Medication Administration

Information:

EMS providers preparing to administer medications in the out of hospital setting should review and/or recite the "6 Rights" prior to administering any medication to a patient. While all 6 elements are important, In the out of hospital setting, special attention should be paid to the right medication, right dose, and right route - as these are frequently the areas of error in the EMS environment. In addition, EMS providers should ensure the patient is informed as to what medications they are receiving and afford an opportunity for the patient to refuse. Lastly, documentation is essential so that medications administered in the out of hospital setting become part of the patient's clinical medical record. By following the "6 Rights" of medication administration, EMS providers will significantly decrease the potential and number of errors associated with medication administration.

Definitions:

I. Medication: Any pharmacological intervention used to treat, prevent, or reduce signs and symptoms of diseases, disorders, and/or traumatic injuries.

II. Medication administration routes include the following: Intramuscular, Intravenous, Intraosseous, Oral, Buccal, Rectal, Inhaled, and Subcutaneous.

Procedure:

I. Prior to the administration of any medication ensure the following are reviewed and/or verbalized by at least two providers – if available (checked, and double checked):
   A. 6 Rights of Medication Administration –
      1. Right Patient
      2. Right Dose
      3. Right Medication (including indication)
      4. Right Route
      5. Right Time
      6. Right Documentation (including response)

II. Calculating medications when given a dosage range and a per kg dose:
   A. Calculate weight in kilos and multiply by the prescribed dosage (e.g. - mg/kg)
   B. The resultant dose should be less than the maximum single dose.
      1. In adults, for ease of administration, doses may be rounded to the nearest whole number within the range for those calculated doses at or above 1 dosage unit, or to the nearest tenth for those below 1 dosage unit (examples: 1.2 mg rounded to 1 mg, and 0.26mg rounded to 0.3mg). That calculated and rounded dose may be given and repeated in timed intervals, as indicated for that medication, to the control of symptoms or maximum stated cumulative dose if symptom control is not previously achieved.
      2. For pediatric patients, utilize MI-MEDIC and a length-based tape for all medication calculations.

C. Pediatric patients will never be given a single or total dose that exceeds the maximum single or total adult dose.

III. Following administration of any medication
   A. Document all pertinent aspects of the medication administration including but not limited to medication name, dose, route, and time in an electronic patient care report.
   B. Obtain signature of prescriber (medical control physician or other qualified designee) per local medical control authority policy.

Intranasal Medication Administration:

Intranasal medication administration using an FDA approved and MCA authorized atomizing device as specified in applicable patient care protocols may be allowed for MFR per MCA selection.

MCA Approval for intranasal medication administration for MFR
(●) Yes
( ) No

MCAs will be responsible for maintaining a roster MFR of the BLS agencies choosing to participate and will submit roster to MDHHS

Procedure:

1. Select desired medication and determine dose per applicable protocol.).
2. Draw up appropriate dose (volume) of medication plus an additional 0.1 mL to account for device dead space.
3. Attach atomizing device to syringe.
4. Use one hand to support back of patient's head as needed.
5. Place tip of atomizing device snuggly against nostril aiming slightly upward and outward. Administration angle should be approximately 45°.
6. Rapidly administer one half of the dose of medication, briskly pushing plunger.
7. Repeat with other nostril delivering the remaining volume of medication.
8. Use the highest concentration available for the medication.
9. Note: Maximal dose per nostril is 1 mL

Nebulized Medication Administration

Nebulized medication administration using an FDA approved and MCA authorized atomizing device as specified in applicable patient care protocols may be allowed for EMT per MCA selection.

MCA Approval for nebulized medication administration by EMT

(●) Yes
( ) No

MCAs will be responsible for maintaining a roster MFR of the BLS agencies choosing to participate and will submit roster to MDHHS

Procedure:

1. Obtain vital signs and auscultate lung sounds.
2. Select desired medication and determine dose per applicable protocol.).
3. Place the appropriate volume of medication in the lower half of the nebulizer unit. Then screw the upper half of the unit in place.
4. Attach the nebulizer to the base of the T piece. Then attach the mouthpiece to the T piece or connect neb chamber to NRB mask.
5. Attach one end of the oxygen tubing to the base of the nebulizer and the other end of the oxygen tubing to the oxygen source.
6. Set the **oxygen** liter flow at 6 L/min.
7. Instruct the patient to breathe normally through the mouthpiece, taking a deep inspiration every 4 or 5 breaths.
8. Continue the treatment until all the medication has been delivered through the nebulizer. You may need to gently tap the reservoir once or twice during the treatment to re-disperse the medication.
9. Obtain and record another complete set of vital signs and lung sounds after completion of the treatment.

