without a history of seizure to determine possible cardiac cause

## OB/Gyn

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# Abnormal Delivery

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## 1. Universal Patient Care

### Basic Care Guidelines

2. Consider the following recommendations for specific conditions:
  - a. Shoulder Dystocia:
    - i. Hyperflex mother's hips to severe supine knee-chest position
    - ii. Apply firm suprapubic pressure to attempt to dislodge shoulder
    - iii. Angle baby's head as posteriorly as possible, NEVER pull
  - b. Prolapsed Umbilical Cord:
    - i. Assess for pulsations in cord:
      1. If no pulses are felt, lift the presenting part off the cord
    - ii. Maintain assistive position until relieved by hospital staff
  - c. Breech Birth:
    - i. Allow the buttocks, feet, and trunk to deliver spontaneously
    - ii. If needed, put the mother in a kneeling position
    - iii. If head fails to deliver, place your index and ring fingers on the baby's cheeks, forming a "V," allowing the chin to be tilted toward the chest, flexing the neck
    - iv. Once the legs are delivered, support the body
  - d. Arm or Leg Presentation:
    - i. Do not attempt to facilitate delivery
  - e. Nuchal Cord:
    - i. After the head has been delivered, palpate the neck for a nuchal cord; if present, slip over the head
    - ii. If the loop is too tight to slip over the head, attempt to slip the cord over the shoulders and deliver the body through the loop
    - iii. The cord can be doubly clamped and cut between the clamps; the newborn should be delivered promptly

### Advanced Care Guidelines

3. Postpartum Hemorrhage with signs of hemorrhagic shock:
  - a. Attempt fundal massage and initiate IV fluid resuscitation
  - b. 1 g IV ( preferred route) in 100 mL NS or D5W over 10 minutes or 1 g IM, divided into two 500 mg injections, into a large muscle
    - i. Must be within three hours

# Eclampsia/Pre-eclampsia

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## 1. Universal Patient Care

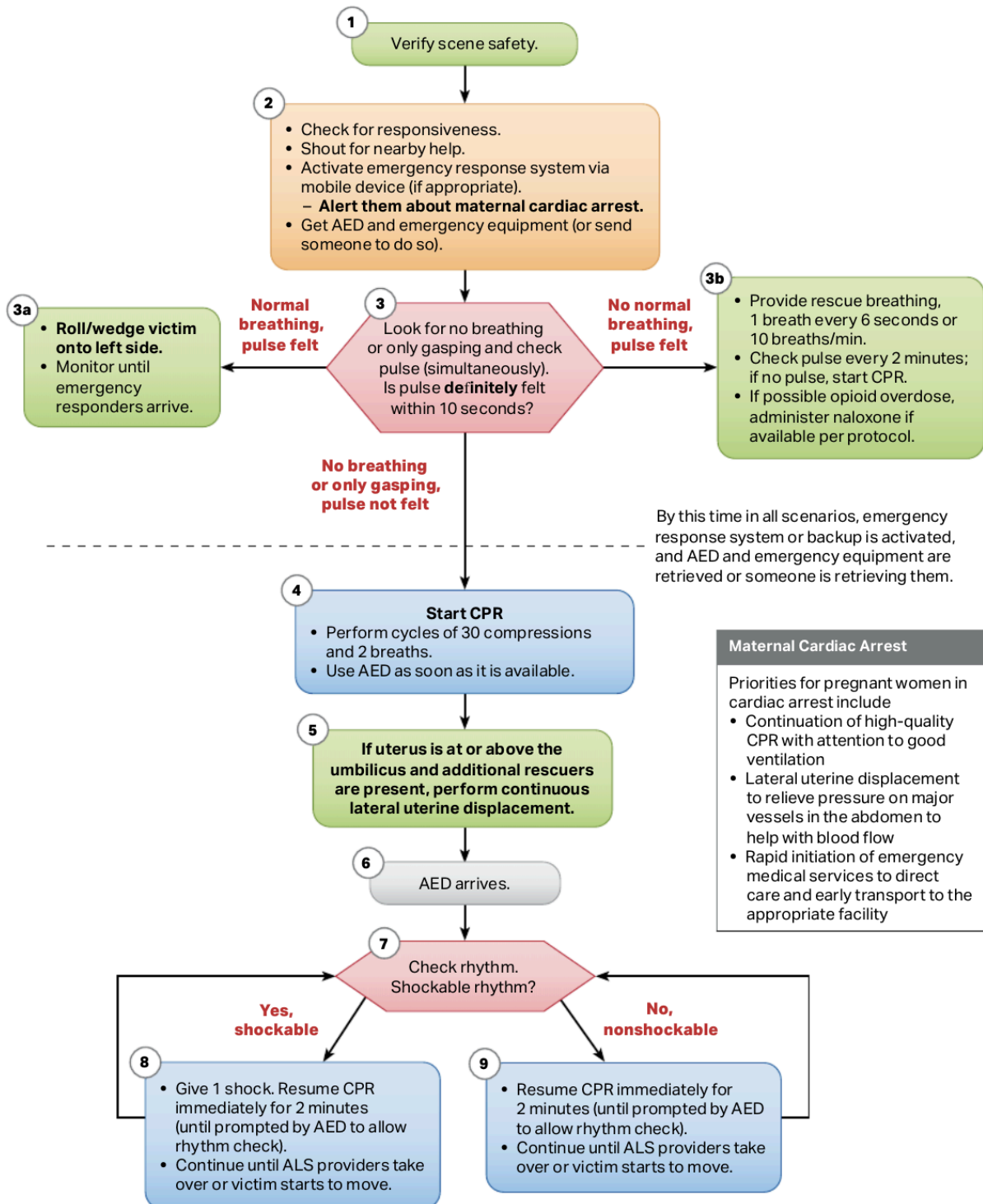
### Basic Care Guidelines

2. Inclusion criteria:
  - a. Female patient, more than 20-weeks gestation, presenting with symptomatic hypertension
3. If capability exists, obtain a 12 lead ECG and transmit it to the receiving facility for interpretation as soon as possible

### Advanced Care Guidelines

4. Monitor ECG
5. Establish IV access
6. Severe hypertension (systolic blood pressure greater than 160 or diastolic blood pressure greater than 110) lasting more than 15 minutes with associated pre-eclampsia symptoms, administer:
  - a. Labetalol:
    - i. 20 mg IV over 2 minutes:
      1. Goal blood pressure is approximately 140/90 to reduce stroke risk but maintain uterine perfusion
      2. Ensure heart rate is greater than 60 beats per minute prior to administration
      3. Repeat every 10 minutes x 2 doses for persistent severe hypertension with preeclampsia symptoms
  - b. Magnesium Sulfate:
    - i. 4 g in 100 mL NS or D5W over 5-10 minutes
7. Active seizures not responding to Magnesium:
  - a. Administer a benzodiazepine; refer to [Seizures](#):
    - i. Monitor EtCO<sub>2</sub> for respiratory depression in patients who received Magnesium Sulfate prior to benzodiazepines

# Maternal Cardiac Arrest



# Normal Delivery

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## 1. Universal Patient Care

### Basic Care Guidelines

2. If patient is in labor without signs of imminent delivery:
  - a. Transport to appropriate receiving facility
3. Imminent delivery:
  - a. Support the infant's head and apply gentle counterpressure to help prevent the head from suddenly popping out:
    - i. Do not routinely suction the infant's airway (even with a bulb syringe) during delivery
  - b. Gently guide head down to allow delivery of the anterior shoulder
  - c. Gently guide the head up to allow delivery of the posterior shoulder
  - d. Deliver the remainder of the infant
  - e. Dry and stimulate infant
  - f. Wrap infant in a towel and place on maternal chest unless resuscitation is needed
  - g. After one minute, clamp cord about 5-6 inches from the abdomen with two clamps, and cut cord between the clamps:
    - i. While cord is attached, take care to ensure the baby is not significantly higher positioned than the mother to prevent blood from flowing backward from baby to placenta
  - h. Record [APGAR](#) scores at 1 and 5 minutes once neonate is stabilized
4. Placenta delivery:
  - a. Delivers spontaneously (often within 5-15 minutes after the infant):
    - i. Do not force the placenta to deliver
    - ii. Contain all tissue in a plastic bag and transport
5. Transport:
  - a. Transport to appropriate receiving facility
  - b. Transport infant secured to mother with approved neonatal restraint system, in car seat or isolette unless resuscitation is needed
  - c. Keep infant warm during transport

## Pediatrics

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## Brief Resolved Unexplained Event (BRUE)

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### 1. Universal Patient Care

#### Basic Care Guidelines

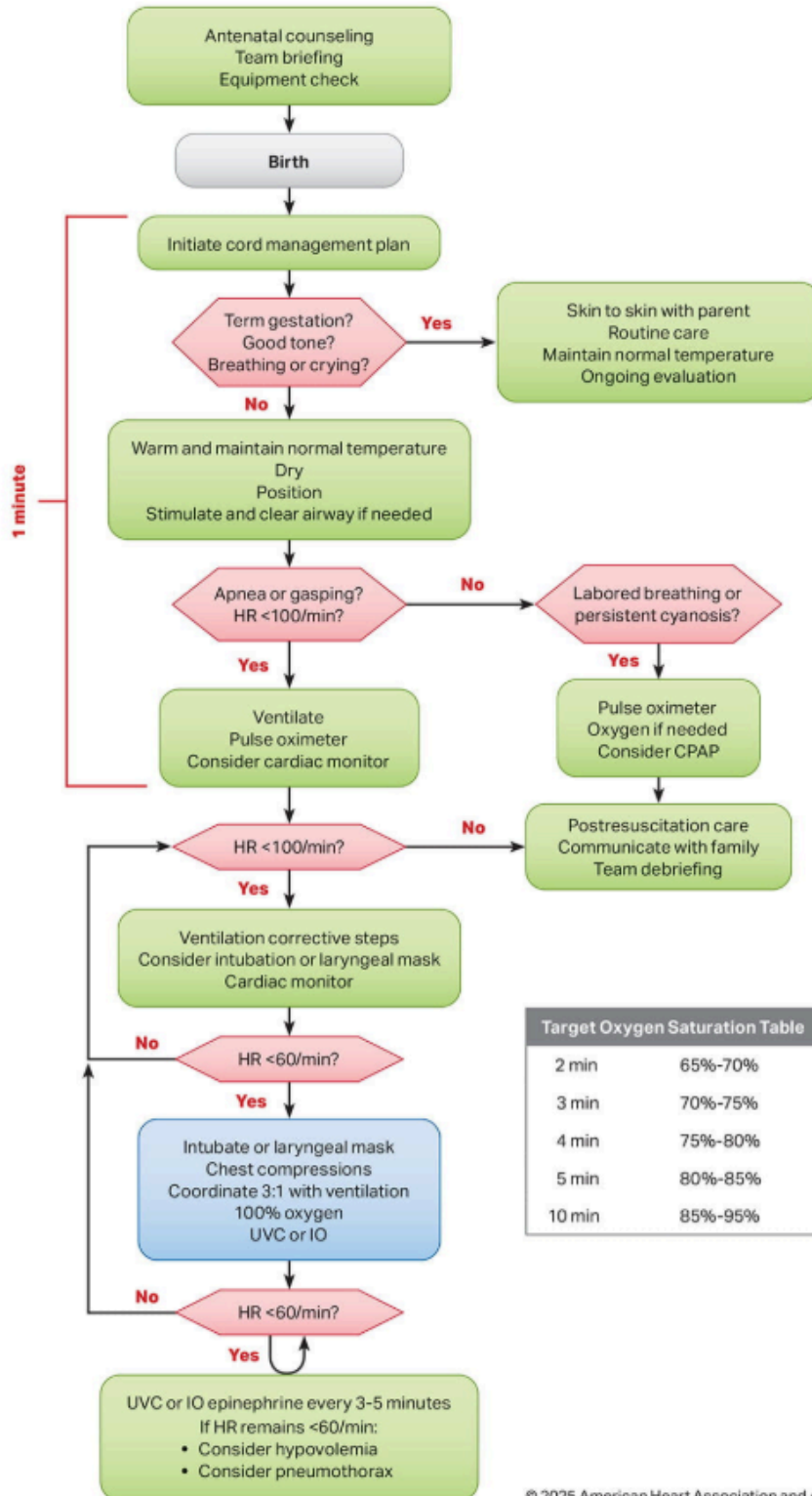
2. Recognize patient characteristics and symptoms consistent with a BRUE:
  - a. An event in an infant less than 1-year-old reported by a bystander as sudden, brief (less than 1 minute), unexplained, and completely resolved upon EMS arrival that includes one or more of the following:
    - i. Breathing, color, or muscle tone change
    - ii. Altered level of responsiveness
3. Obtain a full history:
  - a. Circumstances and symptoms before, during, and after the event
4. Perform a full assessment:
  - a. Pulse, blood pressure, respiratory rate, SpO<sub>2</sub>:
    - i. Treat any signs of respiratory distress or increased work of breathing
    - ii. Suction excess secretions from the nose and/or mouth if indicated
  - b. Skin color and condition
  - c. Pupillary response and anterior fontanelle
  - d. Neurologic status
  - e. Glucose level (if available)
  - f. Signs of trauma or neglect
5. High-Risk Criteria:
  - a. Less than two months of age
  - b. History of prematurity (less than or equal to 32 weeks gestation)
  - c. More than one BRUE, now or in the past
  - d. Event duration greater than 1 minute
  - e. CPR or resuscitation by caregivers or trained rescuers:
    - i. Contact medical direction if parent/guardian is refusing medical care and/or transport, especially if any high-risk criteria are present

