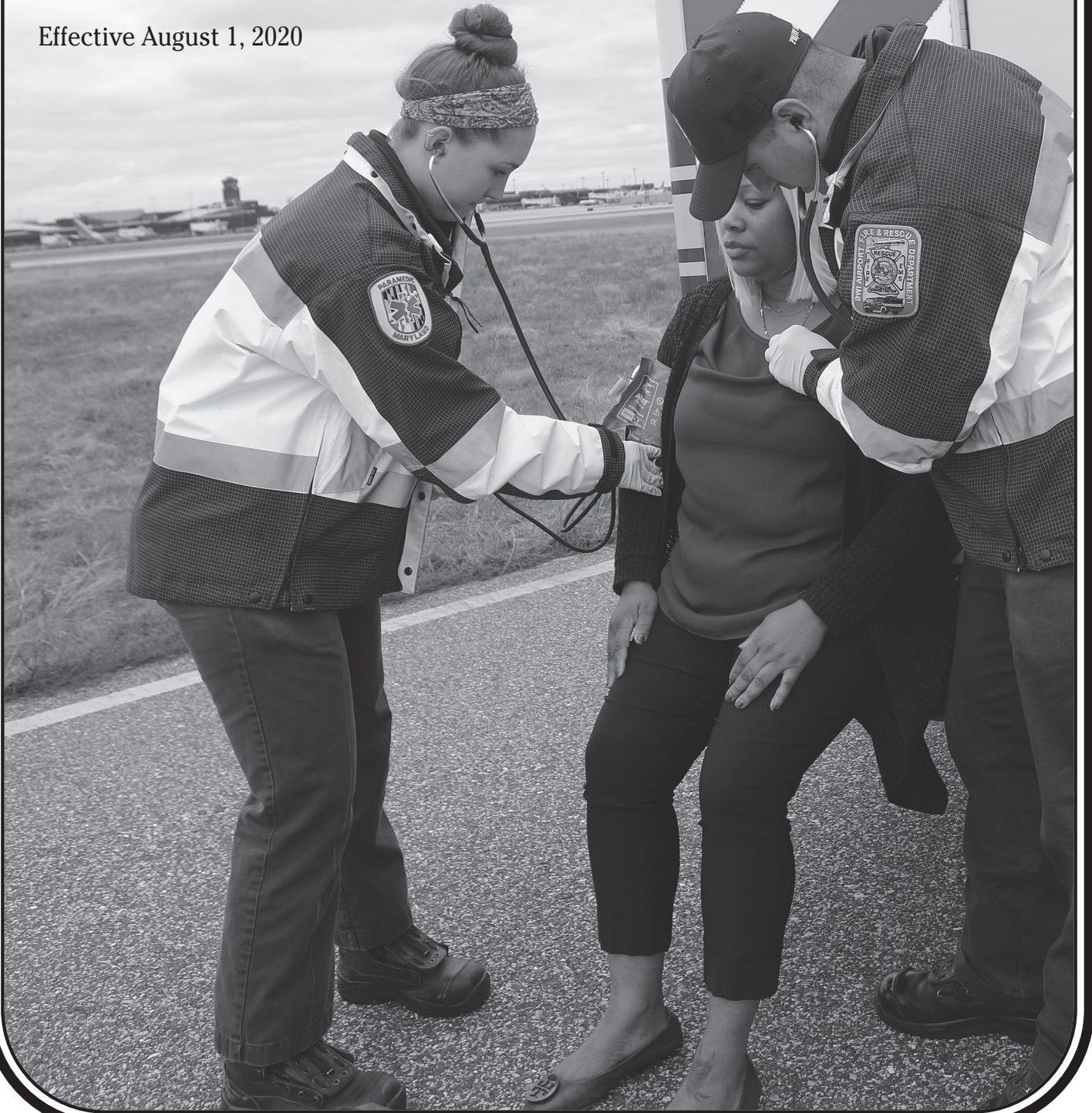


The Maryland Medical Protocols for Emergency Medical Services

Maryland Institute
for Emergency Medical Services Systems

Effective August 1, 2020





State of Maryland

**Maryland
Institute for
Emergency Medical
Services Systems**

653 West Pratt Street
Baltimore, Maryland
21201-1536

Larry Hogan
Governor

Clay B. Stamp, NRP
Chairman
Emergency Medical
Services Board

Theodore R. Delbridge, MD, MPH
Executive Director

410-706-5074
FAX 410-706-4768

To: EMS Clinicians
Base Stations

From: Timothy Chizmar, MD, FACEP
State EMS Medical Director

Date: September 14, 2020

RE: **Updates to Maryland Medical Protocols for Emergency Medical Services**

The Maryland EMS Board has approved the following new and revised protocols with a release date of September 14, 2020. In addition, there are two typographical corrections below. The updated document contains “Release Date September 14, 2020” at the bottom of each page.

