

**Michigan**  
**MEDICATION SECTION**  
**MEDICATIONS (GENERAL)**

Initial Date: 07/19/2023

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Section: 9-9R

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**MEDICATIONS (General)**

A medication reference protocol (9-R series) is only applicable when used in conjunction with an MCA approved treatment protocol.

Medication Reference Protocols do not address licensure level, pre/post radio requirements, or other medications/procedures/assessments that may be required between initial dose and subsequent doses.

Medication Reference Protocols apply to the Michigan standardized EMS protocol suite Sections 1-10; therefore indications/contraindications are aligned with protocol restrictions (such as allowable age for administration) and may be more confining than the actual indications/contraindications of the medication.

**Age:**

1. Adult: patient > 14 years of age (will appear as “Adult” in the 9R series without age explanation)
2. Pediatric: patient ≤ 14 years of age (will appear as “Pediatric” in the 9R series without age explanation)
3. A medication with an age restrictions/considerations will be expressed as such in the 9R series.

**Indications:**

1. Indication(s) listed are in conjunction with protocols, there may be other uses for which EMS is not authorized to use a medication.

**Contraindications:**

1. Hypersensitivity to a medication is a contraindication to that medication. This applies to ALL medications and will not be restated on individual medication protocols.

**Order of Operation**

1. Adult (patients > 14 years of age):
  - a. Indications for medication use
    - i. Protocol (Sections 1-8,10)
    - ii. Medication Protocols (Section 9-9R)
  - b. Dosing
    - i. Protocols (Sections 1-8,10)
    - ii. Medication Protocols (Section 9-9R)
2. Pediatric (patients ≤ 14 years of age)
  - a. Indications for medication use
    - i. Protocol (Sections 1-8,10)
    - ii. Medication Protocols (Section 9-9R)

*Michigan*  
**MEDICATION SECTION**  
MEDICATIONS (GENERAL)

Initial Date: 07/19/2023

Revised Date:

Section: 9-9R

b. Dosing

- i. MI MEDIC cards
- ii. Treatment and/or Procedure Protocol (Sections 1-8, 10)
- iii. Medication Protocols (Section 9-9R)

Initial Date: 07/19/2023  
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Section: 9-10R

## ***Acetaminophen***

**Pharmacological Category:** Analgesic, Nonopioid

**Routes:** PO

**Indications:**

1. Fever
2. Mild pain

**Contraindications:**

1. Known severe acute liver disease

**Precautions:**

1. Has received acetaminophen (i.e., Tylenol) or any medication containing acetaminophen (e.g., cold medication) in last four (4) hours.
2. Patient must be alert enough to take PO medication.

**Expected effects:**

1. Fever reduction
2. Pain relief

**Side effects:**

1. Nausea/vomiting

**Notes:**

1. Children < 60 days old require a documented rectal temperature (including time temperature obtained) prior to acetaminophen administration.

**Dosing: PEDIATRIC FEVER**

Indication: Fever

Pediatrics administer:

1. According to MI MEDIC cards
2. If MI MEDIC cards are not available administer using dosing chart below.

**Dosing: PAIN MANAGEMENT**

Indication: Mild Pain

Adults administer:

1. Acetaminophen 650 mg PO

Pediatrics administer:

1. According to MI MEDIC cards
2. If MI MEDIC cards are not available use dosing chart below.

Initial Date: 07/19/2023  
Revised Date: 08/11/2023

Section: 9-10R

| Children's Acetaminophen Elixir Dosing Table |                 |                             |
|--|-----------------|-----------------------------|
| Child's Weight                               | Child's Age     | Acetaminophen<br>160 mg/5mL |
| 3-5 kg (6-12 lbs.)                           | 0-2 mos.        | 1.25 mL (40 mg)             |
| 6-7 kg (13-16 lbs.)                          | 3-6 mos.        | 3 mL (96 mg)                |
| 8-9 kg (17-20 lbs.)                          | 7-10 mos.       | 4 mL (128 mg)               |
| 10-11 kg (21-25 lbs.)                        | 11-18 mos.      | 5 mL (160 mg)               |
| 12-14 kg (26-31 lbs.)                        | 19 mos.-35 mos. | 6 mL (192 mg)               |
| 15-18 kg (32-40 lbs.)                        | 3-4 yrs.        | 7 mL (224 mg)               |
| 19-23 kg (41-51 lbs.)                        | 5-6 yrs.        | 9 mL (288 mg)               |
| 24-29 kg (52-64 lbs.)                        | 7-9 yrs.        | 12 mL (384 mg)              |
| 30-36 kg (65-79 lbs.)                        | 10-14 yrs.      | 15 mL (480 mg)              |

Used in the Following Protocols

Pediatric Fever (Section 4 Obstetrics and Pediatrics)  
Pain Management (Section 7 Procedures)

**Michigan**  
**MEDICATION SECTION**  
**ADENOSINE**

Initial Date: 07/19/2023

Revised Date:

Section: 9-11R

## **Adenosine**

**Pharmacological Category:** Antiarrhythmic Agent, Miscellaneous; Diagnostic Agent

**Routes:** IV rapid push

### **Indications:**

1. Stable but symptomatic supraventricular tachycardia that is a regular and narrow rhythm (i.e., SVT, A-Flutter) that does not convert with approved vagal maneuver.

### **Contraindications:**

1. Patients with diagnosed sinus node dysfunction (e.g., sick sinus syndrome, WPW syndrome) unless pacemaker is present and functioning
2. Patients with diagnosed or observed high-grade AV block (i.e., 2<sup>nd</sup> or 3<sup>rd</sup> degree heart block) unless pacemaker is present and functioning
3. Patients with diagnosed asthma

### **Precautions:**

1. Be prepared for fluid resuscitation if required
2. Monitor for polymorphic V-Tach
3. Be prepared for full resuscitation efforts.

### **Expected effects:**

1. Slowed conduction through the AV node
2. Conversion to NSR

### **Side effects:**

1. Hypotension – may produce profound vasodilation
2. Flushing
3. Dyspnea
4. Light-headedness
5. Nausea
6. Feeling of impending doom
7. Seizures

### **Notes:**

1. Use most proximal injection site
2. Follow immediately with NS flush
3. Record using cardiac monitor during and after administration

*Michigan*  
**MEDICATION SECTION**  
ADENOSINE

Initial Date: 07/19/2023

Revised Date:

Section: 9-11R

---

**Dosing: TACHYCARDIA (Adult)**

Indication: Symptomatic SVT

Adults administer:

1. Adenosine 6 mg rapid IV push followed immediately with 20 mL NS flush
2. If conversion does not occur, and the rhythm persists, administer adenosine 12 mg rapid IV push followed immediately with 20 mL NS flush

**Dosing: PEDIATRIC TACHYCARDIA**

Indication: Symptomatic SVT

Pediatrics administer:

1. According to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Adenosine 0.1 mg/kg (max dose 6 mg) rapid IV push immediately followed by 10 mL flush
  - b. If conversion does not occur, and the rhythm persists administer 0.2 mg/kg \_\_\_\_ (max of 12 mg) rapid IV push immediately followed by 10 mL NS flush

Used in the Following Protocols

Tachycardia (Section 5 Adult Cardiac)

Pediatric Tachycardia (Section 6 Pediatric Cardiac)

Initial Date: 07/19/23

Revised Date:

Section: 9-12R

## ***Albuterol***

**Pharmacological Category:** Beta-2 Agonist, Bronchodilator

**Routes:** Nebulized

**Indications:**

1. Bronchospasm (wheezing)
2. Known or suspected hyperkalemia resulting from a crush injury.

**Expected effects:**

1. Bronchodilation
2. Decreased respiratory work/effort

**Dosing: RESPIRATORY DISTRESS (Adult)**  
**PEDIATRIC RESPIRATORY DISTRESS**  
**ANAPHYLAXIS/ALLERGIC REACTION**  
**PULMONARY EDEMA/CARDIOGENIC SHOCK**

Indication: Respiratory distress with wheezing

Adults administer:

1. Albuterol 2.5 mg/3mL NS nebulized

Pediatrics administer: Albuterol dosage is not weight/age based

1. Albuterol 2.5 mg/3mL NS nebulized (*Albuterol dosage is not weight/age based*)

**Dosing: GENERAL CRUSH INJURY**

Indication: Suspected hyperkalemia due to crush injury

Adults administer:

1. Albuterol 2.5 mg/3mL NS nebulized to a maximum dose of 20 mg

Pediatrics administer:

1. According to MI MEDIC cards
2. If MI MEDIC cards are not available administer Albuterol 2.5 mg/3mL NS nebulized to a maximum dose of 20 mg

**Note:** A single responding unit is not expected to carry 20 mg of albuterol for treatment of up to 20 mg in Crush Injury protocol. Dosage is a maximum if other resources (i.e., Haz Mat drug box, second drug box) are available.

Used in the Following Protocols

Anaphylaxis/Allergic Reaction (Section 1 General Treatment)

General Crush Injury (Section 2 Trauma and Environmental)

Respiratory Distress (Section 3 Adult Treatment)

Pediatric Respiratory Distress, Failure or Arrest (Section 4 Obstetrics and Pediatrics)

Pulmonary Edema/Cardiogenic Shock (Section 5 Adult Cardiac)

Initial Date: 07/19/2023

Revised Date:

Section: 9-13R

## **Amiodarone**

**Pharmacological Category:** Antiarrhythmic Agent

**Routes:** IV/IO

### **Indications:**

1. Cardiac Arrest (V-Fib or pulseless V-Tach)
2. Tachycardiac that is stable but symptomatic (i.e., does not require immediate cardioversion)
  - a. Rhythm is irregular and narrow (i.e., A-Fib/A-Flutter)
  - b. Rhythm is regular with a wide QRS (i.e., V-Tach, SVT/A-Flutter with aberrancy)

### **Contraindications:**

1. Cardiogenic Shock
2. Severe sinus node dysfunction
3. Bradycardia with syncope except with functioning artificial pacemaker

### **Expected effects:**

1. Prolongs refractory period
2. Inhibits alpha and beta adrenergic stimulation

### **Side effects:**

1. Prolonged QT
2. Vasodilation
3. Hypotension

### **Dosing: CARDIAC ARREST (Adult)**

Indication: V-Fib/V-Tach

Adults administer:

1. Amiodarone 300 mg IV/IO (May repeat once 150 mg IV/IO)

### **Dosing: TACHYCARDIA (Adult)**

Indication: Irregular Narrow rhythm (i.e., A-Fib/A-Flutter) or Regular Wide QRS rhythm (i.e., V-Tach, SVT/A-Flutter with aberrancy):

Adults administer:

1. Amiodarone 150 mg IV over 10 minutes

Indication: Suspected V-Tach

Adults administer:

1. Amiodarone 150 mg IV over 10 minutes as needed to a maximum of 450 mg



Initial Date: 07/19/2023

Revised Date:

Section: 9-13R

---

**Dosing: PEDS CARDIAC ARREST**

Indication: V-Fib/V-Tach

Pediatrics administer:

1. According to MI MEDIC Cards
2. If MI MEDIC cards are not available administer:
  - a. Amiodarone 5 mg/kg (max single dose 300 mg) IV/IO. May repeat twice.  
Do not exceed 450 mg total

**Dosing: PEDS TACHYCARDIA**

Indication: Unstable Regular, Wide Complex Tachycardia

Pediatrics administer:

1. According to MI MEDIC Cards
2. If MI MEDIC cards are not available administer:
  - a. Amiodarone 5 mg/kg (max single dose 300 mg) IV/IO. May repeat twice.  
Do not exceed 450 mg total IV/IO

Used in the Following Protocols

General Cardiac Arrest (Section 5 Adult Cardiac)

Tachycardia (Section 5 Adult Cardiac)

Pediatric Cardiac Arrest – General (Section 6 Pediatric Cardiac)

Pediatric Tachycardia (Section 6 Pediatric Cardiac)

Initial Date: 07/19/2023

Revised Date:

Section: 9-14R

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## ***Aspirin***

**Pharmacological Category:** Analgesic, Nonopioid; Antiplatelet Agent; Nonsteroidal Anti-inflammatory Drug (NSAID), Oral; Salicylate

**Routes:** PO

### **Indications:**

1. Suspected cardiac chest pain
2. Suspected myocardial infarction

### **Contraindications:**

1. Hypersensitivity to nonsteroidal anti-inflammatories

### **Dosing: CHEST PAIN/ACUTE CORONARY SYNDROME**

Indication: Cardiac chest pain/acute coronary syndrome

Adults administer:

1. Aspirin up to 325 mg PO (chew and swallow). If no aspirin taken or suspected insufficient dose taken since the onset of chest pain, administer additional aspirin to achieve a total dose of up to 325 mg.