#### Advanced Care Guidelines

6. Monitor ECG
7. IV access:
  - a. Only established for concerns of shock or to administer IV medications

# Neonatal Resuscitation

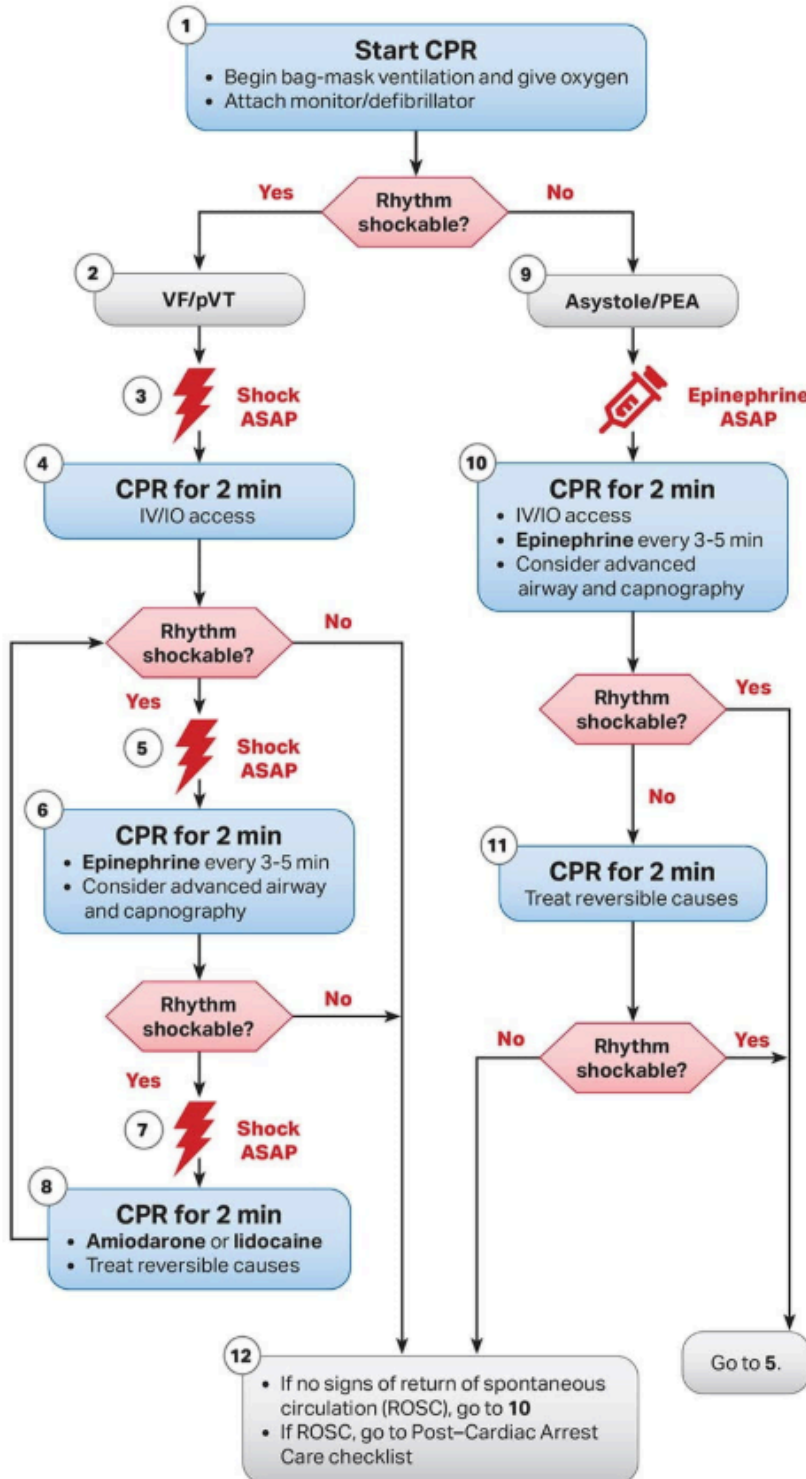
## Neonatal Resuscitation Algorithm



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# Pediatric Resuscitation

## Pediatric Cardiac Arrest Algorithm



### High-Quality CPR

- Push hard ( $\geq \frac{1}{2}$  AP diameter of the chest)
- Push fast: 100-120/min
- Allow complete chest recoil
- Minimize interruptions in compressions
- Change compressor every 2 min, sooner if fatigued
- If no advanced airway, use compression-ventilation ratio of
  - 15:2 if 2 rescuers (prepuberty)
  - 30:2 if 2 rescuers (postpuberty onset)
  - 30:2 if 1 rescuer (any age)
- If advanced airway, provide continuous compressions and give a breath every 2-3 seconds
- Monitor ETCO<sub>2</sub> and, when available, invasive diastolic BP

### Shock Energy for Defibrillation

- First shock 2 J/kg
- Second shock 4 J/kg
- Subsequent shocks  $\geq 4$  J/kg, maximum 10 J/kg or adult dose

### Drug Therapy

- **Epinephrine IV/IO dose:** 0.01 mg/kg (0.1 mg/mL concentration). Max dose 1 mg.
- **Amiodarone IV/IO dose:** 5 mg/kg bolus (max 300 mg). May repeat up to 3 doses (max 150 mg subsequent doses).
- **Lidocaine IV/IO dose:** 1 mg/kg

### Advanced Airway

- ET intubation or supraglottic airway
- ETCO<sub>2</sub> to confirm and monitor ET tube placement

### Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypoglycemia
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

# Respiratory

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# Airway Management

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## 1. Universal Patient Care

### Basic Care Guidelines

2. Maintain oxygen saturation of 94-98%
3. Consider Continuous Positive Airway Pressure (CPAP)
4. Maintain a patent airway:
  - a. Suction as needed
  - b. Insert appropriate airway device (NPA, OPA, or SGA) if indicated
5. Use bag-valve-mask ventilation in settings of respiratory failure or arrest

### Advanced Care Guidelines

6. Monitor EtCO<sub>2</sub>:
  - a. Patients without primary pulmonary pathology:
    - i. Maintain EtCO<sub>2</sub> of 35-40 mmHg
7. Consider Bilevel Positive Airway Pressure (BiPAP)
8. When less invasive methods are ineffective or inappropriate:
  - a. Consider endotracheal intubation; refer to [Endotracheal Intubation](#)
9. Patients who cannot be oxygenated/ventilated effectively using any of the above interventions or when other airway approaches are impossible:
  - a. Consider needle cricothyroidotomy; refer to [Needle Cricothyroidotomy](#)

# Difficulty Breathing

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Maintain patent airway; refer to [Airway Management](#)
3. If the patient is complaining of shortness of breath, has signs of respiratory distress, or pulse oximetry is less than 94%, titrate oxygen for symptom improvement or to maintain oxygen saturation of 94-98%
4. Wheezing without respiratory distress:
  - a. Albuterol 2.5 mg (if available), nebulized at 8 lpm oxygen
5. Respiratory distress with signs of bronchospasm:
  - a. Albuterol 5 mg (if available), nebulized at 8 lpm oxygen, repeat as needed for ongoing respiratory distress

### Advanced Care Guidelines

6. Monitor ECG and EtCO<sub>2</sub>
7. Consider the need for the following:
  - a. DuoNeb:
    - i. Adult: Albuterol 3 mg and Ipratropium Bromide 0.5 mg, nebulized at 8 lpm oxygen, up to 3 doses
  - b. Steroids:
    - i. Adult: Methylprednisolone 40-125 mg IM/IV or Dexamethasone 10 mg IM/IV
  - c. Magnesium Sulfate:
    - i. Adult: 2 g in 100 mL NS or D5W over 10-15 minutes
    - ii. Pediatric: 40 mg/kg in 100 mL NS or D5W over 10-15 minutes, not to exceed 2 g
  - d. Epinephrine:
    - i. Adult (1:1000): 0.3 mg IM
    - ii. Pediatric (1:1000): 0.01 mg/kg IM, not to exceed 0.3 mg
8. Croup:
  - a. Respiratory distress with signs of stridor at rest administer:
    - i. Epinephrine 5 mg (5 mL of 1:1000) nebulized
      1. Patients under 10 kg administer 2.5 mL
      2. Repeat in 20 minutes as needed
    - ii. Dexamethasone 0.6 mg/kg IV/IM, maximum 16 mg

