

Initial Date: 07/19/2023
Revised Date: 12/10/2025

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: ADULT FEVER

Indication: Fever

Adults administer: (per MCA selection)

1. Acetaminophen 650 mg PO

Dosing: PEDIATRIC FEVER

Indication: Fever

Pediatrics administer:

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

Dosing: PAIN MANAGEMENT

Indication: Mild Pain

Adults administer:

Initial Date: 07/19/2023

Revised Date: 12/10/2025

Section: 9-10R

1. Acetaminophen 650 mg PO

Pediatrics administer:

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

Children's Acetaminophen Elixir Dosing Table		
Child's Weight	Child's Age	Acetaminophen 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

Adult Fever (Section 3 Adult Treatment)

Pediatric Fever (Section 4 Obstetrics and Pediatrics)

Pain Management (Section 7 Procedures)

Initial Date: 07/19/2023
Revised Date: 02/10/2026

Section: 9-35R

Morphine

Pharmacological Category: Analgesic, Opioid

Routes: IV/IO/IM

Indications:

1. Pain

Precautions:

1. Pregnant or suspected pregnant patients
 - a. Optimize non-pharmacologic interventions as directed in the **Pain Management Protocol**.
 - b. For mild to moderate pain, use acetaminophen as directed in the **Pain Management Protocol**.
 - c. For severe pain (greater than 7 on the Wong Pain Scale), administer opioid as directed in the **Pain Management Protocol**. Administer IV/IO slowly, titrating to lowest dose needed to reduce pain score to less than 7.
 - d. Opioids should not be used for labor pain.

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/IM. Maximum single dose 5 mg.
 - a. IV/IO may repeat three times (total of four doses). Total dose may not exceed 20 mg. Interval between doses is minimally 10 minutes.
 - b. If IM administration may NOT repeat.

Pediatrics (patients > 18 months of age) administer:

1. Morphine according to MI MEDIC
2. When MI MEDIC is not available administer Morphine 0.1 mg/kg IV/IO/IM. Maximum single dose 5 mg.
 - a. IV/IO may repeat three times (total of four doses). Total dose may not exceed 20 mg. Interval between doses is minimally 10 minutes.

Michigan
MEDICATION SECTION
MORPHINE

Initial Date: 07/19/2023

Revised Date: 02/10/2026

Section: 9-35R

- b. If IM administration may NOT repeat.
- c. Do NOT administer to children < 18 months of age.

Used in the Following Protocol(s):

Pain Management (Section 7 Procedures)

Initial Date: 07/19/2023
Revised Date: 12/10/2025

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
2. If MI MEDIC is not available administer:
 - a. Ketorolac 0.5 mg/kg IM/IV. Max dose 15 mg.

Used in the Following Protocols

Pain Management (Section 7 Procedures)

**Michigan
MEDICATION SECTION
MEDICATIONS (GENERAL)**

Initial Date: 07/19/2023

Revised Date:

Section: 9-9R

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)

Michigan
MEDICATION SECTION
ADENSOINE

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., 2nd or 3rd 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
ADENSOINE

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: 12/10/2025

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 but it does appear on MI MEDIC

1. Albuterol 2.5 mg/3mL NS nebulized

Dosing: GENERAL CRUSH INJURY

Indication: Suspected hyperkalemia due to crush injury

Adults administer:

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

Pediatrics administer:

* Albuterol dosage is not weight/age based but it does appear on MI MEDIC

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

Note: A single responding unit is not expected to carry 20 mg (8 nebulers) 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 (Section 4 Obstetrics and Pediatrics)

Pulmonary Edema/Cardiogenic Shock (Section 5 Adult Cardiac)

Initial Date: 07/19/2023
Revised Date: 12/10/2025

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: 12/10/2025

Section: 9-13R

Dosing: PEDS CARDIAC ARREST

Indication: V-Fib/V-Tach

Pediatrics administer:

1. According to MI MEDIC
2. If MI MEDIC is 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
2. If MI MEDIC is not available administer:
 - a. Amiodarone 5 mg/kg (max single dose 300 mg) IV/IO slow push over 10 minutes. May repeat twice. Do not exceed 450 mg total IV/IO
 - b. MI MEDIC includes amiodarone for shock resistant V-fib. The dosage is the same for unstable wide complex tachycardia (with a pulse), administered slow IV push.

