



Pennsylvania Statewide

Advanced Life Support Protocols

**Pennsylvania Department of Health
Bureau of Emergency Medical Services**

2023 v1.2



(717) 787-8740

December 29, 2023

Dear EMS Provider:

The Bureau of EMS, Department of Health, is pleased to provide these updated “Statewide ALS Protocols” to the ALS providers of Pennsylvania.

This 2023 update contains many important changes, but some of the highlights include 2 new protocols:

- 6094 – Tranexamic Acid Administration (Optional)
- 6095 – Blood Administration (Optional)
- 8003 - Agitated Behavior now REPLACES protocol 8001 and 8002
- Where CPAP/BiPAP was listed is now identified as NIPPV (Non Invasive Positive Pressure Ventilation). Agency Medical Director may permit the use of BiPAP in addition to CPAP at the ALS Level only.

Pennsylvania has used Statewide ALS Protocols since July 1, 2007, and this edition is an update to the version that was effective on November 1, 2021. To assist ALS providers when reviewing the changes, new sections of the protocols that correspond to this 2023 version are identified with yellow highlighting, and sections that have been removed are struck through and highlighted. If an agency wishes to utilize this 2023 version of the statewide BLS protocols before the March 31 deadline, that agency may do so when its personnel have completed the statewide protocol updates for their level of training and its medical director approves early implementation. All personnel must have completed the training and begin functioning under the new protocols no later than the March 31 deadline.

EMS providers are permitted to perform patient care, within their PA defined scope of practice, when following the appropriate protocol(s) or when following the order of a medical command physician. Each EMS provider is responsible for being knowledgeable regarding current state-approved protocols so that they may provide the safest, highest quality and most effective care to patients.

To assist providers in becoming familiar with the changes to the protocols, a continuing education presentation is available to regions and agencies. This update is available for in-person presentations or the course can be completed on TRAIN PA, the on-line Learning Management System (LMS). **The 2023 ALS Protocol Update (BEMS course #1000058613) is considered a core requirement for all EMS providers above the level**

of AEMT that register their certification during the current time period. Furthermore, the completion of this course should be used by EMS agencies when ensuring that the agency's providers have been educated to the current protocols.

When providing patient care under the EMS Act, EMS providers of all levels must follow applicable protocols. Since written protocols cannot feasibly address all patient care situations that may develop, the Department expects EMS providers to use their training and judgment regarding any protocol-driven care that would be harmful to a patient. **When the provider believes that following a protocol is not in the best interest of the patient, the EMS provider should contact a medical command physician if possible.** Cases where deviation from the protocol is justified are rare. The reason for any deviation should be documented. All deviations are subject to investigation to determine whether they were appropriate. In all cases, EMS providers are expected to deliver care within the scope of practice for their level of certification.

The Department of Health's Bureau of EMS website will always contain the most current version of the EMS protocols, the scope of practice for each level of provider, important EMS Information Bulletins, and many other helpful resources. This information can be accessed online at www.health.pa.gov. The Statewide ALS Protocols may be directly printed or downloaded into a mobile device for easy reference.

In these protocols, terms have the meanings ascribed to them in the EMS System Act (Act) and corresponding Department regulations. The Act is available at the Pennsylvania General Assembly website found [here](#)¹. The regulations are available on the Pennsylvania Code website found [here](#)².

The Department is committed to providing Pennsylvania's EMS providers with the most up-to-date protocols, and to do this requires periodic updates. The protocols will be reviewed regularly, and EMS providers are encouraged to provide recommendations for improvement at any time. Comments should be directed to the Commonwealth EMS Medical Director, Pennsylvania Department of Health, Bureau of EMS, 1310 Elmerton Avenue, Harrisburg, PA 17110.



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¹Pennsylvania EMS Act of 2009
<https://www.legis.state.pa.us/cfdocs/legis/LI/consCheck.cfm?txtType=HTM&ttl=35&div=0&chpt=81>

²Pennsylvania EMS Rules and Regulations
<https://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/028/chapter1021/s1021.2.html&d=reduce>

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GENERAL PROTOCOL PRINCIPLES STATEWIDE ALS PROTOCOL

Criteria:

A. These general principles apply to the use of all protocols used by ALS providers

B. Statewide Medications List

1. Paramedics may only use medications that are listed on the Approved and Required Medication List for Emergency Medical Service Agencies and Emergency Medical Service Providers as published in the Pennsylvania Bulletin and posted on the Bureau of EMS website.
2. At a minimum, the ALS agency must carry each medication that is required to provide the care that is listed in the Statewide and applicable regional protocols. The list of required medications is included within these protocols, and regional council staff will use this list when conducting licensure inspections. Regions may establish minimum quantities of required medications for EMS agencies within their region.

C. Medications/Procedural Skills

1. The protocols list many medications and treatments that are optional and are not required of every ALS agency or of every EMS provider. EMS regions may choose to require the use of some of these options if there is a regional reason for standardization (for example a specific medication may be required because of a regional drug box exchange program). Medications or treatments that are not required by the region may be standardized by the EMS agency medical director using agency level policy.
2. General medication issues
 - a. When possible, dosing for various medications has been standardized across all protocols. EMS providers must use their training and knowledge to assure that doses given are appropriate for the patient's age and weight. Although doses may not exceed those listed in the protocol, it may be appropriate to decrease the doses of some medications based upon patient condition, patient vital signs or patient age.
 - b. All references to medications, abbreviations, and doses have been standardized with attention to pharmacologic principles of medication error reduction.
 - c. Agencies should assure that medications are stored in a manner that provides for maximal shelf life and appropriate security. Some medications, for example **LOR**azepam, may have limitations to the listed expiration date if the medication is not refrigerated. EMS agencies should follow Department guidance and good medication storage practices to assure that medications have not lost their potency.
 - d. EMS providers are expected to know the contraindications for each medication and are expected to assess patients for allergies, when possible, to any medication that is given. EMS providers should not administer medications to a patient when that medication is contraindicated in that situation.
3. Crystalloid isotonic solutions, including normal saline solution (NSS): NSS is a safe and useful "isotonic" solution for hydration and medication delivery by EMS. When intravenous fluids are indicated, NSS is used throughout these protocols. NSS has the advantage of being compatible with all EMS medications and being preferred for patients with traumatic head injury. Lactated Ringers and other balanced salt solutions may be carried as an option by an EMS agency if approved by the agency medical director, but it is up to the agency medical director to educate providers when another isotonic fluid is preferred by the medical director over NSS. The EMS agency medical director must develop a written policy that identifies which fluid is preferred in specific patient conditions, with specific attention to compatibility of other isotonic solutions with medications administered by EMS providers. When compliant with these requirements, EMS

providers may substitute these other isotonic solutions where the protocol states NSS, without contact with a medical command physician. Solutions with hypertonic concentrations of any electrolyte or other solvent that exceed physiologic concentration, are not acceptable as substitutions for NSS.

4. Infusion mixtures - EMS regions or agencies may set standards for the mixture of medications that are to be given by infusion. When such standard concentrations are established, it is recommended that the region or agency also provide ALS providers with a table to assist in administering the correct infusion dosage.
5. Drawing blood samples - Drawing blood in the prehospital setting may assist receiving facilities in providing better diagnoses or more rapid treatment of patients, but in some areas the receiving facilities will not accept blood drawn by prehospital providers. Although it would be appropriate for an EMS agency to require blood draw in most situations where IV access is listed, EMS regions or agencies may determine whether drawing blood on prehospital patients is appropriate based upon the practices of local receiving hospitals.
6. Vascular Access - Many protocols list "Initiate IV/IO NSS". The most appropriate means of establishing this peripheral vascular or intraosseous access should be determined by agency policy or by the ALS provider's judgment based upon the condition of the patient.
 - a. Peripheral venous access may be established with a saline lock or a NSS intravenous infusion. The rate of the infusion may be KVO or should be determined by specific IV fluid volumes as stated in the appropriate protocol.
 - b. Intraosseous access - When IV access is indicated but not obtainable in a timely manner, intraosseous access is an acceptable alternative. An IO access may be initiated on any critically ill patient requiring IV fluids or medications.
 - 1) IO access may be obtained in the following extremity sites:
 - a) Proximal tibia
 - b) Distal femur
 - c) Proximal humerus
 - 2) Any acceptable method or device that obtains IO access in an extremity site listed above is appropriate. EMS agency policy may indicate which technique or extremity sites listed above are acceptable for IO access.
 - 3) ALS agencies must have the capability of providing pediatric IO access but adult IO access is considered optional unless required by the region.
 - 4) In conscious patients, ~~lidocaine (2%, adults = 20-40 mg 0.5 mg/kg (max 40mg) peds = 0.5 mg/kg)~~ 2% Lidocaine 0.5 mg/kg up to 40mg maximum dose, should be administered prior to infusing medications or fluids through an IO to reduce the pain of infusions.
7. Controlled Substance Use - when a medical command physician orders an ALS provider to administer a controlled substance, the medical command physician is responsible for providing a prescription in the patient's name for the order. A medical command physician may also provide a prescription for controlled substances that were given on protocol prior to contact with the medical command physician, but if the medical command physician is not comfortable writing this prescription for a medication that he/she did not order, then it is the EMS agency medical director's responsibility to arrange for a prescription in the patient's name to account for the controlled substance that was administered.

D. Pediatric issues

1. Unless otherwise stated, pediatric protocols will apply to patients ≤ 14 years of age. If the patient's age is not known, then pediatric protocols will apply until there are physical signs that

the patient has reached puberty/adolescence as indicated by armpit hair in boys and breast development in girls.

2. All IALS agencies and above, in consultation with agency medical director to assure compliance with state-wide protocol, must carry the most current version of a pediatric length-based drug dosing/equipment sizing tape. must carry a commercial length-based device to estimate patient weight and appropriate drug dosages. When possible, these devices should be used as the primary method for determining the weight/appropriate drug doses for children. Additionally, the following formula or table may be used:

a. Formula: $(\text{Age in years} \times 3) + 7 = \text{estimated weight in kgs.}$

b. Table

1)	1 y/o	=10 kg
2)	3 y/o	=15 kg
3)	5 y/o	=20 kg
4)	7 y/o	=25 kg
5)	9 y/o	=30 kg

E. Equipment Issues

1. All medical devices must be used, maintained, and calibrated in accordance with the recommendations from the manufacturer.
2. Electronic glucose testing meters must be carried by all ALS agencies, and these agencies must have either a CLIA license or certificate of waiver. An ALS agency performing glucose testing with a meter cleared for home use by the FDA must hold a CLIA certificate of waiver. A CLIA certificate of waiver (CoW) is good for two years. Each agency is responsible for determining whether a CLIA license or waiver is required.

F. Acetaminophen (if available) 15mg/kg up to 650mg may be given for fever if: 1, 2, and 3:

1. Patient is at least 3 months old.
2. Temperature $> 38^{\circ} \text{C}$ or 100.4°F (ambulances are required to have a non-tympanic, digital thermometer).
3. Patient has not had a dose of acetaminophen within the last 4 hours.

G. Ketamine is an optional medication with additional organizational requirements to be carried at the ALS level. A regional EMS council and its Medical Advisory Committee may allow or disallow the use of ketamine for ALS agencies within its region. An agency and its medical director may, through organizational policy, determine which indications ketamine may be used by agency personnel. Indications for ketamine include:

1. Drug assisted airway management per ALS Protocol 4002. All conditions in the protocol must be met by the agency to participate with this protocol.
2. Sedation for severe agitation per ALS Protocol 8003.
3. Pain management per ALS Protocols 6003, 6071, and 7003.
4. Sedation of a patient with an advanced airway in place with **Medical Command orders only.**
5. Treatment of refractory seizures with **Medical Command orders only.**

Agencies licensed at the critical care or air level may use ketamine in accordance with the scope of practice for those crew configurations only. This is included in licensure at the critical care or air level and not subject to regional approval. A critical care crew may not function as a critical care crew on an emergency ambulance call.

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**ALS RELEASE TO BLS/ IALS
STATEWIDE ALS PROTOCOL**

Criteria:

- A. Patient assessed by ALS provider who determines that ALS treatment is not needed or anticipated to be needed.

Exclusion Criteria:

- A. Any patient who refuses ALS care (e.g. patient refuses IV) should be transported by the ALS unit, unless patient refuses transport by the ALS unit then contact medical command

Procedure:

- A. If a BLS/ IALS crew arrives on-scene prior to the ALS provider arrival:
 - 1. If multiple patients, perform triage.
 - 2. BLS/ IALS provider performs assessment of the patient in accordance with Statewide BLS/ AEMT Protocols and prepares for transport.
- B. When ALS and BLS/ IALS agencies have arrived at a patient incident:
 - 1. If BLS/ IALS provider did initial patient assessment, BLS/ IALS provider will give a verbal patient report to the ALS provider.
 - 2. ALS provider will assess the patient and determine if ALS care is needed or may be anticipated to be needed.¹ The ALS provider will complete a PCR documenting his/her assessment for every patient assessed except when triaging patients in a multi-casualty incident
 - 3. ALS provider may hand off patient to BLS/ IALS provider if patient does not require ALS care.
 - 4. If ALS provider performs any ALS procedure (including ECG, but not general ALS patient assessment or glucose check) he/she must contact Medical Command prior to hand off to BLS/ IALS:
- C. When the ALS and BLS/ IALS providers are on the crew of an ALS ambulance together:
 - 1. The ALS provider must perform the initial assessment. After determining that ALS care is not needed or anticipated to be needed, the ALS provider may hand off care to the BLS/ IALS provider on the crew, but the ALS provider must review and is also responsible for the PCR completed by his/her BLS/ IALS partner

Notes:

- 1. When the number of patients exceeds the number of ALS providers, the ALS provider(s) must triage the patients that require ALS care, and may not have the resources to evaluate all patients directly.

Performance Parameters:

- A. When the number of patients exceeds the number of ALS providers, the ALS provider(s) must triage the patients that require ALS care, and may not have the resources to evaluate all patients directly.

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CONFIRMATION OF AIRWAY PLACEMENT STATEWIDE ALS PROTOCOL

Criteria:

- A. Patient who has ET tube or alternative airway device inserted by EMS provider.

Exclusion Criteria:

- A. None

System Requirements:

- A. Every ALS agency must carry and use an electronic wave-form **ETCO₂ detector** capnography device¹ for confirmation and continuous monitoring of endotracheal tube/ alternative airway device placement.

Procedure:

- A. Insert ETT² or **Alternative** Supraglottic Airway Device
- B. Attach electronic **ETCO₂** capnography monitor to BVM.
- C. Ventilate³ while simultaneously:
 - 1. Assuring “positive” **CO₂** capnography wave with each ventilation.
 - 2. Verifying absence of gastric sounds.
- D. Verify presence of bilateral breath sounds.
- E. Secure tube.
- F. Continuously monitor waveform **ETCO₂** capnography.⁴
- G. Reassess bilateral breath sounds and absence of gastric sounds after each move or transfer of the patient.
- H. Document all of the above. If ETT, also document depth of tube at anterior teeth.

Notes:

- 1. Colorimetric ETCO₂ detectors may give false negative results when the patient has had prolonged time in cardiac arrest. EDD aspiration devices may give false negative results in patients with lung disease (e.g. COPD or status asthmaticus), morbid obesity, late stages of pregnancy, or cardiac arrest. ALS agencies may consider carrying colorimetric ETCO₂ detectors or EDD aspiration devices as back-ups in case of electronic device failure, but must primarily use the wave-form ETCO₂ detector as described in this procedure.
- 2. If ETT is not visualized to pass through a good view of glottic opening, then the chance of misplaced esophageal intubation is increased and transmitted sounds during auscultation alone may lead to misdiagnosed tube position.
- 3. Immediately remove ETT or **Alternative** Supraglottic Airway Device if any step reveals evidence of lack of lung ventilation. If there is any doubt about adequate ventilation with an ETT or **Alternative** Supraglottic Airway Device, remove the device and ventilate with BVM.
- 4. Quantitative ETCO₂ readings may be beneficial in assessing the quality of CPR or as an indicator of the prognosis for successful resuscitation.

Performance Parameters:

- A. Review all ETI and Alternative Airway Device insertions for documentation of absence of:
 - 1. Gastric sound.
 - 2. Presence of bilateral breath sounds.
 - 3. Appropriate use of a confirmation device.
- B. If systems have the capability of recording a capnograph tracing, review records of all intubated patients to assure that capnograph was recorded.

- C.** Document ETCO₂ reading immediately after intubation, after each movement or transfer of patient and final transfer to ED stretcher.

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**CRASHING PATIENT/ PATIENT IN EXTREMIS – ADULT
STATEWIDE ALS PROTOCOL**

General Impression of Patient in Extremis
New Onset Altered LOC (“not following commands” – motor GCS <6)
Airway Issues
Significant Respiratory Distress
Signs of Shock

If no pulse, follow appropriate Cardiac Arrest Protocol (#3031)

DO NOT INITIATE MOVEMENT OF PATIENT
Consider Calling for Backup Unit
Place NP/OP Airway, as indicated/tolerated
Apply Monitors: ECG, SpO₂, BP, & EtCO₂ Capnography (if available)

Respiratory Failure (Intervene ASAP)

- Poor respiratory effort
- Unable to speak
- Loss of muscle tone
- Unable to sit up
- SpO₂ < 90% despite O₂
- Altered mental status
- Increasing EtCO₂ 4
- Hypoventilation capnograph pattern

OK or Respiratory Distress

Assess Respiratory Status

High flow Oxygen by NRB
Apply oxygen

OR

NIPPV +/- Albuterol per Asthma/COPD/Bronchospasm Protocol #4022

Respiratory Status Worsens

Immediate PPV with BVM
(2-person-2 thumbs up, Sit or elevate head of bed, High-flow 100% oxygen, PEEP valve at 10 cm, if available)

Improves to adequate effort

NO Improvement

Assess Circulatory Status

Secure Airway per Airway Management Protocol #4001

BP < 90 And Suspected Dysrhythmia

YES

Cardiovert or Pacing per Tachycardia/Bradycardia Protocols #5021A, 5022A, or 5023A

Immediate IV/IO Access
Obtain in < 10 min from patient contact

Shock BP < 90

NO

If no CHF, pressure infuse 500 mL NSS IV/IO
OR
If CHF, push dose **EPINEPHrine**
0.02mg of 0.01mg/mL EPINEPHrine slow IV push (prepared by adding 0.1mg (1mL) of 0.1mg/mL EPINEPHrine to 9mL of saline/flush)

OK to Initiate Patient Extrication/ Transport now
Maximize Therapy
Provide treatment per Protocol(s)

**CRASHING PATIENT/ PATIENT IN EXTREMIS – ADULT
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Patient in whom cardiac or respiratory arrest appears imminent.
- B. Patient with provider impression of extremis, including new onset altered mental status, airway issues, severe respiratory distress/failure, signs and symptoms of shock/poor perfusion.

Exclusion Criteria:

- A. Life-threatening trauma (Follow Multisystem Trauma/ Traumatic Shock Protocol #6002)

Goals: EMS frequently encounters patients that are in extremis and quickly deteriorating to the point of cardiac arrest, often while packaging and loading these patients. It is important to rapidly recognize the deteriorating patient and take immediate action where you encounter the patient to stabilize the condition before loading and transporting. The following timeline provides a prioritization of the goal directed treatments to stabilize the patient and prevent deterioration:

- A. Immediate Actions (within First 5 Minutes)^{1,2}:

- 1. Airway

- a. Insert Nasopharyngeal (or OP) Airway as indicated/tolerated if not following commands (GCS motor <6) or no response to verbal stimuli.

- 2. Breathing

- a. If respiratory failure or distress, sit patient up if tolerated and not contraindicated by suspected spine injury.

- b. Provide high-flow oxygen:

1) ~~If respirations adequate, by NRB at 15 lpm — have a low threshold for CPAP applications if significant respiratory distress/hypoxia. Apply oxygen by NRB if respirations are adequate, and consider NIPPV CPAP in significant respiratory distress/hypoxia.~~

2) ~~If respirations inadequate, give positive pressure ventilation with BVM + oxygen at 15 lpm. Two-Person, Two-Thumbs-Up technique is most effective. If respirations are inadequate, the patient is not following commands, or SpO₂ is <90% give positive pressure ventilation with BVM with oxygen. Two-Person, Two-Thumbs-Up technique is most effective.~~

- a) Respirations can be assisted with BVM in sitting position if patient tolerates.

~~b) Consider PPV by BVM if not following commands or SpO₂ <90%~~

- 3. Monitoring – ECG, SpO₂, EtCO₂ (if nasal prong adapter available), ~~NI~~BP (if available)

- B. Actions within First 10 Minutes^{1,2}:

- 1. Circulation

- a. Electrical Therapy (cardioversion or pacing) if dysrhythmia is primary cause of shock
- b. Emergent IV/IO access
- c. Administer NSS 500 mL bolus, infused under pressure unless signs of pulmonary edema

- C. Actions within First 15 Minutes^{1,2}:

- 1. Re-assess response to treatments

- 2. Circulation

- a. Repeat NSS 500 mL bolus if indicated

- b. If bradycardia, consider atropine 1 mg IV/IO, if indicated
 - c. If no response to fluids (SBP<80 and decreased LOC), administer **EPINEPHrine 20 mcg 0.01 mg/mL EPINEPHrine 0.02mg of 0.01mg/mL EPINEPHrine slow IV push (prepared by adding 0.1mg (1mL) of 0.1mg/mL EPINEPHrine to 9mL of saline/flush)EPINEPHrine** or **DOPAmine** infusion by appropriate protocol or medical command order
3. Airway – ~~if considering advanced airway, consider high flow NC oxygen at 15 LPM using a second oxygen tank~~ if attempting advanced airway, consider applying a nasal cannula with 15 LPM oxygen to maintain an appropriate SpO₂.
- D. Actions within First 20 Minutes^{1,2}:**
1. Re-assess response to treatments
 2. Circulation – continue fluids/vasopressors (push dose or infusion) as indicated by appropriate protocol or medical command order
 3. Airway – insert advanced airway if indicated
- E. Once critical actions have been completed, move the patient to ambulance for transport.**

Notes:

1. The specific lengths of time listed are approximate to provide a sense of urgency and to prioritize actions. Provider safety is of utmost importance. Care for these patients should be given as quickly as possible, but safety considerations and the scene environment may lead to times that are longer than these stated goals. When conditions make it impossible to meet these goals, the reasons should be documented.
2. Actions listed should be simultaneous and not in any specific order.
3. Follow appropriate shock protocol for push dose **EPINEPHrine. 0.01 mg/mL (prepared by mixing 1 mL of 0.1 mg/mL diluted with 9 mL NSS) EPINEPHrine 0.02mg of 0.01mg/mL EPINEPHrine slow IV push (prepared by adding 0.1mg (1mL) of 0.1mg/mL EPINEPHrine to 9mL of saline/flush)**
4. Symptomatic patients with end tidal capnography reading greater than 50mmHg may suggest impending respiratory failure. End tidal capnography readings less than 30mmHg in symptomatic patients may suggest shock.

Performance Parameters:

1. Review all cases of cardiac arrest witnessed by (in presence of) EMS providers for compliance with this protocol to prevent patient deterioration.
2. Ensure that specific treatments also follow other appropriate protocols, e.g. Airway Management, Shock, Tachycardia, Bradycardia, etc.

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CRASHING PATIENT/ PATIENT IN EXTREMIS – PEDIATRIC STATEWIDE ALS PROTOCOL

General Impression of Patient in Extremis
New Onset Altered LOC (“not following commands” – motor GCS <6)
Airway Issues
Significant Respiratory Distress
Signs of Shock

If no pulse, follow appropriate Cardiac Arrest Protocol (#3031P)

DO NOT INITIATE MOVEMENT OF PATIENT
Consider Calling for Backup Unit
Position Airway (consider towel roll)
Place NP/OP Airway, as indicated/tolerated
Apply Monitors: ECG, SpO₂, BP, & EtCO₂ Capnography (if available)

Respiratory Failure (Intervene ASAP)

- Poor respiratory effort
- Unable to speak/cry
- Loss of muscle tone
- Poor eye contact
- SpO₂ < 90% despite O₂
- Altered mental status
- Increasing EtCO₂
- Hypoventilation capnograph pattern

OK or Respiratory Distress

Assess Respiratory Status

High-flow Oxygen by NRB
OR
Albuterol/ EPINEPHrine +/- NIPPV per Asthma/COPD/Broncho spasm Protocol #4022

Respiratory Status Worsens

Immediate PPV with BVM
(2-person-2 thumbs up, Position airway (towel, NP/OP), High-flow 100% oxygen, PEEP valve at 5 cm, if available)

Improves to adequate effort

NO Improvement

Assess Circulatory Status

Secure Airway per Airway Management Protocol #4001

For children 1-10 years old and BP <70 + (age x2) or if greater than 10 years old and BP < 90 and Suspected Dysrhythmia

Cardiovert or Pacing per Tachycardia/Bradycardia Protocols #5021P, 5022P, or 5023P

Immediate IV/IO Access
Obtain in < 10 min from patient contact

Shock
Delayed capillary refill,
For children 1-10 years old and BP <70 + (age x2) or if greater than 10 years old and BP < 90

Pressure infuse or syringe 20 mL/kg NSS IV/IO OR If cardiogenic shock, infuse 10 mL/kg NSS IV/IO

OK to Initiate Patient Extrication/ Transport now
Maximize Therapy
Provide treatment per Protocol(s)

YES

NO

**CRASHING PATIENT/ PATIENT IN EXTREMIS – PEDIATRIC
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Patient in whom cardiac or respiratory arrest appears imminent.
- B. Patient with provider impression of extremis, including new onset altered mental status, airway issues, severe respiratory distress/failure, signs and symptoms of shock/poor perfusion.

Exclusion Criteria:

- A. Life-threatening trauma (Follow Multisystem Trauma/ Traumatic Shock Protocol #6002)

Goals: EMS frequently encounters patients that are in extremis and quickly deteriorating to the point of cardiac arrest, often while packaging and loading these patients. It is important to rapidly recognize the deteriorating patient and take immediate action where you encounter the patient to stabilize the condition before loading and transporting. The following timeline provides a prioritization of the goal directed treatments to stabilize the patient and prevent deterioration:

A. Immediate Actions (within First 5 Minutes)^{1,2:}

1. Airway

- a. Position airway manually or with towel roll
- b. Insert Nasopharyngeal (or OP) Airway as indicated/tolerated if not following commands (GCS motor <6) or no response to verbal stimuli.

2. Breathing

- a. If respiratory failure or distress, keep patient calm. Allow patient to maintain position of comfort, if possible.
- b. Provide high-flow oxygen:

~~1) If respirations adequate, by NRB at 15 lpm — have a low threshold for CPAP applications if significant respiratory distress/hypoxia. Apply oxygen by NRB if respirations are adequate, and consider NIPPV CPAP is significant respiratory distress/hypoxia.~~

~~2) If respirations inadequate, give positive pressure ventilation with BVM + oxygen at 15 lpm. Two-Person, Two-Thumbs-Up technique is most effective. If respirations are inadequate, the patient is not following commands, or SpO₂ is <90% give positive pressure ventilation with BVM with oxygen. Two-Person, Two-Thumbs-Up technique is most effective.~~

~~a) Consider PPV by BVM if not following commands or SpO₂ <90%~~

- 3. Monitoring – ECG, SpO₂, EtCO₂ (if nasal prong adapter available), ~~NI~~BP (if available)

B. Actions within First 10 Minutes^{1,2:}

1. Circulation

- a. Electrical Therapy (cardioversion or pacing) if dysrhythmia is primary cause of shock
- b. Emergent IV/IO access
- c. Administer NSS 20 mL/kg bolus, infused under pressure or by syringe infusion unless cardiogenic shock suspected

1) If suspected cardiogenic shock, administer 5-10 mL/kg NSS and Contact Medical Command.

C. Actions within First 15 Minutes^{1,2:}

1. Re-assess response to treatments, including capillary refill with vital signs³
 2. Circulation
 - a. Repeat NSS 20 mL/kg bolus if indicated
 - b. If bradycardia, optimize ventilation/ oxygenation (follow protocol #5021P).
 - c. If no response to fluids, follow Shock Protocol #7005 (Consider need for steroids if steroid dependent or h/o congenital adrenal hyperplasia.)
 3. Airway – ~~if considering advanced airway, consider high flow NC oxygen at 15 LPM using a second oxygen tank if attempting advanced airway, consider applying a nasal cannula with 15 LPM oxygen to maintain an appropriate SpO2.~~
- D.** Actions within First 20 Minutes^{1,2}:
1. Re-assess response to treatments, ~~including capillary refill with vital signs³~~
 2. Circulation – continue fluids/vasopressors (push dose or infusion) as indicated by appropriate protocol or medical command order
 3. Airway – insert advanced airway if indicated
- E.** Once critical actions have been completed, move the patient to ambulance for transport.

Notes:

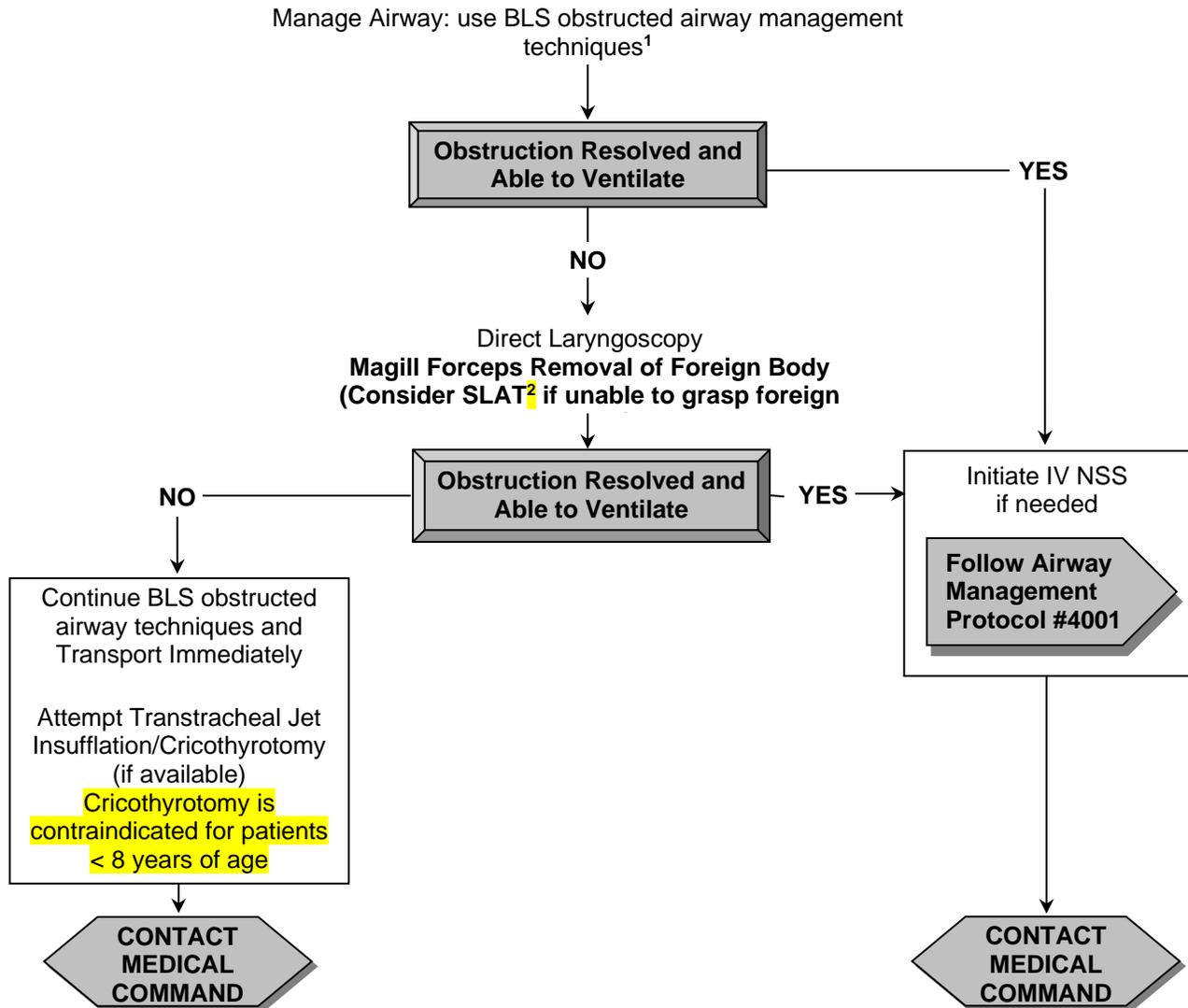
1. The specific lengths of time listed are approximate to provide a sense of urgency and to prioritize actions. Provider safety is of utmost importance. Care for these patients should be given as quickly as possible, but safety considerations and the scene environment may lead to times that are longer than these stated goals. When conditions make it impossible to meet these goals, the reasons should be documented.
2. Actions listed should be simultaneous and not in any specific order.
3. See BLS Protocol Appendix G for normal vital sign range by age.
4. Symptomatic patients with end tidal capnography reading greater than 50mmHg may suggest impending respiratory failure. End tidal capnography readings less than 30mmHg in symptomatic patients may suggest shock.

Performance Parameters:

1. Review all cases of cardiac arrest witnessed by (in presence of) EMS providers for compliance with this protocol to prevent patient deterioration.
2. Ensure that specific treatments also follow other appropriate protocols, e.g. Airway Management, Shock, Tachycardia, Bradycardia, etc.

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AIRWAY OBSTRUCTION STATEWIDE ALS PROTOCOL



**AIRWAY OBSTRUCTION
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Obstructed airway from suspected foreign body.

Exclusion Criteria:

- A. Acute obstruction of the airway due to systemic allergic reactions - Follow Allergic Reaction Protocol # 4011.
- B. Acute airway obstruction due to mucosal swelling from edema or trauma

Possible MC Orders:

- A. Cricothyrotomy, if available.

Notes:

1. For children < 1 year of age, put head down and use back blows/chest thrusts. For adults and children > 1 year of age, use abdominal thrusts. For pregnant patients or patients who are too obese for abdominal thrusts, use chest thrusts.
2. **SLAT** = **S**imultaneous **L**aryngoscopy and **A**bdominal **T**hrusts. When the foreign body can be visualized within the trachea but cannot be grasped by Magill forceps, there have been case reports of success when one rescuer visualizes the airway with a laryngoscope and another rescuer applies abdominal thrusts to temporarily dislodge the foreign body so that it can be grasped by the first rescuer with the Magill forceps

**GENERAL CARDIAC ARREST – ADULT
STATEWIDE ALS PROTOCOL**

Initial Patient Contact - See Protocol # 201¹
Pulseless, may have gasping/agonal respirations

**Cardiac arrest witnessed by ALS personnel
OR
Quality CPR in progress on ALS arrival**

NO

YES²

Uninterrupted
Chest Compressions
until defibrillator ready^{4,5,15}

If VF/VT, Defibrillate
360 joules³

200 Uninterrupted
Chest Compressions^{4,5}

If VF/VT, Defibrillate
360 joules³

200 Uninterrupted
Chest Compressions^{4,5}

If VF/VT, Defibrillate
360 joules³

200 Uninterrupted
Chest Compressions^{4,5}

If VF/VT, Defibrillate
360 joules³

**PROCEED TO
NEXT PAGE**

**Return of
Spontaneous
Circulation
(ROSC)**

**Proceed to
Post-
Resuscitation
Protocol #3080**

**Post-ROSC
care should
delay
transport for
about 10
minutes¹⁴**

**DURING UNINTERRUPTED
COMPRESSIONS:**

IO/IV Access ASAP¹⁶
EPINEPHRINE (0.1 mg/mL)
1 mg IO/IV
every 3 - 5 minutes

- Airway Options^{6,17}:
- Naso/oropharyngeal Airway
 - Advanced Airway (**King LT or iGel preferred**)^{7,8}

- Ventilation Options⁶:
- No Ventilation (during initial cycles of compressions if less than 3 providers)
 - 1 ventilation every 10 compressions⁹ (10 breaths/min, ideally aided by rate timer)

Monitor Perfusion with Capnography)

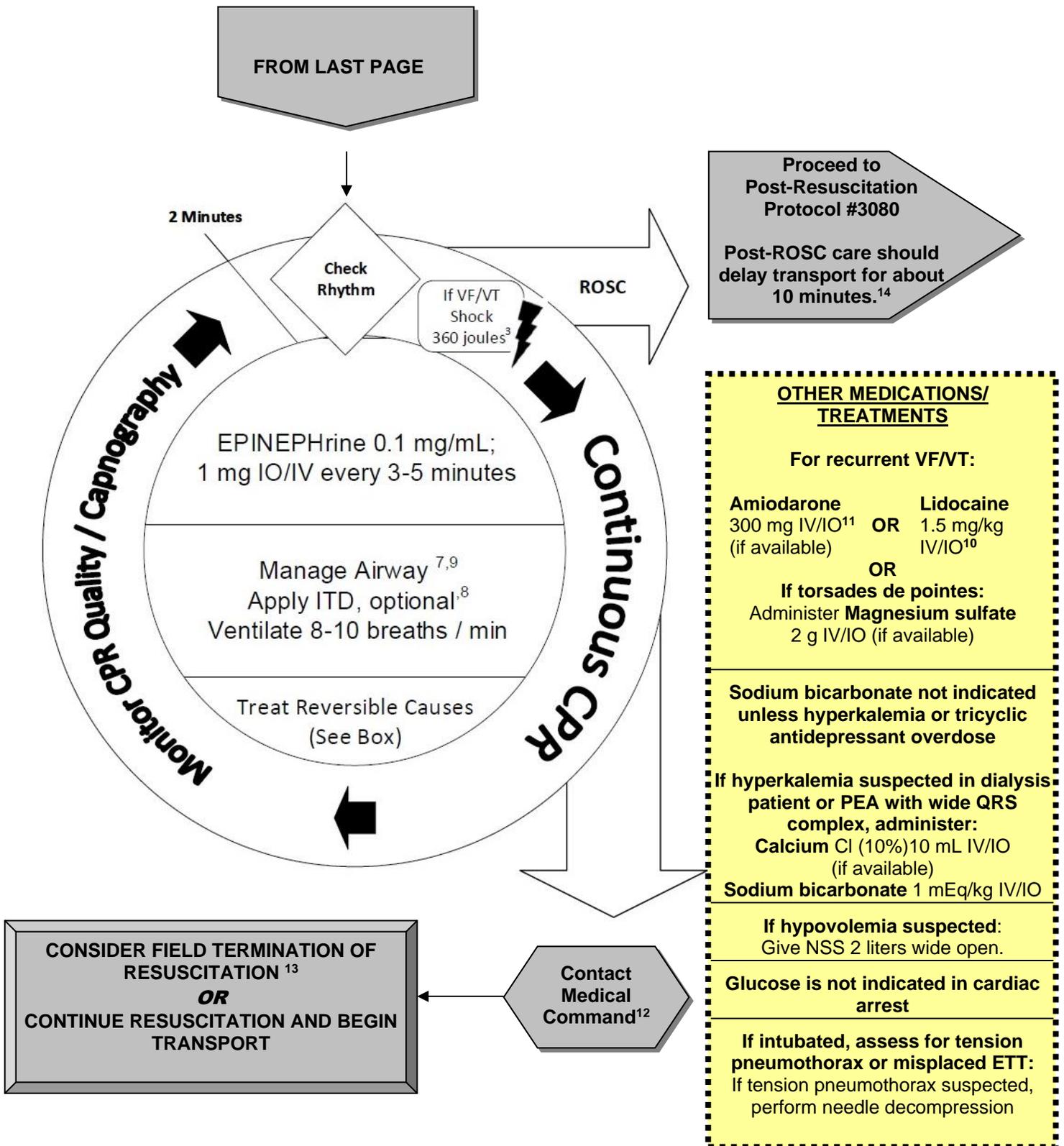
If available, use monitor metronome, rate timers, or feedback to guide compression and ventilation rates

Supplemental Oxygen

Checking glucose during CPR is not appropriate

Antidysrhythmic if Recurrent VF/VT and Other Medications if appropriate (See Box on Next Page)

**GENERAL CARDIAC ARREST – ADULT
STATEWIDE ALS PROTOCOL**



**GENERAL CARDIAC ARREST
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Adult patient with cardiac arrest (may have gasping or agonal breathing).

Exclusion Criteria:

- A. Cardiac arrest due to acute traumatic injury - Follow Cardiac Arrest - Traumatic Protocol #3032.
- B. Cardiac arrest due to severe hypothermia - Follow Hypothermia Protocol #3035
- C. Patient displaying an Out-of-Hospital Do Not Resuscitate (OOH-DNR) original order, bracelet, or necklace - see OOH-DNR Protocol #324.

System Requirements:

- A. Ideally, providers in each EMS agency will use a “pit crew” approach when using this protocol to ensure the most effective and efficient cardiac arrest care. Training should include teamwork simulations integrating QRS, BLS, and ALS crew members who regularly work together. High-performance systems should practice teamwork using “pit crew” techniques with predefined roles and crew resource management principles. For example:
 - 1. Rescuer 1 and 2 set up on opposite sides of patient’s chest and perform continuous chest compressions, alternating after every 100 compressions to avoid fatigue.
 - 2. Use metronome or CPR feedback device to ensure that compression rate is 100-120/ minute and ventilation rate is 10/minute. Timing devices are strongly encouraged.
 - 3. AHA guidelines state that the routine use of mechanical CPR devices is not recommended, but the use of mechanical CPR devices by trained personnel may be beneficial in settings where reliable, high-quality manual compressions are not possible or may cause risk to personnel (e.g. limited personnel, moving ambulance, angiography suite, prolonged resuscitation, or with concerns for infectious disease exposure.
 - 4. Chest compressions are only interrupted during rhythm check (AED analysis or manual) and defibrillation shocks. Continue compressions when AED/ defibrillator is charging.
 - 5. Additional rescuer obtains IO (or IV) access and gives **EPINEPH**rine.
 - 6. During the first four cycles of compressions/defibrillation (approximately 10 minutes) avoid any attempt at intubation and consider delaying use of mechanical CPR device.
 - 7. Use of a CPR checklist to ensure that all best practices are followed during CPR.
- B. For efficient “pit crew” style care, the EMS agency medical director should establish the options that will be used by providers functioning within the EMS agency. Options include establishing:
 - 1. The airway/ventilation management, if any, that will be used during compression-only CPR.
 - 2. The initial route of vascular access.
 - 3. Whether an ITD will be used.
- C. The EMS agency, overseen by the agency medical director, must perform a QI review of care and outcome for every patient that receives CPR.
 - 1. The QI should be coordinated with local receiving hospitals to include hospital admission, discharge, and condition information. This EMS agency QI can be accomplished by participation in the Cardiac Arrest Registry for Enhanced Survival (CARES) program.

2. The QI should be coordinated with local PSAP/dispatch centers to review opportunities to assure optimal recognition of possible cardiac arrest cases and provision of dispatch-assisted CPR (including hands-only CPR when appropriate).

Notes:

1. If AED has been applied by BLS provider, skip to appropriate place in protocol that incorporates previous care. ALS providers should switch to manual defibrillator as soon as possible.
2. Precordial thump may be used when ALS providers witness VF arrest in a monitored patient. Begin chest compressions if any delay to defibrillation.
3. Shock at maximum output of defibrillator, up to maximum of 360 joules, for initial and subsequent defibrillation attempts.
4. Excellent CPR is a priority:
 - a. Push hard and fast (100-120/min) and allow full recoil of chest during compressions.
 - b. Change rescuer doing compressions every 1-2 minutes (100-200 compressions) to avoid fatigue
 - c. When ventilation indicated and advanced airway in place, deliver 8-10 breaths/minute, giving one ventilation for every 10 compressions or using respiratory rate on capnograph or timer on ITD/CPR feedback device. Avoid hyperventilation.
 - d. Restart CPR immediately after any defibrillation attempts.
 - e. Keep pauses in CPR to a minimum by charging defibrillator during CPR, restarting compressions immediately after defibrillation without checking pulse or rhythm, and avoiding pauses in CPR during airway management.
5. Do not move or package patient for transport at this time. Chest compressions are much less effective during patient transportation/movement, and any possible interventions by medical command will be less effective without optimal CPR.
6. The optimal airway management during compression-only CPR has not been established. Agency medical directors can set agency policy using the following approaches:
 - a. Open airway with manual technique or naso/oropharyngeal airway or Alternative Airway – with or without passive oxygenation
 - b. Provide either no active ventilation (passive ventilation from compressions) or bag ventilate at 10 breaths per minute (one ventilation every 10 compressions) without interrupting compressions (monitor perfusion with capnography if providing active ventilation)
 - c. If BVM ventilation, consider 2-thumbs-up 2-person BVM technique
7. Endotracheal intubation should be reserved for cases where patient cannot be ventilated adequately with King LT or iGel. Endotracheal intubation with video laryngoscopy may increase success rate and facilitate uninterrupted chest compressions.
8. Confirm and document tube placement with absence of gastric sounds and presence of bilateral breath sounds **AND** continuous waveform **ETCO₂ detector** capnography. Follow Confirmation of Airway Placement Protocol #2032 May insert gastric tube, if available, to decompress stomach.
9. If available, an inspiratory impedance threshold device (ITD) may be placed on the end of an advanced airway or two-person BVM during CPR.
10. Repeat lidocaine, 0.75 mg/kg IV/IO, every 5 -10 minutes to a total dose of 3 mg/kg.

11. May repeat one additional dose of amiodarone, 150 mg IV/IO, after 10 minutes.
 12. If possible, contact medical command prior to moving or transporting patient. CPR is much less effective during patient transportation, and any possible interventions by medical command will be less effective without optimal CPR.
 13. Field termination of resuscitation must be ordered by Medical Command Physician, otherwise continue resuscitation attempts and initiate transport.
 14. After ROSC, cardiac arrest is most likely to recur in first 10 minutes. It is appropriate to delay transport by approximately 10 minutes while focusing on ensuring an adequate BP (systolic >120) and other post-ROSC care. See Post-ROSC Protocol #3080.
 15. If the patient is pregnant at over 20 weeks estimated gestational age (EGA) or if fundus is palpable above the patient's naval, then apply the following additional interventions:
 - a. During CPR, have an additional rescuer apply leftward lateral displacement of the uterus to remove uterine pressure on inferior vena cava and to enhance venous return.
 - b. Use the same defibrillation and medication doses and indications as for any non-pregnant patient.
 - c. Contact medical command as soon as possible during CPR to in case perimortem Cesarean section (PMCS) can be done at a receiving facility. Previous studies show that PMCS is most successful if done within 5 minutes of maternal cardiac arrest.
 16. Vascular access should be obtained by the quickest possible route to facilitate giving the first **EPINEPHRINE** dose as soon as possible if nonshockable rhythm,(ideally within 5 minutes of starting chest compressions) and after initial defibrillation attempt if shockable rhythm. More than 5 doses of **EPINEPHRINE** are not likely to be beneficial.
 17. For patients with cardiac arrest and known or suspected opioid overdose, in the absence of a proven benefit from the use of naloxone, standard resuscitation measures should take priority over naloxone administration, with a focus on high-quality CPR (compressions plus ventilation).
 18. Monitor CPR Quality with waveform capnography – in cardiac arrest, level of capnography correlates with perfusion/cardiac output from CPR. The minimum ETCO₂ reading is 10mmHg with an optimal goal of >20mmHg. A SUDDEN increase in ETCO₂ by >10mmHg may indicate a return of spontaneous circulation (ROSC).
-

Performance Parameters:

- A. Documentation of code summary from monitor /ECG rhythm strips.
- B. Documentation of confirmation of advanced airway placement including documentation of gastric sounds, breath sounds and use of confirmatory device (include print out of ETCO₂ monitor if possible)
- C. First **EPINEPHRINE** dose given IO or IV within 5 minutes of initiation of chest compressions for patients with nonshockable rhythm and after defibrillation attempt in shockable rhythm.
- D. EMS agency should document patient outcome and QI indicators for cardiac arrest, including ROSC during EMS care, ROSC on arrival to ED, admitted to hospital, discharged from hospital alive, and neurologic function on discharge. Participating in and registering each cardiac arrest patient in CARES can be used is encouraged to benchmark agency performance.