Pediatric Considerations

1. Infants and small children may not be able to use adult mouthpiece and may need to use blow-by or pediatric mask

NOTES:
MCL 333.17754 Section 1(C)) An electronic signature or other identifier that specifically identifies and authenticates the prescriber or his or her agent.

Medication Substitution

Purpose:

This protocol allows for MCA to substitute medications during a time of shortage without having to enact emergency protocols within the MCA. This protocol does not replace or override any portion of the **Medication Shortage Procedure**. All procedures within that procedure must still be followed in regards to substitutions in concentration or medication.

Indications:

None of the medication options indicated in the MCA approved protocol are available.

Procedure:

1. Follow **Medication Shortage Procedure.**
2. Alternate concentrations are listed within this protocol for reference; these do not require a protocol change and are outlined in the **Medication Shortage Procedure.**
3. Notification and education of providers within the MCA should be done as soon as the substitution is known.
    a. It is the responsibility of the MCA to distribute information on the shortages and substitutions to agencies for distribution to providers.
    b. If a substitution is imminent, it is acceptable for an MCA to distribute information prior to the medication being substituted.
4. The MCA should notify the Division of EMS and Trauma if a substitution is suspected to last more than 60 days so that a more permanent protocol solution can be enacted.
5. All uses of substitute medications will be reviewed by PSRO for appropriateness.

Current Medication	Substitution
Amiodarone	Procainamide
Calcium Chloride	Calcium Gluconate
Diazepam	Lorazepam
Diphenhydramine	Famotidine Ranitidine Hydroxyzine
Fentanyl	Hydromorphone
Lidocaine	Procainamide
Midazolam	Lorazepam
Morphine	Hydromorphone
Ondansetron	Promethazine Compazine

Medication Shortage

A. Definitions:

1. ***Alternate Concentration*** – same medication, different concentration, while volume may change, the delivered dose remains unchanged, dilution may be required (*Epinephrine 1: 10,000 replaced using Epi 1: 1,000 with a 10mL diluent)*
2. ***Alternate Supplied Volume –*** same medication, same concentration, standard volume is unavailable, the delivered dose and volume remain the same *(Epi 1: 1,000, typically supplied in a 1mL vial replaced with Epi 1: 1,000 in a 10mL multi-dose vial due to shortage of the smaller vials)*
3. ***Alternate Supply/Type –*** same medication, standard supply type is unavailable (preloads vs. vials), dosing remains unchanged *(diphenhydramine 50mg/5mL preload is unavailable, replaced with diphenhydramine 50mg/5mL in a vial)*
4. ***Alternate Form*** – same medication, different route such that identical dosing does not yield the same systemic concentration or effect *(ondansetron 4mg vial unavailable, replaced with ondansetron 4mg ODT, option to repeat x 1 added to allow approximation of equivalent dosing)*
5. ***Alternate Medications*** – medication other than the standard approved medication which accomplishes an acceptably similar effect as the medication it replaces *(fentanyl 100mcg approved to replace morphine 10mg, dosing adjusted to obtain therapeutic equivalency)*
6. ***Missing Medication*** – standard medication which is unavailable *(amyl nitrite not available, acceptable alternative of Cyanokit is excessive in cost and size: alternate means to access treatment established – MEDDRUN)*
7. ***Outsourced medications – Repackaged by a 340B or 503 B medications in the same concentration and volume that have at least a 90 day expiration date.***

B. Criteria:

1. Participating pharmacies be it at the individual MCA or at a wider regional level, shall establish and maintain a listing of the standard medications and supplies contained in drug bags or boxes supplied to life support agencies for the purposes of treating patients.
2. Each participating pharmacy shall maintain a dated listing of alternative medications which are approved as substitutes or replacements for medications which are in shortage.
3. Due to the frequency of medication shortages and the need for alternative dosing or medication substitutions, each MCA shall develop and enact a medication cross-check procedure, to which EMS personnel will be held accountable as a means to avoid medication errors
4. Both the standard list and the alternate list (may be combined into a single document) shall be made readily available to system participants
5. The participating pharmacy shall enact policies/procedures which guide each of the following:
   A. Recognition of medication shortages and a means to report them