### Used in the Following Protocols

Chest Pain/Acute Coronary Syndrome (Section 5 Adult Cardiac)

Initial Date: 07/19/2023

Revised Date:

Section: 9-15R

## **Atropine**

**Pharmacological Category:** Anticholinergic Agent; Antidote; Antispasmodic Agent, Gastrointestinal

**Routes:** IV/IO

### **Indications:**

1. Severe symptomatic bradycardia
2. Exposure to organophosphates or other nerve agents when Nerve Agent (NA) Antidote Kit is not available.

### **Expected effects:**

1. Increased heart rate
2. Dilated pupils

**Note:** For Nerve Agent/Organophosphate Pesticide Exposure, when NA Antidote kit is not available, pralidoxime should also be administered in conjunction with atropine when available.

### **Dosing: CRASHING ADULT/IMPENDING ARREST**

Indication: Bradycardia

Adults administer:

1. Atropine 1 mg IV/IO

### **Dosing: ADULT BRADYCARDIA**

Indication: Bradycardia

Adults administer:

1. Atropine 1 mg IV/IO rapid push repeating every 3-5 minutes to a total dose of 3 mg

### **Dosing: PEDIATRIC BRADYCARDIA**

Indication: Bradycardia

Pediatrics administer:

1. According to MI MEDIC Cards
2. If MI MEDIC Cards are not available administer:
  - a. Atropine 0.02 mg/kg IV/IO (minimum dose 0.1 mg, maximum single dose 0.5 mg).May repeat once in 5 minutes, if effective.

### **Dosing: NERVE AGENT/ORGANOPHOSPHATE PESTICIDE EXPOSURE**

Indication: Nerve Agent/Organophosphate Pesticide Exposure when NA Antidote Kit is not available.

See chart below for number of NA kits required based on age and symptoms.

Adults administer:

1. Atropine 2 mg IM/IV for every 1 NA kit that is required.

Pediatrics administer:

Initial Date: 07/19/2023

Revised Date:

Section: 9-15R

1. According to MI MEDIC cards
2. If MI MEDIC cards are not available refer to CHART A below for atropine dosage.
3. Refer to CHART B below and administer 2 mg atropine IV/IM for every one NA Antidote kit required.

CHART A

## Nerve Agent/Organophosphate Antidotes/Countermeasures

| Weight               | Age          | Duodote <sup>1</sup><br>Mod-Severe<br>Sxs | Atropen <sup>2</sup><br>(1 mg) Mod-<br>Severe Sxs | Atropine Dose<br>(0.1 mg/kg)<br>IM/IV/IO | Atropine Vial <sup>2</sup><br>(1 mg/mL) | Cardiac<br>Atropine <sup>2,3</sup><br>(1 mg/10 mL) | Midazolam <sup>4</sup><br>(10 mg/2 mL)<br>IM/IV/IO |
|----------------------|--------------|---|---|--|---|--|--|
| 3-5 kg (6-11 lbs)    | 0-2 months   | 1   | 1   | 0.4 mg                                   | 0.4 mL                                  | 4 mL   | 0.1 mL   |
| 6-7 kg (13-16 lbs)   | 3-6 months   | 1   | 1   | 0.7 mg                                   | 0.7 mL                                  | 7 mL   | 0.2 mL   |
| 8-9 kg (17-20 lbs)   | 7-10 months  | 1   | 1   | 0.9 mg                                   | 0.9 mL                                  | 9 mL   | 0.2 mL   |
| 10-11 (21-25 lbs)    | 11-18 months | 1   | 1   | 1 mg                                     | 1 mL                                    | 10 mL  | 0.2 mL   |
| 12-14 kg (26-31 lbs) | 19-35 months | 1   | 2   | 1.3 mg                                   | 1.3 mL                                  | 13 mL  | 0.25 mL  |
| 15-18 kg (32-40 lbs) | 3-4 years    | 1   | 2   | 1.6 mg                                   | 1.6 mL                                  | 16 mL  | 0.3 mL   |
| 19-23 kg (41-51)     | 5-6 years    | 1   | 2   | 2 mg                                     | 2 mL                                    | 20 mL  | 0.4 mL   |
| 24-29 kg (52-64)     | 7-9 years    | 2   | 3   | 2.6 mg                                   | 2.6 mL                                  | 26 mL  | 0.5 mL   |
| 30-36 kg (65-79 lbs) | 10-14 years  | 2   | 3   | 3.3 mg                                   | 3.3 mL                                  | 33 mL  | 0.6 mL   |
| Adult                | >14 years    | 2 to 3                                    | 4 to 6  | 4 to 6 mg                                | 4 to 6 mL                               | 40-60 mL   | 2 mL   |



<sup>1</sup>Preferred initial autoinjector, <sup>2</sup>May Repeat atropine every 5 minutes until airway secretions decrease (6 mg maximum), <sup>3</sup>Not available in MEDDRUN, <sup>4</sup>Patients with severe symptoms should receive midazolam even if not obviously seizing

CHART B

**Michigan**  
**MEDICATION SECTION**  
**ATROPINE**

Initial Date: 07/19/2023  
 Revised Date:


Section: 9-15R

|                                    | Clinical Findings                        | Signs/Symptoms  | Required Conditions  | NA Kits To Be Delivered  |
|------------------------------------|--|---|--|--|
| <b>SELF-RESCUE</b>                 | <b>Threshold Symptoms</b>                | <ul style="list-style-type: none"> <li>• Dim vision</li> <li>• Increased tearing</li> <li>• Runny nose</li> <li>• Nausea/vomiting</li> <li>• Abdominal cramps</li> <li>• Shortness of breath</li> </ul> | Threshold Symptoms<br>-and-<br>Positive evidence of nerve agent or OPP on site<br><br> Medical Control Order   | 1 NA Kit (self-rescue)   |
|                                    | <b>ADULT PATIENT &gt; 8 years of age</b> | <b>Mild Symptoms and Signs</b>  | <ul style="list-style-type: none"> <li>• Increased tearing</li> <li>• Increased salivation</li> <li>• Dim Vision</li> <li>• Runny nose</li> <li>• Sweating</li> <li>• Nausea/vomiting</li> <li>• Abdominal cramps</li> <li>• Diarrhea</li> </ul> |  Medical Control Order |
| <b>Moderate Symptoms and Signs</b> |  | <ul style="list-style-type: none"> <li>• Constricted pupils</li> <li>• Difficulty breathing</li> <li>• Severe vomiting</li> </ul>   | Constricted Pupils   | 2 NA Kits  |
| <b>Severe Signs</b>                |  | <ul style="list-style-type: none"> <li>• Constricted pupils</li> <li>• Unconsciousness</li> <li>• Seizures</li> <li>• Severe difficulty breathing</li> </ul>  | Constricted Pupils   | 3 NA Kits (If 3 NA Kits are used, administer 1 <sup>st</sup> dose of available benzodiazepine)           |

Initial Date: 07/19/2023

Revised Date:

Section: 9-15R

|                                      | Clinical Findings                                       | Signs/Symptoms   | Required Conditions  | NA Kits To Be Delivered |
|--------------------------------------|---|--|--|-------------------------|
| <b>PEDIATRIC &lt; 8 years of age</b> | <b>Pediatric Patient with Non-Severe Signs/Symptoms</b> | <ul style="list-style-type: none"> <li>• <i>Mild or moderate symptoms as above</i></li> </ul>  | Threshold Symptoms<br><i>-and-</i><br>Positive evidence of nerve agent or OPP on site<br><br> Medical Control Order | 1 NA Kit                |
|                                      | <b>Pediatric Patient with Severe Signs/Symptoms</b>     | <ul style="list-style-type: none"> <li>• Constricted pupils</li> <li>• Unconsciousness</li> <li>• Seizures</li> <li>• Severe difficulty breathing</li> </ul> | Severe breathing difficulty<br><br>Weakness  | 1 NA Kit                |

Used in the Following Protocols

Crashing Adult/Impending Arrest (Section 3 Adult Treatment)

Bradycardia (Section 5 Adult Cardiac)

Pediatric Bradycardia (Section 6 Pediatric Cardiac)

Nerve Agent/Organophosphate Pesticide Exposure (Section 10 Special Operations)

Initial Date: 07/19/2023

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Section: 9-16R

## **Calcium Chloride**

**Pharmacological Category:** Calcium Salt; Electrolyte Supplement, Parenteral

**Routes:** IV/IO

### **Indications:**

1. Cardiac arrest in the renal failure patient
2. Calcium channel blocker toxicity
3. Crush Injury with suspected hyperkalemia

### **Precautions:**

1. Use with caution in patients on digoxin; hypercalcemia may precipitate cardiac arrhythmias.
2. Calcium chloride is not compatible with sodium bicarbonate, flush IV line between medications.

### **Expected effects:**

1. Increased force of myocardial contraction
2. Rise in arterial pressure

**Note:** If given in a line that infiltrated, calcium chloride administration may cause skin sloughing.

### **Dosing: GENERAL CRUSH INJURY**

Indication: Suspected hyperkalemia (peaked T waves, widened QRS, hypotension)

#### Adults administer:

1. Calcium chloride 1 gm slow IVP over 5 minutes

#### Pediatrics administer:

1. According to MI MEDIC cards
2. If MI MEDIC Cards are not available administer:
  - a. Calcium chloride 20 mg/kg slow IVP over 5 minutes. Max dose 1 gm

### **Dosing: POISONING/OVERDOSE/ENVIRONMENTAL EXPOSURE**

Indication: Symptomatic calcium channel blocker overdose

Initial Date: 07/19/2023

Revised Date:

Section: 9-16R

Adults administer:

1. Calcium chloride 1 gm IV

Pediatrics administer:

1. According to MI MEDIC Cards
2. If MI MEDIC Cards are not available administer:
  - a. Calcium chloride 20 mg/kg IV. Max dose 1 gm.

