DMEMSMD
JANUARY 2024 PROTOCOL UPDATES

Denver Metro Emergency Medical Services (EMS) Medical Directors Statement for Prehospital Providers

Shared Goal: To create a framework for emergency medical care within our community that supports safe and effective treatment and transport of patients experiencing medical emergencies to the hospital built on the most up to date and patient-safety centered medical literature.

0990 Quick Reference for Procedures and Medications Allowed by Protocol

a. Change to the indication label for benzodiazepines as an adjunctive agent in the treatment of uncontrolled severe anxiety.

b. Update to epinephrine section of quick reference guide, including indication labels and inclusion of IV push dose. Also, pediatric bradycardia changed to standing epinephrine order for paramedics.

Change to label for benzodiazepine as an adjunctive agent.

0990 QUICK REFERENCE FOR PROCEDURES AND MEDICATIONS ALLOWED BY PROTOCOL

Medications	B	BIV	AEMT	I	P
Benzodiazepines (midazolam, diazepam, lorazepam)					
• Seizure – Midazolam IN			S	S	S
• Seizure – All medications and routes in protocol				S	S
• Sedation for transcutaneous pacing or cardioversion				S	S
• Sedation for severely agitated or combative patient – Adult				S	S
• Sedation for severely agitated or combative patient – Pediatric				B	B
• Adjunctive agent for treatment of severe anxiety with extrication, packaging, or transport in adults that is uncontrolled by other interventions				B	B
Calcium					
• Pulseless arrest assumed due to hyperkalemia					S
• Calcium channel blocker overdose					B
Crystalloids (D_5W, LR, NS) – Initiation/Maintenance		S	S	S	S
Dextrose IV		S	S	S	S
Diphenhydramine (Benadryl)			S	S	S
Dopamine					S
Droperidol – Behavioral Management (For nausea/vomiting refer to Antiemetics)					
• Adult				S	S
• Pediatric				B	B
DuoDote™ / Mark I Kits	S	S	S	S	S
Epinephrine					
• Pulseless arrest – IV/IO				S	S
• Asthma – IM					S
• Anaphylaxis– IM	S	S	S	S	S
• Adult hypotension and poor perfusion refractory to fluid resuscitation – IV push dose and infusion					S
• Adult severe systemic allergic (Anaphylaxis) reaction – IV push dose or infusion					S
• Stridor at rest (alternative to racemic epinephrine)				B	S
• Epinephrine auto-injector	S	S	S	S	S
• Pediatric bradycardia – IV/IO				B	S
• Pediatric severe systemic allergic reaction (Anaphylaxis) refractory to IM epinephrine and fluids - IV/IO				B	B

Inclusion of IV Push Dose Epi

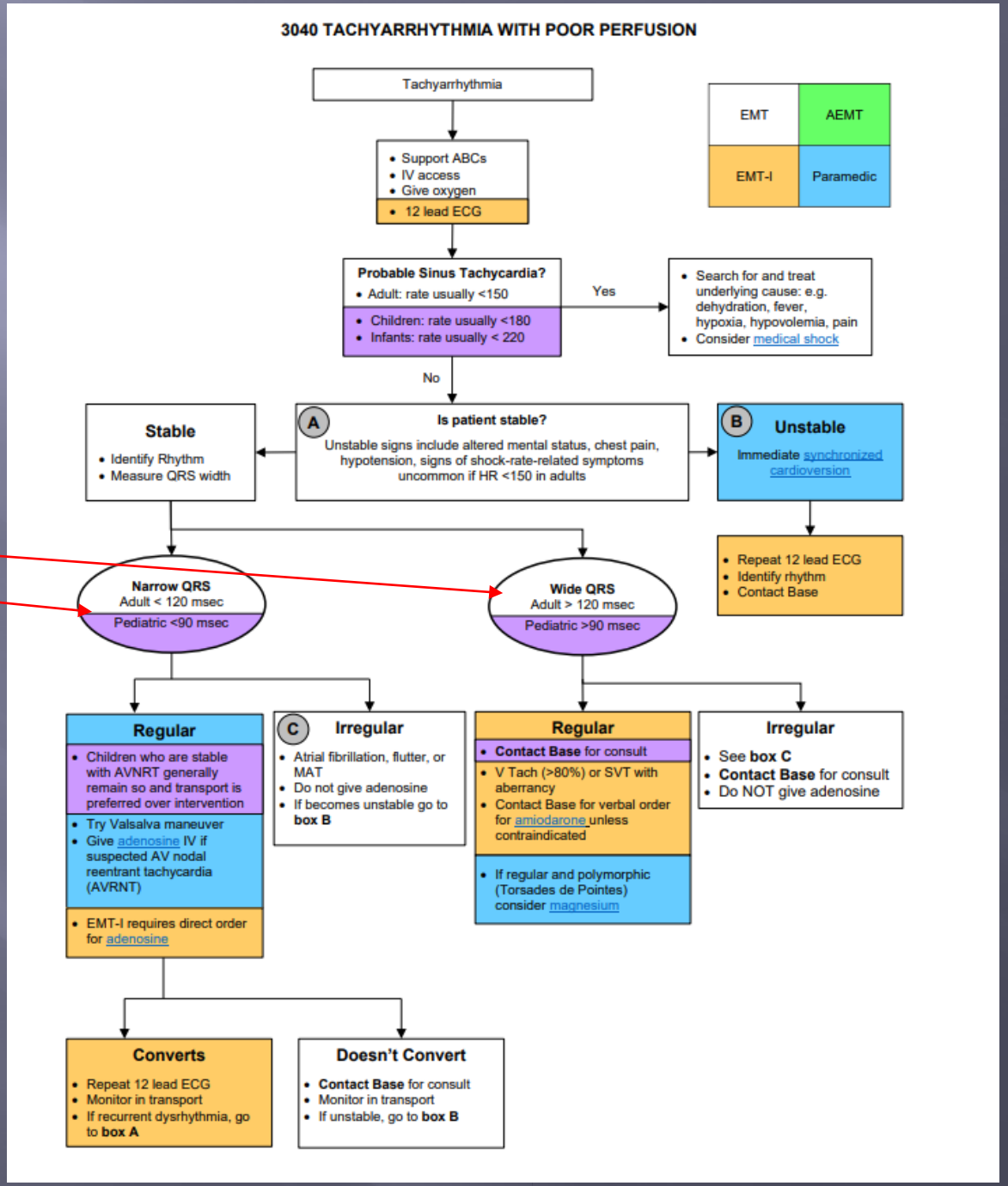
Medications	B	BIV	AEMT	I	P
Benzodiazepines (midazolam, diazepam, lorazepam)					
• Seizure – Midazolam IN			S	S	S
• Seizure – All medications and routes in protocol				S	S
• Sedation for transcutaneous pacing or cardioversion				S	S
• Sedation for severely agitated or combative patient – Adult				S	S
• Sedation for severely agitated or combative patient – Pediatric				B	B
• Adjunctive agent for treatment of severe anxiety with extrication, packaging, or transport in adults that is uncontrolled by other interventions				B	B
Calcium					
• Pulseless arrest assumed due to hyperkalemia					S
• Calcium channel blocker overdose					B
Crystalloids (D_5W, LR, NS) – Initiation/Maintenance		S	S	S	S
Dextrose IV		S	S	S	S
Diphenhydramine (Benadryl)			S	S	S
Dopamine					S
Droperidol – Behavioral Management (For nausea/vomiting refer to Antiemetics)					
• Adult				S	S
• Pediatric				B	B
DuoDote™ / Mark I Kits	S	S	S	S	S
Epinephrine					
• Pulseless arrest – IV/IO				S	S
• Asthma – IM					S
• Anaphylaxis– IM	S	S	S	S	S
• Adult hypotension and poor perfusion refractory to fluid resuscitation – IV push dose or infusion					S
• Adult severe systemic allergic (Anaphylaxis) reaction – IV push dose or infusion					S
• Stridor at rest (alternative to racemic epinephrine)				B	S
• Epinephrine auto-injector	S	S	S	S	S
• Pediatric bradycardia – IV/IO				B	S
• Pediatric severe systemic allergic reaction (Anaphylaxis) refractory to IM epinephrine and fluids - IV/IO				B	B