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**GENERAL CARDIAC ARREST – PEDIATRIC
STATEWIDE ALS PROTOCOL**

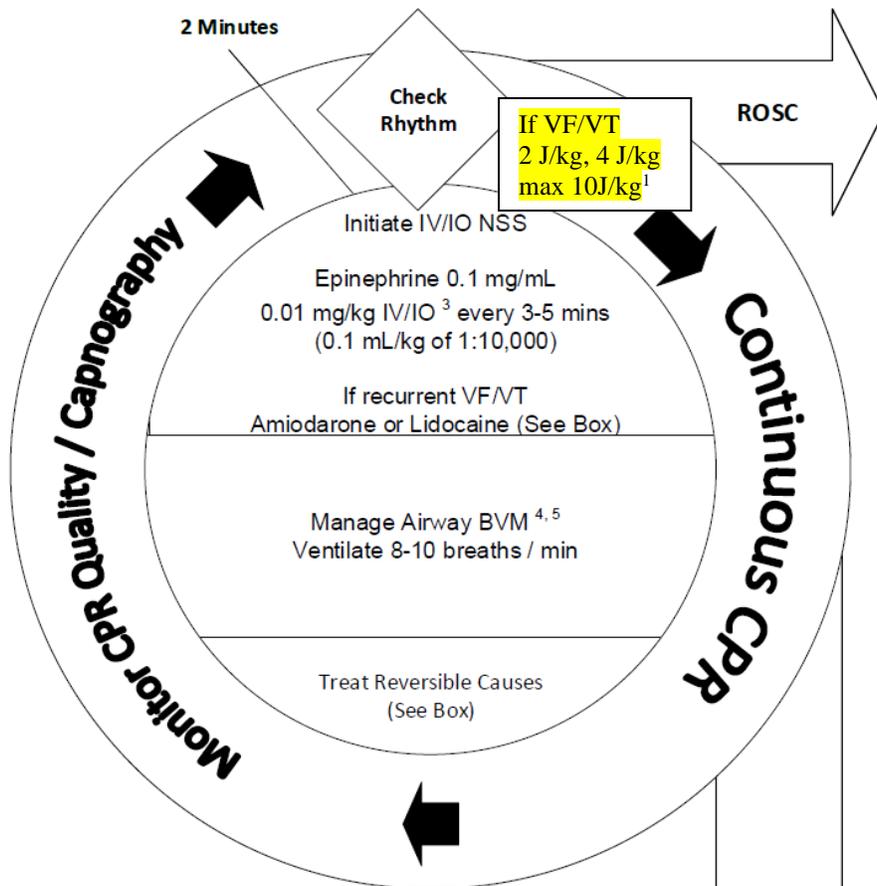
Initial Patient Contact - See Protocol # 201
Assess for pulse and monitor ECG¹

**Cardiac arrest witnessed by ALS personnel
OR
Quality CPR in progress on ALS arrival**

NO^{2,3}

Perform CPR¹ (15:2) for 2 minutes
or until defibrillator charged

YES^{2,4}



**Proceed to
Post-Resuscitation
Protocol #3080**

OTHER MEDICATIONS/ TREATMENTS

For recurrent VF/VT:

Amiodarone 5 mg/kg IV/IO 300 mg max (if available)	OR	Lidocaine 1.5 mg/kg Second dose 0.75mg/kg. maximum dose 300mg IV/IO
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If torsade de pointes:
Administer **Magnesium sulfate**
25-50 mg/kg Max 2 g IV/IO (if available)

If intubated, assess for tension pneumothorax or misplaced ETT:
If tension pneumothorax suspected, perform needle decompression

Sodium bicarbonate not indicated unless hyperkalemia or tricyclic antidepressant overdose

If hyperkalemia suspected or if wide complex PEA, administer:
Calcium Cl (10%) 0.2 mL/kg IV/IO (if available)
Sodium bicarbonate 1 mEq/kg IV/IO

If hypovolemia suspected:
Give NSS 20 mL/kg wide open.

**CONTINUE RESUSCITATION AND BEGIN
TRANSPORT
OR
CONSIDER FIELD TERMINATION OF
RESUSCITATION⁸**

**Contact
Medical
Command⁷**

**GENERAL CARDIAC ARREST – PEDIATRIC
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Pediatric patient (preadolescent ≤ 14 y/o) with cardiac arrest (may have gasping or agonal breathing).

Exclusion Criteria:

- A. Cardiac Arrest in newborns - Follow Neonatal Resuscitation Protocol #3033.
- B. Cardiac arrest due to acute traumatic injury - Follow Cardiac Arrest - Traumatic Protocol #3032.
- C. Cardiac arrest due to severe hypothermia - Follow Cardiac Arrest - Hypothermia Protocol #3035.
- D. Patient displaying an Out-of-Hospital Do Not Resuscitate (OOH-DNR) original order, bracelet, or necklace - see OOH-DNR Protocol #324.

Possible MC Orders:

- ~~A.~~ Defibrillation attempts at doses up to 10 joules/kg.
- ~~B.~~ Additional antidysrhythmic therapy
- C. If tricyclic antidepressant overdose is suspected, administer sodium bicarbonate 1-2 mEq/kg IV/IO.
- D. Field termination of resuscitation

Notes:

1. Excellent CPR is a priority:
 - a. 15 compressions: 2 ventilations in groups of 10 cycles over 2 minutes (30:2 if only one rescuer).
 - b. Push hard and fast (≥ 100 /min) and allow full recoil of chest during compressions.
 - c. Change rescuer doing compressions every 2 minutes to avoid fatigue.
 - d. After advanced airway, ventilation rate should be 10 / minute without pausing compressions to deliver ventilation. Respiratory rate on ETCO₂ monitor may help to avoid harmful hyperventilation.
 - e. Restart CPR immediately after any defibrillation attempts.
 - f. Keep pauses in CPR to a minimum by charging defibrillator during CPR, restarting compressions immediately after defibrillation without checking pulse or rhythm, and avoiding pauses in CPR during airway management.
 - g. First defibrillation shock of 2J/kg, next 4J/kg, subsequent shocks up to 10J/kg.
 - h. Monitor CPR quality with waveform capnography – in cardiac arrest, level of ETCO₂ correlates with perfusion/ cardiac output from CPR. A SUDDEN increase in ETCO₂ by >10 mmHg may indicate return of spontaneous circulation (ROSC).
2. If AED has been applied by BLS provider, skip to appropriate place in protocol that incorporates previous care. ALS providers should switch to manual defibrillator after initial AED shock.
3. Vascular access should be obtained by the quickest possible route to facilitate giving the first **EPINEPHRINE** dose as soon as possible, ideally within 5 minutes of starting chest compressions. Endotracheal medications are not very effective, but if IV/IO is unsuccessful, **EPINEPHRINE** and lidocaine may be administered via endotracheal tube. **EPINEPHRINE** 0.1 mg/kg (0.1 mL/kg of 1mg/mL concentration).
4. Ventilation with BVM is as effective as endotracheal intubation in children when transport times are short. If appropriate size is available, consider insertion of King LT or iGel alternative airway. Endotracheal intubation should be avoided unless unable to ventilate adequately with BVM and/or alternative advanced airway, if available.
5. Confirm and document tube placement with absence of gastric sounds and presence of bilateral breath sounds **AND** continuous waveform ETCO₂ detector. Follow Confirmation of Airway Placement Protocol #2032. May insert gastric tube, if available, to decompress stomach.
6. Repeat lidocaine, **4 0.75 mg/kg IV (max 100mg)**, in 15 minutes (**maximum total dose of 3 mg/kg 300mg**).
7. If possible, contact medical command prior to moving or transporting patient. CPR is much less effective during patient transportation, and any possible interventions by medical command will be less effective without optimal CPR.
8. Field termination of resuscitation must be ordered by Medical Command Physician, otherwise continue resuscitation attempts and initiate transport.
9. Monitor CPR Quality with waveform capnography – in cardiac arrest, level of capnography correlates with perfusion/cardiac output from CPR. The minimum ETCO₂ reading is 10mmHg with

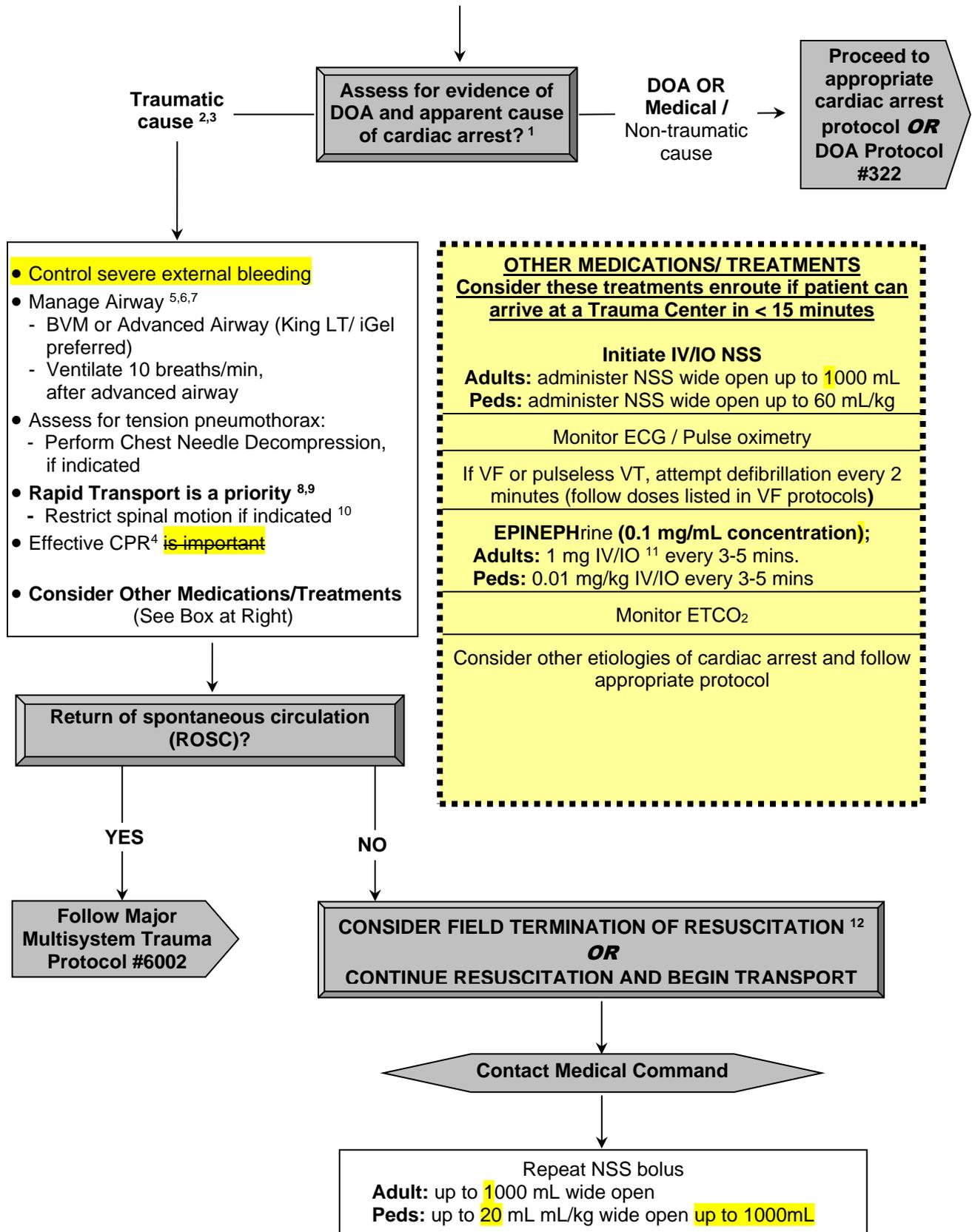
an optimal goal of >20mmHg. A SUDDEN increase in ETCO₂ by >10mmHg may indicate a return of spontaneous circulation (ROSC).

Performance Parameters:

- A. Documentation of code summary from monitor /ECG rhythm strips.
- B. Documentation of confirmation of advanced airway placement including documentation of gastric sounds, breath sounds and use of confirmatory device (include waveform capnography tracings. ~~print out of ETCO₂ monitor if possible~~)

**CARDIAC ARREST – TRAUMATIC
STATEWIDE ALS PROTOCOL**

Initial Patient Contact – See Protocol # 201
Cervical spine stabilization, when indicated
Rapid extrication



**CARDIAC ARREST - TRAUMATIC
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Patient in cardiac arrest from suspected traumatic cause.

Exclusion Criteria:

- A. Patient that meets DOA criteria (including unwitnessed cardiac arrest of traumatic cause, decapitation, rigor mortis, etc...) – See DOA Protocol #322.
B. Patient in cardiac arrest due to medical or non-traumatic causes ¹

Possible MC Orders:

- A. Terminate resuscitation in the field
-

Notes:

1. If the trauma appears to be minor and a medical condition appears to be the cause of the cardiac arrest, follow the appropriate cardiac arrest protocol.
2. If cardiac arrest is witnessed by EMS provider, or there is evidence that the patient had any signs of life within a few minutes before the arrival of EMS personnel, proceed with this protocol. Otherwise, follow DOA Protocol # 322.
3. Unless there is an immediately correctable cause victims of traumatic cardiac arrest must arrive at a hospital within a few minutes to have any chance of survival. Placement of an advanced airway (ETT or Alternative Airway Device) or decompression of a tension pneumothorax may increase this very short time window for survival.
4. Excellent CPR is a priority:
 - a. Chest compressions should be continuous with an upstroke ventilation every 10 compressions (15:2 for children and infants).
 - b. Push hard and fast (100-120 compressions/min) and allow full recoil of chest during compressions.
 - c. Change rescuer doing compressions every 2 minutes to avoid fatigue.
 - d. After advanced airway, ventilation rate should be 8-10/minute without pausing compressions to deliver ventilation.
 - e. Keep pauses in CPR to a minimum by checking rhythm when rotating rescuer doing compressions and by avoiding pauses in CPR during airway management and other interventions.
 - f. Monitor CPR Quality with waveform capnography – in cardiac arrest level of ET_{CO}₂ correlates with perfusion/cardiac output from CPR. A SUDDEN increase in ET_{CO}₂ by >10 mmHg may indicate return of spontaneous circulation (ROSC).
5. Ventilate with BVM or **alternative supraglottic** airway (King LT or iGel). Avoid endotracheal intubation unless unable to ventilate with BVM or alternative airway.
6. Confirm and document tube placement with absence of gastric sounds and presence of bilateral breath sounds *AND* confirmatory device (like wave-form ET_{CO}₂ detector). Follow Confirmation of Airway Placement Protocol #2032. May place orogastric tube, if available, to decompress stomach.
7. If unable to intubate on up to 3 attempts, consider alternative/ rescue airway device.
8. Transport immediately if patient can arrive at a trauma center (preferred destination) or the closest hospital in ≤ 15 minutes.
 - a. If the patient can arrive at the closest trauma center within 15 minutes, the patient should be taken to the trauma center even if another hospital is closer.
 - b. Notify the receiving facility ASAP to allow maximum time for preparation to receive the patient.
 - c. Air medical transport of patients in traumatic cardiac arrest is generally not indicated.
9. Contact medical command for possible field termination of resuscitation if the patient remains in cardiac arrest after initial resuscitation attempt and cannot arrive at the closest receiving facility within 15 minutes.
10. See Spine Care Protocol # 261

11. Endotracheal medications are not very effective, but if IV/IO is unsuccessful, **EPINEPH**rine, atropine, and lidocaine may be administered via endotracheal tube at twice the IV dose.
12. Field termination of resuscitation must be ordered by Medical Command Physician, otherwise continue resuscitation attempts and initiate transport.

Performance Parameters:

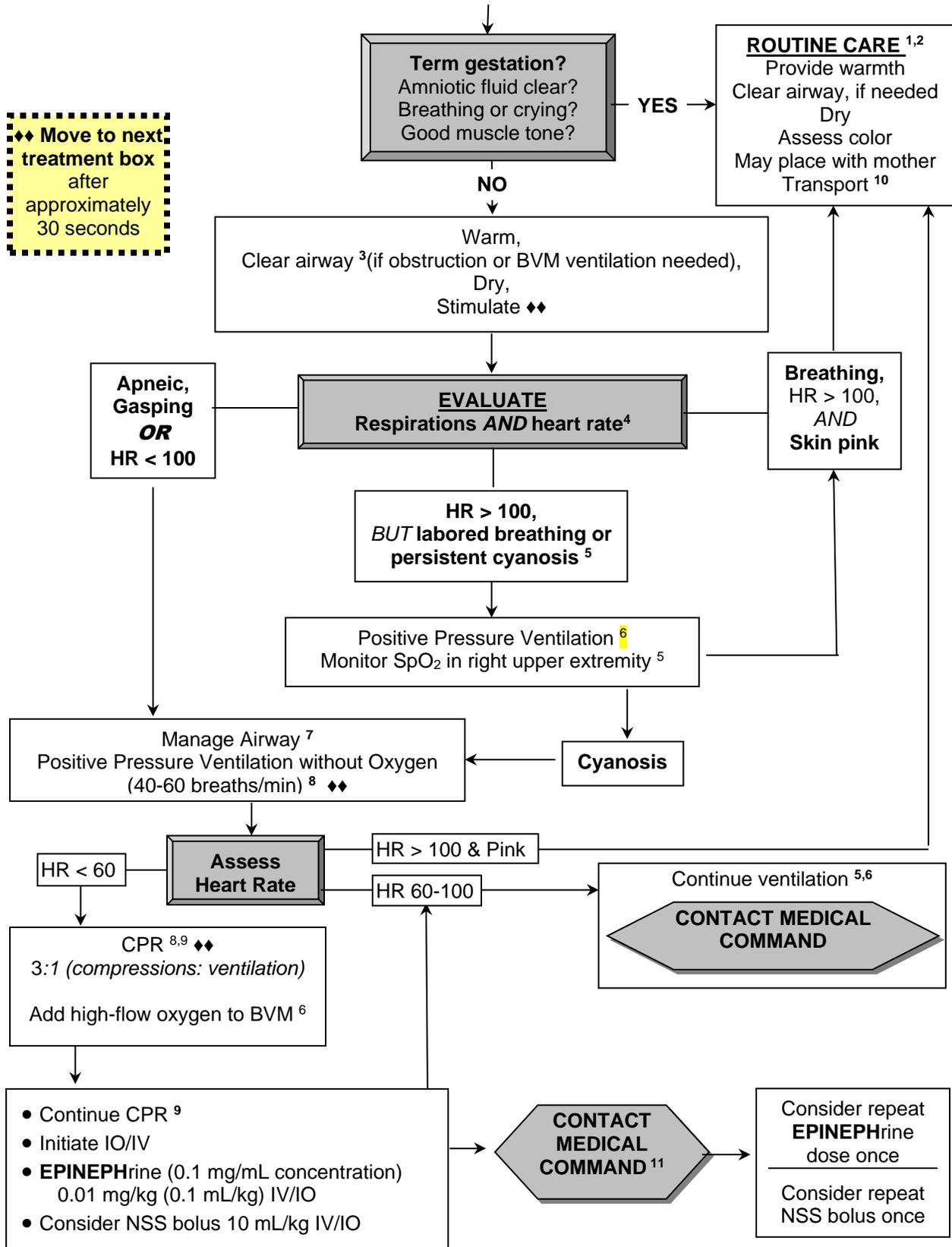
- A. Review all care given on scene for benefit of intervention versus potential delay to transport time. Especially procedures other than airway management and chest needle decompression in non-entrapped victims with short transport times.
- B. Review for transport to appropriate destination based upon protocol.
- C. Consider possible benchmark of on-scene time < 10 minutes for non-entrapped patients, although agencies may want to set goal of even less time on-scene

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NEWBORN RESUSCITATION STATEWIDE ALS PROTOCOL

BIRTH ¹

Initial Patient Contact – See Protocol #201
Consider call for second ambulance if newborn requires resuscitation



NEWBORN RESUSCITATION STATEWIDE ALS PROTOCOL

Criteria:

- A. Newborn infant (home birth or field birth)

Exclusion Criteria:

- A. Resuscitation may not be appropriate in rare cases where gestational age (confirmed gestational age <23 weeks) or fatal birth defects (for example anencephaly or absence of skull bones and brain hemispheres) are consistently associated with certain early death.
- B. Resuscitation for infants of any age who were not newly born should be treated with Pediatric Cardiac Arrest Protocol #3031P.

Note:

1. The newborn should be evaluated immediately after birth and reevaluated for respiratory effort, heart rate, and color every 30 seconds during the initial care until it is clear that the newborn is stable.
2. Transport the stable infant in a warm environment and within an infant car seat (if available) that has been firmly secured within the ambulance.
3. When there is meconium-stained amniotic fluid and a nonvigorous infant, intubation and suction is only indicated if there is evidence of airway obstruction.
4. Monitoring heart rate by ECG limb leads may be more accurate than palpation.
5. Examine for central cyanosis at the face, trunk and mucous membranes. Acrocyanosis of hands and feet only is usually a normal finding if the infant is vigorous, breathing, and heart rate >100. Monitor SpO₂ in right upper extremity and apply oxygen only if SpO₂ below targets of: 1 min (60-65%); 3 min (70-75%); 5 min (80-85%); and 10 min 85-95%.
6. When needed, initial BVM ventilation of a newborn should be done on room air without supplemental oxygen. When chest compressions are also indicated, high-flow supplemental oxygen should be added to the BVM. If a pulse is restored, then supplemental oxygen should be discontinued.
7. Consider ETI in the following situations:
 - a. When tracheal suctioning for evidence of airway obstruction from meconium is required
 - b. If BVM ventilation is ineffective or prolonged
 - c. When endotracheal administration of medications is desired
8. Positive pressure ventilation should use the minimum volume and pressure to achieve chest rise and /or achieve or maintain HR>100. Ventilation 40-60/min is one breath every 1-1.5 seconds. Consider placing a gastric tube, if available, to decompress the stomach when positive pressure ventilation is required.
9. Two thumb-encircling chest technique is preferred. Compressions and ventilations should occur in a 3:1 ratio and should be done quickly enough to provide approximately 90 compressions and 30 ventilations per minute.
10. Newborns who required resuscitation are at risk for deterioration, reassess frequently.
11. Newly born babies who have failed to respond to resuscitative efforts by approximately 20 minutes of age have a low likelihood of survival. Consider contacting medical command before transport.

APGAR SCORING CHART			
Clinical Signs	Zero	One	Two
A = Appearance (Color)	Blue, pale	Body pink, Extremities blue	All pink
P = Pulse (Heart Rate)	Absent	< 100	> 100
G = Grimace (Reflex Response) i, ii	No response	Grimace	Cough, sneeze
A = Activity (Muscle Tone)	Limp	Some flexion of arms and/or legs	Well flexed
R = Respiratory effort	Absent	Weak cry Hypoventilation	Strong cry

ⁱ Tangential foot slap

ⁱⁱ Response to catheter in nostril (tested after pharynx is cleared)

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**CARDIAC ARREST – HYPOTHERMIA
STATEWIDE ALS PROTOCOL**

Initial Patient Contact – See Protocol #201

- Lengthen time for breathing and pulse checks to 45 seconds each
- Begin CPR if pulseless
- Monitor ECG
- Assess body temperature, if obtainable

If ANY breathing or pulse, Follow Hypothermia Protocol #6081

Follow appropriate Cardiac Arrest protocols (#3031A/P) for standard approaches to defibrillation and medication doses and timing.

When accidental hypothermia is suspected as cause of cardiac arrest, the following exceptions to the cardiac arrest protocols apply:

- Transport (by ground or air) ASAP to closest center capable of providing bypass rewarming ¹
- Notify receiving center ASAP ²
- Protect against heat loss ³
- Administer warmed IV/IO NSS and warmed humidified oxygen if possible

These patients may have excellent outcomes after prolonged CPR and bypass rewarming ⁴

If measured temperature is >34 C° (> 92.3 F°) or if patient is rewarmed to >34 C° (> 92.3 F°), then this protocol no longer applies. Follow standard Cardiac Arrest Protocols #3031A/P.

Contact Medical Command

TRANSPORT ASAP to Facility capable of bypass rewarming (if possible)

**CARDIAC ARREST – HYPOTHERMIA
STATEWIDE ALS PROTOCOL**

Criteria:

- A.** Patient in cardiac arrest from a suspected hypothermic cause (Generalized cooling that reduces the body temperature). Hypothermia may be:
1. Acute/Immersion (e.g. sudden immersion in cold water)
 2. Subacute/Exertion (e.g. individual wandering in the woods)
 3. Chronic/ "urban" (e.g. elderly individual with no heat in home)

Exclusion Criteria:

- A.** Patients in cardiac arrest that meet criteria for DOA – Follow BLS DOA Protocol #322.
1. Hypothermic patient in cardiac arrest after submersion for more than 1 hour.
 2. Body tissue/chest wall frozen solid.
 3. Hypothermia patients whose body temperature has reached the temperature of the surrounding environment with other signs of death (decomposition, lividity, etc.).
- B.** Patients in cardiac arrest but without suspected hypothermia (temperature $>34\text{ C}^{\circ}$ or $> 92.3\text{ F}^{\circ}$) or who have been rewarmed to a temperature $> 34\text{ C}^{\circ}$, follow appropriate Cardiac Arrest protocol.
- C.** Patients with hypothermia (temperature $< 34\text{ C}^{\circ}$) that are not in cardiac arrest. Follow Hypothermia Protocol #6081.

Notes:

1. Initiate transport to center capable of cardiac bypass rewarming (Level I trauma centers or other facilities known to have capability of emergency bypass rewarming) as soon as possible. Medical Command can be contacted for assistance in identifying appropriate facility and mode of transport. Consider air transport if ground transport time is > 30 minutes or if it will decrease transport time. Generally, air ambulances are not indicated for patients in cardiac arrest, but hypothermia is the exception to this.
2. Notify the receiving facility as soon as possible. Bypass rewarming requires the mobilization of specialized personnel and equipment.
3. Prevent heat loss by all means available:
 - a. Move to warm environment (like inside ambulance with heaters on maximum)
 - b. Remove wet clothing
 - c. Wrap patient in warm dry blankets
 - d. Apply heat packs to axilla, groin, and neck
4. In severe hypothermia, EMS providers should attempt to prevent additional heat loss, but transport should not be delayed by attempts to provide rewarming in the field.

**POST-RESUSCITATION CARE
STATEWIDE ALS PROTOCOL**

ROSC after cardiac arrest

Manage Airway/ Ventilate ^{1,2,3}, if needed

- Monitor continuous waveform capnography **ETCO₂** if intubated.
- **Avoid hyperventilation (10-12 breaths/min, ETCO₂ 35-40)**
- Consider sedation, initial dose, (see box) if agitated ¹

Administer oxygen (titrate to **minimum** O₂ needed to achieve SpO₂ 95-99%)
Assure/initiate IV/IO NSS
Monitor ECG/pulse oximetry
Obtain 12-lead ECG^{4,5}
Consider/ treat associated factors (see box)

**Reassess Patient and Check Vital Signs
(Follow multiple treatment paths, if applicable)**

**Hypotension?
SBP < 120 mmHg (or MAP <80)
[Peds: SBP < 70 + (age x 2)]**

**Altered Level of Consciousness?
GCS Motor < 6**

**Dysrhythmia? ⁹
Bradycardia or Tachycardia (not-sinus)**

**Treat/titrate to target perfusion pressure of
SBP > 120 mmHg (or MAP >80) ⁶
[Peds: 70 + (age x 2)]**

If no signs of CHF,
Administer 20 mL/kg NSS wide open (up to 1000 mL total)

EPINEPHrine ⁷ push dose (diluted) 20 mcg boluses or infusion
OR
NorEPINEPHrine¹¹ (if available) infusion
OR
DOPAmine (if available) infusion ⁸

If patient does not follow commands, avoid warming:

- Remove excess clothing
- Cover only with light sheet
- Avoid heat packs or warm IV fluids

Check blood glucose. If ≤60,
10% **Dextrose** 25 g IV/ IO (250 mL)
[Peds: **Dextrose** 10% 5 mL/kg IV/ IO]

Follow appropriate dysrhythmia protocol
(Bradycardia, Wide-complex tachycardia, Narrow-complex tachycardia)¹⁰

Contact Medical Command

If unstable from recurrent VF/VT, consider antidysrhythmic infusion after initial bolus:

Lidocaine 2-4 mg/min IV/IO (adult)
OR
Amiodarone, if available, 1 mg/min IV/IO (adult)
Amiodarone, if available 5 mg/kg IV/IO infused over 60 minutes (pediatric)

Additional dose(s) of sedation if patient is agitated

Consider transport to a center that consistently provides a comprehensive, structured, multidisciplinary system of care for post-cardiac arrest patients, including PPCI and hypothermia.

POST-RESUSCITATION CARE STATEWIDE ALS PROTOCOL

Criteria:

- A. Patient that has return of spontaneous circulation (ROSC) after cardiopulmonary arrest.
 - 1. This includes resuscitation after CPR by EMS providers and after CPR by first responders/ laypersons with or without AED use.
 - 2. The post-resuscitation goals are to:
 - a. Optimize brain perfusion by optimizing cardiopulmonary function and systemic perfusion
 - b. Identify the cause/associated factors of the cardiac arrest
 - c. Prevent recurrence of cardiac arrest

Exclusion Criteria:

- A. Patient in cardiac arrest who does not sustain a pulse (ROSC) after resuscitation. Continue to follow appropriate cardiac arrest protocol (VF/VT, PEA/Asystole, Cardiac Arrest- Hypothermia protocols).
- B. Patients with ROSC after cardiac arrest from trauma. Continue to follow appropriate trauma protocol(s).
- C. Patient whose cardiac arrest was due to hypothermia. Follow Hypothermia protocol #6081

Possible Medical Command Orders:

- A. In adult patient, cooling may be ordered if patient not following commands after ROSC from nontraumatic cardiac arrest and core temperature is $>36^{\circ}\text{C}$. External cooling methods are preferred. Cooling via cold NSS increases the chance of re-arrest and pulmonary edema.

Notes:

1. If previously intubated and not tolerating endotracheal tube, administer initial dose of sedation medication (See box below). Consider extubation only if wide awake, following commands, and unable to tolerate endotracheal tube. If possible, sedation is preferred over extubation.
2. Do not permit patient to struggle against an alternative/rescue supraglottic airway. These devices should generally be removed if the patient awakens.
3. Before removing an endotracheal tube or alternative/rescue supraglottic airway device, turn patient on side and have suction running, if possible,
4. **12-lead ECG ideally should be transmitted to receiving/ command facility ASAP. Otherwise, give copy of all 12-lead ECGs to ED physician ASAP on arrival to facility.**
5. If 12-lead ECG is consistent with ST-elevation MI (STEMI), either:
 - a. Transport to STEMI-receiving center capable of providing emergency PPCI – See Destination Protocol # 170.
 - b. Early contact with Medical Command is encouraged for patients with STEMI on prehospital 12-lead ECG, since these patients may benefit by direct transport to a receiving facility capable of PPCI.
 - c. The first 12 lead ECG after ROSC is often a false positive for a STEMI and therefore, should be repeated after 10 minutes.
6. Hemodynamic instability is common after cardiac arrest, and ALS providers should aggressively treat hypotension to improve perfusion, especially to the brain.
7. **EPINEPHRINE** by push dose (dilute boluses) or infusion. Pulse dose boluses = prepare 10 mcg/mL concentration by adding 1 mL (of 0.1 mg/mL concentration) **EPINEPHRINE** in 9 mL NSS, then

administer **1-2 mL 20mcg** every 2 minutes and titrate to SBP target. Infusion = must administer by electronic pump at 0.1-0.5 mcg/kg/min titrated to SBP target.

8. Mix DOPamine (if available) infusion using regional or agency prescribed concentration, and administer 5-20 mcg/kg/min. Generally, start at 5 mcg/kg/min, and increase every 10 minutes by an additional 5 mcg/kg/min until SBP >120 mmHg (or [70 + (age x 2)] in children). **DO NOT exceed 20 mcg/kg/min unless ordered by medical command physician.**
9. Premature ventricular contractions and non-sustained VT are best treated in post-resuscitation patients with oxygenation and waiting for catecholamine levels to return to normal.
10. Narrow-complex tachydysrhythmias should generally not be treated in post cardiac arrest settings unless associated with hypotension or symptoms of poor perfusion.
11. Norepinephrine infusion 0.05-0.5mcg/kg/minute. If utilizing norepinephrine, an infusion pump is necessary.

POSSIBLE ASSOCIATED FACTORS:

- Hypovolemia**
Follow Shock protocol
- Hypoxia**
Reassess oxygen delivery
- Hydrogen Ion (Acidosis)**
Treat by optimizing blood pressure
- Hyperkalemia**
Consider in dialysis patient
- Toxins**
Follow appropriate Poisoning /Toxin protocol
- Tamponade (cardiac)**
Follow Shock protocol
- Tension pneumothorax**
Perform chest needle decompression, if indicated
- Thrombosis (acute MI)**
Obtain 12-lead ECG
- Trauma**
Follow Multisystem Trauma protocol

Sedation Options:
(Choose one)
(Titrate to minimum amount necessary)

Midazolam 1-5 mg IV/ IO (0.05 mg/kg)
titrated slowly
maximum 5 mg/ dose (2 mg pediatrics)
may repeat every 5 minutes
until maximum of 0.1 mg/kg total

OR

diazePAM 5-10 mg IV/ IO (0.1 mg/kg)
titrated slowly
maximum 10 mg/ dose (5 mg pediatrics)
may repeat every 5 minutes
until maximum 0.3 mg/kg total

OR

LORazepam 1-2 mg IV/ IO (0.1 mg/kg)
titrated slowly
maximum 2 mg/ dose
may repeat every 5 minutes
until maximum of 4 mg total

ALSO MAY ADD
fentaNYL 1 mcg/kg IV/IO
maximum 100 mcg/ dose
may repeat ½ dose every 5 minutes
until maximum of 300 mcg

Performance Parameters:

- A. Review record for frequent documentation of vital signs (at least every 5 minutes for 15 minutes after cardiac arrest or for the entire time on vasopressor infusions).

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TERMINATION OF RESUSCITATION STATEWIDE ALS GUIDELINE

Purpose:

- A. When there is no response to prehospital cardiac arrest treatment, it is acceptable and often preferable to cease futile resuscitation efforts in the field.
 1. In patients with cardiac arrest, prehospital resuscitation is initiated with the goal of returning spontaneous circulation before permanent neurologic damage occurs. Unfortunately, most patients do not respond to an aggressive resuscitation attempt. In most situations ALS providers are capable of performing an initial resuscitation that is equivalent to an in-hospital resuscitation attempt, and there is usually no additional benefit to emergency department resuscitation in most cases.
 2. CPR that is performed during patient packaging and transport is much less effective than CPR done at the scene. Additionally, EMS providers risk physical injury while attempting to perform CPR in a moving ambulance while unrestrained. In addition, continuing resuscitation in futile cases increases the time that EMS crews are not available for another call, impedes emergency department care of other patients, and incurs unnecessary hospital charges.
 3. When cardiac arrest resuscitation becomes futile, the patient's family should become the focus of the EMS providers. Families need to be informed of what is being done, and transporting all cardiac arrest patients to the hospital is an inconvenience and inconveniences the grieving family by requiring a trip to the hospital where they must begin grieving in an unfamiliar setting. Most families understand the futility of the situation and are accepting of ceasing resuscitation efforts in the field.

Criteria:

- A. Any cardiac arrest patient that has received resuscitation in the field but has not responded to treatment, **AND** a medical command physician has ordered termination of resuscitation efforts.
 1. Consider field termination of resuscitation in the following situations:
 - a. There is no response to approximately 20-40 minutes of ALS care including ventilation with advanced airway and several "rounds" of resuscitation medications.
 - b. Persistent ETCO₂ < 10 after 20 minutes of resuscitation
 - c. During resuscitation, new information related to DNR or terminal medical condition is obtained. If patient has OOH-DNR order, must follow OOH-DNR Protocol #324 before this protocol.
 - d. BLS care when AED has advised "no shock" on 3 sequential analyses, and the patient cannot arrive at a hospital or ALS cannot arrive at the patient within 15 minutes.
 2. In some situations, up to 10% of cardiac arrest survivors may attain ROSC after 40-60 minutes of CPR. Field termination is still appropriate in these cases, but consider delaying field termination until after 40-60 minutes of CPR for patients who may survive extended CPR. Examples include patients who:
 - a. have a sustained shockable rhythm
 - b. have high ETCO₂ (e.g. >35) during resuscitation
 - c. are younger
 - d. are healthier prior to cardiac arrest.
 - e. have medical causes of cardiac arrest that may respond to longer resuscitation efforts. Including lightning strike, electrocution, and drug overdose.

Exclusion Criteria:

- A. Consider continuing resuscitation and transporting patients with the following conditions (although under certain circumstances, a medical command physician may order termination of resuscitation in these conditions also):

1. Hypothermia as the suspected cause of cardiac arrest
2. Cardiac arrest in infants and children
3. Cardiac arrest in a public place
4. Cardiac arrest in an environment where the bystanders do not accept the idea of ceasing efforts in the field. While most families understand the futility of the situation and are very accepting of field termination, some family members or bystanders can become hostile.

System Requirements:

- A. Ideally, the EMS agency medical director should be involved in the decision to begin a program of terminating resuscitation in the field. Each agency should develop policies (e.g. related to transportation of bodies) and should make proactive contacts with key individuals (e.g. the coroner/ medical examiner, local nursing homes). Every ALS provider that participates in this process should have training related to “breaking bad news”, dealing with grieving individuals, and interpersonal skills.

Procedure:**A. All Patients:**

1. Prior to field termination, if possible, EMS providers should update any family on scene about care already attempted and futility of prognosis. This communication should help prepare the family for the pending field termination of care.
2. Follow appropriate resuscitation protocol to the point of “Contact Medical Command” to consider termination of resuscitation. Verify appropriate patient:
 - a. No central pulse
 - b. No respiratory efforts
 - c. Asystole or wide complex PEA at < 60 BPM
 - d. **ETCO2 < 10 during CPR correlates with irreversible death, but field termination may also be considered with ETCO2 levels > 10.**
 - i. **If ETCO2 <10mmHg after 20 minutes of continuous resuscitative efforts and no change in rhythm or perfusion.**
 - ii. **Continuous high quality resuscitation ≥ to 20 minutes without a response.**
3. Contact medical command. **EMS providers may terminate resuscitation only after order from a medical command physician.**¹
4. Terminate resuscitation efforts and document time of death.
5. Consider the possibility of a crime scene. If suspected, restrict access (if possible) and notify law enforcement immediately. See Crime Scene Preservation Guideline #919.
6. Inform any family at the scene of the patient’s death and facilitate early grieving.
7. Contact the coroner or medical examiner
 - a. Do not move the body or remove any resuscitation adjuncts (e.g. endotracheal tube or IV lines) until given permission by the coroner or medical examiner.
8. Provide for dignity. If the coroner has given permission:
 - a. Remove airway devices and IV catheters
 - b. Place the patient in a position that appears comfortable
 - c. Clean up debris from the resuscitation
9. Assist the family.
 - a. Offer to call a friend, pastor, or funeral director.
 - b. Consider notifying the patient’s primary care physician.
 - c. Do not leave the scene until the family has adequate support.

10. Consider calling the local organ donation program [800-DONORS1 (Eastern PA) or 800-DONORS7 (Western PA)] for the family. Many individuals can donate corneas, skin grafts or bone grafts.
11. It is not generally the role of EMS to transport bodies, and this is usually handled by funeral directors or medical examiner offices. In some situations, EMS agencies may have a policy that permits transport of deceased patients to a local morgue for the coroner or to a local funeral director. These arrangements should not take EMS vehicles out of service for an extended time to perform these services.

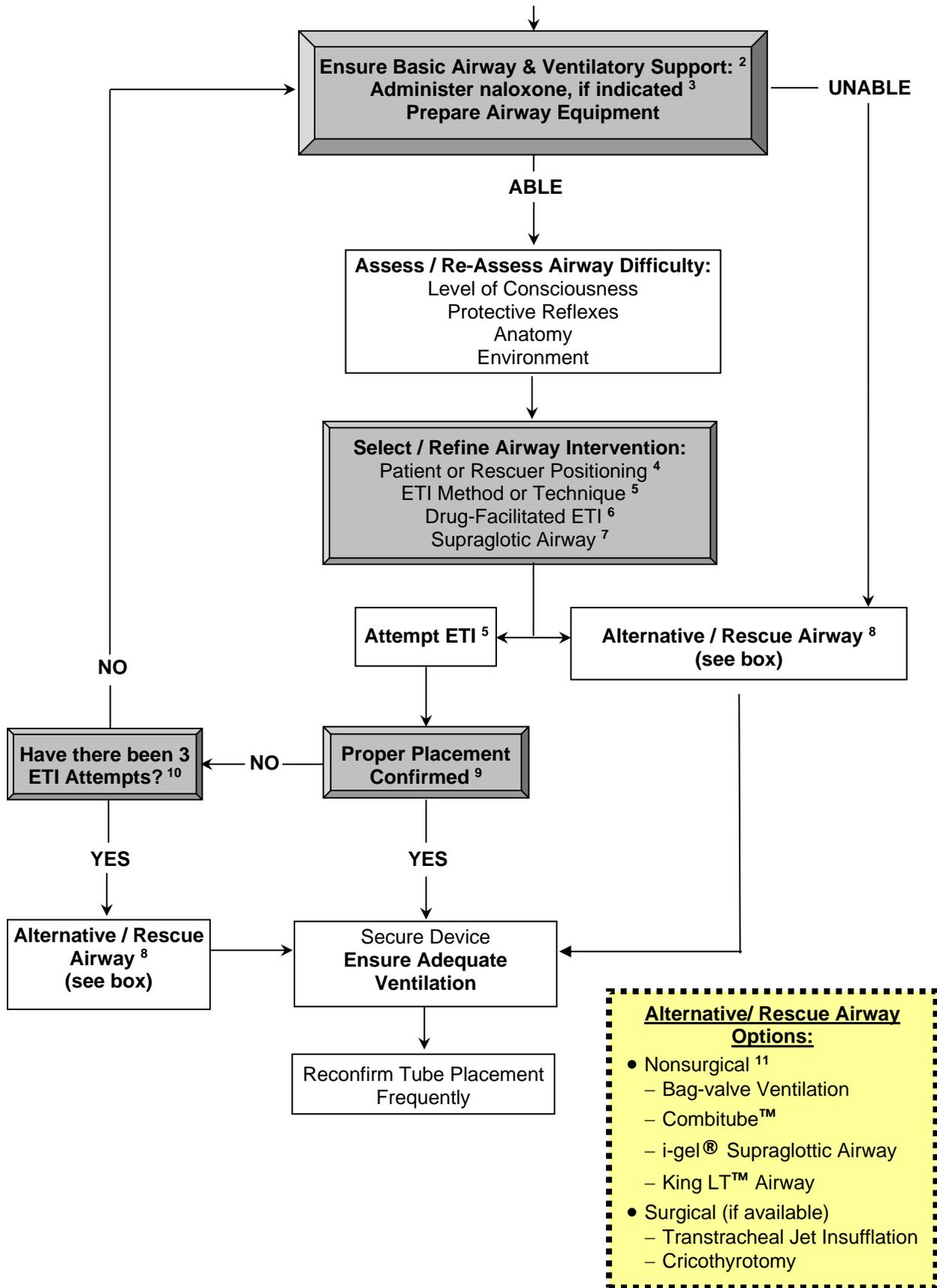
Notes:

1. In remote or wilderness situations, EMS providers **must** make every effort to contact medical command, but resuscitation may be terminated in the field without medical command when the following have occurred:
 - a. There has been no return of pulse despite >40 minutes of CPR (This does not apply in the case of hypothermia)
 - b. Transport to an emergency department will take > 45 minutes (This does not apply in the case of hypothermia)
 - c. The EMS providers are exhausted and it is physically impossible to continue the resuscitation

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AIRWAY MANAGEMENT STATEWIDE ALS PROTOCOL

Assess Need for Airway or Ventilatory Support ¹



AIRWAY MANAGEMENT STATEWIDE ALS PROTOCOL

Criteria:

- A. Any patient that requires airway management to assure adequate ventilation or a patent airway

Exclusion Criteria:

- A. Patient with obstructed airway- See Airway Obstruction Protocol #3001
-

Notes:

1. The need for airway management is based upon the provider's judgment after a rapid global assessment of the patient. Indications for airway management include:
 - a. Apnea or agonal respirations
 - b. Airway reflexes compromised
 - c. Ventilatory effort compromised
 - d. Injury or medical condition compromising airway patency
 - e. Potential for future rapid compromise of airway (for example airway burns or expanding neck hematoma).
 2. If patient ventilation is initially adequate, but airway management is anticipated, high-flow oxygen should be administered. If ventilation is inadequate, provide positive pressure ventilation with high-flow oxygen (ideally, BVM ventilation should be done with two-person technique, **ericoid pressure**, and an oropharyngeal/ nasopharyngeal airway if possible).
 3. If opioid overdose is suspected, administer naloxone per Altered Mental Status Protocol #7002A or 7002P while ventilating with BVM if needed.
 4. Techniques that may improve position for laryngoscopy are "sniffing position", head elevation, elevation of head of backboard if patient immobilized to backboard or raising stretcher height.
 5. **Consider using external laryngeal manipulation to improve laryngoscopy view.** Consider nasotracheal intubation in patient's that are awake or have clenching of teeth. Video laryngoscopy may improve first pass success rate. May use directional -tipped ETT or BAAM whistle to assist with nasotracheal intubation. May use bougie, lighted stylet, or fiberoptic stylet as adjuncts to endotracheal intubation (ETI).
 6. Topical atomized or nebulized lidocaine or tetracaine may be used. ALS providers who are qualified to perform drug-facilitated may follow the Sedation-Assisted Intubation Protocol when appropriate- See Protocol #4002. Some PHRNs may perform rapid sequence intubation when following approved air ambulance agency protocols.
 7. **Secondary/ rescue** Supraglottic airway options may be used as the primary airway/ ventilation technique in certain situations (for example: cardiac arrest to reduce interruption in compressions, opioid overdose until naloxone is administered, or confined/ entrapped patient in position that precludes laryngoscopy, or air medical patient inside a helicopter). Ventilation with BVM may be as effective as ETI in children when transport times are short.
 8. There should be a low threshold for using a **secondary/ rescue** supraglottic device when basic techniques do not provide adequate ventilation, when ETI may be futile or when there have been multiple attempts at ETI.
 9. Confirm and document tube placement with absence of gastric sounds and presence of bilateral breath sounds **AND** continuous **electronic** waveform **capnography-ETCO₂** monitoring. Follow Confirmation of Airway Placement Protocol #2032
 10. Placing the laryngoscope blade into the patient's mouth is considered an intubation attempt. A maximum of 3 attempts (total for all providers) is suggested, because the success rate dramatically decreases after 3 attempts. In some cases, it may be appropriate to proceed to a **rescue** supraglottic airway before 3 ETI attempts have been made. Regions or agency medical directors may determine the number of intubation attempts that are appropriate.
 11. ALS agencies must carry one type of **nonsurgical Alternative/ Rescue** supraglottic airway device in various sizes.
-

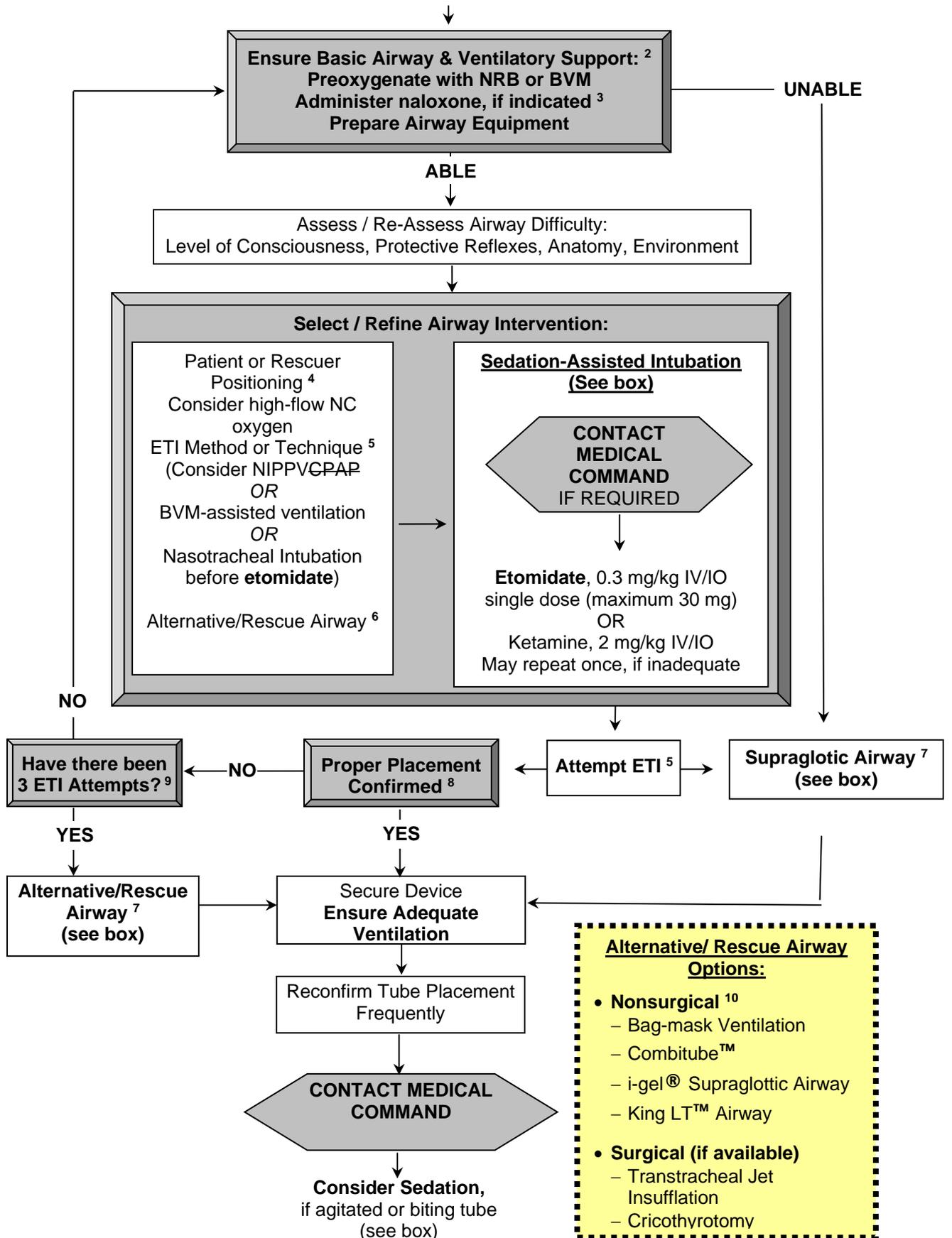
Performance Parameters:

- A. Review PCR's for documentation of the following:
1. In perfusing patients, document pulse oximetry, heart rate, and **electronic** wave-form **capnography and** ETCO₂ **readings** during intubation attempts. In perfusing patients, ideally a continuous recording strip is documented.
 2. Document number of attempts at ETI and/or alternative/ rescue airway placement.

