Memorial EMS
Decatur Memorial EMS
Springfield Memorial EMS

Interfacility Paramedic Transport Infusions

Developed March 2025

Medication Infusion Guidelines

The medications listed in the following protocols are the only medications that EMS may transport at the Interfacility Paramedic and Expanded Scope level. This includes any medication in the ALS Protocol as well as additional, commonly transferred medications. Specific guidelines for each medication are listed in that protocol. General information is listed below. At any time if a crew member does not feel comfortable with the patient condition and the transport scenario, they need to relay their concerns to the hand off care providers, work to address the concerns, if not addressed, Medical Control may be contacted.

GENERAL PATIENT CARE ORDERS:

1. All medications, with the exception of Antibiotics, Antivirals, and Multi-vitamin Banana Bag, must be transported on a pump. The treating provider must be competent in the management of the pump, either via previous training, or just in time training prior to taking responsibility for patient care.
2. *Routine ALS Care*
3. **Verify initial dose and infusion rate as well as total time at the transferring facility prior to departure.**
4. **Monitor patient closely** en route.
5. Any other change in rate/dosage of the medication during interfacility transfer requires **Medical Control** order.
6. If perceived life-threatening reaction, infusion may be stopped while contacting Medical Control.

ADDITIONAL REQUIREMENTS:

This is an Advanced Scope of Practice Protocol. Only providers who have completed additional system training are authorized to perform. The protocol is only designed for patients who are being transferred from one medical facility to another.

A **Medical Control Physician** must be contacted prior to the EMS crew taking transfer of care of the patient if any of the following conditions apply:

1. Patient in hypotensive at the time of transfer.
2. An acute deterioration or change in the patient's status is noted.
3. Medications ordered are outside of the concentrations or infusion rates that are permitted by the current prehospital treatment protocols.
4. The prehospital provider has any concern that the provider's experience or abilities, or the available equipment, may not meet the patient's anticipated needs during the transport.

All Crystalloid Solutions

CLASS:

1. Crystalloids

ACTION:

Increase Intravascular volume
Replenish Electrolyte deficits

INDICATION:

1. Hypovolemia
2. Hemorrhage
3. Sepsis
4. Dehydration
5. Hemodynamic instability
6. IV medication delivery
7. Maintenance

COMPLICATIONS/ADVERSE REACTIONS:

1. Too fast infusion can produce a volume overload state

PRECAUTIONS:

- Hyperkalemia
- Cerebral edema
- Congestive heart failure patients
- Renal insufficiency patients

SIDE EFFECTS:

- Fluid overload
- Pulmonary edema
- Electrolyte imbalance
- Acid-base disturbances

EQUIPMENT:

- Varies based on patient diagnosis

HOW SUPPLIED:

- 250 mL, 500 mL and 1000 mL

DOSE:

- Rate determined by transferring physician

Antibiotics

CLASS:

- Antibiotic

ACTION:

- Treatment for known infection. Prophylactic measure for patient who may undergo surgical procedure or who has had recent exposure that indicates likelihood of resulting infection.

INDICATION:

1. Pre-existing diagnosed infection or suspected infection.
2. Exposure that creates likelihood of resulting infection.

CONTRAINDICATION:

1. Known allergy to the medication

COMPLICATIONS/ADVERSE REACTIONS:

1. Allergic reactions
2. Ototoxicity
3. Nephrotoxicity (aminoglycosides)

PRECAUTIONS:

1. Speed of infusion

SIDE EFFECTS:

- Localized reaction to infusion: redness/ burning at site of infusion.

EQUIPMENT:

- Antibiotic infusions may be administered by pump or by gravity set rate. Dial-a-flow devices can also be utilized.

HOW SUPPLIED:

- Varies by antibiotic

DOSE:

- Dependent on the specific antibiotic.

STANDING ORDERS:

1. Antibiotics need to be started 15 minutes or more before the start of the transport.
2. **Verify infusion rate as well as total time at the transferring facility prior to departure.**
3. Follow A*naphylaxis Protocol* if needed for signs of allergic reaction and/ or shock.
4. If infusion is completed during transport, antibiotics should be discontinued, and line kept open by infusing 0.9% Normal Saline at TKO rate.

Antivirals

CLASS:

- Antivirals

ACTION:

- Treatment for known infection. Prophylactic measure for patient who may undergo surgical procedure or who has had recent exposure that indicates likelihood of resulting infection.

INDICATION:

1. Suspected viral infection

CONTRAINDICATION

1. Known allergy to the medication

COMPLICATIONS/ADVERSE REACTIONS:

1. Allergic reactions
2. Ototoxicity
3. Nephrotoxicity (aminoglycosides)

PRECAUTIONS:

1. Speed of infusion

SIDE EFFECTS:

Localized reaction to infusion: redness/ burning at site of infusion.

EQUIPMENT:

- Antiviral infusions may be administered by pump or by gravity set rate. Dial-a-flow devices can also be utilized.

HOW SUPPLIED:

- Varies by medication

DOSE:

- Dependent on the specific antivirals.