pediatric bradycardia changed to standing order for paramedic

3040 Tachyarrhythmia with Poor Perfusion

a. Correction to QRS width measurement unit

Changed from 0.12 msec and 0.90 msec to 120 msec and 90 msec



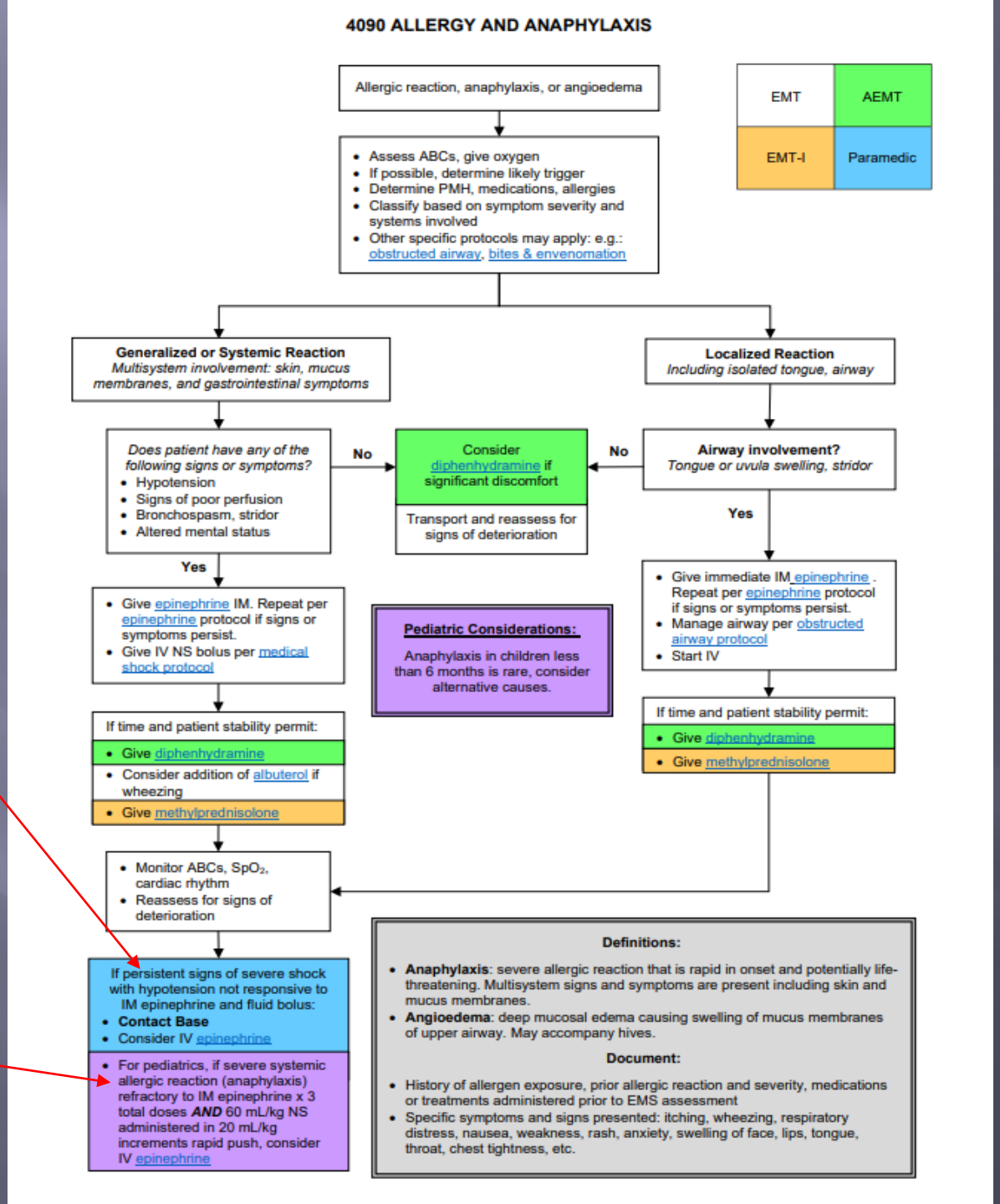
4090 Allergy and Anaphylaxis

a. References to epinephrine in vasopressor infusion protocol change.

b. Specific guidance on when to administer IV epinephrine in pediatric patients.

References to epinephrine in vasopressor infusion protocol change.

Specific guidance on when to administer IV epinephrine in pediatric patients



4090 ALLERGY AND ANAPHYLAXIS

Allergic reaction, anaphylaxis, or angioedema

EMT	AEMT
EMT-I	Paramedic

- Assess ABCs, give oxygen
- If possible, determine likely trigger
- Determine PMH, medications, allergies
- Classify based on symptom severity and systems involved
- Other specific protocols may apply: e.g.: obstructed airway, bites & envenomation

Generalized or Systemic Reaction
Multisystem involvement: skin, mucus membranes, and gastrointestinal symptoms

Does patient have any of the following signs or symptoms?
- Hypotension
- Signs of poor perfusion
- Bronchospasm, stridor
- Altered mental status

No → Consider diphenhydramine if significant discomfort → Transport and reassess for signs of deterioration

Yes

- Give epinephrine IM. Repeat per epinephrine protocol if signs or symptoms persist.
- Give IV NS bolus per medical shock protocol

If time and patient stability permit:
- Give diphenhydramine
- Consider addition of albuterol if wheezing
- Give methylprednisolone

Localized Reaction
Including isolated tongue, airway

Airway involvement?
Tongue or uvula swelling, stridor

No → Consider diphenhydramine if significant discomfort → Transport and reassess for signs of deterioration

Yes

- Give immediate IM epinephrine . Repeat per epinephrine protocol if signs or symptoms persist.
- Manage airway per obstructed airway protocol
- Start IV

If time and patient stability permit:
- Give diphenhydramine
- Give methylprednisolone

Pediatric Considerations:

Anaphylaxis in children less than 6 months is rare, consider alternative causes.