3. Document confirmation of tube placement consistent with protocol #2032

**SEDATION-ASSISTED INTUBATION
STATEWIDE ALS PROTOCOL [OPTIONAL]**

Assess Need for Airway or Ventilatory Support ¹



**SEDATION-ASSISTED INTUBATION
STATEWIDE ALS PROTOCOL [OPTIONAL]****Sedation Options:****Initial Sedation to Facilitate Intubation****NOTE: Choose ONE**

**It is not appropriate to use two different medications for sedation prior to intubation.
Dosing is per patient encounter, not per intubation attempt.**

Etomidate, 0.3 mg/kg IV/IO
single dose (maximum 30 mg)
DO NOT repeat.

OR

Ketamine, 2 mg/kg IV/IO
May repeat once if inadequate sedation with first dose.

Post-Intubation Sedation

NOTE: Consider using an objective assessment, like IMCRASS score, to follow patient agitation and guide need for post-intubation sedation. Ketamine lasts longer than etomidate and is less likely to require post-intubation sedation.

(Titrate to minimum amount necessary)

Midazolam up to 0.05 mg/kg IV/IO titrated slowly
maximum 5 mg/ dose (~~pediatric max. 2 mg/dose~~)
may repeat every 5 minutes
until maximum of 0.1 mg/kg total

OR

diazepam up to 0.1 mg/kg IV/IO titrated slowly
maximum 10 mg/dose (~~pediatric max. 5 mg/dose~~)
may repeat every 5 minutes
until maximum 0.3 mg/kg total

OR

LORazepam up to 0.1 mg/kg IV/IO titrated slowly
maximum 2 mg/ dose
may repeat every 5 minutes
until maximum of 4 mg total

ALSO MAY ADD
fentanyl 1 mcg/kg IV/IO
maximum 100 mcg/ dose
may repeat ½ dose every 5 minutes
until maximum of 300 mcg

SEDATION-ASSISTED INTUBATION STATEWIDE ALS PROTOCOL [OPTIONAL]

Criteria:

- A. Sedation-assisted intubation may be appropriate for **adult** patients with compromised respiratory effort and partially intact protective airway reflexes. Examples of appropriate criteria for sedation-assisted intubation include:
1. Hypoxia (pulse oximetry < 90%) despite high flow oxygen by NRB mask or by NIPPV **CPAP**.
 2. Inability to protect airway.
 3. Traumatic injury with GCS < 8 at the time of decision to intubate.

Exclusion Criteria:

- A. **Patient age less than 14 y/o.**
- B. **CAUTION:** Sedation-assisted intubation may not be appropriate for patients with fully-intact protective airway reflexes. The advantages of an airway secured by an endotracheal tube must be weighed against the potential risk of worsened hypoxia, hypotension, bradycardia, or elevated intracranial pressure that may be side effects of the sedative or complications of the intubation attempt. There is also risk of worsening a patient's outcome or misplaced esophageal intubation with this procedure. ALS provider judgment is critical, and providers must be aware of the potential adverse effects of this procedure. Other options may be preferred in some situations:
1. NIPPV **CPAP** and medications may be preferred if patient has acute pulmonary edema/ CHF.
 2. Nasotracheal intubation may be preferred in breathing patients.
 3. Assisting ventilation with BVM and high-flow oxygen may be preferred if ETA to receiving facility is short, if airway reflexes are fully-intact, or until naloxone can be administered in opioid overdose.
- C. This protocol may only be used by ALS providers who have been approved for this skill by their agency medical director and are functioning with an ALS agency that meets all of the system requirements for sedation-assisted intubation. The Pennsylvania Department of Health does not condone sedation-assisted intubation by ALS providers or EMS agencies that do not meet all of the system requirements of this protocol, and does not condone the use of benzodiazepine and/or opioid medications for the purpose of intubation when given outside of a Department approved protocol. Medical command physicians should not order such medications in an attempt to facilitate intubation.

System Requirements:

- A. EMS region must approve the use of sedation-assisted intubation within the region, and the region must perform a QI audit of **every** case of sedation-assisted intubation for compliance with this protocol. All results must be forwarded to the Bureau of EMS for statewide QI.
- B. Agency medical director must approve of sedation-assisted intubation by the EMS agency and must perform a QI audit of **every** case of sedation-assisted intubation for compliance with this protocol.
- C. Agency medical director must personally **assure** ensure training and continuing education in patient selection, endotracheal intubation, use of **alternative/ rescue supraglottic** airway device, use of **electronic** wave-form **capnography** ETCO₂ monitoring, and use of this protocol.
- D. Agency medical director must assure initial and ongoing competence (including supervised sedation-assisted intubation) for each individual EMS provider who will use sedation-assisted intubation. Only individuals credentialed for this procedure will perform the procedure. Medical directors should strongly consider requirements for regular supervised operating room intubations (if it is possible to arrange for such experience) and should consider the use of high-fidelity simulation as a component of assuring competence.
- E. **Two** ALS providers **at or** above the level of **AEMT paramedic** must be treating the patient before sedation-assisted intubation may be used.
- F. Agency must carry an alternative/ rescue airway device in various sizes.
- G. Agency must have the capability of monitoring and recording the following parameters continuously before, during and after all intubation attempts. Recordings of these parameters must be documented for every patient treated with this protocol:
1. **Electronic** wave-form **capnography ETCO₂** (documented to confirm intubation, and monitored continuously thereafter)
 2. Heart rate by continuous ECG monitoring (documented by recording strip demonstrating trending of heart rate before, during, and after each intubation attempt).
 3. Oxygen saturation by continuous pulse oximetry (documented by recording strip demonstrating trending of pulse oximetry before, during, and after each intubation attempt).

4. Blood pressure (documented before and immediately after intubation or intubation attempts).
- H. Etomidate and/or ketamine for sedation-assisted intubation may only be carried by ALS agencies that follow all aspects of this protocol and will be removed from the agency's ambulances if either the agency or regional QI determines that there are significant variances from this protocol.
- I. Regions or agency medical directors may add more stringent criteria for use within the agency. For example, regions or agencies may require that medical command be contacted before sedation-assisted intubation.

Notes:

1. The need for airway management is based upon the provider's judgment after a rapid global assessment of the patient. Indications for airway management include:
 - a. Apnea or agonal respirations
 - b. Airway reflexes compromised
 - c. Ventilatory effort compromised
 - d. Injury or medical condition compromising airway patency
 - e. Potential for future rapid compromise of airway (for example airway burns or expanding neck hematoma).
2. If patient ventilation is initially adequate, but airway management is anticipated, high-flow oxygen should be administered. If ventilation is inadequate, provide positive pressure ventilation with high-flow oxygen (ideally, BVM ventilation should be done with two-person technique, **ericoid pressure**, and an oropharyngeal/ nasopharyngeal airway if possible).
3. If opioid overdose is suspected, administer naloxone per Altered Mental Status Protocol #7002A **or 7002P** while ventilating with BVM if needed.
4. Techniques that may improve position for laryngoscopy are "sniffing position", head elevation, elevation of head of backboard if patient immobilized to backboard or raising stretcher height.
5. **Consider using external laryngeal manipulation to improve laryngoscopy view. Video laryngoscopy may improve first pass success rate.** Consider nasotracheal intubation in patient's that are awake or have clenching of teeth. May use directional -tipped ETT or BAAM whistle to assist with nasotracheal intubation. May use bougie, lighted stylet, or fiberoptic stylet as adjuncts to endotracheal intubation (ETI).
6. **Secondary/ rescue Supraglottic** airway options may be used as the primary airway/ ventilation technique in certain situations (for example: cardiac arrest to reduce interruption in compressions, opioid overdose until naloxone is administered, or confined/ entrapped patient in position that precludes laryngoscopy, or air medical patient inside a helicopter). Ventilation with BVM may be as effective as ETI in children when transport times are short.
7. There should be a low threshold for using a **secondary/ rescue supraglottic airway** device when basic techniques do not provide adequate ventilation, when ETI may be futile or when there have been multiple attempts at ETI.
8. Confirm and document tube placement with absence of gastric sounds and presence of bilateral breath sounds **AND** continuous **electronic waveform capnography ETCO₂ monitoring**. Follow Confirmation of Airway Placement Protocol #2032
9. Placing the laryngoscope blade into the patient's mouth is considered an intubation attempt. A maximum of 3 attempts (total for all providers) is suggested. The success rate dramatically decreases after 3 attempts. It may be appropriate to proceed to a rescue airway before 3 ETI attempts have been made. Regions or agency medical directors may determine the number of intubation attempts that are appropriate. Do not repeat sedation medication with each attempt.
10. ALS agencies must carry one type of nonsurgical **Alternative/Rescue supraglottic** airway available in various sizes.

Performance Parameters:

- A. Review PCRs for documentation of the following:
 1. Review for documentation of reason for intubation.
 2. Review for complications related to intubation attempts including hypoxia, bradycardia, hypotension, and esophageal intubation(s).
 3. Review for overall successful placement of an ETT or **alternative supraglottic** airway and number of attempts at ETI and alternative/ rescue su airway placement.
 4. Include recording strip of continuous trend of heart rate and pulse oximetry before, during, and after each intubation attempt.
 5. Document pulse oximetry, blood pressure, and heart rate readings before and after intubation attempts. Document **electronic waveform capnography with** ETCO₂ readings after intubation attempts.
 6. Document number of attempts at ETI and/or **alternative/ rescue supraglottic** airway placement.

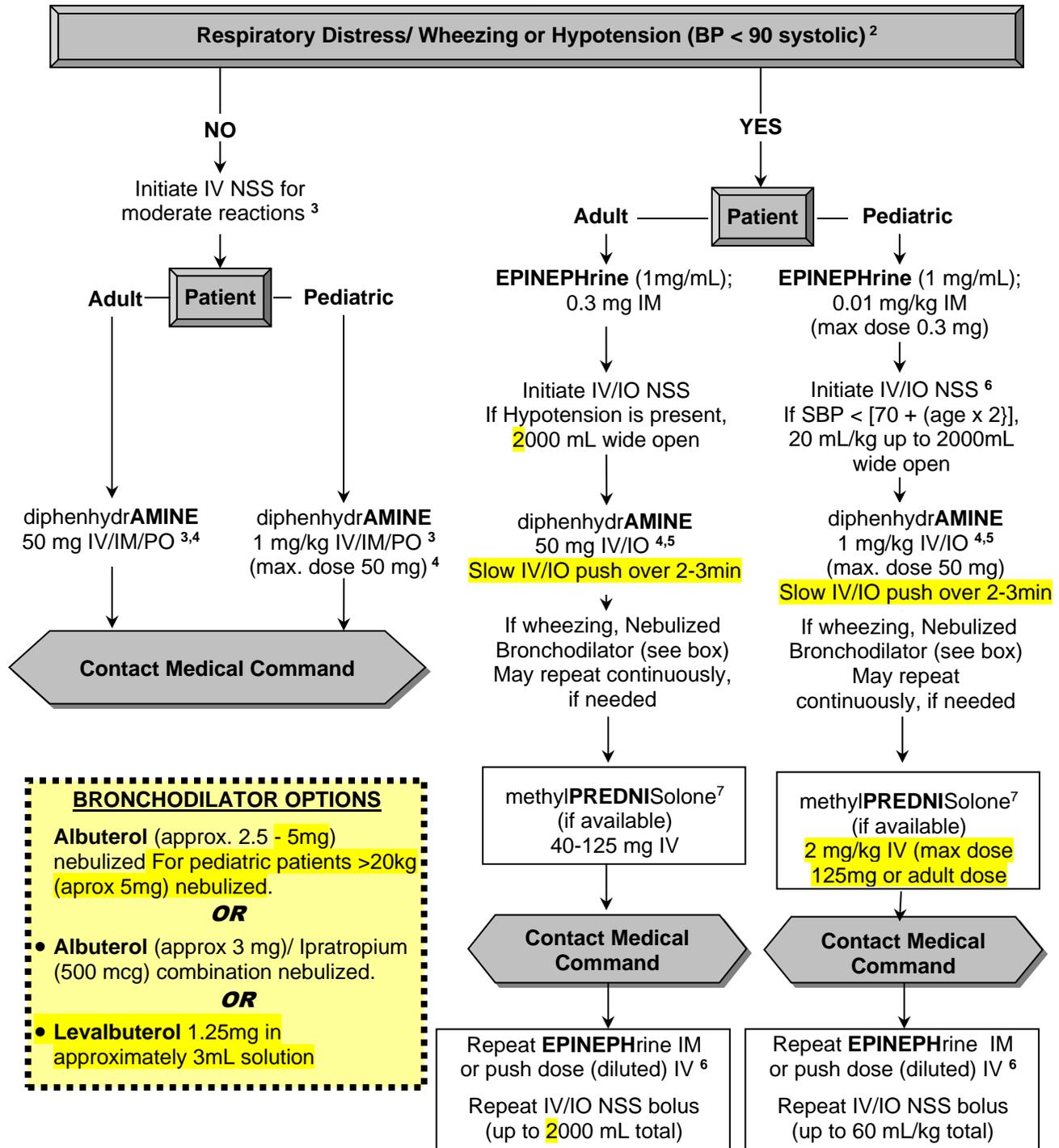
7. Document confirmation of tube placement by both auscultation and continuous **electronic** waveform **capnography** **ETCO₂** consistent with protocol #2032

**ALLERGIC REACTION
STATEWIDE ALS PROTOCOL**

Initial Patient Contact - see Protocol #201
Look for Medical Alert bracelet/necklace

Manage Airway/ Ventilate, if needed
Apply Oxygen if needed

Monitor ECG (unless mild reaction) and Pulse Oximetry, remove stinger if visible¹,
keep part dependent if possible, apply cold pack as available



**ALLERGIC REACTION
STATEWIDE ALS PROTOCOL**

Criteria:

- A. Severe Allergic Reaction/Anaphylaxis:** A patient with any of the following symptoms of severe allergic reaction after suspected exposure to an allergen (e.g. bee/wasp stings, medications/antibiotics, nuts, seafood):
1. Difficulty breathing and wheezing
 2. Difficulty breathing from swollen tongue/lips
 3. Hypotension
- B. Moderate Allergic Reaction:** A patient with less severe reaction may have:
1. Mild shortness of breath with wheezing
 2. Extensive hives and itching
 3. Mild tongue/lip swelling without difficulty swallowing or shortness of breath
- C. Mild Allergic Reaction:** A patient with a mild reaction may have:
1. Local swelling or itching isolated to extremity or area around bite site.

Possible MC Orders:

- A.** If unconscious or life-threatening condition, consider additional doses of **EPINEPH**rine.
1. Additional dose of **EPINEPH**rine 0.3 mg IM (0.3 mL of 1 mg/mL concentration)
 2. **EPINEPH**rine infusion (1 mg/250 mL NSS) IV/IO infused until hypotension resolves.
 3. **EPINEPH**rine 0.1 mg (1 mL of 0.1 mg/mL concentration) IV/IO very slow over 5 minutes.
- B.** Glucagon, if available, (1-2 mg IV repeated every 5 minutes to 10 mg total) may be ordered if patient is taking β -blocker and hypotension does not resolve with NSS bolus and **EPINEPH**rine.
- C.** Consider nebulized **EPINEPH**rine if severe airway swelling.
- D.** dex**AMETH**asone or hydrocortisone, if available.

Notes:

1. Remove stinger(s) by gently scraping stinger free with a blade or credit card, without squeezing or using forceps. In severe reaction, do not delay treatment while attempting to remove stingers.
2. **In pediatrics, hypotension is SBP < $[70 + (\text{age} \times 2)]$. Hypotension for children 1-10 years old and BP < $70 + (\text{age} \times 2)$ or if greater than 10 years old and BP < 90.**
3. For mild reactions, IV access is not necessary. May provide diphenhydr**AMINE**, 1 mg/kg to maximum of 50 mg orally (if tablets/capsules/elixir available). May use local benzocaine applicator at bite/sting site.
4. May repeat diphenhydr**AMINE** dose up to 50 mg total.
5. IV route is preferred. diphenhydr**AMINE** (Benadryl) may be given IM if IV/IO is not available.
6. **EPINEPH**rine dose may be repeated if hypotension and severe symptoms persist. Use caution when giving IV **EPINEPH**rine to any patient with perfusing vital signs, especially those over 50 years old. Doses should be controlled, given slowly, and titrated only to adequate blood pressure. Higher doses may be needed in patients that are taking β -blocker medications. Dosing options include:
 - a. Repeat the original IM dose.
 - b. **EPINEPH**rine by push dose (dilute boluses) or infusion. Push dose boluses = prepare 10 mcg/mL concentration by adding 1 mL of 0.1 mg/mL concentration **EPINEPH**rine in 9 mL NSS, then administer 1-2 mL every 2 minutes and titrate to SBP target.
7. **Agency medical directors may choose the maximum dose (40-125mg) of methyl**PREDNIS**olone for their agency based on the concentrations available on hand.**

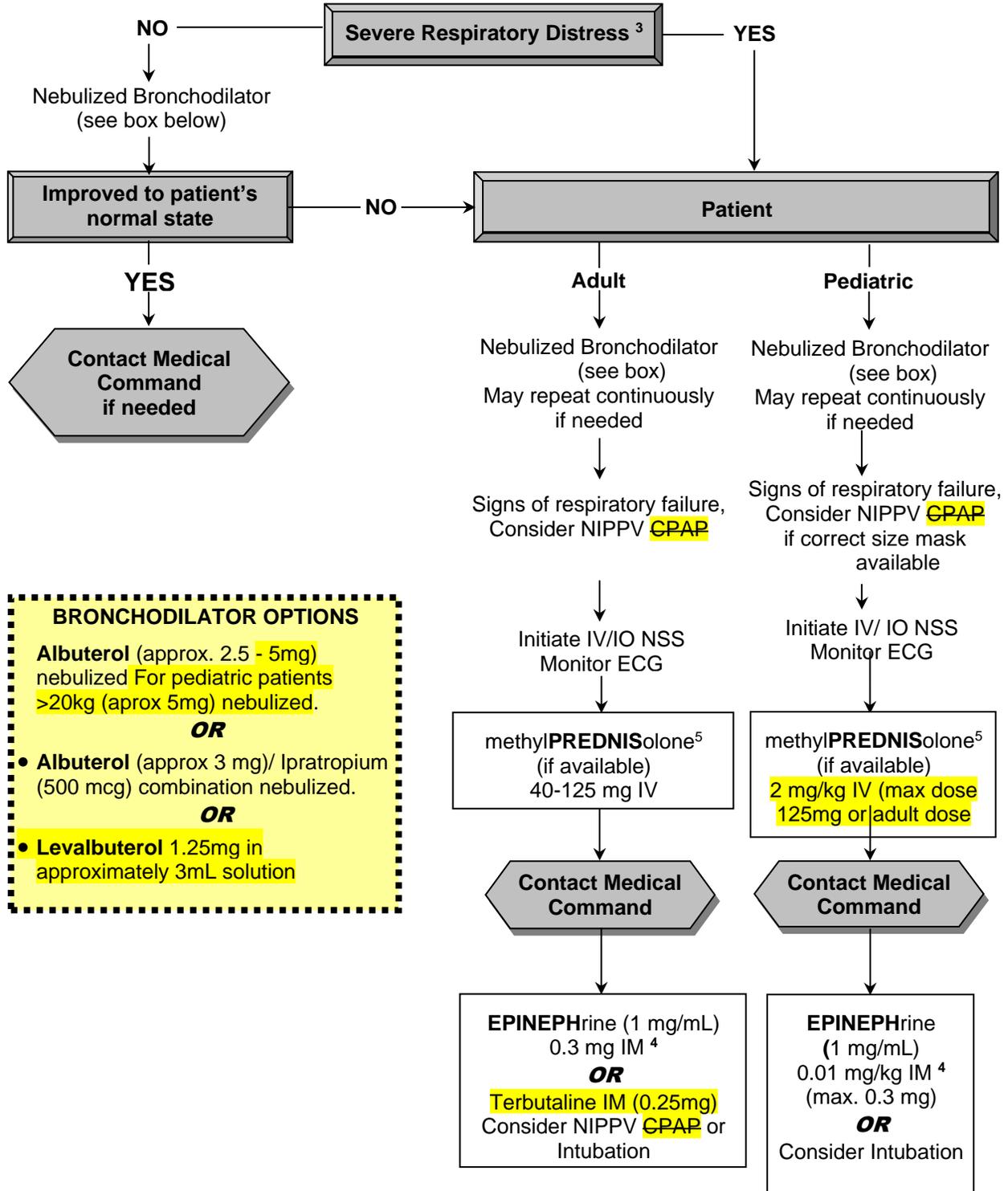
Performance Parameters:

- A.** Review for documentation of level of consciousness, airway patency, and pulse oximetry reading.

**ASTHMA / COPD / BRONCHOSPASM
STATEWIDE ALS PROTOCOL**

Initial Patient Contact - See protocol #201

Manage Airway/ Ventilate, if needed ¹
Administer Oxygen ²
Monitor Pulse Oximetry



**ASTHMA / COPD / BRONCHOSPASM
STATEWIDE ALS PROTOCOL**

Criteria:

- A. A patient with signs and symptoms of acute respiratory distress from bronchospasm or restrictive airway disease:
 - 1. Symptoms/signs may include:
 - a. Wheezing - will have expiratory wheezing unless they are unable to move adequate air to generate wheezes
 - b. May have signs of respiratory infection (e.g. fever, nasal congestion, cough, sore throat)
 - c. May have acute onset after inhaling irritant
 - 2. This includes:
 - a. Asthma exacerbation
 - b. COPD exacerbation
 - c. Wheezing from suspected pulmonary infection (e.g. pneumonia, acute bronchitis)

Exclusion Criteria:

- A. Respiratory distress secondary to trauma – Follow appropriate trauma protocol.
- B. Respiratory distress secondary to congestive heart failure - Follow CHF Protocol #5002.
- C. Allergic reactions – Follow Allergic Reaction Protocol #4011.
- D. Suspected Croup – Follow Croup Protocol #4023

Possible MC Orders:

- A. Additional nebulized bronchodilators
- B. Intravenous volume, NSS bolus or 20 mL/kg if fever, infection, or signs of dehydration.
- C. Additional doses of **EPINEPH**rine (IM or IV/IO)
- D. NIPPV **CPAP/BiPAP**, if available and not already being used.
- E. Endotracheal Intubation, if not already done
- F. Magnesium sulfate 2 gm slow IV or infusion.

Notes:

- 1. **WARNING:** Although sometimes needed, intubation further narrows the airway restriction in a severe asthma exacerbation, and this may worsen some cases. Aggressive use of bronchodilators is generally the most important therapy for severe asthma exacerbation.
- 2. Administer oxygen at high-flow rate to all patients in severe respiratory distress. COPD patients **NOT** in respiratory distress should be given oxygen to maintain adequate O₂ saturation (e.g. >90%).
- 3. Indications of severe respiratory distress include:
 - a. apprehension, anxiety, combativeness
 - b. hypoxia, SpO₂ < 90%
 - c. intercostals/subcostal retractions
 - d. nasal flaring
 - e. cyanosis
 - f. use of accessory muscles
- 4. **EPINEPH**rine administration may be ordered by Medical Command Physician regardless of patient's age or past medical history. **EPINEPH**rine is relatively contraindicated during pregnancy; report pregnancy to physician. **EPINEPH**rine may be repeated only with order from Medical Command Physician.
- 5. Agency medical directors may choose the maximum dose (40-125mg) of methyl**PREDNIS**olone for their agency based on the concentrations available on hand.

Performance Parameters:

- A. Review for documentation of lung sounds, pulse oximetry, repeat assessments/ pulse oximetry readings, and response to treatment.

CROUP/ STRIDOR/ UPPER AIRWAY DISEASE – PEDIATRIC STATEWIDE ALS PROTOCOL

Initial Patient Contact - See protocol #201

Manage Airway/ Ventilate, if needed ¹
Administer Oxygen ²
Monitor Pulse Oximetry

Severe Respiratory Distress ³
(Stridor severe or persistent at rest, tachypnea or retractions present)

NO

YES

Consider Nebulized Bronchodilator if lower airway wheezing only (see box below)

Possible epiglottitis
(Toxic appearance with high fever, drooling, tripod position, and severe respiratory distress)

Contact Medical Command

YES

NO

Minimize agitation and transport

Nebulized **EPINEPHRINE**
Either
2.25% racemic **EPINEPHRINE**,
0.5 mL in 2 mL NSS
OR
EPINEPHRINE (1 mg/mL),
5 mL via nebulizer

BRONCHODILATOR OPTIONS

Albuterol (approx. 2.5 - 5mg) nebulized For pediatric patients >20kg (aprox 5mg) nebulized.

OR

- **Albuterol** (approx 3 mg)/ Ipratropium (500 mcg) combination nebulized.

OR

- **Levalbuterol** 1.25mg in approximately 3mL solution

Contact Medical Command

Contact Medical Command

**CROUP/ STRIDOR/ UPPER AIRWAY DISEASE – PEDIATRIC
STATEWIDE ALS PROTOCOL**

Criteria:

- A. A pediatric patient with signs and symptoms of stridor and cough from upper respiratory disease:
 - 1. Symptoms/signs may include:
 - a. Stridor
 - b. Barking cough
 - c. May have signs of respiratory infection (e.g. fever, nasal congestion, cough, sore throat)

Exclusion Criteria:

- A. Foreign body airway obstruction – Follow Airway Obstruction Protocol #3001
- B. Respiratory distress secondary to lower airway bronchoconstriction – Follow Asthma/ COPD/Bronchospasm Protocol #4022
- C. Respiratory distress secondary to trauma – Follow appropriate trauma protocol.
- D. Allergic reactions – Follow Allergic Reaction Protocol #4011.

Possible MC Orders:

- A. Nebulized bronchodilator if suspected lower airway bronchospasm.
- B. Intravenous volume, NSS bolus or 20 mL/kg if fever, infection, or signs of dehydration.

Notes:

- 1. **WARNING:** Avoid intubation attempts if epiglottitis is suspected – most patients can be adequately ventilated with BVM. If epiglottitis is possible, manipulating the airway with intubation attempts can be fatal.
- 2. Administer oxygen at high-flow rate to all patients in severe respiratory distress.
- 3. Indications of severe respiratory distress include:
 - a. apprehension, anxiety, combativeness
 - b. hypoxia, SpO₂ < 90%
 - c. intercostals/subcostal retractions
 - d. nasal flaring
 - e. cyanosis
 - f. use of accessory muscles

Performance Parameters:

- A. Review for documentation of lung sounds, pulse oximetry, repeat assessments/ pulse oximetry readings, and response to treatment.
- B. Review cases of nebulized **EPINEPH**rine use for appropriate differentiation between croup and lower respiratory bronchospasm.

**VOLUME CONTROL TRANSPORT VENTILATOR MANAGEMENT
STATEWIDE ALS PROTOCOL (OPTIONAL)****Criteria:**

- A. Patient with advanced airway requiring uncomplicated volume control mechanical ventilation for interfacility transport
 1. CAUTION: An EMS critical care transport agency or air ambulance agency or transport with staff from the sending facility skilled in ventilator management should be considered for interfacility transport of patients with the following conditions:
 - i. Simple volume control ventilation is not ideal for the patient
 - ii. Active titration of ventilator settings, recent or anticipated
 - iii. Patient is at risk for displacement of advanced airway or may be a difficult reintubation if extubated
 - iv. Patient with monitoring or treatment needs that require more than one ALS provider
 - v. Transport is not time-sensitive and will be safer for patient by waiting for arrival of a critical care transport or air medical crew
- B. Patient with advanced airway requiring consistent ventilation after pre-hospital placement of advanced airway.
- C. Patient on home ventilator being maintained by a family member consistent with BLS protocol #921
- D. Patient with non-acute tracheostomy (older than 14 days) on chronic/long-term ventilator using pressure support mode with no changes in settings in the past 24 hours (or changes reflecting improvement in the patient's ventilatory status) being transported:
 - to/from a scheduled outpatient appointment with anticipated return to the original facility, or
 - to an extended care facility capable of providing the same level of care as the originating facility, or
 - for emergency treatment at a facility capable of providing a higher-level of care for a condition that is unrelated to an airway issue or cardiorespiratory decompensation.

And where:

- the transport ventilator is able to duplicate the mode and ventilator settings used at the originating facility (or the patient's own ventilator is able to be safely transported with the patient), AND
- no ventilator setting changes are anticipated during transport, AND
- peak pressures + PEEP are less than or equal to 35 cm H₂O.

Exclusion Criteria:

- A. Patients < 1 year old
- B. Patients requiring advanced modes of ventilation will require a specialty transport team, including:
 1. Patients on Volume Control where the plateau pressure > 35 or the PIP > 40 cmH₂O.
 2. Patients on Pressure Control ventilation, except stable tracheostomy patients covered by inclusion criteria D above.
 3. Patients on any other mode of ventilation.
- C. Any patient for whom the following parameters are met on their current ventilator settings:
 1. SaO₂ < 95%.
 2. Peak airway pressure > 45 cmH₂O (or >30cm H₂O with supraglottic airway).
 3. ETCO₂ > 45 mmHg for patients who are not suspected of elevated intracranial pressure.
 4. ETCO₂ > 40 mmHg for patients with suspected elevated intracranial pressure.
 5. ETCO₂ < 35 mmHg for all patients.
 6. Patient is otherwise not tolerating initial ventilator settings.

System Requirements:

- A. EMS agency medical director must approve any transport ventilator used by the EMS agency. A multimodal ventilator may be used by providers if only used in volume control mode.
- B. EMS agency medical director must assure initial and ongoing competence (with each ventilator type used) for each individual EMS provider who will use mechanical ventilation.
- C. ALS agency must have the capability of monitoring and recording continuous waveform capnography, pulse, respiratory rate, and blood pressure during mechanical ventilation. Recordings of these parameters must be documented for every patient treated with this protocol.

Possible Medical Command Orders:

- A. Change in ventilator volume or rate
- B. Titrate ventilator FiO₂ down to maintain pulse oximetry between 95-99% for patients with ischemic conditions.¹
- C. The medical command physician may consider ordering sedative medication (see box).

Procedure:

- A. All Patients:
 - 1. Confirm endotracheal tube placement or ~~extraglottic~~ supraglottic airway placement as per Confirmation of Airway Placement protocol #2032.
 - 2. If any issue with mechanical ventilator support ventilation as needed with bag-valve and supplemental O₂.
 - 3. Volume control ventilator settings:
 - a) Prehospital advanced airway
 - 1) Adult – 6-8 mL/kg predicted body weight (PBW) and 12-14 bpm (See Table)
 - 2) Pediatric (1-14 y/o) – 6-10 mL/kg PBW and 12-20 bpm (See Table)
 - 3) FiO₂: 50-100% to achieve SpO₂ between 95-99%²
 - 4) PEEP: 5-8 cm H₂O²
 - b) Interfacility transport patient with existing advanced airways:
 - 1) Continue previous ventilator settings from referring facilities if they are consistent with the following parameters:
 - a. Adult – 6-8 mL/kg predicted body weight (PBW) and 12-14 bpm (See Table)
 - b. Pediatric (1-14 y/o) – 6-10 mL/kg PBW and 12-20 bpm (See Table)
 - c. FiO₂: 50-100% to achieve SpO₂ between 95-99%²
 - d. PEEP: 5-8 cm H₂O²
 - 2) Contact medical command if the facility ventilator settings differ from the above parameters.
 - 3) Following transfer to the transport ventilator, observe the patient to ensure adequate ventilation/ oxygenation based on the parameters established in this protocol before leaving the sending facility.
 - 4. Pressure control ventilator settings in patient with stable ventilator settings and tracheostomy meeting criteria D above. Transport on patient’s ventilator or on ventilator with identical settings with all features of the patient’s long-term ventilator.
 - 5. Ensure adequate sedation
 - a) Prehospital advanced airway – administer sedation if needed² (see box)
 - b) Interfacility transport – Contact Medical Command for sedation order
 - 6. Contact Medical Command immediately if:
 - a) SpO₂ < 95%
 - b) Peak airway pressure > 45 cm H₂O (or > 30cm H₂O with supraglottic airway).
 - c) ETCO₂ > 45 mmHg for patients who are not suspected of elevated intracranial pressure
 - d) ETCO₂ > 40 mmHg for patients with suspected elevated intracranial pressure.
 - e) ETCO₂ < 35 mmHg for all patients
 - f) Patient otherwise not tolerating ventilator settings.
 - g) If SBP < 90 or patient hemodynamically unstable

Sedation Options³: (Choose one)
(Titrate to minimum amount necessary)

Midazolam up to 0.05 mg/kg IV/ IO titrated slowly
maximum 5 mg/dose (pediatric maximum 2 mg/dose)
may repeat every 5 minutes, until maximum of 0.1 mg/kg total

OR

diasePAM up to 0.1 mg/kg IV/ IO titrated slowly
maximum dose 10 mg (pediatric maximum 5 mg)
may repeat every 5 minutes, until maximum 0.3 mg/kg total

OR

LORazepam 0.1 mg/kg IV/ IO titrated Maximum 2 mg/dose
may repeat every 5 minutes, until maximum of 4 mg total

ALSO MAY ADD
fentaNYL 1 mcg/kg IV/IO
maximum 100 mcg
may repeat ½ dose every 5 minutes
until maximum 300 mcg total

Notes:

1. Hyperoxygenation may be harmful for patients with ischemic conditions - consider contact with medical command physician for STEMI, acute stroke, and post-cardiac arrest patients.
2. If these parameters are available on the transport ventilator
3. Do not administer sedation if SBP < 90 (or < 70 + [age x 2] for patients under 10 y/o)

Performance Parameters:

- A. Document medical command contact and orders for ventilator settings and sedation when required.
- B. Document the following at least every 15 minutes during mechanical ventilation:
 1. Wave-form ETCO₂ (initial and final waveform graph and quantitative value every 15 minutes)
 2. Heart rate
 3. Oxygen saturation
 4. Blood pressure

Predicted Body Weight and Tidal Volume for Females:

HEIGHT	PBW	4 mL	5 mL	6 mL	7 mL	8 mL
4' 0" (48)	17.9	72	90	107	125	143
4' 1" (49)	20.2	81	101	121	141	162
4' 2" (50)	22.5	90	113	135	158	180
4' 3" (51)	24.8	99	124	149	174	198
4' 4" (52)	27.1	108	136	163	190	217
4' 5" (53)	29.4	118	147	176	206	235
4' 6" (54)	31.7	127	159	190	222	254
4' 7" (55)	34	136	170	204	238	272
4' 8" (56)	36.3	145	182	218	254	290
4' 9" (57)	38.6	154	193	232	270	309
4' 10" (58)	40.9	164	205	245	286	327
4' 11" (59)	43.2	173	216	259	302	346
5' 0" (60)	45.5	182	228	273	319	364
5' 1" (61)	47.8	191	239	287	335	382
5' 2" (62)	50.1	200	251	301	351	401
5' 3" (63)	52.4	210	262	314	367	419
5' 4" (64)	54.7	219	274	328	383	438
5' 5" (65)	57	228	285	342	399	456
5' 6" (66)	59.3	237	297	356	415	474
5' 7" (67)	61.6	246	308	370	431	493
5' 8" (68)	63.9	256	320	383	447	511
5' 9" (69)	66.2	265	331	397	463	530
5' 10" (70)	68.5	274	343	411	480	548
5' 11" (71)	70.8	283	354	425	496	566
6' 0" (72)	73.1	292	366	439	512	585
6' 1" (73)	75.4	302	377	452	528	603
6' 2" (74)	77.7	311	389	466	544	622
6' 3" (75)	80	320	400	480	560	640
6' 4" (76)	82.3	329	412	494	576	658
6' 5" (77)	84.6	338	423	508	592	677
6' 6" (78)	86.9	348	435	521	608	695
6' 7" (79)	89.2	357	446	535	624	714
6' 8" (80)	91.5	366	458	549	641	732
6' 9" (81)	93.8	375	469	563	657	750
6' 10" (82)	96.1	384	481	577	673	769
6' 11" (83)	98.4	394	492	590	689	787
7' 0" (84)	100.7	403	504	604	705	806

Predicted Body Weight and Tidal Volume for Males:

HEIGHT	PBW	4 mL	5 mL	6 mL	7 mL	8 mL
4' 0" (4 8)	22.4	90	112	134	157	179
4' 1" (4 9)	24.7	99	124	148	173	198
4' 2" (5 0)	27	108	135	162	189	216
4' 3" (5 1)	29.3	117	147	176	205	234
4' 4" (5 2)	31.6	126	158	190	221	253
4' 5" (5 3)	33.9	136	170	203	237	271
4' 6" (5 4)	36.2	145	181	217	253	290
4' 7" (5 5)	38.5	154	193	231	270	308
4' 8" (5 6)	40.8	163	204	245	286	326
4' 9" (5 7)	43.1	172	216	259	302	345
4'10" (5 8)	45.4	182	227	272	318	363
4' 11" (5 9)	47.7	191	239	286	334	382
5' 0" (6 0)	50	200	250	300	350	400
5' 1" (6 1)	52.3	209	262	314	366	418
5' 2" (6 2)	54.6	218	273	328	382	437
5' 3" (6 3)	56.9	228	285	341	398	455
5' 4" (6 4)	59.2	237	296	355	414	474
5' 5" (6 5)	61.5	246	308	369	431	492
5' 6" (6 6)	63.8	255	319	383	447	510
5' 7" (6 7)	66.1	264	331	397	463	529
5' 8" (6 8)	68.4	274	342	410	479	547
5' 9" (6 9)	70.7	283	354	424	495	566
5'10" (7 0)	73	292	365	438	511	584
5'11" (7 1)	75.3	301	377	452	527	602
6' 0" (7 2)	77.6	310	388	466	543	621
6' 1" (7 3)	79.9	320	400	479	559	639
6' 2" (7 4)	82.2	329	411	493	575	658
6' 3" (7 5)	84.5	338	423	507	592	676
6' 4" (7 6)	86.8	347	434	521	608	694
6' 5" (7 7)	89.1	356	446	535	624	713
6' 6" (7 8)	91.4	366	457	548	640	731
6' 7" (7 9)	93.7	375	469	562	656	750
6' 8" (8 0)	96	384	480	576	672	768
6' 9" (8 1)	98.3	393	492	590	688	786
6' 10" (8 2)	100.6	402	503	604	704	805
6'11" (8 3)	102.9	412	515	617	720	823
7' 0" (8 4)	105.2	421	526	631	736	842

Predicted Body Weight and Tidal Volume for Children (1-5 years old):

AGE (yrs.)	PBW (kg)	4 mL	5 mL	6 mL	7 mL	8 mL	9 mL	10 mL
1	10	40	50	60	70	80	90	100
2	12.5	50	63	75	88	100	113	125
3	15	60	75	90	105	120	135	150
4	17	68	85	102	119	136	153	170
5	20	80	100	120	140	160	180	200

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**CHEST PAIN / SUSPECTED ACUTE CORONARY SYNDROME
STATEWIDE ALS PROTOCOL**

Initial Patient Contact – see Protocol #201
Consider non-cardiac causes ^{1,2}
Administer Oxygen titrated to SpO₂ to 95-99% ³
Monitor Pulse Oximetry
Monitor ECG

**Unstable tachycardia/
bradycardia present**

**Proceed to Appropriate
Dysrhythmia Protocol**

NO

Administer Aspirin 324 mg PO chewed ⁴

Systolic pressure >100

YES

NO

Initiate IV NSS
Obtain 12-Lead ECG ^{5,6,7} if **STEMI suspected, notify receiving facility ASAP**
If not using **Viagra-type drugs** ⁸,
Nitroglycerin 0.4 mg SL
(Repeat as needed ^{7,9})

Initiate IV NSS
Obtain 12-Lead ECG ^{5,6,7}

**Proceed to Shock
Protocol # 7005 ^{7,10}**

If pain continues after 3 doses of NTG
and systolic pressure > 100,
Administer First Dose of Opioid
Analgesic (See box at right)

If STEMI,
transport to closest STEMI receiving
center^{6,7} capable of emergency
primary percutaneous coronary
intervention (PPCI) if possible
**Contact Medical
Command ⁷**

Administer Repeat Dose(s)
of Opioid Analgesic
(See box at right)

**OPIOID ANALGESIC OPTIONS
(Choose one)**

fentaNYL up to 1 mcg/kg IV/IO
maximum 100 mcg/dose
may repeat ½ dose every 5 minutes
until maximum of 300 mcg total

OR

Morphine sulfate up to 0.1 mg/kg IV
maximum 10 mg/dose
may repeat dose every 5 minutes
until maximum of 20 mg total

**CHEST PAIN / SUSPECTED ACUTE CORONARY SYNDROME
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Adult patients with symptoms of possible cardiac ischemia. Diabetics, women, and elderly patients may have atypical symptoms without retrosternal chest pain. May include:
1. Retrosternal chest heaviness/pressure/pain
 2. Radiation of pain to arm(s), neck, or jaw
 3. Associated **shortness of breath**, nausea/vomiting, or sweating
 4. Possibly worsened by exertion
 5. Patient over 30 y/o or with known cardiac ischemic disease
 6. Patient with history of recent cocaine/amphetamine/**stimulant drug-use**

Exclusion Criteria:

- A. Chest pain/symptoms, probably not cardiac origin:
1. May include:
 - a. Pleuritic chest pain - worsens with deep breath or bending/turning
 - b. Patient less than 30 y/o

Possible MC Orders:

- A. Diversion to receiving facility capable of emergent primary percutaneous coronary intervention (PPCI).

Notes:

1. Some potentially lethal mimics of Acute Coronary Syndrome (ACS) that must be considered as the patient is assessed and treated include:
 - a. Aortic dissection
 - b. Acute pericarditis
 - c. Acute myocarditis
 - d. Spontaneous pneumothorax
 - e. Pulmonary embolism
 - f. Pneumonia/Lung infection
2. If patient has an implanted defibrillator and is receiving shocks when not in VF/VT, may place a magnet (if available) over the AICD to deactivate it.
3. Administer oxygen by appropriate method and monitor Pulse Oximetry. Place patient in position of comfort. Nasal cannula may be utilized if patient is unable to tolerate a facemask.
4. Preferred method is to chew 4 baby ASA (81 mg each).
5. **12 lead ECG is to be obtained as soon as possible after patient contact, but in no more than 10 minutes. 12-lead ECG ideally should be transmitted to receiving/ command facility ASAP. Otherwise, give copy of all 12-lead ECGs to ED physician ASAP on arrival to facility.**
6. If 12-lead ECG is consistent with ST-elevation MI (STEMI), either:
 - a. Contact medical command ASAP since some patients may benefit from transport to a receiving facility capable of emergent primary percutaneous coronary intervention (PPCI).
 - b. Transport to STEMI-receiving center capable of providing emergency PPCI – see Destination Protocol #170.
7. Early contact with Medical Command is encouraged for patients with chest pain who have continued pain despite 3 doses of NTG, shock, or evidence of STEMI on prehospital 12-lead ECG, since these patients may benefit by direct transport to a receiving facility capable of PPCI.

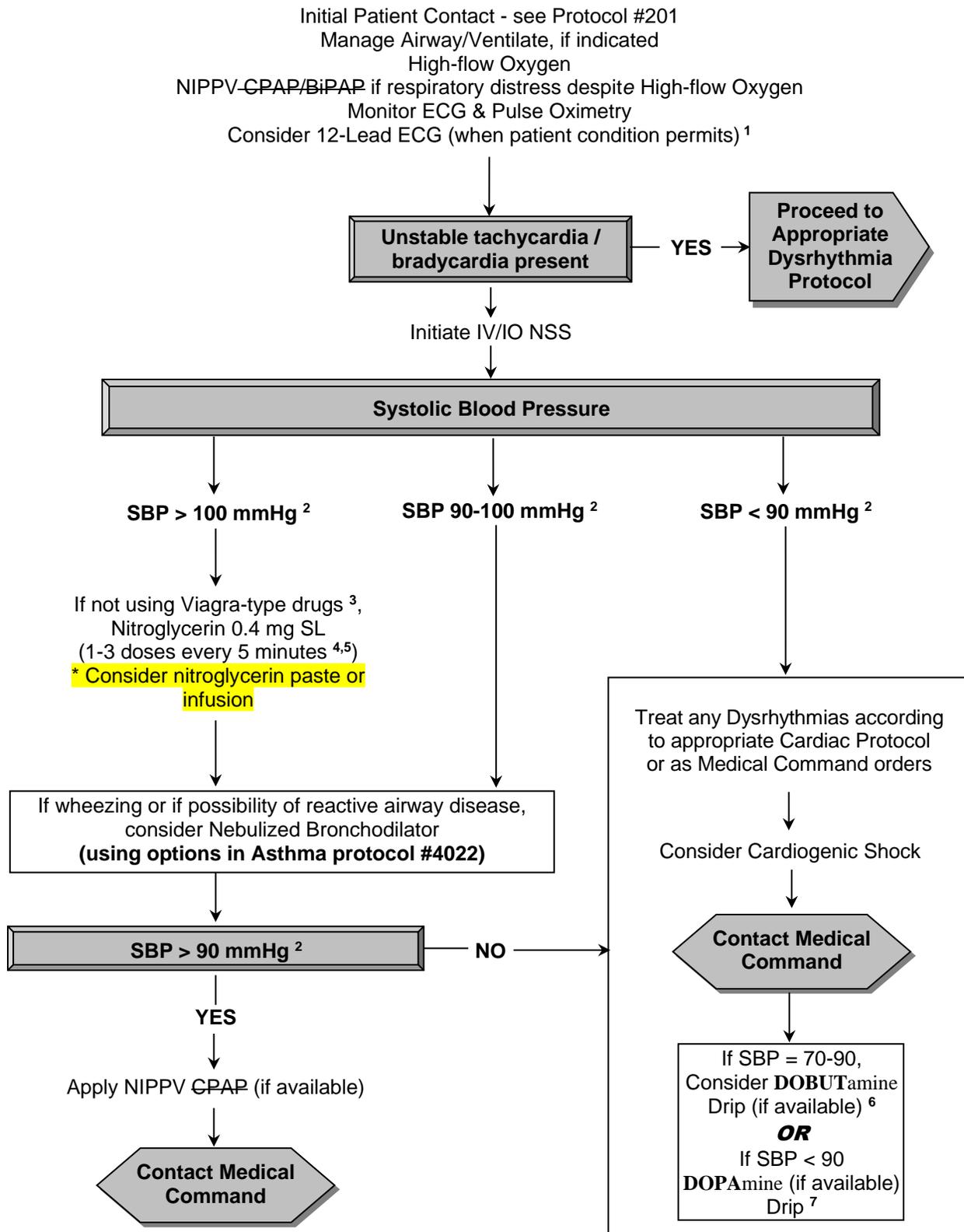
8. **WARNING:** Nitroglycerin may lead to fatal hypotension if given to patients using drugs for erectile dysfunction.
 - a. **DO NOT** administer nitroglycerin (NTG) to a patient has taken sildenafil (Viagra/Revatio) or vardenafil (Levitra) within 24 hours.
 - b. **DO NOT** administer NTG to a patient who has taken tadalafil (Cialis) within the last 48 hours.
 - c. These medications may be used for conditions other than erectile dysfunction (e.g. Revatio is used for pulmonary hypertension).
 9. Use caution in giving NTG to patients with inferior or suspected right ventricular STEMI. If chest pain continues and SBP > 100, may repeat NTG every 5 minutes as needed.
 10. If initial fluid bolus in shock protocol leads to SBP > 100, may return to this protocol and continue with NTG/analgesic medication.
-

Performance Parameters:

- A. All patients should either receive aspirin or the PCR should include documentation of why aspirin was contraindicated.
- B. Review for appropriate transmission of 12-lead ECG when possible. Review for appropriate diversion to facility capable of PCI and/or for appropriate notification of receiving facility when STEMI is identified.
- C. Cardiac rhythm monitored and 12-lead ECGs done (when available) and rhythm strips/12-lead ECGs documented with graphs included in PCR.
- D. Possible benchmark for on scene time of \leq 20 minutes.
- E. Vital signs documented after each use of vasoactive medication (e.g. nitroglycerin or opioid analgesics).