# Resuscitation

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```
graph TD
    1[1 Start CPR  
• Begin bag-mask ventilation and give oxygen  
• Attach monitor/defibrillator] --> 2{Rhythm shockable?}
    2 -- Yes --> 3[2 VF/pVT]
    3 --> 4[3 Shock]
    4 --> 5[4 CPR 2 min  
• IV/IO access]
    5 --> 6{Rhythm shockable?}
    6 -- Yes --> 7[5 Shock]
    7 --> 8[6 CPR 2 min  
• Epinephrine every 3-5 min  
• Consider advanced airway, capnography]
    8 --> 9{Rhythm shockable?}
    9 -- Yes --> 10[7 Shock]
    10 --> 11[8 CPR 2 min  
• Amiodarone or lidocaine  
• Treat reversible causes]
    11 --> 12{Rhythm shockable?}
    12 -- Yes --> 13[Go to 5]
    12 -- No --> 14[12 If no signs of ROSC, go to 10  
• If ROSC, go to post-cardiac arrest care  
• Consider appropriateness of continued resuscitation]
    2 -- No --> 9[9 Asystole/PEA]
    9 --> 10[10 Epinephrine ASAP]
    10 --> 11[10 CPR 2 min  
• IV/IO access  
• Epinephrine every 3-5 min  
• Consider advanced airway, capnography]
    11 --> 12{Rhythm shockable?}
    12 -- Yes --> 13
    12 -- No --> 14
```

**1 Start CPR**

- Begin bag-mask ventilation and give oxygen
- Attach monitor/defibrillator

**Rhythm shockable?**

**Yes**

**2 VF/pVT**

**3 Shock**

**4 CPR 2 min**

- IV/IO access

**Rhythm shockable?**

**Yes**

**5 Shock**

**6 CPR 2 min**

- Epinephrine every 3-5 min
- Consider advanced airway, capnography

**Rhythm shockable?**

**Yes**

**7 Shock**

**8 CPR 2 min**

- Amiodarone or lidocaine
- Treat reversible causes

**Rhythm shockable?**

**Yes** → **Go to 5**

**No** → **12**

**No**

**9 Asystole/PEA**

**10 Epinephrine ASAP**

**10 CPR 2 min**

- IV/IO access
- Epinephrine every 3-5 min
- Consider advanced airway, capnography

**Rhythm shockable?**

**Yes** → **Go to 5**

**No** → **11**

**11 CPR 2 min**

- Treat reversible causes

**Rhythm shockable?**

**Yes** → **Go to 5**

**No** → **12**

**12**

- If no signs of ROSC, go to 10
- If ROSC, go to post-cardiac arrest care
- Consider appropriateness of continued resuscitation

### High-Quality CPR

- Push hard (at least 2 inches [5 cm]).
- Push fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, use 30:2 compression-ventilation ratio.
- If advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions.
- Continuous waveform capnography
  - If ETCO<sub>2</sub> is low or decreasing, reassess CPR quality.

### Shock Energy for Defibrillation

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

### Drug Therapy

- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus  
Second dose: 150 mg or  
**Lidocaine IV/IO dose:** First dose: 1-1.5 mg/kg  
Second dose: 0.5-0.75 mg/kg

### Advanced Airway

- ET intubation or supraglottic advanced airway
- Continuous waveform capnography or capnometry to confirm and monitor ET tube placement

### Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

## Determination of Death - Withholding Resuscitation Efforts

---

1. Resuscitation should be started on all patients who are found apneic and pulseless unless the following medical cause, traumatic injury, or body condition clearly indicates biological death (irreversible brain death):
  - a. Decapitation
  - b. Transection of the torso (the body is completely transected below the shoulders and above the hips through all major organs and vessels)
  - c. Incineration (90% of the body surface area with full-thickness burns)
  - d. Massive crush injury or visible brain matter
  - e. Blunt and penetrating trauma:
    - i. No movement, ECG activity, or pupillary response present
  - f. Nontraumatic arrest with obvious signs of death, including rigor mortis and dependent lividity
  - g. Physical decomposition of the body

**OR**

  - h. A valid DNR order (form, card, bracelet) or other actionable medical order (e.g., IPOST) is present when it:
    - i. Conforms to state specifications
    - ii. Is intact:
      1. Has not been cut, broken, or shows signs of being repaired
    - iii. Displays the patient's name and the physician's name
2. If apparent death is confirmed, continue as follows:
  - a. Contact the county medical examiner and law enforcement
  - b. When possible, contact Iowa Donor Network at 1-800-831-4131
  - c. At least one EMS provider should remain at the scene until the appropriate authority is present
  - d. Provide psychological support for grieving survivors
  - e. Document the reason(s) no resuscitation was initiated
3. Preserve crime scene if applicable

## Termination of Resuscitative Efforts

---

1. Indications to consider termination of resuscitation:
  - a. Paramedic-level interventions have been initiated, including rhythm analysis, defibrillation when indicated, airway management, and medication administration as per protocol.
  - b. There is no return of spontaneous circulation or respirations
  - c. Correctable causes or special resuscitation circumstances have been considered and addressed
  - d. Patient does not have profound hypothermia
  - e. Non-traumatic arrest considerations:
    - i. Asystole or slow wide complex PEA that has persisted for 20 minutes and EtCO<sub>2</sub> is less than 20 mmHg
    - ii. If narrow complex PEA with a rate above 40 or refractory ventricular fibrillation/ventricular tachycardia remains:
      1. Resuscitation should be considered for up to 60 minutes from the time of dispatch
      2. Termination of efforts may be considered before 60 minutes based on factors including but not limited to EtCO<sub>2</sub> less than 20 mmHg, age, comorbidities, distance from and resources available at the closest hospital
2. Termination of resuscitation must meet one of the following:
  - a. A valid DNR order is obtained by the EMS provider (any level)
  - b. Patient meets all criteria under 'indications' above and as applicable to scope of practice:
    - i. On-line medical direction is contacted while advanced care continues to discuss any further appropriate actions:
      1. Advanced care may be discontinued if physician's online medical direction authorizes
3. Other considerations:
  - a. Documentation must reflect that the decision to terminate resuscitation was determined by physician's online medical direction
  - b. An EMS/health care provider must attend to the deceased until the appropriate authorities arrive
  - c. All IVs, tubes, etc., should be left in place
  - d. Implement survivor support plans related to coroner notification, funeral home transfer, leaving the body at the scene, and death notification/grief counseling for survivors
  - e. Consider organ donation; refer to [Organ and Tissue Donation](#)
4. Safety Considerations:
  - a. All patients over 18 years old who are found with ventricular fibrillation or whose rhythm changes to ventricular fibrillation should, in general, have full resuscitation continued on scene if possible (this is not intended to prevent transport of these patients; rather, it is intended to serve as a reminder of the safety risks to all involved)

## Shock

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# Hypovolemic Shock

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## 1. Universal Patient Care

### Basic Care Guidelines

2. Avoid heat loss
3. Place patient in position of comfort
4. Stabilize fractures if indicated
5. Manage bleeding; refer to [Hemorrhage Control](#)

### Advanced Care Guidelines

6. Monitor ECG
7. Monitor EtCO<sub>2</sub>:
  - a. Reading of less than 25 mmHg may be a sign of poor perfusion
8. Establish IV/IO access:
  - a. If systolic blood pressure is less than 90 mmHg:
    - i. Administer NS or LR:
      1. Adult: 250 mL rapid boluses, up to 20 mL/kg:
        - a. Discontinue if:
          - i. Systolic blood pressure of 90 mmHg or MAP of 65 is reached, or pulmonary edema develops
      2. Pediatric: refer to length-based tape

# Cardiogenic Shock

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Place patient in position of comfort
3. If capability exists, obtain a 12 lead ECG and transmit it to the receiving facility for interpretation as soon as possible

### Advanced Care Guidelines

4. Monitor ECG
5. Monitor EtCO<sub>2</sub>:
  - a. Reading of less than 25 mmHg may be a sign of poor perfusion
6. Establish IV/IO access
7. Consider Push-Dose Epinephrine:
  - a. 10-20 mcg IV/IO
    - i. Used as a bridge until vasopressor infusion
8. Consider Norepinephrine infusion:
  - a. Adult: 1-30 mcg/min IV/IO [4 mg in 250 mL D5W (16 mcg/mL)]:
    - i. Use infusion pump
    - ii. Initiate 1 mcg/min and titrate to maintain a systolic blood pressure of 90 mmHg or MAP of 65
    - iii. Label bag with orange medication label
  - b. Pediatric: 0.01-0.3 mcg/kg/min; consult medical control

## Obstructive Shock (Tension Pneumothorax)

---

1. Universal Patient Care

### Basic Care Guidelines

2. Place patient in position of comfort

### Advanced Care Guidelines

3. Monitor ECG
4. Monitor EtCO<sub>2</sub>:
  - a. Reading of less than 25 mmHg may be a sign of poor perfusion
5. Perform needle decompression; refer to [Needle Thoracostomy](#)

# Obstructive Shock (Pulmonary Embolism)

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Place patient in position of comfort
3. Consider Aspirin 324 mg:
  - a. Amount may be reduced if patient has already taken Aspirin within the past 12 hours for a total of 324 mg

### Advanced Care Guidelines

4. Monitor ECG
5. Monitor EtCO<sub>2</sub>:
  - a. Reading of less than 25 mmHg may be a sign of poor perfusion
6. Establish IV/IO access:
  - a. Administer NS or LR:
    - i. Adult: 500 mL rapid boluses, up to 20 mL/kg:
      1. Discontinue if:
        - a. Systolic blood pressure of 90 mmHg or MAP of 65 is reached, or pulmonary edema develops
    - ii. Pediatric: refer to length-based tape
7. Consider Push-Dose Epinephrine:
  - a. 10-20 mcg IV/IO
    - i. Used as a bridge until vasopressor infusion
8. Consider Norepinephrine infusion:
  - a. Adult: 1-30 mcg/min IV/IO [4 mg in 250 mL D5W (16 mcg/mL)]:
    - i. Use infusion pump
    - ii. Initiate 1 mcg/min and titrate to maintain a systolic blood pressure of 90 mmHg or MAP of 65
    - iii. Label bag with orange medication label
  - b. Pediatric: 0.01-0.3 mcg/kg/min; consult medical control
9. Consider the following:
  - a. Antiemetic; refer to [Nausea and Vomiting](#)
  - b. Analgesia; refer to [Pain Management](#)

# Distributive Shock (Neurogenic)

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Place patient in supine position
3. Avoid heat loss

### Advanced Care Guidelines

4. Monitor ECG
5. Monitor EtCO<sub>2</sub>:
  - a. Reading of less than 25 mmHg may be a sign of poor perfusion
6. Establish IV/IO access:
  - a. Administer NS or LR:
    - i. Adult: 500 mL rapid boluses, up to 20 mL/kg:
      1. Discontinue if:
        - a. Systolic blood pressure of 90 mmHg or MAP of 65 mmHg is reached, or pulmonary edema develops
    - ii. Pediatric: refer to length-based tape
7. Consider Push-Dose Epinephrine:
  - a. 10-20 mcg IV/IO
    - i. Used as a bridge until vasopressor infusion
8. Consider Norepinephrine infusion:
  - a. Adult: 1-30 mcg/min IV/IO [4 mg in 250 mL D5W (16 mcg/mL)]:
    - i. Use infusion pump
    - ii. Initiate 1 mcg/min and titrate to maintain a systolic blood pressure of 90 mmHg or MAP of 65
    - iii. Label bag with orange medication label
  - b. Pediatric: 0.01-0.3 mcg/kg/min; consult medical control
9. If symptomatic bradycardia is present and does not respond to the treatments above, consider:
  - a. Atropine:
    - i. Adult: 1 mg IV/IO, every 5 minutes if indicated, up to 3 mg
  - b. Transcutaneous pacing

## Distributive Shock (Septic)

---

### 1. Universal Patient Care

#### Basic Care Guidelines

2. If temperature is over 102°F/38.9°C:
  - a. Cool patient

#### Advanced Care Guidelines

3. Monitor ECG
4. Monitor EtCO<sub>2</sub>:
  - a. Reading of less than 25 mmHg may be a sign of poor perfusion
5. Establish IV/IO access:
  - a. Administer NS or LR:
    - i. Adult: 500 mL rapid boluses, up to 20 mL/kg:
      1. Discontinue if:
        - a. Systolic blood pressure of 90 mmHg or MAP of 65 mmHg is reached, or pulmonary edema develops
    - ii. Pediatric: refer to length-based tape
6. Consider Push-Dose Epinephrine:
  - a. 10-20 mcg IV/IO
    - i. Used as a bridge until vasopressor infusion
7. Consider Norepinephrine infusion:
  - a. Adult: 1-30 mcg/min IV/IO [4 mg in 250 mL D5W (16 mcg/mL)]:
    - i. Use infusion pump
    - ii. Initiate 1 mcg/min and titrate to maintain a systolic blood pressure of 90 mmHg or MAP of 65
    - iii. Label bag with orange medication label
    - iv. Septic patients may require higher doses to maintain systolic blood pressure
  - b. Pediatric: 0.01-0.3 mcg/kg/min; consult medical control
8. Consider Diphenhydramine:
  - a. Adult: 25-50 mg IM/IV

# Trauma

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# Burns

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## 1. Universal Patient Care

### Basic Care Guidelines

2. General burn care:
  - a. Stop the burning process
  - b. Continually monitor airway for evidence of obstruction or impending obstruction:
    - i. High-flow O<sub>2</sub> should be considered for any burn patient rescued from an enclosed space
  - c. Remove smoldering clothing and jewelry and expose the area
  - d. Estimate percent of body surface area injured (BSA) using the “Rule of 9’s” and depth of injury:
    - i. First-degree/superficial burns are not included in TBSA calculations
  - e. Do not use any type of ointment, lotion, or antiseptic
  - f. Leave blisters intact
  - g. Cover the burned area loosely with a dry dressing and/or plastic wrap
  - h. Maintain normal body temperature
3. Chemical burns:
  - a. Don the appropriate PPE and attempt to identify contaminant
  - b. Brush off powders prior to flushing
  - c. Immediately begin to flush with large amounts of water:
    - i. Continue flushing while en route to the receiving facility (do not contaminate uninjured areas while flushing)
4. Toxin in eye:
  - a. Flood eye(s) with lukewarm water and have patient blink frequently during irrigation:
    - i. Use caution not to contaminate other eye or body areas
  - b. Attempt to identify contaminant

### Advanced Care Guidelines

5. Establish IV/IO
6. For severe burns, administer:
  - a. NS or LR:
    - i. Adult: 500 mL
    - ii. Pediatric: 20 mL/kg, not to exceed 500 mL
  - b. Contact medical control for further fluid administration
7. Electrical burn:
  - a. Monitor ECG
8. Consider analgesia; refer to [Pain Management](#)

# Abdominal & Chest Trauma

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Manage any external bleeding; refer to [Hemorrhage Control](#)
3. Abdominal evisceration:
  - a. Cover with a sterile saline-soaked dressing
4. Impaled objects:
  - a. Leave in place
  - b. Stabilize with bulky dressings
5. Open chest wounds:
  - a. Seal immediately with a chest seal

### Advanced Care Guidelines

6. Symptomatic pneumothorax:
  - a. Perform needle decompression; refer to [Needle Thoracostomy](#)
7. Establish IV access if indicated
8. Consider analgesia; refer to [Pain Management](#)

# Extremity Trauma & Amputations

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Manage any external bleeding; refer to [Hemorrhage Control](#)