- Monitor ABCs, SpO_2, cardiac rhythm
- Reassess for signs of deterioration

If persistent signs of severe shock with hypotension not responsive to IM epinephrine and fluid bolus:
- **Contact Base**
- Consider IV epinephrine

- For pediatrics, if severe systemic allergic reaction (anaphylaxis) refractory to IM epinephrine x 3 total doses ***AND*** 60 mL/kg NS administered in 20 mL/kg increments rapid push, consider IV epinephrine

Definitions:

- **Anaphylaxis**: severe allergic reaction that is rapid in onset and potentially life-threatening. Multisystem signs and symptoms are present including skin and mucus membranes.
- **Angioedema**: deep mucosal edema causing swelling of mucus membranes of upper airway. May accompany hives.

Document:

- History of allergen exposure, prior allergic reaction and severity, medications or treatments administered prior to EMS assessment
- Specific symptoms and signs presented: itching, wheezing, respiratory distress, nausea, weakness, rash, anxiety, swelling of face, lips, tongue, throat, chest tightness, etc.

New protocol 4150 Hyperkalemia

a. New protocol to provide specific information including risk factors for hyperkalemia and guidance on treatment. Medication dosing already existed in the applicable medication protocols.

4150 HYPERKALEMIA

EMT	AEMT	EMT-I	Paramedic

Do not use this protocol for prolonged entrapment; refer to general trauma care protocol for specific treatment

Consider hyperkalemia in the following protocols if the patient has risk factors for hyperkalemia, especially with dialysis patients:
- Universal altered mental status
- Bradycardia
- Ventricular arrhythmia
- Adrenal insufficiency

- Assess and stabilize ABCs, give O_2 if needed, assess vital signs
- Initiate cardiac monitor, consider 12 lead
- Start IV
- If there is high clinical suspicion or documented hyperkalemia and the patient has ECG changes indicative of hyperkalemia:
  - Administer calcium
  - Consider albuterol
  - Consider sodium bicarbonate
- Consider fluids
  - Administer fluids cautiously if severe acute kidney injury; only administer fluids if patient producing urine and does not have contraindications such as end-stage renal failure or congestive heart disease

- Acquire12 lead ECG post-treatment if time permits
- Continue monitoring during transport and **Contact Base** if patient deteriorates

Hyperkalemia Risk Factors:
- Dialysis patient
- Chronic renal failure/insufficiency
- Renal injury
- Rhabdomyolysis
- Burns
- Prolonged entrapment/crush injury/ suspension syndrome
- Potassium supplements
- Potassium sparing diuretics (e.g., spironolactone)
- Digoxin toxicity
- Adrenal insufficiency

ECG Changes Indicative of Hyperkalemia:
- Peaked T waves
- New wide complex rhythm
- Ventricular tachycardia with following characteristics:
  - P waves disappear
  - May see very wide QRS
  - Peaked T waves
  - Heart rate slower than typical VT
- Sine-wave pattern
- Bradycardia with widened PR interval
- Junctional rhythm

General Information:
- Hyperkalemia can be present without ECG changes which may not require prehospital treatment in the stable patient.
- ECG changes may not directly correspond to serum potassium levels.
- Calcium is the only medication that will stabilize the cardiac membrane and is the backbone of treatment in prehospital care.
- Calcium must be given in separate line from IV sodium bicarbonate to prevent precipitation/formation of calcium carbonate.
- In setting of digoxin toxicity, calcium administration may worsen cardiovascular function and is contraindicated.

Why are we making changes to the sedation protocol?

The Denver Metro EMS Medical Directors are updating the sedation protocol to reflect evidence-based practice in prehospital medicine. Our intention in this update is to ensure a patient-centered policy that minimizes risks to the patient and to individuals providing emergency care while supporting paramedics in their individual clinical practices. The protocol changes are supported by multiple clinical trials to reduce the risk of adverse events and promote effective selection and dosing of medications. Please be aware that these updates are agreed upon by the Denver Metro EMS Medical Directors, physician experts who reviewed and collectively developed this as regional best practice. While each agency has the ability and responsibility to adapt these to the needs of the patients that they serve, this is our regional recommendation.

What are the changes being made?

- There is now an initial dose of up to 5 mg of intravenous midazolam or equivalent dose of alternative benzodiazepines. This comes with the recommendation to give a lower dose of benzodiazepines when clinically appropriate.

- After administering the first dose of benzodiazepine, switch to a butyrophenone or contact base for additional benzodiazepine dosing.

- The selection of the first agent used for the sedation of the agitated patient is left to the discretion of the paramedic to allow prehospital providers to use their clinical judgement depending on the suspected etiology of the severely agitated behavior.

- Once two administrations of **any** sedating agent are given, regardless of agents or doses administered, any further medication doses will require a base order.

6010 Agitated/Combative Patient

a. Change to algorithm. Consider causes of agitation added to flow chart to determine most appropriate class of medication for agitation with RASS of +3 or +4. Dosing guidance update for butyrophenone and benzodiazepine.

b. Refer to DMEMSMD sedation position statement for explanation for purpose of changes.

6010 AGITATED/COMBATIVE PATIENT PROTOCOL

EMT	AEMT
EMT-I	Paramedic

Principles:

While treating patients experiencing agitation, the safety of EMS providers should be maximized while honoring patient dignity and treating the patient's medical condition in a professional manner.

- EMS Safety. The safety of field personnel is paramount. Although EMS personnel have a duty to treat patients experiencing emergency medical conditions, they must not take risks that they are not comfortable with. Risks to personnel or scene safety should be commensurate to the benefit a patient may receive.
- Patient safety. Patient safety and the aid they receive from our care is the reason EMS exists. All treatments should be designed to reduce potential harm and maximize potential benefit.
- Dignity. All patients and providers deserve dignity and respect. Patient encounters for mental health and substance related emergencies are often challenging. It is essential that EMS professionals recognize our own biases. We owe it to our patients, especially those in disenfranchised groups, to provide equitable care. We strive to maximize the dignity of both patients and providers by practicing with clinical expertise and professionalism.