- **Pediatric Termination of Resuscitation:** (correction, page 70): May terminate resuscitation with ETCO₂ less than 15 mmHg and administration of at least 1 dose (not 1 mg) of epinephrine (1:10,000).
- **Shock/Hypoperfusion:** (correction, page 154): 3(d) Hypotension is defined as a systolic blood pressure....less than 70 + (2 x years) (not 70 x (2 x years) for patients greater than 1 year of age.
- **OSP: Airway Management: Bi-Level Positive Airway Pressure (BiPAP) – Chronic:** (revision, page 359): Paramedic may transport patients who are 13 years of age or older on BiPAP, if no change in settings within 6 hours (previously 48 hours) or changes reflecting improvement in the patient’s condition. Patients who are less than 13 years of age shall be screened by SCT service to determine crew composition.
- **OSP: Airway Management: Bi-Level Positive Airway Pressure (BiPAP) – Acute:** (addition, page 359-2): Paramedic may initiate BiPAP for patients who are 13 years of age or older.
- **OSP: Heated/Humidified High Flow Nasal Cannula (HHFNC):** (addition, pages 359-3, 359-4): Paramedic may initiate HHFNC for patients 13 years of age or older. For patients who are less than 13 years of age, SCT Paramedic/RN is required for the transport (with certain exceptions, as defined in the protocol).

EMS clinicians may download the full document or changed pages only from the MIEMSS website at www.miemss.org. If you have a printed 8 ½ x 11” three-ring-binder format of the protocols, please add the updated pages noted above.

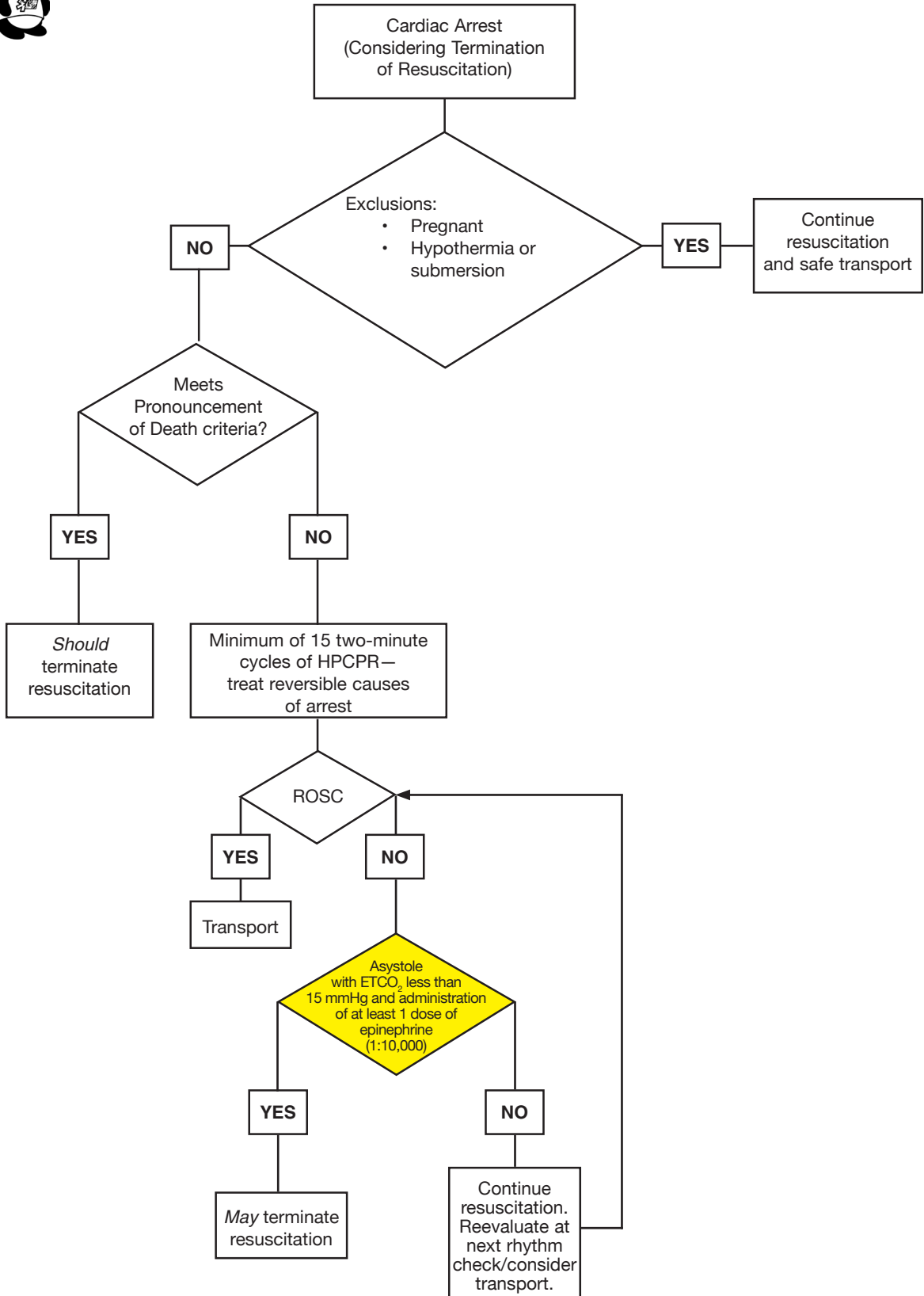
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**PEDIATRIC TERMINATION OF RESUSCITATION ALGORITHM (NEW '20)
MEDICAL ARREST
(Patients Who Have Not Yet Reached Their 18th Birthday)**