3. Remove or cut away clothing and jewelry
4. Stabilize suspected fractures/dislocations
5. Do not intentionally replace any protruding bones
6. Apply cold pack to area of pain or swelling
7. If severe deformity of the distal extremity is cyanotic or lacks pulses, align with gentle traction before splinting and transport immediately
8. Amputations:
  - a. Locate amputated part if possible:
    - i. Transport with patient for possible reimplantation
  - b. Place amputated part in a plastic bag:
    - i. Place bag with amputated part on ice in a second bag if possible:
      1. Do not let amputated part come into direct contact with ice

### Advanced Care Guidelines

9. Establish IV access if indicated
10. Consider analgesia; refer to [Pain Management](#)

# Head, Neck, and Facial Trauma

---

## 1. Universal Patient Care

### Basic Care Guidelines

2. Manage any external bleeding; refer to [Hemorrhage Control](#)
3. Place head in a neutral in-line position unless the patient complains of pain or there is difficulty with movement to an in-line position
4. Monitor airway:
  - a. Provide suctioning of secretions or vomit as needed
  - b. Impaled objects in the cheek may only be removed if causing airway problems or with difficulty controlling bleeding
5. Head injury:
  - a. Apply a moist sterile dressing to any potential open skull injury
  - b. Severe injury:
    - i. Elevate head of bed 30 degrees
6. Eye injury:
  - a. If globe is avulsed, do not put back into socket:
    - i. Cover with a moist dressing
  - b. Place eye shield over injury
7. Epistaxis:
  - a. Have patient lean forward
  - b. Squeeze nose (or have patient do so) for 10-15 minutes continuously
8. Avulsed tooth:
  - a. Avoid touching the root of the avulsed tooth
  - b. If dirty, rinse with saline for 10 seconds
  - c. Place in saline as the storage medium

### Advanced Care Guidelines

9. Establish IV access if indicated
10. Moderate/severe closed head injury:
  - a. Maintain a systolic blood pressure at or above 110 mmHg for patients over 10 years old:
    - i. Do not wait until after the patient is hypotensive to administer fluids
11. Consider analgesia; refer to [Pain Management](#)
12. Consider intubation (if GCS is less than 8 or airway cannot be maintained):
  - a. Monitor EtCO<sub>2</sub> and maintain between 35-40 mmHg

# Hemorrhage Control

---

## 1. Universal Patient Care

### Basic Care Guidelines

## 2. Manage bleeding:

- a. Expose the wound and apply direct pressure to bleeding site, followed by a pressure dressing
- b. Epistaxis:
  - i. Have patient lean forward and squeeze nose (or have patient do so) for 10-15 minutes continuously
- c. If direct pressure/pressure dressing is ineffective or impractical:
  - i. Apply a commercial 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:
      - a. If bleeding continues, place a second tourniquet proximal to the first
    2. For thigh wounds, consider placement of two tourniquets side-by-side, and tighten sequentially
- d. Wound packing (groin/axillary “junctional” injury or any limb wound with persistent bleeding despite direct pressure and/or application of commercial tourniquet):
  - i. Pack hemostatic gauze or regular gauze tightly and fully to the depth of the wound until bleeding stops:
    1. Pack around bone fragments or foreign objects
  - ii. Apply direct pressure and/or pressure dressing

### Advanced Care Guidelines

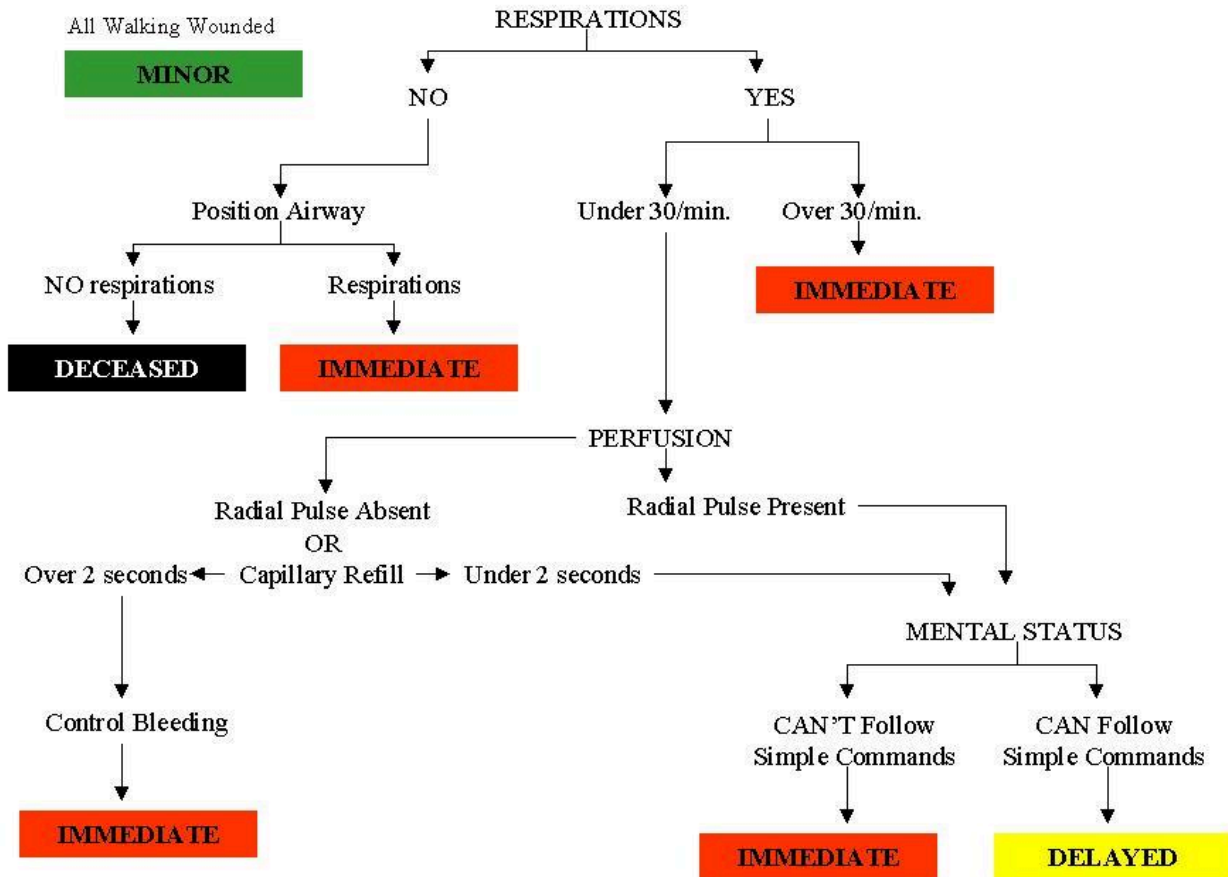
3. Bleeding with signs of hemorrhagic shock, consider TXA:
  - a. Adult: 1 g IV in 100 mL NS or D5W over 10 minutes or 1 g IM, divided into two 500 mg injections, administered into a large muscle
    - i. Must be within three hours of injury
    - ii. IV route preferred
4. Epistaxis, consider TXA:
  - a. 500 mg IN or gauze soaked in 500 mg and packed into nostril(s)
5. Consider analgesia; refer to [Pain Management](#)

# Spinal Motion Restriction

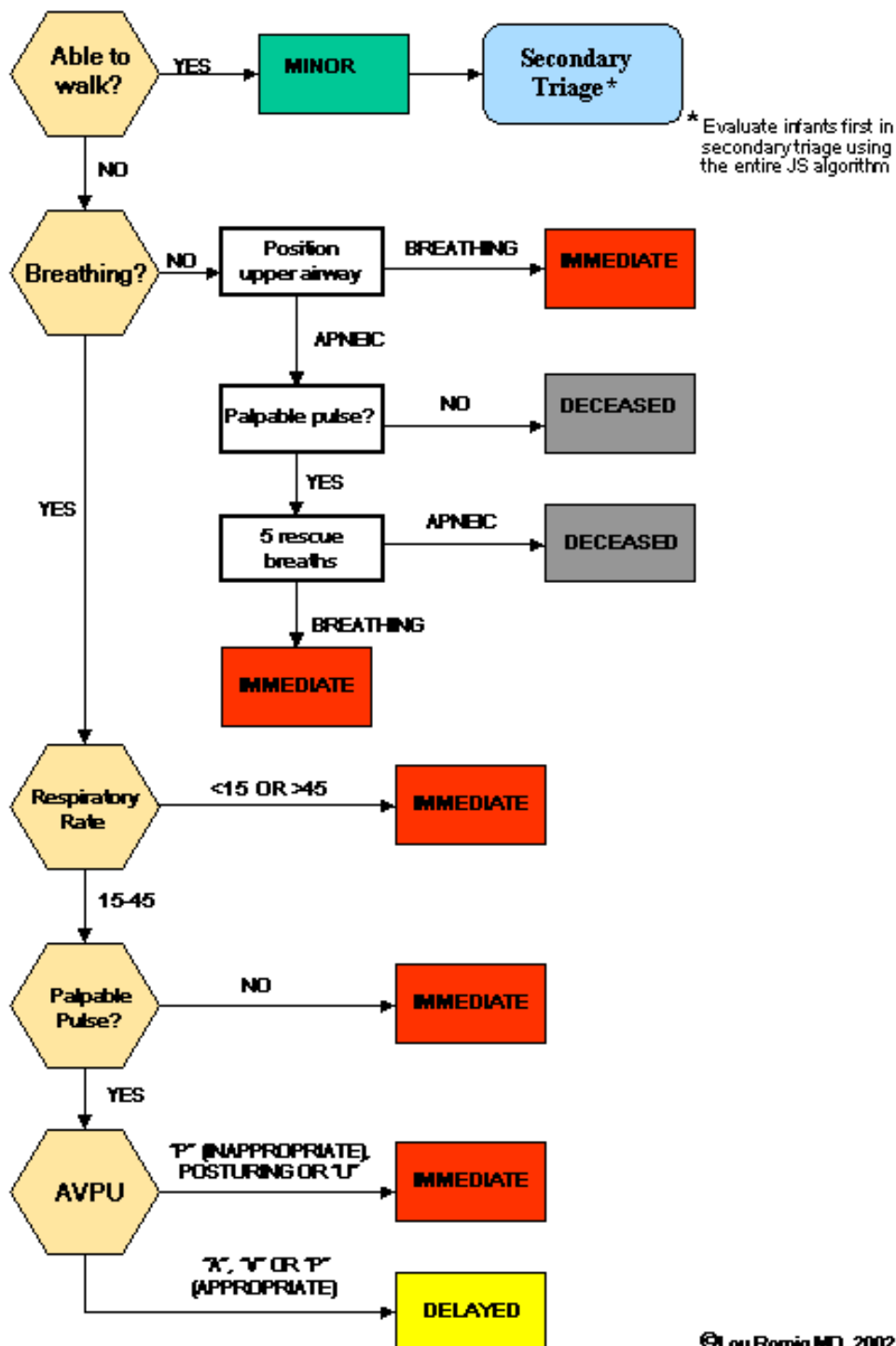
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1. Universal Patient Care
2. Place patient in a cervical collar if there are any of the following after a traumatic mechanism of injury:
  - a. Midline neck pain
  - b. Midline neck or spinal tenderness with palpation
  - c. Abnormal mental status
  - d. Focal or neurologic deficit
  - e. Evidence of alcohol or drug intoxication
  - f. Severe or painful distracting injury
  - g. Communication barrier that prevents accurate assessment
3. Patients with penetrating injury to the neck should not be placed in a cervical collar regardless of whether they are exhibiting neurologic symptoms or not (may lead to delayed identification of injury or airway compromise and has been associated with increased mortality)
4. Use spinal and cervical motion restriction and a long spine board *OR* full body vacuum splint *OR* scoop stretcher if:
  - a. Patient complains of midline back pain
5. Do not transport patients on rigid long boards unless the clinical situation warrants longboard use, such as:
  - a. Immobilization of multiple extremity injuries or an unstable patient where removal of a board will delay transport and/or other treatment priorities
6. If extrication is required from a vehicle:
  - a. After placing a cervical collar, if indicated, adults should be allowed to self-extricate
  - b. 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
7. Helmet removal:
  - a. Remove face mask, followed by manual removal of helmet while keeping the neck manually immobilized
  - b. Occipital and shoulder padding should be applied as needed, with the patient in a supine position to maintain neutral cervical spine positioning
  - c. If available, utilize athletic trainers on scene who have been trained in these specific situations to help prepare the patient for EMS transport

# Trauma Triage - START



# Trauma Triage - JumpSTART



## PROCEDURES

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## Medical Procedures

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# Bilevel Positive Airway Pressure

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## Indications

1. Dyspnea or Hypoxemia secondary to congestive heart failure (CHF)
2. Chronic obstructive pulmonary disease (COPD)
3. Shortness of breath without improved oxygenation with the use of less invasive adjuncts

## Contraindications

1. Pneumothorax
2. Tracheostomy
3. Respiratory arrest
4. Agonal respirations
5. Unconsciousness
6. Shock associated with cardiac insufficiency
7. Penetrating chest trauma

## Precautions

1. Impaired mental status
2. Facial anomalies (facial trauma or stroke obtundation)
3. Active GI bleeding or history of recent gastric surgery
4. Nausea or vomiting
5. Excessive secretions

## Procedure

1. Place patient in a sitting position
2. Explain procedure to patient
3. Connect ventilator circuit and oxygen hose
4. Place mask on patient's face and secure with manufacturer's head strap
5. Ensure placement of EtCO<sub>2</sub> adapter in circuit
6. Set breath rate to 12, adjust as needed
7. Initiate at 10/5, titrate as needed to a maximum of 16/10
8. Monitor for mental status, tolerance, and decompensation

# Continuous Positive Airway Pressure (CPAP)

---

## Indications

1. Dyspnea or Hypoxemia secondary to congestive heart failure (CHF)
2. Chronic obstructive pulmonary disease (COPD)
3. Respiratory distress due to asthma, pulmonary edema, or pneumonia

## Contraindications

1. Pneumothorax
2. Tracheostomy
3. Respiratory arrest
4. Agonal respirations
5. Unconsciousness
6. Shock associated with cardiac insufficiency
7. Penetrating chest trauma
8. Blood pressure below 90 systolic

## Precautions

1. Impaired mental status
2. Facial anomalies (facial trauma or stroke obtundation)
3. Active GI bleeding or history of recent gastric surgery
4. Nausea or vomiting
5. Excessive secretions

## Procedure

1. Place patient in a sitting position
2. Explain procedure to patient
3. Connect mask to oxygen tubing with 10 lpm oxygen
4. Place mask on patient's face and secure with manufacturer's head strap
5. Adjust PEEP as indicated

## Special Notes

1. Do not use in children under 12 years old
2. Most patients will improve in 5-10 minutes:
  - a. If there is no improvement, consider bag valve mask ventilation

# ECG 12-Lead Acquisition and Monitoring

---

## Indications

1. Chest pain or pressure in any patient over age 25
2. Syncopal episode in any patient over age 25
3. Unexplained respiratory distress
4. Shoulder, arm, or jaw pain in the absence of chest pain in patients with past cardiac history or irregular pulse
5. Suspected Stroke

## Contraindications

1. On scene 12-Lead ECG acquisition of the unstable patient
2. On scene 12-Lead ECG acquisition of the critically unstable trauma patient

## Procedure

1. Turn monitor “ON” and ensure ECG cables are appropriately connected
2. Prepare patient’s skin for electrode application:
  - a. Shave excessive hair at the electrode site
  - b. Clean oily or dirty skin with an alcohol pad, then dry briskly
3. Position electrodes on patient:
  - a. Avoid placing electrodes over tendons and major muscle masses
4. Electrode placement:
  - a. RA - Right arm
  - b. RL - Right leg
  - c. LA - Left arm
  - d. LL - Left leg
  - e. V1 - Fourth intercostal space, right sternal border
  - f. V2 - Fourth intercostal space, left sternal border
  - g. V3 - Equidistant between V2 and V4
  - h. V4 - Fifth intercostal space, left midclavicular line
  - i. V5 - Fifth intercostal space, left anterior axillary line
  - j. V6 - Fifth intercostal space, left midaxillary line
5. Acquisition:
  - a. Encourage the patient to relax all muscles and remain as still as possible
  - b. Enter patient demographics on the monitor and push button to acquire
  - c. If capability exists, transmit to the receiving hospital
  - d. When a STEMI is present, transport emergently to a receiving facility with interventional cath lab capabilities

# Endotracheal Intubation

---

## OROTRACHEAL

### Indications

1. Airway control needed as a result of respiratory or cardiac arrest

### Procedure

1. Assemble all necessary equipment
2. Preoxygenate patient for 2-3 minutes with 100% oxygen
3. Position patient in sniffing position (maintain manual in-line stabilization for suspected or known cervical spine trauma)
4. Insert the laryngoscope blade into the right side of the mouth and displace the tongue to the left
5. Gently lift the long axis of the laryngoscope handle until you can visualize the glottic opening and the vocal cords
6. Insert the ET tube through the right corner of the mouth:
  - a. Advance tube till the cuff lies just below the vocal cords
  - b. Remove stylet or bougie
7. Inflate the distal cuff of the ET tube and immediately detach the syringe from the inflation port
8. Placement confirmation:
  - a. Direct visualization of tube passing through the vocal cords
  - b. Observation of bilateral chest rise and fall with each ventilation
  - c. Auscultation over both lungs and epigastrium
  - d. Positive end-tidal capnography
9. Secure the endotracheal tube with a commercial tube holder and note the depth of the ET tube at the patient's teeth
10. A maximum of 3 intubation attempts may be made:
  - a. If orotracheal intubation is not achieved and the patient has no contraindications, place a supraglottic airway

## NASOTRACHEAL

1. Contact medical control

## i-gels

---

### Indications

1. Airway management in cardiac arrest
2. Inability to intubate when rapid control of airway is essential

### Contraindications

1. Intact gag reflex
2. Inability to open the patient's mouth because of trauma, dislocation of the jaw, or a pathologic condition

### Procedure

1. Preoxygenate patient
2. Select appropriately sized i-gel according to patient's weight
3. Remove i-gel from packaging and protective cradle
4. Lubricate back, sides, and front of the cuff with a thin layer of lubricant
5. Place patient in sniffing position
6. Gently press chin down to open airway
7. Position i-gel so that the cuff outlet faces toward the patient's chin
8. Insert soft tip of i-gel into patient's mouth, directing toward the hard palate
9. Glide i-gel downward along the hard palate with a continuous push until a definitive resistance is felt:
  - a. Do not apply excessive force on the device during insertion
  - b. If early resistance is felt:
    - i. Apply jaw thrust maneuver or insert with deep rotation
10. Secure i-gel with manufacturer's strap
11. Ventilate patient and confirm chest rise and breath sounds
12. Attach capnography (if available)

# Intranasal Medication Administration

---

## Indications

1. Overdose with no IV access
2. Pain control with no IV access
3. Seizures
4. Sedation for medical procedures or behavioral problems

## Contraindications

1. Excessive blood in or bleeding from the nose
2. Impeding nasal trauma

## Procedure

1. Assess the patient to ensure the nasal cavity is free of blood or mucous:
  - a. If blood or mucus is present:
    - i. Suction the nose prior to delivery or choose a different method to deliver the medication
2. Draw up an appropriate dose of approved medication:
  - a. Draw up an extra 0.1 mL of medication to account for MAD dead space
  - b. Ensure volume does not exceed 1mL per nare
3. Insert MAD into nostril and apply half the medication:
  - a. Briskly compress syringe:
    - i. Not briskly compressing the syringe will fail to atomize the medication, resulting in a steady flow of liquid that will run into the patient's throat
4. Repeat in other nostril with remainder of the medication
5. Assess patient's response to the medication:
  - a. Onset is usually within 3-5 minutes, with a peak in 10-20 minutes
  - b. Some medications, especially Midazolam, may cause an uncomfortable burning sensation in the nares, which generally resolves in 30-45 seconds and should be explained to the patient
6. Consider the need for IV/IO access if vital signs become unstable or patient has an immediate need for other medications or fluids

# Intraosseous Vascular Access

---

## Indications

1. Immediate vascular access in emergencies or cardiac arrest
2. Intravenous fluids or medications are urgently needed, and peripheral IV cannot be established in 2 attempts or 90 seconds, and the patient exhibits one or more of the following:
  - a. Altered mental status:
    - i. GCS of 8 or less
  - b. Respiratory compromise:
    - i. SpO2 90% or less after appropriate oxygen therapy
    - ii. Respiratory rate of less than 10 or greater than 40
  - c. Hemodynamic instability:
    - i. Systolic blood pressure of less than 90 mmHg

## Contraindications

1. Fracture or infection at the site selected for IO infusion (consider alternate site)
2. Excessive tissue at the insertion site with the absence of anatomical landmarks
3. Previous significant orthopedic procedures, IO within 24 hours, prosthesis
4. Previous failed IO attempts in the same bone

## Procedure

1. If the patient is conscious, advise of the emergent need for this procedure and obtain informed consent
2. Locate appropriate insertion site:
  - a. Proximal Tibia, Proximal Humerus, Distal Tibia
3. Cleanse insertion site
4. Prepare supplies:
  - a. Unlock clamp and prime extension set
  - b. Attach appropriate size needle to power driver and remove safety cap
5. Push needle set through skin until tip rests against bone, squeezing the trigger and applying gentle, steady pressure:
  - a. Immediately release the trigger when you feel a sudden “give” or loss of resistance as the needle set enters the medullary space
6. Stabilize needle set hub, disconnect driver, and remove stylet:
  - a. Place stylet in sharps block
  - b. Apply stabilizer dressing
7. Confirm placement
8. Administer an appropriate dose of Lidocaine 2% to conscious patients
9. Attach primed extension set to cannula hub and flush
10. Begin fluid and/or medication administration:
  - a. Utilize pressure bag or infusion pump for continuous infusions if indicated

# Mechanical Ventilation (VOCSN)

---

## Interfacility Transfer Procedure

1. For intubated patients:
  - a. Leave patient on hospital vent and transport RT with patient
  - b. Initiate hospital vent settings, adjust as needed to meet target vital signs

## ICAS Vent Procedure

1. Suggested guidelines (titrate each setting per patient as needed according to physiology and/or pathology that's present):
  - a. Verify ETT or Supraglottic airway tube placement
  - b. Establish continuous ETCO<sub>2</sub> monitoring
  - c. Assess effectiveness of sedation
  - d. Calculate ideal body weight using IBW chart or Broselow tape
  - e. Tidal Volume 6-8 mL/kg, titrate as needed
  - f. Breathing Rate:
    - i. Adult: 10-18 breaths per minute
    - ii. Pediatrics: 16-20 breaths per minute
  - g. Peep 5 cmH<sub>2</sub>O
    - i. Pneumonia, ARDS, pulmonary edema: 7-12 cmH<sub>2</sub>O
    - ii. Severe refractory bronchospasm: 0 cmH<sub>2</sub>O
  - h. Inspiratory/Expiratory ratio:
    - i. 1:1-1:4
      1. May need longer expiratory phase for asthma/COPD
  - i. FiO<sub>2</sub> 100% initially, titrate down while maintaining SpO<sub>2</sub> of 93%-96%
  - j. Maintain Plateau Pressure of less than 30 cmH<sub>2</sub>O
  - k. Maintain EtCO<sub>2</sub> 35-45 mmHg, monitor waveform capnography
2. If unable to maintain SPO<sub>2</sub> or ETCO<sub>2</sub>:
  - a. May need to use 100% FIO<sub>2</sub> and manual ventilation

# Needle Cricothyrotomy

---

## Indications

1. Inability to ventilate patient by any other means
2. Massive maxillofacial trauma
3. Inability to open patient's mouth
4. Uncontrolled oropharyngeal bleeding

## Contraindications

1. Severe airway obstruction above site of catheter

## Procedure

1. Attach a 14-16 gauge IV catheter to a 10 mL syringe with 3 mL saline
2. Place the patient's head in a neutral position
3. Stabilize the thyroid cartilage and locate the cricothyroid membrane
4. Cleanse the area
5. Insert the catheter just below the midpoint of the cricothyroid membrane with the needle at a 45-degree angle caudally
6. Aspirate with the syringe to determine correct catheter placement
7. Withdraw the needle while advancing the plastic catheter into the trachea
8. Attach #3 ETT End to catheter
9. Secure catheter
10. Attach hub of catheter to a prepared ventilation device:
  - a. Ventilate at a rate of 12 breaths per minute at a 1:4 ratio to allow for exhalation

## QuickTrach Procedure

1. Hyperextend head/neck to make landmarks prominent
2. Stabilize the thyroid cartilage and locate the cricothyroid membrane
3. Cleanse the area
4. Insert device at a 90° angle in the midline while aspirating
5. Once air is aspirated (confirming tracheal entry), drop the angle to 45° caudally
6. Remove stopper
7. Withdraw metal needle while advancing plastic cannula forward
8. Use provided neck strap to secure flange to neck
9. Attach 15 mm connector to device and attach a BVM to connector

# Needle Thoracostomy

---

## Indications

1. Tension Pneumothorax
2. Absent or significantly decreased breath sounds over the hemothorax area
3. Trachea shifted to unaffected side and/or JVD
4. Subcutaneous emphysema
5. Multiple rib fractures with respiratory compromise

## Procedure

1. Prepare and assemble all necessary equipment
2. Expose anterior chest at level of the 2nd intercostal space on the affected side
3. Locate 2nd intercostal space midclavicular line with gloved finger
4. Cleanse site
5. Using ARS direct needle into the 2nd intercostal space at the midclavicular line or into the 5th intercostal space at the midaxillary line (preferred):
  - a. Apply enough pressure to push the needle through the intercostal muscle and into the pleural cavity
  - b. A release of air is a sign of positive placement
6. Remove the needle, leaving catheter in place
7. Secure catheter
8. Assess patient for improvement in status

# Rapid Sequence Intubation

---

## Indications

1. Uncontrolled, obstructed, or inadequate airway secondary to trauma or overdose when sedation is needed
2. Decreased level of consciousness, combativeness, or severe agitation secondary to trauma or suspected CVA
3. CHF, COPD, or asthma patient with hypoxia and or respiratory exhaustion who cannot be orally intubated without sedation
4. Burn patient with potential or existing respiratory compromise

## Procedure

1. Follow [Endotracheal Intubation](#) procedure
2. Preoxygenate patient for 3 minutes
3. Consider administering pain management:
  - a. Fentanyl: 0.5-2 mcg/kg IV/IO
    - i. Consider lower dosing or avoidance for hypotensive or significantly unstable patients
4. Administer sedative, consider one of the following:
  - a. Ketamine: 1-2 mg/kg IV/IO
    - i. Consider decreased dosing in hypotensive or significantly unstable patients
    - ii. Consider Etomidate in severe hypertension (SBP > 180) and/OR tachycardia (HR > 150)
  - b. Etomidate: 0.3 mg/kg IV/IO
    - i. Consider Ketamine in seizure and severe sepsis
5. Administer paralytic:
  - a. Rocuronium:
    - i. Adult: 1 mg/kg IV/IO
      1. 100 mg IV/IO is appropriate in standard adult patients if difficult to estimate weight
    - ii. Pediatric: 1.2 mg/kg IV/IO
6. If bradycardia occurs, pause and assist ventilation with BVM and 100% oxygen
7. If the patient remains bradycardic, consider ACLS/PALS algorithm:
  - a. Atropine:
    - i. Adult: 1 mg IV/IO
    - ii. Pediatric: 0.02 mg/kg IV/IO, not to exceed 1 mg
8. For continued sedation, consider one of the following:
  - a. Midazolam: 2-5 mg IV/IO, over 1-2 minutes to desired effect, maximum 10 mg in a 30 minutes, use caution in patients who are hypotensive
  - b. Ketamine: 0.5 mg/kg IV/IO every 10 minutes as needed, up to 200 mg

# Synchronized Cardioversion

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## Indications

1. Unstable tachycardia

## Precautions

1. Risk of thromboembolic complications (e.g., stroke) in patients with a history of atrial fibrillation duration greater than 48 hours

## Procedure

1. Consider procedural sedation; refer to [Midazolam](#)
2. Turn on defibrillator
3. Attach monitor leads to the patient
4. Place defibrillation pads on the patient as directed by the manufacturer
5. Engage the synchronization mode by pressing the “sync” control button
6. Look for markers on the “R” waves indicating sync mode
7. If necessary, adjust monitor size until sync markers occur with each R wave
8. Set initial joules:
  - a. Supraventricular Tachycardia:
    - i. Adult: 100 J
    - ii. Pediatric: 0.5 J/kg
  - b. Ventricular Tachycardia:
    - i. Adult: 100 J
    - ii. Pediatric: 1 J/kg
  - c. Uncontrolled Atrial Fibrillation or Atrial Flutter:
    - i. Adult: 200 J
9. Announce to team members: “Charging defibrillator...stand clear”
10. Press “Charge” button
11. When the defibrillator is charged, announce the shock
12. Press and hold the “shock” button
13. If tachycardia persists, increase the joules in a stepwise fashion, 100 J, 120 J, 150 J, 200 J, consult medical direction
14. Remember to reset the sync mode after each synchronized cardioversion:
  - a. Most defibrillators default back to the unsynchronized mode (this default allows defibrillation if the cardioversion produces ventricular fibrillation):
    - i. If sync is retained and the patient is in ventricular fibrillation, shut it off to administer an unsynchronized shock

# Transcutaneous Cardiac Pacing

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## Indications

1. Profound bradycardia with hemodynamic compromise

## Contraindications

1. Severe hypothermia is a relative contraindication:
  - a. Bradycardia is a normal response to the decreased metabolic rate that occurs with hypothermia:
    - i. Electrical stimulation from TCP may cause asymptomatic bradyarrhythmias to degenerate into more life-threatening arrhythmias

## Special Considerations

1. Patients with implantable pacemakers may require higher energy and rate

## Procedure

1. Consider procedural sedation if time allows and patient is stable enough to wait; refer to [Midazolam](#)
2. Apply pads according to manufacturer's recommendations
3. Turn on pacemaker
4. Set rate at 60-80 bpm start amperage at 0 mA
5. Increase the output in 10 mA increments until mechanical capture occurs:
  - a. Assess the patient for both mechanical and electrical capture:
    - i. Following capture, back amperage down in increments of 2-5 mA to ensure lowest possible setting
    - ii. Adjustment of amperage to maintain capture may be necessary with prolonged pacing or with increased discomfort of the patient
6. If at any point the patient goes into either ventricular fibrillation or ventricular tachycardia:
  - a. Shut pacing off and defibrillate the patient

# Operational Procedures

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# Air Medical Transport

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## Indications

1. Advanced level of care need (skills or medications) exists that could be made available more promptly with an air medical tier versus ground ALS service, and further delay would likely jeopardize the outcome of the patient
2. Transport time to a definitive care hospital can be significantly reduced for a critically ill or injured patient where saving time is in the best interest of the patient
3. Multiple critically ill or injured patients at the scene where the needs exceed the means available
4. EMS Provider 'index of suspicion' based upon mechanism of injury and patient assessment

## Difficult Access Situations

1. Wilderness or water rescue assistance needed
2. Road conditions impaired due to weather, traffic, or road construction/repair
3. Other locations difficult to access

# Firefighter Rehab

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## Purpose

To ensure that the physical and mental condition of members operating at the scene of an emergency or a training exercise does not deteriorate to a point that affects the safety of each member or that jeopardizes the safety and integrity of the operation

## Rehabilitation Area

The Incident Commander will establish a Rehabilitation Area when conditions indicate that rest and rehabilitation are needed for operating personnel:

1. Emergency operation or training evolution rehabilitation areas should:
  - a. Be far enough away from the scene that members may safely remove their turnout gear, and SCBA providing physical and mental rest from the stress and pressures of the operation
  - b. Provide suitable protection from the prevailing environmental conditions
  - c. Enable members to be free of exhaust fumes from apparatus, vehicles, or equipment (including those involved in the Rehabilitation Operations)
  - d. Be large enough to accommodate multiple crews based on the size of the incident and easily accessible by EMS units

## Guidelines

1. Hydration: Members should consume at least a quart per hour of 50/50 mixture water and commercial activity beverage during strenuous activity with care to avoid carbonated and caffeinated beverages prior to and during the event
2. Nourishment: Food shall be provided for incidents engaging three or more hours; preference is given to quickly digested foods like soup or stew; fruits for energy replacement are advised; fatty and/or salty foods should be avoided
3. Rest: Firefighters having worked through two full 30-minute rated bottles or for 45 minutes shall go to rehabilitation for a minimum of 10 minutes and consume at least 8 ounces of fluid
4. Recovery: Members should not be moved directly from a hot environment into an air-conditioned space, as this may cause the body's cooling mechanisms to stop functioning properly; closely monitor members that have taken medications that impair the ability to sweat, such as antihistamines, diuretics, or stimulants
5. Evaluation: Heart rate should be measured for 30 seconds as early as possible in the rest period; if a member's heart rate exceeds 110 bpm, an oral temperature should be taken; if the member's temperature exceeds 100.6 F, he/she should not be permitted to wear protective equipment; if it is below 100.6 F and the heart rate remains above 110 bpm, rehabilitation time should be increased; if heart rate is less than 110 bpm, chance of heat stress is negligible
6. Document all medical evaluations and submit to Incident Commander

## **Mandatory Reporting (Suspected Abuse, Assault, Neglect)**

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### Procedure

1. Contact local law enforcement if not present
2. Provide reassurance
3. Do not burden patient with questions about the details of the incident
4. Provide appropriate medical care per protocol
5. Be alert to immediate scene and document what you see:
  - a. Touch only what you need to touch at the scene
  - b. Do not disturb any evidence unless necessary for treatment of patient:
    - i. If necessary to disturb evidence, document why and how it was disturbed
6. Preserve evidence, such as clothing that was removed for treatment, and make sure that it is never left unattended at any time to preserve "chain of evidence"
7. Provide local referrals as available
8. During radio report communicate vital information only; additional info can be given to the receiving nurse and/or physician on arrival
9. Only document objective information on run report
10. Provide an oral report for all suspected abuse within 24 hours of contact with the patient to the pediatric and dependent adult hotline at 1-800-362-2178

## Organ and Tissue Donation

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### Procedure

1. All appropriate patient care protocols will be enacted to ensure patient care is provided according to prevailing standards
2. If resuscitation efforts are unsuccessful or if, upon arrival, the patient is deceased and without indications to initiate resuscitation, then online medical direction will be contacted to confirm that no further medical care is to be given
3. As per Iowa Code 142C.7, a medical examiner or a medical examiner's designee, peace officer, firefighter, or emergency medical care provider may release an individual's information to an organ procurement organization, donor registry, or bank or storage organization to determine if the individual is a donor
4. As per Iowa Code 142C.7, any information regarding a patient, including the patient's identity, however, constitutes confidential medical information and, under any other circumstances, is prohibited from disclosure without the written consent of the patient or the patient's legal representative