B. Pharmacy involvement in the investigation and designation of acceptable alternatives when shortages are identified
C. An organized process by which participant pharmacies will enact the replacement or substitution
D. A documented means of visually identifying when an alternative medication or dosing has been placed into an EMS drug box, or when a medication is missing
    a. ***Alternate medications*** will be indicated by the placement of a sticker, tag or label on the outside of the drug box; on the compartment where the alternate medication is located (if applicable) such that one inspecting the box could easily recognize that the medication was included and what the missing medication it is intended to replace was. (Stickers GREEN or WHITE with GREEN)
    b. ***Missing medications*** will be signified by the placement of a sticker, tag or label on the outside of the drug box, on the compartment where the missing medication would be located (if applicable) such that one inspecting the box could easily recognize that the medication was missing and what the potential alternate medication was. (Stickers YELLOW or WHITE with YELLOW)
E. A method for dissemination of information related to changes made to the participating pharmacy drug boxes with a means of accounting for receipt of the notifications at the agency/pharmacy levels

C. Selection of Alternative Medications:

1. Alternative concentrations, alternative supply/type and alternative supplied volume may be approved at the MCA/participating pharmacy level without a change to protocol provided that the standard and approved alternate medications are documented in the required lists, by effective date or date range.
2. Alternate form and alternate medications may be enacted as an emergency protocol according to statute and state approval, in the event of imminent shortage.
3. Non-standard medications, or those with no precedence of EMS use within Michigan must be submitted as new protocol submissions. The state may allow for expedited review in the event of imminent shortage of the medication being replaced.
4. If a missing medication will not be replaced, or an acceptable alternative is not found, a protocol or process should be developed or presented which addresses the potential inability to meet the existing protocol established standard of care.

CI. Process:

1. A brightly colored ALTERNATE DOSE sticker/tag MUST be attached to the outside of the drug box that lists the effected medication, the concentration of the substituted medication, the expiration date of the medication and the pharmacy name/date.
2. A brightly colored – MISSING MEDICATION sticker/tag must be placed on boxes when a protocol medication is not available to stock in that box.

3. A dosing/instruction card may be required to be included in the box depending on the change.
4. Pharmacies experiencing shortages must provide notification of the need to utilize alternate dosing to the MCA , and receive MCA approval, prior to any change being implemented.
5. Drug boxes with alternate dose medications/missing medications should have the medication replaced and the sticker/tag removed by pharmacy as soon as possible when the proper medication or concentration of medication is available.
6. Any additional equipment, which is needed to deliver the medication, must be included with the alternate dose.
7. EMS Agencies receiving notice of the utilization of alternate dosing, alternate medications or missing medications due to shortage must post the changes and ensure that all providers that may have cause to use the medications are made aware of the changes and are educated on proper use, risk and dosing of any new or replacement medication prior to their first potential exposure to the alternate dose or medication.
8. Any Special Instruction for a particular shortage will be communicated to all effected pharmacies and EMS services.

Epinephrine Auto-Injector Procedure

Aliases: Epi-Pen ®

Purpose: To outline the use and resupply of epinephrine auto-injector/pediatric epinephrine auto-injector by authorized prehospital providers for life-threatening anaphylaxis and respiratory emergencies as outlined in applicable treatment protocols. Providers, opting out of draw-up epinepherine, may be authorized through TCEMCA to provide their own Epi-Pens. Providers must be licensed at or above the Emergency Medical Technician level unless otherwise specified by MCA selection. .

MCA Approval of **Epinephrine Auto-injector** for Select MFR Agencies

◉ YES ○ NO

MCAs will be responsible for maintaining a roster of the agencies choosing to participate and will submit roster to MDHHS

1. **Indications**
   - A. Life-threatening allergic/anaphylactic and respiratory emergencies
   - B. Use is outlined in applicable treatment protocol
2. **Contraindications**
   - A. No absolute contraindications to life-threatening allergic/anaphylactic emergencies as described in applicable treatment protocols.
3. **Cautions**
   - A. Use with caution in patients with heart disease, high blood pressure, and stroke.
   -  B. Contact Medical Control if child appears to weigh less than 10 kg (approx. 20 lbs.) prior to administration if possible.
4. **Technique**
   - A. **Epinephrine auto-injector** is an auto-injector that injects medication into the intramuscular tissue when the device is pushed against the skin. Injection is to be done at the anterolateral portion of the thigh.
   - B. Dosing:
     - i. **Epinephrine auto-injector** (0.3 mg) is used for patients weighing over 30 kg (approx. 60 lbs.)
     - ii. **Pediatric epinephrine auto-injector** (0.15 mg) is used for patients weighing between 10-30 kg (approx.20-60 lbs.)
     -  iii. Contact Medical Control if child appears to weigh less than 10 kg (approx. 20 lbs.), prior to **pediatric epinephrine auto-injector** administration, if possible
   - C. Instructions for use are pictured on the side of each auto-injector.
   - D. The auto-injector must be held in place for ten (10) seconds once the needle injects into the thigh.