UU. SHOCK / HYPOPERFUSION (Continued)

- (3) Hypovolemic or Septic Shock
 - (a) If lungs are clear, administer fluid bolus of 20 mL/kg of LR IV. Titrate to a systolic blood pressure of 90 mmHg (or mean arterial pressure of 65 mmHg). Maximum patient dose of 2,000 mL of LR
 - (b)  If hypotension persists after 2 L of LR are provided, consider additional LR up to a maximum of 30 mL/kg total.
 - (c) Initiate epinephrine infusion if systolic blood pressure remains less than 90 mmHg (or mean arterial pressure less than 65 mmHg) after IV fluid bolus of 30 mL/kg LR.
- (4) Anaphylactic shock: Initiate epinephrine infusion for patients who are in extremis with severe hypotension or impending respiratory failure, after having administered 3 doses of IM epinephrine. (Refer to Anaphylaxis Protocol.)
- (5) Neurogenic shock (suspected spinal cord injury which typically presents with hypotension and bradycardia)
 - (a) If lungs are clear, administer fluid bolus of 20 mL/kg of LR IV. Titrate to a systolic blood pressure of 110 mmHg (or mean arterial pressure of 85 mmHg). Maximum patient dose of 2,000 mL of LR.
 - (b) Initiate epinephrine infusion if systolic blood pressure remains less than 110 mmHg (or mean arterial pressure less than 85 mmHg).



-
- d) The pediatric patient may present hemodynamically unstable or with hypoperfusion evidenced by hypotension and signs such as altered mental status, delayed capillary refill greater than 2 seconds, pallor, and/or peripheral cyanosis. Hypotension is defined as a systolic blood pressure less than 60 in neonates (patients birth to 28 days of age), less than 70 in infants (patients less than 1 year of age), less than $[70 + (2 \times \text{years})]$ = systolic BP] for patients greater than 1 year of age.
 - e) Continue General Patient Care.



-
- f) Establish IV/IO access with LR.
If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR IV/IO.
OR
For volume-sensitive children administer initial fluid bolus of 10 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 10 mL/kg LR IV/IO.
Volume-sensitive children include: neonates (birth to 28 days), children with congenital heart disease, chronic lung disease, or chronic renal failure.
 - g) Third and subsequent fluid boluses at 20 mL/kg IV/IO.

V. JURISDICTIONAL OPTIONAL PROTOCOLS SUPPLEMENTAL PROGRAMS/
PROTOCOLS



**A. AIRWAY MANAGEMENT: BI-LEVEL POSITIVE AIRWAY PRESSURE (BiPAP) –
CHRONIC (NEW '20)**

1. PURPOSE

To define the indications for the use of BiPAP by a paramedic for the continuation of BiPAP airway management which has been initiated prior to EMS arrival.

- a) The level of care required for the interfacility transport of a "Chronic BiPAP Patient" is within the scope of a practice of a paramedic who has been credentialed, is competent, and received adequate training specific to the patient's condition and equipment necessary to provide care.
- b) Exception: A CRT-I or EMT may transport a chronically ventilated patient who is going for routine medical care and has in attendance a patient provided attendant who can manage the patient's specific BiPAP equipment.