5. At least one EMS provider should remain at the scene until the appropriate authority (medical examiner, funeral home, public safety, etc.) is present
6. Contact Iowa Donor Network at 800-831-4131

# Patient Restraint

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## Inclusion Criteria

1. Patients of all ages who are exhibiting agitated or violent behavior are a danger to themselves or others and, in the sole assessment of the EMS clinician, require physical restraint to mitigate injury to themselves or others

## Exclusion Criteria

1. Patients exhibiting agitated or violent behavior due to medical conditions including but not limited to:
  - a. Head Injury
  - b. Metabolic disorders (i.e., hypoglycemia, hypoxia)

## Procedure

1. Do not attempt to enter or control a scene where active physical violence or weapons are present:
  - a. If not already done so, dispatch law enforcement immediately to secure and maintain scene safety
2. Attempt verbal de-escalation
3. Place patient in sitting position
4. Secure patient using soft restraints:
  - a. Patients who are more physically uncooperative should be physically secured with one arm above the head and other arm below the waist with both lower extremities individually secured
  - b. Sheets may be utilized if additional restraint is needed by being placed around the lower lumbar region, below the buttocks, and over the thighs, knees, and legs
  - c. EMS clinicians should not transport patients with key-locking devices (handcuffs) in place unless the agency who placed them accompanies the patient to the hospital
5. Unacceptable restraint methods:
  - a. At no time should the patient be transported in the prone position with or without hands and feet behind the back (hobbling or “hog-tying”)
  - b. No techniques or devices that constrict the neck or compromise the airway should be used
  - c. No cot straps or devices should restrict chest wall movement
6. Continuously monitor pulse, motor, and sensory function of restrained extremities
7. Patients who require physical management should also receive pharmacological treatment from an ALS provider

## Physician On Scene

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Your offer of assistance is appreciated. However, this EMS service operates under the direct authority of a physician medical director, under law, and in accordance with nationally recognized standards of care in emergency medicine. Our medical director and physician designees have already established a physician-patient relationship with this patient. Please comply with our established protocols to ensure the best possible patient care and prevent inadvertent patient abandonment or interference with an established physician-patient relationship.

**Review the following if you wish to assume responsibility for this patient:**

1. You must be recognized or identify yourself as a qualified physician
2. You must be able to provide proof of licensure and identify your specialty
3. If requested, you must speak directly with the on-line medical control physician to verify transfer of responsibility for the patient from that physician to you
4. EMS personnel, in accordance with state law, can only follow orders that are consistent with the approved protocols
5. You must accompany this patient to the hospital unless the online medical control physician agrees to re-assume responsibility for this patient prior to transport

## Special Events

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### Purpose

1. To offer guidance for EMS providers when delivering on-site medical coverage at special events, such as recreational activities and community celebrations

### Assessment

1. The EMS provider shall assess the patient as the patient's condition indicates:
  - a. All patients exhibiting changes in mental status or abnormal vital signs shall have an ALS assessment and/or ambulance requested

### First Aid Treatment

1. Only treatments that can be performed by someone with minimal medical training, such as first aid, should be carried out:
  - a. If emergency treatment is needed or requested, an ambulance should be requested immediately if not already present
2. At certain special events, OTC medications may be available for use:
  - a. These shall be documented in the First Aid OTC Log
  - b. OTC medications are only provided as a courtesy; providers should not assist the patient with administration when providing First Aid

### First Aid Supplies

1. Only supplies and medications that can be obtained over the counter or in a basic first aid kit shall be used

### First Aid Log

1. When possible, first aid treatment shall be documented in a First Aid Log to include patient's name, address, complaint, vital signs, treatment, and disposition

### Special Event Reports

1. A Special Event Report should be completed following each event and submitted to the EMS Director:
  - a. The report should include:
    - i. EMS Service, providers, number of patients, supplies used, date of event, location of event, and time event started/ended
    - ii. First Aid Log
2. Anytime a patient refusal is necessary, or ambulance transport is required, a dispatch number should be assigned, and an ePCR shall be completed

## Special Needs Patients

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### Purpose

1. To be used when an EMS provider, responding to a call, is confronted with a patient using specialized medical equipment that the EMS provider has not been trained to use and when the operation of that equipment is outside of the EMS provider's scope of practice
2. This protocol is not intended for interfacility transfers

### Procedure

1. EMS providers may treat and transport the patient as long as the EMS provider doesn't monitor or operate the equipment in any way while providing care:
  - a. EMS providers should consider utilizing a family member or caregiver who has experience using the equipment to help monitor and operate the special medical equipment if necessary during transport
2. When providing care to patients with special needs, EMS providers should only provide the necessary level of care within their training and certification

### Medical Device Examples

1. PCA (patient controlled analgesic)
2. Chest Tube

# Stroke Destination Decision

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## Procedure

1. Perform a validated stroke assessment (e.g., Cincinnati Stroke Scale)
2. If assessment is positive for stroke, and onset of symptoms can be established within the past 4.5 hours, transport directly to a primary stroke center
3. Consider the use of air transport if it will facilitate the arrival of the acute stroke patient for treatment within 4.5 hours to a primary stroke center
4. If transport to a primary stroke center or stroke-capable hospital cannot be achieved within 4.5 hours, then transport to the closest appropriate facility
5. In all instances, those patients requiring immediate hemodynamic or airway stabilization should be transported to the closest appropriate facility
6. Complete the fibrinolytic checklist; refer to [Fibrinolytic Checklist](#)

## Levels of Stroke Care Capacity

1. Comprehensive Stroke Center:
  - a. Certified by the Joint Commission
  - b. Accredited acute care hospitals must meet all the criteria for Primary Stroke Certification
2. Primary Stroke Center:
  - a. Certified by the Joint Commission on Hospital Accreditation or an equivalent agency to meet Brain Attack Coalition and American Stroke Association guidelines for stroke care
3. Stroke-Capable hospitals that have the following:
  - a. rt-PA readily available for administration
  - b. Head CT, laboratory, and ECG capabilities 24/7
  - c. Process for transporting patients to a primary stroke center
  - d. Protocols that follow American Stroke Association guidelines
  - e. Emergency department coverage by a physician or advanced practitioner

# Trauma Destination Decision

## Iowa Guideline for the Field Triage of Injured Patients

Adopted from the ACS National Guideline for the Field Triage of Injured Patients (2021)

### RED CRITERIA: High Risk for Serious Injury

Injury Patterns	Mental Status & Vital Signs
<ul style="list-style-type: none"> <li>• Penetrating injuries to head, neck, torso, and proximal extremities</li> <li>• Skull deformity, suspected skull fracture</li> <li>• Suspected spinal injury with new motor or sensory loss</li> <li>• Chest wall instability, deformity, or suspected flail chest</li> <li>• Suspected pelvic fracture</li> <li>• Suspected fracture of two or more proximal long bones</li> <li>• Crushed, degloved, mangled, or pulseless extremity</li> <li>• Amputation proximal to wrist or ankle</li> <li>• Active bleeding requiring a tourniquet or wound packing with continuous pressure</li> </ul>	<p>All Patients</p> <ul style="list-style-type: none"> <li>• Unable to follow commands (motor GCS &lt; 6)</li> <li>• RR &lt; 10 or &gt; 29 breaths/min</li> <li>• Respiratory distress or need for respiratory support</li> <li>• Room-air pulse oximetry &lt; 90%</li> </ul> <p>Age 0–9 years</p> <ul style="list-style-type: none"> <li>• SBP &lt; 70mm Hg + (2 x age in years)</li> </ul> <p>Age 10–64 years</p> <ul style="list-style-type: none"> <li>• SBP &lt; 90 mmHg or</li> <li>• HR &gt; SBP</li> </ul> <p>Age ≥ 65 years</p> <ul style="list-style-type: none"> <li>• SBP &lt; 110 mmHg or</li> <li>• HR &gt; SBP</li> </ul>

Patients meeting any of the above **RED** criteria should be transported to the nearest Level I or Level II trauma center within the geographic constraints of the local trauma system. If neither is available, transport should be directed to the highest-level trauma center available.

Destination decisions should follow established agreements between EMS agencies and trauma center stakeholders.

### YELLOW CRITERIA: Moderate Risk for Serious Injury

Mechanism of Injury	EMS Judgment
<ul style="list-style-type: none"> <li>• High-Risk Auto Crash               <ul style="list-style-type: none"> <li>– Partial or complete ejection</li> <li>– Significant intrusion (including roof)                   <ul style="list-style-type: none"> <li>• &gt;12 inches occupant site OR</li> <li>• &gt;18 inches any site OR</li> <li>• Need for extrication for entrapped patient</li> </ul> </li> <li>– Death in passenger compartment</li> <li>– Child (age 0–9 years) unrestrained or in unsecured child safety seat</li> <li>– Vehicle telemetry data consistent with severe injury</li> </ul> </li> <li>• Rider separated from transport vehicle with significant impact (eg, motorcycle, ATV, horse, etc.)</li> <li>• Pedestrian/bicycle rider thrown, run over, or with significant impact</li> <li>• Fall from height &gt; 10 feet (all ages)</li> </ul>	<p>Consider risk factors, including:</p> <ul style="list-style-type: none"> <li>• Low-level falls in young children (age ≤ 5 years) or older adults (age ≥ 65 years) with significant head impact</li> <li>• Anticoagulant use</li> <li>• Suspicion of child abuse</li> <li>• Special, high-resource healthcare needs</li> <li>• Pregnancy &gt; 20 weeks</li> <li>• Burns in conjunction with trauma</li> <li>• Children should be triaged preferentially to pediatric capable centers</li> </ul> <p>If concerned, take to a trauma center</p>

Patients meeting any one of the **YELLOW CRITERIA WHO DO NOT MEET RED CRITERIA** should be preferentially transported to a trauma center, as available within the geographic constraints of the regional trauma system (need not be the highest-level trauma center)

Iowa HHS Bureau of Emergency Medical and Trauma Services - July 2025

## Reference Tables

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## Fibrinolytic Checklist

This checklist should be completed for patients suffering from Acute Coronary Syndromes and/or STEMI. This tool will be used to triage patients to the appropriate receiving facility and provide a template for passing information on to the receiving facility. Fibrinolytic screening may be done at the EMT level; however, the decision to bypass a local hospital to transport to a Percutaneous Coronary Intervention (PCI) capable facility is reserved for the Paramedic level.

Any **YES** findings will be relayed to medical control. **Absolute Contraindications** preclude the use of fibrinolytics. **Relative Contraindications** require consultation with medical control.

DATE:	PATIENT AGE:	MALE	FEMALE	INCIDENT/RECORD #:	YES	NO
<b>ABSOLUTE CONTRAINDICATIONS</b>						
Any known intracranial hemorrhage?						
Known structural cerebral vascular lesion?						
Ischemic stroke within 3 months EXCEPT acute ischemic stroke within 3 hours?						
Suspected aortic dissection?						
Active bleeding or bleeding diathesis (excluding menses)?						
Significant closed head trauma or facial trauma within 3 months?						
<b>RELATIVE CONTRAINDICATIONS</b>						
History of chronic, severe, poorly controlled hypertension?						
Severe, uncontrolled hypertension on presentation (S >180mmHg or D>110mmHg)						
History of prior ischemic stroke >3 months, dementia, or known intracranial pathology?						
Traumatic or prolonged (>10 min) CPR or major surgery (<3 weeks)						
Non-compressible vascular punctures?						
Pregnancy?						
Active peptic ulcer?						
Current use of anticoagulants?						

## Ideal Body Weight Chart (VOCSN)

Female					Height		Male				
Tidal Volume			IBW lbs	IBW kg	ft/in	in	IBW lbs	IBW kg	Tidal Volume		
6 ml/kg	7 ml/kg	8 ml/kg							6 ml/kg	7 ml/kg	8 ml/kg
270	315	360	99	45	< 5' 0"	< 60"	110	50	300	350	400
270	315	360	99	45	5' 0"	60"	110	50	300	350	400
288	336	384	106	48	5' 1"	61"	115	52	312	364	416
300	350	400	110	50	5' 2"	62"	121	55	330	385	440
312	364	416	115	52	5' 3"	63"	126	57	342	399	456
330	385	440	121	55	5' 4"	64"	130	59	354	413	472
342	399	456	125	57	5' 5"	65"	137	62	372	434	496
354	413	472	130	59	5' 6"	66"	141	64	384	448	512
372	434	496	137	62	5' 7"	67"	145	66	396	462	528
384	448	512	141	64	5' 8"	68"	150	68	408	476	544
396	462	528	146	66	5' 9"	69"	157	71	426	497	568
414	483	552	152	69	5' 10"	70"	161	73	438	511	584
426	497	568	157	71	5' 11"	71"	165	75	450	525	600
438	511	584	161	73	6' 0"	72"	172	78	468	546	624
450	525	600	165	75	6' 1"	73"	176	80	480	560	640
468	546	624	172	78	6' 2"	74"	181	82	492	574	656
480	560	640	176	80	6' 3"	75"	187	85	510	595	680
492	574	656	181	82	6' 4"	76"	192	87	522	609	696

## Infusion Reference Tables

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The tables are for reference only. Providers should confirm calculations independently prior to administration.

Nitroglycerin Drip Rates - 250 mL Glass Container (100 mcg/1 mL)										
Dose mcg/min	5	10	15	20	25	30	35	40	45	50
Rate mL/hr	3	6	9	12	15	18	21	24	27	30

Epinephrine Drip Rates - 2 mg mixed in 500 mL NS (4 mcg/1 mL)									
Dose mcg/min	2	3	4	5	6	7	8	9	10
Rate mL/hr	30	45	60	75	90	105	120	135	150

Norepinephrine Drip Rates - 4 mg mixed in 250 mL D5W (16 mcg/1 mL)								
Dose mcg/min	1	2	4	8	12	16	20	24
Rate mL/hr	4	8	15	30	45	60	75	90

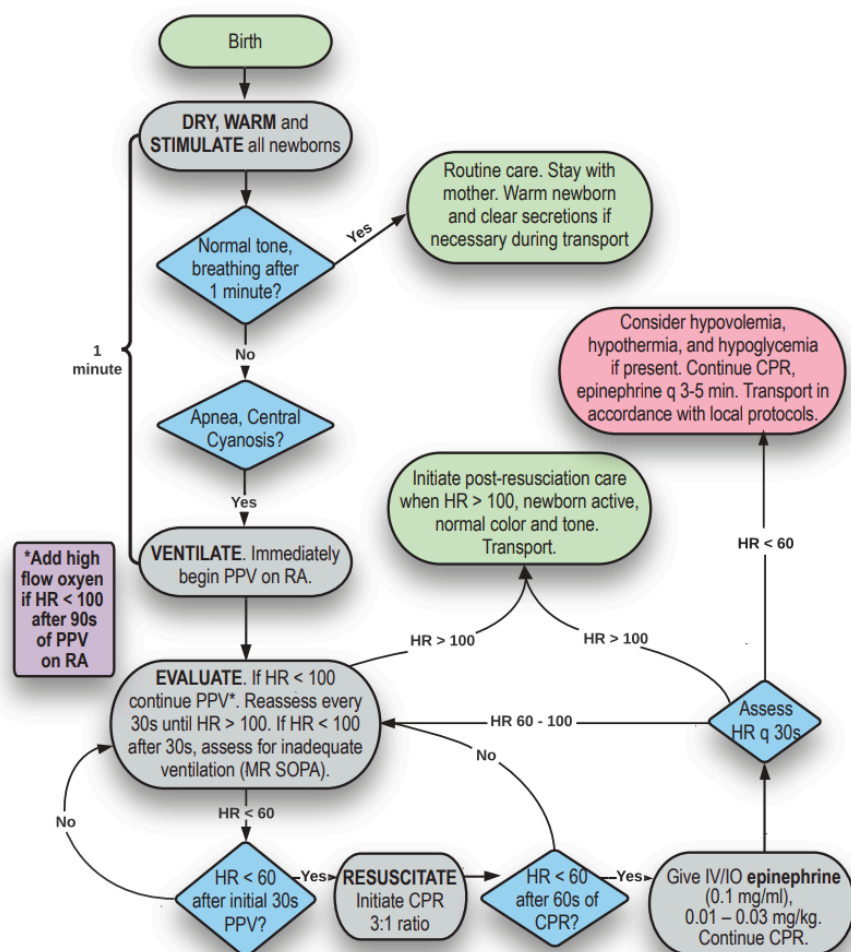