5. **Documentation**
   A. EMS providers will document any changes in the patient's condition and report those changes to on-line medical control.
   B. Complete an agency electronic patient care report as required by MCA.
6. **Accountability**
   A. **Epinephrine auto-injectors** will be stored in a secured compartment in a temperature-controlled area of the EMS vehicle.
   B. **Epinephrine auto-injectors** must be restocked at the pharmacy or through other Medical Control approved process in conformity with current pharmacy laws and the public health code. Utilization forms must be completed for each use.

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)

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

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.

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

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

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)

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)

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

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)

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)

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:

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**

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

CHART B

	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 1st dose of available benzodiazepine)

	Clinical Findings	Signs/Symptoms	Required Conditions	NA Kits To Be Delivered
PEDIATRIC < 8 years of age	**Pediatric Patient with Non-Severe Signs/Symptoms**	• *Mild or moderate symptoms as above*	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
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)

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

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)

Cefazolin

Pharmacological Category: Antibiotic, Cephalosporin (First Generation)

Routes: IV/IO

Indications:
1. **Open fractures**
2. Partial/complete amputations
3. Major soft tissue injures (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 injures (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 ≥ 7 years of age infusion of cefazolin administer:

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)

Ceftriaxone

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 ≤ 2 months old (any administration of ceftriaxone)
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 ceftriaxone
1. Dilute 2 gm ceftriaxone with 20 mL NS:
    a. Inject two 10 mL flushes into one 2 gm vial of ceftriaxone
    OR
    b. Inject one 10 mL flush into each 1 gm vial of ceftriaxone.
2. Resulting concentration is 100 mg/mL

Infusion dilution of ceftriaxone
1. Add ceftriaxone 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 ceftriaxone 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. Ceftriaxone Slow IVP: 2gm (slow IV push dilution), slow IVP over 3-5 minutes
    OR
2. Ceftriaxone 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 ceftriaxone slow IV push administer:
    a. Ceftriaxone (slow IV push dilution) according to MI MEDIC cards.

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

OR

2. Pediatrics ≥ 7 years of age ceftriaxone infusion administer:

a. Ceftriaxone infusion according to MI MEDIC cards

i. If MI MEDIC cards are not available administer ceftriaxone (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)

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

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)

Pediatric Cardiac Arrest – General (Section 6 Pediatric Cardiac)

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)

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)

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.

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)

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. Maxiumum of 2 doses total of epinephrine (including

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. Maxiumum 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. Maxiumum 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.

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 ≤ 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.

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)

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:

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 1 mcg/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)

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

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)

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

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)**

[1]The safety and efficacy in pediatrics has not been established, [2]Administer slowly over 15 minutes.
[3]Push slowly over 15 minutes, [4]Infuse over 15 minutes

Used in the Following Protocols
Cyanide Exposure (Section 10 Special Operations)

MCA Name Tri-County Emergency Medical Control Authority
MCA Board Approval 2/12/24
MCA Implementation Date 3/25/24
MDHHS Approval: 7/19/23

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

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** 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)

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)

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 MANGEMENT

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 cards
2. If MI MEDIC cards are not available administer:
    a. Pediatrics (> 6 years of age and ≤ 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 ≤ 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)

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)

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

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)

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:

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)

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.

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)

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.

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)

Morphine

Pharmacological Category: Analgesic, Opioid

Indications:
1. Pain

Routes: IV/IO/IM

Contraindications:
1. Hypotension
2. Children < 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)

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 TREATEMENT 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

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)

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 PAINE/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)

Ondansetron

Pharmacological Category: Antiemetic

Indications:

1. Nausea and vomiting

Routes: IV/IM; ODT (for patients ≥ 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.

Pediatrics administer:

1. Ondansetron according to MI MEDIC cards
2. If MI MEDIC cards are not available administer:
    a. Pediatrics ≥ 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)

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 PESTICED ESPOSURE
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.

	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 1st dose of available benzodiazepine)

PEDIATRIC < 8 years of age	**Pediatric Patient with Non-Severe Signs/ Symptoms**	• *Mild or moderate symptoms as above*	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)

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 ≤ 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

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)

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:

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)

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)

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)

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)

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)