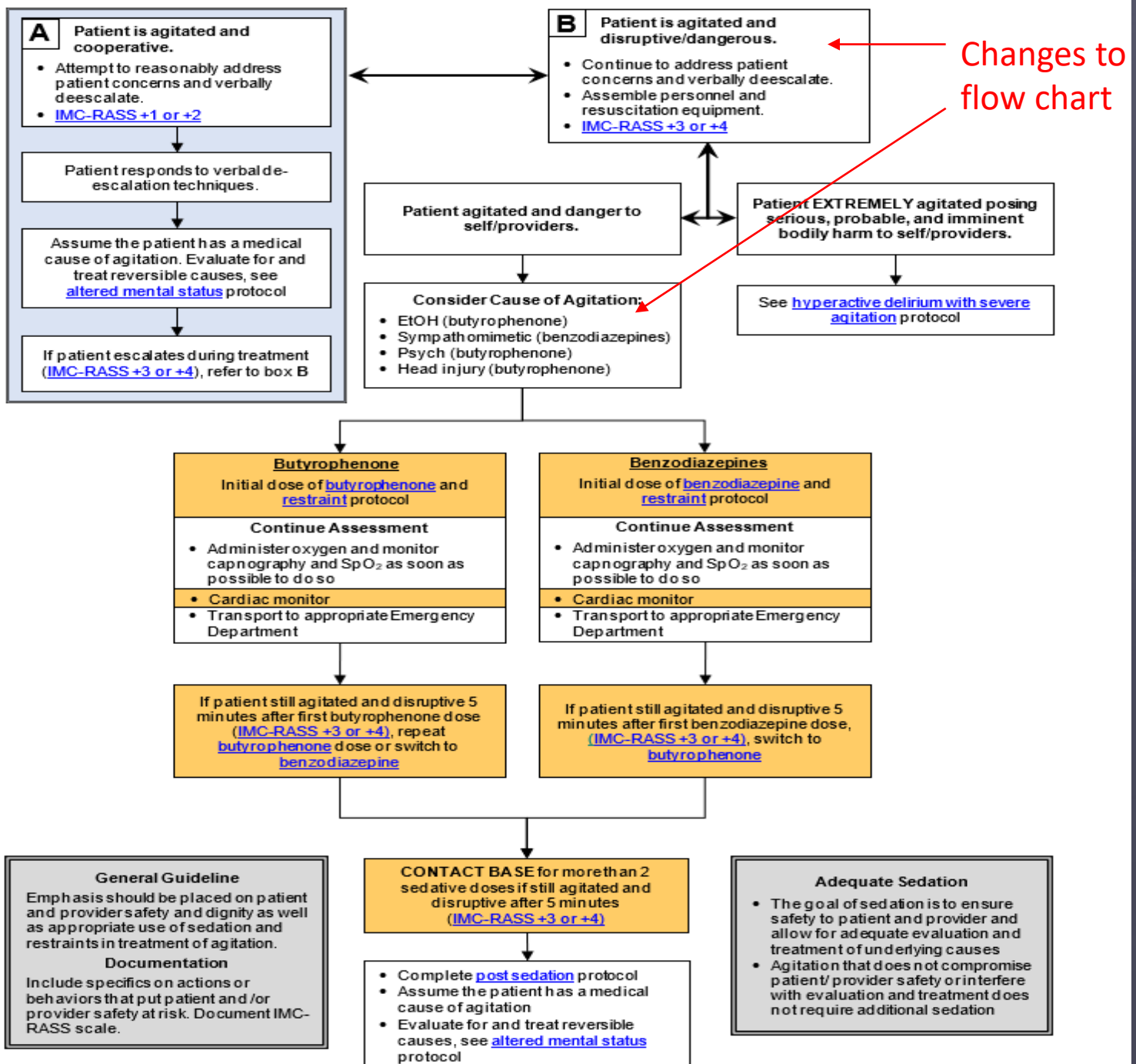
Initial Assessment:

The most critical initial step in managing agitation is the determination of an emergency medical condition.

- Patients assessed as having non-medical agitation do not require emergency medical intervention. EMS should never intervene solely for the support of another 911 function.
- EMS should only intervene in the medical management of agitation when the patient is assessed and suspected to have an emergency medical condition.
- Prior to any physical restraint or medication administration, all patients must first be assessed and suspected to have an emergent medical condition. Depending on the acuity of the situation, some initial assessments must be made in seconds while others may require more time.
- In some situations, it may be appropriate for EMS to stand by in case a person develops a medical emergency.
- Some patients with emergency medical conditions such as trauma or dyspnea may also exhibit agitation. That agitation should only be treated if the paramedic assesses that the patient lacks decision making capacity to care for their illness or injury.
- As soon as safely possible, EMS providers should assess and treat for underlying conditions that may present as agitation.
- EMS safety is paramount. In some uncommon circumstances it may be necessary to separate from an agitated patient in order to protect the patient and personnel on scene.
- When we have tension between the duty to treat and the safety of field personnel, we should apply the principles of EMS safety, patient safety and dignity.