**Dosing: GENERAL CARDIAC ARREST (Adult)**

Indication: known or highly suspected hyperkalemia (e.g., dialysis patient, EKG changes)

Adults administer:

1. Calcium chloride (10%) 1 gm/10 mL IV/IO

**Dosing: PEDIATRIC CARDIAC ARREST**

Indication: hyperkalemia (renal failure)

Pediatrics administer:

1. According to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Calcium chloride (10%) 20 mg/kg (0.2 mL/kg). Max single dose 1 gm

**Used in the Following Protocols**

General Crush Injury (Section 2 Trauma and Environmental)

Poisoning/Overdose/Environmental Exposure (Section 2 Trauma and Environmental)

General Cardiac Arrest (Section 5 Adult Cardiac)

Pediatric Cardiac Arrest – General (Section 6 Pediatric Cardiac)



Initial Date: 07/19/2023  
Revised Date: 08/11/2023

Section: 9-17R

## **Cefazolin**

**Pharmacological Category:** Antibiotic, Cephalosporin (First Generation)

**Routes:** IV/IO

### **Indications:**

1. **Open fractures**
2. Partial/complete amputations
3. Major soft tissue injuries (e.g., mangled extremity)

### **Contraindications:**

1. Infusion <7 years of age (volume for infusion is larger than allowable fluid bolus).

### **Notes:**

#### Slow IV push dilution of cefazolin

1. Dilute 2 gm cefazolin with 20 mL NS
  - a. Inject two 10 mL flushes into one 2 gm vial of cefazolin  
**OR**
  - b. Inject one 10 mL flush into each 1 gm vial of cefazolin.
2. Resulting concentration is 100 mg/mL

#### Infusion dilution of cefazolin

1. Add cefazolin dosage (slow IV push dilution) to 100 mL bag of NS
  - a. Adults: add 20 mL (2 gm diluted) to 100 mL bag of NS
  - b. Pediatrics > 7 years of age: volume of diluted cefazolin added to 100 mL of NS will be calculated weight-based dosage.

### **Dosing: SOFT TISSUE AND ORTHOPEDIC INJURIES**

Indication: Partial/complete amputation, major soft tissue injuries (e.g., mangled extremity) and open fractures.

#### Adults administer:

1. Cefazolin 2 gm (slow IV push dilution), slow IVP over 3-5 minutes  
**OR**
2. Cefazolin Infusion: 2 gm (slow IV push dilution) added to a 100 mL bag of NS. Infuse over 15-30 minutes.

#### Pediatrics

1. Pediatrics slow IVP cefazolin administer:
  - a. Cefazolin (slow IV push dilution) according to MI MEDIC cards.
    - i. . If MI MEDIC cards are not available administer Cefazolin (slow IV push dilution) 30 mg/kg slow IVP over 3-5 minutes. Maximum dose 2 gm.  
**OR**
2. Pediatrics  $\geq$  7 years of age infusion of cefazolin administer:

Initial Date: 07/19/2023

Revised Date: 08/11/2023

Section: 9-17R

---

- a. Cefazolin infusion according to MI MEDIC cards
  - a. If MI MEDIC cards are not available administer cefazolin (slow IV push dilution) 30 mg/kg added to 100 mL bag of NS. Max dose 2 gms. Infuse over 15-30 minutes.

**Used in the Following Protocols**

Soft Tissue and Orthopedic Injuries (Section 2 Trauma and Environmental)

Initial Date: 07/19/2023  
Revised Date: 08/11/2023

Section: 9-18R

## **Ceftriazone**

**Pharmacological Category:** Antibiotic, Cephalosporin (Third Generation)

### **Indications:**

1. Open fractures
2. Partial/complete amputations
3. Major soft tissue injuries (e.g., mangled extremity).

### **Contraindications:**

1. Patients  $\leq$  2 months old (any administration of ceftriazone)
2. Infusion  $<$ 7 years of age (volume for infusion is larger than allowable fluid bolus).
3. Allergies to cefepime (Maxipime) or cefotaxime (Claforan)

### **Side effects:**

1. Rapid administration can result in tachycardia, restlessness, diaphoresis, and palpitations, pain at injection site.

### **Notes:**

#### Slow IV push dilution of ceftriazone

1. Dilute 2 gm ceftriazone with 20 mL NS:
  - a. Inject two 10 mL flushes into one 2 gm vial of ceftriazone**OR**
  - a. Inject one 10 mL flush into each 1 gm vial of ceftriazone.
2. Resulting concentration is 100 mg/mL

#### Infusion dilution of ceftriazone

1. Add ceftriazone dosage (slow IV push dilution) to 100 mL bag of NS:
  - a. Adults: add 20 mL (2 gm of slow IV push dilution) to 100 mL bag of NS
  - b. Pediatrics  $>$  7 years of age: volume of diluted ceftriazone added to 100 mL bag of NS will be calculated weight-based dosage.

### **Dosing: SOFT TISSUE AND ORTHOPEDIC INJURIES**

Indication: Partial/complete amputations, major soft tissue injuries (e.g., mangled extremity) and open fractures.

#### Adults administer:

1. Ceftriazone Slow IVP: 2gm (slow IV push dilution), slow IVP over 3-5 minutes
- OR**
2. Ceftriazone Infusion: 2gm (slow IV push dilution) added to a 100 mL bag of NS. Infuse over 15-30 minutes.

#### Pediatrics

1. Pediatrics  $>$  2 months old ceftriazone slow IV push administer:
  - a. Ceftriazone (slow IV push dilution) according to MI MEDIC cards.

Initial Date: 07/19/2023

Revised Date: 08/11/2023

Section: 9-18R

ii. If MI MEDIC cards are not available administer ceftriazone (slow IV push dilution) 50 mg/kg slow IVP over 3-5 minutes. Maximum dose 2 gm.

**OR**

2. Pediatrics  $\geq 7$  years of age ceftriazone infusion administer:

a. Ceftriazone infusion according to MI MEDIC cards

i. If MI MEDIC cards are not available administer ceftriazone (slow IV push dilution) 50 mg/kg added to 100 mL bag of NS. Max dose 2 gm. Infuse over 15-30 minutes.

**Used in the Following Protocol(s):**

Soft Tissue and Orthopedic Injuries (Section 2 Trauma and Environmental)

Initial Date: 07/19/2023

Revised Date:

Section: 9-19R

## **Dextrose**

**Pharmacological Category:** Glucose-Elevating Agent

**Routes:** IV/IO

### **Indications:**

1. Hypoglycemia
2. Altered mental status

### **Precautions:**

1. Ensure patent line, extravasation may cause significant tissue damage.
2. Dextrose should be pushed slowly (e.g., over 1-2 minutes).

### **Expected effects:**

1. Increased blood glucose level
2. Improvement in altered mental status.

### **Notes:**

1. Instructions for diluting dextrose
  - a. To obtain dextrose 10%, discard 40 mL out of one amp of D50, then draw up 40 mL of NS into the D50 ampule.
  - b. To obtain dextrose 12.5%, discard 37.5 mL out of one amp of D50, then draw 37.5 mL of NS into the D50 ampule
  - c. To obtain dextrose 25%, discard 25 mL out of one amp of D50, then draw 25 mL of NS into the D50 ampule
2. May utilize 10% for all ages 5 mL/kg (0.5 gm/kg) up to 250 mL

### **Dosing: ADULT ALTERED MENTAL STATUS**

Indication: Patient is demonstrating signs of hypoglycemia, blood glucose is < 60 mg/dL.

Adults administer:

1. Dextrose 25 gm IV, titrate to fully awake and oriented.

### **Dosing: ADULT SEIZURES**

Indication: Seizure patient with blood glucose < 60 mg/dL

Adults administer:

1. Dextrose 25 gm IV

### **Dosing: PEDIATRIC ALTERED MENTAL STATUS**

Indication: Patient is demonstrating signs of hypoglycemia and blood glucose as follows:

1. 2 months old or younger and blood glucose is <40 mg/dL
2. 3 months old or older and blood glucose is <60 mg/dL

Pediatrics administer:

1. Dextrose according to MI MEDIC cards

Initial Date: 07/19/2023

Revised Date:

Section: 9-19R

2. If MI MEDIC cards are not available use chart below:

**Dosing: PEDIATRIC SEIZURES**

Indication: Pediatric seizure patient and blood glucose as follows:

1. 2 months old or younger and glucose is <40 mg/dL
2. 3 months old or older and glucose is <60 mg/dL

Pediatrics administer:

1. Dextrose according to MI MEDIC cards
2. If MI MEDIC cards are not available utilize the chart below.

**Dosing: PEDIATRIC CARDIAC ARREST**

Indication: Pediatric patients in cardiac arrest with a blood glucose is less than 60 mg/dL

Pediatrics administer:

1. Dextrose according to MI MEDIC cards
2. If MI MEDIC cards are not available utilize the chart below.
3. If chart is not available administer dextrose 0.5 g/kg

| Color  | Age          | Weight                | Dose  | Concentration  | Volume |    | Concentration | Volume |
|--------|--------------|-----------------------|-------|----------------|--------|----|---------------|--------|
| Grey   | 0-2 months   | 3-5 kg (6-11 lbs.)    | 2.5g  | Dextrose 12.5% | 20 mL  | OR | Dextrose 10%  | 25 mL  |
| Pink   | 3-6 months   | 6-7 kg (13-16 lbs.)   | 3.25g | Dextrose 25%   | 13 mL  | OR | Dextrose 10%  | 33 mL  |
| Red    | 7-10 months  | 8-9 kg (17-20 lbs.)   | 4.25g | Dextrose 25%   | 17 mL  | OR | Dextrose 10%  | 43 mL  |
| Purple | 11-18 months | 10-11 kg (21-25 lbs.) | 5g    | Dextrose 25%   | 20 mL  | OR | Dextrose 10%  | 50 mL  |
| Yellow | 19-35 months | 12-14 kg (26-31 lbs.) | 6.25g | Dextrose 25%   | 25 mL  | OR | Dextrose 10%  | 63 mL  |
| White  | 3-4 years    | 15-18 kg (32-40 lbs.) | 8g    | Dextrose 25%   | 32 mL  | OR | Dextrose 10%  | 80 mL  |
| Blue   | 5-6 years    | 19-23 kg (41-50 lbs.) | 10g   | Dextrose 25%   | 40 mL  | OR | Dextrose 10%  | 100 mL |
| Orange | 7-9 years    | 24-29 kg (52-64 lbs.) | 12.5g | Dextrose 50%   | 25 mL  | OR | Dextrose 10%  | 125 mL |
| Green  | 10-14 Years  | 30-36 kg (65-79 lbs.) | 15g   | Dextrose 50%   | 40 mL  | OR | Dextrose 10%  | 150 mL |

Used in the Following Protocols

Altered Mental Status (Section 3 Adult Treatment)

Seizures (Section 3 Adult Treatment)

Pediatric Altered Mental Status (Section 4 Obstetrics and Pediatrics)

Pediatric Seizures (Section 4 Obstetrics and Pediatrics)



*Michigan*  
**MEDICATION SECTION**  
DEXTROSE

Initial Date: 07/19/2023  
Revised Date:

Section: 9-19R

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Pediatric Cardiac Arrest – General (Section 6 Pediatric Cardiac)

Initial Date: 07/19/2023

Revised Date:

Section: 9-20R

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## ***Diazepam***

**Pharmacological Category:** Antiseizure Agent, Benzodiazepine

**Routes:** IV/IO

**Indications:**

1. Procedural sedation

**Precautions:**

1. Respiratory depression
2. Hypotension

**Expected effects:**

1. Skeletal muscle relaxation

**Notes:**

1. Not used for pediatric procedural sedation

**Dosing: PROCEDURAL SEDATION**

Indication: Procedural sedation

Adults administer:

1. Diazepam 5-10 mg (0.1 mg/kg) IV/IO titrated slowly. May repeat every 5 minutes to a maximum of 0.3 mg/kg.

Used in the Following Protocols

Patient Procedure Sedation (Section 7 Procedures)



Initial Date: 07/19/2023  
Revised Date: 08/11/2023

Section: 9-21R

## ***Diltiazem***

**Pharmacological Category:** Antiarrhythmic Agent, Calcium Channel Blocker

**Routes:** IV/IO

**Indications:**

1. Symptomatic Tachycardia: Narrow Complex (Regular and Narrow or Irregular and Narrow rhythms)

**Contraindications:**

1. Patients with diagnosed sinus node dysfunction (e.g., sick sinus syndrome, WPW syndrome) unless pacemaker is present and functioning.
2. Patients with diagnosed or observed high-grade AV block (i.e., 2<sup>nd</sup> or 3<sup>rd</sup> degree heart block) unless pacemaker is present and functioning.