Antivirals

STANDING ORDERS:

1. Antivirals need to be started 15 minutes or more before the start of the transport.
2. **Verify infusion rate as well as total time at the transferring facility prior to departure.**
3. Follow A*naphylaxis Protocol* if needed for signs of allergic reaction and/ or shock.
4. If infusion is completed during transport, antivirals should be discontinued, and line kept open by infusing 0.9% Normal Saline at TKO rate.

Racemic Epinephrine

CLASS:

- Alpha and beta agonist

ACTION(S):

- Enhances activity of both alpha and beta receptors

INDICATIONS:

1. Adult:
    a. Asthma
2. Pediatrics
    a. Bronchospasm, asthma
    b. Croup

CONTRAINDICATIONS/COMPLICATIONS/ADVERSE REACTIONS:

None listed

PRECAUTIONS:

1. Used with caution in patients with following conditions: heart disease, hypertension, diabetes, glaucoma, prostatic hyperplasia, psychiatric conditions, seizure disorder, thyroid disease

SIDE EFFECTS:

- Tachycardia
- Anxious feeling
- Hypertension

HOW SUPPLIED:

- 2.25% nebulized solution

Racemic Epinephrine

DOSE:

- Adult:
    a. Asthma: (hand bulb nebulizer) 1 to 3 inhalations of 2.25% (1 vial); may repeat in 3 hours as needed
- Pediatrics
    a. Bronchospasm, asthma: (hand bulb nebulizer) Add 0.5 mL (1 vial) of 2.25% solution to nebulizer; 1 to 3 inhalations; may repeat dose after at least 3 hours if needed
    b. Croup: Nebulization: 0.05 to 0.1 mL/kg (maximum dose: 0.5 mL/dose) diluted in 2 to 3 mL NS, may repeat dose every 15 to 20 minutes

STANDING ORDERS:

1. Any other change in rate/dosage of racemic epinephrine during interfacility transfer requires **Medical Control** order.

Natural Colloids (Blood Products)

CLASS:

- Blood Components

ADDITIONAL NAMES:

- FFP
- PRBCs
- Platelets
- Clotting factors
- Albumin

ACTION:

- Replace cells (fresh frozen plasma or packed red blood cells) needed by the body

INDICATION:

1. Hemorrhagic shock
2. Anticoagulant reversal
3. Symptomatic anemia

CONTRAINDICATION:

1. Patient refusal

COMPLICATIONS/ADVERSE REACTIONS:

1. Transfusion reaction. Severe reactions will usually manifest during initial 50cc or less of infusion.
2. ABO incompatibility

PRECAUTIONS:

1. Too fast of infusion can produce volume overloaded state.

SIDE EFFECTS:

- Transfusion reaction
- Volume Overload

Blood Products

HOW SUPPLIED:

- 250-300 mL per unit infusion
- Usually infused over 1- 3 hours

DOSE:

- 1 unit
- Rate based on situation

STANDING ORDERS:

1. **Blood infusions must be started at least 15 minutes before the transport AND at least 50 CC must be infused before the transport can begin.**
2. Temperature must be taken every 15 minutes.
3. If perceived life-threatening reaction, infusion may be stopped while contacting Medical Control.
4. Tubing must be changed every 2 units or after every 4 hours of use. Tubing must be discarded immediately following completion of transfusion.
5. If receiving two separate blood products (RBC's and platelets), they must infuse through separate IV sites.
6. **If signs of transfusion reaction, infusion should be stopped, and the tubing should be removed. Tubing and remaining blood should be transported to destination facility for evaluation.**
    a. **Signs of a transfusion reaction include:**
        i. **Temperature**
        ii. **Hypertension/ Hypotension**
        iii. **Dyspnea**
        iv. **Rash**
        v. **Itching**
        vi. **Hives**
    b. **Treat symptoms based on appropriate protocol which may include**
        i. **Benadryl 25-50 mg IV**
        ii. **IV Fluids**
        iii. **Epinephrine 0.15-0.3 mg IM**

Alteplase (post Tenecteplase IVP)

CLASS:

- Thrombolytic

ADDITIONAL NAMES:

- Activase (Alteplase)
- Alteplase (Alteplase)
- TNKase (Tenectaplase)

ACTION:

- Dissolve clot in treatment of ischemic stroke.

INDICATION:

1. Ischemic Stroke-Alteplase and Tenecteplase.
2. Acute MI-Alteplase and Tenecteplase.
3. Unstable Pulmonary Embolism-Alteplase

CONTRAINDICATION:

1. Nasogastric Tube
2. Evidence/ suspicion of cerebral hemorrhage
3. Intracranial or intraspinal surgery, serious head trauma or previous stroke within last 3 months
4. History of intracranial hemorrhage
5. Uncontrolled hypertension (> 185mmHg Systolic, > 110 mmHg Diastolic)
6. Seizure at the onset of stroke
7. Active internal bleeding
8. Intracranial neoplasm, arteriovenous malformation, or aneurysm
9. History of Pradaxa use
10. Known bleeding diathesis including but not limited to:
    a. Current use of oral anticoagulants or an International Normalized Ratio (INR) >1.7 or a prothrombin time (PT) > 15 seconds
    b. Administration of heparin or Low Molecular Weight Heparin (Lovenox) within 48 hours preceding the onset of stroke and have an elevated partial thromboplastin time (aPTT) at presentation
    c. Platelet count <100,000mm3

COMPLICATIONS/ADVERSE REACTIONS:

1. Bleeding
2. Reperfusion arrhythmias
3. Elevated temp
4. Hypotension
5. Anaphylactic Reaction

Alteplase (post Tenecteplase IVP)

PRECAUTIONS:

1. Alteplase or Tenecteplase must be started within 4.5 hours of onset of symptoms.
2. Do not take blood pressure in the arm tPA is infusing in.
3. Patient must be NPO for 24 hours and until swallow study is done.