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CONGESTIVE HEART FAILURE STATEWIDE ALS PROTOCOL



**CONGESTIVE HEART FAILURE (CHF)
STATEWIDE ALS PROTOCOL****Criteria:**

- A.** Patients presenting with shortness of breath from pulmonary edema/CHF, as indicated by:
1. Severe dyspnea, tachypnea, bilateral rales, tachycardia, cough with frothy sputum, or orthopnea.
 2. No fever
 3. May be associated with restlessness, agitation, pedal edema, diaphoresis, or pallor.
 4. Patient may have history of diuretic or digitalis use.

Exclusion Criteria:

- A.** Patients presenting with shortness of breath from non-CHF etiologies:
1. Pneumonia: **WARNING** - Patients with SOB from pneumonia may have symptoms similar to those of CHF, but these patients may be harmed by diuretics. Fever may be present in these patients.
 2. COPD exacerbation: These patients may take bronchodilators without a history of diuretic use.
 3. Pneumothorax: NIPPV **CPAP** is contraindicated in these patients.

Possible MC Orders:

- A.** Additional Nitroglycerin
- B.** **DOPA**mine (if available) or **DOBUT**amine (if available) infusion
- C.** Captopril (if available) 25 mg sublingual or enalapril (if available) 0.625 – 1.25 mg IV
- D.** Endotracheal Intubation

Notes:

1. Ideally, transmit 12-lead ECG to medical command physician if possible. If STEMI, transport to emergency PPCI center may benefit patient – see Protocol #170.
2. Relative hypotension in pulmonary edema may indicate poor cardiac function. Aggressive use of diuretics and nitroglycerin may result in extreme hypotension and further reduction of cardiac output. Contact Medical Command to discuss individualizing treatment options in these patients.
3. **WARNING:** Nitroglycerin may lead to fatal hypotension if given to patients using drugs for erectile dysfunction.
 - a. **DO NOT** give nitroglycerin (NTG) to a patient who has taken sildenafil (Viagra/Revatio) or vardenafil (Levitra) within 24 hours.
 - b. **DO NOT** give NTG to a patient who has taken tadalafil (Cialis) within the last 48 hours.
 - c. These medications may be used for conditions other than erectile dysfunction (e.g. Revatio is used for pulmonary hypertension).
4. After initial single tablet/spray of NTG, give nitroglycerin dose based upon blood pressure:
 - a. If patient tolerates sublingual tablets or spray:
 - i. 3 SL tablets or sprays – for SBP > 180
 - ii. 2 SL tablets or sprays – for SBP 140-180
 - iii. 1 SL tablet or spray – for SBP 100-140

- b. For patients who do not tolerate SL NTG (for example those on NIPPV **CPAP**), may use one of the following:
- i. [OPTIONAL] IV/IO nitroglycerin 200 mcg slow IV/IO, if available and approved by the agency medical director. Prepare **as follows in accordance with Agency Medical Director guidance and available concentration.**
 - ~~1. Obtain 250 mg vial of NTG (25 mg/250mL – concentration 100 mcg/mL)~~
 - ~~2. Draw 2 mL of solution from the vial. For safety, a three (3) mL syringe will avoid significant overdose and allow for slow administration. Agencies should consider packaging this smaller syringe together with the NTG vial.~~
 3. Administer 200 mcg (**2 mL**) of NTG IV/IO solution slowly over 2 minutes
 - ii. [OPTIONAL] 1 – 2 inches of topical NTG paste.
- c. When available and with an electronic IV pump, may substitute nitroglycerin IV infusion 5 – 200 mcg / min titrated to SBP>100.
5. NTG may be repeated every 5 minutes but avoid decreasing SBP below 100 or by more than 25% of initial SBP. [**Note:** One NTG repeated every 5 minutes is equivalent to a NTG infusion of 30 mcg/min]
 6. Some recommendations suggest using **DOBUT**amine for mild cardiogenic shock (SBP 70-90) and **DOPA**mine for severe shock (SBP< 70). Mix **DOBUT**amine infusion using regional or agency prescribed concentration, and administer 5-20 mcg/kg/min. Generally, start at 5 mcg/kg/min, and increase every 10 minutes by an additional 5 mcg/kg/min until SBP > 100 mmHg. **DO NOT exceed 20 mcg/kg/min unless ordered by medical command physician.**
 7. Mix **DOPA**mine infusion using regional or agency prescribed concentration, and administer 5-20 mcg/kg/min. Generally, start at 5 mcg/kg/min, and increase every 10 minutes by an additional 5 mcg/kg/min until SBP > 100 mmHg. **DO NOT exceed 20 mcg/kg/min unless ordered by medical command physician.**

Performance Parameters:

- A.** Outcomes follow-up to determine percentage of patients treated with this protocol that ultimately had hospital diagnoses of non-CHF conditions (e.g. pneumonia).
- B.** Blood pressure documented after each dose of vasoactive medication (e.g. nitroglycerin)

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**BRADYCARDIA – ADULT
STATEWIDE ALS PROTOCOL**

Initial Patient Contact - see Protocol # 201

**If patient has severe hypotension or impending cardiac arrest,
begin Pacing IMMEDIATELY.^{1,2,3}**

Maintain Airway/Ventilate, if needed.
Administer Oxygen
Monitor ECG & Pulse Oximetry
Initiate IV/IO NSS
Consider 12-Lead ECG

Signs or symptoms of poor perfusion?
(e.g. acute altered mental status, ongoing chest pain, hypotension, or signs of shock)⁴

NO

YES⁵

**Second-degree AV block
(Type II)
OR
Third-degree AV block**

Atropine 1 mg IV/IO^{6,7}
while preparing Pacer
(May repeat if needed
to maximum of 3 mg) **OR**
Begin Pacing^{3,6,8}
Sedation³
Initial dose, if needed
(see box below)

NO

YES

Consider applying
Pacer pads⁵

Observe/Monitor

If pacing is not effective,
EPINEPHrine⁹ push dose (diluted)
40-20 mcg boluses or infusion

**CONTACT
MEDICAL
COMMAND**

**CONTACT
MEDICAL
COMMAND**

DOPAmine (if available) infusion¹⁰
Repeat additional sedation (see
box below)

Sedation Options³:
(Choose one)
(Titrate to minimum amount necessary)

Midazolam 1-5 mg IV/ IO (0.05 mg/kg) titrated slowly
maximum 5mg/dose
may repeat every 5 minutes
until maximum of 0.1 mg/kg total

OR

diazepam 5-10 mg IV/ IO (0.1 mg/kg) titrated slowly
maximum 10 mg/dose
may repeat every 5 minutes
until maximum 0.3 mg/kg total

OR

LORazepam 1-2 mg IV/ IO (0.1 mg/kg) titrated
maximum 2 mg/dose
may repeat every 5 minutes
until maximum of 4 mg total

**BRADYCARDIA - ADULT
STATEWIDE ALS PROTOCOL**

Criteria:

- A.** Adult patient with heart rate less than 60 50 bpm with associated symptoms poor perfusion (see box)

Exclusion Criteria:

- A.** Patient without pulse - Follow appropriate cardiac arrest protocol.
B. History or evidence of trauma - Follow appropriate trauma protocol

Possible MC Orders:

- A.** Additional doses of sedation or analgesia.
B. **DOPA**mine infusion.
C. Glucagon 3-5 mg IV (0.05 mg/kg) (if available) if beta-blocker or calcium channel blocker overdose is suspected. May be repeated in 10-15 minutes.
D. Calcium Cl 10 mL of 10% solution IV (if available) if calcium channel-blocker overdose or hyperkalemia is suspected.

Notes:

1. When applying transcutaneous pacer for serious bradycardia or impending cardiac arrest, begin rapidly increasing the energy to obtain electrical capture.
2. Application and initiation of transcutaneous pacer should not be delayed while awaiting IV access if patient has severe symptoms.
3. Some patients may not tolerate the pacing stimulus to the skin and chest wall that occurs with transcutaneous pacing. In these cases, consider sedation if SBP > 100. (See box)
4. Consider possible etiologies:
 - a. Hyper/hypokalemia, other metabolic disorders
 - b. Hypothermia
 - c. Hypovolemia (including vomiting/diarrhea)
 - d. Hypoxia
 - e. Toxins/ overdose (e.g. beta-blocker or calcium channel-blocker)
 - f. Tamponade
 - g. Tension pneumothorax
5. Transcutaneous pacemaker electrode pads may be applied to these patients without initiating pacing so that the pacemaker is ready if patient condition deteriorates.
6. For symptomatic high-degree (second-degree or third-degree) AV block, begin pacing without delay.
7. Atropine should be administered by rapid IV push and may be repeated every 3-5 minutes, to a maximum dose of 3 mg. Atropine is ineffective and should be avoided in heart transplant patients.
8. ~~Start pacing at heart rate of 80 and 80 mAmps.~~ When initiating transcutaneous pacing on a patient that is conscious with a perfusing rhythm, set the pacing heart rate at 80 bpm and the pacing energy level should be increased gradually to a level slightly above the minimum energy required to obtain electrical and mechanical capture.
9. **EPINEPH**rine by push dose (dilute boluses) or infusion. Push dose boluses = prepare 10 mcg/mL concentration by adding 1 mL of 0.1 mg/mL concentration **EPINEPH**rine in 9 mL NSS, then administer 1-2 mL 20 mcg every 2 minutes and titrate to SBP target. Infusion = must administer by electronic pump at 0.1-0.5 mcg/kg/min titrated to SBP target.
10. Mix **DOPA**mine (if available) infusion using regional or agency prescribed concentration, and administer 5-20 mcg/kg/min. Generally, start at 5 mcg/kg/min, and increase every 10 minutes by an additional 5 mcg/kg/min until SBP >90 mmHg (or [70 + (age x 2)] in children). **DO NOT exceed 20 mcg/kg/min unless ordered by medical command physician.**

Performance Parameters:

- A.** Document presence or absence of signs of poor perfusion/ shock before and after interventions.
B. Review for appropriate use of immediate pacing before IV or atropine for patients with serious hypoperfusion or impending cardiac arrest.

- C.** Documentation of correct ECG rhythm interpretation and inclusion of rhythm strips and ECGs on PCR.

**BRADYCARDIA – PEDIATRIC
STATEWIDE ALS PROTOCOL**

Initial Patient Contact ¹ – see Protocol #201

Maintain Airway/ Ventilate, if needed ^{2,3}
Administer Oxygen
Monitor ECG & Pulse Oximetry

**Continued Bradycardia
AND
Signs of Cardiorespiratory Compromise?**

NO

Consider contributing factors
Continue ventilation, if needed
Initiate IV/IO NSS, if needed
Consider blood glucose check

**CONTACT
MEDICAL
COMMAND**

YES

Perform chest compressions/CPR
if HR < 60
despite oxygenation and ventilation

Initiate IV/IO NSS
Check blood glucose

EPINEPHrine 0.01 mg/kg IV/IO ⁶
(0.1 mL/kg of 0.1 mg/mL)

Suspected increased vagal tone or primary AV block

NO

EPINEPHrine 0.01 mg/kg
IV/IO
(0.1 mL/kg of 0.1 mg/mL)
Repeat every 3-5 minutes

YES

Atropine 0.02 mg/kg IV/IO ⁷
(NOTE: No minimum dose)
max single dose of 0.5mg
and may repeat once up to a
total of 1mg.
May repeat once
AND/OR
Begin Pacing
(at rate up to 100 bpm)

CONTACT MEDICAL COMMAND

**BRADYCARDIA – PEDIATRIC
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Pediatric patient with heart rate < 60. Bradycardia in children is usually caused by hypoxia and often responds to oxygen and ventilatory support.

Exclusion Criteria:

- A. Patient without pulse - Follow appropriate cardiac arrest protocol.
B. Newborn patient – Follow Neonatal Resuscitation Protocol #7090.
C. History or evidence of trauma - Follow appropriate trauma protocol.
D. Severe hypothermia – Follow Hypothermia Protocol #6081.

Possible MC Orders:

- A. **DOPA**mine or **EPINEPH**rine infusion.
B. Glucagon 0.05 mg/kg IV/IO (if available) if beta-blocker or calcium channel blocker overdose is suspected. May be repeated in 10-15 minutes.
C. Calcium Cl 0.2 mL/kg of 10% solution IV/IO (if available) if calcium channel-blocker overdose or hyperkalemia is suspected.

Notes:

- Consider possible etiologies:
 - Hypovolemia (including vomiting/diarrhea)
 - Hypoxia
 - Hypothermia
 - Hyper/hypokalemia, other metabolic disorders
 - Hypoglycemia
 - Toxins/overdose (e.g. beta-blocker or calcium channel-blocker)
 - Trauma/Tension Pneumothorax - follow appropriate trauma protocol.
- Ventilation with BVM may be as effective as endotracheal intubation in children when transport times are short. If unable to intubate on up to 3 attempts, ventilate with BVM.
- Confirm and document tube placement with absence of gastric sounds and presence of bilateral breath sounds **AND confirmatory device (like electronic waveform capnography ETCO₂ detector).** Follow Confirmation of Airway Placement Protocol #2032
- Serious signs or symptoms include:
 - Poor perfusion - indicated by absent or weak peripheral pulses, increased capillary refill time, skin cool/mottled.
 - Hypotension is **SBP < 70 + (age x 2)** for children 1-10 years old and **BP < 70+ (age x 2)** or if **greater than 10 years old and BP < 90.**
 - Respiratory difficulty (respiratory rate >60/minute) indicated by increased work of breathing (retractions, nasal flaring, grunting), cyanosis, altered level of consciousness (unusual irritability, lethargy, failure to respond to parents), stridor, wheezing.
- When CPR is required, a precise diagnosis of the specific bradyarrhythmia is not important. Perform chest compressions if, despite oxygenation and ventilation, the heart rate is < 60/minute and associated with poor systemic perfusion in infant or child. If severe hypothermia, do not perform chest compressions and follow Hypothermia Protocol #6081.
- When given IV/IO, **EPINEPH**rine may be repeated every 3-5 minutes. **EPINEPH**rine 0.1 mg/kg (0.1 mL /kg of 1 mg/mL concentration) flushed with 5 mL NSS may be administered via endotracheal tube, but IV/IO route is preferred.
- Atropine administration may be repeated once in five minutes. Maximum dose is **0.5** mg per dose. Atropine 0.03 mg/kg flushed with 5 mL NSS may be administered via endotracheal tube, but IV/IO route is preferred.

**NARROW COMPLEX TACHYCARDIA – ADULT
STATEWIDE ALS PROTOCOL**

Initial Patient Contact – see protocol #201

Manage Airway/Ventilate, if needed
Apply Oxygen
Monitor ECG & Pulse Oximetry

**Unstable with serious signs or symptoms¹
Related symptoms uncommon if HR <150**

STABLE

UNSTABLE

IV/IO Access
12-Lead ECG

Regular Narrow QRS Rhythm?

REGULAR²

IRREGULAR⁷

IV/IO Access
Sedation if conscious
(see box below)
DO NOT delay cardioversion
Synchronized Cardioversion
50 - 100 joules^{8,9,10}
If no conversion, repeat at
100, 200, 300, 360 joules⁹
until conversion

Consider Valsalva Maneuver³

Medication (Choose One):
Adenosine 6 mg IV/IO⁴
(if available)
May repeat 12 mg IV
OR
Verapamil 5 mg slow IV/IO
(if available)
OR
dil**TIAZem** 0.25 mg/kg slow IV/IO
(if available)

Contact Medical Command

If symptomatic from atrial fibrillation/flutter with tachycardia,
dil**TIAZem** **15-20 mg**
0.25 mg/kg IV/IO slowly⁵
(if available)
(After 15 min., may repeat **20-25 mg**
0.35 mg/kg IV/IO)
OR
Verapamil 5 mg IV/IO^{5,6}
(if available)

Contact Medical Command

Consider treatments
(adenosine or calcium channel blocker
under stable regular QRS pathway

Contact Medical Command

Sedation Options:
(Choose one) (Titrate to minimum amount necessary)
Midazolam 1-5 mg IV/IO (0.05 mg/kg) titrated slowly
maximum 5 mg/dose, may repeat every 5 minutes until maximum 0.1 mg/kg total
OR
diazepam 5-10 mg IV/IO (0.1 mg/kg) titrated slowly
maximum 10 mg/dose, may repeat every 5 minutes until maximum 0.3 mg/kg total
OR
LORazepam 1-2 mg IV/IO (0.1 mg/kg) titrated slowly
maximum 2 mg/dose, may repeat every 5 minutes until maximum of 4 mg total

**NARROW COMPLEX TACHYCARDIA – ADULT
STATEWIDE ALS PROTOCOL**

Criteria:

- A. Symptomatic adult patients with heart rates >100 bpm and narrow QRS complex (< 0.12 sec). It is uncommon for serious symptoms to be related to tachycardia if heart rate is <150 bpm.

Exclusion Criteria:

- A. Sinus tachycardia - treat underlying cause rather than rhythm. Causes may include:
 - 1. Trauma - Follow appropriate trauma protocol
 - 2. Fever
 - 3. Hypovolemia/ Shock
- B. Wide-complex tachycardias should not be treated with this protocol (SVT with wide QRS complex may be due to Wolf-Parkinson-White, and the use of calcium channel-blockers in these patients can lead to cardiac arrest.)

Possible MC Orders:

- A. Synchronized cardioversion

Notes:

1. Many patients who present with SVT have evidence of cardiovascular dysfunction (low blood pressure, chest pain, congestive heart failure, altered level of consciousness). Some of these patients are unstable (such as shock, pulmonary edema, decreased level of consciousness) and require immediate synchronized cardioversion. The rest who have mild hypotension, mild shortness of breath/scattered rales, chest discomfort and a GCS > 13 may be treated with medications. If the patient develops signs/ symptoms of unstable SVT at any time during treatment, proceed immediately to the cardioversion column. The following chart illustrates the continuum from borderline to critically unstable.

<u>Borderline</u>	<u>Unstable</u>
Low BP	Shock
SOB, Scattered Rales	Pulmonary Edema
Mild chest discomfort	Severe chest discomfort
Alert & oriented	Decreased level of consciousness
GCS 14-15	GCS ≤ 13

2. Regular narrow complex supraventricular tachycardias (SVTs) include reentry AV nodal tachycardia and atrial tachycardia. Atrial flutter with 2:1 conduction (seen with a regular rhythm and monitor calculated rate 140-160). may be difficult to distinguish from other forms of SVT. Adenosine is not indicated if the ECG is determined to be atrial flutter or fibrillation. If atrial flutter is identified, proceed to treatment of irregular narrow complex tachycardia. If sinus tachycardia is noted, treat the underlying cause with other appropriate protocol. Fast irregular rhythms can appear regular- measure R-R intervals to be sure.
3. Carotid massage is no longer an acceptable vagal technique to treat tachycardia.
4. Adenosine must be given by rapid IV/IO push (over 1-3 seconds) by immediate bolus of 20 ml NSS. Adenosine success may be enhanced by administration through an antecubital IV with the arm elevated above the level of the heart during injection.
5. **Do NOT give diltiazem or verapamil if wide complex QRS or if SBP < 100.** Calcium channel blocker medications may not be the best treatment for patients with impaired ventricular function and medical command should assist with this decision.
6. ~~May substitute verapamil 5 mg IV/IO slowly over 3-5 minutes.~~ May repeat verapamil once at 5-10 mg dose after 15 minutes.
7. Irregular narrow complex tachycardias include atrial fibrillation, atrial flutter with variable conduction, or multifocal atrial tachycardia (MAT). **DO NOT** treat MAT with medications.
8. ~~Begin with 100 joules if using a monophasic defibrillator or if ECG rhythm is atrial fibrillation.~~
9. ~~If using a biphasic defibrillator, initial and subsequent countershock energy doses should be determined by agency medical director.~~
10. Unstable patients with known chronic atrial fibrillation may be refractory to cardioversion. Consider early Medical Command contact and rapid transport. Rates <130 beats per minute are rarely the cause of instability; assess patient and resuscitate according to inciting cause of tachycardia.

Performance parameters

- A. Review for correct documentation of rhythm and for inclusion of rhythm strip in PCR
- B. Review for documentation of vital signs and rhythm after each medication or cardioversion.

**NARROW COMPLEX TACHYCARDIA – PEDIATRIC
STATEWIDE ALS PROTOCOL**

Initial Patient Contact – see protocol #201

Manage Airway/ Ventilate, if needed
Apply Oxygen
Monitor ECG & Pulse Oximetry
Consider 12-Lead ECG, if patient stable

<p style="text-align: center;"><u>Probable SVT</u></p> <ul style="list-style-type: none"> • History of abrupt rate changes • P waves absent/abnormal • HR not variable • Infants: rate usually ≥ 220 bpm • Children: rate usually ≥ 180 bpm 	OR	<p style="text-align: center;"><u>Probable Sinus Tachycardia</u></p> <ul style="list-style-type: none"> • Known cause ⁵ • P waves present/normal • Constant P-R; variable R-R • Infants: rate usually < 220 bpm • Children: rate usually < 180 bpm
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Probable SVT
Unstable with signs of Poor Perfusion ¹

Probable Sinus Tachycardia

STABLE

UNSTABLE ¹

**Assess for cause of
sinus tachycardia ⁵**

Consider vagal
maneuvers ²
Initiate IV/IO NSS

Initiate IV/IO NSS
Sedation before cardioversion
if conscious (see box at right)

DO NOT delay cardioversion ⁴

If IV/IO readily available ⁴,
Adenosine 0.1 mg/kg IV/IO ³
Maximum 6 mg
(if available)
May repeat with 0.2 mg/kg IV/IO ³
Maximum 12 mg

If HR >180, consider
Synchronized Cardioversion
0.5 - 1 joules/kg
If no conversion, repeat
at 2 joules/kg.

**Follow other
appropriate protocol**

Sedation Options:
(Choose one)
**(Titrate to minimum amount
necessary)**

Midazolam 0.05 mg/kg IV/IO
ped max. 2 mg/dose, titrated

OR

diazepam 0.1 mg/kg IV/IO
ped max. 5 mg/dose, titrated

OR

LORazepam 0.1 mg/kg IV/IO
max 2 mg/dose, titrated

Adenosine 0.1 mg/kg IV/IO ³
Maximum 6 mg
(if available)
May repeat with 0.2 mg/kg IV/IO ³
Maximum 12 mg

Contact Medical Command

**NARROW COMPLEX TACHYCARDIA – PEDIATRIC
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Pediatric (preadolescent ≤ 14 years of age) patient presenting with narrow QRS complex (≤ 0.08 sec) and symptomatic heart rates greater than normal for age.

Exclusion Criteria:

- A. Tachycardia in trauma patients (see appropriate trauma protocol)
- B. Tachycardia due to shock – Follow Shock Protocol #7005.

Possible MC Orders:

- A. Amiodarone (if available) 5 mg/kg IV/IO infused over 20-60 minutes.
- B. Procainamide (if available) 15 mg/kg IV/IO infused over 30-60 minutes. Avoid administering both amiodarone and procainamide.
- C. Additional synchronized cardioversions.

Notes:

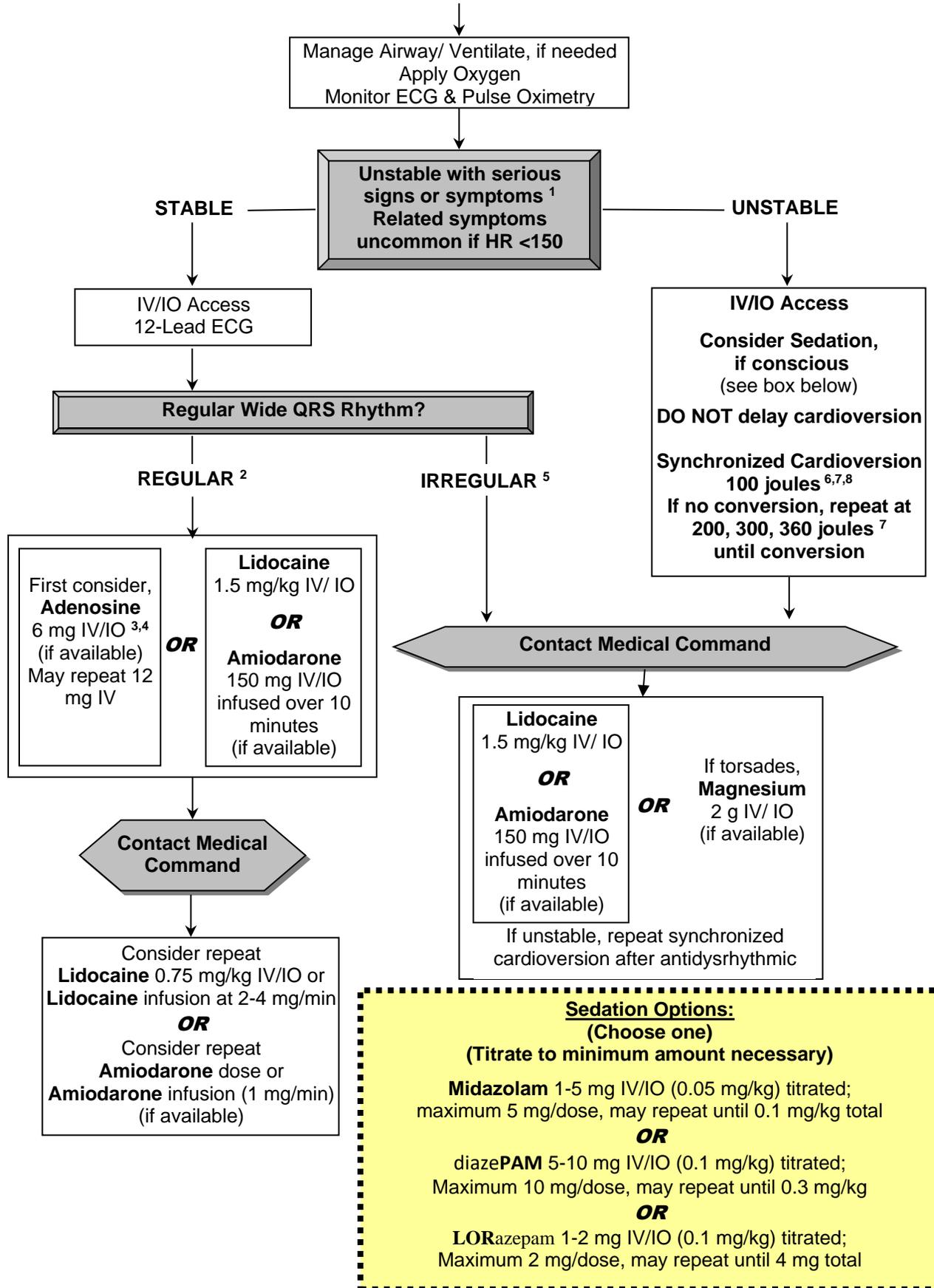
1. Poor perfusion is suggested by central cyanosis, tachypnea, altered level of consciousness, weak or absent peripheral pulses, or hypotension for age [SBP $< 70 + (2 \times \text{age})$]; for children 1-10 years old and BP $< 70 + (\text{age} \times 2)$ or if greater than 10 years old and BP < 90 .
2. Carotid sinus massage should not be attempted. Appropriate vagal maneuvers include:
 - a. Infants and young children: Cover entire face with large bag of ice without occluding the airway.
 - b. Older children: Valsalva (blow through obstructed straw).
3. Adenosine must be given by rapid IV/IO push (over 1-3 seconds) by immediate bolus of 5 -10 mL NSS. Adenosine success may be enhanced by administration through an antecubital IV with the arm elevated above the level of the heart during injection.
4. In unstable patients, do not delay cardioversion for administration of sedation or trial of adenosine. In borderline unstable patients, adenosine may be tried, and conscious patients should be sedated before cardioversion.
5. Possible causes of sinus tachycardia include:
 - a. Fever
 - b. Shock
 - c. Hypovolemia (e.g. vomiting/ diarrhea, blood loss)
 - d. Hypoxia
 - e. Abnormal electrolytes
 - f. Drug ingestions
 - g. Pneumothorax
 - h. Cardiac tamponade

Performance Parameters:

- A. Review for documentation of vital signs and rhythm after each medication or cardioversion.
- B. Review for correct documentation of rhythm and for inclusion of rhythm strip in PCR

**WIDE COMPLEX TACHYCARDIA – ADULT
STATEWIDE ALS PROTOCOL**

Initial Patient Contact – see protocol #201



**WIDE COMPLEX TACHYCARDIA – ADULT
STATEWIDE ALS PROTOCOL**

Criteria:

- A. Symptomatic adult patients with heart rates >100 bpm and wide QRS complex (≥ 0.12 sec). It is uncommon for serious symptoms to be related to tachycardia if heart rate is <150 bpm.

Exclusion Criteria:

- A. Sinus tachycardia with aberrancy - treat underlying cause rather than rhythm. Causes may include:
 - 1. Trauma- Follow appropriate trauma protocol
 - 2. Fever
 - 3. Hypovolemia/ Shock – Follow Shock Protocol #7005.
- B. PEA – Follow PEA Protocol #3041A.

Possible MC Orders:

- A. Synchronized cardioversion
- B. Procainamide (if available), 10 mg/kg administered IV/IO slowly over 20 minutes.
- C. Amiodarone (if available) 150 mg IV/IO infused over 10 minutes. May be repeated as needed up to 2.2 gm in 24 hours.
- D. Consider sodium bicarbonate if suspected hyperkalemia or overdose.
- E. Consider calcium chloride, 10 ml of 10% solution IV (if available) if suspected renal failure/ dialysis patient or overdose of calcium channel blocker.
- F. Consider glucagon, 3-10 mg (0.05 mg/kg) IV (if available) if suspected calcium channel blocker overdose that is unresponsive to calcium chloride.

Notes:

- 1. Many patients who present with wide complex tachycardia have evidence of cardiovascular dysfunction (low blood pressure, chest pain, congestive heart failure, altered level of consciousness). Some of these patients are unstable (such as shock, pulmonary edema, decreased level of consciousness) and require immediate synchronized cardioversion. The rest who have mild hypotension, mild shortness of breath/scattered rales, chest discomfort and a GCS >13 may be treated with medications. If the patient develops unstable signs/symptoms at any time during treatment, proceed immediately to the cardioversion column. The following chart illustrates the continuum from borderline to critically unstable.

<u>Borderline</u>	<u>Unstable</u>
Low BP	Shock
SOB, Scattered Rales	Pulmonary Edema
Mild chest discomfort	Severe chest discomfort
Alert & oriented	Decreased level of consciousness
GCS 14-15	GCS ≤ 13

- 2. Regular wide complex tachycardias include ventricular tachycardia and SVT with aberrancy. If the patient has a previous history of coronary artery disease, then VT is most likely. If SVT with aberrancy is suspected, adenosine (if available) may be tried. If sinus tachycardia is noted, treat the underlying cause with other appropriate protocol.
- 3. Vagal maneuvers may be considered. Avoid carotid massage if patient is older than 50 y/o or has history of hypertension.
- 4. Adenosine must be given by rapid IV push (over 1-3 seconds) by immediate bolus of 20 mL NSS. Adenosine success may be enhanced by administration through an antecubital IV with the arm elevated above the level of the heart during injection.
- 5. Irregular wide complex tachycardias include atrial fibrillation, pre-excitation atrial fibrillation, polymorphic VT and torsades de pointes.
- 6. ~~Begin with 100 joules if using a monophasic defibrillator or if ECG rhythm is atrial fibrillation.~~
- 7. ~~If using a biphasic defibrillator, initial and subsequent countershock energy doses should be determined by agency medical director.~~
- 8. Unstable patients with known chronic atrial fibrillation may be refractory to cardioversion. Consider early Medical Command contact and rapid transport.

Performance Parameters:

- A. Review for correct documentation of rhythm and for inclusion of rhythm strip in PCR.
- B. Review for documentation of vital signs and rhythm after each medication or cardioversion.

**WIDE COMPLEX TACHYCARDIA – PEDIATRIC
STATEWIDE ALS PROTOCOL**

Initial Patient Contact – see protocol #201

Manage Airway/ Ventilate, if needed
Apply Oxygen
Monitor ECG & Pulse Oximetry
Consider 12-Lead ECG, if patient stable

<p>Probable VT/ SVT</p> <ul style="list-style-type: none"> • History of abrupt rate changes • P waves absent/abnormal • RR not variable 	OR	<p>Probable Sinus Tachycardia</p> <ul style="list-style-type: none"> • Known cause ⁶ • P waves present/normal • Constant P-R; variable R-R • Infants: rate usa. < 220 bpm • Children: rate usa. < 180 bpm
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**Probable VT/ SVT
Unstable with signs of Poor Perfusion ¹**

Probable Sinus Tachycardia

STABLE

UNSTABLE ¹

Assess for cause of sinus tachycardia ⁶

Consider vagal maneuvers ²
Initiate IV/IO NSS

Contact Medical Command
Initiate IV/IO NSS

DO NOT delay cardioversion ⁴
If IV/ IO readily available ⁴,
Adenosine 0.1 mg/kg IV/IO ³
Maximum 6 mg (if available)
May repeat with 0.2 mg/kg IV/IO ³
Maximum 12 mg

Follow other appropriate protocol

Adenosine 0.1 mg/kg IV/IO ³
Maximum 6 mg (if available)
May repeat with 0.2 mg/kg IV/IO ³
Maximum 12 mg

Contact Medical Command

Lidocaine 1 mg/kg IV/IO
OR
Amiodarone 5 mg/kg IV/IO
infused over 20-60 minutes ⁵

Sedation before cardioversion
if conscious (see box at right)

Synchronized Cardioversion
0.5 - 1 joules/kg
If no conversion, repeat at
2 joules/kg.

Sedation Options:
(Choose one)
(Titrate to minimum amount necessary)

Midazolam 0.05 mg/kg
IV/IO titrated;
peds max 2 mg/dose
OR
diazepam 0.1 mg/kg
IV/IO titrated;
peds max 5 mg/dose
OR
LORazepam 0.1 mg/kg
IV/IO titrated;
Max 2 mg/dose

**WIDE COMPLEX TACHYCARDIA – PEDIATRIC
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Pediatric (preadolescent ≤ 14 years of age) patient presenting with wide QRS complex (> 0.08 sec) and symptomatic heart rates greater than normal for age

Exclusion Criteria:

- A. Tachycardia in trauma patients (see appropriate trauma protocol)
- B. Tachycardia due to shock – Follow Shock Protocol #7005.
- C. PEA - Follow PEA Protocol # 3041P.

Possible MC Orders:

- A. Amiodarone (if available) 5 mg/kg IV/IO infused over 20-60 minutes.
- B. Lidocaine 1 mg/kg IV/IO
- C. Procainamide (if available) 15 mg/kg IV/IO infused over 30-60 minutes. Avoid administering both amiodarone and procainamide.
- D. Additional synchronized cardioversions.
- E. Consider sodium bicarbonate, 1-2 mEq/kg IV/IO, if suspected hyperkalemia or overdose on tricyclic antidepressant or cocaine.
- F. Consider calcium chloride, 0.2 mL/kg of 10% solution IV (if available) and glucagon, 0.1 mg/kg IV/IO (if available) if suspected overdose of calcium channel blocker.
- G. **WARNING:** Calcium channel blocker medications should not be given for wide QRS rhythms.

Notes:

1. Poor perfusion is suggested by central cyanosis, tachypnea, altered level of consciousness, weak or absent peripheral pulses, or hypotension for age [SBP $< 70 + (2 \times \text{age})$]. for children 1-10 years old and BP $< 70 + (\text{age} \times 2)$ or if greater than 10 years old and BP < 90 .
2. Carotid sinus massage should **not** be attempted. Appropriate vagal maneuvers include:
 - a. Infants and young children: Cover entire face with large bag of ice without occluding the airway.
 - b. Older children: Valsalva (blow through obstructed straw)
3. Adenosine must be given by rapid IV push (over 1-3 seconds) by immediate bolus of 5 -10 mL NSS. Adenosine success may be enhanced by administration through an antecubital IV with the arm elevated above the level of the heart during injection.
4. In unstable patients, do not delay cardioversion for administration of sedation or trial of adenosine. In borderline unstable patients, adenosine may be tried and conscious patients should be sedated before cardioversion.
5. May substitute lidocaine, 1 mg/kg IV/IO, repeated every 5 minutes to total of 3 mg/kg.
6. Possible causes of sinus tachycardia include:
 - a. Fever
 - b. Shock
 - c. Hypovolemia (e.g. vomiting/ diarrhea, blood loss)
 - d. Hypoxia
 - e. Abnormal electrolytes
 - f. Drug ingestions
 - g. Pneumothorax
 - h. Cardiac tamponade

Performance Parameters:

- A. Review for documentation of vital signs and rhythm after each medication or cardioversion.
- B. Review for correct documentation of rhythm and for inclusion of rhythm strip in PCR.

VENTRICULAR ASSIST DEVICE (VAD) MANAGEMENT STATEWIDE ALS PROTOCOL

Criteria:

- A. All patients with a **HeartMate II, HeartMate 3, or HeartWare** Ventricular Assist Device
1. Description of VAD
 - a. A VAD is a mechanical heart pump that is surgically implanted in patients with severe heart failure in order to aid in the circulation of oxygen-rich blood to the body.
 - b. A VAD can be used as a bridge to heart transplant and/or as destination therapy for patients who do not qualify for heart transplant. These designations can be fluid; patients who have a VAD placed as destination therapy can later qualify for transplant.
 - c. VADs are designed to support the failing left ventricle (LVAD). Rarely VADs are placed in the right ventricle to create an RVAD or bi-VAD configuration.
 - d. The VAD is implanted inside the thoracic cavity. Cannulation involves attachment of a tube (inflow cannula) to the left ventricle that diverts cardiac circulation to a small pump. An outflow conduit takes blood from the pump to the aorta, above the aortic valve. This alters the normal physiological blood flow pathway, as blood typically does not travel through the aortic valve, and in most patients the aortic valve remains closed.
 - e. The VAD connects to a small computer (system controller) which powers the pump via an electrical cord referred to as a driveline, that generally exits the body in the abdomen. The controller is powered via batteries and/or power supply directly from the wall.
 - f. Current generation VADs are continuous flow, meaning blood is constantly circulated at a set rate through the body. This alters normal pulsatile physiology due to the pathway of blood flow, bypassing of the aortic valve, resulting in notable feature of reduced or absent pulse pressure. As a result there are implications to clinical exam, inability to palpate peripheral pulses, inability to capture accurate pulse oximetry, inability to measure blood pressure utilizing standard automated cuffs.

Exclusion Criteria:

- A. None

Treatment:**A. All patients:**

1. Initial assessment of patient with VAD remains the same as other patients. Many patients call 911 for conditions that are not related to the VAD (altered mental status, trauma, infection or other medical conditions. Initial Patient Contact – see Protocol # 201.
 - a. Assess pulse
 - 1) Many VAD patients will not have a palpable pulse. Auscultate the VAD over the area of the heart to confirm it is still working – a continuous humming sound indicates the VAD is running.
 - b. Manage critically ill patients using usual resuscitation protocols when indicated – For example see #331A, 3031A, and 3000A ^{1,2,3}
 - 1) If patient is pulseless and apneic, CPR should be initiated. Chest compressions are generally indicated as part of CPR in patients with VADs.
 - a) Defibrillation can be done on a patient with a VAD. Consider anterior-posterior pad placement to avoid placing the defibrillation pads directly over the VAD device.

- b) Consult the family/ caregiver, VAD information card, and/or VAD coordinator for further guidance.
 - c) If doing CPR, contact Medical command for advice on chest compressions or other treatments in patients with a VAD.
- c. Assess blood pressure
- 1) Blood pressure can be measured by using a doppler and blood pressure cuff, or secondarily by automated non-invasive BP (NIBP) measurement.
 - a) The first sound noted via doppler is the Doppler blood pressure. A Doppler blood pressure >60 mmHg generally indicates appropriate perfusion in the patient with a VAD. The Doppler blood pressure should be used in conjunction with other signs of perfusion (skin color, mental status, and capillary refill).
 - b) If a doppler is not available, an automated NIBP should be obtained to determine the mean arterial pressure (MAP).
 2. Apply oxygen (High concentration if patient also has difficulty breathing or hypoperfusion)
 3. Monitor pulse oximetry – See Pulse Oximetry Protocol #226 – and titrate oxygen to the lowest concentration that will maintain SpO₂ between 95 and 99%.
 - a. Pulse oximetry may be unreliable due to lack of pulsatile blood flow. Signs of hypoxia, such as cyanosis and dyspnea, should be used to determine the need for oxygen therapy.
 4. Assess the patient's VAD device/ equipment
 - a. Verify that the driveline exiting the patient is connected to the controller.
 - b. Verify that the controller is powered by adequate power supply (batteries or wall power).
 - c. For any VAD alarms or concerns, consult the patient's care giver. If there is no caregiver, contact the VAD emergency phone number for the patient's device. Hospitals that implant VADs are required to provide 24-hour support to VAD patients.
 - d. Inspect the area where the driveline exits the abdomen for signs of infection. Do not remove existing dressing.
 - e. Inspect the VAD to ensure all cables are connected and power is being supplied to the device.
 - 1) When changing the batteries on the VAD, be sure to only replace one battery at a time. You should NEVER remove both batteries simultaneously.
 5. If hypotension/ hypoperfusion:
 - a. Standard resuscitation medications and dosing can be used in the VAD patient; however, the Doppler blood pressure should be greater than 90 mmHg. Consider 250 mL NSS prior to or in addition to antidysrhythmic medications.
 - b. Cardioversion and pacing can be done on a patient with VAD. Consider anterior-posterior pad placement to avoid placing an electrode pad over the device.
 - c. VADs are preload dependent. Patients who present with hypoperfusion should be treated for hypovolemic and cardiogenic shock as appropriate. Consider 250 mL NSS bolus and reassessment prior to vasopressor use.
 6. The patient/ family/ caregivers are generally trained in the function and use of the VAD, especially the controller. Seek their assistance early in the patient contact.
 - a. Consult the patient/ family/ caregiver to determine the type of VAD.
 - b. Consider calling the VAD coordinator emergency phone number for device specific management, in consultation with Medical Command, for specific questions.

7. Transport with all equipment necessary for function of the VAD, including chargers, extra batteries, and back-up controller.
8. Monitor vital signs and reassess.
9. Contact medical command if concerned that VAD issue is reason for patient's illness or for advice regarding the VAD.

Possible Medical Command Orders:

- A. Medical command may order transport to the facility that placed the VAD or to another facility that places VADs, if the patient is deemed to be stable enough for the trip.
-

Notes:**Performance Parameters:**

- A. Review for appropriate consultation with medical command to determine destination. Ideally VAD patients are taken to the facility that placed the VAD or to a closer tertiary care facility that also places VADs.

Additional Resources:

<https://www.mylvad.com/medical-professionals/resource-library/ems-field-guides>

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MULTISYSTEM TRAUMA OR TRAUMATIC SHOCK STATEWIDE ALS PROTOCOL

Initial Patient Contact – See Protocol #201
Stabilize C-spine during assessment
Open airway using modified jaw thrust, if indicated.
Consider Air Ambulance – per Trauma Triage Protocol #180
Consider Rapid Extrication ¹

Manage Airway/Administer Oxygen/Ventilate, if needed ^{2,3,4,5,6}
If tension pneumothorax suspected, Needle Decompression ⁷
Control External Bleeding
Restrict spinal motion, if indicated ⁸

If head injury, also follow TBI protocol #6011

- Avoid hypoxia, hypotension, and hyperventilation
- Follow minimum oxygen and IV fluid therapies from TBI protocol

The Following Treatments Should Not Delay Transport:

- Initiate IV/IO NSS
 - Initiate 1-2 large-bore IVs or single IO, if possible
 - If hypotensive, titrate NSS bolus as described ⁹
- Monitor ECG/Pulse Oximetry
- Notify Trauma Center/receiving facility of ETA/category ASAP

Injury Specific Treatments:

- Follow other appropriate protocols ¹⁰
- Immobilize Suspected Fractures
 - Traction splint preferred for isolated femur fracture
 - Consider pelvic binder (if available) for suspected pelvis fracture with hypotension ¹¹
- Occlude sucking chest wounds ¹²
- Cover eviscerations ¹³

BEGIN TRANSPORT TO TRAUMA CENTER ASAP, if possible
(See Trauma Destination Protocol #180)

CONTACT MEDICAL COMMAND

If hypotension persists **AND** due to hypovolemic shock: Repeat IV/IO NSS fluid bolus ⁹ **OR** If hypotension persists **AND** due to spinal cord injury:
Norepinephrine¹⁵ (if available)
EPINEPHrine¹⁶
DOPAmine Drip ¹⁴

MULTISYSTEM TRAUMA OR TRAUMATIC SHOCK STATEWIDE ALS PROTOCOL

Criteria:

- A. Patient that meets Category 1 or Category 2 trauma triage criteria related to traumatic injury.
- B. Patients with symptoms of spinal cord injury including extremity weakness, numbness or sensory loss.

Exclusion Criteria:

- A. Cardiac Arrest related to trauma – Follow ALS Cardiac Arrest – Traumatic Protocol #3032.
- B. Hypotension not related to trauma – See appropriate Shock or Cardiac protocol.
- C. Patient that meets Category 3 trauma triage criteria – See appropriate injury-specific protocol.

Possible Medical Command Orders:

- A. Additional NSS for hypotension.
- B. Norepinephrine¹⁵, EPINEPHrine¹⁶ infusion, or DOPAmine¹⁴ infusion for neurogenic shock
- C. Assistance with destination decisions (Trauma Center v. non-Trauma Center, Pediatric Trauma Center v. Adult Trauma Center, etc.)

Notes:

1. Rapid extrication may be appropriate in any unsafe environment: danger of explosion (including potential secondary explosion at a terrorism incident); rapidly rising water; danger of structural collapse; hostile environments (e.g. riots); patient position prevents access to another patient that meets criteria for rapid extrication; shock; inability to establish an airway, adequately ventilate a patient, or control bleeding in entrapped position; or cardiac arrest.
2. Indications for ventilatory support include GCS < 8, inadequate respiratory effort, and airway not patent.
3. Follow: Airway Management Protocol 4001 or option 4002. When possible, the patient should be intubated by orotracheal route using manual inline stabilization of the cervical spine. When patient's reflexes and muscle tone do not permit orotracheal intubation, consider BVM ventilation if adequate or nasotracheal intubation. Ventilation with BVM may be as effective as endotracheal intubation in children when transport times are short.
4. Confirm and document tube placement with absence of gastric sounds and presence of bilateral breath sounds AND confirmatory device electronic waveform capnography (~~like wave-form ETCO₂ detector~~). Follow Confirmation of Airway Placement Protocol #2032.
5. If unable to intubate patient on up to 3 attempts, consider the use alternative/rescue of supraglottic airway device.
6. If intubation/ventilation is needed, **AVOID OVERZEALOUS HYPERVENTILATION.**
 - a. For all other trauma patients requiring ventilation, ventilate initially at the following rate, ideally with a timing device:
 - 1) 10 bpm for adults
 - 2) 20 bpm for children > 2 and ≤ 14 y/o
 - 3) 25 bpm for infant < 2 y/o
 - b. Then monitor capnography and adjust ventilation rate to ETCO₂ target of 40 mm (range 35-45).

7. Perform needle chest decompression if indicated by hypotension *AND* diminished breath sounds.
8. Follow BLS Spine Care Protocol #261.
9. IV/IO NSS fluid resuscitation should be guided by the following:
 - a. Adults: Administer NSS at wide open rate only until desired blood pressure is attained:
 - 1) When bleeding has not been controlled, titrate NSS to permit moderate hypotension (SBP between 70-90) unless severe head injury also present.
 - 2) When bleeding has been controlled or if severe head injury, titrate NSS to achieve SBP >90.
 - 3) Maximum NSS dose is 1000 mL before contacting Medical Command.
 - b. Pediatrics (preadolescent or age ≤ 14 y/o):
 - 1) When bleeding has not been controlled, titrate NSS to permit moderate hypotension (SBP between $[50 + 2(\text{age})] - [70 + 2(\text{age})]$), unless severe head injury also present.
 - 2) When bleeding has been controlled or if severe head injury, titrate NSS to achieve SBP > $70 + 2(\text{age})$.
 - 3) Maximum NSS dose is 40 mL/kg before contacting Medical Command.
10. Other injury-specific appropriate protocols may include amputation, extremity trauma, burn, impaled object, or head injury.
11. Pelvic binder splinting devices (circumferential commercial devices that compress the pelvis) are appropriate splinting devices.
12. If sucking chest wound, cover wound with occlusive dressing sealed on 3 sides. Release dressing if worsened shortness of breath or signs of tension pneumothorax.
13. If intestinal evisceration, cover intestines with a sterile dressing moistened with sterile saline or water; cover the area with an occlusive material (aluminum foil or plastic wrap). Cover the area with a towel or blanket to keep it warm. Transport with knees slightly flexed if possible.
 - a. **DO NOT PUSH VISCERA BACK INTO ABDOMEN**, unless prolonged extrication. In wilderness/delayed transport situations with prolonged evacuation time (at least several hours), examine the bowel for visible perforation or fecal odor. If no perforation is suspected, irrigate the eviscerated intestine with saline and gently try to replace in abdomen.
14. Mix **DOPA**mine infusion using regional or agency prescribed concentration, and administer 5-20 mcg/kg/min. Generally, start at 5 mcg/kg/min, and increase every 10 minutes by an additional 5 mcg/kg/min until SBP > 100 mmHg. **DO NOT exceed 20 mcg/kg/min unless ordered by medical command physician.**
15. Norepinephrine 0.05–0.5 mcg/kg/minute
 - a. 1. Preference in both neurogenic and infectious (sepsis) causes of distributive shock. Titrate by 0.05mcg/kg/min every 5 minutes to a MAP of 65mmHg.
 - b. If utilizing Norepinephrine, an infusion pump is necessary.
16. **EPINEPH**rine infusion Epinephrine 0.05-1.0 micrograms/kg/min IV/IO (~~preferred agent~~). Titrate by 0.05 micrograms/kg/min every 5-10 min to achieve goal blood pressure. If goal is not reached at 0.5 micrograms/kg/min. This is prepared by adding 1 mg to 250 mL NSS.
 - a. **EPINEPH**rine 0.02mg of 0.01mg/mL EPINEPHrine slow IV push (prepared by adding 0.1mg (1mL) of 0.1mg/mL EPINEPHrine to 9mL of saline/flush).