**Precautions:**

1. Be prepared to administer fluid bolus

**Expected effects:**

1. Resolution of rapid ventricular response or return to NSR

**Side effects:**

1. Hypotension

**Dosing: ADULT TACHYCARDIA**

Indication: Regular Narrow Complex Tachycardia (i.e., SVT, A-Flutter) and Irregular Narrow Complex Tachycardia (i.e., A-Fib/A-Flutter)

Adults administer:

1. Diltiazem 15-20 mg (0.25 mg/kg) IV slowly

Used in the Following Protocols

Tachycardia (Section 5 – Adult Cardiac)

Initial Date: 07/19/2023

Revised Date:

Section: 9-22R

## ***Diphenhydramine***

**Pharmacological Category:** Histamine H1 Antagonist

**Routes:** IV/IO/IM

**Indications:**

1. Anaphylaxis
2. Mild or moderate allergic reaction
3. Urticaria/hives
4. Nausea and vomiting

**Expected effects:**

1. Antihistamine, decreased urticarial, decreased itching
2. Drowsiness

**Dosing: NAUSEA AND VOMITING**

Indications: Nausea and vomiting

Adults administer:

1. Diphenhydramine 12.5-25 mg IV/IM. Maximum dose 25 mg.

Pediatric (>2 years of age AND > 12 kg) administer:

1. According to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Diphenhydramine 1.0 mg/kg IV. Max dose 25 mg.

**Dosing: ANAPHYLAXIS ALLERGIC REACTION**

Indication: Anaphylaxis/allergic reaction

Adults administer:

1. Diphenhydramine 50 mg IM/IV/IO

Pediatrics administer:

1. According to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Diphenhydramine 1 mg/kg IM/IV/IO. Maximum dose 50 mg.

**Dosing: POISONING/OVERDOSE/ENVIRONMENTAL EXPOSURE**

Indication: extrapyramidal dystonic reactions

Adults administer:

1. Diphenhydramine 50 mg IV.

Pediatrics administer:

1. Diphenhydramine 1 mg/kg IV. Max dose 50 mg.

Initial Date: 07/19/2023

Revised Date:

Section: 9-22R

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Used in the Following Protocols

Nausea & Vomiting (Section 1 General Treatment)

Anaphylaxis/Allergic Reaction (Section 1 General Treatment)

Poisoning/Overdose/Environmental Exposure (Section 2 Trauma and Environmental)

Initial Date: 07/19/2023

Revised Date:

Section: 9-23R

## ***Epinephrine***

**Pharmacological Category:** Sympathomimetic agent

**Routes:** IV/IO/IM, Nebulized

### **Indications:**

1. Anaphylaxis
2. Bradycardia
3. Respiratory distress
4. Hypotension
5. Cardiac arrest

### **Expected effects:**

1. Decreased wheezing
2. Increased BP
3. Increased HR

### **Notes:**

1. This protocol does NOT apply to Epi Auto Injector (see Epi Auto Injector Protocol)
2. Note that epinephrine is not utilized in the pediatric bradycardia protocol

### **Preparing PUSH DOSE Epinephrine:**

1. Prepare (epinephrine 10 mcg/mL)
  - a. Combine 1 mL of 1 mg/10 mL epinephrine in 9mL NS

### **Dosing: SHOCK**

Indication: Hypotension unresponsive to fluid bolus administration

#### Adults administer:

1. PUSH DOSE epinephrine 10-20 mcg (1-2 mL of 10 mcg/mL) IV/IO. Repeat every 3-5 minutes. Titrate to SBP > 90 mm/Hg.

#### Pediatrics administer:

1. PUSH DOSE epinephrine utilizing MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. PUSH DOSE epinephrine 1 mcg/kg (0.1 mL of epinephrine 10 mcg/mL) IV/IO. Maximum single dose 10 mcg (1 mL). Repeat every 3-5 minutes.

### **Dosing: ANAPHYLAXIS/ALLERGIC REACTION**

Indication: Anaphylaxis/Severe Allergic Reaction

#### Adults administer:

1. Epinephrine (1mg/mL) 0.3 mg (0.3 mL) IM. May repeat one time after 3-5 minutes if patient remains hypotensive. Maximum of 2 doses total of epinephrine (including

Initial Date: 07/19/2023

Revised Date:

Section: 9-23R

epi pen).

Pediatrics administer EPI IM:

1. EPI IM according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. For child weighing  $\leq$  30 kg or approx. 60 lbs.
    - i. Epinephrine (1mg/mL) 0.15 mg (0.15 mL) IM. May repeat one time after 3-5 minutes if patient remains hypotensive. Maximum of two IM doses (including epi pen).
  - b. For child weighing  $>$  30 kg or approx. 60 lbs.
    - i. Epinephrine (1mg/mL) 0.3 mg (0.3 mL) IM. May repeat one time after 3-5 minutes if patient remains hypotensive. Maximum of two IM doses total (including epi pen).

Indication: Hypotension not responsive to fluid bolus administration and/or impending arrest

Adults administer:

1. PUSH DOSE epinephrine 10-20 mcg (1-2 mL of 10 mcg/mL) IV/IO. Repeat every 3-5 minutes. Titrate to SBP  $>$  90 mm/Hg.

Pediatrics administer:

1. PUSH DOSE epinephrine utilizing MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. PUSH DOSE epinephrine 1 mcg/kg (0.1 mL of epinephrine 10 mcg/mL) IV/IO. Maximum single dose 10 mcg (1 mL). Repeat every 3-5 minutes.

**Dosing: ADULT RESPIRATORY DISTRESS**

Indication: Impending respiratory failure and unable to tolerate nebulizer therapy

Adults administer EPI IM:

1. Epinephrine (1mg/mL) 0.3 mg (0.3 mL) IM

**Dosing: CRASHING ADULT/IMPENDING ARREST**

Indication: Patient in whom cardiac or respiratory arrest appears imminent and hypotension is unresponsive to fluid bolus administration

Adults administer:

1. PUSH DOSE epinephrine 10-20 mcg (1-2 mL of 10 mcg/mL) IV/IO. Repeat every 3-5 minutes. Titrate to SBP  $>$  90 mm/Hg.

Initial Date: 07/19/2023

Revised Date:

Section: 9-23R

**Dosing: PEDIATRIC RESPIRATORY DISTRESS, FAILURE OR ARREST**

Indication: Pediatric patient presents with stridor at rest without suspected airway obstruction.

Pediatrics administer EPI IM:

1. EPI IM according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Child weighing  $\leq$  30 kg or approx. 60 lbs.:
    - i. Epinephrine (1 mg/mL) 0.15 mg (0.15 mL) IM
  - b. Child weighing  $>$  30 kg or approx. 60 lbs.:
    - i. Epinephrine (1 mg/mL) 0.3 mg (0.3 mL) IM

Indication: Severe respiratory distress

Pediatrics administer NEBULIZED EPI

1. Epinephrine (1 mg/1 mL) 5 mg nebulized

**Dosing: ADULT CARDIAC ARREST**

Indication: Cardiac arrest

Adults administer:

1. Epinephrine (1 mg/10 mL) 1 mg IV/IO every 3 to 5 minutes

**Dosing: PEDIATRIC CARDIAC ARREST**

Indication: Cardiac arrest

Pediatrics administer:

1. Epinephrine according to MI MEDIC cards.
2. If MI MEDIC cards are not available administer:
  - a. Epinephrine (1 mg/10 ml), 0.01 mg/kg (0.1 ml/kg). Max dose 1 mg (10 mL).  
Repeat every 3-5 minutes

**Dosing: ADULT BRADYCARDIA**

Indication: Patients with persistent symptomatic bradycardia

Adults administer:

1. PUSH DOSE epinephrine 10-20 mcg (1-2 mL of 10 mcg/mL) IV/IO. Repeat every 3-5 minutes. Titrate to SBP  $>$  90 mm/Hg.

**Dosing: ADULT CHF/CARDIOGENIC SHOCK**

Indication: If SBP is below 100 mmHG treat for cardiogenic shock

Adults administer:

1. PUSH DOSE epinephrine 10-20 mcg (1-2 mL of 10 mcg/mL) IV/IO. Repeat every 3-5 minutes. Titrate to SBP  $>$  90 mm/Hg.

Initial Date: 07/19/2023

Revised Date:

Section: 9-23R

**Dosing: ADULT ROSC**

Indication: Hypotension unresponsive to fluid bolus administration

Adults administer:

1. PUSH DOSE epinephrine 10-20 mcg (1-2 mL of 10 mcg/mL) IV/IO. Repeat every 3-5 minutes. Titrate to SBP > 90 mm/Hg.

**Dosing: PEDIATRIC BRADYCARDIA**

Indication: If pulse remains < 60, despite oxygenation & ventilation

Pediatrics administer:

1. Epinephrine according to MI MEDIC cards.
2. If MI MEDIC cards are not available administer:
  - a. Epinephrine (1 mg/10 mL) 0.01 mg/kg (0.1 mL/kg) IV/IO up to 1 mg (10 mL). Repeat every 3-5 minutes.

**Dosing: PEDIATRIC ROSC**

Indication: Hypotension unresponsive to fluid bolus administration

Pediatrics administer:

1. PUSH DOSE epinephrine according to MI MEDIC cards, titrating to age appropriate SBP per MI MEDIC cards.
2. If MI MEDIC cards are not available administer:
  - a. PUSH DOSE epinephrine 1 mcg/kg (0.1 mL of epinephrine 10 mcg/mL) IV/IO. Maximum single dose 10 mcg (1 mL). Repeat every 3-5 minutes. Titrate to SBP > 70 mmHG + (2 x age in years) up to 100 mmHg.

Used in the Following Protocols

Shock (Section 1 General Treatment)

Anaphylaxis/Allergic Reaction (Section 1 General Treatment)

Respiratory Distress (Section 3 Adult Treatment)

Crashing Adult/Impending Arrest (Section 3 Adult Treatment)

Pediatric Respiratory Distress, Failure or Arrest (Section 4 Obstetrics and Pediatrics)

General Cardiac Arrest (Section 5 Adult Cardiac)

Pediatric Cardiac Arrest – General (Section 6 Pediatric Cardiac)

Bradycardia (Section 5 Adult Cardiac)

Pulmonary Edema/Cardiogenic Shock (Section 5 Adult Cardiac)

Pediatric Bradycardia (Section 6 Pediatric Cardiac)

Return of Spontaneous Circulation (ROSC)-Adult (Section 3 Adult Treatment)

Peds ROSC (Section 4 Obstetrics and Pediatrics)

Initial Date: 07/19/2023

Revised Date:

Section: 9-24R

## ***Fentanyl***

**Pharmacological Category:** Analgesic, Opioid; General Anesthetic

**Routes:** IV/IO/IM/IN

### **Indications:**

1. Pain management
2. Patient sedation

### **Contraindications:**

1. Altered Mental Status
2. Hypotension
3. Respiratory Depression

### **Expected effects:**

1. Decreased pain
2. Decreased agitation

### **Side effects:**

1. Drowsiness
2. Hypotension
3. Respiratory Depression
4. Vomiting

### **Dosing: CHEST PAIN/ACUTE CORONARY SYNDROME**

Indication: Chest pain in which nitroglycerin is contraindicated due to erectile dysfunction medication or suspected cardiac chest pain is refractory to nitroglycerin.