## Ketamine Dose Table

This table is for reference only. Providers should confirm calculations independently prior to administration.

Patient Weight	50 kg 110 lbs	60 kg 132 lbs	70 kg 154 lbs	80 kg 176 lbs	90 kg 198 lbs	100 kg 220 lbs	110 kg 242 lbs	120 kg 264 lbs	130 kg 286 lbs	140 kg 308 lbs	150 kg 330 lbs
<b>Pain Management (Adult): 0.25 mg/kg, max initial 25 mg, max cumulative 100 mg - Use 1mL syringe</b>											
Dose	12.5 mg	15 mg	17.5 mg	20 mg	22.5 mg	25 mg	25 mg	25 mg	25 mg	25 mg	25 mg
Volume	0.25 mL	0.3 mL	0.35 mL	0.4 mL	0.45 mL	0.5 mL	0.5 mL	0.5 mL	0.5 mL	0.5 mL	0.5 mL
<b>Medication Assisted Intubation: 2 mg/kg IV/IO</b>											
Dose	100 mg	120 mg	140 mg	160 mg	180 mg	200 mg	220 mg	240 mg	260 mg	280 mg	300 mg
Volume	2.0 mL	2.4 mL	2.8 mL	3.2 mL	3.6 mL	4.0 mL	4.4 mL	4.8 mL	5.2 mL	5.6 mL	6.0 mL
<b>Severe Agitation (Adult): 0.5-1 mg/kg IV/IO or 2-4 mg/kg IM</b>											
IM Dose (4 mg)	200 mg	240 mg	280 mg	320 mg	360 mg	400 mg	440 mg	480 mg	520 mg	560 mg	600 mg
IM Volume	4.0 mL	4.8 mL	5.6 mL	6.4 mL	7.2 mL	8.0 mL	8.8 mL	9.6 mL	10.4 mL	11.2 mL	12 mL
IV/IO Dose (1 mg)	50 mg	60 mg	70 mg	80 mg	90 mg	100 mg	110 mg	120 mg	130 mg	140 mg	150 mg
IV/IO Volume	1.0 mL	1.2 mL	1.4 mL	1.6 mL	1.8 mL	2.0 mL	2.2 mL	2.4 mL	2.6 mL	2.8 mL	3.0 mL

## Newborn Care References

Score	0	1	2
Appearance (Color)	Cyanotic, Pale	Peripheral Cyanosis	Pink
Pulse	Absent	<100	>100
Grimace (Reflexes)	No Response	Grimace	Cry When Stimulated
Activity	Limp	Some Flexion	Flexed/Resisting Extension
Respiration	Apneic	Slow, Irregular	Strong Cry



### Corrective Steps for Inadequate Mask Ventilation

M	Mask adjustment
R	Reposition airway
S	Suction mouth and nose
O	Open mouth
P	Pressure increase
A	Alternative airway

## Protocol References

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## System Hospitals and Capabilities Table

Hospital	Trauma Level	Cardiac	Stroke	Adult Psych	Peds Psych	Ortho	OB	Miles from MGO	Miles from WBG
CMH	4	no	no	no	no	no	no	446 feet	12.7
UIHC North Liberty	4	no	no	Call ahead	Call ahead	Yes	no	28.5	24.2
VA - IC	n/a	Call ahead	Call ahead	Call ahead	Call ahead	Call ahead	Call ahead	30.4	26.6
Virginia Gay	4	no	no	no	no	no	no	31.2	42.8
Mercy CR	3	yes	yes	yes	no	yes	yes	32.2	36.5
UPH St. Lukes	3	yes	yes	yes	yes	yes	yes	35.3	41.7
Grinnell	4	no	no	no	no	yes	yes	36.1	42.3
UIHC Main	1	yes	yes	yes	yes	yes	yes	37.2	26.8
UIHC Downtown	3	Yes	yes	yes	no	yes	no	37.9	27.5
Keokuk Co.	4	no	no	no	no	yes	no	39.3	32.4
UPH Marshalltown	4	no	no	no	no	yes	no	51.7	69.9
Wash Co.	4	no	no	yes	no	yes	no	54.2	43.1
MercyOne Waterloo	3	yes	yes	yes	yes	yes	yes	58.4	70.2
MercyOne Newton	4	no	no	no	no	yes	no	59.1	56.8
Oskaloosa	4	no	no	no	no	yes	yes	59.9	54.4
UPH Allen	3	yes	yes	Call ahead	Call ahead	no	yes	60.9	72.7

## Vital Signs Tables

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### Normal Vitals

Age	Pulse	Respiratory Rate	Systolic BP
Preterm (>1 kg)	120-160	30-60	39-59
Preterm (1-3 kg)	120-160	30-60	60-76
Newborn	100-205	30-60	67-84
Up to 1 year	100-190	30-60	72-104
1-3 years	100-190	20-40	86-106
4-6 years	80-140	22-34	88-112
7-9 years	74-140	18-30	96-115
10-12 years	74-118	18-30	102-120
13-15 years	60-100	14-20	110-130
15 years or older	60-100	14-20	110-130

### Glasgow Coma Scale

Eye		Verbal		Motor	
Spontaneous	4	Oriented	5	Obeys Commands	6
To Verbal	3	Confused	4	Localizes Pain	5
To Pain	2	Inappropriate Words	3	Withdraws From Pain	4
None	1	Incomprehensible Sounds	2	Flexion To Pain	3
		None	1	Extension To Pain	2
				None	1

## VOCSN Troubleshooting

D.O.P.E.
Dislodgement of airway tube
Obstruction of airway tube or ventilator tubing
Pneumothorax
Equipment failure
High Pressure Alarms
Check for obstruction <ul style="list-style-type: none"> <li>Assess need for suction</li> <li>Check for tubing kinks in tubing</li> </ul>
Assess the need for further sedation <ul style="list-style-type: none"> <li>coughing/gagging/biting</li> </ul>
Bronchospasm
Tube in right bronchus
PEEP set too high
Pmax set too low
Wet filter increasing resistance
Low Pressure Alarms
Check to make sure the patient is still connected to the vent
ET tube cuff balloon is not adequately inflated
Circuit connections are loose
Tidal Volume set too low
Esophageal Intubation
Water condensation in circuit
Chest wounds/drains allowing air to escape
Auto-PEEP
Consider auto-PEEP in patients with obstructive lung disease <ul style="list-style-type: none"> <li>If accumulating CO<sub>2</sub>, consider disconnecting vent to allow chest to fully exhale</li> </ul>

# FORMULARY

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# Adenosine

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## PHARMACOLOGIC ACTION

Slows conduction through AV node and interrupts AV reentry pathways.

## INDICATIONS

Conversion of regular, narrow complex tachycardia, stable supraventricular tachycardia (SVT) or regular, monomorphic wide complex tachycardia.

## CONTRAINDICATIONS

Hypersensitivity. Second or third-degree heart block (except those on pacemakers), sick sinus syndrome.

## DOSAGE AND ADMINISTRATION

### ➤ Tachycardia

- Stable with Narrow QRS:
  - Adult: 6 mg rapid IV push, repeat at 12 mg after 2 minutes if indicated
  - Pediatric: 0.1 mg/kg rapid IV push ( maximum 6 mg), repeat at 0.2 mg/kg after 2 minutes if indicated (maximum 12 mg)
- Stable with Wide QRS (regular and monomorphic):
  - Adult: 6 mg rapid IV push, repeat at 12 mg after 2 minutes if indicated
  - Pediatric: 0.1 mg/kg rapid IV push (maximum 6 mg) for SVT with aberrancy

# Albuterol

---

## PHARMACOLOGIC ACTION

Beta-2 receptor agonist, relaxes bronchial smooth muscle.

## INDICATIONS

Bronchospastic lung disease.

## CONTRAINDICATIONS

Hypersensitivity. Tachycardia secondary to heart condition.

## DOSAGE AND ADMINISTRATION

- Anaphylaxis:
  - 2.5-5 mg (if available), nebulized at 8 lpm oxygen
- Wheezing without respiratory distress:
  - 2.5 mg (if available), nebulized at 8 lpm oxygen
- Respiratory distress with signs of bronchospasm:
  - 5 mg (if available), nebulized at 8 lpm oxygen, repeat as needed for ongoing respiratory distress

# Amiodarone

---

## PHARMACOLOGIC ACTION

Inhibits adrenergic stimulation; affects sodium, potassium, and calcium channels; markedly prolongs action potential and repolarization; decreases AV conduction and sinus node function.

## INDICATIONS

Regular wide complex tachycardia in stable patients, irregular wide complex tachycardia in stable patients, and as antidysrhythmic for the management of ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT).

## CONTRAINDICATIONS

Hypersensitivity. Severe sinus node dysfunction, second or third-degree heart block or bradycardia causing syncope (except with functioning artificial pacemaker), cardiogenic shock.

## DOSAGE AND ADMINISTRATION

- Tachycardia:
  - Stable with Wide QRS:
    - Adult: 150 mg IV/IO in 100 mL NS or D5W over 10 minutes, repeat once if indicated
    - Pediatric: 5 mg/kg IV/IO (maximum 150 mg) in 100 mL NS or D5W over 10 minutes
- VT or VF without a pulse:
  - Adult:
    - 1st Dose: 300 mg IV/IO
    - 2nd Dose: 150 mg IV/IO
- Pulseless VT or Refractory VF:
  - Pediatric:
    - 5 mg/kg IV/IO
    - Repeat up to 3 total doses
    - Refer to length-based tape

# Aspirin

---

## PHARMACOLOGIC ACTION

Inhibits synthesis of prostaglandin by cyclooxygenase; inhibits platelet aggregation; has antipyretic and analgesic activity.

## INDICATIONS

Antiplatelet agent for the care of patients suspected of suffering from an acute coronary syndrome.

## CONTRAINDICATIONS

Hypersensitivity to aspirin or NSAIDs (aspirin-associated hypersensitivity reactions include aspirin-induced urticarial or aspirin-intolerant asthma), bleeding GI ulcers, hemolytic anemia from pyruvate kinase (PK) and glucose-6-phosphate dehydrogenase (G6PD) deficiency, hemophilia, hemorrhagic diathesis, hemorrhoids, lactating mother, nasal polyps associated with asthma, sarcoidosis, thrombocytopenia, ulcerative colitis.

## DOSAGE AND ADMINISTRATION

- Chest Pain and Pulmonary Embolism:
  - Have patient chew non-enteric Aspirin 324 mg:
    - Amount may be reduced if patient has already taken Aspirin within the past 12 hours for a total of 324 mg

# Atropine Sulfate

---

## PHARMACOLOGIC ACTION

Competitively inhibits action of acetylcholinesterase on autonomic effectors innervated by postganglionic nerves.

## INDICATIONS

Symptomatic bradycardia (primary or related to toxin ingestion), organophosphate, and carbamate insecticide toxicity.

## CONTRAINDICATIONS

Hypersensitivity. Narrow-angle glaucoma, GI obstruction, severe ulcerative colitis, toxic megacolon, bladder outlet obstruction, myasthenia gravis, hemorrhage with cardiovascular instability, thyrotoxicosis.

## DOSAGE AND ADMINISTRATION

- Bradycardia:
  - Adult: 1 mg IV/IO, every 3-5 minutes if indicated, up to 3 mg
  - Increased vagal tone or primary AV block:
    - Pediatric: 0.02 mg/kg (minimum 0.1 mg / maximum 0.5 mg) IV/IO, repeat once if indicated
- Bradycardia during RSI:
  - Adult: 1 mg IV/IO
  - Pediatric: 0.02 mg/kg IV/IO, not to exceed 1 mg
- Bradycardia with unknown overdose:
  - Adult: 1 mg IV/IO, every 5 minutes if indicated, up to 3 mg
- Digitalis overdose:
  - Adult: 1 mg IV/IO, every 5 minutes if indicated, up to 3 mg
- Organic phosphate poisoning:
  - Contact medical control
- Symptomatic bradycardia in neurogenic shock unresponsive to initial treatments:
  - Adult: 1 mg IV/IO, every 5 minutes if indicated, up to 3 mg

## Dexamethasone

---

### PHARMACOLOGIC ACTION

Suppresses acute and chronic inflammation; immunosuppressive effects.

### INDICATIONS

Anaphylaxis, acute exacerbation of bronchial asthma, AMS, HACE, spinal cord injury, croup, elevated ICP (prevention and treatment), as an adjunct treatment of shock, COVID-19 with severe respiratory symptoms.

### CONTRAINDICATIONS

Documented hypersensitivity, systemic fungal infection, preterm infants.

### DOSAGE AND ADMINISTRATION

- Anaphylaxis:
  - Adult: 10 mg IV/IM

# Dextrose

---

## PHARMACOLOGIC ACTION

Parenteral dextrose is oxidized to carbon dioxide and water and provides 3.4 kilocalories/gram of d-glucose.

## INDICATIONS

Hypoglycemia.

## CONTRAINDICATIONS

Hyperglycemia, anuria, diabetic coma, intracranial or intraspinal hemorrhage, dehydrated patients with delirium, glucose-galactose malabsorption syndrome.

## DOSAGE AND ADMINISTRATION

- Diabetic emergencies:
  - D10 is preferred
  - Adult (25 g of 10-50%):
    - D50 (50 mL) IV
    - OR
    - D10 (250 mL) IV
  - Pediatric (0.5-1 g/kg of 10-25%):
    - D10 (5-10 mL/kg) IV
    - OR
    - D10 (2 mL/kg) IV, newborns

# Diazepam

---

## PHARMACOLOGIC ACTION

Modulates postsynaptic effects of GABA-A transmission, resulting in an increase in presynaptic inhibition. Appears to act on part of the limbic system, as well as on the thalamus and hypothalamus, to induce a calming effect.

## INDICATIONS

Anxiety/agitation, seizures, muscle spasms.

## CONTRAINDICATIONS

Hypersensitivity. Acute narrow angle glaucoma.

## DOSAGE AND ADMINISTRATION

- Anxiety or agitation:
  - Adult: 5 mg IV (2-5 minute onset of action)
  - Adult: 10 mg IM (15-30 minute onset of action)
  - Pediatric: 0.05-0.1 mg/kg IV, not to exceed 5 mg
  - Pediatric: 0.1-0.2 mg/kg IM, not to exceed 10 mg
- Muscle spasm and/or anxiolytic pain exacerbation:
  - Adult: 2-5 mg IM/IN/IV, every 5 minutes if indicated, up to 10 mg
  - Pediatric: 0.1 mg/kg IM/IN/IV, not to exceed adult dose
- Seizures:
  - Adult: 2-5 mg IM/IN/IV titrated until seizure stops or maximum dose of 10 mg is given
  - Pediatric: 0.2 mg/kg IM/IN/IV, maximum 10 mg
- Tachycardia with unknown overdose, consider:
  - Adult: 2-5 mg IM/IN/IV, every 5 minutes if indicated, up to 10 mg

## Diphenhydramine

---

### PHARMACOLOGIC ACTION

Histamine H1-receptor antagonist of effector cells in respiratory tract, blood vessels, and GI smooth muscle.

### INDICATIONS

Urticaria or pruritus. Septic shock.

### CONTRAINDICATIONS

Hypersensitivity. Premature infants and neonates.

### DOSAGE AND ADMINISTRATION

- Allergic reaction (urticaria or pruritus):
  - Adult: 25-50 mg IM/IV
  - Pediatric: 1 mg/kg IM/IV, up to 50 mg
- Distributive shock (Septic):
  - Adult: 25-50 mg IM/IV

## DuoNeb

---

### PHARMACOLOGIC ACTION

Combination of Ipratropium Bromide, an anticholinergic (parasympatholytic) agent which inhibits vagally mediated reflexes by antagonizing acetylcholine action; prevents increase in intracellular calcium concentration that is caused by interaction of acetylcholine with muscarinic receptors on bronchial smooth muscles and Albuterol, a beta2-adrenergic receptor agonist.

### INDICATIONS

Asthma and chronic obstructive pulmonary disease (COPD).

### CONTRAINDICATIONS

Hypersensitivity to ipratropium, atropine, or derivatives.

### DOSAGE AND ADMINISTRATION

- Difficulty Breathing:
  - Adult: Albuterol 3 mg and Ipratropium Bromide 0.5 mg, nebulized at 8 lpm oxygen, up to 3 doses

# Epinephrine

---

## PHARMACOLOGIC ACTION

Strong alpha-adrenergic effects which cause an increase in cardiac output and heart rate, a decrease in renal perfusion and peripheral vascular resistance, and a variable effect on BP, resulting in systemic vasoconstriction and increased vascular permeability. Strong beta-1- and moderate beta-2-adrenergic effects, resulting in bronchial smooth muscle relaxation.

## INDICATIONS

Anaphylaxis, shock, cardiac arrest, bradycardia.

## DOSAGE AND ADMINISTRATION

- Anaphylaxis:
  - Epinephrine (1:1000):
    - Over 25 kg: 0.3 mg IM; Under 25 kg: 0.15 mg IM:
      - If signs of anaphylaxis and hypoperfusion persist following the first dose of epinephrine, repeat every 5–15 minutes
  - Severe anaphylaxis, consider Epinephrine (1:10,000):
    - Adult: 0.3 mg - 0.5 mg IV/IO slowly over 3-5 minutes
- Cardiac arrest:
  - Adult (1:10,000): 1 mg every 3-5 minutes
  - Pediatric (1:10,000): 0.01 mg/kg, not to exceed 1 mg
- Difficulty breathing:
  - Adult (1:1000): 0.3 mg IM
  - Pediatric (1:1000): 0.01 mg/kg IM, not to exceed 0.3 mg
- Shock:
  - Push-Dose: 10-20 mcg IV/IO
    - Used as a bridge until vasopressor infusion
  - Preparation:
    - Dispel 1 mL from 10 mL saline flush then draw up 1 mL of 1:10000
      - Agitate syringe and label 10 mcg/mL
- Symptomatic bradycardia:
  - Pediatric: 0.01 mg/kg (0.1 mL, 1:10,000 concentration) IV/IO, every 3-5 minutes if indicated
- Symptomatic bradycardia refractory to Atropine:
  - Adult: 2-10 mcg/min IV/IO [2 mg of 1:1000 or 1:10,000 in 500 mL NS (4 mcg/mL)]:
    - Use infusion pump
    - Initiate 2-10 mcg/min, titrate to response
    - Label bag with orange medication label

# Etomidate

---

## PHARMACOLOGIC ACTION

Ultra-short-acting hypnotic that produces rapid sedation with minimal cardiovascular or respiratory depression.

## INDICATIONS

Premedication for medication facilitated intubation or procedural sedation.

## CONTRAINDICATIONS

Known hypersensitivity, labor/delivery, or septic shock (particularly in children).

## DOSAGE AND ADMINISTRATION

- 0.3 mg/kg IV/IO
  - Consider Ketamine in seizure and severe sepsis

# Fentanyl

---

## PHARMACOLOGIC ACTION

Narcotic agonist-analgesic of opiate receptors; inhibits ascending pain pathways, thus altering response to pain; increases pain threshold.

## INDICATIONS

Acute pain.