Changes

Changes to flow chart

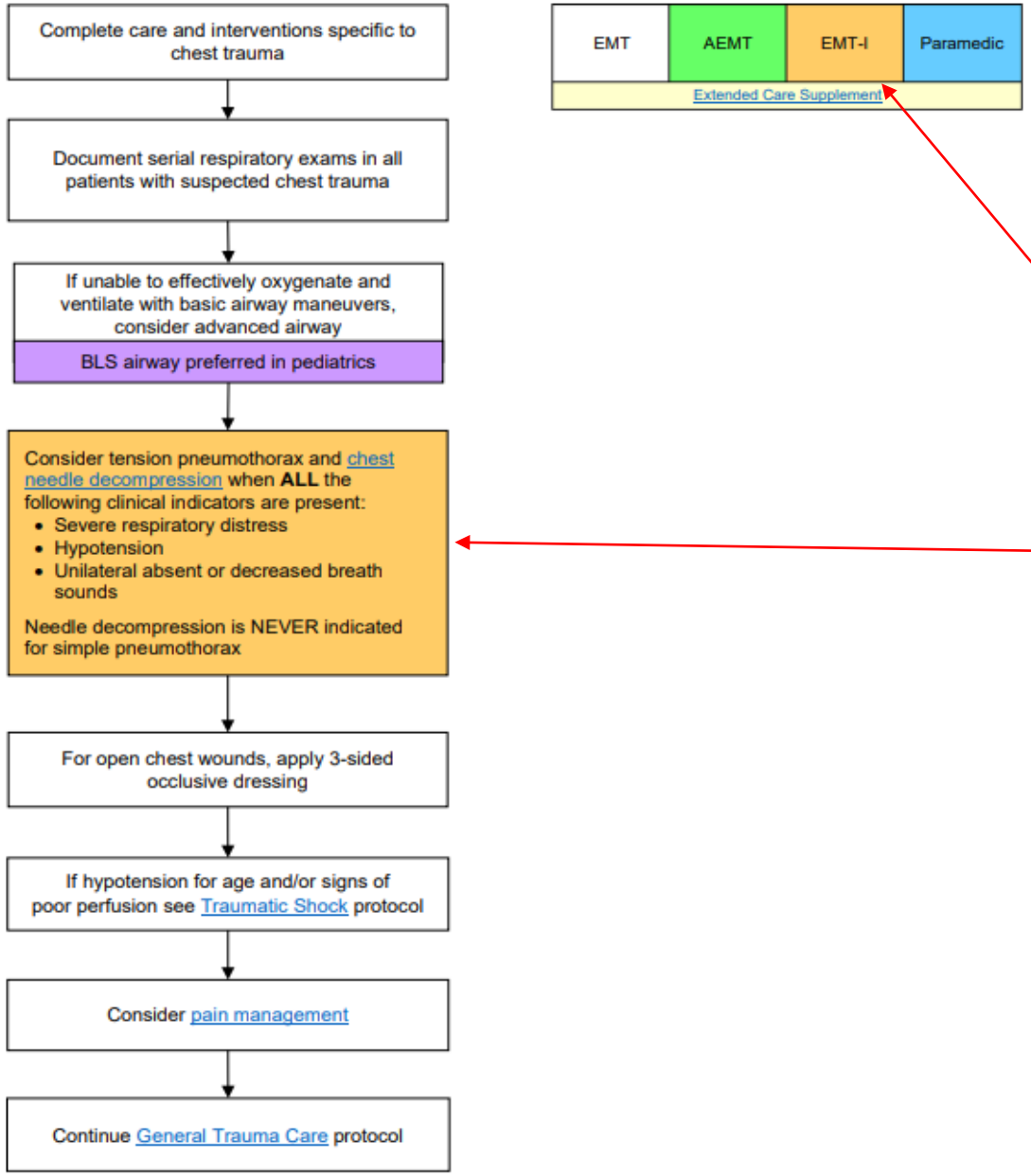


Improved Montgomery County Richmond Agitation Sedation Scale (IMC-RASS)			
Score	Term	Description	EMS Activity
+4	Combative	Overtly combative, violent, immediate danger to staff	Unsafe to care for patient without maximal assistance, require law enforcement assistance
+3	Very agitated	Pulls or removes tubes and catheters, aggressive	Struggles aggressively and forcefully against care. Routine EMS care impossible.
+2	Agitated	Frequent, non-purposeful movements, fights interventions	Resists EMS care, requires gentle physical redirection to allow for routine EMS care
+1	Restless	Anxious but movements are not aggressive or vigorous	Verbally redirectable, follows commands, routine EMS care possible
0	Alert and Calm		
-1	Drowsy	Not fully alert but has sustained awakening and eye contact to voice (>10 seconds)	Awakens to voice
-2	Light sedation	Briefly awakens with eye contact to voice (<10 seconds)	Awakens to bumps/potholes in roadway during transport or application of oxygen via NC or NRB
-3	Moderate Sedation	Movement or eye opening to voice (no eye contact)	Eyes open to physical exam, venous tourniquet application and/or BP cuff inflation
-4	Deep Sedation	No response to voice but movement or eye opening to physical stimulation	Responds to insertion of NPA or IV start
-5	Unarousable	No response to voice or physical stimulation	No response to insertion of OPA/NPA or IV start

8060 Chest Trauma

a. Correction to color of the tension pneumothorax box

8060 CHEST TRAUMA



Correction to color of the tension pneumothorax box for EMT-I and above.

9070 Benzodiazepine

a. Update to dosing and redosing of benzodiazepines for combative patients with a RASS of +3 or +4. Refer to DMEMSMD sedation position statement for purpose of change.

b. The indication for adjunctive agent for treatment of severe pain has been changed to “Adjunctive agent for treatment of severe anxiety with extrication, packaging, or transport in adults that is uncontrolled by other interventions – WITH CALL IN ONLY”.

c. Under midazolam, dosing for seizure and sedation for cardioversion/pacing separated. Intranasal/intramuscular dosing for adult seizure increased. Determined original dosing was too low.

The indication for an adjunctive agent for pain was changed

The indication for an adjunctive agent for pain was changed to anxiety.

Also The indication for an adjunctive agent for pain was removed

9070 MEDICATIONS

BENZODIAZEPINES (DIAZEPAM, LORAZEPAM, MIDAZOLAM)

Description

- Benzodiazepines are sedative-hypnotics that act by increasing GABA activity in the brain. GABA is the major inhibitory neurotransmitter, so increased GABA activity *inhibits* cellular excitation. Benzodiazepine effects include anticonvulsant, anxiolytic, sedative, amnestic and muscle relaxant properties. Each individual benzodiazepine has unique pharmacokinetics related to its relative lipid or water solubility.
- Selection of specific agent as preferred benzodiazepine is at individual agency Medical Director discretion.

Onset & Duration

- Any agent given IV will have the fastest onset of action, typical time of onset 2-3 minutes
- Intranasal administration has slower onset and is less predictable compared to IV administration, however, it may still be preferred if an IV cannot be safely or rapidly obtained. Intranasal route has faster onset compared to intramuscular route.
    - Diazepam should not be given intranasally as it is not well absorbed.
- IM administration has the slowest time of onset.

Indications

- Status epilepticus
- Sedation of the severely agitated/combative patient
- Hyperactive delirium with severe agitation
- Sedation for cardioversion or transcutaneous pacing (TCP)
- Adjunctive agent for treatment of severe anxiety with extrication, packaging, or transport in adults that is uncontrolled by other interventions – **WITH CALL IN ONLY**

The indication for use of benzodiazepines as an adjunctive agent for pain was removed and updated to dosing and redosing of benzodiazepines for agitated/combative patients with a RASS of +3 or +4. Refer to DMEMSMD position statement in resource slide for the rationale of the change.

Dosing and redosing Change

Dosage and Administration

MIDAZOLAM:

Sedation of severely agitated or combative patient

Adult:

IV/IN/IM route: 5 mg

- If patient still agitated and disruptive 5 minutes after first benzodiazepine dose, (IMC-RASS +3 or +4), switch to butyrophenone
- If additional sedation medication needed **CONTACT BASE**

Pediatric:

- **Contact Base** before any consideration of sedation of severely agitated/combative child.

Hyperactive delirium with severe agitation

IM route: 10 mg. **Contact Base** for additional sedation orders.

DIAZEPAM:

Sedation of severely agitated or combative patient

Adult:

IV/IM route: 5 mg

- If patient still agitated and disruptive 5 minutes after first benzodiazepine dose, (IMC-RASS +3 or +4), switch to butyrophenone
- If additional sedation medication needed **CONTACT BASE**

Pediatric:

- **Contact Base** before any consideration of sedation of severely agitated/combative child.

LORAZEPAM:

Sedation of severely agitated or combative patient

Adult:

IV/IM route: 2 mg

- If patient still agitated and disruptive 5 minutes after first benzodiazepine dose, (IMC-RASS +3 or +4), switch to butyrophenone
- If additional sedation medication needed **CONTACT BASE**

Pediatric:

- **Contact Base** before any consideration of sedation of severely agitated/combative child

Dosing for seizure and sedation for cardioversion/pacing was separated

Dosage and Administration

MIDAZOLAM:

Seizure:

Adult:

IV/IO route: 2 mg

- Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses.

IN/IM route (intranasal preferred): 10 mg

- Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses.

Pediatric:

IV/IO route 0.1 mg/kg

- Maximum single dose is 2 mg IV. Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses.

IN/IM route (intranasal preferred): 0.2 mg/kg.

- Maximum single dose is 10 mg IN or IM. Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses.

Sedation for cardioversion or transcutaneous pacing:

Adult:

IV/IO route: 2 mg

- Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses.

IN/IM route: (intranasal preferred) 5 mg

- Dose may be repeated x 1 after 5 minutes if additional sedation needed. **Contact Base** for more than 2 doses.

Pediatric:

IV/IO route 0.1 mg/kg

- Maximum single dose is 2 mg IV. Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses.

IN/IM route: (intranasal preferred) 0.2 mg/kg.

- Maximum single dose is 5 mg IN or IM. Dose may be repeated x 1 after 5 minutes if additional sedation needed. **Contact Base** for more than 2 doses.