SIDE EFFECTS:

- Bleeding at venipuncture sites and other various sites
- Hematuria
- Intercranial hemorrhage

HOW SUPPLIED:

- Alteplase -100mg/100mL bedside premix for infusion

DOSE:

- Loading dose of 10% of total infusion given over 1 minute to be completed at transferring facility.
- Infusion of 0.9mg/kg to be infused over 60 minutes.

STANDING ORDERS:

1. If infusion is completed during transport, tPA should be discontinued and line kept open by infusing 0.9% Normal Saline at TKO rate.

PEARLS

While Tenecteplase (TNK) is used in the same patients, the administration of a single injection negates the need for EMS to transport with an ongoing infusion. Regardless the side effects, precautions, and standing orders above would also apply to the patient post Tenecteplase as they would for a patient post Alteplase.

Dopamine

CLASS:

- Sympathomimetic

ACTION:

- Alpha- and beta-adrenergic agonist, resulting in increased cardiac contractility and myocardial workload as well as peripheral vasoconstriction (both venous & arterial)

INDICATIONS:

1. Correction of hemodynamic imbalance in hypoperfusion syndromes other than volume deficit
2. Cardiac dysfunction due to AMI
3. Cardiac dysfunction due to CHF
4. Poor perfusion due to sepsis
5. Neurologically induced vasodilation (neurogenic shock)
6. Renal failure

CONTRAINDICATIONS:

1. Uncontrolled tachycardia
2. Ventricular irritability
3. Hypertension
4. Hypoperfusion from volume deficit

COMPLICATIONS/ADVERSE REACTIONS/SIDE EFFECTS:

1. Tachycardia
2. Hypertension
3. Ventricular irritability
4. Angina
5. Anxiety
6. Decreased peripheral perfusion
7. Tissue necrosis with infiltration of IV line

PRECAUTIONS:

Use with caution in the following patients:

1. Children
2. Patients with occlusive vascular disease (or other types of peripheral vascular insufficiency)

HOW SUPPLIED:

- 400mg in 250mL D_5W
- 800mg in 250 mL D_5W

Dopamine

DOSE:

- *Dopaminergic (renal) dose:* 2-5mcg/kg/min
- *Beta agonist (cardiac) dose:* 5-15mcg/kg/min
- *Alpha agonist (vasopressor) dose:* >15mcg/kg/min

STANDING ORDERS:

1. Verify patient's **weight (in *kilograms*)**
2. Verify concentration & dose, infusion rate as well as total time and vital sign parameters at the transferring facility prior to departure.
3. Incompatible with Sodium Bicarb. **No IV push drugs can be administered through this line**. Monitor patient closely for rhythm changes en route and repeat vitals signs ***every 15 minutes.***
4. Monitor urine output (should be at least 25mL/hr)
5. **Maximum infusion of Dopamine not to exceed 50mcg/kg/minute.**

Norepinephrine

CLASS:

- Sympathomimetic

ADDITIONAL NAMES:

- Levophed

ACTION:

- Alpha adrenergic and some Beta-adrenergic agonist to cause peripheral vasoconstriction, increase blood pressure and increase heart rate to lesser degree

INDICATION:

1. Neurogenic shock
2. Septic shock
3. Hypotension refractory to other sympathomimetics

CONTRAINDICATION:

1. Hypotension from hypovolemia

COMPLICATIONS/ADVERSE REACTIONS:

1. Headache

PRECAUTIONS:

1. Alkaline solutions can deactivate.
2. Requires constant monitoring of blood pressure.
3. Extravasation can cause tissue necrosis.
4. Infusion rates > 20 mg/ min significantly increase risk of extravasation.

SIDE EFFECTS:

- Anxiety
- Palpitations
- Hypertension

HOW SUPPLIED:

- 4 mg/ 250 mL (typical)
- 8 mg/ 250 mL (double strength)

Norepinephrine

DOSE:

- 0.5-40 mcg/ minute. Typical starting dose is 5 mcg/min. Max 40 mcg/min.
- 4 mg in 250 ml of D5W, giving a concentration of 15 mcg/mL (Typical)
- MEMS does **not** use weight-based dosing. If EMS responds for an inter-facility transport and finds dosing or concentrations other than as noted above, Contact Medical Control for orders.

STANDING ORDERS:

1. Contact Medical Control if the heart rate is greater than 150 bpm or persistently less than 60 bpm or a SBP less than 90 for 2 consecutive readings 5 minutes apart.
2. Any change in rate/dosage of Norepinephrine during inter-facility transfer requires Medical Control Order. Typical titration orders would be increasing 2.5-5mcg/min every 5 minutes to maintain SBP>90mmHg.