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

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 ¹ Mod-Severe Sxs	Atropen ² (1 mg) Mod- Severe Sxs	Atropine Dose (0.1 mg/kg) IM/IV/IO	Atropine Vial ² (1 mg/mL)	Cardiac Atropine ^{2,3} (1 mg/10 mL)	Midazolam ⁴ (10 mg/2 mL) 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

¹Preferred initial autoinjector, ²May Repeat atropine every 5 minutes until airway secretions decrease (6 mg maximum), ³Not available in MEDDRUN, ⁴Patients 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
SELF-RESCUE	Threshold Symptoms	• Dim vision • Increased tearing • Runny nose • Nausea/vomiting • Abdominal cramps • Shortness of breath	Threshold Symptoms <i>-and-</i> Positive evidence of nerve agent or OPP on site  Medical Control Order	1 NA Kit (self-rescue)
		• Increased tearing • Increased salivation • Dim Vision • Runny nose • Sweating • Nausea/vomiting • Abdominal cramps • Diarrhea	 Medical Control Order	1 NA Kit
		• Constricted pupils • Difficulty breathing • Severe vomiting	Constricted Pupils	2 NA Kits
		• Constricted pupils • Unconsciousness • Seizures • Severe difficulty breathing	Constricted Pupils	3 NA Kits (If 3 NA Kits are used, administer 1 st dose of available benzodiazepine)

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
PEDIATRIC < 8 years of age	Pediatric Patient with Non-Severe Signs/Symptoms	• <i>Mild or moderate symptoms as above</i>	Threshold Symptoms <i>-and-</i> Positive evidence of nerve agent or OPP on site  Medical Control Order	1 NA Kit
	Pediatric Patient with Severe Signs/Symptoms	• Constricted pupils • Unconsciousness • Seizures • Severe difficulty breathing	Severe breathing difficulty 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

Revised Date:

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**
 - b. 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.

Michigan
MEDICATION SECTION
CEFTRIAZONE

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 ≥ 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: 03/03/2025

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 is <60 mg/dL

Pediatrics administer:

1. Dextrose according to MI MEDIC
2. If MI MEDIC is not available use table below:

Initial Date: 07/19/2023
Revised Date: 03/03/2025

Section: 9-19R

Dosing: PEDIATRIC SEIZURES

Indication: Pediatric seizure patient and blood glucose is <60 mg/dL:

Pediatrics administer:

1. Dextrose according to MI MEDIC
2. If MI MEDIC cards are not available utilize the tablet 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
2. If MI MEDIC cards are not available utilize the table 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)

Pediatric Cardiac Arrest – General (Section 6 Pediatric Cardiac)

Initial Date: 07/19/2023

Revised Date:

Section: 9-20R

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., 2nd or 3rd 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: 12/10/2025

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. 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
2. If MI MEDIC is 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.

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 ≤ 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: 02/10/2026

Section: 9-24R

Fentanyl

Pharmacological Category: Analgesic, Opioid; General Anesthetic

Routes: IV/IO/IM/IN

Indications:

1. Pain management
2. Patient sedation

Precautions:

1. Pregnant or suspected pregnant patients
 - a. Optimize non-pharmacologic interventions as directed in the **Pain Management Protocol**.
 - b. For mild to moderate pain, use acetaminophen as directed in the **Pain Management Protocol**.
 - c. For severe pain (greater than 7 on the Wong Pain Scale), administer opioid as directed in the **Pain Management Protocol**. Administer IV/IO slowly, titrating to lowest dose needed to reduce pain score to less than 7.
 - d. Opioids should not be used for labor pain.

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 administer 1 mcg/kg IV/IO/IM/IN dosage rounded as per below:

1. Up to and including 25 kg - administer 25 mcg
2. 26-50 kg – administer 50 mcg

Initial Date: 07/19/2023

Revised Date: 02/10/2026

Section: 9-24R

3. 51-75 kg - administer 75 mcg
4. 76 kg and above – administer 100 mcg
5. IV/IO/IN may repeat one-time, total dose may not exceed 200 mcg
6. If IM administration may NOT repeat

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 (patients > 14 years of age), administer 1 mcg/kg IV/IO/IM/IN dosage, rounded as per below:

1. Up to and including 25 kg - administer 25 mcg
2. 26-50 kg – administer 50 mcg
3. 51-75 kg - administer 75 mcg
4. 76 kg and above – administer 100 mcg
5. IV/IO/IN may repeat one-time, total dose may not exceed 200 mcg. Interval between doses is minimally 10 minutes.
6. If IM administration may NOT repeat

Pediatrics administer:

1. Fentanyl according to MI MEDIC
2. If MI MEDIC is not available administer:
 - a. Fentanyl 1 mcg/kg IV/IO/IM/IN
 - b. May repeat IV/IO/IN one time. Interval between doses is minimally 10 minutes.
 - c. If IM administration may NOT repeat

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.
- 2.