Now Separated

Increased Dosage

9070 Benzodiazepine special considerations

Protocol

- Synchronized Cardioversion
- Transcutaneous Pacing
- Seizure
- Poisoning/Overdose
- Agitated/Combative Patient
- Hyperactive Delirium with Severe Agitation

Special Considerations

- All patients receiving benzodiazepines must have cardiac, pulse oximetry monitoring during transport. Continuous waveform capnography recommended.
- Sedative effects of benzodiazepines are increased in combination with opioids, alcohol, or other CNS depressants.
- Coadministration of opioids and benzodiazepines is discouraged and may only be done with direct physician verbal order.
- In patients >65 years old or small adults <50kg, lower doses may be sufficient and effective. Consider ½ dosing in these patients.

Considerations for lower dosing

Special Considerations

- Due to butyrophenone's potential effect on QT interval prolongation, all patients receiving them should be placed on the cardiac monitor. Though it is understood that obtaining an ECG on the combative or agitated patient may be difficult, every effort should be made to do so.
- Avoid droperidol in frail or elderly patients due to increased risk of over-sedation as well as increased risk of hypotension and prolonged QT. If it must be given, administer half typical dose.
- For haloperidol, use ½ dose in patients age ≥ 65 who are at increased risk of complications.

Protocol

- Agitated/Combative Patient
- Hyperactive Delirium with Severe Agiation
- Antiemetics

New protocol 9075 Butyrophenone

a. New protocol To replace droperidol and haloperidol with a combined protocol by their butyrophenone medication classification with the update to 6020 Agitated/Combative protocol.

b. Dosing update. Refer to DMEMSMD sedation position statement for explanation for purpose of changes.

Verbiage was updated to remove reference to leg elevation

BUTYROPHENONES (DROPERIDOL, HALOPERIDOL)

Description

Butyrophenones are antipsychotic medications. They produce a dopaminergic blockade, a mild alpha-adrenergic blockade, and causes peripheral vasodilation. Its major actions are sedation and tranquilization. Droperidol also has a potent anti-emetic effect.

Onset & Duration

- Onset: Within 10 minutes after IM administration. Peak effect within 30 minutes
- Duration: 2-4 hours (may be longer in some individuals)

Indications

- Sedation of a severely agitated and/or combative patient
- Droperidol specific indications:
  - Hyperactive delirium with severe agitation.
  - Second line medication for management of intractable vomiting.
  - Combative head injured patients

Contraindications

- Suspected acute myocardial infarction/acute coronary syndrome
- Systolic blood pressure under 100 mmHg, or the absence of a palpable radial pulse
- Signs of respiratory depression
- Pregnancy

Side Effects

- Due to the vasodilation effect, butyrophenones can cause a transient hypotension that is usually self-limiting and can be treated effectively with IV fluids. Droperidol may cause tachycardia which usually does not require pharmacologic intervention.
- Cardiac monitor and establish an IV as soon as possible with all administrations.
- Some patients may experience unpleasant sensations manifested as restlessness, hyperactivity, or anxiety following butyrophenone administration. Extra-pyramidal reactions have been noted hours to days after treatment. This is called akathisia and is treated with diphenhydramine.
- Rare instances of neuroleptic malignant syndrome have been known to occur following treatment using butyrophenones.

New Protocol 9075 Dosage and Administration

Dosage and Administration

DROPERIDOL:

Agitation/Combative Patients

Adult:

IV/IM route: 5 mg slow IV or IM administration.

- If patient still agitated and disruptive 5 minutes after first butyrophenone dose (IMC-RASS +3 or +4), repeat butyrophenone dose or switch to benzodiazepine
- If additional sedation medication needed **CONTACT BASE**

Pediatric:

- Less than 12 years, **CONTACT BASE**

Hyperactive Delirium with Severe Agitation

IM route: 10 mg IM administration. **CONTACT BASE** for additional sedation orders.

Antiemetic

IV/IM route:

- **Adult:** 1.25 mg slow push.
- **Pediatric:** Not indicated.

HALOPERIDOL:

Agitated/Combative Patients

Adult:

IM route: 5 mg IM

- If patient still agitated and disruptive 5 minutes after first butyrophenone dose (IMC-RASS +3 or +4), repeat butyrophenone dose or switch to benzodiazepine
- If additional sedation medication needed **CONTACT BASE**

Pediatric (not for use in children <6 years):

- **BASE CONTACT**
- **Ages 6-12:** 2 mg IM

New Protocol 9075 Special Considerations

Considerations for lower dosing

Special Considerations

- Due to butyrophenone's potential effect on QT interval prolongation, all patients receiving them should be placed on the cardiac monitor. Though it is understood that obtaining an ECG on the combative or agitated patient may be difficult, every effort should be made to do so.
- Avoid droperidol in frail or elderly patients due to increased risk of over-sedation as well as increased risk of hypotension and prolonged QT. If it must be given, administer half typical dose.
- For haloperidol, use ½ dose in patients age ≥ 65 who are at increased risk of complications.

Protocol

- Agitated/Combative Patient
- Hyperactive Delirium with Severe Agiation
- Antiemetics

New Protocol 9110 Dopamine

a. With removal of 9300 Vasopressor protocol, dopamine has been moved to its own protocol as an alternative in case of medication shortages.

b. To include this medication and protocol is at the discretion of the individual agency medical director.

c. 9110 in previous protocols was droperidol. Droperidol was combined with 9140 Haloperidol into a new protocol 9075 Butyrophenones.

With agency specific verbiage

9110 MEDICATIONS

DOPAMINE

- Endogenous catecholamine chemically related to epinephrine and norepinephrine. Increases blood pressure through combination of dopamine, alpha and beta receptor effects leading to increased heart rate, contractility and peripheral vasoconstriction.
- May be used as an alternative vasopressor for indications of hypotension or bradycardia, but not for anaphylaxis or status asthmaticus.
- The decision to include this medication and protocol is at the discretion of the individual agency medical director.

Indications

- Alternative vasopressor to epinephrine for hypotension with poor perfusion refractory to adequate fluid resuscitation (typically 30 mL/kg crystalloid)
- Alternative vasopressor to epinephrine for bradycardia with signs of poor perfusion

Contraindications

- Do not use in pediatric patients (age less than 12 years)

Adverse Reactions

- Dysrhythmia
- Hypertension
- Anxiety
- Angina

Drug Interactions

- Do not add sodium bicarbonate or other alkaloids as epinephrine will be inactivated at higher pH.

Dosage and Administration:

- **Mix:** 400 mg in 250 ml NS or 800 mg in 500 ml NS to produce concentration of 1600 mcg/mL.
- **Adult IV/IO:** 5-20 mcg/kg/min, start at 5 mcg/kg/min, titrate dose up 5 mcg/kg/min every 5 min to a max of 20 mcg/kg/min to desired hemodynamic effect.