Performance Parameters:

- A. Documentation of reason for any on scene time interval over 10 minutes.
- B. Percentage of calls, without entrapment, with on scene time interval \leq 10 minutes. Consider benchmark for on scene time for non-entrapped patients \leq 10 minutes and \leq 20 minutes for entrapped trauma patients and Category 2 trauma patients.
- C. Documentation of applicable trauma triage criteria.
- D. Appropriate destination per Trauma Patient Destination Protocol #180.
- E. Appropriate utilization of air medical transport per Trauma Patient Destination Protocol #180.

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**MUSCULOSKELETAL TRAUMA
STATEWIDE ALS PROTOCOL**

Initial Patient Contact – See Protocol #201

Splint suspected fractures as appropriate:

- Traction splinting is preferred for isolated femur fractures ¹
- Straighten severely angulated fractures if distal extremity has signs of decreased perfusion.

**Assess pain on 1-10 scale
Assess Neurovascular Status distal to injury**

**Mild to moderate pain AND
Oral medication not contraindicated**

- Place in position of comfort
- Provide verbal reassurance

Administer Oral Analgesic Medication:

- **Acetaminophen**, ² if available, 650 mg orally
Peds 15 mg/kg (max 650 mg)
OR
- **Ibuprofen**, if available, 10mg/kg max 600 mg orally ³
OR
- **Aspirin** 324-975 650 mg orally (adult > 14 y/o only)

WARNING: Do not administer these medications if patient had medication recently (within 4 hours for acetaminophen/aspirin, within 6 hours for NSAID).

Peds
< 2 y/o

Moderate/severe pain

- Place in position of comfort
- Provide verbal reassurance
- Initiate IV/IO NSS ⁴
- If nausea, consider ondansetron, if available (see protocol 7010)
- **Administer Analgesic Medication ⁵
(see box below)**
- Monitor Pulse Oximetry (if opioid or nitrous oxide given)

**CONTACT MEDICAL
COMMAND**

ANALGESIC MEDICATION OPTIONS (Choose one)

fentaNYL 50-100 mcg IV/IO/IM/IN ^{6,7,8,9} (1 mcg/kg) slowly, maximum 100 mcg/dose
may repeat ½ dose every 5 minutes until maximum of 300 mcg total (or peds maximum 3 mcg/kg)

OR

Morphine sulfate 2-5 mg IV/IO/IM ^{6,7,8,9} (0.1 mg/kg) slowly, maximum 10 mg (pediatric max. 5 mg/dose)
may repeat dose every 5 minutes, until maximum of 20 mg total (or peds maximum 0.2 mg/kg)

OR

Nitrous Oxide (50:50) by inhalation ¹⁰

OR

Ketorolac ^{3,11}, if available, 15 mg IV/IO (30 mg IM)
(Peds 0.5 mg/kg IV/IO/IM, maximum 15 mg IV/IO or 30 mg IM)

OR

Acetaminophen, if available, 15mg/kg up to 1000 mg IV (maximum 650 mg if <65 kg), give slowly over 15 minutes
(Peds 15 mg/kg, maximum 650 mg)

WARNING: Do Not Administer if patient had acetaminophen in last 4 hours.

OR

Ketamine, if available, 0.3 mg/kg in 100 mL NSS, given IV/IO over 10 min (maximum 30 mg).

WARNING: Ketamine must be administered by infusion rather than direct bolus. Ketamine should not be administered to pediatric patients <15 yrs old. Adverse psychomimetic effects are more common in bolus

MUSCULOSKELETAL TRAUMA STATEWIDE ALS PROTOCOL

Criteria:

- A. Patient with isolated suspected extremity fractures.
- B. Patient with acute extremity pain after trauma
- C. Patient with acute back pain, excluding chronic back pain
- D. Patient with acute thoracic/ rib pain after trauma

Exclusion Criteria:

- A. Traumatic/hypovolemic shock (Follow Multisystem Trauma or Traumatic Shock protocol #6002)

System Requirements

- A. EMS region must approve the use of ketamine within the region, and the region must perform a QI audit of **every** case of ketamine administration for compliance with this protocol. All results must be forwarded quarterly to the Bureau of EMS for statewide QI.
- B. Agency medical director must approve of ketamine use by the EMS agency and must perform a QI audit of **every** case of ketamine administration for compliance with this protocol.
- C. Agency medical director must personally assure training and continuing education in patient selection, continuous respiratory monitoring, advanced airway management, ketamine pharmacology, and use of this protocol.
- D. Ketamine is an optional medication for EMS providers **at or** above the level of **AEMT** paramedic level, and approval to carry this **medication is specific to the use for pain, delirium with agitated behavior, and/or airway management based upon regional and agency medical director approval. An agency may have medical director and regional approval to use ketamine for some, all, or none of the indications as listed in protocol # 1000(G) above. Agency medical director must assure initial and ongoing competence for each individual EMS provider who will use ketamine. Only individuals credentialed to administer this medication will utilize the medication.**
- E. The ALS agency must carry an ~~alternative/rescue~~ supraglottic airway device in various sizes.
- F. Ketamine may only be carried by ALS agencies that follow all aspects of this protocol and permission to carry the medication will be removed from the agency by the Bureau of EMS if either the agency/regional QI or other investigation determines that there are significant variances from this protocol.

Possible Medical Command Orders:

- A. Additional fenta**NYL** or morphine or other analgesic
- B. Intramuscular fenta**NYL** or morphine

Notes:

1. Traction splinting should not be used for hip (proximal femoral neck) fractures.
2. Acetaminophen is contraindicated in patients with liver disease/failure.
3. NSAID (nonsteroidal anti-inflammatory drugs), including ibuprofen and ketorolac, are contraindicated if:
 - a. Oral NSAID (e.g. ibuprofen, naproxen, etc.) taken by patient in last 6 hours
 - b. **Bleeding or suspected bleeding (e.g. head/chest/abdominal trauma, gastrointestinal, vascular).**
 - c. Known kidney disease/failure or kidney transplant
 - d. **NSAIDs can be given to any child older than 6 months. The maximum dose is 600mg.**

4. IV/IO access is not required for administration of nitrous oxide or IM ketorolac.
5. Reassess and document 1-10 pain score 15-30 minutes after analgesic dose or at time of transfer of care.
6. Opioid pain medication may not be administered for other medical/trauma conditions (e.g. multiple rib fractures) before attempted contact with Medical Command.
7. Reduce dose for patients over 65 y/o.
8. Opioid medication should not be given if:
 - a. Oxygen saturation \leq 95%
 - b. SBP < 100 for adults
 - c. SBP < 70 + 2(age in years) for children < 14 y/o-); SBP < 70 for age 6 months to 1 year OR < 70 + 2(age in years) for children 1-10 y/o
 - d. Patient has altered level of consciousness
9. If respiratory depression or hypoxia occur after opioid:
 - a. Administer oxygen and ventilate if necessary
 - b. If significant respiratory depression, administer naloxone 0.4 mg IV, titrate additional doses until adequate ventilation or total of 2 mg.
10. Nitrous oxide should be self-administered. Nitrous Oxide should only be given to a pediatric patient who can successfully self-administer by holding the mask up to their face by themselves and can communicate understanding the procedure. Patient should be coached to hold mask on his/her face, and the patient will drop mask if he/she becomes sedated. Over sedation may occur if EMS provider holds mask to patient's face. Nitrous oxide may be administered without IV access. Avoid nitrous oxide in:
 - a. SBP < 90 [Pediatrics < 70 + (2 x age)] SBP < 70 for age 6 months to 1 year OR < 70 + 2(age in years) for children 1-10 y/o
 - b. obvious intoxication
 - c. head injury with altered mental status
 - d. chronic lung disease
 - e. suspected pneumothorax
 - f. suspected bowel obstruction
 - g. decompression sickness (e.g. from diving/submersion)
11. Dosing over 15mg IV or 30mg IM for Ketorolac does not improve pain relief but risks additional side effects to renal and GI systems.

Performance Parameters:

- A. Pain medication given or documentation of pain medication being offered for suspected isolated extremity fractures.
- B. Traction splinting used for isolated femur fractures without hypotension in all cases.
- C. Vital signs and oxygen saturation documented before and after any administration of opioid.
- D. Severity of pain documented for all painful conditions and documented before and after analgesic medications/ interventions.
- E. Agency medical director and QI committee review of each case of sub-dissociative dose of ketamine for pain. Review for pre- and post-administration pain severity, appropriate indication, appropriate dosage, monitoring of VS and continuous pulse oximetry. Agencies must submit

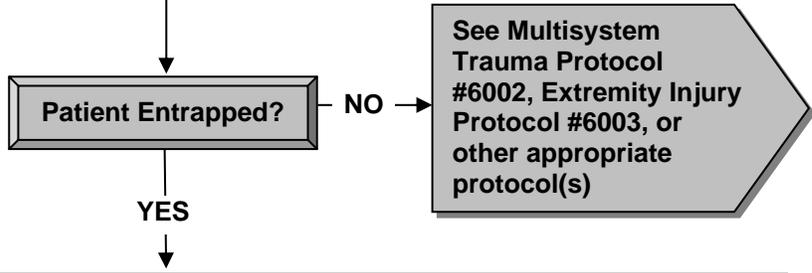
quarterly report of ketamine uses to EMS regional QI committee. Regional QI committee must report quarterly regional summary of use and protocol compliance to BEMS quarterly

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CRUSH SYNDROME STATEWIDE ALS PROTOCOL

Initial Patient Contact- See Protocol #201
Follow all other appropriate Trauma Protocols also
Administer Oxygen
In collapsed building, place surgical mask/ filter mask on patient, if possible ¹
 Monitor ECG and pulse oximetry

↓
 Initiate IV/ IO NSS
Administer NSS bolus of 20 mL /kg (warm if possible) ^{2,3}



Before Extrication:

Coordinate extrication time with Rescue Agency
 Monitor ECG continuously if possible ⁴
 Assess extremity neurovascular status
 Initiate second IV/IO if possible
 Administer analgesia per protocol #6003 ⁵
 If hypotension or entrapped > 1 hour, administer additional NSS bolus of 20 mL /kg/hr (or administer fluids to maintain urine output of 300 mL/hr [Peds: 2 mL/kg/hr])
 Examine urine/ measure urine output, check point-of-care labs, and deliver additional medications to the scene. Consider summoning speciality/critical care medical team to monitor urine output if prolonged entrapment.

Contact Medical Command if communications possible

Immediately prior to extrication:

Sodium Bicarbonate, 1 mEq/kg IV/IO
If hyperkalemia, Calcium chloride (if available), 10 mL 10% solution IV/IO [Peds: 0.2 mL/kg IV/IO]
Caution: bicarbonate and calcium will precipitate if given together in same IV site
 Anticipate possible cardiac arrest on extrication
 If IV/IO not available, consider **albuterol** (approx..2.5 mg nebulized)

After extrication:

IV NSS wide open to maintain SBP > 100 [Pediatrics SBP > 70 + 2 (age)] for children 1-10 years old and BP <70+ (age x 2) or if greater than 10 years old and BP <90.
 If QRS widens repeat **sodium bicarbonate** and **calcium chloride** (if available) doses above.

Contact Medical Command

**CRUSH SYNDROME
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Patient entrapped and crushed under heavy load (e.g. extremities and/or body crushed in building collapse, trench collapse, industrial accident, or pinned under/by heavy vehicle/ farm equipment for more than 30 minutes and with suspected crush syndrome:

Exclusion Criteria:

- A. Patient trapped for less than 30 minutes
- B. Patient entrapped but without significant tissue crushing.
- C. Altered mental status – See Altered Level of Consciousness Protocol #7002A or #7002P.

Possible Medical Command Orders:

- A. Additional opioid analgesic
- B. Alteration in intravenous fluid volume
- C. Benzodiazepine for anxiety
- D. Additional sodium bicarbonate

Notes:

1. In addition to a dust mask, victims may need eye, head and hearing protection if rescue crews are working nearby. Surgical mask should not be applied if patient requires oxygen by mask.
2. Avoid using Ringer's lactate as an IV fluid due to its potassium content.
3. Victims of structural collapse may become hypothermic in prolonged incidents, even in warm weather.
4. Pain control is important; crush injury is painful, often increasing upon release.
5. EKG signs of severe and life-threatening hyperkalemia should be treated with calcium chloride and sodium bicarbonate using dose in protocol.
 - a. Signs of hyperkalemia:
 - 1) Mild – peaked T waves
 - 2) Moderate – prolonged PR interval, decreased P wave amplitude, ST segment depression
 - 3) Severe – QRS widening, flat P waves, second degree Mobitz I, PVCs
 - 4) Life Threatening – absent P waves, V-tach, AV block, extremely widened QRS

Performance Parameters:

- A. Review every case where crush syndrome protocol used.

**BLAST/ EXPLOSIVE INJURY
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Injuries sustained in a blast or explosion, including:
 - 1. Industrial explosions
 - 2. Terrorist bombings
 - 3. Any other type of explosion

Exclusion Criteria:

- A. None

System Requirements:

- A. If elevated threat of terrorist bombing, agencies should consider carrying several commercial tourniquets.
- B. If elevated threat of terrorist bombing, fire/rescue/EMS agencies should consider availability of a Geiger counter with initial responding units.
- C. Personal Protective Equipment:
 - 1. If toxic materials are suspected, only appropriately trained and equipped personnel should enter the immediate area.
 - 2. Without suspected toxic hazards, appropriate PPE for explosion scenes include outerwear (like coveralls and heavy “turn out” coat), heavy gloves, steel/composite-toed shoes, hardhat, eye protection, dust particle mask.

Treatment:**A. All Patients:**

- 1. Scene Safety – see Protocol # 102
 - a. Consider risks of secondary explosions at scene, triage area, staging area, or receiving facilities
 - 1) Be observant for victims, vehicles, packages or containers that seem out of place.
 - b. Consider risks of radiation contaminated victims of terrorist explosions.
 - 1) Screen scene with Geiger counter, if radiation is suspected and device is available
 - c. Consider risks of unstable buildings and infrastructure.
- 2. Initial Patient Contact – see Protocol #201
 - a. Initiate regional MCI plan if needed
 - 1) Triage patients using regional MCI plan ^{1,2,3}
 - a) During triage, apply tourniquets to severely bleeding extremities.
 - 2) Explosion scenes should be presumed to be crime scenes until cleared by authorities – see Protocol # 919
 - b. Explosions/ blasts may cause bilateral ruptured tympanic membranes – consider that communications with patients may be impaired.
 - c. If thrown by explosion, restrict spinal motion if indicated – see Protocol # 261
- 3. If severe bleeding, see Protocol #501
 - a. Use tourniquets early if severe extremity bleeding.
- 4. Consider blast-related injuries:
 - a. Primary blast injuries (from blast pressure wave) ⁴
 - 1) If Blast Lung suspected due to: SOB, rapid respirations, hypoxia⁵ (pulse oximetry <95% when available), wheezing, cough, or coughing blood. Bradycardia may occur with blast lung.
 - a) Administer high-flow oxygen
 - b) Monitor pulse oximetry [Optional], if available ⁵
 - c) Initiate IV/IO NSS at KVO
 - (1) Fluids may accumulate in lungs as edema

- (2) If hypotension, hypovolemia, crush injury, or burns, infusion rates should be guided by appropriate related protocol(s), but Medical Command should be contacted, if possible, before exceeding 250 mL (Peds: 20 mL/kg) if concern for associated Blast Lung.
 - d) Observe stable patients for signs of blast lung
 - b. Secondary blast injuries (from projectiles) ⁶
 - 1) If impaled objects, follow Protocol #632
 - c. Tertiary blast injuries (from patient falling or being thrown by blast or pinned by debris) ⁷
 - 1) Restrict spinal motion, if required – see Protocol # 261
 - 2) If multisystem trauma – see Protocol # 6002
 - 3) If crush syndrome suspected – see Protocol # 6004
 - d. Quaternary blast injuries (all other injuries/conditions) ⁸
 - 1) If burns – see Protocol # 6071
5. Transport
 - a. Transport to trauma center if Category I or II trauma patient – see Protocol # 180
 - b. Closest ED may not be most appropriate receiving facility ⁹
6. Contact Medical Command, if needed

Notes:

1. Severe internal injuries caused by blast wave may not be apparent initially. Eardrum (tympanic membrane – TM) rupture is the most common type of blast pressure injury and may be associated with other more serious blast injuries. When TM rupture is not present, other blast pressure injuries are less likely.
2. Projectile injuries (e.g. from nails or other sharp objects) may be overlooked at initial triage.
3. In MCIs with explosions, most patients have minor injuries. Over triage may delay treatment of the smaller number of patients with salvageable life-threatening injuries.
4. Primary blast injuries are caused by the pressure wave of the blast. These include eardrum (tympanic membrane – TM) rupture, eye globe rupture, blast lung, intestinal rupture, and intraabdominal bleeding.
5. Hypoxia may precede other signs of blast lung injury like tachypnea or shortness of breath. Hypoxia despite high-flow oxygen is an indication for early endotracheal intubation, and highest priority triage and priority transport are indicated.
6. Secondary blast injuries are caused by projectiles. These may include debris from structures like glass or wood or may include debris from improvised explosive devices (IEDs) like nails in a pipe bomb. Serious injuries from penetrating objects may be overlooked during triage.
7. Tertiary blast injuries are caused by falling, being thrown or being pinned or entrapped. These include fractures and other injuries seen in blunt trauma. They also may include crush syndrome and compartment syndrome in entrapped patients.
8. Quaternary blast injuries are caused by other trauma/ environment related to explosions or by preexisting conditions of patient. Examples include burns and respiratory distress due to post-explosion dust.
9. Historically, in explosions with many patients, the closest ED becomes overwhelmed with ambulatory patients before any EMS patients arrive. These overwhelmed facilities may not be able to appropriately treat more serious patients arriving by EMS. Transport officer should take this into consideration when dispersing patients to receiving facilities.

Performance Parameters:

- A. Transport Category I and II trauma patients within 10 minutes of EMS patient contact unless delayed because patients exceed medical resources available

**HEAD INJURY/ TRAUMATIC BRAIN INJURY
STATEWIDE ALS PROTOCOL**

Criteria:

- A.** All patients with traumatic mechanism and suspected traumatic brain injury (TBI), including:
1. Head injury and altered mental status (GCS <15).
 2. Patient asking repetitive questions
 3. Witnessed or suspected loss of consciousness (LOC)
 4. Seizure after trauma, whether still seizing or not
 5. Multisystem trauma requiring airway or ventilatory support

Exclusion Criteria:

- A.** Isolated trauma without any evidence of LOC or alteration in mental status/GCS at any time.

Treatment:**A. All patients:**

1. Initial Patient Contact – see Protocol # 201.
 - a. Consider call for air ambulance. See Trauma Destination protocol #180
2. Apply cervical collar and restrict spinal motion, if indicated – See Spine Care Protocol #261.¹
3. Assure a patent airway.
4. PREVENT HYPOXIA ²
 - a. Administer high concentration oxygen at 15 lpm via NRB mask to all patients
 - b. Measure and continuously monitor pulse oximetry - See Pulse Oximetry Protocol #226 – but all patients should continue to get high-flow oxygen even if SpO₂ is adequate
 - 1) If SpO₂ <90% (despite NRB) or if patient hypoventilating, insert OP/NP airway and ventilate with BVM (at rates listed below).
 - 2) If SpO₂ ≥90% and patient breathing adequately, continue NRB mask high-flow oxygen and continuously monitor oxygen saturation.
5. Assure adequate ventilation. If SpO₂ <90% (despite NRB) or if RR <10, insert OP/NP airway and ventilate with BVM and high flow supplemental oxygen. **DO NOT HYPERVENTILATE.**^{3,4}
 - a. Ventilate
 - 1) 10 bpm for an adult (≥15 years-old)
 - 2) 20 bpm for a child (2-14 years-old)
 - 3) 25 bpm for an infant (<12 months-old)
 - b. Consider using rate timer or ETCO₂ monitor (when ALS present) to ensure that hyperventilation is avoided.
 - c. Monitor ETCO₂ during any BVM ventilation. Adjust above ventilation rates to attain ETCO₂ target of 40 mmHg (range 35-45). If patient has unilateral dilated unresponsive pupil or extensor posturing (GCS motor of 2), then maintain ETCO₂ at 35 mmHg).
6. Also follow Multisystem Trauma/ Shock Protocol # 602, if applicable.⁵
7. Place sterile dressing over soft tissue injury sites, but don't delay transport:
 - a. Do not apply pressure to open or depressed skull fracture.
 - b. Treat eye injuries appropriately.
8. Transport according to Trauma Destination protocol # 180.
9. PREVENT HYPOTENSION ⁵

- a. Goal = avoid even single episode of hypotension (SBP <90 in adult or <70 + (age x 2) in pediatric patient).
 - b. Initiate large bore IV or IO vascular access
 - c. If SBP <90 (in pediatrics <70 + (age x 2)), approaching hypotension, or dropping rapidly, administer IVF
 - 1) Adults: 1,000 mL NSS bolus; repeat 500 mL bolus as needed to avoid hypotension; maximum volume 2,000 mL before contact with Medical Command.
 - 2) Pediatrics: 20 mL/kg NSS bolus; repeat 20 mL/kg as needed to avoid hypotension; maximum volume of 60 mL/kg before contact with Medical Command
10. Monitor pulse oximetry – See Pulse Oximetry Protocol #226 – but all patients with GCS < 15 or possible TBI indications above should continue to receive high concentration oxygen
 11. If GCS<15 or continued confusion, check blood glucose, if available – See Glucose Monitoring Protocol #228.
 12. Monitor vital signs and reassess.
 13. Contact Medical Command

Notes:

1. Avoid any straps or constriction across the neck since this may increase intracranial pressure.
2. **CLINICAL AXIOM:** A single non-spurious SpO₂ of <90% is independently associated with a doubling of death rate.
3. **CLINICAL AXIOM:** In intubated patients, hyperventilation is independently associated with at least a doubling of death rate, and some studies have shown that even moderate hyperventilation can increase the risk of dying by six times.
4. NO ONE (in or out of the hospital) can manually ventilate at the proper rate without ventilatory adjuncts. EVERYONE inadvertently hyperventilates unless meticulously attempting to prevent it. EMS agencies should consider adjuncts to prevent hyperventilation, which include:
 - a. Ventilation electronic rate timing devices (for example, LED light that flashes 10 times/min or ventilation prompt in airway setting on monitor/defibrillator CPR metronome)
 - b. Pressure-controlled BVMs and smaller volume adult BVMs that avoid hyperventilation by limiting ventilation volume
 - c. ETCO₂ monitoring, target ETCO₂ = 40 mmHg (range 35-45).
5. **CLINICAL AXIOM:** A single episode of SBP <90 is independently associated with at least a doubling of death rate. Repeated episodes of hypotension can increase the risk of dying by as much as eight times.

Performance Parameters:

- A. Patients who do not follow commands (motor GCS ≤5) or those with total GCS ≤ 13 should be transported to a trauma center when possible
- B. Review for use of high-flow oxygen in patients with any LOC, GCS<15, asking repeated questions, or seizure after head trauma.
- C. Review for any hypoxia or hypotension

**BURNS
STATEWIDE ALS PROTOCOL**

Initial Patient Contact - Protocol #201
Use PPE/Remove from source of burn ¹
Follow BLS Burn Protocol # 671

**History/Evidence of
Category 1 or 2 Trauma**

YES

**Proceed to
Multisystem
Trauma Protocol
#6001**

NO

Manage Airway/Ventilate, if needed ^{2,3,4}
Administer Oxygen, if indicated ²
Restrict spinal motion, as indicated by BLS Protocol #261

Mechanism of burn injury		
<u>Chemical</u> Brush off dry, then flush with water ⁵	<u>Thermal</u> Dry, sterile/clean sheet Cool, unless large BSA involved	<u>Electrical / Lightning</u> Monitor ECG Dry, sterile dressing to entrance and exit wounds

Monitor Pulse Oximetry and/or ECG, if indicated ^{2,6}
Determine Burn Extent & Severity ⁷ (rule of nines)
Initiate IV/IO NSS, if indicated

Administer 20 mL /kg NSS wide open for
hypotension or 10 mL/kg NSS over 1 hour for
other serious burns >20% TBSA ⁸
Administer Analgesic Medication (see box below),
if indicated⁹

**TRANSPORT TO
CLOSEST APPROPRIATE
FACILITY/ TRAUMA
CENTER ¹³**

If hypotension persists
repeat 20 mL /kg NSS fluid bolus ⁸
If pain continues, Administer Repeat dose(s) of Analgesic
Medication (see box below)

Contact Medical Command ¹⁴

ANALGESIC MEDICATION OPTIONS
(Choose one)

fentaNYL ^{10,11} up to 1 mcg/kg IV/IO/IM/IN maximum 100 mcg/dose
may repeat ½ dose every 5 minutes until maximum of 3 mcg/kg

OR

Morphine sulfate ^{10,11} up to 0.1 mg/kg IV/IO/IM maximum 10 mg/dose (peds max 5 mg/dose)
may repeat dose every 5 minutes until maximum of 0.2 mg/kg

OR

Nitrous Oxide (50:50) by inhalation ¹²

OR

Ketamine, if available, 0.3 mg/kg in 100 mL NSS, given IV/IO over 10 min (maximum 30 mg).

WARNING: Ketamine must be administered by infusion rather than direct bolus. Ketamine should not be administered to pediatric patients <15 yrs old. Adverse psychomimetic effects are more common in bolus dosing and the elderly. EMS providers require special approval to administer ketamine.

BURNS
STATEWIDE ALS PROTOCOL

Criteria:

- A. Patient with burns from:
 - 1. Thermal injury
 - 2. Chemical dermal injury.
- B. Patient with lightning or electrical injury.

Possible MC Orders:

- A. Additional morphine or fentanyl
- B. Transport to a burn center or trauma center
- C. NIPPV CPAP/BiPAP for respiratory difficulty

Notes:

1. Consider scene safety. Be aware of possible chemical contamination and/or electrical sources. Stop the burning process. Remove clothing and constricting jewelry.
2. Determine presence of respiratory burns as indicated by carbonaceous sputum, cough, hoarseness, or stridor (late). All patients with exposure to smoke or fire in a confined space should receive high-flow oxygen and Pulse Oximetry monitoring.
3. Consider early intubation in patients with respiratory distress, hoarseness, carbonaceous sputum or stridor. If unsure, contact medical command early for assistance with this decision.
4. Confirm and document tube placement with absence of gastric sounds and presence of bilateral breath sounds AND confirmatory device (like wave-form ETCO_2 detector) with electronic waveform capnography. Follow Confirmation of Airway Placement Protocol #2032.
5. For chemical burn exposure, brush dry powders then begin flushing immediately with water or appropriate agent for chemical. **Exceptions:** for phosphorous and sodium, **DO NOT** flush with water, cover with cooking oil if available; for Phenol remove with alcohol and follow with large volume of water. If eye is burned, flush with large volume of NSS for 15-20 minutes. May administer tetracaine eye drops before flushing. Continue eye flushing during transport.
6. Monitor ECG for all patients with:
 - a. Electrical/Lightning injury
 - b. Respiratory symptoms
 - c. Multisystem trauma
 - d. Hypovolemic/Traumatic Shock
7. Indicators of severe burn injury include:
 - a. Respiratory tract injury, inhalation injury.
 - b. 2nd and 3rd degree burns that involve face, hands, feet, genitalia or perineal area or those that involve skin overlying major joints.
 - c. 3rd degree burns of greater than 5% BSA.
 - d. 2nd degree burns of greater than 15% BSA.
 - e. Significant electrical burns, including lightning injury.
 - f. Significant chemical burns.
 - g. Burn injury in patients with pre-existing illnesses that could complicate management, prolong recovery, or affect mortality.

Medical Command physician may direct transport to Burn Center in these cases.

8. **DO NOT** provide fluid bolus if respiratory symptoms are present.

9. Opioid pain medication should not be given if:
 - a. Oxygen saturation \leq 95%
 - b. SBP < 100 for adults
 - c. **SBP < 70 + 2(age in years) for children < 14 y/o) SBP < 70 for age 6 months to 1 year OR < 70 + 2(age in years) for children 1-10 y/o Patient has altered level of consciousness**
 - d. Patient has altered level of consciousness
10. Reduce dose for patients over 65 y/o.
11. If respiratory depression or hypoxia occur after opioid:
 - a. Administer oxygen and ventilate if necessary
 - b. If significant respiratory depression, administer naloxone 0.4 mg IV, titrate additional doses until adequate ventilation or total of 2 mg.
12. Nitrous oxide should be self-administered. Patient should be coached to hold mask on his/her face, and the patient will drop mask if he/she becomes sedated. Over sedation may occur if EMS provider holds mask to patient's face.
13. Transport to the closest appropriate medical facility, using the following order of preference:
 - a. If unable to maintain airway or unable to ventilate or patient has symptoms of shortness of breath/cough or inhalation injury is suspected, transport to closest hospital.
 - b. **Transport to Trauma Center, if patient has associated trauma.** Follow Trauma Destination Protocol #180.
 - c. Medical Command Physician may assist in decision for direct transport to a burn center. Consider transport to a burn center if:
 - 1) The burn meets one of the following clinical criteria:
 - a) Partial thickness burns of >10% body surface area
 - b) Burns involving the face, hands, feet, genitalia, perineum, or major joints
 - c) Third degree burns in any age group
 - d) Electrical burns, including lightning injury
 - e) Chemical burns
 - f) Inhalation injury
 - 2) **AND**, the patient does not meet trauma triage criteria,
 - 3) And, the difference between estimated transport time to the closest receiving facility and the burn center is 45 minutes or less.
 - d. If none of the above apply, transport to the closest hospital.
14. Medical Command Physician may direct transport to Burn Center.

Performance Parameters:

- A. Review all burn calls for compliance with Trauma Destinations Protocol # 180
- B. Review all burn calls for frequency of administration of or documentation of offering pain medication.

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**HYPOTHERMIA / COLD INJURY / FROSTBITE
STATEWIDE ALS PROTOCOL**

Initial Patient Contact – Follow Protocol #201
Assess respirations and pulse for 45 seconds each ¹

- Manage Airway/ Ventilate, as indicated
 - Intubate gently if indicated
- Apply Oxygen ²
- Monitor ECG / Pulse Oximetry
- Environment
 - Move patient to warm dry place
 - Remove wet clothing
 - Wrap in warm blankets

**Patient temperature > 30° C (86° F)?
Patient is shivering and conscious?**

NO

YES

- **TRANSPORT IMMEDIATELY** ^{3,4}
 - **Transport to center capable of bypass rewarming, if possible**
 - Consider air ambulance if transport time > 30 minutes
 - Obtain IV/ IO NSS
 - administer NSS 20 mL/kg up to 2000 mL total
 - use warmed NSS if possible
 - Check blood glucose
 - if < 60 mg/dL, administer **Dextrose** ⁵
- If cardiac arrest develops, follow Cardiac Arrest-Hypothermia protocol #3035**

- Active external rewarming:
 - apply heat packs to groin, axillae, and neck, if possible. ⁶
- Consider IV NSS
 - Use warmed NSS if possible
- Check blood glucose
 - if < 60 mg/dL, administer **Dextrose**
- If the patient is alert, administer warm non-caffeinated beverages (if available) by mouth slowly.⁷

Contact Medical Command

Contact Medical Command

2

Repeat warmed NSS bolus to total of 60 mL/kg (max.3000 mL)

HYPOTHERMIA / COLD INJURY / FROSTBITE STATEWIDE ALS PROTOCOL

Criteria:

- A. Generalized cooling that significantly reduces the body temperature.
- B. Body temperature < 35° C (95° F).
 - 1. Hypothermia is severe if core body temperature is < 30° C (86° F).
- C. Frostbite generally affects feet, hands, ears, and/or face. Skin initially appears reddened, then mottled, bluish, white and/or gray. This is painful initially then becomes numb.

Exclusion Criteria:

- A. Cardiac Arrest from hypothermia – Follow protocol # 3035.
- B. DOA, including the following - see DOA protocol # 322.
 - 1. Submersion for >1 hour.
 - 2. Body tissue/chest wall frozen solid.
 - 3. Body temperature same as surrounding temperature and other signs of death (lividity/ rigor)
- C. Frostbite or cold injury isolated to soft tissues – Follow BLS Hypothermia Protocol # 681

Notes:

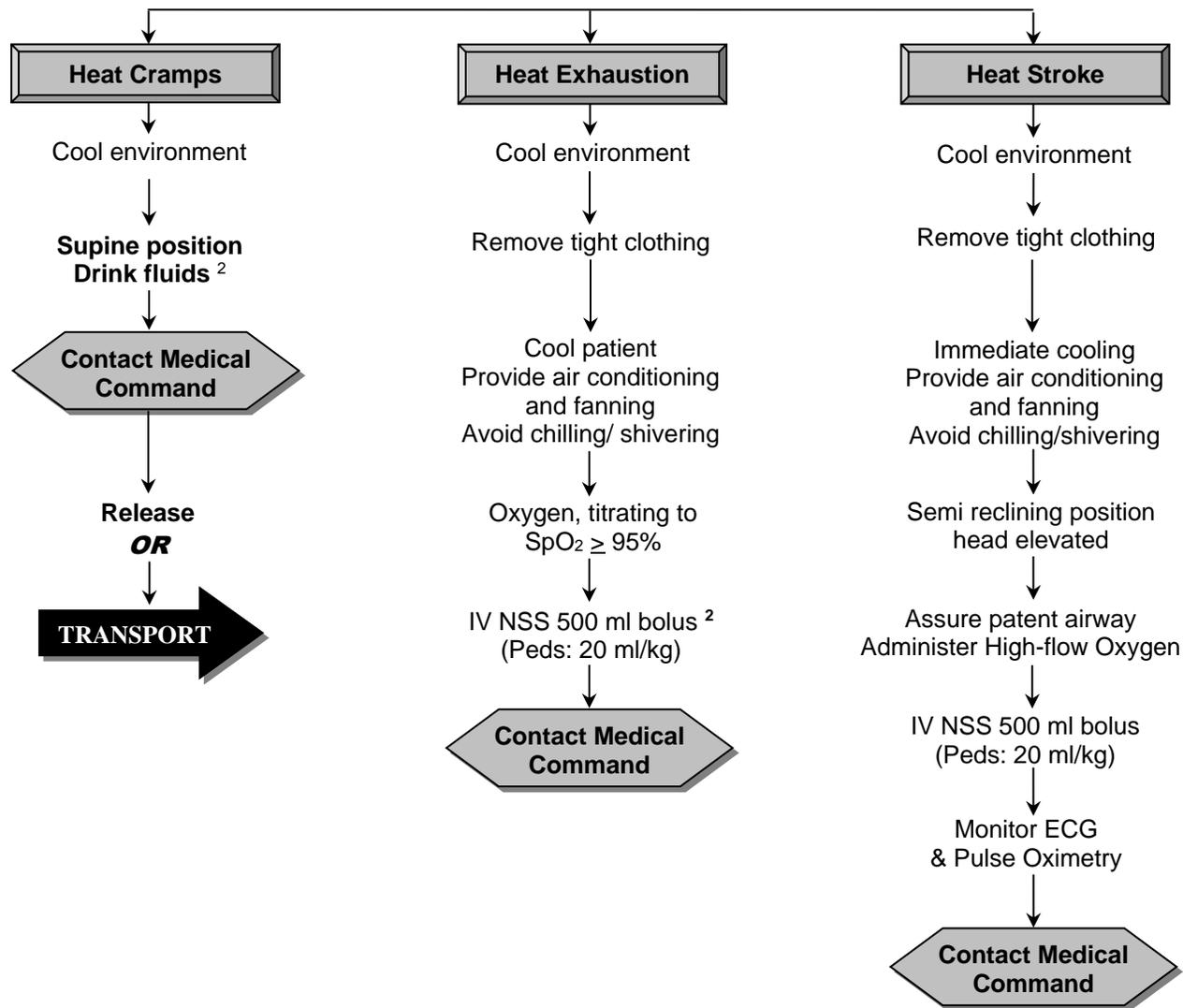
- 1. **Vital signs should be taken for a longer time than usual, so that a very slow pulse or respiratory rate is not missed. Assess pulse for 45 seconds. If a pulse or respirations are detected, do not perform CPR.**
- 2. Use warmed humidified oxygen if available.
- 3. If unresponsive to verbal stimuli or temperature <30° C (86° F), transport to center capable of extracorporeal rewarming (cardiac bypass) if possible. If unsure whether center is capable of 24-hour/7-day emergent bypass rewarming, contact medical command to confirm availability *OR* transport to the closest Level II or III Trauma Center, following Trauma Triage Protocol # 180. Contact medical command at destination facility as soon as possible to provide maximum time for staff to prepare to receive the patient.
- 4. If the patient has severe hypothermia and vertical evacuation is required, transport the patient in a level position when possible. Transporting vertically with the head up has been associated with seizures and death.
- 5. Dextrose dosing:
 - a. Adults- 25 gms IV/ IO, 10-50% dextrose concentration
 - b. Pediatrics- 2 mL/kg IV/ IO of 25% dextrose (or 5 mL/kg of 10% concentration)
- 6. Do not place heat packs directly against skin- wrap in towel.
- 7. **DO NOT** permit fluids by mouth if patient also has severe traumatic injuries or abdominal pain.

Performance Parameters:

- A. Review for transport to center capable of bypass rewarming when appropriate

**HEAT EMERGENCIES
STATEWIDE ALS PROTOCOL**

History/evidence of HEAT exposure
Initial Patient Contact – see Protocol # 201
Check blood glucose and treat hypoglycemia per protocol #7002
Follow Heat Emergency Protocol – see Protocol #686



HEAT EMERGENCY STATEWIDE ALS PROTOCOL

Criteria:

- A. Heat Cramps** - Painful muscle spasms of the skeletal muscles that occur following heavy work or strenuous exercise in hot environments. Thought to be caused by rapid changes in extracellular fluid osmolarity resulting from fluid and sodium loss. Signs and symptoms include
1. Alert
 2. Muscle cramps (normally in muscles most recently heavily exercised)
 3. Hot, diaphoretic skin
 4. Tachycardia
 5. Normotensive
- B. Heat exhaustion** - Patient presents with dizziness, nausea, headache, tachycardia, and possibly syncope. Usually from exposure to high ambient temperatures accompanied by dehydration due to poor fluid intake. Temperature is less than 103° F. Rapid recovery generally follows saline administration.
- C. Heat Stroke** ¹ - Patient should be treated as heat stroke if he/she has ALL of the following
1. Exposure to hot environment, and
 2. Hot skin, and
 3. Altered mental status

Exclusion Criteria:

- A. None**

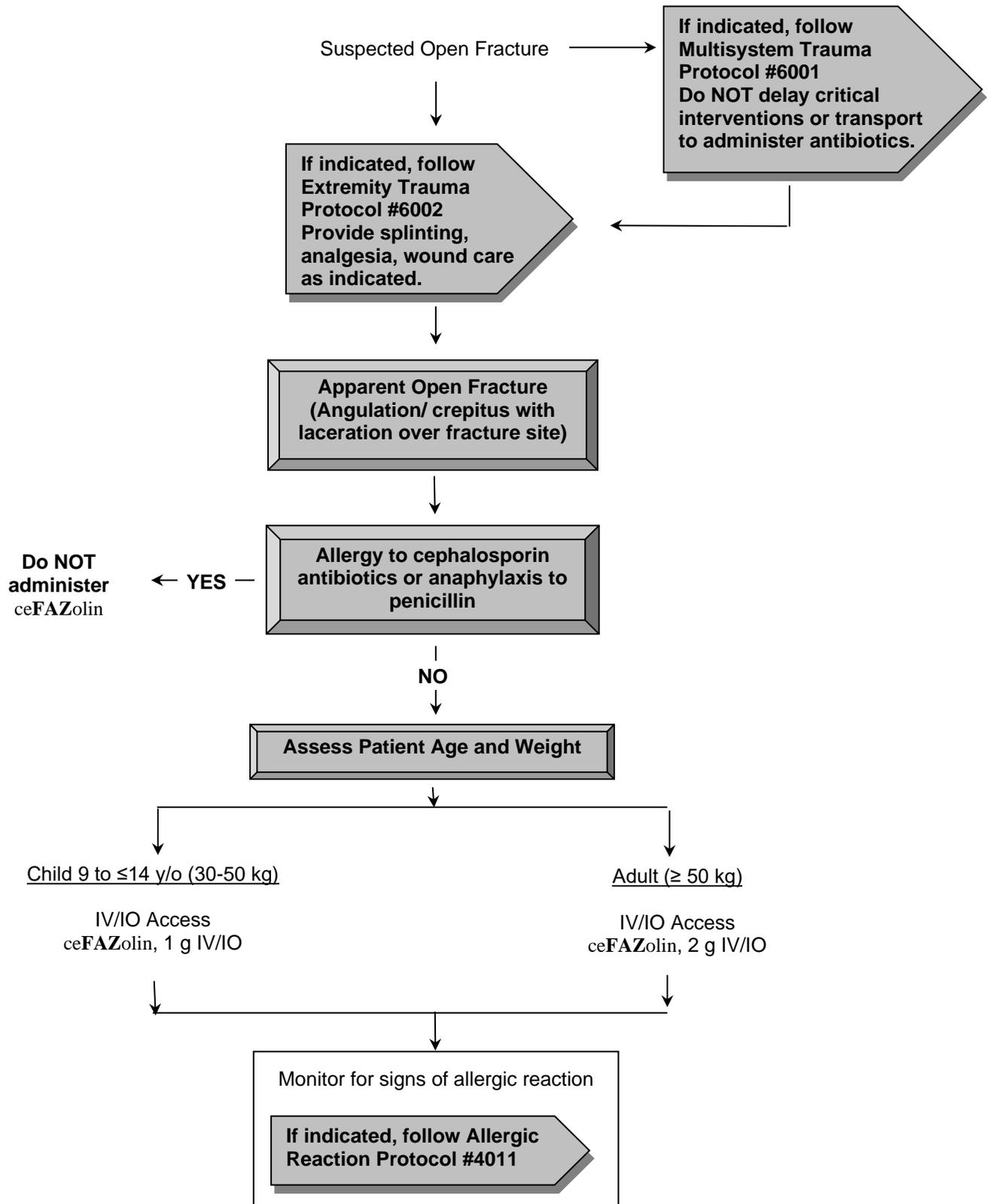
Possible MC Orders:

- A.** Medical command physician may order release of care for mild heat cramps or mild heat exhaustion.
- B.** May order additional fluid boluses

Notes:

1. Patient's thermoregulatory mechanisms break down completely. Body temperature is elevated to extreme levels, which results in multi-system tissue damage including altered mental status. Heat stroke often affects elderly patients with underlying medical disorders. Patients usually have dry skin; however, up to 50% of patients with exertional heat stroke may exhibit persistent sweating. Therefore, patients with heat stroke may be sweating.
2. Patient may take oral fluid replacement rather than IV if no nausea. Allow oral intake of cool fluids or water (may use commercial sport/rehydration drinks like Gatorade or Powerade) if patient is alert. Do not permit the patient to drink if altered mental status, abdominal pain or nausea. Avoid carbonated sodas, alcoholic beverages, and caffeinated beverages.
3. If effective cooling is initiated on scene and is not able to be maintained during transport, do not transport until the temperature is $\leq 102^{\circ}$ F.

ANTIBIOTICS FOR OPEN FRACTURE STATEWIDE ALS PROTOCOL [OPTIONAL]



ANTIBIOTICS FOR OPEN FRACTURE STATEWIDE ALS PROTOCOL [OPTIONAL]

Criteria:

- A. Patients with apparent open fractures – bony deformity or crepitus, with laceration over the fracture site.

Exclusion Criteria:

- A. History of allergic reaction to antibiotics in cephalosporin class
- B. History of anaphylaxis to antibiotics in penicillin class

System Requirements:

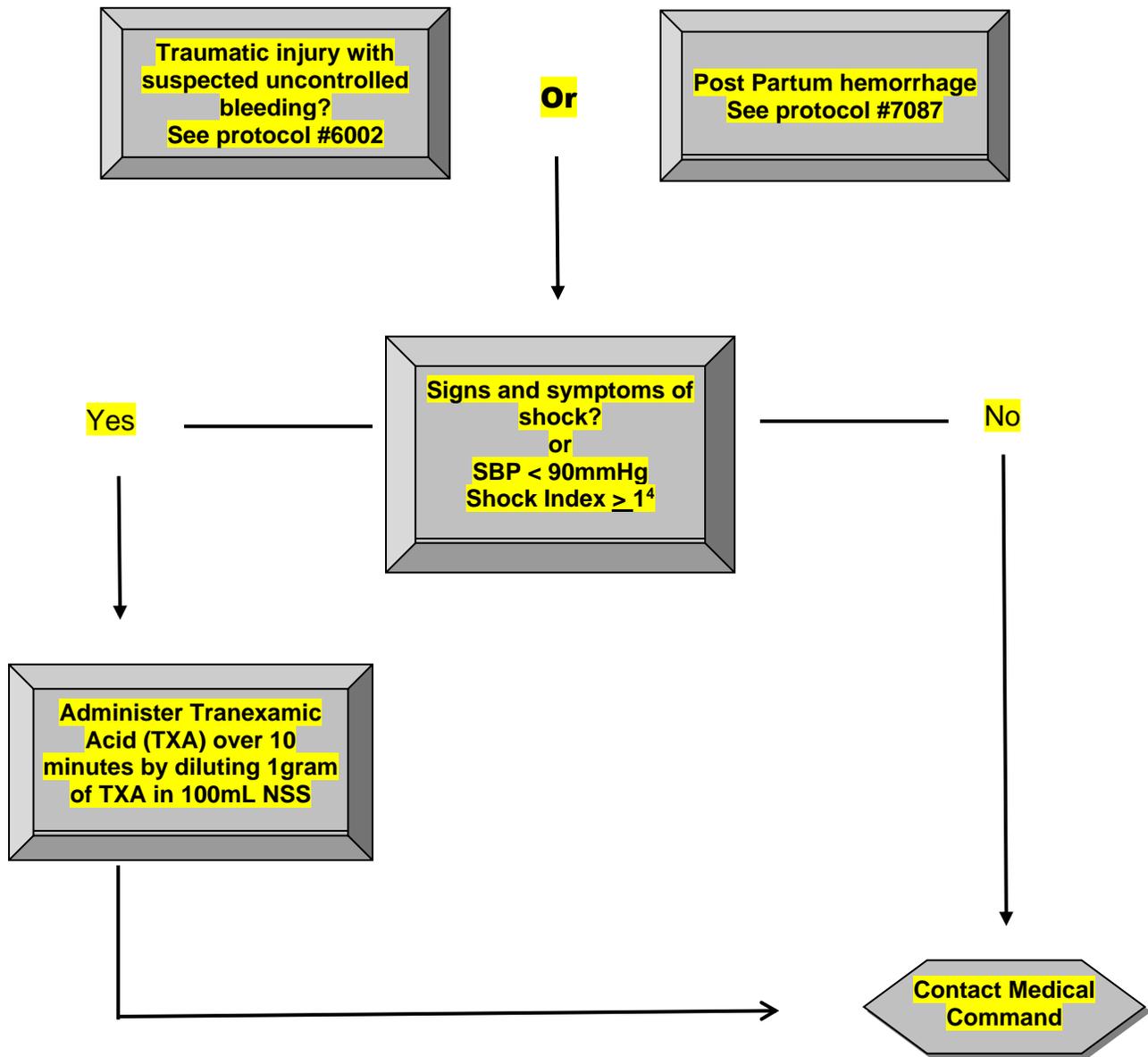
- A. ceFAZolin may only be carried by an ALS agency and administered by ALS providers above the level of AEMTs
- ~~B. Every participating ALS provider must complete the Antibiotics for Open Fractures continuing education course #1000033337, either through an in-person presentation overseen by the EMS agency medical director or through the online LMS course.~~
- C. EMS agency medical director must credential ALS providers to administer ceFAZolin.
- ~~D. A Patient Data Form must be completed by the ALS provider after each use of antibiotics for open fracture. Agencies must ensure that their medical director completes his/her section of the form and that the forms are submitted monthly to the regional EMS council for the regional/state QI process.~~

Performance Parameters:

- ~~1. Ensure that a completed Patient Data Form is collected for each patient treated with cefazolin, including patient demographics, time/date of injury, time/date of initiating antibiotic, documentation of history of allergies to antibiotics, and other information.~~
- ~~2. Ensure that EMS agency medical director has reviewed each Patient Care Report Data Form and completed documentation of the medical director QI review on the Patient Care Report Data Form.~~

**TRANEXAMIC ACID (TXA) ADMINISTRATION
STATEWIDE ALS PROTOCOL [OPTIONAL]**

Initial patient contact – See protocol #201
Signs and symptoms of significant blood loss.
Control external bleeding. See protocol #601



**TRANEXAMIC ACID (TXA) ADMINISTRATION
STATEWIDE ALS PROTOCOL [OPTIONAL]****Criteria (A and B are met):**

- A. Patient has signs of significant blood loss related to one of the following:
 - 1. Traumatic injury (blunt or penetrating) with suspected uncontrolled bleeding.
 - 2. Post-partum hemorrhage.
- B. Patient has signs of shock or has a SBP <90 mmHg.