Adults (65 years of age or under) administer:

1. Fentanyl 1 mcg/kg IV/IO/IN, max single dose 100 mcg. May repeat one time.  
Total dose may not exceed 200 mcg.

Adults (> 65 years of age or older) administer:

1. Fentanyl 0.5 mcg/kg IV/IO/IN. Max single dose 50 mcg. May repeat three times.  
Total dose may not exceed 200 mcg.

### **Dosing: PAIN MANAGEMENT**

Indication: Patient is unable to tolerate ketamine or ketamine is not available and the patient has significant pain (described as 7 or greater on the Wong Pain Scale).

Adults 65 years of age or under administer:

1. Fentanyl 1 mcg/kg IV/IO/IN. Max single dose 100 mcg. May repeat one time. Total dose may not exceed 200 mcg.

Adults > 65 years of age administer:



Initial Date: 07/19/2023

Revised Date:

Section: 9-24R

1. Fentanyl 0.5 mcg/kg IV/IO/IN. Max single dose 50 mcg. May repeat three times. Total dose may not exceed 200 mcg.

Pediatrics administer:

1. Fentanyl according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Fentanyl 0.1 mg/kg IV/IO/IN

**Dosing: PATIENT PROCEDURAL SEDATION**

Adults administer:

1. Fentanyl 50-100 mcg (1 mcg/kg) IV/IO titrated slowly (IN, if available). May repeat every 4 minutes to a maximum of 3 mcg/kg.

Pediatrics administer:

1. Fentanyl according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Fentanyl 1 mcg/kg IV/IO titrated slowly (IN, if available). May repeat every 5 minutes to a maximum of 3 mcg/kg.

Used in the Following Protocols

Chest Pain/Acute Coronary Syndrome (Section 5 Adult Cardiac)

Pain Management (Section 7 Procedures)

Patient Procedure Sedation (Section 7 Procedures)

Initial Date: 07/19/2023

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Section: 9-25R

## **Glucagon**

**Pharmacological Category:** Antidote; Hypoglycemia

**Routes:** IM/IN

**Indications:**

1. Unable to obtain IV access and dextrose is indicated

**Contraindications:**

1. Adrenal gland tumor

**Expected effects:**

1. Increased blood glucose

**Side effects:**

1. Nausea
2. Vomiting

**Dosing: ADULT ALTERED MENTAL STATUS**

Indication: Patient is demonstrating signs of hypoglycemia, blood glucose is < 60 mg/dL and unable to start IV.

Adults administer:

1. Glucagon 1 mg IM/IN

**Dosing: ADULT SEIZURE**

Indication: Seizure patient with blood glucose < 60 mg/dL and unable to start IV.

Adults administer:

1. Glucagon 1 mg IM/IN

**Dosing: PEDS ALTERED MENTAL STATUS**

Indication: Pediatric patient demonstrating signs of hypoglycemia, unable to start IV and blood glucose as follows:

1. 2 months old or younger and glucose is <40 mg/dL
2. 3 months old or older and glucose is <60 mg/dL

Pediatrics administer:

1. Glucagon according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Pediatrics age 5 or greater:
    - i. Glucagon 1 mg IM/IN
  - b. Pediatrics less than age 5:
    - i. Glucagon 0.5 mg IM/IN

Initial Date: 07/19/2023

Revised Date:

Section: 9-25R

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**Dosing: PEDS SEIZURE**

Indication: Pediatric seizure patient, unable to start IV, and blood glucose as follows:

1. 2 months old or younger and glucose is <40 mg/dL
2. 3 months old or older and glucose is <60 mg/dL

Pediatrics administer:

1. Glucagon according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Pediatrics age 5 or greater:
    - i. Glucagon 1 mg IM/IN
  - b. Pediatrics less than age 5:
    - i. Glucagon 0.5 mg IM/IN

Used in the Following Protocols

Altered Mental Status (Section 3 Adult Treatment)

Seizures (Section 3 Adult Treatment)

Pediatric Altered Mental Status (Section 4 Obstetrics and Pediatrics)

Pediatric Seizures (Section 4 Obstetrics and Pediatrics)

Initial Date: 07/19/2023

Revised Date:

Section: 9-26R

## ***Hydroxocobalamin***

**Pharmacological Category:** Antidote; Vitamin, Water Soluble

**Routes:** IV/IO

### **Indications:**

1. Known or suspected cyanide poisoning.
2. Smoke inhalation with altered mental status and/or moderate to severe respiratory distress.

### **Precautions:**

1. Numerous drugs and blood products are not compatible with hydroxocobalamin.
2. Push over 15 minutes
3. Hydroxocobalamin is incompatible with dopamine and fentanyl. Must flush line between medications.

### **Expected effects:**

1. Increased blood glucose

### **Side effects:**

1. Nausea
2. Vomiting
3. Abdominal pain
4. Red colored urine, skin, mucus membranes
5. Rash

### **Notes:**

1. Hydroxocobalamin comes as a powder to be reconstituted prior to administration and is available as Cyanokit®
2. Reconstitute Cyanokit® (5 gm or 2.5 gm vial) for injection using sterile transfer spike with diluent (0.9%NaCl).
  - a. The line on each vial label represents the volume of diluent
  - b. Repeatedly inverted or rock vial (do not shake) prior to infusion
    - i. 5 gm bottle invert/rock for at least 60 seconds
    - ii. 2.5 gm bottle invert/rock for at least 30 seconds
  - c. Visually inspect solution - should be dark red with no particulates
    - i. Discard if visible particulates and/or not dark red

Initial Date: 07/19/2023

Revised Date:

Section: 9-26R

**Dosing: CYANIDE EXPOSURE**

Indication: Patients exposed to cyanide that demonstrate symptoms as outlined in the above protocol.

Adults administer:

1. Hydroxocobalamin 5 gm IV/IO slow IV push over 15 minutes. May repeat 5 gm dose infusion. Infuse over 15 minutes for sever cases, slower infusion, up to 2 hours, for less severe cases. Total max dose 10 gm.

Pediatrics administer:

1. Hydroxocobalamin according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Hydroxocobalamin according to chart below
  - b. If chart below is not available administer Hydroxocobalamin 70 mg/kg IV/IO slow IV push over 15 minutes.

**Cyanokit® Administration for Suspected Cyanide Poisoning  
(including serious smoke inhalation)**

| Weight                          | Age          | Cyanokit® Dose <sup>1</sup><br>(~70 mg/kg +/-) IV/IO | Cyanokit® Volume to Administer <sup>2</sup> IV/IO |
|---------------------------------|--------------|--|---|
| 3-5 kg (6-11 lbs)               | 0-2 months   | 250 mg   | 10 mL <sup>3</sup>                                |
| 6-7 kg (13-16 lbs)              | 3-6 months   | 500 mg   | 20 mL <sup>3</sup>                                |
| 8-9 kg (17-20 lbs)              | 7-10 months  | 625 mg   | 25 mL <sup>3</sup>                                |
| 10-11 (21-25 lbs)               | 11-18 months | 750 mg   | 30 mL <sup>3</sup>                                |
| 12-14 kg (26-31 lbs)            | 19-35 months | 900 mg   | 36 mL <sup>3</sup>                                |
| 15-18 kg (32-40 lbs)            | 3-4 years    | 1100 mg  | 44 mL <sup>3</sup>                                |
| 19-23 kg (41-51)                | 5-6 years    | 1500 mg  | 60 mL <sup>3</sup>                                |
| 24-29 kg (52-64)                | 7-9 years    | 1750 mg  | 70 mL <sup>3</sup>                                |
| 30-36 kg (65-79 lbs)            | 10-14 years  | 2500 mg  | 100 mL <sup>4</sup> (1/2 bottle)                  |
| Adult 37 40 kg (80-88 lbs)      | >14 years    | 3000 mg  | 120 mL <sup>4</sup>                               |
| Adult 41 49kg (89-108 lbs)      | >14 years    | 3500 mg  | 140 mL <sup>4</sup>                               |
| Adult > or 50 kg (> or 109 lbs) | >14 years    | 5000 mg  | 200 mL <sup>4</sup> (full bottle)                 |

<sup>1</sup>The safety and efficacy in pediatrics has not been established, <sup>2</sup>Administer slowly over 15 minutes.

<sup>3</sup>Push slowly over 15 minutes, <sup>4</sup>Infuse over 15 minutes

Used in the Following Protocols

Cyanide Exposure (Section 10 Special Operations)

Initial Date: 07/19/2023  
Revised Date: 08/11/2023

Section: 9-27R

## ***Ibuprofen***

**Pharmacological Category:** Analgesic, Nonopioid; Nonsteroidal Anti-inflammatory Drug (NSAID)

**Routes:** PO

**Indications:**

1. Mild pain
2. Fever

**Contraindications:**

1. Active bleeding
2. <6 months of age
3. Pregnancy

**Precautions:**

1. Has received ibuprofen (i.e., Motrin/Advil) or any medication containing ibuprofen (e.g., cold medication) in the last 6 hours and is alert.
2. Patient must be alert enough to take PO medication.

**Expected effects:**

1. Fever reduction
2. Pain relief

**Side effects:**

1. Nausea/vomiting
2. Abdominal pain
3. Heartburn

**Dosing: PEDIATRIC FEVER**

Indication: Fever

Pediatrics over 6 months old administer:

1. Ibuprofen according to MI MEDIC cards
  - a. If MI MEDIC cards are not available administer ibuprofen according to dosing chart below.

**Dosing: PAIN MANAGEMENT**

Indication: For mild to moderate pain (described as 1-6 on the Wong Pain Scale)

Adults administer:

1. Ibuprofen 400 mg PO.

Pediatrics (patients greater than 6 months of age) administer:

1. Ibuprofen according to MI MEDIC cards

Initial Date: 07/19/2023  
Revised Date: 08/11/2023

Section: 9-27R

2. If MI MEDIC cards are not available administer ibuprofen according to chart below

| Children's Ibuprofen Elixir Dosing Table |                 |                         |
|--|-----------------|-------------------------|
| Child's Weight                           | Child's Age     | Ibuprofen<br>100 mg/5mL |
| 3-5 kg (6-12 lbs.)                       | 0-2 mos.        | DO NOT GIVE             |
| 6-7 kg (13-16 lbs.)                      | 3-6 mos.        | DO NOT GIVE             |
| 8-9 kg (17-20 lbs.)                      | 7-10 mos.       | 4 mL (80 mg)            |
| 10-11 kg (21-25 lbs.)                    | 11-18 mos.      | 5 mL (100 mg)           |
| 12-14 kg (26-31 lbs.)                    | 19 mos.-35 mos. | 6 mL (120 mg)           |
| 15-18 kg (32-40 lbs.)                    | 3-4 yrs.        | 7.5 mL (150 mg)         |
| 19-23 kg (41-51 lbs.)                    | 5-6 yrs.        | 9.5 mL (190 mg)         |
| 24-29 kg (52-64 lbs.)                    | 7-9 yrs.        | 13 mL (260 mg)          |
| 30-36 kg (65-79 lbs.)                    | 10-14 yrs.      | 15 mL (300 mg)          |

Used in the Following Protocols

Pediatric Fever (Section 4 Obstetrics and Pediatrics)

Pain Management (Section 7 Procedures)

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Section: 9-28R

## ***Ipratropium Bromide***

**Pharmacological Category:** Anticholinergic Agent

**Routes:** Nebulized

**Indications:**

1. Wheezing
2. Airway Constriction

**Contraindications:**

1. Hypersensitivity to atropine or its derivatives

**Expected effects:**

1. Decreased wheezing
2. Decreased respiratory distress

**Notes:** May be administered in conjunction with albuterol 2.5 mg/3 mL NS as a 'Duoneb'.

**Side effects:**

1. Palpitations
2. Dry Mouth
3. Anxiety

**Dosing: ANAPHYLAXIS ALLERGIC REACTION**

Indication: Continued wheezing and/or airway constriction after administration of nebulized albuterol.