Pediatrics administer:

1. Fentanyl according to MI MEDIC
2. If MI MEDIC is 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)

MCA Name

MCA Board Approval Date

MCA Implementation Date

MDHHS Approval: 02/27/2026

MDHHS Reviewed 2026

Page 2 of 2

Initial Date: 07/19/2023
Revised Date: 03/03/2025

Section: 9-25R

Glucagon

Pharmacological Category: Antidote; Hypoglycemia

Routes: IM – injectable formulation or IN – intranasal formulation

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

NOTE:

1. Use ONLY intranasal formulation for IN administration
2. Use ONLY injectable formulation for IM administration

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 (injectable formulation) OR 3 mg IN (intranasal formulation)

Dosing: ADULT SEIZURE

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

Adults administer:

1. Glucagon 1 mg IM (injectable formulation) OR 3 mg IN (intranasal formulation)

Dosing: PEDS ALTERED MENTAL STATUS

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

Pediatrics administer:

1. Glucagon according to MI MEDIC
2. If MI MEDIC is not available administer:
 - a. Pediatrics age 5 or greater:
 - i. Glucagon 1 mg IM (injectable formulation)
 - ii. Glucagon 3 mg IN (intranasal formulation)

Initial Date: 07/19/2023
Revised Date: 03/03/2025

Section: 9-25R

- b. Pediatrics less than age 5:
 - i. Glucagon 0.5 mg IM (injectable formulation)
 - ii. Glucagon IN DO NOT ADMINISTER

Dosing: PEDS SEIZURE

Indication: Pediatric seizure patient, unable to start IV, and blood glucose is <60 mg/dL:

Pediatrics administer:

- 1. Glucagon according to MI MEDIC
- 2. If MI MEDIC is not available administer:
 - a. Pediatrics age 5 or greater:
 - i. Glucagon 1 mg IM (injectable formulation)
 - ii. Glucagon 3 mg IN (intranasal formulation)
 - b. Pediatrics less than age 5:
 - i. Glucagon 0.5 mg IM (injectable formulation)
 - ii. Glucagon IN DO NOT ADMINISTER

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

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

³Push slowly over 15 minutes, ⁴Infuse over 15 minutes

Used in the Following Protocols

Cyanide Exposure (Section 10 Special Operations)

Initial Date: 07/19/2023
Revised Date: 12/10/2025

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: ADULT FEVER

Indication: Fever

Adults administer:

1. Ibuprofen 400 mg PO.

Dosing: PEDIATRIC FEVER

Indication: Fever

Pediatrics over 6 months old administer:

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

Initial Date: 07/19/2023

Revised Date: 12/10/2025

Section: 9-27R

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

Children's Ibuprofen Elixir Dosing Table		
Child's Weight	Child's Age	Ibuprofen 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

Adult Fever (Section 2 Adult Treatment)

Pediatric Fever (Section 4 Obstetrics and Pediatrics)

Pain Management (Section 7 Procedures)

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

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: 02/10/2026

Section: 9-29R

Ketamine

Pharmacological Category: Antidepressant; General Anesthetic

Routes: IV/IO/IM/IN

Indications:

1. Pain Management
2. Sedation

Precautions:

1. Administration of Ketamine IV for pain management should be diluted to prevent ketamine dissociation.

Contraindications:

1. Pregnancy
2. Chest Pain/Acute Coronary Syndrome

Expected effects:

1. Sedation
2. Decreased agitation
3. Decreased pain

Side effects:

1. Nausea/vomiting
2. Nystagmus
3. Dysphoria
4. Laryngospasm/Stridor
5. Increased oral secretions
6. Changes to heart rates (tachycardia or bradycardia)

Notes:

1. IM Ketamine has a 3–5-minute onset
2. When 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.

MCA Name

MCA Board Approval Date

MCA Implementation Date

MDHHS Approval: 03/05/2026

MDHHS Reviewed 2026

Page 1 of 2

Initial Date: 07/19/2023
Revised Date: 02/10/2026

Section: 9-29R

Dosing: HYPERACTIVE DELIRIUM SYNDROME WITH SEVERE AGITATION

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.