Heparin Sodium

CLASS:

- Anticoagulant

ACTION(S):

- Functions as an anticoagulant by accelerating neutralization of activated clotting factors, hence inhibiting the clotting of blood and the formation of fibrin clots.

INDICATIONS:

1. Concurrent usage with administration of TPA in the acute MI patient
2. Treatment of pulmonary embolism and a-fib with embolization
3. Treatment of peripheral arterial embolism
4. Treatment of venous thrombi and its extension
5. Prevention of re-thrombosis or re-occlusion during MI after thrombolytic therapy

CONTRAINDICATIONS:

Absolute:

1. Severe thrombocytopenia
2. Uncontrolled active bleeding (except when known to be from DIC [disseminated intravascular coagulation])
3. Sensitivity to Heparin

Relative:

1. Any disease where risk of hemorrhage may be increased
2. Aneurysm
3. Severe hypertension
4. Diverticulitis or ulcerative colitis
5. Severe hepatic disease or renal disease
6. Sub-acute bacterial endocarditis
7. Following major surgery or lumbar puncture (spinal tap)

COMPLICATIONS/ADVERSE REACTIONS:

1. Local site irritation
2. Hypersensitivity
3. Anaphylactic reaction
4. Adrenal hemorrhage

Heparin Sodium

PRECAUTIONS:

Use with caution in the following patients:

1. Pregnant patients
2. Alcoholics (due to decreased hepatic function)
3. Elderly (due to decreased hepatic & renal function and increased injury capability
4. Avoid IM injections or other procedures that may cause bleeding.
5. Move patients gently to avoid bruising or bleeding

SIDE EFFECTS:

- Fever
- Bruising
- Oozing of blood

HOW SUPPLIED:

- 25,000 units in 500 mL 0.45% NS (50u/mL)
- 25,000 units in 500mL D_5W (50u/mL)
- 25,000 units in 250mL D_5W (100u/mL)
- 1,000 units in 500mL NS (2u/mL)

DOSE:

- 5,000 units (loading dose)
- Maintenance infusion is based on PTT results but is usually around 1,000 units/hr (dose will be determined by transferring facility)

STANDING ORDERS:

1. Any other change in rate/dosage of Heparin during interfacility transfer requires **Medical Control** order.

Nitroglycerin

CLASS:

- Nitrate

ADDITIONAL NAMES:

2. Nitrostat

ACTION:

- Vasodilator and vascular smooth muscle relaxant
- Reduces myocardial oxygen consumption, preload & afterload
- Metabolized by the liver
- Excreted in urine
- Half-life of 1-4 minutes
- IV onset of action – immediate; duration – variable

INDICATIONS:

1. Unstable angina pectoris if hemodynamically stable
2. Congestive heart failure (CHF) in settings of acute MI that are hemodynamically stable
3. Hypertensive emergencies

CONTRAINDICATIONS:

1. Sensitivity to nitrates
2. Increased ICP (*e.g.* head trauma, hemorrhagic stroke or other cerebral hemorrhage)
3. Uncorrected hypovolemia
4. Use of *erectile* dysfunction medications (Sildenafil-Viagra, Tadalafil-Cialis, Vardenadil-Levitra, or Avanafil-Stendra) within 48 hours

COMPLICATIONS/ADVERSE REACTIONS/SIDE EFFECTS:

1. Hypotension, especially postural (from vasodilation)
2. Dizziness/syncope (from hypotension)
3. Pallor/sweating (from hypotension)
4. Temporary pulsating headache (from vasodilation)
5. Nausea/vomiting
6. Tachycardia (in response to hypotension)
7. Paradoxical bradycardia (rare)
8. Rash or anaphylaxis

Nitroglycerin

PRECAUTIONS:

Use with caution in the following patients:

1. Pregnant or lactating patients
2. Hepatic or renal disease
3. Pericarditis
4. Postural hypotension

HOW SUPPLIED:

- 25mg in 250mL D_5W
- 50mg in 250mL D_5W
  Note: Nitroglycerin infusions MUST be in a glass bottle with **polyethylene tubing**.

DOSE:

- 5-50mcg/minute

STANDING ORDERS:

1. Nitroglycerin infusion should have its own IV site. **No IV push drugs can be administered through this line**. If absolutely necessary, NTG is compatible with Heparin (and Lidocaine).
2. Titrate NTG drip to effect (patient's pain relief) by increasing in 10mcg increments every 3-5 minutes until a response is noted.
3. **BE ALERT FOR DEVELOPING HYPOTENSION**. Titrate down in 10mcg increments for hypotension. Monitor vital signs every 3-5 minutes after an increase in dose.
4. **Notify Medical Control** in the following circumstances
   a. Chest pain re-occurs en route
   b. Vital signs deviate from the predetermined parameters set forth by the transferring hospital
   c. Any titration of the NTG drip (up or down)
5. **Maximum infusion of NTG not to exceed 50mcg/minute**

Amiodarone

CLASS:

3. Class III antiarrhythmic

ADDITIONAL NAMES:

4. Cardone

ACTION:

5. Prolongs the duration of action potential and effective refractory period. Noncompetitive alphas and Beta-adrenergic inhibition. It increases the PR and QT intervals and decreases sinus rate. Also effective for atrial arrhythmias in patients with impaired left ventricular function when digoxin has proven ineffective.