Adults and pediatrics administer:

1. Ipratropium 500 mcg/2.5 mL NS nebulized

**Dosing: ADULT RESPIRATORY DISTRESS**

Indication: Continued wheezing and/or airway constriction after administration of nebulized albuterol.

Adults administer:

1. Ipratropium 500 mcg/2.5 mL NS nebulized

Used in the Following Protocols

Anaphylaxis/Allergic Reaction (Section 1 General Treatment)

Respiratory Distress (Section 3 Adult Treatment)



Initial Date: 07/19/2023  
Revised Date: 07/28/2023

Section: 9-29R

## ***Ketamine***

**Pharmacological Category:** Antidepressant; General Anesthetic

**Routes:** IV/IO/IM/IN

**Indications:**

1. Pain Management
2. Sedation

**Precautions:**

1. Ketamine IV should be diluted to prevent ketamine dissociation.

**Expected effects:**

1. Sedation
2. Decreased agitation
3. Decreased pain

**Side effects:**

1. Nausea/vomiting
2. Nystagmus
3. Dysphoria

**Notes:**

1. IM Ketamine has a 3–5-minute onset
2. Diluting ketamine
  - a. Mix the patient specific dose into 100 mL NS and administer slow infusion over 5-10 minutes.
3. Ketamine is an MCA optional medication and may not be available.

**Dosing: HYPERACTIVE DELIRIUM SYNDROME WITH SEVERE AGITATIONS**

Indication: Patients demonstrating signs and symptoms of hyperactive delirium syndrome with severe agitation that are in imminent physical threat to themselves and/or personnel.

Adults administer:

1. Ketamine 4 mg/kg IM. Maximum single dose 500 mg

**Dosing: PAIN MANAGEMENT**

Indication: For patients with severe pain (described as 7 or greater on the Wong Pain Scale)

Adults administer:

1. Ketamine 0.2 mg/kg IV/IO (diluted) slow infusion. Maximum single dose 25 mg.
2. Ketamine 0.5 mg/kg IN (undiluted). Maximum single dose 50 mg.
3. May repeat after 10 minutes.

Initial Date: 07/19/2023  
Revised Date: 07/28/2023

Section: 9-29R

Pediatrics

1. Ketamine according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Pediatrics (> 6 years of age and  $\leq$  14 years of age):
    - i. Ketamine 0.2 mg/kg IV/IO (diluted) slow infusion, maximum single dose 7.2 mg
    - ii. Ketamine 0.5 mg/kg IN (undiluted) maximum single dose 18 mg
    - iii.. May repeat after 10 minutes.
  - b. Pediatrics (> 6 months of age and  $\leq$  6 years of age)
    - i. 0.5 mg/kg IN (undiluted) maximum single dose 18 mg
    - ii.. May repeat after 10 minutes.

Used in the Following Protocols

Hyperactive Delirium Syndrome with Severe Agitation (Section 3 Adult Treatment)  
Pain Management (Section 7 Procedures)

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Section: 9-30R

## ***Ketorolac***

**Pharmacological Category:** Analgesic, Nonopioid; Nonsteroidal Anti-inflammatory Drug (NSAID)

**Routes:** IM/IV

**Indications:**

1. Pain management

**Contraindications:**

1. Allergies to NSAIDs
2. Active labor or women who are breastfeeding
3. Renal impairment
4. Bleeding or high risk of bleeding
5. Pregnancy

**Expected effects:**

1. Pain Relief

**Side effects:**

1. Nausea/vomiting
2. Bloating

**Dosing: PAIN MANAGEMENT**

Adults administer:

1. Ketorolac 15 mg IM/IV

Pediatrics (patients over 5 years of age) administer:

1. Ketorolac according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Ketorolac 1 mg/kg IM/IV. Max dose 15 mg.

Used in the Following Protocols

Pain Management (Section 7 Procedures)

Initial Date: 07/19/2023

Revised Date:

Section: 9-31R

## **Lidocaine**

**Pharmacological Category:** Antiarrhythmic, anesthetic

**Routes:** IV/IO

### **Indications:**

1. Cardiac arrest from VF/VT
2. Wide complex tachycardia
3. As an anesthetic agent for IO establishment

### **Contraindications:**

1. Bradycardia or heart block

### **Expected effects:**

1. Increased VF threshold
2. Decreased ventricular irritability
3. Decreased pain with infusion

### **Dosing: ADULT CARDIAC ARREST**

Indication: Cardiac arrest V-Fib, pulseless V-Tach, or multiple AED defibrillations

Adults administer:

1. Lidocaine 1 mg/kg IV/IO. May repeat 0.5 mg/kg every 5-10 minutes. Total dose of 3 mg/kg

### **Dosing: ADULT TACHYCARDIA**

Indication: Regular Wide QRS rhythm (i.e., V-Tach, SVT/A-Flutter with aberrancy)

Adults administer:

1. Lidocaine 1 mg/kg IV. Repeat lidocaine 0.5 -1.0 mg/kg IV push every 5 - 10 minutes to a maximum of 3 mg/kg.

### **Dosing: PEDIATRIC CARDIAC ARREST**

Indication: Cardiac arrest V-Fib, pulseless V-Tach, or multiple AED defibrillations

Pediatrics administer:

1. Lidocaine according to MI MEDIC cards
2. If MI MEDIC cards are not available administer Lidocaine 1 mg/kg IV/IO. May repeat 0.5 mg/kg twice at 5-10 minute intervals. Maximum 3 doses total

### **Dosing: PEDIATRIC TACHYCARDIA**

Indication: For recurrent or refractory wide complex – unstable tachycardia

Pediatrics administer:

1. Lidocaine according to MI MEDIC cards
2. If MI MEDIC cards are not available administer Lidocaine 1 mg/kg IV/IO. May repeat 0.5 mg/kg twice at 5-10 minute intervals. Maximum 3 doses total

Initial Date: 07/19/2023

Revised Date:

Section: 9-31R

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**Dosing: VASCULAR ACCESS & IV FLUID THERAPY**

Indication: Conscious patients experiencing pain with IO infusion

Adults administer:

1. Lidocaine 2%, 20 mg IO

Pediatrics administer:

1. Lidocaine 0.5 mg/kg, IO maximum dose of 20 mg

Used in the Following Protocols

General Cardiac Arrest (Section 5 Adult Cardiac)

Tachycardia (Section 5 Adult Cardiac)

Pediatric Cardiac Arrest – General (Section 6 Pediatric Cardiac)

Pediatric Tachycardia (Section 6 Pediatric Cardiac)

Vascular access & IV Fluid Therapy (Section 7 Procedures)

Initial Date: 07/19/2023

Revised Date:

Section: 9-32R

## ***Magnesium Sulfate***

**Pharmacological Category:** Antiseizure Agent, Electrolyte Supplement

### **Indications:**

1. Cardiac: Torsades de Pointes
2. VF/VT in hypomagnesemia
3. Pre-eclampsia
4. Eclamptic seizures
5. Refractory status asthmaticus

### **Precautions:**

1. Magnesium Sulfate is diluted for applications in these protocols

### **Expected effects:**

1. Seizure cessation
2. Decreased respiratory distress

### **Side effects:**

1. Respiratory depression
2. Hypotension
3. Asystole
4. Burning in IV site for conscious patients

### **Best Practice for Administering Magnesium Sulfate**

1. Magnesium Sulfate dose added to 100 to 250 mL of NS and infusing over approximately 10 minutes.

### **Notes:**

1. Magnesium Sulfate for Preeclampsia/Eclampsia can be administered prior, during, or up to 6 weeks post childbirth.
2. The dosing for preeclampsia and eclampsia are both 4 gm (see treatment protocol for pre/post radio requirements).

### **Dosing: ADULT RESPIRATORY DISTRESS**

Indication: Status asthmaticus

Adults administer:

1. Magnesium Sulfate 2 gm slow IV (preferably added to 100-200 mL NS bag over 10 minutes).

### **Dosing: ADULT SEIZURES**

Indication: Eclamptic seizure

Adults administer:

Initial Date: 07/19/2023

Revised Date:

Section: 9-32R

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1. Magnesium Sulfate 4 gm over 10 minutes IV/IO until seizure stops (preferably added to 100-200 mL NS bag over 10 minutes).

**Dosing: CHILDBIRTH & RELATED OBSTETRICAL EMERGENCIES**

Indication: Preeclampsia or Eclamptic Seizure

Adults administer:

1. Magnesium Sulfate 4 gm over 10 minutes IV/IO until seizure stops (preferably added to 100-200 mL NS bag over 10 minutes).

**Dosing: ADULT CARDIAC ARREST**

Indications: Suspected torsades de pointes

Adults administer:

1. Magnesium Sulfate 2 gm IV/IO

Used in the Following Protocols:

Respiratory Distress (Section 3 Adult Treatment)

Seizures (Section 3 Adult Treatment)

Childbirth and Obstetrical Emergencies (Section 4 Obstetrics and Pediatrics)

General Cardiac Arrest (Section 5 Adult Cardiac)

Initial Date: 07/19/2023

Revised Date:

Section: 9-33R

## ***Methylprednisolone***

**Pharmacological Category:** Corticosteroid, Systemic

**Routes:** IV/IO/IM

### **Indications:**

1. Allergic reactions
2. Airway inflammation
3. Reactive airway disease
4. Acute adrenal insufficiency

### **Contraindications:**

1. Hypersensitivity to methylprednisolone (or similar)

### **Expected effects:**

1. Decreased inflammation

### **Side effects:**

1. Dizziness
2. Nausea/vomiting

### **Notes:**

1. Prednisone PO is preferred over methylprednisolone for respiratory distress however prednisone it is not a required medication, and the PO tablet has restrictions (tablet cannot be cut, cannot be administered to children  $\leq 6$  years of age, cannot be administered to patient that is unable to safely take PO medication).

### **Dosing: ANAPHYLAXIS ALLERGIC REACTION**

Indication: If patient is symptomatic of an allergic reaction but not in a severe allergic reaction or anaphylaxis OR after epinephrine administration

Adults administer:

1. Methylprednisolone 125 mg IV/IO/IM

Pediatrics administer:

1. Methylprednisolone according to MI MEDIC cards.
2. If MI MEDIC cards are not available administer Methylprednisolone 2 mg/kg IV/IO/IM. Maximum dose 125 mg.

### **Dosing: ADRENAL CRISIS**

Indication: Patients with a known history of adrenal insufficiency, experiencing signs of crisis.

Adults administer:

1. Methylprednisolone 125 mg IV/IO/IM

Pediatrics administer:

1. Methylprednisolone according to MI MEDIC cards.



Initial Date: 07/19/2023

Revised Date:

Section: 9-33R

2. If MI MEDIC cards are not available administer Methylprednisolone 2 mg/kg IV/IO/IM.  
Maximum dose 125 mg

**Dosing: ADULT RESPIRAOTRY DISTRESS**

Indication: Respiratory distress patients with wheezing or diminished breath sounds due to asthma or COPD.

Adults administer:

1. Methylprednisolone 125 mg IV/IO/IM

**Dosing: PEDIATRIC RESPIRATORY DISTRESS, FAILURE OR ARREST**

Indication: Pediatric respiratory distress patients with suspected bronchospasm (wheezing)

Pediatrics administer:

1. Methylprednisolone according to MI MEDIC cards.
2. If MI MEDIC cards are not available administer Methylprednisolone 2 mg/kg IV/IO/IM.  
Maximum dose 125 mg

Used in the Following Protocols:

Anaphylaxis/Allergic Reaction (Section 1 General Treatment)

Adrenal Crisis (Section 1 General Treatment)

Respiratory Distress (Section 3 Adult Treatment)

Pediatric Respiratory Distress, Failure or Arrest (Section 4 Obstetrics and Pediatrics)

Initial Date: 07/19/2023

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Section: 9-34R

## ***Midazolam***

**Pharmacological Category:** Antiseizure Agent, Benzodiazepine; Benzodiazepine

**Routes:** IV/IO/IM/IN

### **Indications:**

1. Adult or pediatric seizures
2. Procedural Sedation
3. Severe agitation that prohibits essential assessment and/or treatment

### **Contraindications:**

1. Shock

### **Precautions:**

1. Consider lower range of dosing for Geriatric patients

### **Expected effects:**

1. Seizure cessation
2. Sedation

### **Side effects:**

1. Respiratory depression
2. Hypotension

### **Dosing: ADULT SEIZURES**

Indication: Actively seizing adult patient.