Protocol

- Post-Resuscitation Care with ROSC
- Bradyarrhythmia with Poor Perfusion
- Medical Hypotension/Shock
- Overdose and Acute Poisoning

Special Considerations

- May increase myocardial oxygen demand and angina pectoris. Use with caution in patients with known or suspected CAD

9120 Epinephrine

a. Addition of push dose epinephrine for adults. This has been added to allow for more accuracy in dosing than the current epinephrine infusion in protocol.

b. Moving away from ratio concentration epinephrine in the protocol to volume-based concentration. This is a recommended safety best practice. Ratios will remain in protocol for one more cycle then will be removed.

c. Removed base contact from pediatric bradycardia with poor perfusion.

d. Alternative IM dosing for Pediatric Wheezing and Moderate to Severe Allergic Reactions moved to primary dosing. Weight based dosing for these indications were removed.

e. Update to label for severe anaphylaxis in pediatric patient to provide more clarification on when to move to push dose epinephrine. New label is “Severe systemic allergic reaction (Anaphylaxis) refractory to IM epinephrine x 3 total doses AND 60 mL/kg NS (administered in 20 mL/kg increments) rapid Push (Contact Base):”. Will require three IM doses and 3 separate 20 mL/kg NS boluses before moving to IV push dose epinephrine.

9120 Epinephrine

Added indication

9120 MEDICATIONS

EPINEPHRINE (ADRENALIN) Extended Care Supplement

Description

Endogenous catecholamine alpha, beta-1, and beta-2 adrenergic receptor agonist. Causes dose-related increase in heart rate, myocardial contractility and oxygen demand, peripheral vasoconstriction and bronchodilation.

Indications

- Pulseless Arrest
- Anaphylaxis
- Asthma
- Bradycardia with poor perfusion
- Hypotension for age and poor perfusion refractory to fluids or other interventions

Adverse Reactions

- Tachycardia, tachypnea, and/or tachydysrhythmia
- Hypertension
- Anxiety
- Increased myocardial oxygen demand, monitor for cardiac ischemia

Drug Interactions

- Should not be added to sodium bicarbonate or other alkaloids as epinephrine will be inactivated at higher pH.

9120 Epinephrine

Dosage and Administration

Adult:

Pulseless Arrest:

- 1 mg (10 ml of 0.1mg/mL [1:10,000] solution), IV/IO bolus.
- Repeat every 3-5 minutes up to maximum of 3 doses. Additional dose may be considered for recurrent arrest after ROSC or narrow complex PEA.

Hypotension for age and poor perfusion refractory to other interventions:

- Administer push dose epinephrine or infusion

Adult Wheezing / Systemic Allergic Reaction:

- 0.3 mg (0.3 ml of 1mg/mL [1:1,000] solution) IM. May repeat dose x 1.
- If refractory, consider push dose epinephrine or infusion

Severe systemic allergic reaction (Anaphylaxis) refractory to IM epinephrine:

- Consider push dose epinephrine or infusion

ALTERNATIVE to racemic epinephrine: (for stridor at rest)

- 5 mL of 1mg/mL [1:1,000] epinephrine via nebulizer x 1

Adult Push Dose:

Refer to agency-specific protocol, as dosing error is common. Suggested dosing:

1. Draw up 1 mL of 0.1 mg/1mL (1:10,000) epinephrine into a 10 mL syringe
2. Draw up 9 mL of normal saline into the same 10 mL syringe, making a 10 mcg/mL (0.01 mg/mL) solution
3. Makes concentration of epinephrine for 10 mcg/1mL
4. Administer slow push of 50 mcg (5 mL) aliquots every 5 minutes as needed
5. Apply label to syringe noting epinephrine 10mcg/mL

Push dose epi changes

Adult Infusion:

- **Mix**: inject 1 mg epinephrine into 1000 mL Normal Saline bag to achieve 1 mcg/mL concentration (This means 1 mL of 1mg/mL [1:1000] or 10 mL of 0.1mg/mL [1:10,000] – either way 1 mg of drug). Use macro drip set.
- **Adult IV/IO**: Begin IV/IO infusion wide open to gravity to give small aliquots of fluid. **Typical volumes are less than 100 mL of total fluid**, as typical doses are expected to be < 100 mcg. Titrate to desired hemodynamic effect with goal BP of > 90 mmHg systolic, improved respiratory status (bronchodilation), and improved perfusion/mentation.
- **Label**: Apply label to bag noting epinephrine 10mcg/mL

Epinephrine Auto-Injector:

Systemic allergic reaction:

Adult: 0.3 mg IM with autoinjector (adult EpiPen, Auvi-Q)
Pediatric: 0.15 mg IM with autoinjector (EpiPen Jr., Auvi-Q)

9120 Epinephrine

Removal of base contact

Updated label, and clarification on when to move to push dose epinephrine

Alternative IM dosing for Pediatric Wheezing and Moderate to Severe Allergic Reactions moved to primary dosing.

Dosage and Administration

Pediatric:

Pulseless arrest:

- 0.01 mg/kg IV/IO (0.1 ml/kg of 0.1mg/mL [1:10,000] solution).
- Subsequent doses repeated every 3-5 minutes: 0.01 mg/kg IV/IO (0.1 ml/kg of 0.1mg/mL [1:10,000] solution)

Bradycardia with Poor Perfusion:

- 0.01 mg/kg (0.1 ml/kg of 0.1mg/mL [1:10,000] solution) IV/IO

Pediatric Wheezing 1 to 12 years old:

- 0.15 mg (0.15 mL of 1mg/mL [1:1,000] solution) IM for <25 kg and 0.3 mg (0.3 mL of 1mg/mL [1:1,000] solution) IM for >25 kg. May repeat dose x 2 every 5 minutes.

Moderate to Severe Allergic Reactions:

4 months to 12 years

- 0.15 mg (0.15 mL of 1mg/mL [1:1,000] solution) IM for <25 kg and 0.3 mg (0.3 mL of 1mg/mL [1:1,000] solution) IM for >25 kg. May repeat dose x 2 every 5 minutes.

Term to <4 months

- 0.1 mg (0.1 mL of 1mg/mL [1:1,000] solution) IM. May repeat dose x 2 every 5 minutes.

Severe systemic allergic reaction (Anaphylaxis) refractory to IM epinephrine x 3 total doses *AND* 60 mL/kg NS (administered in 20 mL/kg increments) rapid push (Contact Base):

Refer to agency-specific protocol, as dosing error is common. Suggested dosing:

1. Draw up 1 mL of 0.1 mg/mL [1:10,000] epinephrine into a 10 mL syringe.
2. Draw up 9 mL of normal saline into the same 10 mL syringe, making a 10 mcg/mL (0.01 mg/mL) solution.
3. Administer slow push of 1 mcg/kg (0.1 ml/kg) aliquots as needed to maintain minimum systolic blood pressure for age.

ALTERNATIVE to racemic epinephrine: (for stridor at rest)

- 5 mL of 1mg/mL [1:1,000] epinephrine via nebulizer x 1. **Contact Base** for repeated dosing.