INDICATION:

1. Treatment and prophylaxis of frequently recurring ventricular fibrillation and hemodynamically unstable ventricular tachycardia.

CONTRAINDICATION:

1. Known hypersensitivity.
2. Cardiogenic shock.
3. Marked Sinus Bradycardia and 2nd and 3rd heart block without functioning pacemaker.
4. Severe liver disease.
5. Hypotension.

COMPLICATIONS/ADVERSE REACTIONS:

Cardiovascular

1. Vasodilation and hypotension
2. Torsades de Pointes
3. Sinus arrest
4. Bradycardia
5. CHF
6. Prolonged QT interval
7. Negative inotropic effects

Amiodarone

Pulmonary

1. Pulmonary toxicity
2. Progressive dyspnea
3. Fatigue
4. Cough
5. Pleuritic pain
6. Fever
7. Pulmonary edema

PRECAUTIONS:

1. Use with caution in renal failure patients
2. Incompatible with Heparin Sodium

HOW SUPPLIED:

- 150mg/ 3 mL
- 150mg/ 100 mL D5W
- 360 mg/ 100 mL D5W

DOSE:

- Loading dose of 150 mg or 300 mg infusion to be completed at transferring facility.
- Slow infusion of 360 mg over 6 hours at 1 mg/ min.
- Maintenance infusion of 540 mg over 18 hours at 0.5 mg/ min.

STANDING ORDERS:

1. Verify Potassium, Magnesium and liver function labs, if available.
2. Notify Medical Control if heart rate less than 60 or B/P less than 90.

Diltiazem

CLASS:

6. Calcium Channel Blocker

ADDITIONAL NAMES:

7. Cardizem

ACTION:

8. Inhibits calcium ion influx across the cell membrane in cardiac and vascular smooth muscle. Produces relaxation of coronary vascular smooth muscle and dilates coronary arteries. Slows SA/AV node conduction and dilates peripheral arteries.

INDICATION:

1. Atrial fibrillation with rapid ventricular response
2. Atrial Flutter
3. PSVT
4. Chronic unstable angina pectoris

CONTRAINDICATION:

1. 2nd or 3rd heart bock
2. Cardiogenic shock
3. Sick Sinus Syndrome
4. Hypotension of 90mmHg Systolic
5. Wolff-Parkinson-White Syndrome

COMPLICATIONS/ADVERSE REACTIONS:

Cardiovascular

1. Hypotension
2. CHF
3. Ventricular or atrial arrhythmias
4. Chest pain
5. Junctional or AV dissociation
6. Facial Flushing

Diltiazem

Central Nervous System

1. Dizziness
2. Paresthesia
3. Headache
4. Weakness
5. Visual disturbance

Dermatologic

1. Injection site reaction (itching, burning)
2. Sweating

SIDE EFFECTS:

1. Constipation
2. Nausea
3. Vomiting
4. Dry Mouth

HOW SUPPLIED:

- 25mg/ 5 mL
- 100mg/ 100mL NS
- 100mg/ 100mL D5W

DOSE:

- 0.25mg/kg IVP over 2 minutes with second dose (if no response after fifteen minutes) of 0.35 mg/kg over 2 minutes to be given at transferring facility.
- 5-15 mg/hr (dose will be determined by transferring facility)

Metoprolol (IVP)

CLASS:

- Beta blocker

ACTION(S):

- Competitively blocks beta-1 receptors

INDICATIONS:

1. Atrial fibrillation/flutter, rate control
2. Hypertension

CONTRAINDICATIONS:

Absolute:

1. Hypersensitivity or allergy to metoprolol or other beta blocker medications
2. Second- or third-degree heart block
3. Sick sinus syndrome
4. Bradycardia
5. Hypotension

Relative:

1. Vasospastic angina

COMPLICATIONS/ADVERSE REACTIONS:

1. Bradyarrhythmia
2. Bronchospasm
3. Fatigue
4. Potentiation/masking of hypoglycemia

PRECAUTIONS:

Use caution when administering to those with past medical history of the following conditions:

1. Heart failure with reduced ejection fraction
2. Asthma or other obstructive respiratory disease
3. Myasthenia gravis
4. Pheochromocytoma
5. Thyroid disease
6. Diabetes
7. Hepatic impairment
8. Psoriasis
9. SVT

Metoprolol

SIDE EFFECTS:

- Bradycardia
- Hypotension

HOW SUPPLIED:

- Solution, Intravenous, as tartrate:
  - Generic: 5mg/5mL (5 mL)

DOSE:

- Atrial fibrillation/flutter, rate control
  - 2.5mg to 5mg over 2 minutes; repeat dose every 5 min as needed; max total dose 15mg
- Hypertension
  - 2.5mg to 5mg over 2 minutes; repeat dose every 5 min as needed; max total dose 15mg

STANDING ORDERS:

1. Any other change in rate/dosage of metoprolol during interfacility transfer requires **Medical Control** order.

Magnesium Sulfate

CLASS:

- Antidysrhythmic

ACTION:

9. Parenterally, magnesium decreases acetylcholine in motor nerve terminals and acts on myocardium by slowing rate of S-A node impulse formation and prolonging conduction time. Magnesium is necessary for the movement of calcium, sodium, and potassium in and out of cells, as well as stabilizing excitable membranes. Intravenous magnesium may improve pulmonary function in patients with asthma; causes relaxation of bronchial smooth muscle independent of serum magnesium concentration.