Adults administer:

1. Midazolam 10 mg IM prior to IV start
2. If IV established prior to the need for medication administration, midazolam 5 mg IV/IO
3. If seizure persists repeat midazolam 5mg IV/IO/IM/IN

### **Dosing: HYPERACTIVE DELIRIUM SYNDROME**

Indication: Patients who are uncontrollably agitated despite de-escalation techniques

Adults administer:

1. Midazolam 10 mg IM/IN

### **Dosing: PEDIATRIC SEIZURES**

Indication: Actively seizing pediatric patient.

Pediatrics administer:

1. Midazolam according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Midazolam 0.1 mg/kg IM, maximum individual dose 10 mg.

Initial Date: 07/19/2023

Revised Date:

Section: 9-34R

- b. If IV established prior to the need for medication administration, administer midazolam 0.05 mg/kg IV/IO. Maximum single dose of 5 mg.
- c. If seizures persisting 10 minutes after initial dose (and correction of low blood glucose if applicable) repeat midazolam one time
  - i. Midazolam 0.1 mg/kg IM. Maximum single dose 10 mg
  - OR**
  - ii. If IV available midazolam 0.05 mg/kg IV/IO maximum single dose of 5 mg.

**Dosing: PATIENT RESTRAINT**

Indication: when soft restraint placement alone would pose a safety risk or is ineffective in calming the patient

Adults administer:

- 1. Midazolam 0.1 mg/kg IM/IN. Maximum dose of 10 mg

Pediatrics administer:

- 1. Midazolam according to MI MEDIC cards
- 2. If MI MEDIC cards are not available administer Midazolam 0.1 mg/kg IM. Maximum single dose 5mg.

**Dosing: PATIENT PROCEDURAL SEDATION**

Indication: Sedation titrated to minimum amount necessary for patients requiring a painful medical procedure (i.e., cardioversion, transcutaneous pacing), post intubation sedation, CPAP, or HFNC.

Adults administer:

- 1. Midazolam 1-5 mg (maximum dose of 0.05 mg/kg) IV/IO titrated slowly or IN. May repeat once in 5 minutes. Maximum total dose 0.1 mg/kg. Titrate to minimum amount necessary.

Pediatrics administer:

- 1. Midazolam according to MI MEDIC cards
- 2. If MI MEDIC cards are not available administer Midazolam 0.05 mg/kg IV/IO titrated slowly or IN. May repeat once in 5 minutes to a maximum of 0.1 mg/kg. Titrate to minimum amount necessary.

Used in the Following Protocols:

Seizures (Section 3 Adult Treatment)

Hyperactive Delirium Syndrome (Section 3 Adult Treatment)

Pediatric Seizures (Section 4 Obstetrics and Pediatrics)

Patient Restraint (Section 7 Procedures)

Patient Procedure Sedation (Section 7 Procedures)

Initial Date: 07/19/2023

Revised Date:

Section: 9-35R

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## ***Morphine***

**Pharmacological Category:** Analgesic, Opioid

**Indications:**

1. Pain

**Routes:** IV/IO/IM

**Contraindications:**

1. Hypotension
2. Children  $\leq$  18 months old

**Expected effects:**

1. Decreased pain

**Side effects:**

1. Respiratory depression
2. Hypotension

**Dosing: PAIN MANAGEMENT**

Adults administer:

1. Morphine 0.1 mg/kg IV/IO. Maximum single dose 5 mg. May repeat three times. Total dose may not exceed 20 mg.

Pediatrics (patients > 18 months of age) administer:

1. Morphine according to MI MEDIC cards
2. When MI MEDIC cards are not available administer Morphine 0.1 mg/kg IV/IO. Maximum single dose 5 mg. May repeat three times. Total dose may not exceed 20 mg.

Used in the Following Protocol(s):

Pain Management (Section 7 Procedures)

Initial Date: 07/19/2023

Revised Date:

Section: 9-36R

## **Naloxone**

**Pharmacological Category:** Antidote; Opioid Antagonist

**Indications for administration:**

1. Known opioid overdose WITH respiratory depression
2. Respiratory depression or arrest of unknown origin (per treatment protocol)

**Precautions:**

1. Rapid IV push may cause agitation.

**Expected effects:**

1. Increased mental status
2. Increased respiratory drive

**Side effects:**

1. Agitation
2. Nausea/vomiting

### **Dosing: OPIOID OVERDOSE TREATMENT AND PREVENTION**

Indication: Decreased level of consciousness associated with respiratory depression from Opioid Overdose

Adults administer:

1. Narcan® Nasal Spray 4 mg in one nostril. May repeat one time in 3-5 minutes in opposite nostril if effective respirations not restored.  
**OR**
2. Naloxone prefilled 2 mg/2 mL IN via Atomizer. Half dose in each nostril. May repeat one time in 3-5 minutes if effective respirations not restored.  
**OR**
3. Naloxone 2 mg IM or slow IV push titrating to improvement in respiratory status. IV naloxone may be repeated as needed every 3-5 minutes.

Pediatrics administer:

1. According to MI MEDIC cards administer naloxone prefilled 2 mg/2 mL IN via atomizer. Half dose each nostril.
2. If MI MEDIC cards are not available administer naloxone prefilled 2 mg/2 mL IN via atomizer. Half dose each nostril.
  - a. Age 36 months/3 years of age or older: 2mL (2 mg)
  - b. Age 19-35 months old: 1.5 mL (1.5 mg)
  - c. Age 3-18 months old: 1 mL (1.0 mg)
  - d. Age 0-2 months old: 0.5 mL (0.5 mg)

**OR**

Initial Date: 07/19/2023

Revised Date:

Section: 9-36R

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3. According to MI MEDIC cards administer naloxone IM or slow IV push titrating to improvement in respiratory status. IV naloxone may be repeated as needed every 3-5 minutes.
4. If MI MEDIC cards are not available administer Naloxone 0.1 mg/kg IM or slow IV push titrating to improvement in respiratory status. IV naloxone may be repeated as needed every 3-5 minutes

**Dosing: ADULT CARDIAC ARREST**

Indication: Adult cardiac arrest with known or highly suspected opioid overdose

Adults administer:

1. Naloxone 2 mg IV/IO or 2-4 mg IN

Used in the Following Protocols:

Opioid Overdose Treatment and Prevention (Section 1 General Treatment)

General Cardiac Arrest (Section 5 Adult Cardiac)

Initial Date: 07/19/2023

Revised Date:

Section: 9-37R

## ***Nitroglycerin***

**Pharmacological Category:** Antianginal Agent; Vasodilator

**Routes:** SL

**Indications:**

1. Cardiac pain
2. Pulmonary edema

**Contraindications:**

1. Use of erectile dysfunction medications in previous 48 hours.
2. Use of medication to treat pulmonary hypertension in previous 48 hours
3. BP < 120 mm Hg without IV access
4. BP < 100 mm Hg with IV access

**Expected effects:**

1. Decreased blood pressure
2. Relief of chest pain

**Side effects:**

1. Headache
2. Flushing
3. Hypotension

**Dosing: PULMONARY EDEMA/CARDIOGENIC SHOCK**

Indication: Pulmonary edema

Adults administer:

1. Nitroglycerin 0.4 mg SL (without IV access) maximum of 3 doses.
2. Nitroglycerin 0.4 mg SL (with IV access) every 3-5 minutes

**Dosing: CHEST PAIN/ACUTE CORONARY SYNDROME**

Indication: Cardiac chest pain

Adults administer:

1. Nitroglycerin 0.4 mg SL (without IV access) maximum of 3 doses.
2. Nitroglycerin 0.4 mg SL (with IV access) every 3-5 minutes

Used in the Following Protocols:

Pulmonary Edema/Cardiogenic Shock (Section 5 Adult Cardiac)

Chest Pain/Acute Coronary Syndrome (Section 5 Adult Cardiac)

Initial Date: 07/19/2023

Revised Date:

Section: 9-38R

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## ***Ondansetron***

**Pharmacological Category:** Antiemetic

### **Indications:**

1. Nausea and vomiting

**Routes:** IV/IM; ODT (for patients  $\geq$  30 kg)

### **Contraindications:**

1. Patients with Phenylketonuria (PKU)

### **Precautions:**

1. Do not administer ODT to patients that are actively vomiting

### **Expected effects:**

1. Diminished nausea

### **Side effects:**

1. Headache
2. Dry mouth
3. Drowsiness

### **Notes:**

1. Orally Disintegrating Tablet (ODT) is an MCA optional medication and may not be available.

### **Dosing: NAUSEA & VOMITING**

Indication: Nausea & vomiting

#### Adults administer:

1. Ondansetron ODT 4mg if not actively vomiting and ODT is available.
2. Ondansetron 4mg IV/IM if patient is actively vomiting, vomited post ODT administration, or ODT is not available.
3. May administer a second dose of ondansetron 4 mg (IV/IM only). Total dose (including ODT) not to exceed 8 mg.



Initial Date: 07/19/2023

Revised Date:

Section: 9-38R

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Pediatrics administer:

1. Ondansetron according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
  - a. Pediatrics  $\geq$  30 kg that is not actively vomiting and ODT is available administer:
    - i. Ondansetron 4 mg ODT
  - b. Pediatrics < 30 kg, or if the patient is actively vomiting, or if the patient vomited post OD administration, or ODT is not available, administer:
    - i. Ondansetron 0.1 mg/kg IV/IM, maximum dose of 4 mg.
  - c. May repeat ondansetron 0.1 mg/kg IV/IM, maximum dose of 4 mg. Total dose (including ODT) may not exceed 8 mg.

Used in the Following Protocol(s):

Nausea & Vomiting (Section 1 General Treatment)

Initial Date: 07/19/2023

Revised Date:

Section: 9-39R

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## ***Pralidoxime***

**Pharmacological Category:** Cholinesterase reactivator

**Routes:** IV/IM

**Indications:**

1. Exposure to organophosphate or nerve agents

**Expected effects:**

1. Decrease in symptoms

**Side effects:**

1. Blurred vision
2. Headache
3. Dizziness
4. Nausea

**Notes:**

1. This medication may be part of a Nerve Agent (NA) Antidote kit.
2. When not part of an NA kit, 600 mg pralidoxime (along with 2 mg Atropine) will be administered in place of each NA kit that was to be administered.

**Dosing: NERVE AGENT/ORGANOPHOSPHATE PESTICIDE EXPOSURE**

Indication: Symptomatic nerve agent or organophosphate pesticide exposure when a NA Antidote Kt is not available.