Protocol

- Medical Pulseless Arrest Algorithm
- Bradyarrhythmia with poor perfusion
- Neonatal Resuscitation
- Medical Shock
- Allergy and Anaphylaxis Protocol
- Adult Wheezing
- Pediatric Wheezing

9300 Vasopressor Infusion

REMOVED

a. Protocol removed. Epinephrine vasopressor dosing moved to the epinephrine protocol. Dopamine alternative will remain as an alternative option for medical directors if there is an epinephrine shortage and it needs to be saved for other indications. Use of protocol is at the discretion of the agency medical directors.

b. All vasopressor references in protocol will be directed to epinephrine protocol.

c. Extended care vasopressor protocol updated to be a reference to and from the epinephrine protocol.

9000X Medication Extended Care Supplements

a. 9300X Vasopressor Infusion epinephrine information moved changed to 9120X Epinephrine.

9000X Medication Extended Care Supplements

9300X Vasopressor Infusion epinephrine information moved changed to 9120X Epinephrine

9120X EPINEPHERINE

Paramedic

C. Refer to epinephrine for medication information.
D. Supplemental Indication/Dosing – Epinephrine

1. **Mix:** Inject amount of epinephrine into normal saline size bag per table below to achieve 1mcg/mL concentration. Use macro drip set for infusion.

Normal Saline Volume	Epinephrine Amount	Epinephrine 1mg/mL [1:1,000] Concentration Amount	Epinephrine 0.1mg/mL [1:10,000] Concentration Amount
1000 mL	1 mg	1 mL	10 mL
500 mL	0.5 mg	0.5 mL	5 mL
250 mL	0.25 mg	0.25 mL	2.5 mL

2. **Adult IV/IO:**
   a. 0.01-1 mcg/kg/min
   b. Begin IV/IO infusion wide open to gravity to give small aliquots of fluid. Typical volumes are less than 100 mL of total fluid, as typical doses are expected to be < 100 mcg. Titrate to desired hemodynamic effect with goal BP of > 90 mmHg systolic, improved respiratory status (bronchodilation), and improved perfusion/mentation.
3. **Pediatric IV/IO:** 0.01-1 mcg/kg/min

Drip Rate Chart (1 mcg/mL)		
Dose (mcg/min)	10 gtt/mL Drip Set	15 gtt/mL Drip Set
2	20 gtt/min	30 gtt/min
3	30 gtt/min	45 gtt/min
4	40 gtt/min	60 gtt/min
5	50 gtt/min	75 gtt/min
6	60 gtt/min	90 gtt/min
7	70 gtt/min	105 gtt/min
8	80 gtt/min	120 gtt/min
9	90 gtt/min	135 gtt/min
10	100 gtt/min	150 gtt/min

Resources

January 2024 Denver Metro EMS Physicians Statement on Clinical Management of Prehospital Patients Presenting with Severe Agitation:

The specialty of Emergency Medical Services is dedicated to the care of patients in the prehospital environment. As specialty trained EMS physicians, we recognize the importance of caring for patients with time sensitive, life-threatening conditions, including patients experiencing delirium, substance use disorders, mental health crises and severe agitation. It is of the utmost importance that we treat all our patients, regardless of emergency type, with respect and dignity. We are unified and resolute in the following principles:

Medical emergencies should be handled by medical professionals. The practice of EMS medicine requires specific initial and ongoing training to National and State standards. These standards ensure our clinicians are appropriately trained. EMTs and paramedics are trained to assess and manage people who are agitated and pose a threat to themselves and others. Paramedics must make the critical determination if a person is experiencing a medical emergency such as psychosis, delirium, severe metabolic derangement or drug toxicity, and if they require interventions to ensure their safety.

Severe agitation can lead to cardiovascular collapse and death. Severe agitation is associated with metabolic acidosis, hyperthermia, dehydration, and electrolyte abnormalities which can lead to cardiovascular collapse and death. What was once thought of as solely a psychiatric or behavioral issue is now known to be a medical emergency. Early recognition and treatment of severe agitation is essential. Safe care of these individuals may require the administration of sedating medications to minimize the time spent physically restraining them. The safety and efficacy of medications such as midazolam and droperidol to rapidly sedate severely agitated patients are supported by the medical literature and by vast amounts of clinical experience. The administration of these medications is required to help manage and resuscitate these patients, as well as facilitate their transfer to a higher level of care.

Trauma Informed Care and patient respect remain at the core of our practice. Studies have demonstrated that medical management combined with training and practices in trauma informed care is the ideal patient centered approach for patients experiencing delirium or mental health crises. EMTs and paramedics are trained to recognize and understand the complex interactions between patients and emergency services, and respect the potential trauma our patients have experienced or are experiencing during these encounters. They practice verbal de-escalation, alternative team activation, and other practices where appropriate. The care of these patients is multidisciplinary and complex, and as a profession, we are committed to disseminating best practices as they continually evolve.

The Denver Metro EMS Medical Directors are experts on the medical literature and practice of managing agitated patients in the emergency department and prehospital settings. We believe that emergency medical decisions should be based on science and medical expertise.

Resources

Literature review for the agitated/combative (6010), benzodiazepine (9070), and butyrophenone (9075) protocols:

- Uebinger RM, Zaidi HQ, Tataris KL, et al. Retrospective Study of Midazolam Protocol for Prehospital Behavioral Emergencies. West J Emerg Med. 2020;21(3):677-683. Published 2020 Apr 21. doi:10.5811/westjem.2020.3.45552 2. Chan EW, Taylor DM, Knott JC, Phillips GA, Castle DJ, Kong DC.

- Intravenous droperidol or olanzapine as an adjunct to midazolam for the acutely agitated patient: a multicenter, randomized, double-blind, placebo-controlled clinical trial. Ann Emerg Med. 2013 Jan;61(1):72-81. doi: 10.1016/j.annemergmed.2012.07.118 3. Yap CYL, Taylor DM, Knott JC, Taylor SE, Phillips GA, Karro J, Chan EW, Kong DCM, Castle DJ.

- Intravenous midazolam-droperidol combination, droperidol or olanzapine monotherapy for methamphetamine-related acute agitation: subgroup analysis of a randomized controlled trial. Addiction. 2017 Jul;112(7):1262-1269. doi: 10.1111/add.13780. Epub 2017 Feb 28. PMID: 28160494. 4. Taylor DM, Yap CYL, Knott JC, Taylor SE, Phillips GA, Karro J, Chan EW, Kong DCM, Castle DJ.

- MidazolamDroperidol, Droperidol, or Olanzapine for Acute Agitation: A Randomized Clinical Trial. Ann Emerg Med. 2017 Mar;69(3):318-326.e1. doi: 10.1016/j.annemergmed.2016.07.033 5. Page CB, Parker LE, Rashford SJ, et al.

- A Prospective Before and After Study of Droperidol for Prehospital Acute Behavioral Disturbance. Prehosp Emerg Care. 2018;22(6):713-721. doi:10.1080/10903127.2018.1445329

- ACEP Clinical Policy: Critical Issues in the Evaluation and Management of Adult Out-of-Hospital or Emergency Department Patients Presenting With Severe Agitation. Approved by the ACEP Board of Directors, October 6 2023: https://www.acep.org/siteassets/new-pdfs/clinical-policies/severe-agitation-cp.pdf