INDICATION:

1. Asthma/COPD, severe acute exacerbations
2. Eclampsia/preeclampsia with severe features
3. Hypomagnesemia
4. Torsades de pointes

CONTRAINDICATION:

1. Heart block
2. Myocardial damage

COMPLICATIONS/ADVERSE REACTIONS:

Cardiovascular:

1. Flushing
2. Hypotension
3. Vasodilation

Endocrine and metabolic:

1. Hypermagnesemia - Magnesium toxicity can lead to fatal cardiovascular arrest and/or respiratory paralysis

PRECAUTIONS:

1. Use with extreme caution in patients with history of myasthenia gravis or other neuromuscular disease
2. Caution in patients with renal impairment (risk of build-up causing Magnesium toxicity)

Magnesium Sulfate

HOW SUPPLIED:

- Solution, Injection:
  - Generic: 50% (10 mL, 20 mL)
- Solution, Injection [preservative free]:
  - Generic: 50% (2 mL, 10 mL, 20 mL, 50 mL)
- Solution, Intravenous:
  - Generic: 4 g/100 mL (100 mL); 1 g/100 mL (100 mL); 2 g/50 mL (50 mL); 20 g/500 mL (500 mL); 4 g/50 mL (50 mL); 40 g/1000 mL (1000 mL)
- Solution, Intravenous [preservative free]:
  - Generic: 4 g/100 mL (100 mL); 1 g/100 mL (100 mL); 2 g/50 mL (50 mL); 20 g/500 mL (500 mL); 4 g/50 mL (50 mL); 40 g/1000 mL (1000 mL)

DOSE:

- Asthma/COPD severe acute exacerbation:
  - IV: 2 g as a single dose over 20 minutes

- Eclampsia/preeclampsia with severe features:
  - IV: Initial: 4 to 6 g loading dose over 15 to 30 minutes at onset of labor or induction/cesarean delivery, followed by 1 to 2 g/hour continuous infusion for at least 24 hours after delivery; maximum infusion rate: 3 g/hour.
    - If seizure occurs while receiving magnesium, an additional bolus of 2 to 4 g may be administered over ≥5 minutes with frequent monitoring for toxicity

- Hypomagnesemia:
  - IV: slowly administer at rate ≤1 g/hour

- Torsades de pointes:

  - ***Polymorphic ventricular tachycardia (with pulse) associated with QT prolongation (torsades de pointes):***
    - **IV:** 1 to 2 g (diluted in 50 to 100 mL D5W) over 15 minutes (range: 5 to 60 minutes)
    - If no response or torsades de pointes recurs, may repeat dose up to a total of 4 g in 1 hour
  - ***Ventricular fibrillation/pulseless ventricular tachycardia associated with torsades de pointes:*** **Note:** Administer in conjunction with electrical cardioversion/defibrillation**.**
    - **IV/intraosseous:** 1 to 2 g (diluted in 10 mL D5W) administered as a bolus over ≥1 to 2 minutes; if ineffective, may repeat immediately; maximum total dose: 6 g

Octreotide

CLASS:

- Synthetic hormone
- Antidiarrheal Somatostatin Analog

Additional Names

- Sandostatin

ACTION(S):

- Long Acting octapeptide with pharmacologic actions mimicking those of the natural hormone somatostatin

INDICATIONS:

1. GI Bleed
2. Refractory hypoglycemia in combination with Dextrose

CONTRAINDICATIONS:

Absolute:

1. Known allergy to Octreotide
2. Patients with known Bradycardia or ECG changes and arrhythmias
3. Dialysis

Relative:

1. Dosage may be reduced for renal failure/ dialysis patients
2. Patients with known bradycardia or ECG changes/ arrhythmias

COMPLICATIONS/ADVERSE REACTIONS:

1. May affect insulin dosing

PRECAUTIONS:

Use with caution in the following patients:

1. May enhance toxicity of QTc prolonging agents
2. Multiple drug incompatibilities

Octreotide

SIDE EFFECTS:

- Abdominal or stomach pain
- Blurred vision
- Dizziness
- Dry mouth
- Fainting
- Fast, slow, or irregular heartbeat
- Flushed, dry skin
- Muscle cramps and stiffness
- Nausea
- Severe stomach pain with nausea and vomiting
- Sweating
- Hyperglycemia

HOW SUPPLIED:

- 500 mcg/100 mL

DOSE:

- 25-100 mcg/hr

STANDING ORDERS:

1. Verify lab values (platelet count, coagulation studies) prior to departure (if available).
2. If uncontrolled bleeding or allergic reaction develops, immediately discontinue the infusion, provide necessary treatment and **contact Medical Control**.