Adults and Pediatrics administer:



1. Pralidoxime 600 mg IV/IM for every one (1) NA Kit as required on Chart below.

*Michigan*  
**MEDICATION SECTION**  
PRALIDOXIME

Initial Date: 07/19/2023

Revised Date:

Section: 9-39R


|  | <b>Clinical Findings</b>           | <b>Signs/Symptoms</b>  | <b>Required Conditions</b>  | <b>NA Kits To Be Delivered</b>   |
|--|------------------------------------|--|---|--|
| <b>SELF-RESCUE</b>                       | <b>Threshold Symptoms</b>          | <ul style="list-style-type: none"> <li>• Dim vision</li> <li>• Increased tearing</li> <li>• Runny nose</li> <li>• Nausea/vomiting</li> <li>• Abdominal cramps</li> <li>• Shortness of breath</li> </ul>  | Threshold Symptoms<br>-and-<br>Positive evidence of nerve agent or OPP on site<br> Medical Control Order | 1 NA Kit (self-rescue)   |
| <b>ADULT PATIENT &gt; 8 years of age</b> | <b>Mild Symptoms and Signs</b>     | <ul style="list-style-type: none"> <li>• Increased tearing</li> <li>• Increased salivation</li> <li>• Dim Vision</li> <li>• Runny nose</li> <li>• Sweating</li> <li>• Nausea/vomiting</li> <li>• Abdominal cramps</li> <li>• Diarrhea</li> </ul> |  Medical Control Order  | 1 NA Kit   |
|  | <b>Moderate Symptoms and Signs</b> | <ul style="list-style-type: none"> <li>• Constricted pupils</li> <li>• Difficulty breathing</li> <li>• Severe vomiting</li> </ul>  | Constricted Pupils  | 2 NA Kits  |
|  | <b>Severe Signs</b>                | <ul style="list-style-type: none"> <li>• Constricted pupils</li> <li>• Unconsciousness</li> <li>• Seizures</li> <li>• Severe difficulty breathing</li> </ul>   | Constricted Pupils  | 3 NA Kits (If 3 NA Kits are used, administer 1 <sup>st</sup> dose of available benzodiazepine) |

**Michigan**  
**MEDICATION SECTION**  
**PRALIDOXIME**

Initial Date: 07/19/2023

Revised Date:

Section: 9-39R

|                                      |   |  |  |          |
|--------------------------------------|---|--|--|----------|
| <b>PEDIATRIC &lt; 8 years of age</b> | <b>Pediatric Patient with Non-Severe Signs/Symptoms</b> | <ul style="list-style-type: none"> <li>Mild or moderate symptoms as above</li> </ul>   | <p>Threshold Symptoms<br/>-and-<br/>Positive evidence of nerve agent or OPP on site</p> <p> Medical Control Order</p> | 1 NA Kit |
|                                      | <b>Pediatric Patient with Severe Signs/Symptoms</b>     | <ul style="list-style-type: none"> <li>Constricted pupils</li> <li>Unconsciousness</li> <li>Seizures</li> <li>Severe difficulty breathing</li> </ul> | <p>Severe breathing difficulty</p> <p>Weakness</p>   | 1 NA Kit |

Used in the Following Protocols

Nerve Agent/Organophosphate Pesticide Exposure (Section 10 Special Operations)

Initial Date: 07/19/2023

Revised Date:

Section: 9-40R

## ***Prednisone***

**Pharmacological Category:** Corticosteroid, Systemic

**Routes:** PO

**Indications:**

1. Allergic Reaction
2. Inflammatory respiratory issues

**Contraindications:**

1. Hypersensitivity to steroids
2. Known systemic fungal infections
3. Children  $\leq$  6 years of age
4. Inability to take PO medication

**Expected effects:**

1. Decreased inflammation

**Side effects:**

1. Retention of fluids

**Notes:**

1. Do not cut prednisone tablets

**Dosing: ANAPHYLAXIS ALLERGIC REACTION**

Indication: If patient is symptomatic of an allergic reaction but not in a severe allergic reaction or anaphylaxis OR after epinephrine administration.

Adults administer:

1. Prednisone tablet 50 mg PO

Pediatrics > 6 years of age administer:

1. Prednisone tablet 50 mg PO

**Dosing: ADRENAL CRISIS**

Indication: Patients with a known history of adrenal insufficiency, experiencing signs of crisis.

Adults administer:

1. Prednisone tablet 50 mg PO

Pediatrics > 6 years of age administer:

1. Prednisone tablet 50 mg PO

Initial Date: 07/19/2023

Revised Date:

Section: 9-40R

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**Dosing: ADULT RESPIRATORY DISTRESS**

Indication: Respiratory distress patients with wheezing or diminished breath sounds due to asthma or COPD

Adults administer:

1. Prednisone tablet 50 mg PO

**Dosing: PEDIATRIC RESPIRATORY DISTRESS, FAILURE, OR ARREST**

Indication: Pediatric respiratory distress patients with suspected bronchospasm (wheezing)

Pediatrics > 6 years of age administer:

1. Prednisone tablet 50 mg PO

Used in the Following Protocols

Anaphylaxis/Allergic Reaction (Section 1 General Treatment)

Adrenal Crisis (Section 1 General Treatment)

Respiratory Distress (Section 3 Adult Treatment)

Pediatric Respiratory Distress, Failure or Arrest (Section 4 Obstetrics and Pediatrics)

Initial Date: 07/19/2023

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Section: 9-41R

## ***Sodium Bicarbonate***

**Pharmacological Category:** Alkalinizing Agent; Antacid; Electrolyte Supplement,

### **Indications:**

1. Cardiac arrest in dialysis patient with suspected hyperkalemia
2. Symptomatic tricyclic antidepressant overdose
3. Acidosis related to crush injury
4. Hyperkalemia

### **Contraindications:**

1. Severe pulmonary edema
2. Known Alkalosis

### **Precautions:**

1. Must flush IV line between medications
  - a. Calcium and epinephrine are not compatible with sodium bicarbonate
2. Administer slowly

### **Dosing: GENERAL CRUSH INJURY**

Indication: If extrication is prolonged, and/or hyperkalemia is suspected.

#### Adults administer:

1. Sodium bicarbonate 100 mEq IVP prior to extrication. May repeat 50 mEq/hr IVPB or slow IVP

#### Pediatrics administer:

1. Sodium bicarbonate according to MI MEDIC cards
2. If MI MEDIC cards are not available administer Sodium bicarbonate 1 mEq/kg (max dose 50 mEq) IVP

### **Dosing: POSIONING/OVERDOSE/ENVIRONMENTAL EXPOSURE GENERAL CRUSH INJURY**

Indication: symptomatic tricyclic antidepressant ingestions (tachycardia, wide complex QRS)

#### Adults administer:

1. Sodium bicarbonate 50 mEq IV. Repeat as needed

#### Pediatrics administer:

1. Sodium bicarbonate according to MI MEDIC cards.
2. If MI MEDIC cards are not available administer Sodium bicarbonate 1 mEq/kg IV.  
Repeat as needed

### **Dosing: ADULT CARDIAC ARREST**

Indications: Cardiac arrest with known or highly suspected tricyclic antidepressant overdose or known or highly suspected hyperkalemia (e.g., dialysis patient, EKG changes)

#### Adults administer:

Initial Date: 07/19/2023

Revised Date:

Section: 9-41R

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1. Sodium bicarbonate 1 mEq/kg IV/IO

**Dosing: PEDIATRIC CARDIAC ARREST**

Indication: Cardiac arrest with hyperkalemia (renal failure)

Pediatrics administer:

1. Sodium bicarbonate according to MI MEDIC cards
2. If MI MEDIC cards are not available administer Sodium bicarbonate 1 mEq/kg IV/IO

Used in the Following Protocols:

General Crush Injury (Section 2 Trauma and Environmental)

Poisoning/Overdose/Environmental Exposure (Section 2 Trauma and Environmental)

General Cardiac Arrest (Section 5 Adult Cardiac)

Pediatric Cardiac Arrest – General (Section 6 Pediatric Cardiac)



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## ***Racepinephrine***

**Pharmacological Category:** Adrenergic Agonist Agent; Alpha-/Beta- Agonist;  
Vasoconstrictor

**Routes:** Nebulized

**Indications:**

1. Pediatric patients with stridor at rest without suspected airway obstruction.

**Expected effects:**

1. Respiratory difficulty and stridor resolves

**Dosing: PEDIATRIC RESPIRATORY DISTRESS, FAILURE, OR ARREST**

Indication: Pediatric patient presents with stridor at rest without suspected airway obstruction.

Pediatrics administer:

1. Racepinephrine 0.5 mL of 2.25% inhalation solution diluted with 3 mL of NS via nebulizer.

Used in the Following Protocol(s):

Pediatric Respiratory Distress, Failure or Arrest (Section 4 Obstetrics and Pediatrics)

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## ***Tetracaine***

**Pharmacological Category:** Local Anesthetic; Local Anesthetic, Ophthalmic

### **Indications:**

1. Eye pain relief related to chemical exposure and subsequent eye irrigation.

### **Contraindications:**

1. Hypersensitivity to anesthetics
2. Large area application
3. Infants < 1 year old

### **Precautions:**

1. Patient should not rub eyes after administration

### **Expected effects:**

1. Numbing of eye

### **Side effects:**

1. Burning
2. Irritation
3. Rash

### **Notes:**

1. Tetracaine is an MCA optional medication and may not be available.

### **Dosing: POISONING/OVERDOSE/ENVIRONMENTAL EXPOSURE**

Adults and Pediatrics administer:

1. Tetracaine, 1-2 drops per eye every 5 minutes, maximum of 5 doses

### **Dosing: CHEMICAL EXPOSURE**

Adults and Pediatrics administer:

1. Tetracaine, 1-2 drops per eye every 5 minutes, maximum of 5 doses

### Used in the Following Protocols:

Poisoning/Overdose/Environmental Exposure (Section 2 Trauma and Environmental)  
Chemical Exposure (Section 10 Special Operations)

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## ***Tranexamic Acid***

**Pharmacological Category:** Hemostatic Agent

**Routes:** IV/IO

### **Indications:**

1. Massive uncontrolled hemorrhage internal or external

### **Contraindications:**

1. Intracranial bleeding
2.  $\leq 18$  years of age
3. Injury time greater than 3 hours

### **Precautions:**

1. Transport to hospital that will continue TXA
  - a. TXA delivered in the field is FIRST DOSE
  - a. NOT effective if a SECOND DOSE is not given at the appropriate time in the hospital
2. Ensure receiving facility is aware of exact time of first dose prior to arrival, upon arrival and that it is documented in the EPCR.
3. Do not delay transport for administration of TXA

### **Expected effects:**

1. Reduction of blood loss

### **Notes:**

1. Draw up and mix 1 gram of TXA into a 100 mL bag of normal saline
  - a. Use a filter needle if the medication is supplied in an ampule.
  - b. Apply pre-printed "TXA added" fluorescent-colored label to IV bag.
  - c. Administer mixed medication via piggyback into IV/IO line over 10 minutes.

### **Dosing: HEMORRHAGIC SHOCK**

Indication: Massive uncontrolled hemorrhage internal or external

Adults > 18 years if age administer:

1. TXA 1 gram diluted in 100 mL NS IV/IO piggyback NS

### Used in the Following Protocol(s):

Hemorrhagic Shock (Section 2 Trauma and Environmental)

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## ***Verapamil***

**Pharmacological Category:** Antianginal Agent: Antiarrhythmic Agent

**Routes:** IV

**Indications:**

1. Symptomatic Tachycardia: Narrow Complex (Regular and Narrow or Irregular and Narrow rhythms)

**Contraindications:**

1. Hypotension
2. Patient under the age of 1 year.

**Expected effects:**

1. Slower heart rate
2. Potential conversion to NSR

**Side effects:**

1. Hypotension
2. Bradycardia

**Dosing: TACHYCARDIA (Adult)**

Indication: Regular Narrow Complex Tachycardia (i.e., SVT, A-Flutter) and Irregular Narrow Complex Tachycardia (i.e., A-Fib/A-Flutter)

Adults administer:

1. Verapamil 5 mg IV

Used in the Following Protocols  
Tachycardia (Section 5 Cardiac)