## CONTRAINDICATIONS

Hypersensitivity. Should be used with caution in the elderly and in patients with hypotension, suspected gastrointestinal obstruction, head injury, and concomitant CNS depressants.

## DOSAGE AND ADMINISTRATION

- Chest pain:
  - Fentanyl 25-50 mcg IV, every 5 minutes if indicated, up to 200 mcg
- Rapid Sequence intubation:
  - 0.5-2 mcg/kg IV/IO
    - Consider lower dosing or avoidance for hypotensive or significantly unstable patients
- Pain management:
  - Adult: 1 mcg/kg IM/IN/IV, maximum initial dose of 100 mcg, repeat if indicated as long as patient remains hemodynamically stable and GCS is intact
  - Pediatric: 1 mcg/kg; refer to length-based tape

# Glucagon

---

## PHARMACOLOGIC ACTION

Insulin antagonist. Stimulates cAMP synthesis to accelerate hepatic glycogenolysis and gluconeogenesis. Glucagon also relaxes smooth muscles of GI tract.

## INDICATIONS

Hypoglycemia. Beta-blocker or calcium channel blocker overdose.

## CONTRAINDICATIONS

Hypersensitivity. Pheochromocytoma, insulinoma.

## DOSAGE AND ADMINISTRATION

- Calcium Channel Blocker or Beta Blocker overdose:
  - Adult: 1-3 mg slow IV push over 1-2 minutes, repeat after 10-15 minutes if no response is seen
- Hypoglycemia:
  - Adult: 1 mg IM
  - Pediatric: 1 mg IM (over 20 kg or more than 5 years old)
  - Pediatric: 0.5 mg IM (less than 20 kg or less than 5 years old)

## Glucose Paste

---

### PHARMACOLOGIC ACTION

Increases blood glucose levels via buccal absorption.

### INDICATIONS

Conscious hypoglycemic patients.

### CONTRAINDICATIONS

Diabetic ketoacidosis. Inability to swallow.

### DOSAGE AND ADMINISTRATION

- Hypoglycemia:
  - Adult: 15 g
  - Pediatric: 0.5-1 g/kg

# Ketamine

---

## PHARMACOLOGIC ACTION

Produces dissociative anesthesia. Blocks N-methyl D-aspartate (NMDA) receptor.

## INDICATIONS

Agitated or violent behavior, severe pain, medication-assisted intubation.

## CONTRAINDICATIONS

Hypersensitivity. Use caution with head trauma, intracranial mass/hemorrhage, hypertension, angina, stroke, or underlying psychiatric disorder.

## DOSAGE AND ADMINISTRATION

- Rapid Sequence Intubation:
  - 1-2 mg/kg IV/IO
    - Consider decreased dosing in hypotensive or significantly unstable patients
    - Consider Etomidate in severe hypertension (SBP > 180) and/OR tachycardia (HR > 150)
- Rapid Sequence Intubation continued sedation:
  - 0.5 mg/kg IV/IO every 10 minutes as needed, up to 200 mg
- Severe agitation or a high risk of violence:
  - Adult and Pediatric: 0.5-1 mg/kg IV (1 minute onset of action)
  - Adult and Pediatric: 2-4 mg/kg IM (3-5 minute onset of action)
    - Consider medical direction for patients under age 2
- Severe pain:
  - Ketamine:
    - Adult: 0.25 mg/kg IM/IV/IO, maximum initial dose of 25 mg, repeat if indicated, up to 100 mg; refer to [Ketamine Dose Table](#)
    - Pediatric: 0.1 mg/kg IM/IV/IO

# Ketorolac

---

## PHARMACOLOGIC ACTION

Inhibits synthesis of prostaglandins in body tissues by inhibiting at least 2 cyclo-oxygenase (COX) isoenzymes, COX-1 and COX-2. May inhibit chemotaxis, alter lymphocyte activity, decrease proinflammatory cytokine activity, and inhibit neutrophil aggregation; these effects may contribute to anti-inflammatory activity.

## INDICATIONS

Acute Pain. Febrile seizures.

## CONTRAINDICATIONS

Allergy to aspirin, ketorolac, or other NSAIDs; women who are in active labor or are breastfeeding, significant renal impairment, particularly when associated with volume depletion, previous or current GI bleeding, intracranial bleeding, coagulation defects, patients with a high risk of bleeding.

## DOSAGE AND ADMINISTRATION

- Febrile seizures (avoid in patients under 6 months):
  - 1 mg/kg IV/IM, not to exceed adult dose
- Pain management (avoid in patients under 6 months or over 65):
  - Adult: 30 mg IM or 15 mg IV
  - Pediatric: 0.5 mg/kg, not to exceed adult dose

# Labetalol

---

## PHARMACOLOGIC ACTION

Nonselective alpha and beta blocker with intrinsic sympathomimetic activity.

## INDICATIONS

Severe hypertension.

## CONTRAINDICATIONS

Hypersensitivity. Asthma or obstructive airway disease, severe bradycardia, second-degree or third-degree heart block without pacemaker, cardiogenic shock, bronchial asthma, uncompensated cardiac failure, sinus bradycardia, sick sinus syndrome without pacemaker; conditions associated with prolonged and severe hypotension.

## DOSAGE AND ADMINISTRATION

- Eclampsia/Pre-eclampsia:
  - 20 mg IV over 2 minutes:
    - Goal blood pressure is approximately 140/90 to reduce stroke risk but maintain uterine perfusion
    - Ensure heart rate is greater than 60 beats per minute prior to administration
    - Repeat every 10 minutes x 2 doses for persistent severe hypertension with preeclampsia symptoms
- Hypertensive crisis:
  - Adult: 10 mg IV over 2 minutes, repeat once after 10 minutes for continued hypertension:
    - Goal is to reduce MAP by 20-25% initially
    - Ensure heart rate is greater than 60 beats per minute prior to administration

## Lidocaine

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### PHARMACOLOGIC ACTION

Stabilizes the neuronal membrane by inhibiting the ionic fluxes required for the initiation and conduction of impulses thereby effecting local anesthetic action.

### INDICATIONS

Local or regional anesthesia.

### CONTRAINDICATIONS

Hypersensitivity to lidocaine or amide-type local anesthetic.

### DOSAGE AND ADMINISTRATION

- Conscious IO insertion:
  - Adult: 20-40 mg
  - Pediatric: 0.5 mg/kg

# Magnesium Sulfate

---

## PHARMACOLOGIC ACTION

Depresses CNS, blocks peripheral neuromuscular transmission, produces anticonvulsant effects, and decreases the amount of acetylcholine released at the end-plate by motor nerve impulse. Slows rate of sinoatrial (SA) node impulse formation in myocardium and prolongs conduction time. Promotes movement of calcium, potassium, and sodium in and out of cells and stabilizes excitable membranes.

## INDICATIONS

Torsades de pointes or for severe bronchoconstriction with impending respiratory failure, seizure during the third trimester of pregnancy, or in the postpartum patient.

## CONTRAINDICATIONS

Hypersensitivity. Myocardial damage, diabetic coma, heart block, hypermagnesemia, hypercalcemia.

## DOSAGE AND ADMINISTRATION

- Difficulty breathing:
  - Adult: 2 g in 100 mL NS or D5W over 10-15 minutes
  - Pediatric: 40 mg/kg in 100 mL NS or D5W over 10-15 minutes, not to exceed 2 g
- Eclampsia/Pre-eclampsia:
  - 4 g in 100 mL NS or D5W over 5-10 minutes
- Torsades de Pointes:
  - Adult: 1-2 g in 100 mL NS or D5W over 10 minutes
  - Pediatric: 50 mg/kg IV/IO over 10 minutes, not to exceed 1-2 g

# Methylprednisolone

---

## PHARMACOLOGIC ACTION

Modulates carbohydrate, protein, and lipid metabolism and maintenance of fluid and electrolyte homeostasis. Controls or prevents inflammation by controlling rate of protein synthesis, suppressing migration of polymorphonuclear leukocytes (PMNs) and fibroblasts, reversing capillary permeability, and stabilizing lysosomes at cellular level.

## INDICATIONS

Acute bronchospastic disease.

## CONTRAINDICATIONS

Hypersensitivity. Serious infections (except sepsis), IM route is contraindicated in idiopathic thrombocytopenic purpura, traumatic brain injury (high doses).

## DOSAGE AND ADMINISTRATION

- Difficulty breathing:
  - Adult: 40-125 mg IM/IV

# Metoprolol

---

## PHARMACOLOGIC ACTION

Blocks response to beta-adrenergic stimulation.

## INDICATIONS

Uncontrolled atrial fibrillation with rapid ventricular response.

## CONTRAINDICATIONS

Hypersensitivity. Second-degree or third-degree heart block, significant first-degree heart block (PR interval at least 0.24 seconds), cardiogenic shock, sick sinus syndrome (unless permanent pacemaker in place), severe peripheral vascular disease, pheochromocytoma, severe sinus bradycardia with heart rate less than 45 beats per minute, systolic blood pressure less than 100 mmHg, moderate to severe cardiac failure.

## DOSAGE AND ADMINISTRATION

- Atrial fibrillation with rapid ventricular response (ventricular rate greater than 140 bpm):
  - Adult: 5 mg slow IV push over 2 minutes

## Midazolam

---

### PHARMACOLOGIC ACTION

Binds receptors at several sites within the CNS, including the limbic system and reticular formation; effects may be mediated through gaba-aminobutyric acid (GABA) receptor system; increase in neuronal membrane permeability to chloride ions enhances the inhibitory effects of GABA; the shift in chloride ions causes hyperpolarization (less excitability) and stabilization of the neuronal membrane.

### INDICATIONS

Ketamine-induced hallucinations, medication-assisted intubation, procedural sedation, seizures, tachycardia due to overdose.

### CONTRAINDICATIONS

Hypersensitivity. Acute narrow angle glaucoma.

### DOSAGE AND ADMINISTRATION

- Hallucinations after administration of Ketamine for pain:
  - Adult: 1 mg
- Rapid Sequence Intubation continued sedation:
  - 2-5 mg IV/IO, over 1-2 minutes to desired effect, maximum 10 mg in a 30 minutes, Use caution in patients who are hypotensive
- Procedural sedation:
  - Adult: 1-2.5 mg slow IV push over 2 minutes, every 2-5 minutes, up to 5 mg
- Seizures:
  - Adult: 2-5 mg IM/IN titrated until seizure stops or maximum dose of 10 mg is given
  - Pediatric: 0.2 mg/kg IM/IN, maximum 10 mg
- Tachycardia with unknown overdose:
  - Adult: 0.5-2.5 mg IM/IN/IV, every 5 minutes if indicated, up to 5 mg

# Naloxone

---

## PHARMACOLOGIC ACTION

Competitive opioid antagonist.

## INDICATIONS

Reversal of acute opioid toxicity.

## CONTRAINDICATIONS

Hypersensitivity.

## DOSAGE AND ADMINISTRATION

- Opioid overdose:
  - Adult: 0.4-2 mg IM/IV *OR* 4 mg IN
    - Repeat in 3 minutes if indicated
  - Pediatric: 0.1 mg/kg IM/IN/IV
    - Repeat in 3 minutes if indicated, up to 2 mg IM/IV *OR* 4 mg IN

# Nitroglycerin

---

## PHARMACOLOGIC ACTION

Relaxes smooth muscle via dose-dependent dilation of arterial and venous beds to reduce both preload and afterload and myocardial O<sub>2</sub> demand.

## INDICATIONS

Chest pain, acute pulmonary edema.

## CONTRAINDICATIONS

Hypersensitivity. Severe anemia, recent use of erectile dysfunction medications (sildenafil (Viagra®-within last 24 hours), tadalafil (Cialis®-within last 48 hours), vardenafil (Levitra®-within last 48 hours), or other phosphodiesterase-5 inhibitors). Hypotension (systolic blood pressure less than 90 mmHg or  $\geq 30$  mmHg below baseline), bradycardia (less than 50 beats per minute), tachycardia in the absence of heart failure (greater than 100 beats per minute).

## DOSAGE AND ADMINISTRATION

### ➤ Chest Pain:

- BLS: 0.4 mg sublingually (patient's Nitro only), repeat once after five minutes if indicated
- ALS: 0.4 mg sublingually, every 3-5 minutes if indicated and if systolic blood pressure is 100 mmHg or above:
  - Reassess vital signs following each dose of Nitroglycerin
- If ST segment changes exist, consider Nitroglycerin infusion:
  - Initiate 5-10 micrograms per minute (infusion pump must be used):
    - Titrate infusion in 5 microgram increments
    - Discontinue infusion when:
      - Pain is relieved
      - Systolic blood pressure is below 100 mmHg

### ➤ Congestive Heart Failure:

- BLS: 0.4 mg sublingually (patient's Nitro only), maximum of 3 doses
- ALS: 0.4 mg sublingually, repeat every 3-5 minutes if indicated and if systolic blood pressure is 100 mmHg or above, maximum of 3 doses:
  - Reassess vital signs following each dose of Nitroglycerin
- Consider Nitroglycerin infusion:
  - Initiate 10 micrograms per minute:
    - Use infusion pump
    - Titrate infusion in 10 mcg/min increments, up to 50 mcg/min
    - Discontinue infusion when:
      - Systolic blood pressure is below 100 mmHg

# Norepinephrine

---

## PHARMACOLOGIC ACTION

Strong beta-1 and alpha-adrenergic effects and moderate beta-2 effects, which increase cardiac output and heart rate, decrease renal perfusion and peripheral vascular resistance.

## INDICATIONS

Shock. Hypotension refractory to fluid resuscitation.

## CONTRAINDICATIONS

Hypersensitivity. Hypotension due to blood volume deficit, peripheral vascular thrombosis (except for lifesaving procedures).

## DOSAGE AND ADMINISTRATION

- Shock (Cardiogenic, Obstructive, Neurogenic, Septic):
  - Adult: 1-30 mcg/min IV/IO [4 mg in 250 mL D5W (16 mcg/mL)]:
    - Use infusion pump
    - Initiate 1 mcg/min and titrate to maintain a systolic blood pressure of 90 mmHg or MAP of 65
    - Label bag with orange medication label
  - Pediatric: 0.01-0.3 mcg/kg/min; consult medical control

# Ondansetron

---

## PHARMACOLOGIC ACTION

Selective 5-HT<sub>3</sub> receptor antagonist; binds to 5-HT<sub>3</sub> receptors both in periphery and in CNS, with primary effects in GI tract.

## INDICATIONS

Nausea and vomiting.

## CONTRAINDICATIONS

Hypersensitivity. Coadministration with apomorphine (combination can cause profound hypotension and loss of consciousness).

## DOSAGE AND ADMINISTRATION

- Nausea and vomiting:
  - Adult: 4 mg SL/IV, repeat once after 5 minutes if indicated
  - Pediatric: 0.15 mg/kg SL/IV, not to exceed 4 mg

# Oxygen

---

## PHARMACOLOGIC ACTION

Increases the partial pressure of oxygen in the blood, thereby enhancing the oxygen saturation of hemoglobin and improving tissue oxygenation to support cellular metabolism and function.

## INDICATIONS

Hypoxemia.

## DOSAGE AND ADMINISTRATION

- Titrate for symptom improvement or to maintain oxygen saturation of 94-98%

# Rocuronium

---

## PHARMACOLOGIC ACTION

Antagonizes acetylcholine at the motor endplate, producing skeletal muscle paralysis.

## INDICATIONS

Adjunct to provide skeletal muscle relaxation and facilitate tracheal intubation and ventilation.

## CONTRAINDICATIONS

Known hypersensitivity to rocuronium or a bromide hypersensitivity, inability to control the airway or support ventilation with oxygen and positive pressure, neuromuscular disease (myasthenia gravis). Use with caution in patients with heart and liver disease.

## DOSAGE AND ADMINISTRATION

- Adult: 1 mg/kg IV/IO
  - 100 mg IV/IO is appropriate in standard adult patients if difficult to estimate weight
- Pediatric: 1.2 mg/kg IV/IO

## Tranexamic Acid

---

### PHARMACOLOGIC ACTION

Competitive inhibitor of plasminogen activation, which produces antifibrinolytic effects preserving and stabilizing the fibrins matrix structure. It reversibly binds to plasminogen at the lysine binding site, thus preventing the binding of plasmin to fibrin. It is categorized as an anti-fibrinolytic that inhibits the activation of plasminogen to plasmin and thereby prevents fibrinolysis and the breakdown of clots.

### INDICATIONS

Bleeding with signs of hemorrhagic shock.

### CONTRAINDICATIONS

Hypersensitivity. Known blood clot or clotting disorder, gastrointestinal hemorrhage.

### DOSAGE AND ADMINISTRATION

- Bleeding with signs of hemorrhagic shock:
  - Adult: 1 g IV in 100 mL NS or D5W over 10 minutes or 1 g IM, divided into two 500 mg injections, into a large muscle
    - Must be within three hours of injury
    - IV route preferred
- Epistaxis, consider TXA:
  - 500 mg IN or gauze soaked in 500 mg and packed into nostril(s)