Exclusion Criteria:

- A. Known hypersensitivity/allergy to Tranexamic Acid.
- B. Time elapsed from injury or onset of post-partum bleeding >3 hours.
- C. Age <15 years.
- D. Isolated closed head injury.
- E. Pregnancy ≥24 weeks.

Procedure:

- A. Ensure initial focus on management of hemorrhage and shock. Refer to relevant protocol(s):
 - 1. BLS Protocol 602 – Multisystem Trauma or Traumatic Shock.
 - 2. ALS Protocol 6002 – Multisystem Trauma or Traumatic Shock.
 - 3. ALS Protocol 7087 – Post-Partum Hemorrhage.
- B. After addressing key elements of patient resuscitation based on the above protocols, administer Tranexamic Acid (TXA) 1 gram IV/IO over 10 minutes.
 - 1. Dilute -1-gram of Tranexamic Acid (TXA) in 100 ml NSS.
 - 2. Administer mixed TXA over 10 min (e.g., to gravity through free flowing IV).
 - 3. Observe patients for potential side effects and treat per relevant protocol:
 - a) Hypersensitivity / allergic reaction.
 - b) Nausea/vomiting.
- C. Contact Medical Command

Notes:

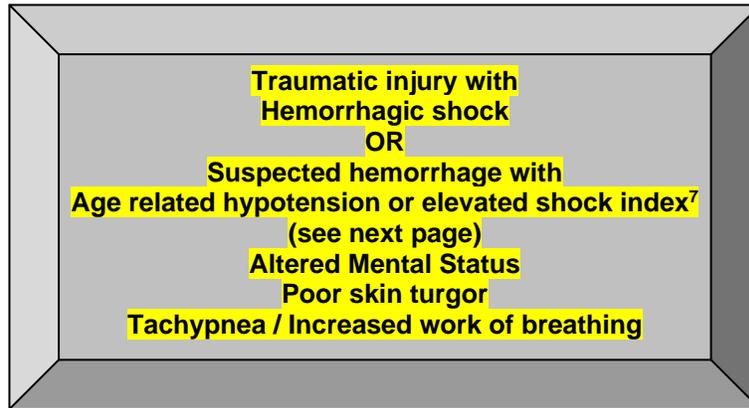
- 1. Do not administer Tranexamic Acid (TXA) in the same IV/IO as blood products or antibiotics/
- 2. Transportation should be to a Trauma Center for injured patients or obstetrics-capable hospital for post partum hemorrhage.
- 3. Ensure the receiving facility staff are aware of Tranexamic Acid (TXA) administration.
- 4. Shock index is determined by dividing the heart rate by the systolic BP.

Performance Parameters:

- A. Appropriate application of inclusion/exclusion criteria.
- B. Appropriate patient management (e.g., oxygenation, ventilation, and shock management) prior to administration of Tranexamic Acid (TXA).
- C. Appropriate dilution and administration of Tranexamic Acid (TXA)

**BLOOD ADMINISTRATION
STATEWIDE ALS PROTOCOL [OPTIONAL]**

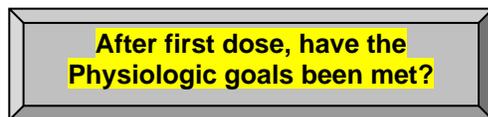
Initial patient contact – See protocol #201
Signs and symptoms of significant blood loss.
Control external bleeding. See protocol #601
Obtain Baseline Vital Signs, and including temperature



YES

NO

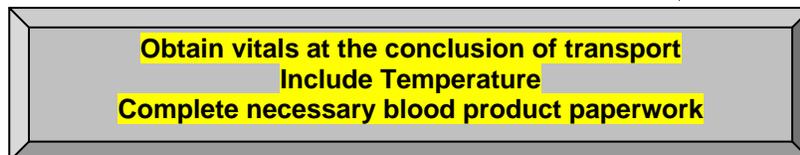
1. Obtain patient consent.
2. Assure IV/IO is patent & >20ga angiocatheter
3. Remove blood product from storage.
4. Confirm blood product type matches standing order.
5. Prepare and prime blood tubing.
(follow agency policy)
6. Begin infusion.
7. Document blood product type, ABO, and Rh group, unit number, and expiration date.
8. Document VS q 10min.
9. Document the volume infused from each unit and time of infusion.
10. Monitor for transfusion reactions.
11. When completed clamp blood product and disconnect.



NO



YES



**BLOOD ADMINISTRATION
STATEWIDE ALS PROTOCOL [OPTIONAL]**

Criteria:

- A. Patients with suspected acute hemorrhagic shock due to traumatic mechanism or otherwise known or suspected hemorrhage as evidenced by the following:
 - 1. Hypotension for age (as defined below)
 - 2. Altered mental status
 - 3. Poor skin perfusion
 - 4. Tachypnea or increased work of breathing

Hypotension for Age Defined	
Age	Systolic Blood Pressure
>10 years	<90 mmHg
1-10 years	70 + (2 x age in years)
<1 years	<70 mmHg

- B. Monitoring blood or blood product infusion initiated at a sending hospital in a stable patient.

Exclusion Criteria:

- A. Patient currently in Cardiac Arrest
- B. Hypotension or shock unrelated to hemorrhage
- C. Patients with decision-making capacity who refuse blood products (e.g. based on religious beliefs)
- D. An interfacility transport patient that requires, or is anticipated to require, vasoactive medications or medications outside of the Pennsylvania EMS scope of practice of the ALS provider or the patient requires or is anticipated to require advanced airway management.

System Requirements:

- A. EMS Regional Council in consultation with Medical Advisory Committee must approve the use of blood products within the region, and the region must perform a QI audit of every case of blood product administration for compliance with this protocol. All results must be forwarded to the Bureau of EMS for statewide QI.
- B. Agency medical director must request the Regional Medical Advisory Committee approve blood product use by the EMS agency and must perform a QI audit of every case of blood product administration for compliance with this protocol. Case follow-up including need for operative intervention and additional inpatient blood product administration should be established.
 - a. Agency medical director should have regular communication with receiving trauma centers in the area the service regularly transports patients regarding EMS transfusion effectiveness and proper indications for transfusion.
- C. Agency medical director must ensure that training has been completed and continuing education is offered in patient selection, documentation of blood product type and unit labeling, volume administered, patient vitals and temperature, monitoring for and treatment of transfusion reaction, appropriate receiving center handoff, and use of this protocol.
- D. Agency medical director must ensure that training has been completed and compliance with proper blood product storage and transit procedures, proper blood product assessment, and paperwork handling in accordance with local health system and/or blood bank policy is occurring.
- E. ALS providers credentialed to administer blood products must successfully complete a Prehospital Blood Product Administration educational course recognized by the Department.
- F. Agency medical director must ensure the initial and ongoing competence for each individual EMS provider who will use blood products. Only individuals credentialed to administer blood products will perform the procedure.

- G. Two EMS providers must be at the patient's side before administration of blood products. At least one of these providers must be an ALS provider at the level of paramedic or above who has completed the Prehospital Blood Product Administration education and is credentialed by the EMS agency medical director to administer blood products. The other provider must be certified at the level of EMT or above.
- H. Agency must have the capability to properly store and transport blood products, monitor storage unit and blood product temperature, ensure the quality of the blood products, minimize blood product wastage, and properly return unused blood products to blood bank all in accordance with the standards set forth by the local health system and/or blood bank.
- I. Blood products may only be carried by ALS services that follow all aspects of this protocol, and permission to carry blood products will be removed from the agency by the Region or Bureau of EMS if either the agency/regional QI or other investigation determines that there are significant variances from this protocol.

Possible Medical Command Orders:

- A. For patients weighing ≥ 50 kg, medical command may order the administration of entire units of blood products.
- B. For patients weighing < 50 kg, medical command may order weight-specific dosing of blood products such as outlined in the table:

Blood product	Suggested weight-based dose
RBC	10- ml/kg
LTOWB	10 ml/kg
Plasma	20 ml/kg

- C. Medical command may order additional blood product dosages to meet the patient's physiologic goals after administration of the first dose.

Procedure:

- A. Confirm indication for transfusion and absence of exclusion criteria as above
 - i. If uncertain whether blood is indicated, CONTACT MEDICAL COMMAND, preferably at the receiving trauma center
- B. If patient has capacity and condition allows, obtain consent.
- C. Assure patency of IV or IO access. An IV angiocatheter ≥ 20 ga is strongly preferred for blood transfusion.
- D. Remove of blood product unit from storage, EMS provider checks and confirms Blood product type (e.g. LTOWB, RBC, Plasma) matches the standing order for transfusion.
- E. Document initial VS and VS every 10 minutes for duration of transfer. A patient temperature must be obtained before transport and at the conclusion of transport.
- F. Prepare and prime blood tubing (using blood warming equipment if adopted by EMS system) and begin infusion by gravity or pressure bag.
- G. Document Blood product type, ABO and Rh group, Unit number, Expiration date.
- H. Document the volume infused from each unit and the time of the transfusion if possible.
- I. Monitor for signs of transfusion reaction, which may include fever, hives, hypotension, dyspnea, wheezing, unexplained back or abdominal pain. Provider must consider the entire clinical condition to determine if new symptoms are related to the transfusion versus a change in the patient's underlying disease state. See suggested orders for possible transfusion reaction below.
- J. When infusion is completed, clamp blood product tubing and disconnect from patient. Keep all blood product bags and tubing to hand over to receiving facility.

- K. After completion of first ordered dose of blood product, contact medical command if the patient's physiologic goals have not been met for consideration of an additional blood product dose.
- L. Upon arrival at receiving facility, notify receiving team that a transfusion was administered, provide remaining blood product bags and tubing to staff, and complete any paperwork specific to local health system and blood bank.
 - a. Notify of any adverse events and communicate if an RhD-positive blood product was administered to a female patient of childbearing age or younger (often defined as <50 years).
- M. If transfusion reaction is suspected:

Reaction Level	Potential Signs and Symptoms	EMS Action
Mild	No worsening of VS, with only rash or itching	Continue infusion Contact Medical Command for guidance
Moderate	Stable VS, rash, angioedema stridor/wheezing.	Pause transfusion Do not disconnect Contact Medical Command
Severe	Evidence of shock, hypoxia	Pause transfusion Do not disconnect Contact Medical Command

Neading R; Scarborough T; O'Connell M; Leasiolagi J; Little M; Burgess J; Hargrove M ; Goodfellow A; Scheiber CJ; Cap A; Yazer, MH. Approach to Handling Atypical Field Blood Transfusion Scenarios. J Spec Oper Med. 2023;23: 76-81.

Notes:

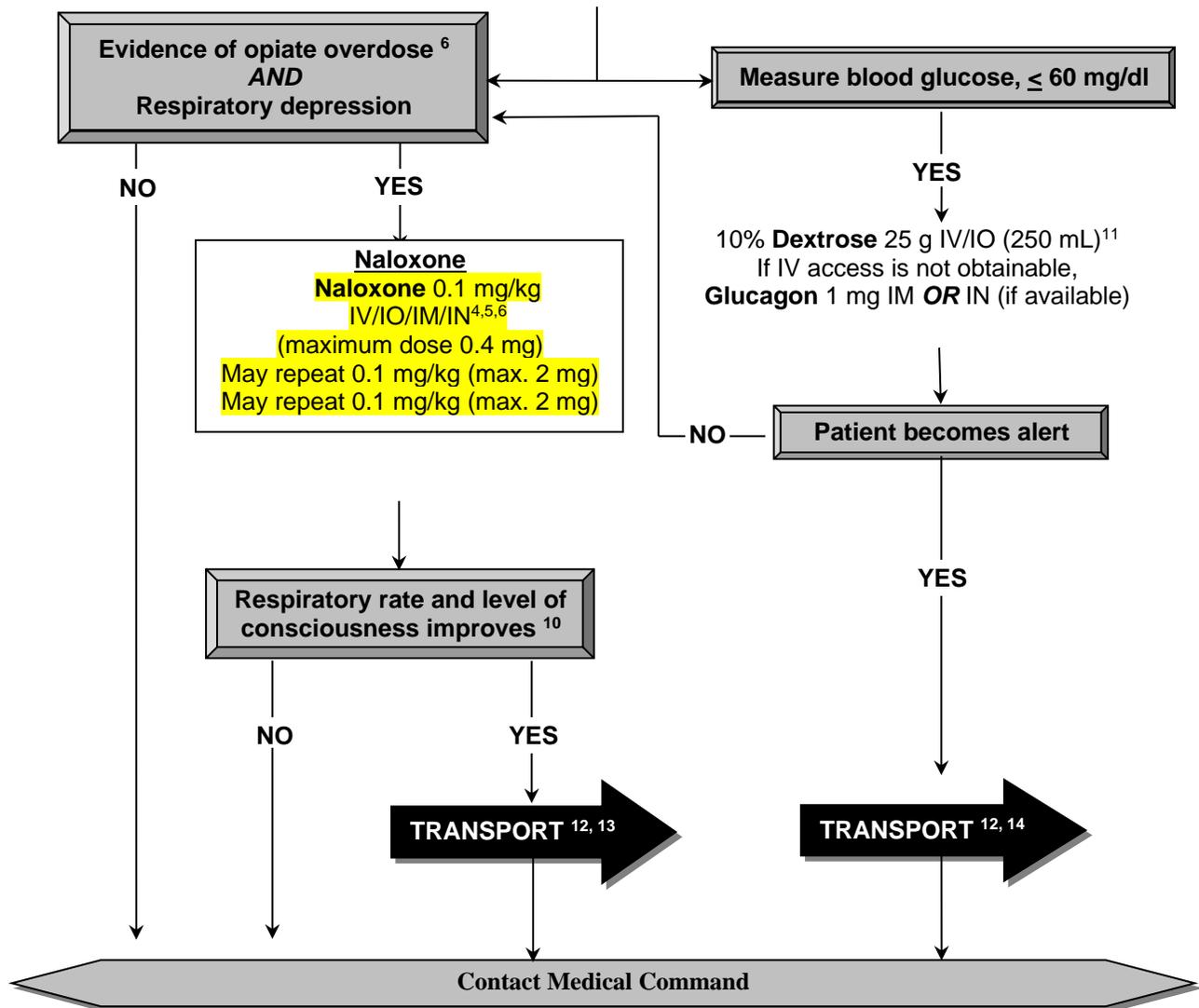
1. Do not delay transport awaiting establishment of blood product administration.
2. Follow Statewide Protocols for Initial Patient Contact (Protocol #201) and Approach to the Crashing Patient/Patient in Extremis (Protocols # 3000A & 3000P).
3. If patient is injured, also follow Trauma Triage (Protocol # 180), and Multi-System Trauma or Traumatic Shock (Protocol # 6002).
4. If patient is alert with decision making capacity and the condition allows, attempt to obtain informed consent for the blood product administration. Otherwise, implied consent should apply (e.g. patient is unresponsive).
5. In volume resuscitation efforts in patients with hemorrhagic shock, the preferred resuscitation fluids are blood products. Crystalloid bolus (NS or LR) up to 1 Liter may be initiated if blood products unavailable immediately.
6. Blood products to be considered: LTO+WB preferred, if not available then plasma or RBCs in balanced ratios when possible, as approved by region and agency medical director.
7. Shock index is determined by dividing the heart rate by the systolic BP.

Performance Parameters:

- A. Establishment of informed or implied consent
- B. Patient has met inclusion criteria and no exclusion criteria
- C. Command consult performed
- D. Documentation of blood product labeling
- E. Documentation of vitals (HR, BP, Spo2, RR) every 10 minutes, with vitals and temperature at initiation and completion of transport.
- F. Documentation of number of units and volume infused
- G. Documentation of any adverse events
- H. Establishment of inpatient follow up

**ALTERED LEVEL OF CONSCIOUSNESS
STATEWIDE ALS PROTOCOL**

Initial Patient Contact - See Protocol # 201
 Administer Oxygen ¹
 Manage Airway/Ventilate, if needed ^{2,3}
 Monitor ECG/Pulse Oximetry ⁴
 Assess Glasgow Coma Scale
 Initiate IV/IO NSS
 Draw blood if required by agency ⁵



**ALTERED LEVEL OF CONSCIOUSNESS - ADULT
STATEWIDE ALS PROTOCOL**

Criteria:**A.** Patient with altered level of consciousness due to:

1. Unclear etiology after assessing patient
2. History consistent with hypoglycemia
3. Suspected drug ingestion /overdose

Exclusion Criteria:**A.** Altered level of consciousness due to:

1. Trauma - Follow appropriate trauma protocol (e.g. head injury or multi-system trauma protocol)
2. Shock - Follow Shock protocol # 7005
3. Dysrhythmias - Follow appropriate dysrhythmia protocol.
4. Toxicologic
 - a. Carbon monoxide - Follow Poisoning/Toxic Exposure Protocol #8031.
 - b. Cyanide - Follow Cyanide Exposure Protocol #8081.
 - c. Nerve agent exposure - Follow Nerve Agent Exposure Protocol #8083.
5. Seizure - Follow Seizure Protocol #7007.
6. Stroke - Follow Stroke Protocol #7006.
7. Other medical problems specifically suspected due to history or exam, e.g. choking, hypoxia due to respiratory failure, etc...- Follow applicable specific protocol.

Possible MC Orders:

- A.** Additional doses of naloxone
- B.** Additional doses of dextrose or glucagon (if available)

Notes:

1. Administer oxygen by appropriate method.
2. Confirm and document tube placement with auscultation and **electronic waveform capnography ETCO₂ detector/secondary device** - Follow Confirmation of Airway Placement Protocol #2032
3. If unable to intubate on up to 3 attempts, consider Alternative/ Rescue airway.
4. See Pulse Oximetry Protocol #226. Pulse Oximetry must not delay the application of oxygen. Record SpO₂ after administration of oxygen or intubation. ECG monitoring is not required when treating uncomplicated hypoglycemia that fully resolves with EMS treatment.
5. If receiving facility will accept blood samples, blood should be drawn in red top tube for analysis at the hospital unless the patient is a known diabetic who takes insulin or oral diabetic medications (e.g. glyburide, metformin, etc...)
6. Indications of possible opiate overdose include decreased respirations, pinpoint pupils, skin “track marks”, *AND/OR* the presence of drug paraphernalia.
7. Naloxone should not be given to patients that have been intubated.
8. Naloxone can be administered IM, IO, or intranasally if IV cannot be established. IN administration should be done via an atomizing device, giving half of dose in each nostril. If IM route is required, use 2 mg.

9. The goal of each naloxone dose is return of adequate spontaneous respirations – the goal is not consciousness or walking. Do not give additional doses if patient breathing spontaneously with adequate oxygen saturation. Larger individual doses of naloxone can precipitate opiate withdrawal with the potential for a violent or combative patient that is difficult to manage at the scene and once the patient is admitted to the hospital. Some opioids may require higher doses of naloxone. Principles related to naloxone use include:
 - a. Assisting ventilation with BVM should occur prior to and during naloxone administration if needed.
 - b. Options for titrating naloxone dosing every 2-4 minutes until adequate spontaneous respirations:
 - i. IV/IO: 0.4 mg, then up to 2mg. 1.6 – 2 mg, then 2 mg (up to 4.4 mg total)
 - ii. IM/IN: 2 mg, then 2 mg (4 mg total); may use 4 mg IN prefilled device
 - iii. 2 mg dose by any route is acceptable for patient with both respiratory depression and poor perfusion (hypotension, weak/thread pulse), then additional 2 mg
 - c. If inadequate spontaneous ventilation after a total of up to 4 mg naloxone by any route, efforts should be focused on adequate BVM ventilation and placement of advanced airway, if possible.
10. Indicators of improved mental status include:
 - a. Orientation to person, place and time
 - b. Increased alertness
 - c. Increased responsiveness to questions
11. There is an increased risk of tissue damage if 50% dextrose extravasates, and the time to regaining consciousness is similar when using either 10% or 50%, therefore administration of 10% dextrose is preferred. ALS agencies may carry dextrose for the treatment of hypoglycemia in adults in any concentration between 10 – 50%.
12. For patients refusing transport, adhere to ~~Refusal of Treatment/Transport~~ ~~Non-Treatment and/or Non-Transport of Patient~~ Protocol #111.
13. After an opioid overdose with patient improvement after naloxone administration, patient may be released for transport to the hospital with a BLS crew without contacting medical command if all of the following are met:
 - a. No contraindications from ~~Refusal of Treatment/Transport~~ ~~Non-Treatment and/or Non-Transport of Patient~~ Protocol #111.
 - b. Anticipated transport time <30 minutes.
 - c. Patient alert and oriented for at least 10 minutes before transfer of care to BLS crew.
 - d. Transporting BLS crew carries naloxone.
 - e. BLS and ALS agencies both agree with BLS transport.
14. Patient may be released without Medical Command if all of the following are met:
 - a. No contraindications from ~~Refusal of Treatment/Transport~~ ~~Non-Treatment and/or Non-Transport of Patient~~ Protocol #111.
 - b. Repeat glucose meter is > 80 mg/dl
 - c. Patient is an insulin-dependent diabetic (not on oral antihyperglycemics)

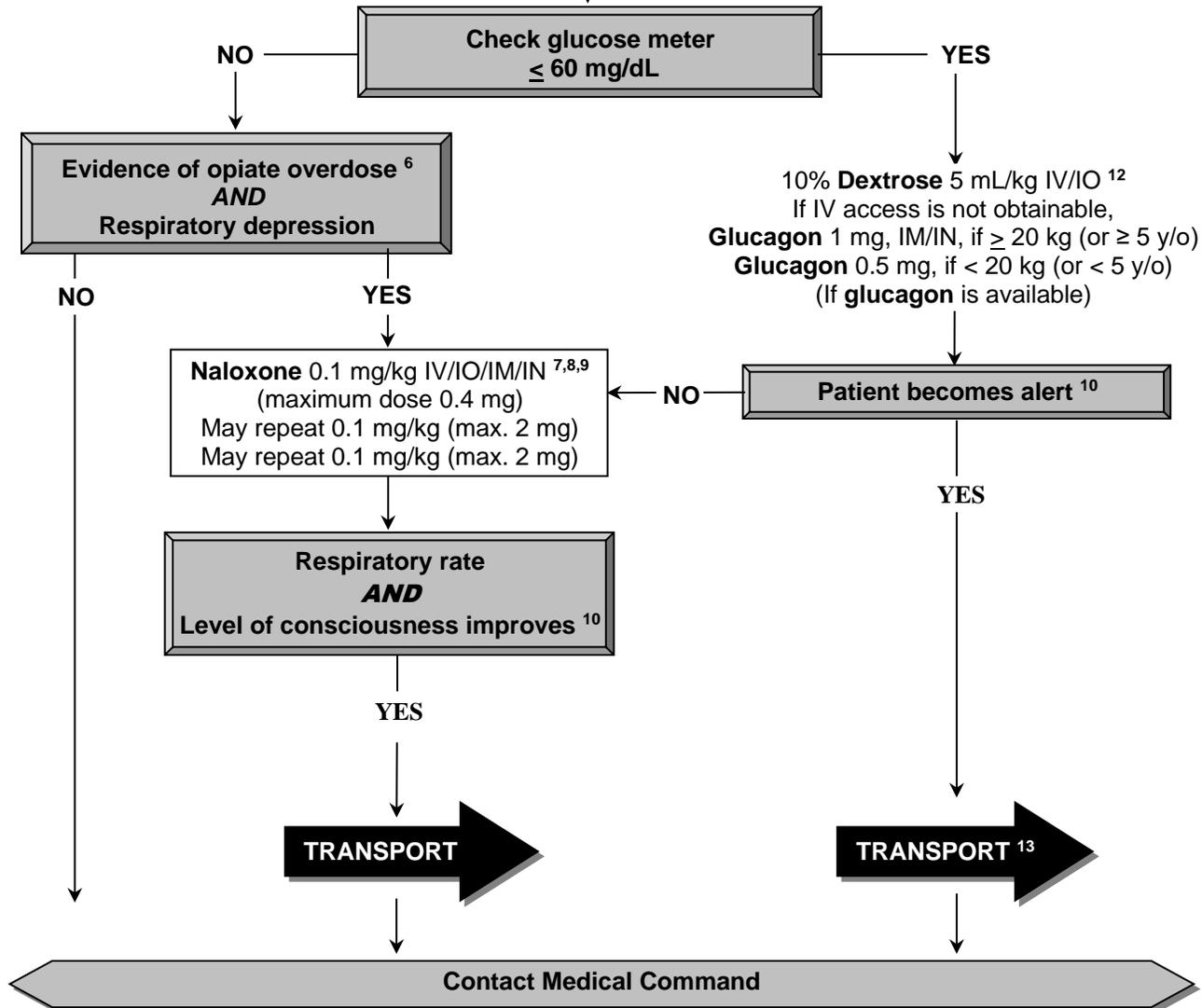
- d. Patient returns to normal mental status, with no focal neurologic signs/symptoms after receiving glucose
- e. Patient can promptly obtain and will eat a carbohydrate meal.
- f. Patient refuses transport, or patient and paramedics agree transport not needed
- g. Another competent adult will be staying with patient
- h. No major co-morbid conditions exist, such as chest pain, arrhythmias, dyspnea, seizures, intoxication
- i. Patient should not be released without medical command contact if given glucagon instead of dextrose or if he/she received naloxone.
- j. If all of the above conditions are not met and the patient or legal guardian refuses transport, contact medical command. If the patient or legal guardian requests transport, honor the request.

Performance Parameters:

- A. Review for proper use of naloxone and glucose and documentation of neurologic assessment/response to treatment.

**ALTERED LEVEL OF CONSCIOUSNESS - PEDIATRIC
STATEWIDE ALS PROTOCOL**

Initial Patient Contact - See Protocol #201
Administer Oxygen ¹
Manage Airway/Ventilate, if needed ^{2,3}
Monitor ECG/Pulse Oximetry ⁴
Assess Glasgow Coma Scale
Initiate IV/IO NSS
Draw blood if required by agency ⁵



**ALTERED LEVEL OF CONSCIOUSNESS - PEDIATRIC
STATEWIDE ALS PROTOCOL**

Criteria:**A.** Patient with altered level of consciousness due to:

1. Unclear etiology after assessing patient
2. History consistent with hypoglycemia (in infants and children, hypoglycemia frequently accompanies overdose, alcohol ingestion, poisoning, or metabolic/medical diseases)
3. Suspected drug ingestion /overdose

Exclusion Criteria:**A.** Altered level of consciousness due to:

1. Trauma - Follow appropriate trauma protocol (e.g. head injury or multi-system trauma protocol)
2. Shock - Follow Shock Protocol #7005
3. Dysrhythmias - Follow appropriate dysrhythmia protocol.
4. Toxicologic
 - a. Carbon monoxide - Follow Poisoning / Toxic Exposure Protocol #8031.
 - b. Cyanide - Follow Cyanide Exposure Protocol #8081.
 - c. Nerve agent exposure - Follow Nerve Agent Exposure Protocol #8083.
5. Seizure - Follow Seizure Protocol #7007.
6. Stroke - Follow Stroke Protocol #7006.
7. Other medical problems specifically suspected due to history or exam, e.g. choking, hypoxia due to respiratory failure, etc... - Follow applicable specific protocol.

Possible MC Orders:

- A.** Additional doses of naloxone
- B.** Additional doses of dextrose or glucagon (if available)

Notes:

1. Administer oxygen by appropriate method.
2. In children, ventilation by bag-valve-mask is the preferred method of airway maintenance and ventilation if transport time is short. However, if patient cannot be adequately oxygenated or ventilated by bag-valve-mask or if transport time is long, intubation is indicated. Use a length-based device to assist with selection of appropriately sized airway equipment.
3. Confirm and document tube placement with auscultation and **electronic waveform capnography ETCO₂ detector/secondary device** - Follow Confirmation of Airway Placement Protocol #2032
4. See Pulse Oximetry Protocol #226. Pulse Oximetry must not delay the application of oxygen. Record SpO₂ after administration of oxygen or intubation.
5. Blood should be drawn in red top tube for analysis at the hospital unless the patient is a known diabetic who takes insulin or oral diabetic medications (e.g. glyburide, metformin, etc...)
6. Indications of possible opiate overdose include decreased respirations, pinpoint pupils, skin "track marks", *AND/OR* the presence of drug paraphernalia.
7. Naloxone should not be given to patients that have been intubated.

8. Naloxone can be administered IM, IO, or intranasally if IV cannot be established. IN administration should be done via an atomizing device, giving half of the dose in each nostril.
9. The goal of each naloxone dose is return of adequate spontaneous respirations – the goal is not consciousness or walking. Do not give additional doses if patient breathing spontaneously with adequate oxygen saturation. Larger individual doses of naloxone can precipitate opiate withdrawal with the potential for a violent or combative patient that is difficult to manage at the scene and once the patient is admitted to the hospital. If history of chronic opioid use, naloxone dose should be decreased to 0.01 mg/kg. If no response to dose of naloxone, dose may be repeated, every 2-4 minutes, in 0.4 mg increments to a total of 2 mg. Some opioids may require higher doses of naloxone. Principles related to naloxone use include:
 - a. Assisting ventilation with BVM should occur prior to and during naloxone administration if needed.
 - b. Options for titrating naloxone dosing every 2-4 minutes until adequate spontaneous respirations:
 - i. 0.1 mg/kg IV/IO/IM/IN (maximum 0.4 mg first dose)
 - ii. then 0.1 mg/kg IV/IO/IM/IN (maximum 2 mg second dose)
 - iii. then 0.1 mg/kg IV/IO/IM/IN (up to 2 mg third dose)
 - iv. 2 mg dose by any route is acceptable for patient with both respiratory depression and poor perfusion (hypotension, weak/thread pulse), then additional 2 mg
 - c. If inadequate spontaneous ventilation after a total of up to 4 mg naloxone by any route, efforts should be focused on adequate BVM ventilation and placement of advanced airway, if possible.
10. Indicators of improved mental status include:
 - a. Orientation to person, place and time
 - b. Increased alertness
 - c. Increased responsiveness to questions
11. For patients refusing transport, adhere to **Refusal of Treatment/Transport Non-Treatment and/or Non-Transport of Patient** Protocol #111.
12. ALS agencies may carry dextrose for the treatment of hypoglycemia in children in any concentration between 10 – 25%. Patients awaken in a similar amount of time whether using 10 or 25%. For neonates, 25% dextrose dose should be diluted with equal amounts of NSS for 12.5% dextrose at 4 mL/kg (or administer 5 mL/kg of 10% dextrose for any age).
13. Patient may be released without Medical Command if all of the following are met in addition to criteria in protocol #111:
 - a. Repeat glucose meter is > 60 mg/dl
 - b. Patient is an insulin-dependent diabetic (not on oral antihyperglycemics)
 - c. Patient returns to normal mental status, with no focal neurologic signs/symptoms after receiving glucose.
 - d. Patient can obtain and will promptly eat a carbohydrate meal.
 - e. Legal guardian refuses transport, or patient, legal guardian and paramedics agree transport not needed
 - f. Legal guardian or another competent adult will be staying with patient
 - g. No major co-morbid conditions exist, such as chest pain, arrhythmias, dyspnea, seizures, intoxication
 - h. Patient should not be released without medical command contact if given glucagon instead of dextrose or if he/she received naloxone.

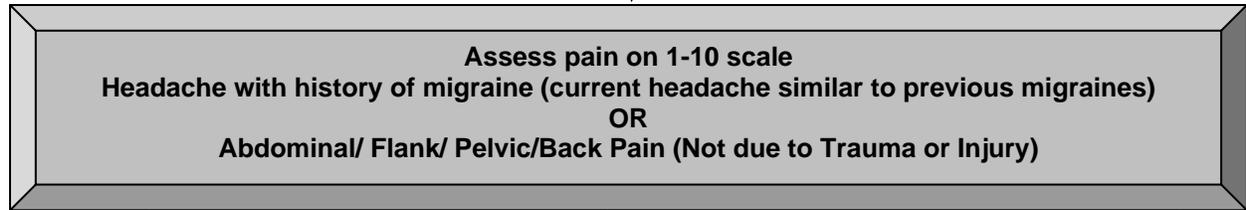
- i. If all of the above conditions are not met and the patient or legal guardian refuses transport, contact medical command. If the patient or legal guardian requests transport, honor the request.

Performance Parameters:

- A. Review for proper use of naloxone and glucose and documentation of neurologic assessment/response to treatment.

NONTRAUMATIC PAIN MANAGEMENT STATEWIDE ALS PROTOCOL

Initial Patient Contact – See Protocol #201



Oral medication not contraindicated

- Place in position of comfort
- Provide verbal reassurance

If mild to moderate pain:

- **Acetaminophen**¹, if available, 650 mg orally
Peds 15 mg/kg (max 650 mg)
OR
- **Ibuprofen**, if available, 10mg/kg, max 600mg Peds ≥ 2 y/o, 10 mg/kg (max 4600 mg), if available
OR
- **Aspirin** 324-975 650 mg orally (adult > 14 y/o only)

WARNING: Do not administer these medications if patient had medication recently (within 4 hours for acetaminophen/aspirin, within 6 hours for NSAID).

Analgesic Medication (see box below)

If severe pain (greater than a 7/10):

fentaNYL 1mcg/kg up to 100mcg^{7,8,9}

Or

Morphine 0.1mg/kg max dose 10mg
*caution/lower dose with elderly and hemodynamic instability.^{7,8,9}

Or

Ketamine See dosing box below or 0.3mg/kg max 30mg

Peds < 2 y/o

Nausea or contraindication to oral medication

- Place in position of comfort
- Provide verbal reassurance
- Initiate IV/IO NSS³
- If nausea, consider ondansetron, if available (see protocol 7010)
- Administer Nonopioid Analgesic Medication (see box below)



**NONTRAUMATIC PAIN MANAGEMENT
STATEWIDE ALS PROTOCOL**

NONOPIOID ANALGESIC MEDICATION OPTIONS (Choose one)

Medical Command MUST order any opioid medication or **ketamine for mild or moderate pain**

Nitrous Oxide, if available (50:50) by inhalation ⁴

OR

Ketorolac, if available, 15 mg IV/IO ^{2,5} (30 mg IM)

IV administration preferred if kidney stone suspected

(Peds ≥ 2 y/o, 0.5 mg/kg IV/IO/IM, maximum 15 mg IV/IO or 30 mg IM)

OR

Acetaminophen, if available, 1000 mg IV (maximum 650 mg if < 65 kg), give slowly over 15 minutes.

(Peds ≥ 2 y/o, 15 mg/kg, maximum 650 mg)

WARNING: Do Not Administer if patient had acetaminophen in last 4 hours.

OR

Ketamine, if available, 0.3 mg/kg in 100 mL NSS, given IV/IO over 10 min (maximum 30 mg).

WARNING: Ketamine must be administered by infusion rather than direct bolus. Ketamine should not be administered to pediatric patients <15 yrs old. Adverse psychomimetic effects are more common in bolus dosing and the elderly. EMS providers require special approval to administer ketamine.

NONTRAUMATIC PAIN MANAGEMENT STATEWIDE ALS PROTOCOL

Criteria:

- A. Patient with headache that is similar to previous migraine headaches
- B. Patient with flank pain, including suspected kidney stone pain
- C. Patient with acute abdominal pain
- D. Patient with acute pelvic pain

Exclusion Criteria:

- A. Headache pain that is new for patient, associated with cerebral aneurysm, or is worst headache of patient's life - these may be associated with intracranial hemorrhage
- B. Known or suspected bleeding (gastrointestinal bleeding, leaking AAA, vaginal bleeding, etc.)
- C. Known or suspected pregnancy
- D. Pain from musculoskeletal trauma (Follow Musculoskeletal Trauma Protocol #6003)
- E. Known history of glucose-6-phosphate dehydrogenase (G6PD) deficiency

System Requirements

- A. EMS region must approve the use of ketamine within the region, and the region must perform a QI audit of **every** case of ketamine administration for compliance with this protocol. All results must be forwarded quarterly to the Bureau of EMS for statewide QI. The Agency's assigned EMS regional council must verify the agency has met, and continues to meet the requirements as specified by the Department, for training, stocking, and QI. The region must perform a QI audit of every case of ketamine administration for compliance with this protocol. All results must be forwarded quarterly to the Bureau of EMS for statewide QI.
- B. Agency medical director must approve of ketamine use by the EMS agency and must perform a QI audit of **every** case of ketamine administration for compliance with this protocol.
- C. Agency medical director must personally assure training and continuing education in patient selection, continuous respiratory monitoring, advanced airway management, ketamine pharmacology, and use of this protocol.
- D. Ketamine is an optional medication for EMS providers above the level of AEMT, and approval to carry this medication is specific to the use of pain, sedation assisted intubation, and/or delirium with agitated behavior, based upon regional and agency medical director approval. **EMS providers are not permitted to administer ketamine for indications outside of specific indications within these protocols – even by medical command order – unless they have received special approval to participate in pilot use for other indications.**
- E. Agency medical director must assure initial and ongoing competence for each individual EMS provider who will use ketamine. Only individuals credentialed to administer this medication will utilize the medication.
- F. The ALS agency must carry an alternative/ rescue airway device in various sizes.

- G.** Ketamine may only be carried by ALS agencies that follow all aspects of this protocol and permission to carry the medication will be removed from the agency by the Bureau of EMS if either the agency/regional QI or other investigation determines that there are significant variances from this protocol.

Possible Medical Command Orders:

- A.** fentaNYL or morphine⁶

Notes:

1. Acetaminophen is contraindicated in patients with liver disease/failure.
2. NSAID (nonsteroidal anti-inflammatory drugs), including ibuprofen and ketorolac, are contraindicated if:
 - a. Oral NSAID (e.g. ibuprofen, naproxen, etc.) taken by patient in last 6 hours
 - b. Gastrointestinal, vascular or other bleeding suspected.
 - c. Known kidney disease/failure or kidney transplant.
3. IV/IO access is not required for administration of nitrous oxide or IM ketorolac.
4. Nitrous oxide should be self-administered. Patient should be coached to hold mask on his/her face, and the patient will drop mask if he/she becomes sedated. Over sedation may occur if EMS provider holds mask to patient's face. Nitrous oxide may be administered without IV access. Avoid nitrous oxide in:
 - a. SBP < 90 [Pediatrics < 70 + (2 x age)] For children 1-10 years old and BP < 70 + (age x 2) or if greater than 10 years old and BP < 90
 - b. altered mental status (e.g. obvious intoxication, head injury)
 - c. chronic lung disease
 - d. suspected pneumothorax
 - e. suspected bowel obstruction
 - f. decompression sickness (e.g. from diving/submersion)
5. In renal colic (kidney stone pain), IV administration of ketorolac is preferred.
6. Medical command must be contacted if EMS provider believes that patient requires opioid analgesia or ketamine for abdominal pain or other nontraumatic pain.
7. Reduce dose for patients over 65 y/o.
8. Opioid medication should not be given if:
 - a. Oxygen saturation < 95%
 - b. SBP < 100 for adults
 - c. SBP < 70 + 2(age in years) for children < 14 y/o; SBP < 70 for age 6 months to 1 year OR < 70 + 2(age in years) for children 1-10 y/o

- d. Patient has altered level of consciousness
9. If respiratory depression or hypoxia occur after opioid:
 - a. Administer oxygen and ventilate if necessary
 - b. If significant respiratory depression, administer naloxone 0.4 mg IV, titrate additional doses until adequate ventilation or total of 2 mg.
-

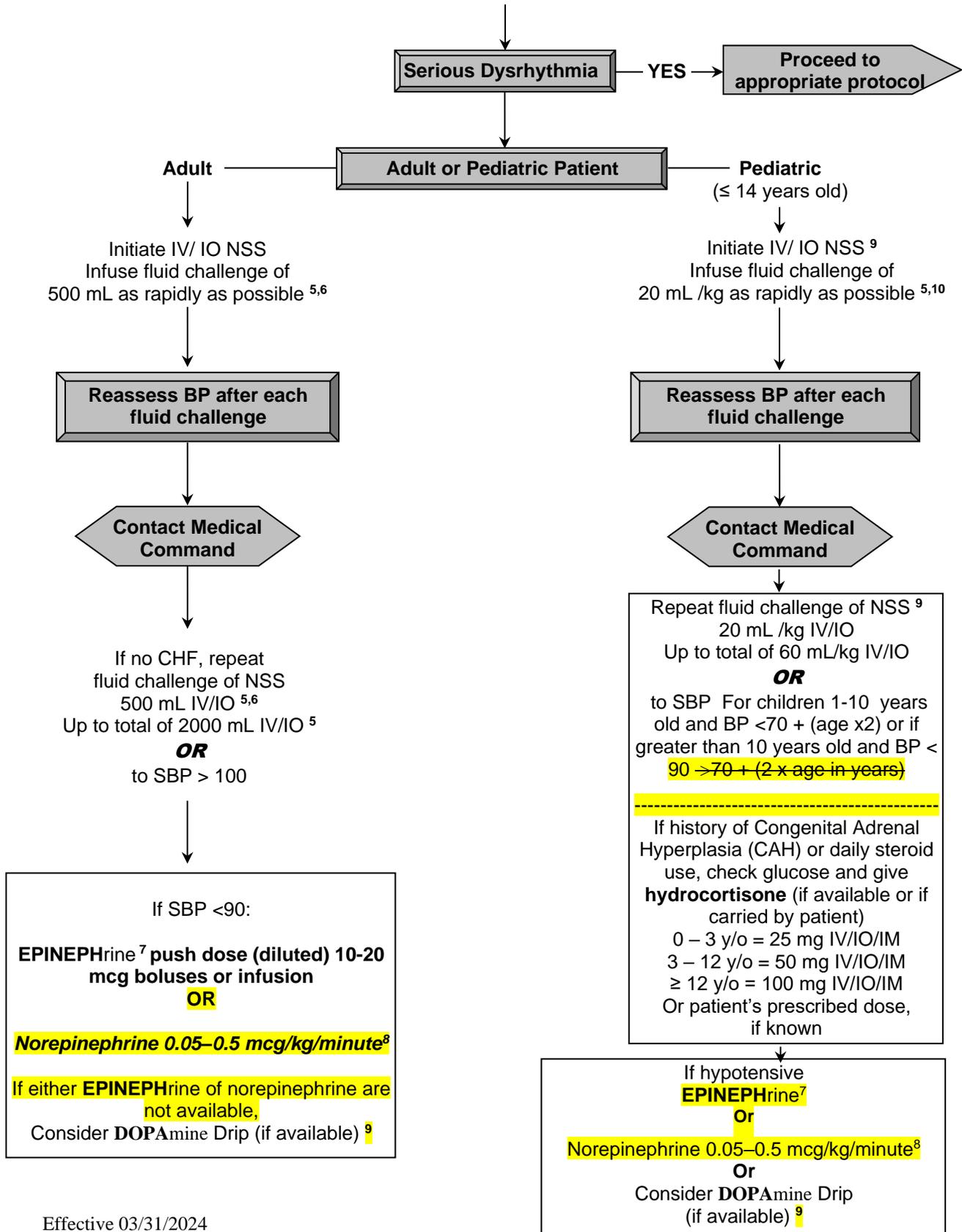
Performance Parameters:

- A. Severity of pain documented for all painful conditions and documented before and after analgesic medications/ interventions.
- B. Agency medical director and QI committee review of each case of sub-dissociative dose of ketamine for pain. Review for pre- and post-administration pain severity, appropriate indication, appropriate dosage, monitoring of VS and continuous pulse oximetry. Agencies must submit quarterly report of ketamine uses to EMS regional QI committee. Regional QI committee must report quarterly regional summary of use and protocol compliance to BEMS quarterly.

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**SHOCK / SEPSIS
STATEWIDE ALS PROTOCOL**

Initial Patient Contact - Follow protocol #201
 Manage Airway/Ventilate, if needed ^{1,2,3}
 High-flow oxygen
 Keep patient warm
 Monitor ECG/Pulse Oximetry ⁴ consider waveform capnography



**SHOCK / SEPSIS
STATEWIDE ALS PROTOCOL**

Criteria:

- A. Hypoperfusion of body organs is characterized by alterations in mental status, pallor, diaphoresis, tachypnea, tachycardia, poor capillary refill, and hypotension.
1. Septic Shock - signs or symptoms of hypoperfusion from a suspected infectious source (e.g. urosepsis, pneumonia, bacteremia / septicemia). These patients may present with a fever or preceding infectious illness.
 2. SIRS is a systemic inflammatory response that may be a precursor to septic shock in a patient that is not yet hypotensive. Consider SIRS in patient with generalized weakness, hypoxia, or suspected infection like pneumonia. SIRS can be recognized in adults when there is a possible infection with at least two of the following:
 - a. Temperature > 38° C (100.4° F) or < 36° C (96.8° F) (ambulances are required to have a non-tympanic, digital thermometer).
 - b. Heart rate > 90 bpm
 - c. Tachypnea > 20 bpm
 3. Hypovolemic Shock from gastrointestinal bleeding or from repetitive vomiting/diarrhea in infants/children.
 4. Hypoperfusion of unknown etiology.

Exclusion Criteria:

- A. Cardiogenic Shock- hypotension with suspected pulmonary edema - See CHF Protocol #5002.
- B. Hypovolemic/Traumatic Shock of traumatic etiology - See Multisystem Trauma or Traumatic Shock Protocol #6002.
- C. Neurogenic Shock due to spinal cord injury – See Multisystem Trauma or Traumatic Shock Protocol #6002.

Possible MC Orders:

- A. Additional NSS fluid boluses
- B. Earlier intervention with vasopressor infusions (**DOPA**mine, **DOBU**Tamine, **EPINEPH**rine).

Notes:

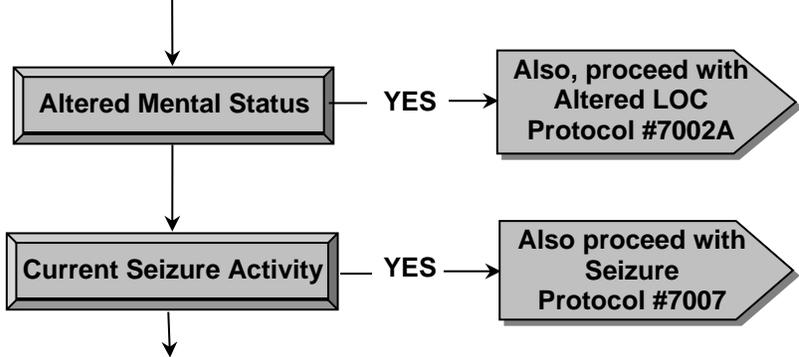
1. Confirm and document tube placement with auscultation and **electronic waveform capnography** **ETCO₂ detector/secondary device** - Follow Confirmation of Airway Placement Protocol #2032.
2. If unable to intubate on up to 3 attempts, consider alternative/ rescue airway device.
3. In children, ventilation by bag-valve-mask is the preferred method of airway maintenance and ventilation if transport time is short. However, if patient cannot be adequately oxygenated or ventilated by bag-valve-mask or if transport time is long, intubation is indicated. Use a length-based device to assist with selection of appropriate sized airway equipment.
4. See Pulse Oximetry Protocol #226. Pulse Oximetry must not delay the application of oxygen. Record SpO₂ after administration of oxygen or intubation.
5. Bolus IV fluid should be given as quickly as possible, ideally in less than ten minutes.