Hydrocortisone Sodium succinate

CLASS:

- Glucocorticoid

ACTION(S):

- Acts on glucocorticoid receptors similar to cortisol

INDICATIONS:

1. Adrenal insufficiency/crisis
2. Septic shock
3. Thyroid storm

CONTRAINDICATIONS:

Absolute:

1. Hypersensitivity
2. Systemic fungal infections
3. Premature infants
4. Idiopathic thrombocytopenia purpura

COMPLICATIONS/ADVERSE REACTIONS:

1. Arrhythmia (bradycardia)
2. Rash
3. Hypersensitivity reaction
4. Pulmonary edema
5. Psychosis

PRECAUTIONS:

1. Avoid extravasation as can be damaging to local tissues
2. Can cause psychiatric disturbances such as insomnia, personality changes up to acute psychosis

SIDE EFFECTS:

- Rash
- Pulmonary edema
- Insomnia
- Acute psychosis

Hydrocortisone Sodium succinate

HOW SUPPLIED:

- Intravenous

DOSE:

- Adrenal Insufficiency
  - Adults:
    - 100 mg IV bolus (initial dose), followed by 50 mg Q6H
  - Peds
    - 2-3 mg/kg IV loading dose (max 100 mg), followed by 1-5 mg/kg Q6H (infants), 25-50 mg/day divided into 4 doses (1-5 years), 50-100 mg/day divided into 4 doses (5-adolescent)
- Thyroid Storm
  - Adults
    - 300 mg IV loading dose, followed by 100 mg Q8H

STANDING ORDERS:

1. Any other change in rate/dosage during interfacility transfer requires **Medical Control** order.

Furosemide

CLASS:

- Diuretic

ACTION(S):

- Acts on Na/K/Cl channel in renal tubules

INDICATIONS:

1. Congestive Heart Failure
2. Anasarca
3. Volume Overload

CONTRAINDICATIONS:

Absolute:

1. Hypersensitivity reaction
2. History of sulfa allergy
3. Hypotension
4. Volume depletion
5. Cirrhosis

COMPLICATIONS/ADVERSE REACTIONS:

2. Hypersensitivity reaction
3. Volume depletion
4. Hypotension
5. Acute kidney injury
6. Ototoxicity

PRECAUTIONS:

1. Avoid using in patients with suspected dehydration
2. Patients who have an allergic reaction to sulfa drugs are at increased risk for allergic reaction to furosemide

Furosemide

SIDE EFFECTS:

- Dizziness
- Abdominal cramping
- DRESS syndrome
- Headache
- Vertigo

HOW SUPPLIED:

- IV

DOSE:

- Adult
  - 20-80 mg IV push 1-2x per day
- Pediatric
  - 2 mg/kg as single dose

STANDING ORDERS:

1. Any other change in rate/dosage during interfacility transfer requires **Medical Control** order.

Pantoprazole

CLASS:

10. Proton Pump Inhibitor

ADDITIONAL NAMES:

11. Protonix

ACTION:

12. Decreases secretion of gastric acid and chronic reflux

INDICATION:

1. Patients with Upper GI Bleed

CONTRAINDICATION:

1. Allergy to drug or drug class

COMPLICATIONS/ADVERSE REACTIONS:

1. Jaundice
2. GI upset
3. CNS Symptoms in elderly

PRECAUTIONS:

1. Hypersensitivity to Proton Pump Inhibitor drug class.

SIDE EFFECTS:

- Anaphylaxis
- Rash

HOW SUPPLIED:

- 40 mg/50 mL
- 80 mg/ 100 mL

DOSE:

- Bolus of 80 mg over 5 minutes given prior to infusion.
- IV Infusion of 8 mg/ hour.

Multivitamin Banana Bag

Class

- Vitamin

OTHER NAMES:

- Rally Packs

ACTION(S):

- Replenishes vitamins/ minerals and fluids lost in acute alcohol consumption.

INDICATIONS:

1. Vitamin and electrolyte deficiencies in chronic alcohol consumption

CONTRAINDICATIONS:

Absolute:

1. True allergy to any component of the preparation

COMPLICATIONS/ADVERSE REACTIONS:

None

PRECAUTIONS:

Use with caution in the following patients:

1. May not provide sufficient quantities of Thiamine for patient with Wernicke's Encephalopathy

SIDE EFFECTS:

- None

EQUIPMENT:

- May run to gravity

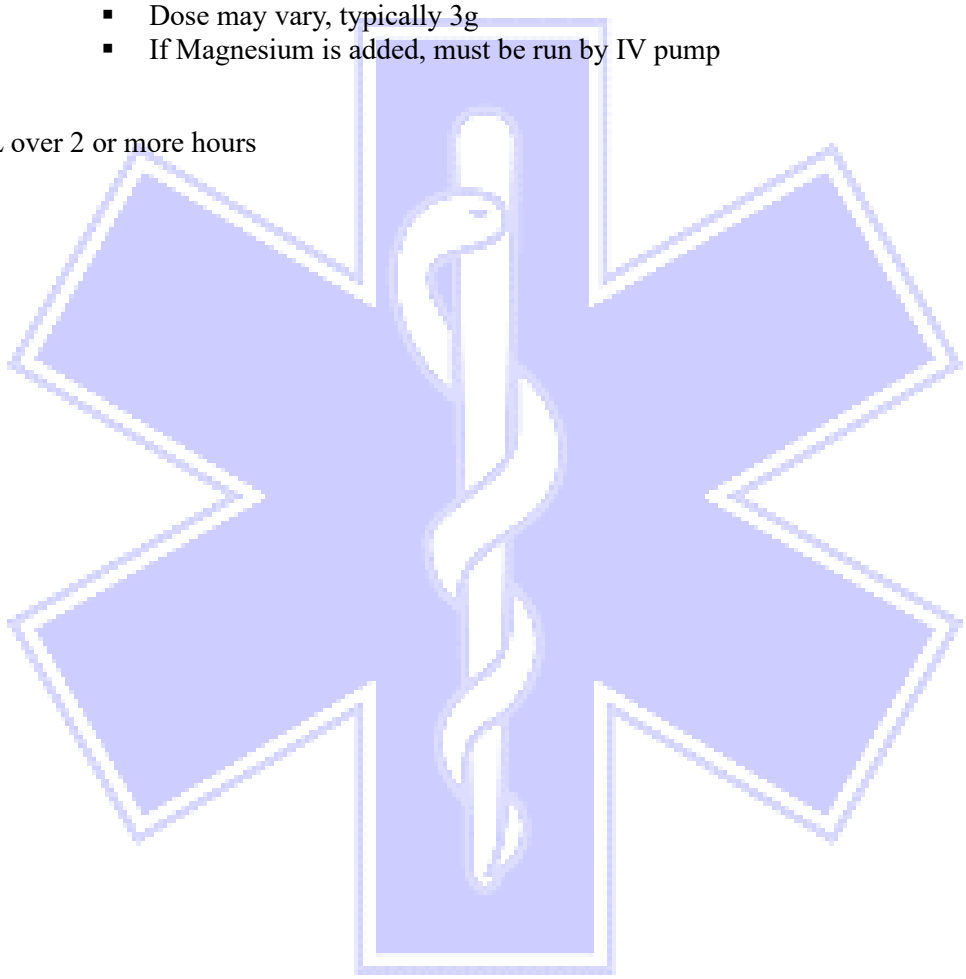
Multivitamin Banana Bag

HOW SUPPLIED:

- 1 L 0.9% Normal Saline
  - 1 amp multivitamin
  - 1 mg Folate
  - 100 mg Thiamine
  - In some situations Magnesium is added
    - Dose may vary, typically 3g
    - If Magnesium is added, must be run by IV pump

DOSE:

- 1 L over 2 or more hours



Sodium Bicarbonate

CLASS:
- Alkalizing agent

ACTION(S):
- Sodium Bicarbonate acts as a buffer working to restore normal plasma pH levels.
- Excess hydrogen ions react with bicarbonate resulting in the formation of carbon dioxide and water.

INDICATIONS:
1. Metabolic Acidosis
2. Rhabdomyolysis
3. Certain Overdoses (Salicylate and Tricyclic antidepressant)

CONTRAINDICATIONS:
1. Use with caution in patients with CHF, severe renal insufficiency and hypertension.

PRECAUTIONS:
1. Monitor IV site and patency to avoid extravasation.
2. Stop infusion and contact Medical Control if extravasation.
3. Extravasation should also be directly reported to receiving provider.

SIDE EFFECTS:
- Elevated sodium

HOW SUPPLIED:
- 150 mEq/L (3 ampules of NaHCO3 mixed in 1 L D5W)

DOSE:
- Typical infusion rate of 100 -250 mL/hour

STANDING ORDERS:
1. ETCO2 monitoring required throughout transport.
2. Not a titratable medication
3. Hold infusion for signs and symptoms of decompensated CHF and contact Medical Control
4. Contact Medical Control for infusion rate > 250 mL/hour.

Vitamin K

CLASS:

- Fat soluble vitamin class

ACTION(S):

- Promotes liver synthesis of clotting factors (II, VII, IX, X)

INDICATIONS:

1. Reversal of anticoagulation due to warfarin

CONTRAINDICATIONS:

Absolute:

1. Hypersensitivity to Vitamin K medication or any component of the formulation

COMPLICATIONS/ADVERSE REACTIONS:

1. Fatal hypersensitivity reactions, including anaphylaxis, have occurred during and immediately after IV and IM injection of phytonadione. Reactions have occurred despite dilution to avoid rapid IV infusion and upon first dose. Avoid the IV and IM routes of administration unless the SUBQ route is not feasible, and the serious risk is justified.

PRECAUTIONS:

1. Due to risk of a severe infusion reaction, including anaphylaxis, the maximum rate of IV administration is 1 mg/minute.

SIDE EFFECTS:

- Dermatologic toxicity
- Hypersensitivity/anaphylactoid reactions

Vitamin K

HOW SUPPLIED:

- Injection: 1mg/0.5mL (0.5mL); 10mg/mL (1mL)
- Tablet: 100mcg; 5mg

DOSE:

- **Oral:** Initial: 2.5 to 10 mg, depending on the INR. Administer as a single dose. Measure INR after 12 to 48 hours and administer another dose as needed.
- **IV:** Initial: 2.5 to 10 mg, depending on the INR and severity of bleeding. Administer as a single dose over 10 to 20 minutes (maximum infusion rate: 1 mg/minute). Measure INR after 6 to 12 hours and administer another dose as needed.

STANDING ORDERS:

1. Any other change in rate/dosage of Vitamin K during interfacility transfer requires **Medical Control** order.