Pediatrics

1. Ketamine according to MI MEDIC
2. If MI MEDIC is 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 25 mg
 - ii. Ketamine 0.5 mg/kg IN (undiluted) maximum single dose 50 mg
 - iii. May repeat one time after a minimum of 10 minutes.
 - b. Pediatrics (> 6 months of age and $\leq$ 6 years of age)
 - i. 0.5 mg/kg IN (undiluted)
 - ii. May repeat one time after a minimum of 10 minutes.

Dosing: PATIENT PROCEDURAL SEDATION (Adult and Pediatric)

Indication: For proper sedation of patients requiring a painful medical procedure.

1. Ketamine 1.5 mg/kg (max dose 150 mg) IV/IO/(IN if available) or 4 mg/kg IM (max dose 400 mg) titrated slowly to sedation.
2. NOT for use with CPAP/HFNO sedation.

Used in the Following Protocols

Hyperactive Delirium Syndrome with Severe Agitation (Section 3 Adult Treatment)

Pain Management (Section 7 Procedures)

Patient Procedural Sedation (Section 7 Procedures)

MCA Name

MCA Board Approval Date

MCA Implementation Date

MDHHS Approval: 03/05/2026

MDHHS Reviewed 2026

Page 2 of 2

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

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

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 ≤ 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 RESPIRATORY 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

Revised Date:

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: 9-36R

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

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: 12/10/2025

Section: 9-38R

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 > 30 kg administer:

1. Ondansetron ODT 4mg one time if not actively vomiting and ODT is available.

Adults administer:

2. Ondansetron 4mg IV/IM if patient is actively vomiting, vomited post ODT administration, or ODT is not available.

Initial Date: 07/19/2023

Revised Date: 12/10/2025

Section: 9-38R

3. May administer a second dose of ondansetron 4 mg IV/IM only, 15 minutes after first dose IV/IM if nausea/vomiting persists. Total dose (including ODT) not to exceed 8 mg.

Pediatrics $\geq$ 30 kg administer:

1. Ondansetron ODT 4mg one time if not actively vomiting and ODT is available.

Pediatrics administer:

2. Ondansetron 0.1 mg/kg IV/IM (max dose 4 mg) if patient is actively vomiting, vomited post ODT administration, or ODT is not available.
3. May administer a second dose of ondansetron 0.1 mg/kg (max dose 4 mg) IV/IM only, 15 minutes after first dose IV/IM if nausea/vomiting persists. Total dose (including ODT) not to 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

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 Kit 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

	Clinical Findings	Signs/Symptoms	Required Conditions	NA Kits To Be Delivered
SELF-RESCUE	Threshold Symptoms	• Dim vision • Increased tearing • Runny nose • Nausea/vomiting • Abdominal cramps • Shortness of breath	Threshold Symptoms -and- Positive evidence of nerve agent or OPP on site  Medical Control Order	1 NA Kit (self-rescue)
ADULT PATIENT > 8 years of age	Mild Symptoms and Signs	• Increased tearing • Increased salivation • Dim Vision • Runny nose • Sweating • Nausea/vomiting • Abdominal cramps • Diarrhea	 Medical Control Order	1 NA Kit
	Moderate Symptoms and Signs	• Constricted pupils • Difficulty breathing • Severe vomiting	Constricted Pupils	2 NA Kits
	Severe Signs	• Constricted pupils • Unconsciousness • Seizures • Severe difficulty breathing	Constricted Pupils	3 NA Kits (If 3 NA Kits are used, administer 1 st dose of available benzodiazepine)

Michigan
MEDICATION SECTION
PRALIDOXIME

Initial Date: 07/19/2023

Revised Date:

Section: 9-39R

PEDIATRIC < 8 years of age	Pediatric Patient with Non-Severe Signs/Symptoms	<i>Mild or moderate symptoms as above</i>	Threshold Symptoms -and- Positive evidence of nerve agent or OPP on site  Medical Control Order	1 NA Kit
	Pediatric Patient with Severe Signs/Symptoms	- Constricted pupils - Unconsciousness - Seizures - Severe difficulty breathing	Severe breathing difficulty Weakness	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

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
Revised Date: 12/10/2025

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. 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: 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:

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:

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:

Section: 9-42R

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)

Initial Date: 07/19/2023

Revised Date:

Section: 9-43R

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)

Initial Date: 07/19/2023

Revised Date:

Section: 9-44R

Tranexamic Acid

Pharmacological Category: Hemostatic Agent

Routes: IV/IO

Indications:

1. Massive uncontrolled hemorrhage internal or external

Contraindications:

1. Intracranial bleeding
2. ≤ 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)

Initial Date: 07/28/2023
Revised Date: 08/11/2023

Section: 9-45R

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)