6. Do not give IV fluid bolus prior to medical command if the patient has signs of CHF (for example, rales or significant pitting edema).
7. **EPINEPH**rine by push dose (dilute boluses) or infusion. Push dose boluses = prepare 10 mcg/mL concentration by adding 1 mL of 0.1 mg/mL concentration **EPINEPH**rine in 9 mL NSS, then administer **1-2 mL 20mcg** every 2 minutes and titrate to SBP >90.
 - a. **EPINEPH**rine Infusion = must administer by electronic pump at 0.05 mcg/kg/min titrated to SBP target. **(this does not include push dose EPINEPHrine)**
8. **Cardiogenic, hypovolemic, obstructive shock and distributive shock:**
 - i. **Norepinephrine 0.05 mcg/kg/minute**
 1. **Preference in both neurogenic and infectious (sepsis) causes of distributive shock. Titrate by 0.05mcg/kg/min every 5 minutes to a MAP of 65mmHg.**
 - a. **If utilizing Norepinephrine, an infusion pump is necessary.**
9. **DOPA**mine infusion: Mix infusion using regional or agency prescribed concentration, and administer 5-20 mcg/kg/min. Generally, start at 5 mcg/kg/min, and increase every 10 minutes by an additional 5 mcg/kg/min until SBP >100 mmHg. **DO NOT exceed 20 mcg/kg/min unless ordered by medical command physician.**
10. If unable to obtain peripheral IV access, place an intraosseous (IO) line, if available.
11. In infants, it is difficult to distinguish between hypoperfusion from hypovolemia and that due to cardiogenic shock. Hypovolemia frequently follows a history of repetitive vomiting/diarrhea. If cardiogenic shock is suspected, fluid boluses should be limited to the initial 20 mL/kg.

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**STROKE
STATEWIDE ALS PROTOCOL**

Initial Patient Contact - See Protocol #201
Administer Oxygen titrated to SpO2 95-99%¹
Manage Airway/Ventilate, if needed ^{2,3}
Monitor ECG/Pulse Oximetry ⁴



Is acute stroke suspected by Cincinnati Prehospital Stroke Scale ^{5,6} (CPSS)?

Face - facial droop present,
OR
Arm - upper extremity arm drift present (arms extended/ palms up),
OR
Speech - inability to say, "The sky is blue in Pennsylvania" normally,
AND
Time - time since last known well < 24 hours ⁷

Large vessel occlusion (LVO) suspected by ≥2 CPSS exam findings or mRACE Score (optional) ≥ 5
LVO strokes may benefit from care at Comprehensive or Thrombectomy-Capable Stroke Center
Other signs of possible stroke include poor balance, vertigo, and partial loss of peripheral vision

**YES,
≤ 3 hours since last seen well**

**YES,
3-24 hours since last seen well**

Package/ Transport patient immediately in supine position ^{8,9}
Check **Glucose Glucometer** ¹⁰

Transport to closest Stroke Center^{11,12}
If LVO suspected or if contraindications to thrombolysis¹³
consider transport to Comprehensive/ Thrombectomy-Capable Stroke Center (preferred), if can be reached within 45 minutes.

Contact Medical Command, if needed for destination assistance¹⁴

Check **Glucose Glucometer** ¹⁰
Initiate IV NSS¹⁵
Consider Drawing Bloods ¹⁶

Contact Medical Command, if needed for destination assistance^{14,17}

If LVO suspected (mRACE Score (optional) ≥ 5) consider transport to Comprehensive/ Thrombectomy-Capable Stroke Center, if can be reached within 45 minutes.¹⁷

Transport in supine position immediately⁹

Notify Receiving Facility ASAP
Initiate IV NSS¹⁵
Consider Drawing Bloods ¹⁶

STROKE STATEWIDE ALS PROTOCOL

Criteria:

- A.** Patients may have the following clinical symptom(s):
1. Impaired expression or understanding of speech
 2. Unilateral weakness/hemiparesis
 3. Facial asymmetry/droop
 4. Headache
 5. Poor coordination or balance
 6. Partial loss of peripheral vision
 7. Vertigo
- B. CAUTION:** Respiratory and cardiovascular abnormalities may reflect increased intracranial pressure. Lowering of the blood pressure may be dangerous.

Exclusion Criteria:

- A.** Consider hypoglycemia, trauma, and other etiologies that can cause focal neurological symptoms that mimic stroke, and follow applicable protocol if appropriate.

System Requirements:

- A.** EMS providers using the optional mRACE Scale must complete DOH approved education for mRACE assessment. EMS agencies using mRACE Scale must ensure that the agency's providers have completed this education.

Possible MC Orders:

- A.** Transport to a receiving facility that is a certified primary stroke center.

Notes:

1. Administer oxygen by appropriate method and monitor Pulse Oximetry, **if available**.
2. Confirm and document tube placement with auscultation and **ETCO₂ detector/secondary device electronic waveform capnography** - Follow Confirmation of Airway Placement Protocol #2032
3. If unable to intubate on up to 3 attempts, consider **alternative/rescue** supraglottic airway device.
4. See Pulse Oximetry Protocol #226. Pulse Oximetry must not delay the application of oxygen. Record SpO₂ after administration of oxygen or intubation.
5. Neurological examination includes level of consciousness, Glasgow Coma Scale, pupils, individual limb movements, and Cincinnati Prehospital Stroke Scale (CPSS).
6. **Cincinnati Prehospital Stroke Scale**. If any of the following is **abnormal** and **new** for the patient, he/she may have an acute stroke:
 - a. Facial Droop (patient smiles or shows teeth) - abnormal if one side of the face does not move as well as the other.
 - b. Arm Drift (patient holds arms straight out in front of him/her and closes eyes) – abnormal if one arm drifts down compared with the other.
 - c. Speech (patient attempts to say “The sky is blue in Pennsylvania”) – abnormal if patient slurs words, uses inappropriate words, or can't speak.

7. Attempt to identify the precise time of the onset of the patient's first symptoms. The time of onset is extremely important information, and patient care may be different if patient can be delivered to a certified primary stroke center within 3 hours from onset of symptoms. Time is based upon the last time that the patient was witnessed to be at his/her neurologic baseline.
8. Transport and Medical Command contact should not be delayed by attempts to initiate IV or draw blood in patients who are awake. In these patients, the IV should be done enroute after notifying receiving facility or medical command.
9. If patient can't tolerate supine position, transport with head elevated < 30 degrees.
10. If **glucometer glucose** < 60 mg/dL, give dextrose 25 g IV/IO (10-50% concentration).
11. The Department of Health maintains a listing of recognized stroke centers. Found at <https://www.health.pa.gov/topics/EMS/Pages/Recognized-Stroke-Centers.aspx>. Transport to the closest certified Primary Stroke Center or Comprehensive Stroke Center if the patient can arrive at the stroke center within 45 minutes. Otherwise, transport to an Acute Stroke Ready Hospital, if the patient can arrive at that facility within 45 minutes.
12. If patient can be delivered by air (but not by ground) to receiving facility within 3 hours of symptom onset, consider contact with medical command for assistance in deciding upon the utility of air medical transport. See Protocol #181.
13. Exclusions or contraindications to thrombolysis for stroke include:
 - a. Any of the following within past 3 months – intracranial surgery, intraspinal surgery, serious head trauma, or stroke.
 - b. Any history of brain hemorrhage, tumor, AVM, or aneurysm.
 - c. Received any of the following medications in last 48 hours – dabigatran (Pradaxa), rivaroxaban (Xarelto), apixaban (Eliquis), or edoxaban (Savaysa).
 - d. Received dose of enoxaparin (Lovenox) within 24 hours.
 - e. Any of the following in the last 2 weeks – surgery/biopsy, gastrointestinal or genitourinary bleeding, serious trauma, or arterial puncture.
14. Contact Medical Command for all patients with acute CPSS symptoms that have onset within 3 hours of estimated arrival at the receiving facility, so the receiving hospital can prepare for the patient's arrival. Describe to the Medical Command Physician your findings, including CPSS results. Medical command may order transport to a certified primary, **thrombectomy capable, or comprehensive stroke center**. If the medical command physician is not at the receiving facility, the medical command physician should relay pertinent information to the receiving facility.
15. If patient will arrive for ED treatment within 3 hours of symptoms, initiate a second IV access with saline lock enroute to hospital. Ideally 18-20 gauge IV access.
16. Before administering glucose, blood should be drawn in red top tube for analysis at the hospital unless the patient is a known diabetic who takes insulin or oral diabetic medications (e.g. glyburide, metformin, etc...).
17. mRACE (modified Rapid Arterial occlusion Evaluation) Scale [OPTIONAL] (See Box) may be used by some EMS agencies, stroke centers, or regions to identify possible large vessel strokes. Medical command may use mRACE ≥ 5 to consider ordering transport directly to a Comprehensive or Thrombectomy-Capable Stroke Center or a regional center that is capable of intravascular stroke treatment.

Performance Parameters:

- A. Review on scene time for all cases of suspected stroke with time of symptom onset less than 3 hours from time of EMS arrival. Consider benchmark of on scene time ≤ 10 minutes.

- B.** Review documentation for CPSS criteria, time of symptom onset, glucose determination, and appropriate communication with medical command and receiving facility to maximize prearrival warning to receiving facility and most appropriate receiving facility.

Modified RACE (mRACE) Score

EMS Agency:		Patient Name:	DOB: / /	Date of Exam: / /
EMS Unit:		Symptom Onset Date: / /	Time:	Witnessed by:
Speech*	Ask patient to repeat the phrase: "The sky is blue in Pennsylvania"	No numerical value	<input type="checkbox"/> Normal Speech <input type="checkbox"/> Abnormal Speech	
Facial Palsy*	Ask patient to smile and show their teeth	<ul style="list-style-type: none"> • Absent (normal facial movement) • Mild (some facial movement) • Moderate to severe (little to no facial movement) 	0	1
Arm Motor Function*	Ask patient to raise both arms, palms up, for 10 seconds	<ul style="list-style-type: none"> • Normal (no drift) to mild drift • Moderate (able to lift arm, unable to hold for 10 secs) • Severe (unable to lift either arm against gravity) 	0	1
Leg Motor Function	Ask patient to raise each leg, one at a time, and hold for 5 seconds	<ul style="list-style-type: none"> • Normal (no drift) to mild drift • Moderate (able to lift leg, unable to hold for 5 secs) • Severe (unable to lift either leg against gravity) 	0	1
Head & Gaze Deviation	Ask patient to move their eyes horizontally by tracking your finger and assess gaze deviation	<ul style="list-style-type: none"> • Absent (moves both eyes to track finger) • Present (fixed or unable to shift gaze past midline) 	0	1
Aphasia	Ask patient to follow 2 commands: 1. Close your eyes 2. Make a fist (on unaffected side)	<ul style="list-style-type: none"> • Performs both tasks correctly • Performs 1 task correctly • Performs neither task correctly 	0	1
Agnosia	Determine if patient recognizes deficit: 1. Ask the patient (while pointing at affected arm): "Whose arms is this?" 2. Ask the patient to clap their hands	<ul style="list-style-type: none"> • Recognizes arm & claps or recognizes inability to clap • Cannot perform one of the tasks • Cannot perform either task 	0	1
<i>If total is ≥5 and time from last known well to arrival at the closest Primary Stroke Center will be >3 hours, contact Medical Command for consideration of transport to a facility capable of performing endovascular interventions.</i>				Total: _____
Patient's Next of Kin:		Relationship:	Phone Number:	
Notes:				

* Any abnormal finding in speech, facial palsy, or arm motor function is a positive finding for the Cincinnati Prehospital Stroke Screen.

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**SEIZURE
STATEWIDE ALS PROTOCOL**

Initial Patient Contact - See Protocol #201 ¹
 If history/evidence of trauma, maintain c-spine stabilization
 (Follow Spine Care Protocol #261 if indicated)

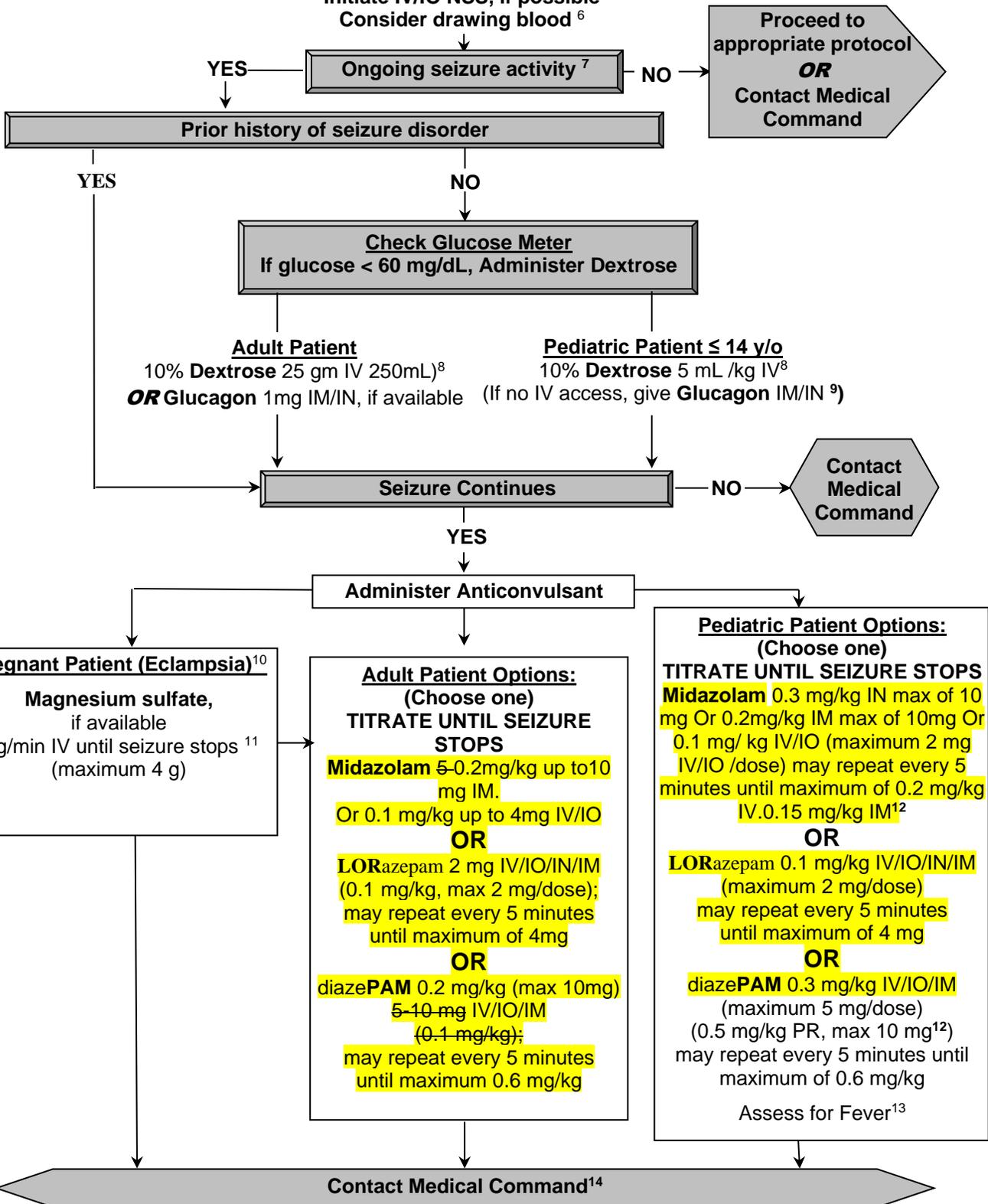
Administer Oxygen ²

Manage Airway/Ventilate, if needed ^{3,4}

Monitor ECG/Pulse Oximetry/**Continuous waveform
capnography** if seizure permits ⁵

Initiate IV/IO NSS, if possible

Consider drawing blood ⁶



SEIZURE STATEWIDE ALS PROTOCOL

Criteria:

- A. Patients who are actively seizing with generalized tonic-clonic seizure. Indicators of seizures requiring treatment include:
 1. two or more consecutive seizures without return of consciousness between episodes.
 2. ongoing seizure for more than 5 minutes.
 3. seizures associated with hypoxia.
- B. Patients who have had tonic-clonic seizure activity prior to EMS arrival.

Exclusion Criteria:

- A. Patients who are postictal following a single seizure and have history or evidence of trauma - Follow Multi-system Trauma or Traumatic Shock Protocol #6002 or Head Injury Protocol #611, as indicated.

Possible MC Orders:

- A. May order additional doses of benzodiazepine.
- B. May order lidocaine.

Notes:

1. Determine (if possible):
 - a. Type of seizure: generalized or focal.
 - b. Stage of seizure: active or post-ictal.
 - c. Cause of seizure:
 - Infections
 - Drug overdose
 - Metabolic
 - Hypoxia
 - Toxins
 - Stroke
 - Traumatic
 - Vascular
 - Alcohol withdrawal
 - Non-compliance with medications
2. Administer oxygen by appropriate method and monitor Pulse Oximetry, **if available**. Patients with prolonged ongoing seizure activity should receive high-flow oxygen.
3. Confirm and document tube placement with auscultation and **electronic waveform capnography ETCO₂ detector/secondary device** - Follow Confirmation of Airway Placement Protocol #2032
4. If unable to intubate on up to 3 attempts, consider alternative/ rescue airway.
5. See Pulse Oximetry protocol #226. Pulse Oximetry must not delay the application of oxygen. Record SpO₂ after administration of oxygen or intubation.
6. Blood should be drawn in red top tube for analysis at the hospital unless the patient is a known diabetic who takes insulin or oral diabetic medications (e.g. glyburide, metformin, etc...), has a known history of seizure disorder, or has ongoing seizure activity that prohibits blood draw.
7. Prevent patient from sustaining physical injury.
8. 50% dextrose may be diluted 1:1 with NSS to administer 25%. There is an increased risk of tissue damage if 50% dextrose extravasates, and the time to regaining consciousness is similar when using either 10% or 50%, therefore administration of 10 % dextrose is preferred. ALS agencies may carry dextrose for the treatment of hypoglycemia in adults in any concentration between 10-50%.
9. Glucagon dosage (if available):
 - a. 1 mg IM if patient is \geq 20 kg or 5 y/o
 - b. 0.5 mg IM if patient is < 20 kg or 5 y/o
10. Seizures related to eclampsia can occur in the third trimester or can even occur days or weeks after delivery. Eclampsia should be considered in pregnant or post-partum women who have a new onset seizure without prior history of seizure disorder or who have a history of preeclampsia or hypertension associated with the pregnancy.
11. If eclampsia seizure does not stop after magnesium, then administer benzodiazepine as listed.
12. If IV/ IO is not obtainable, may administer rectal or IM medications. May repeat these doses once.
13. If fever > 38° C or 100.4° F, administer acetaminophen (if available), 15 mg/kg. If patient is still seizing or not awake enough to swallow, suppository form should be inserted rectally.
14. If pregnant >20 weeks estimated gestation, contact medical command to consider transport to a facility with licensed obstetrical care unit – see Patient Destination-Ground Ambulance Protocol #170.

Performance Parameters:

- A. Review for documentation of blood glucose if patient does not have a history of seizure disorder.
- B. Review for documentation of vital signs and Pulse Oximetry after administration of benzodiazepine.
- C. Review for documentation of description of any witnessed seizure activity.

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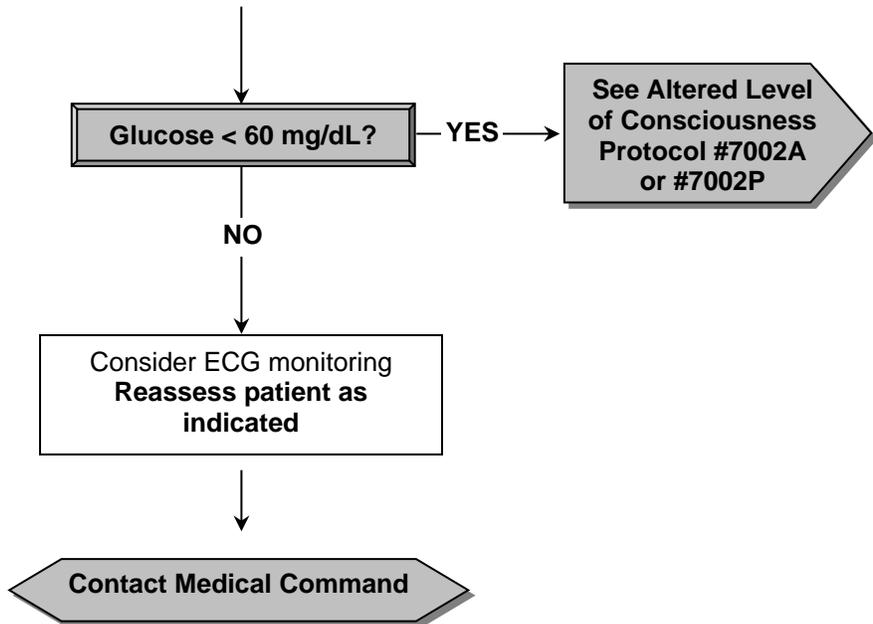
**SERIOUSLY ILL APPEARING PATIENT
STATEWIDE ALS PROTOCOL**

Initial Patient Contact- See Protocol #201

Initiate IV NSS

If signs of hypoglycemia, check blood glucose

Consider obtaining blood samples



**SERIOUSLY ILL APPEARING PATIENT
STATEWIDE ALS PROTOCOL**

Criteria:

- A. Any situation not covered under another existing protocol, in which the provider determines that the patient is potentially seriously ill with a condition that may suddenly deteriorate with the possibility of requiring the administration of medications or fluids.

Exclusion Criteria:

- A. Patient is stable and no ALS intervention is anticipated.
-

Performance Parameters:

- A. Review for stable patients with no indication for necessity of initiating IV access.
- B. Review for specific documentation of need for IV.

**NAUSEA / VOMITING
STATEWIDE ALS PROTOCOL**

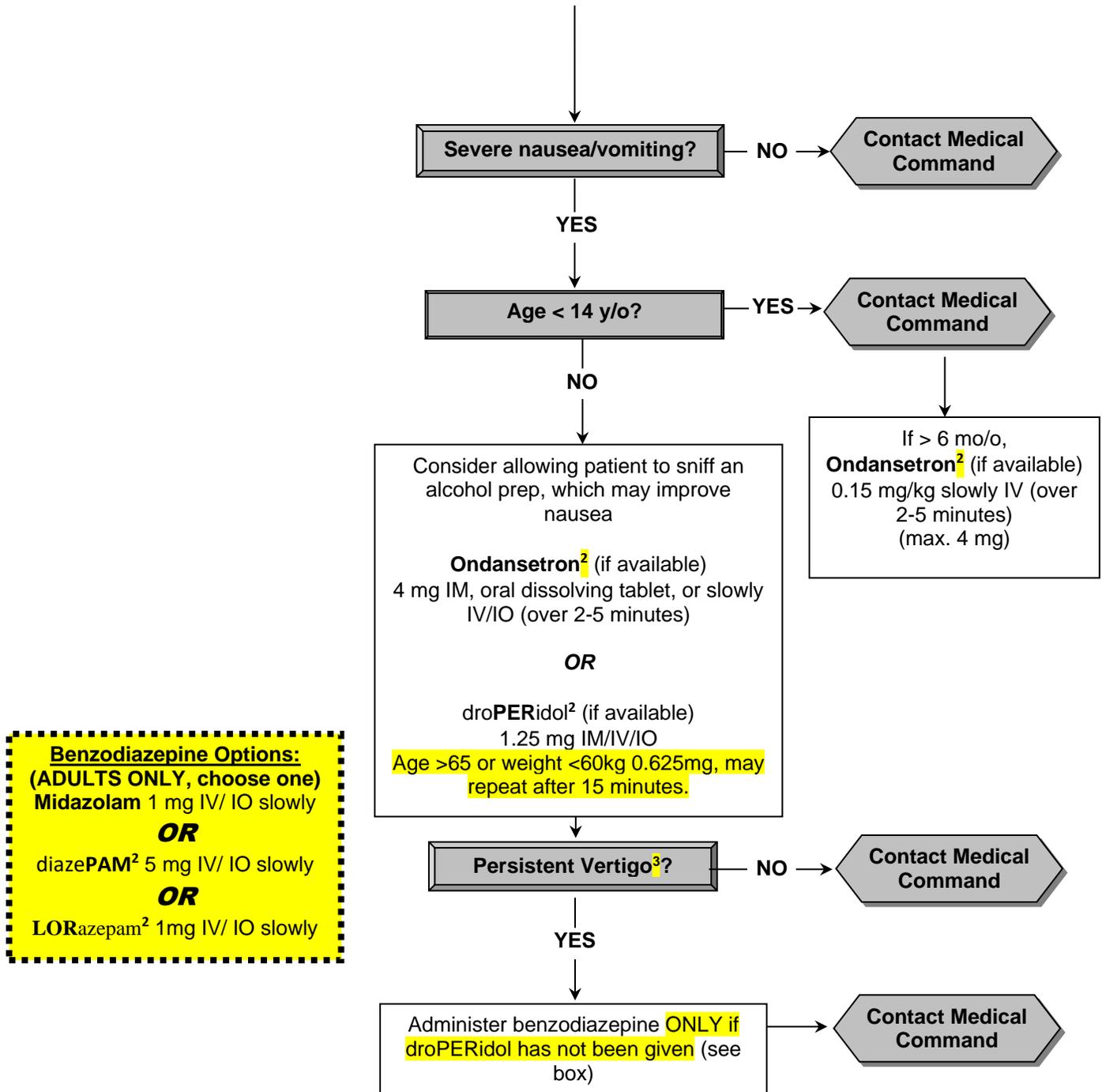
Initial Patient Contact- See Protocol #201

Initiate IV NSS

Administer NSS bolus of 20 mL /kg (2000 mL max) if signs of tachycardia or hypotension
(unless contraindicated by h/o CHF, renal failure, etc)

Check blood glucose

Consider drawing blood samples



**NAUSEA / VOMITING
STATEWIDE ALS PROTOCOL**

Criteria:

- A. Patient with persistent nausea or vomiting.

Exclusion Criteria:

- A. Patient is stable and no ALS intervention is anticipated.

Possible Medical Command Orders:

- A. For children between 6 m/o –14 y/o, may order **ondansetron** (if available) 0.1 mg/kg IM/IV (maximum dose of 4 mg).

Notes:

1. **droPERidol** can oversedate lightweight and elderly patients. Patients age >65 or weight <60kg 0.625mg, may repeat after 15 minutes.

2. May administer a combination of two (2) medications one time. Must contact medical command when seeking a third (3) medication administration.

3. Should also consider posterior stroke syndrome in appropriate clinical circumstances.

Performance Parameters:

- A. Review for contact with Medical Command before giving ondansetron to patients who are < 14 y/o.

POST-PARTUM HEMORRHAGE STATEWIDE ALS PROTOCOL

See Emergency Childbirth Protocol # 781
Assure all fetuses have been delivered

Administer Oxygen
Firmly massage the uterus

Initiate IV/IO NSS, 500 mL bolus
(If hypotension, administer up to 1000 mL NSS at wide-open rate)
If hypotensive consider optional TXA protocol #6094
Monitor ECG/Pulse Oximetry

Contact Medical
Command

Oxytocin IV infusion (if available)
10-20 units/1000mL NSS at wide open rate

**POST-PARTUM HEMORRHAGE
STATEWIDE ALS PROTOCOL****Criteria:**

- A. Excessive uterine bleeding after delivery of neonate (continued steady flow of bright red blood)
- B. Uterine bleeding and signs of hypoperfusion after delivery of neonate

Exclusion Criteria:

- A. Patient known to be pregnant with multiple fetuses (more than delivered)
- B. Patient who has not had a prenatal ultrasound to confirm the number of fetuses.

Possible MC Orders:

- A. Oxytocin IV infusion (if available), 10-20 units / 1000 ml NSS at wide-open rate.

**AGITATED BEHAVIOR / PSYCHIATRIC DISORDERS
STATEWIDE ALS PROTOCOL**

This protocol has been combined into Protocol #8003

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**DELIRIUM WITH AGITATED BEHAVIOR
STATEWIDE ALS PROTOCOL [OPTIONAL]**

This protocol has been combined into Protocol #8003

**AGITATED BEHAVIOR
STATEWIDE ALS PROTOCOL**

Provider Safety is Paramount – Ensure Scene Safety -Wait for law enforcement if scene is unsafe.

Initial Patient Contact – See Protocol 201

Follow BLS Agitated Behavior – See protocol 801

Patient monitoring (SpO2, Capnography, cardiac monitor) must be applied as soon as safety permits.

If intervention is planned, provider MUST consult Medical Commans as soon as safety permits.

Safety of provider, patient, and public must be considered in timing of Medical Command Contact.

Attempt verbal de-escalation techniques ¹
If unable to safely care for patient or ensure patient safety, apply physical restraint as indicated.

Follow appropriate protocol for suspected underlying medical conditions
(such as hypoglycemia, drug overdose, trauma, hypoxia, or postictal from seizure)

If patient struggling or in distress: obtain patient age, assess IMCRASS

Age <16 or >65

Age 16 - 65 And
IMCRASS 2

Age 16 - 65 And
IMCRASS 3-4

CONTACT
MEDICAL
COMMAND

Low Dose Anxiolysis
droPERidol 5mg IM²¹
Or
Midazolam 0.05mg/kg
IM²³ up to 5mg maximum
dose
Or
LORazepam 0.02mg/kg
IM²³ up to 2mg maximum
dose
Or
diazepam 0.05mg/kg
IM²³ up to 5mg maximum
dose

High Dose Sedation¹³
ketamine 4mg/kg IM up to
400mg maximum dose²⁰
Or
ketamine 2mg/kg IV up to
200mg maximum dose²⁰
Or
droPERidol 5mg IM²¹
AND
Midazolam 0.05mg/kg IM up
to 5mg maximum dose^{22,23}
Or
Midazolam 0.1mg/kg IM up to
10mg maximum dose^{17,23}

Must monitor and document ECG, SpO2, ETCO2, IMCRASS score
and VS every 5 minutes.
Transport in supine position.
Manage airway and ventilate if needed.
Check blood sugar
Assure IV and provide a NSS 1000mL bolus if not contraindicated

10 minutes after intervention, is patient
effectively sedated.
(IMCRASS ≤1)?

CONTACT
MEDICAL
COMMAND

AGITATION AND BEHAVIORAL EMERGENCIES STATEWIDE ALS PROTOCOL

Criteria:

- A. Patient with a psychiatric or behavioral disorder who is at imminent risk of self-injury or is a threat to others.
- B. Patient with a medical condition causing agitation and possibly violent behavior. Examples of these conditions include (but are not limited to):
 1. Alcohol or drug (e.g. PCP, methamphetamine, cocaine) intoxications
 2. Hypoglycemia
 3. Stroke
 4. Drug overdose
 5. Post-ictal after seizure
 6. Head trauma
- C. High dose sedation is for severely agitated patients with IMCRASS of 3-4.
- D. Low dose anxiolysis is for mildly agitated patients with IMCRASS of 2.

Exclusion Criteria:

- A. Patients under the age of 16 years of age and over the age of 65.

System Requirements for the use of ketamine:

- A. The agency's medical director, and assigned EMS regional council, must verify the agency has met, and continues to meet, the requirements, as specified by the Department, for training, stocking, and QI. The region must perform a QI audit of every case of ketamine administration for compliance with this protocol. All results must be forwarded quarterly to the Bureau of EMS for statewide QI.
- B. Agency medical director must approve of ketamine use by the EMS agency, and must perform a QI audit of every case of ketamine administration for compliance with this protocol.
- C. Agency medical director must personally assure training and continuing education in patient selection, IMCRASS scoring, considerations of other causes of agitated behavior, continuous respiratory monitoring, advanced airway management, ketamine pharmacology, and use of this protocol.
- D. ALS providers credentialed to administer ketamine must successfully complete the Delirium with Agitated Behavior educational module recognized by the Department.
- E. Two EMS providers must be at the patient's side before administration of ketamine. At least one of these providers must be an ALS provider above the level of AEMT who has completed the ketamine education and is credentialed by the EMS agency medical director to administer ketamine. The other provider must be credentialed at the level of EMT or above.
- F. Agency medical director must assure initial and ongoing competence for each individual EMS provider who will use ketamine. Only individuals credentialed to administer this medication will perform the procedure.
- G. The ALS agency must carry an alternative/ rescue airway device in various sizes.
- H. The ALS agency must have the capability of monitoring and recording the following: continuous electronic waveform capnography in patients that are not intubated, as well as continuous ECG, SpO₂, blood pressure and IMCRASS score.
- I. Ketamine may only be carried by ALS agencies that follow all aspects of this protocol, and permission to carry the medication will be removed from the agency by the Bureau of EMS if either the agency/regional QI or other investigation determines that there are significant variances from this protocol.

Procedure for patients that require physical restraint:

1. Use the minimum amount of restraint necessary to safely accomplish patient care and transportation with regard to the patient's dignity.
2. Assure that adequate personnel are present and that police assistance has arrived, if available, before attempts to restrain patient.
3. Restrain all 4 extremities with patient supine on stretcher.^{4, 5, 6, 7}
4. Use soft restraints to prevent the patient from injuring him or herself or others.⁸
 - a. If the patient is handcuffed by law enforcement officers, consideration should be made to transition to the least restrictive restraints that are safe for the patient and responders.
 - b. Physical restraint devices that are easily removed by providers without a key are preferred. However, if a patient is restrained in devices that require a key, the key must accompany the patient during treatment and transportation.

- c. If the handcuffs or law enforcement devices are used to restrain the patient, a law enforcement officer must remain immediately available while the EMS provider assesses and manages the patient and should accompany the patient during transport by ambulance.
 - d. If soft restraints are used, it is still preferable that a law enforcement officer accompanies the patient or follows the ambulance in a patrol car to the receiving facility.
5. Do not place restraints in a manner that may interfere with evaluation and treatment of the patient or in any way that may compromise patient's respiratory effort.⁹
6. If the patient is spitting, providers may cover the patient's face with a surgical mask, NRB mask with high flow oxygen, or commercial device to prevent spitting.¹⁰
7. After physical restraint, physiologic monitoring and clinical assessment/reassessment of respiratory and hemodynamic status as well as neurovascular status of all restrained extremities must be done as soon as possible and at recurring intervals.
8. Document care, including details of patient behavior, patient assessment, clinical indication for restrain, type of restrain intervention(s) attempted or applied, frequency of reassessment and associated exam findings, and additional care provided during transport.
9. Contact medical command for restraint order if physical restraint is needed. If required for safety of the patient, public or responders, the call to medical command can occur after the patient is physically restrained.

Possible Medical Command Orders:

1. Additional sedating agent
2. Dose modification based on unique patient factors, including (but not limited to) age and weight

Notes:

1. De-escalation techniques include:
 - a. Direct empathetic and calm voice.
 - b. Present clear limits and options.
 - c. Respect personal space.
 - d. Avoid direct eye contact.
 - e. Non-confrontational posture.
2. Do not permit patient to continue to struggle against restraints. This can lead to death due to severe rhabdomyolysis, acidosis, dysrhythmia, or respiratory failure. Medical command should be contacted for possible chemical restraint with sedative medication.
3. Regional or agency policy may permit intranasal midazolam, but this may not be as effective as parenteral medications.
4. Initial "take down" may be done in a prone position to decrease the patient's visual field and ability to bite, punch, and kick. After the individual is controlled, he/she should be restrained to the stretcher or other transport device in the supine position as soon as possible.
5. DO NOT restrain patient in a prone position. Do not tie the hands and feet together or link the restraints of hands and feet; each extremity should be individually secured to a firm point of attachment.
6. DO NOT sandwich patient between devices, such as long boards or Reeves stretchers, for transport. Avoid restraint to unpadded devices like backboards.
7. A stretcher strap that fits snugly just above the knees is effective in decreasing the patient's ability to kick.
8. Padded or leather wrist or ankle straps are appropriate. Handcuffs and plastic ties are not soft restraints.
9. Never apply restraints near the patient's neck or apply restraints or pressure in a fashion that restricts the patient's respiratory effort.
10. Never cover a patient's mouth or nose except with a surgical mask, commercial spit containment device, or a NRB mask with high flow oxygen. A NRB mask with high flow oxygen may be used to prevent spitting in a patient that also may have hypoxia or another medical condition causing their agitation, but a NRB mask should never be used to prevent spitting without simultaneously administering high flow oxygen through the mask.
11. Sedatives must be ordered by a medical command physician, unless there are not adequate resources to ensure patient safety while contacting medical command.
12. Advise the medical command physician of all medications administered prior to request for sedative orders. The medical command physician may want to adjust subsequent dosing based on medications previously given.

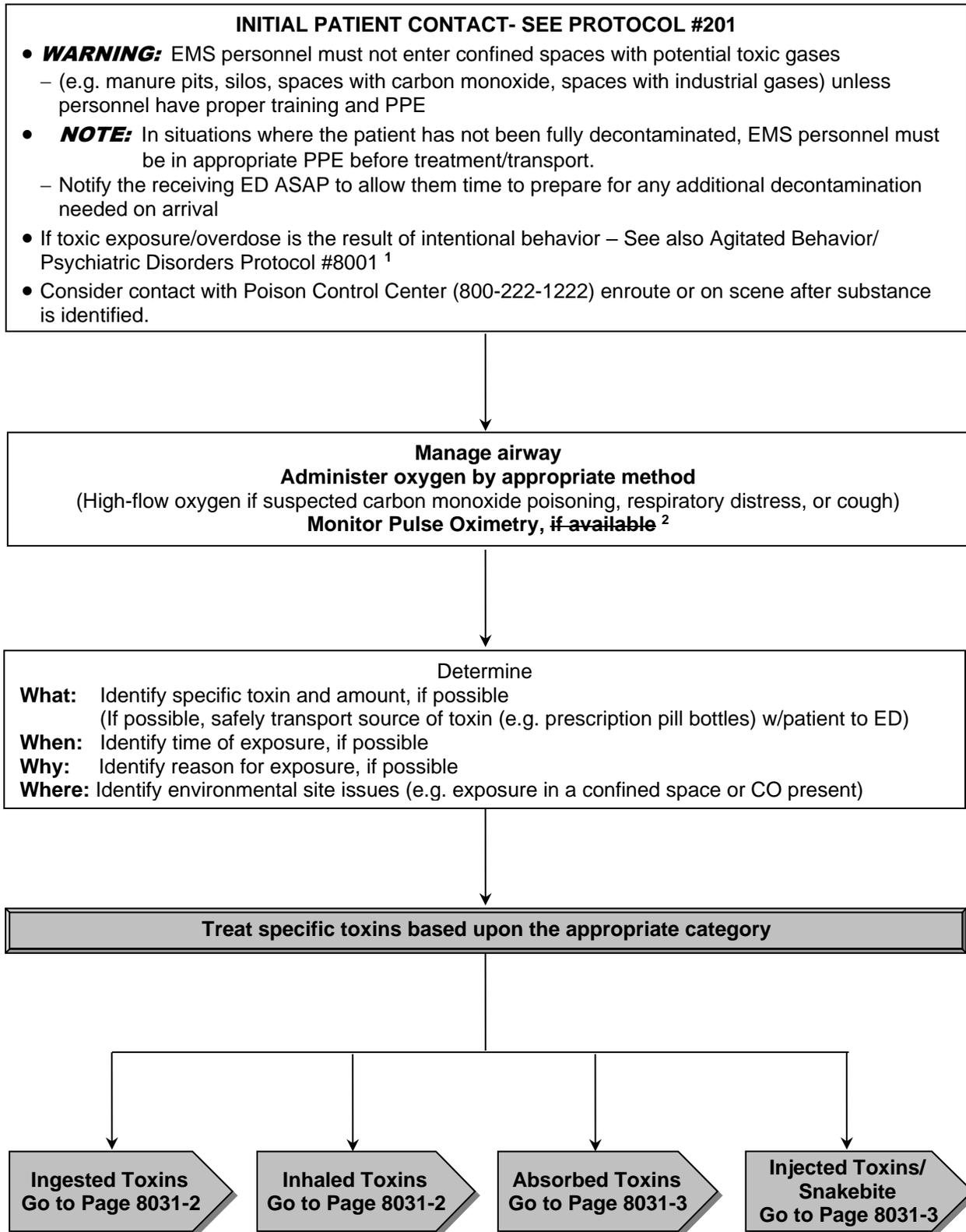
13. Immediately prior to high dose sedation administration, patient should be restrained following physical restraint procedure above. BVM and advanced airway equipment must be at patient's side prior to administration of high dose sedation.
14. Do not place an IV or IO for the purpose of administering of high dose sedation. If there is no IV in place, the ideal site for IM ketamine is midline lateral thigh, however administration in deltoid or gluteal sites is permitted if they can be accessed more safely.
15. Once high dose sedation has been administered, immediately return to de-escalation efforts and apply physiologic monitors as soon as safely able. Goal is to reduce IMCRASS to <1 within 5 minutes.
16. CAUTION: Patients receiving ketamine and concomitant benzodiazepines are more likely to experience respiratory depression requiring airway management.
17. Midazolam is strongly preferred for IM use due to its rapid absorption and passage across the blood-brain barrier. Other intramuscular benzodiazepines are inferior to midazolam but are sometimes the only medications EMS services have available. For the high dose sedation options in this protocol, if midazolam is not available, you may substitute lorazepam 0.05 mg/kg up to 4mg or diazepam 0.1 mg/kg up to 5mg.
18. When safe, initiate transport to the closest appropriate facility. Do not transport in prone position – which can rapidly lead to positional asphyxia. See patient restraint procedure for additional details related to restraint when needed.
19. Ensure adequate resources in patient compartment during transport (law enforcement, additional EMS providers, etc.) in the event the patient becomes agitated again. It is recommended that at least one EMT accompanies the ALS provider in the patient compartment.
20. Ketamine is an optional medication with specific requirements for its various indications. Ketamine use under this protocol is only authorized for agencies meeting all these requirements.
21. Droperidol is an optional medication and may be used by any ALS agency with medical director approval.
22. If midazolam is not available, lorazepam or diazepam can be dosed as indicated in the "low dose anxiolysis" box.
23. In the event the patient has a usable IV at the time of escalation and IV dosing is not specified, the ALS Provider may give half the IM dose of their available benzodiazepine.

Performance Parameters:

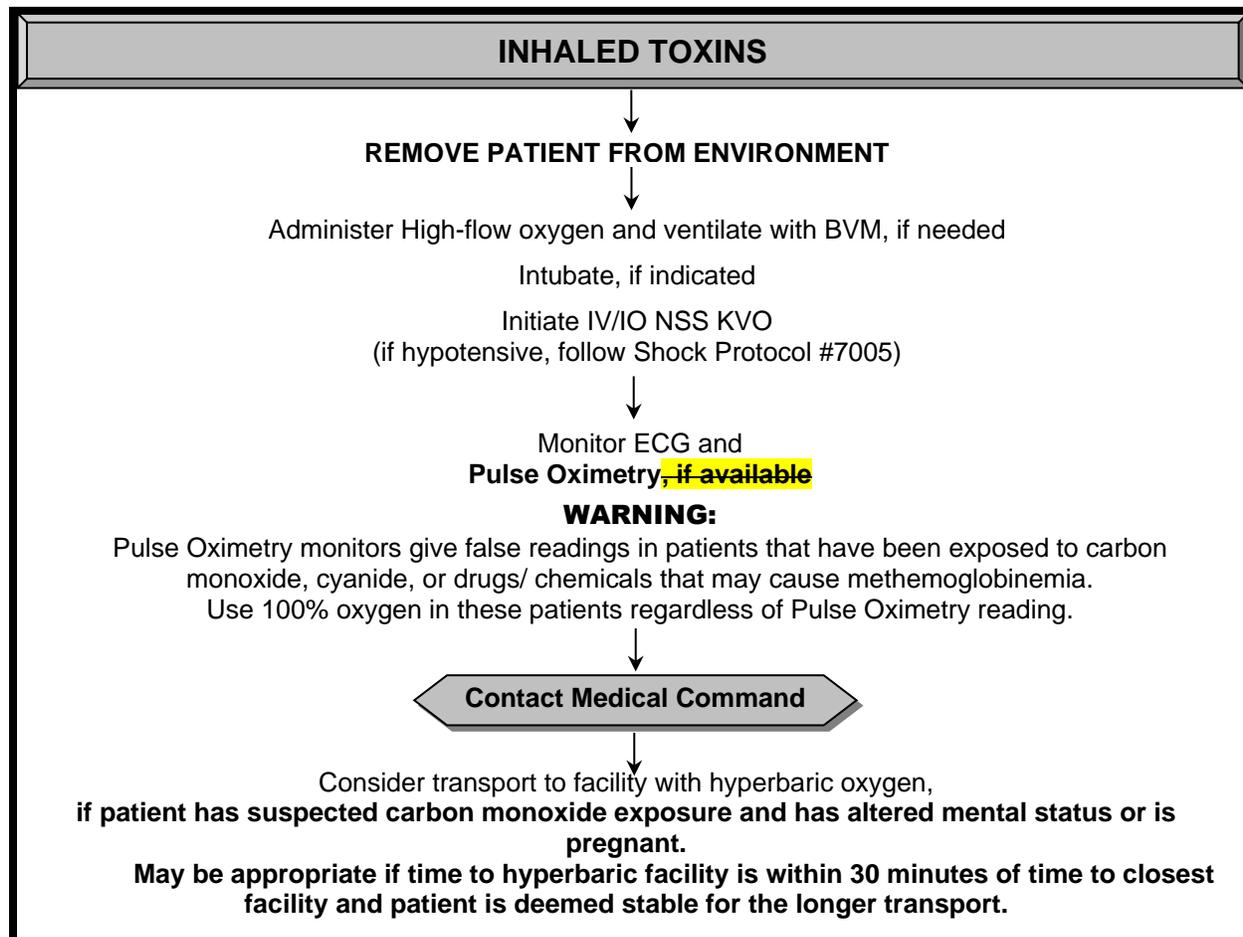
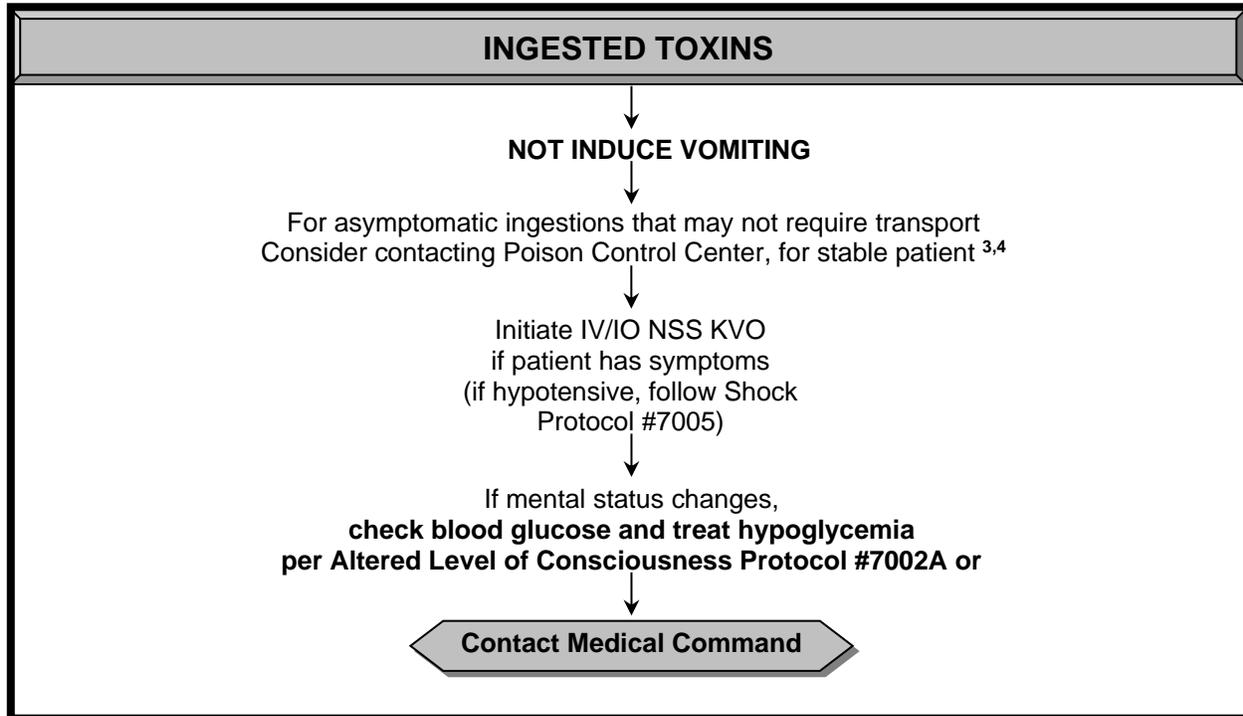
- A. Review every case of the use of sedation, physical or chemical restraint.
- B. Review all PCR's for documentation of the following:
 1. Review for documentation of reason for administration of sedation.
 2. Review for documentation of physical restraint procedure, monitoring of respiratory effort
 3. Review for complications related to ketamine administration compared to other delirium with agitated behavior conditions.
 4. Review for overall successful administration of sedation and pre-sedation IMCRASS scoring.
 5. Review for inclusion of recording strip of continuous trend of heart rate and pulse oximetry after each administration of sedation.
- C. Review for documentation of heart rate and respirations before administration of sedation.
- D. Review for documentation of pulse oximetry, blood pressure, heart rate, ETCO₂, and ECG rhythm after sedation administration.
- E. Review for documentation of IMCRASS score, before sedation, shortly after sedation, and at time of transfer of care at ED.
- F. Review for documentation of assessment of extremity neurovascular status every 15 minutes in the restrained patient.
- G. Review for documentation of medical command physician orders for use of physical or chemical restraint.

Improved Montgomery County Richmond Agitation Sedation Scale (IMCRASS)			
Score	Term	Description	EMS Activity
+4	Combative	Overtly combative, violent, immediate danger to staff	Unsafe to care for patient without maximal assistance, requires 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, nonpurposeful 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 Nasopharyngeal airway or IV start.
-5	Unarousable	No response to voice or physical stimulation	No response to insertion of Oralpharyngeal airway, Nasopharyngeal airway, or IV start
Procedure for IMCRASS Assessment			Score
1. Observe patient - if alert, restless, agitated, or combative			0 to + 4
2. Say patient's name in a gentle tone of voice and ask patient to open eyes			-1
3. If no response to voice, continue with routine EMS care and observe response to routine EMS care and interventions			-2 to - 5
Ketamine may be indicated		Adequate response to Ketamine	
Ketamine NOT indicated		Caution: may be oversedated	
References:			
Sessler CN, Gosnell M, Grap MJ, et al. The Richmond Agitation-Sedation Scale: validity and reliability in adult intensive care patients. Am J Respir Crit Care Med 2002; 166:1338-1344			
Ely EW, Truman B, Shintani A, et al. Monitoring sedation status over time in ICU patients: the reliability and validity of the Richmond Agitation Sedation Scale (RASS). JAMA 2003; 289: 2983-2991			
12/6/2016 ver 2.1 approved by: Usatch, Ben; Wang, Alvin; Neubert, Dave; Martin, Ed			

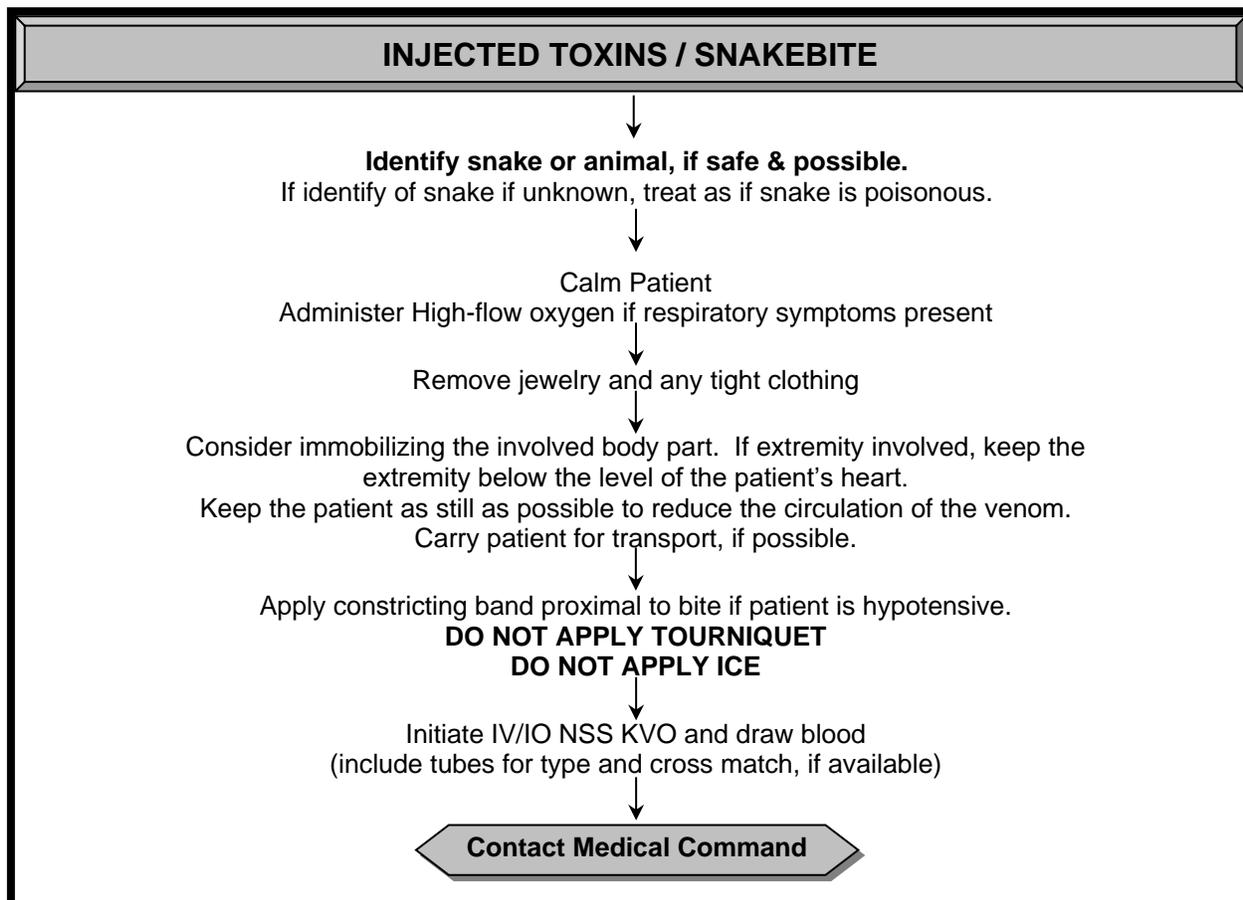
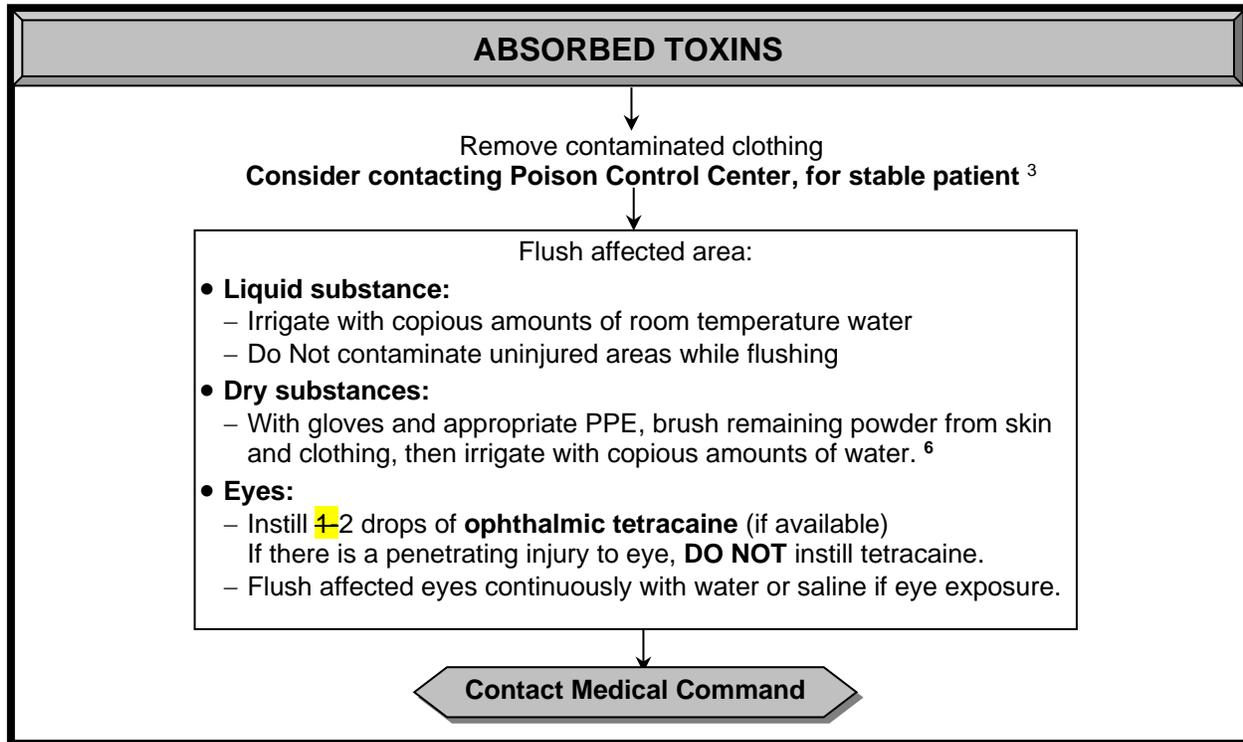
POISONING/TOXIN EXPOSURE STATEWIDE ALS PROTOCOL



**POISONING/TOXIN EXPOSURE
STATEWIDE ALS PROTOCOL**



**POISONING/TOXIN EXPOSURE
STATEWIDE ALS PROTOCOL**



**POISONING/TOXIN EXPOSURE
STATEWIDE ALS PROTOCOL**

Criteria:

- A.** Patient who has accidentally or purposefully been exposed to toxic substances. Including:
1. **Ingested toxins**
 - a. For example, pills, capsules, medications, recreational drugs, poisonous plants, strong acids or alkali household or industrial compounds.
 2. **Inhaled toxins**
 - a. For example, carbon monoxide and other toxic gases.
 3. **Absorbed toxins**
 - a. For example, substances on skin or splashed into eyes.
 4. **Injected toxins**
 - a. For example, snake bites or substances injected through the skin.

Exclusion Criteria:

- A.** Patient with altered level of consciousness (unless suspected carbon monoxide poisoning) - follow Altered Level of Consciousness Protocol #7002A or #7002P.
- B.** Patient with exposure to organophosphate pesticide or nerve agent – follow Nerve Agent Exposure Protocol #8083.
- C.** Patient with exposure to cyanide – follow Cyanide Exposure Protocol #8081.
- D.** Patient with suspected allergic reaction/anaphylaxis – follow Allergic Reaction Protocol #4011.

Treatment:**A. All patients:**

1. Initial Patient Contact – see Protocol #201.
 - a. **WARNING: EMS providers must not enter confined spaces with potential toxic gases (e.g. manure pits, silos, spaces with carbon monoxide, spaces with industrial gases) unless providers have proper training and PPE.**
 - b. **Decontamination- Ideally, patients will be fully decontaminated before treatment and transport. In situations where the patient has not been fully decontaminated, EMS providers must be in appropriate PPE before treatment/ transport. The receiving ED should be notified ASAP so that they can prepare for any additional decontamination that is needed on arrival.**
 - c. If toxic exposure/overdose is the result of intentional behavior - also see Agitated Behavior/Psychiatric Disorders protocol # 8001. ¹
2. Maintain adequate airway.
3. Administer oxygen by appropriate method and monitor Pulse Oximetry ², if available.
 - a. (High-flow oxygen if suspected carbon monoxide poisoning, respiratory distress, or cough).
4. Determine:
 - a. **What** – identify specific toxin and amount, if possible.
 - 1) If possible, safely transport source of toxin (e.g. prescription pill bottles) with patient to receiving facility.
 - 2) EMS vehicles should not transport dangerous items (e.g. toxic chemicals that are not sealed in their original containers, live snakes, etc...)
 - b. **When** – identify time of exposure, if possible.
 - c. **Why** – identify reason for exposure, if possible.
 - d. **Where** – identify environmental site issues (e.g. exposure in a confined space or carbon monoxide present).
5. Treat specific toxins based upon the appropriate category:
 - a. **Ingested Toxins.** Treat all exposures as follows:

- 1) **DO NOT INDUCE VOMITING.**
 - 2) For asymptomatic ingestions that may not require transport, consider contacting Poison Control Center. ^{3,4}
 - 3) Initiate IV/IO NSS KVO if patient has symptoms.
 - a) If hypotensive, follow Shock Protocol #7005.
 - 4) If mental status changes, then check blood glucose and treat hypoglycemia per Altered Level of Consciousness Protocol #7002A or #7002P.
 - 5) Monitor ECG
 - 6) Contact Medical Command for possible order for activated charcoal. ^{3,4,5}
- b. **Inhaled Toxins.** Treat all symptomatic (e.g. SOB, cough, headache, decreased LOC) patients as follows:
- 1) Only providers with proper training and wearing proper PPE should enter environments that may have toxic gases.
 - 2) Remove patient from environment.
 - 3) Administer 100% oxygen.
 - 4) Ventilate with BVM, if needed.
 - 5) Intubate if indicated.
 - 6) Initiate IV/IO NSS KVO
 - a) If hypotensive, follow Shock Protocol # 7005
 - 7) Monitor ECG and Pulse Oximetry
 - a) **WARNING: Pulse Oximetry monitors give false readings in patients that have been exposed to carbon monoxide or cyanide, and normal readings should not diminish the use of 100% oxygen in these patients.**
 - 8) Consider transport to a facility with hyperbaric oxygen if patient has suspected carbon monoxide exposure and has altered mental status or is pregnant. This may be appropriate if time to transport to a facility with hyperbaric oxygen capability is within 30 minutes of the time to transport to the closest facility and the patient is deemed to be stable for the longer transport.
 - 9) Contact Medical Command
- c. **For Absorbed Toxins:**
- 1) Remove contaminated clothing.
 - 2) Flush affected area copiously:
 - a) Liquid substance - Irrigate with copious amounts of room temperature water. Do not contaminate uninjured areas while flushing.
 - b) Dry substances - With gloves and appropriate PPE, brush remaining powder from skin and clothing, then irrigate with copious amounts of water. ⁶
 - c) **Eyes** - Flush affected eyes continuously with water or saline if eye exposure. Prior to flushing eyes, may instill 1-2 drops of ophthalmic tetracaine (if available) and may repeat every 15 minutes as needed for comfort. Do not instill tetracaine or irrigate eyes if there has been blunt trauma/ possible penetrating injury to the eye.
- d. **For Injected Poisons/Snakebite:**
- 1) Identify type of snake or animal (e.g. scorpion), if safe and possible. If identity of a snake is not known, all victims of snakebite should be treated as if the snake is poisonous. Do not delay transport or endanger individuals by attempting to capture or kill a snake.
 - 2) Calm patient.
 - 3) Administer high-flow oxygen, if respiratory symptoms are present.
 - 4) Remove jewelry and tight clothing.
 - 5) Consider immobilizing the involved body part. If extremity involved, keep the extremity at a neutral level to the patient's heart (neither elevate or lower the extremity).

- 6) Keep the patient as still as possible to reduce the circulation of the venom. Carry patient for transport, if possible.
- 7) Apply constricting band proximal to bite if patient is hypotensive. **DO NOT APPLY TOURNIQUET.**
- 8) **DO NOT APPLY ICE.**
- 9) Initiate IV/IO NSS KVO and draw blood (including tubes for type and cross, if available)
 - a) If hypotensive, follow Shock Protocol - #7005
- 10) Contact Medical Command.

Possible Medical Command Orders:

- A. Administration of activated charcoal, if available, may be ordered ^{4,5}:
 1. **Adults:** 25 - 50 gm orally of pre-mixed activated charcoal.
 2. **Children:** 1 gm/kg orally or approximately 12.5 - 25 gm orally of pre-mixed activated charcoal.
- B. If tricyclic antidepressant overdose and patient hypotensive, may order sodium bicarbonate, 1 mEq/kg IV/IO.
- C. If calcium channel blocker or beta-blocker overdose and hypotensive, may order calcium chloride, 10% 0.2 mg/kg IV/IO over 5-10 minutes (if available) or glucagon, 3-10 mg IV/IO over 3-5 minutes (if available).
- D. If cocaine-induced hypertension, tachycardia, agitation or chest discomfort, benzodiazepines, calcium channel blockers (if available), nitroglycerin, and/or morphine (if available) may be ordered.
- E. If dystonic reaction, may order diphenhydramine.
- F. If smoke inhalation (cyanide risk) or suspected asphyxiation from hydrogen sulfide (e.g. in manure pit), may order sodium thiosulfate (if available).
- G. If suspected carbon monoxide toxicity and altered level of consciousness or pregnant, may order transport to center capable of hyperbaric oxygen therapy.

Notes:

1. Patients who have ingested a toxic substance with suicidal intent may not refuse transport. See **Refusal of Treatment/Transport Non Treatment and/or Non-Transport of Patient** Protocol #111.
2. See Pulse Oximetry Protocol #226. Pulse Oximetry is not accurate in patients with suspected exposure to carbon monoxide or cyanide and shall not be used in these situations.
3. **National Poison Control Center telephone number is 800-222-1222.** EMS providers may follow instructions from Poison Control Center unless the orders are superseded by orders from a medical command physician. These instructions must be documented on the PCR. Poison Control Center should only be contacted for stable patients with minor ingestions. Medical Command should be contacted for patients who are likely to require transportation to a hospital.
4. Activated charcoal may only be given by order of medical command or poison control.
5. Contraindications to charcoal:
 - a. Patient unable to swallow/protect airway.
 - b. Seizures.
 - c. Hydrocarbons ingestion (e.g. turpentine)
 - d. Caustic substance ingestion (e.g. liquid drain cleaner or milk pipe cleaner)
6. **Note** - some substances, like dry lime will cause a heat-producing reaction when mixed with water. Copious water should be available before beginning to irrigate.

Performance Parameters:

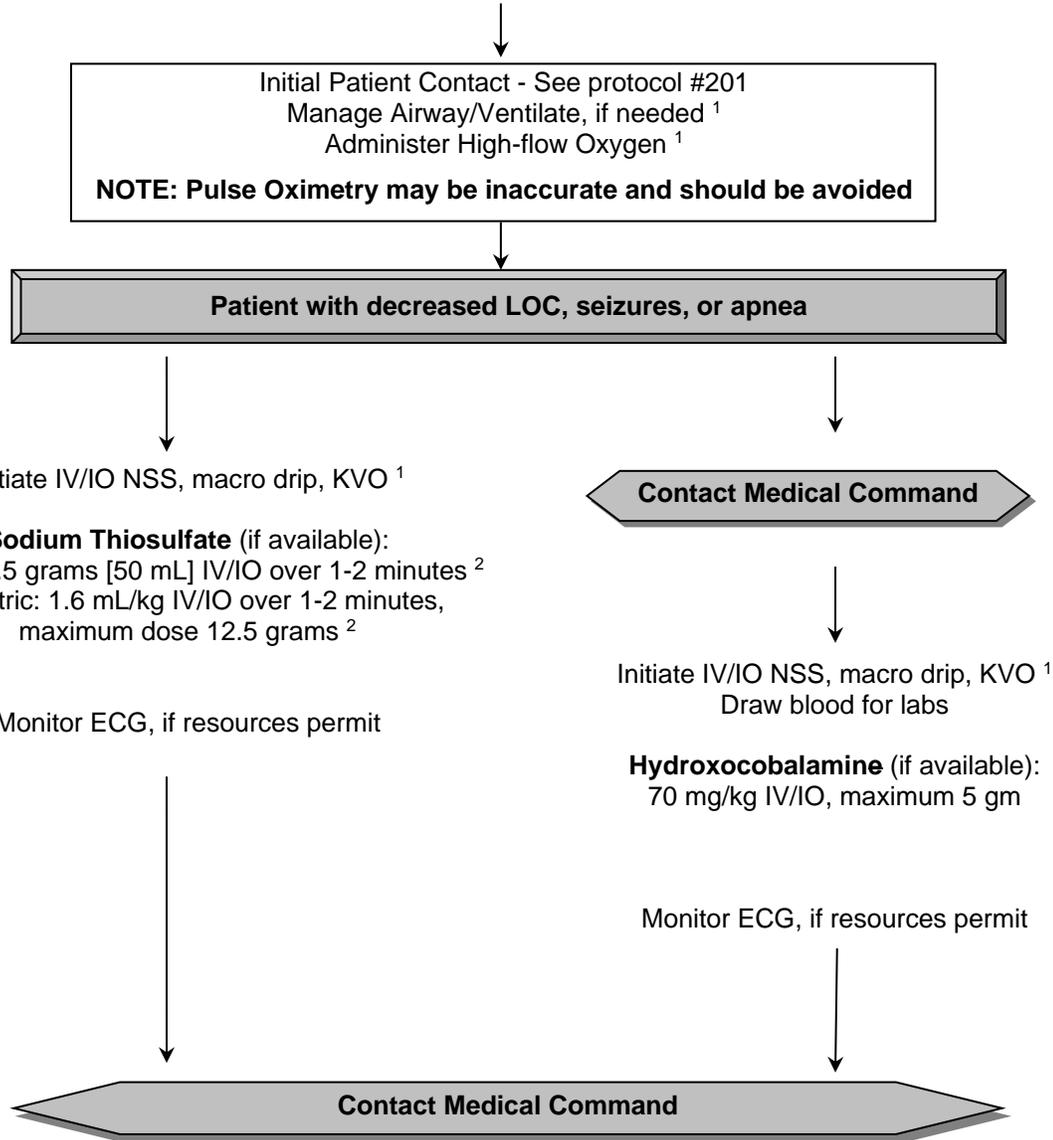
- A. Review for documentation of orders received from Poison Control Centers or Medical Command.

CYANIDE COMPOUND EXPOSURE STATEWIDE ALS PROTOCOL

Decontaminate patient

If possible, treat patients with severe exposure during decontamination

CAUTION: Only personnel wearing Level B PPE (with appropriate training) should treat patient before decontamination



**CYANIDE COMPOUND EXPOSURE
STATEWIDE ALS PROTOCOL****Criteria:**

- A.** Patients experiencing symptoms after suspected exposure to cyanide or cyanogen chloride:
 - 1. Serious exposure: symptoms include unconsciousness, seizures, and apnea. The skin may be bright red.
 - 2. Moderate exposure: symptoms may include dizziness, nausea, weakness, eye/throat irritation, and giddiness.
- B.** Fire victims may be exposed to cyanide when entrapped in an enclosed structure fire. Fire victims with altered mental status, seizures, and apnea may be treated with this protocol in addition to the Poisoning protocol #8031.
- C.** Patients exposed hydrogen sulfide in an enclosed space (for example a manure pit) that have altered mental status, seizures, or apnea may be treated with sodium thiosulfate, but a medical command physician or poison control center should be contacted before using this protocol in this situation.

Exclusion Criteria:

- A.** Patients with suspected exposure, but without symptoms, should be evaluated for decontamination but do not require further medical treatment.
- B.** If patients are seizing and have pinpoint pupils, excessive nasal/oral secretions, or muscle fasciculation (rippling tremors under skin), EMS providers should consider exposure to nerve agents (See Nerve Agent Protocol).

System Requirements:

- A.** Sodium thiosulfate and/or hydroxocobalamine may be carried by ALS agencies. The agency must report the amount carried to the regional EMS council, and the regional EMS council should coordinate the stocks of antidote with the regional counterterrorism task forces.
- B.** Until the patient has been properly decontaminated, all EMS providers who treat patients of suspected exposure to cyanide compounds should use Level B PPE, at a minimum. Level B PPE should only be used by providers with appropriate training.

Possible Medical Command Orders:

- A.** Additional sodium thiosulfate, if available
- B.** Additional hydroxocobalamine up to total of 10 gm, if available
- C.** Sodium bicarbonate for acidosis

NOTES:

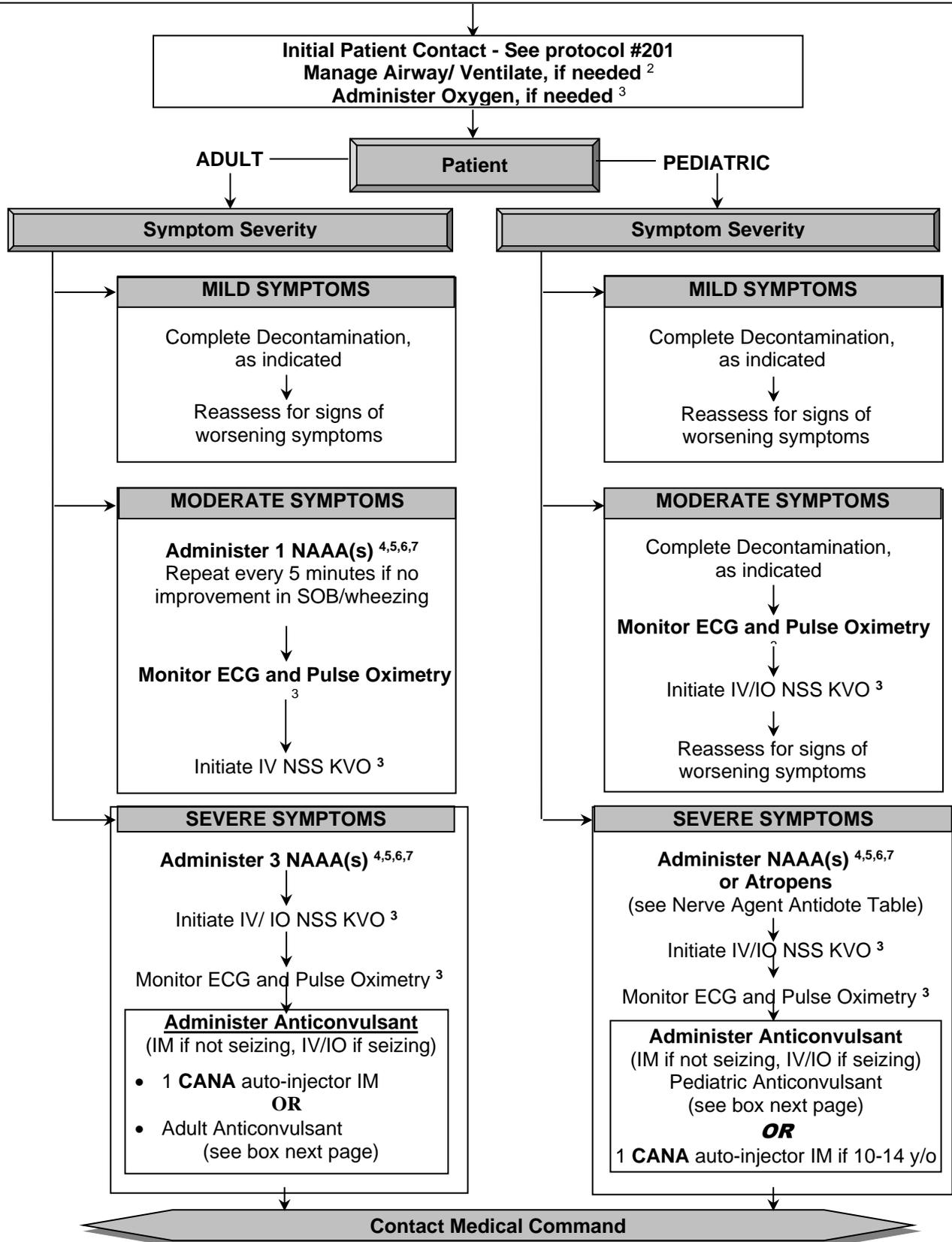
- 1. In mass casualty incidents, oxygen and intravenous access should be prioritized to patients with symptoms of serious exposure if resources are limited.
- 2. May repeat sodium thiosulfate with half of initial dose once if symptoms persist after 5-10 minutes.

Performance Parameters:

- A.** Every case of suspected cyanide compound exposure with any symptoms should receive QI review for appropriate use of oxygen and sodium thiosulfate.

**NERVE AGENT/PESTICIDE EXPOSURE
STATEWIDE ALS PROTOCOL**

Decontaminate patients – Contact Medical Command to order release of CHEMPACK if indicated¹
CAUTION: Personnel must be in appropriate PPE before treating patients who have not been decontaminated. If possible, treat patients with severe exposure during decontamination.



Nerve Agent Antidote Table

	Adult & Older Children > 90 lbs. (>41 kg) ≥ 10 y/o	Pediatric 40-90 lbs. (18-41 kg) 4-10 y/o	Pediatric 15-40 lbs. (7-18 kg) 6 m/o-4 y/o	Pediatric (Infant) < 15 lbs. (< 7kg) < 6 m/o
<p><u>Moderate symptoms include:</u></p> <ul style="list-style-type: none"> • Blurred vision • Excessive tearing or runny nose • Drooling • Mild shortness of breath/ wheezing • Vomiting • Diarrhea, Stomach Cramps • Muscle twitching or sweating at site of exposure 	<p>1 NAAA IM [atropine 2mg + pralidoxime 600 mg IM]</p>	<p>1 Atropen (Red) [atropine 1 mg IM]</p>	<p>1 Atropen (Blue) [atropine 0.5 mg IM]</p>	<p>1 Atropen (Yellow) [atropine 0.25 mg IM]</p>
<p><u>Severe symptoms include:</u></p> <ul style="list-style-type: none"> • Altered Mental Status • Severe shortness of breath/ wheezing • General Weakness/ Severe muscle twitching • Incontinence (urine or feces) • Seizures • Unconsciousness 	<p>3 NAAA(s) IM [atropine 6 mg + pralidoxime 1800 mg IM]</p> <p>AND</p> <p>Anticonvulsant 1 CANA autoinjector [diazepam 10 mg IM]</p> <p>OR (see box below)</p>	<p>2 NAAA(s) IM</p> <p>OR</p> <p>3 Atropen (Red) [atropine 3 mg IM]</p> <p>AND</p> <p>Anticonvulsant (see box below)</p>	<p>1 NAAA(s) IM (if > 2 y/o)</p> <p>OR</p> <p>3 Atropen (Blue) [atropine 1.5 mg IM]</p> <p>AND</p> <p>Anticonvulsant (see box below)</p>	<p>3 Atropen (Yellow) [atropine 0.75 mg IM]</p> <p>AND</p> <p>Anticonvulsant (see box below)</p>

Adult Anticonvulsant Options:
(Choose one)
Titrate until seizure stops

Midazolam 5-0.2mg/kg up to 10 mg IM.
Or 0.1 mg/kg up to 4mg IV/IO

OR

LORazepam 2 mg IV/IO/IN/IM
(0.2 mg/kg, max 2 mg/dose);
may repeat every 5 minutes until maximum of 4mg

OR

diazepam 0.2 mg/kg (max 10mg) 5-10 mg IV/IO/IM
(0.1 mg/kg);
may repeat every 5 minutes until maximum 0.6 mg/kg

Pediatric Anticonvulsant Options:
(Choose one)
Titrate until seizure stops

Midazolam 0.3 mg/kg IN max of 10 mg
Or 0.2mg/kg IM max of 10mg Or 0.1 mg/kg IV/IO (maximum 2 mg IV/IO/dose) may repeat every 5 minutes until maximum of 0.2 mg/kg IV. 0.15 mg/kg IM¹²

OR

LORazepam 0.1 mg/kg IV/IO/IN/IM
(maximum 2 mg/dose)
may repeat every 5 minutes until maximum of 4 mg

OR

diazepam 0.3 mg/kg IV/IO/IM
(maximum 5 mg/dose)
(0.5 mg/kg PR, max 10 mg¹²)
may repeat every 5 minutes until maximum of 0.6 mg/kg

NERVE AGENT/PESTICIDE EXPOSURE STATEWIDE ALS PROTOCOL

CRITERIA:

- A. Patients experiencing symptoms after suspected exposure to:

Nerve Agents (Tabun, Sarin, Soman, VX)

OR

Organophosphate (Malathion, Parathion) / carbamate (Sevin) pesticides.

1. **Mild symptoms include:**

- a. Pinpoint pupils
- b. Runny nose
- c. Suspected exposure to nerve agent, but no symptoms

2. **Moderate symptoms include:**

- a. Blurred vision
- b. Excessive tearing or runny nose
- c. Drooling
- d. Mild shortness of breath/ wheezing
- e. Vomiting
- f. Diarrhea, Stomach Cramps
- g. Muscle twitching or sweating at site of exposure

3. **Severe symptoms include:**

- a. Altered Mental Status
- b. Severe shortness of breath/ wheezing
- c. General Weakness/ Severe muscle twitching
- d. Incontinence (urine or feces)
- e. Seizures
- f. Unconsciousness

EXCLUSION CRITERIA:

- A. Patients with suspected exposure, but without symptoms, should be decontaminated as appropriate, but do not require further medical treatment.
- B. If patients are seizing and **do not** have pinpoint pupils, excessive nasal/oral secretions, or muscle fasciculation (rippling tremors under skin), EMS providers should consider exposure to cyanide (See Cyanide Protocol).

SYSTEM REQUIREMENTS:

- A. Nerve agent antidote auto-injectors (NAAAs) and pralidoxime chloride (2-PAMCl) may be carried by ALS agencies. The agency must report the amount carried to the regional EMS council, and the regional EMS council should coordinate the stocks of antidote with the regional counterterrorism task forces.
- B. Until the patient has been properly decontaminated, all EMS providers who treat patients of suspected exposure to nerve agents should use Level B PPE. Level B PPE should only be used by providers with appropriate training.
- C. EMTs and AEMTs, who have completed Department approved BLS NAAA training, may administer NAAAs under the supervision of an on-scene paramedic after the paramedic has assessed the patient and determined the number of NAAAs to be administered.
- D. BLS / IALS ambulance and squad vehicles may carry NAAAs for self and peer rescue by administration to self or to other emergency responders. In this situation, these medications must be prescribed by the agency medical director who is responsible for assuring appropriate instruction

on when and how to use the medication. These NAAAs are not for patient use unless supervised by appropriate ALS providers.

NOTES:

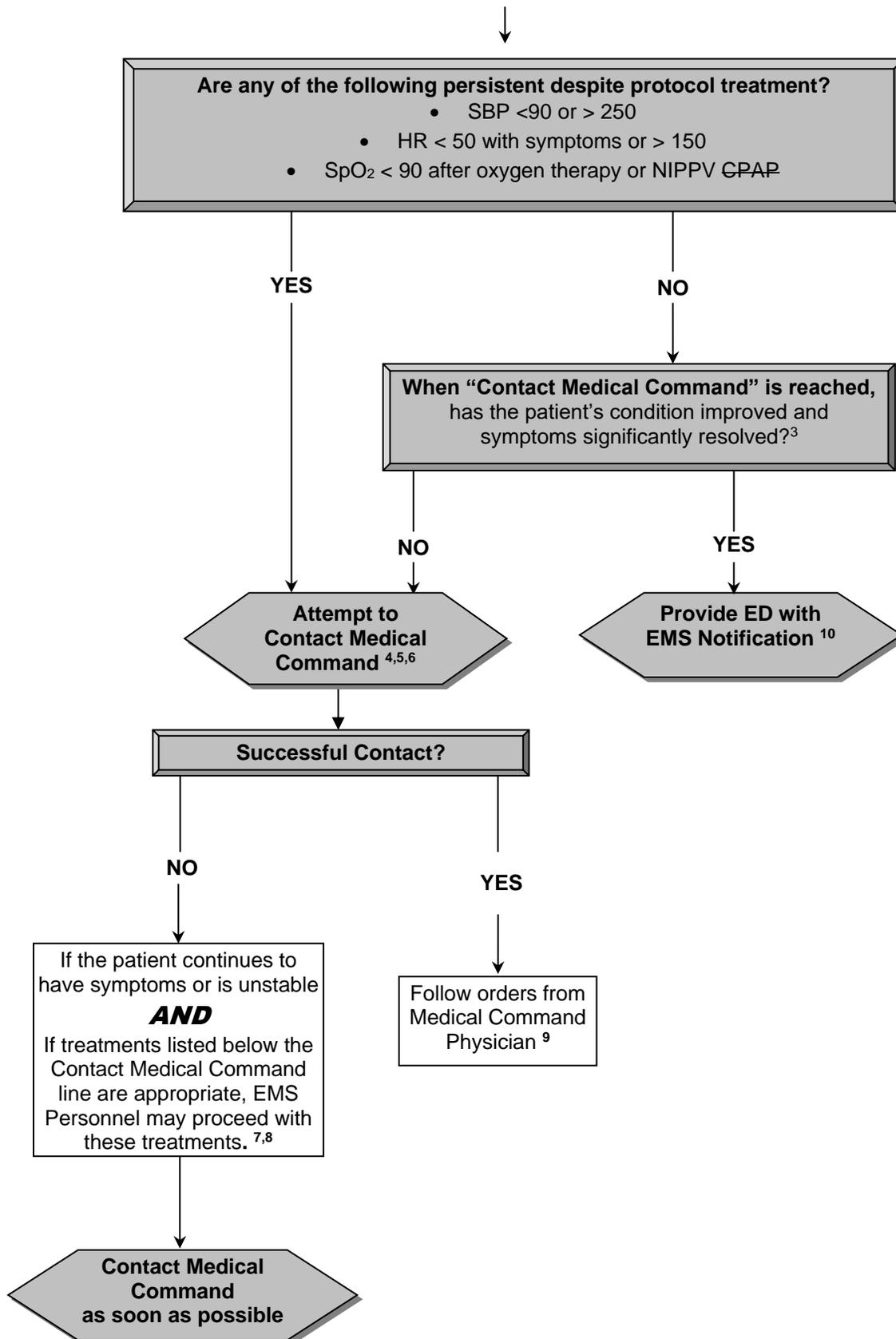
1. The Strategic National Stockpile CHEMPACK(s) are located at predetermined locations throughout the Commonwealth. The CHEMPACK(s) include autoinjectors and antidotes for nerve agent exposure. In the event of a mass casualty incident involving a suspected nerve agent, CHEMPACK(s) shall be released to an incident scene when a medical command physician orders the release of these antidotes through a county Emergency Management Agency
2. Due to severe bronchoconstriction and secretions, ventilation may be difficult, therefore atropine should be administered before attempts to intubate patient.
3. In mass casualty incidents, oxygen, intravenous access, pulse oximetry monitoring, and ECG monitoring should be prioritized to patients with severe symptoms if resources are limited.
4. NAAA (Nerve Agent Antidote Autoinjectors) are available in several brands. MARK 1 kits include 2 mg atropine and 600 mg pralidoxime in separate autoinjectors in a single kit. DuoDote autoinjectors contain 2.1 mg atropine and 600 mg pralidoxime in a single autoinjector. Atropens contain atropine in various doses depending upon the color-coded autoinjector.
5. Do not administer pralidoxime (2-PAMCl) to patients with exposure to carbamate pesticide (Sevin).
6. If NAAAs are not available, alternatively administer:
 - a. Atropine IM or IV/ IO and pralidoxime IM only, if available. Always administer atropine dose before pralidoxime dose. See Nerve Agent Antidote Table for doses.
 - b. **Mark I kits and DuoDotes are not recommended for children under 2 years old**, but appropriate Atropen or atropine doses may be given (see Nerve Agent Antidote Table).
7. **Use of the NAAAs:**
 - a. The **NAAA** contains either a single autoinjector or a kit with two auto injectors. These are administered IM by pressing the end of the device onto the thigh or buttocks.
 - 1) Remove the NAAA from its storage location.
 - 2) With your non-dominant hand, hold the auto injectors by the plastic clip so that the larger auto injector is on top and both are positioned in front of you at eye level.
 - 3) With the other hand check the injection site (lateral thigh muscle) for buttons or objects in the pockets which may interfere with the injections.
 - 4) Grasp the auto injector with the thumb and first two fingers. **Do not place your thumb/finger/palm over the end of the autoinjector. Atropine doses should all be administered prior to the administration of 2-PAM if using MARK 1 kits.**
 - 5) Pull the injector out of the clip with a smooth motion.
 - 6) Hold the auto injector like a pen or pencil, between the thumb and first two fingers.
 - 7) Position the green tip of the auto injector against the injection site.
 - 8) Apply firm, even pressure (not a jabbing motion) to the injector until it pushes the needle into the lateral thigh muscle.
 - 9) Hold the injector firmly in place for at least 10 seconds.
 - 10) Carefully remove the auto injector.
 - 11) Place the used auto injector into a sharps container.
 - 12) Administer additional autoinjectors using the procedures outlined in steps 4 through 11.
 - 13) Annotate the number of auto injectors administered on your patient care report or (in a mass casualty incident) on the triage tag.

Performance Parameters:

- A. Every case of suspected nerve agent or pesticide exposure with any symptoms should receive QI review for appropriate use of antidotes.

**MEDICAL COMMAND CONTACT
STATEWIDE ALS PROTOCOL**

Follow Appropriate Protocol ^{1,2}



MEDICAL COMMAND CONTACT STATEWIDE ALS PROTOCOL

Purpose of Medical Command contact:

- A. By the Pennsylvania EMS Act and its regulations, EMS personnel will provide care within their scope of practice and will follow Department of Health-approved protocols or Medical Command orders when delivering EMS care.
- B. Medical Command must order any ALS treatment (medication or procedure) that an EMS provider administers when that treatment is not included in or is a deviation from the Department-approved protocols. This applies to all ALS care, including interfacility transport.
- C. In certain circumstances, as defined by the Statewide BLS Protocols, medical command must be contacted by EMS (BLS or ALS) providers.
- D. Protocols cannot adequately address every possible patient scenario. The Pennsylvania EMS System provides a structured Medical Command system so that EMS providers can contact a Medical Command Physician when the providers are confronted with a situation that is not addressed by the protocols or when the EMS providers have any doubt about the appropriate care for a patient.
- E. In some situations, and geographic locations, it is not possible for an EMS provider to contact a medical command physician. In some protocols, there are accommodations for additional care when a medical command facility cannot be contacted.
- F. The protocol section entitled “Possible Medical Command Orders” are intended to educate EMS providers to the possible orders that they may receive, and as a resource to medical command physicians. Medical command physicians are not obligated to provide orders consistent with these “possible orders”. **Interventions listed under “Possible Medical Command Orders” may ONLY be done when they are ordered by a medical command physician. These possible treatments should not be done in situations where medical command cannot be contacted.**
- G. Contact with medical command may be particularly helpful in the following situations:
 - 1. Patients who are refusing treatment
 - 2. Patients with time-dependent illnesses or injuries who may benefit from transport to a specific facility with special capabilities (e.g. acute stroke, acute ST-elevation MI)
 - 3. Patients with conditions that have not responded to the usual protocol treatments.
 - 4. Patients with unusual presentations that are not addressed in protocols.
 - 5. Patients with rare illnesses or injuries that are not frequently encountered by EMS providers.
 - 6. Patients who may benefit from uncommon treatments (e.g. unusual overdoses with specific antidotes).
- H. EMS agency medical directors may require more frequent contact with medical command than required by protocol for ALS personnel who have restrictions to the skills that they are credentialed to perform. EMS agency medical directors that want medical command to be contacted on every call must do this in conjunction with local medical command facilities or within a regional plan.

Purpose of facility “EMS Notification”:

- A. If a patient’s condition has improved and the patient is stable, interventions from a medical command physician are rarely needed, and contact with the medical command physician is disruptive to the physician’s care of other patients.
- B. When medical command is not required or necessary, regional policy may require that the receiving facility should still be notified if the patient is being transported to the Emergency Department. This “EMS notification” should be provided to the facility by phone or radio, and may be delivered to any appropriate individual at the facility.

- C. An “EMS Notification” should be a short message that includes the ambulance identifier or designation, the patient age/gender, the chief complaint or patient problem, and whether the patient is stable or unstable.
- D. “EMS Notification” is not necessary when a patient is not being transported to the receiving facilities Emergency Department (e.g. Inter-facility transfer to an acute care facility when the patient is a direct admission to an inpatient floor).
- E. Providing “EMS Notification” to the ED may allow a facility to be better prepared for a patient arriving by ambulance and may decrease the amount of time needed to assign an ED bed to an arriving patient.

Notes:

1. You may contact medical command regardless of your position in the protocol if you need advice or direction in caring for the patient. Medical command should be contacted for orders if a patient requiring interfacility transport needs a medication/ treatment that is not included above the contact medical command line in any Department-approved protocol.
2. When in doubt, contact medical command.
3. For example, a patient with chest pain may have almost complete resolution of pain after oxygen, aspirin, and several nitroglycerin AND may have normal vital signs.
4. Regional policy may determine the preferred method of medical command contact/ EMS notification.
5. Cellular technology may be utilized but all EMS agencies must maintain the ability to contact medical command by radio also.
6. **If the receiving facility is also a medical command facility, the initial medical command contact should be made to the receiving facility.** If the receiving facility cannot be contacted, an alternate facility may be contacted. The medical command physician at the alternate facility is responsible for relaying the information to the receiving facility.
7. Procedures or treatments listed after the medical command box may be considered and performed at the discretion of the ALS provider if unable to contact medical command **and** if the ALS provider believes that these treatments are appropriate and necessary.
8. Attempts to contact medical command must be documented on the PCR, and the provider should document the reasons for continuing with care below the medical command box. Only mark the Medical Command section of the PA PCR if you sought Medical Command.
9. Every time medical command was contacted, the EMS provider must document the medical command facility, the medical command physician, and the orders received.
10. If patient condition worsens after EMS notification, contact medical command.

Performance Parameters:

- A. 100% audit of cases where treatments beyond the “contact medical command” box were performed after unsuccessful contact with medical command.
- B. Documentation of medical command facility contacted, medical command physician contacted, and orders received in every case where medical command is contacted.
- C. Review of cases for appropriate contact with medical command when required by certain protocols (e.g. acute stroke symptoms, refusal of treatment, etc...), when patient’s condition does not improve with protocol treatment, and when patients are unstable.
- D. Review of cases for appropriate use of EMS notification, and inappropriate use of medical command contact for stable patients whose symptoms were alleviated by protocol treatments.

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**APPENDIX A
REQUIRED DRUG LIST FOR ALS VEHICLES**

Adenosine
Albuterol
Aspirin
Atropine
Benzodiazepine (at least one: diaze**PAM**, **LOR**azepam, or midazolam)
Dextrose (at a minimum, must carry one formulation between 10-25%)
diphenhydr**AMINE**
EPINEPHrine (1 mg/mL and 0.1 mg/mL concentrations)
Lidocaine
Naloxone
Opioid analgesic (at least one: fenta**NYL** or morphine)
Nitroglycerin
Normal saline solution
Oxygen
Sodium bicarbonate

NOTE: ALS ambulances may carry additional medications that are listed on most recent version of the medication list for ALS ambulances as published in the Pennsylvania Bulletin. Etomidate and/or ketamine may only be carried if the agency meets the additional system requirements listed within the corresponding optional protocols.

APPENDIX B**[OPTIONAL] BLOOD DRAW BY PARAMEDICS FOR LEGAL ANALYSIS– NOT PATIENT CARE**

Drawing blood samples for legal analysis: Any EMS agency and paramedic performing “legal blood draws” must follow all applicable state and federal laws and guidance, including but not necessarily limited to, Act 142 of 2016, “Brian Steven Gregg Law and Act 35 of 2009, EMS System Act and associated regulations. A paramedic may draw blood for legal testing from an individual in a situation where all of the following conditions have been met:

- a. these activities do not interfere with providing EMS care/ transport or responding to an EMS emergency call,
- b. these activities may only be done by an individual with current registration as a paramedic in the commonwealth,
- c. the EMS agency supports this practice by paramedics within the agency,
- d. the EMS agency medical director has approved a policy that includes:
 - 1) a list of affiliated law enforcement agencies that will be permitted to request a blood draw by the agency’s paramedics,
 - 2) the procedure for law enforcement to request a legal blood draw,
 - 3) the procedure for drawing the blood,
 - 4) the procedure for labeling any legal blood sample with patient identifying information,
 - 5) the plan for following chain of custody for the blood sample,
- e. the EMS agency medical director has credentialed the paramedic as competent to perform this skill, and records of the credentialing process must be maintained by the EMS agency,
- f. a law enforcement officer from an affiliated law enforcement agency requests a legal blood draw for a specific individual,
- g. individuals have the right to refuse a legal blood draw. Paramedics will not draw blood for legal purposes from the following individuals:
 - 1) individuals who have not given consent to have their blood drawn for this purpose
 - 2) individuals who have died or are dead on arrival

APPENDIX C

Pediatric Weight Conversion

PEDIATRIC WEIGHT CONVERSION

Pound	Ounce	kgs
5	5	2.4
5	8	2.5
5	12	2.6
5	15	2.7
6	3	2.8
6	6	2.9
6	10	3.0
6	13	3.1
7	1	3.2
7	4	3.3
7	8	3.4
7	11	3.5
7	15	3.6
8	3	3.7
8	6	3.8
8	10	3.9
8	13	4.0
9	1	4.1
9	4	4.2
9	8	4.3
9	11	4.4
9	15	4.5
10	2	4.6
10	6	4.7
10	9	4.8
10	13	4.9
11	0	5.0
11	4	5.1
11	7	5.2
11	11	5.3
11	14	5.4
12	2	5.5
12	6	5.6
12	9	5.7
12	13	5.8
13	0	5.9

Pound	Ounce	kgs
13	4	6.0
13	7	6.1
13	11	6.2
13	14	6.3
14	2	6.4
14	5	6.5
14	9	6.6
14	12	6.7
14	16	6.8
15	3	6.9
15	7	7.0
15	10	7.1
15	14	7.2
16	2	7.3
16	5	7.4
16	9	7.5
16	12	7.6
16	16	7.7
17	3	7.8
17	7	7.9
17	10	8.0
17	14	8.1
18	1	8.2
18	5	8.3
18	8	8.4
18	12	8.5
18	15	8.6
19	3	8.7
19	6	8.8
19	10	8.9
19	13	9.0

Pounds	kgs
22	10
24	11
26	12
29	13
31	14
33	15
35	16
37	17
40	18
42	19
44	20
46	21
49	22
51	23
53	24
55	25
57	26
60	27
62	28
64	29

Pounds	kgs
66	30
68	31
71	32
73	33
75	34
77	35
79	36
82	37
84	38
86	39
88	40
90	41
93	42
95	43
97	44
99	45
101	46
104	47
106	48
108	49



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