2. INDICATIONS (NEW '20)

- a) Patient has established BiPAP settings that have no changes within 6 hours or changes reflecting improvement in the patient's condition.
- b) Patients who are 13 years of age or older. If less than 13 years of age, patients shall be screened by SCT service (medical director or nurse) to determine the crew composition.
- c) Exception: A CRT-I or EMT may transport patients of any age who are chronically on BiPAP if they are being transported for routine appointments, which are not related to a respiratory complaint. A patient-provided attendant who can manage the patient's specific BiPAP equipment must be present during the transport.

3. CONTRAINDICATIONS

- a) Circumstances in which endotracheal intubation or a surgical airway is indicated.

4. PROCEDURE

- a) Assure patent airway.
- b) Perform appropriate patient assessment, including obtaining vital signs, pulse oximeter (SpO₂) reading, and cardiac rhythm.
- c) Apply BiPAP device per manufacturer's instructions.
- d) Program the device to match the settings of the BiPAP machine that the patient is currently using.
- e) Assess the patient after placing the BiPAP device selected for transfer. If respiratory distress occurs, support the patient with a BVM and supplemental oxygen until facility personnel reestablish therapy with original BiPAP device.
- f) Continuously reassess the patient.
- g) Monitor continuous pulse oximetry.

**OPTIONAL SUPPLEMENTAL PROTOCOL
BI-LEVEL POSITIVE AIRWAY PRESSURE (BiPAP)**

- h) Monitor continuous ETCO₂ with nasal prongs, if available. (Adults only)
- i) Follow the appropriate set of standing orders for continued transport.
- j) Confirm the availability of a BiPAP device at the destination facility.



FOR CIRCUMSTANCES IN WHICH THE PATIENT DOES NOT IMPROVE OR CONTINUES TO DETERIORATE DESPITE BIPAP AND/OR MEDICAL THERAPY, TERMINATE BIPAP ADMINISTRATION AND PERFORM BVM VENTILATION AND ENDOTRACHEAL INTUBATION IF NECESSARY.

**OPTIONAL SUPPLEMENTAL PROTOCOL
BI-LEVEL POSITIVE AIRWAY PRESSURE (BiPAP)
PARAMEDIC ONLY**



A2. AIRWAY MANAGEMENT: BI-LEVEL POSITIVE AIRWAY PRESSURE (BiPAP) – ACUTE (NEW '20)

1. PURPOSE

To define the indications for the initiation of BiPAP by a paramedic.

2. INDICATIONS (NEW '20)

- a) Patients who are 13 years of age or older, presenting with respiratory distress or failure, due to respiratory infection, pulmonary edema, COPD or asthma. The patient must have a patent, self-maintained airway and spontaneous respirations.

3. CONTRAINDICATIONS

- a) Circumstances in which endotracheal intubation or a surgical airway is indicated.
- b) Patients under 13 years of age.

4. PROCEDURE

- a) Ensure emergency equipment is immediately available and an alternate airway management plan has been established.
- b) Assure patient airway.
- c) Perform appropriate patient assessment, including obtaining vital signs, pulse oximeter (SpO₂) reading and cardiac rhythm.
- d) Apply BiPAP device per manufacturer's instructions.
- e) Set initial inspiratory positive airway pressure (IPAP) and expiratory positive airway pressure (EPAP) to decrease patient respiratory effort and adjust as needed
 - (1) Start with EPAP at 5 cm of water (max 8 cm of water).
 - (2) Start with IPAP at 10 cm of water (max 15 cm of water).
- f) Reassess the patient after placing the BiPAP device.
- g) Monitor continuous pulse oximetry.
- h) Monitor continuous ETCO₂ with nasal prongs, if available. (Adults only)
- i) Notify the receiving facility that the patient is on a BiPAP device.
- j) If the patient is located within a healthcare facility, observe the patient on BiPAP at the referring facility. If the patient is not tolerating BiPAP, consult with the sending or receiving physician prior to transport.



FOR CIRCUMSTANCES IN WHICH THE PATIENT DOES NOT IMPROVE OR CONTINUES TO DETERIORATE DESPITE BIPAP, TERMINATE BIPAP ADMINISTRATION AND PERFORM BVM VENTILATION AND ENDOTRACHEAL INTUBATION IF NECESSARY.

**OPTIONAL SUPPLEMENTAL PROTOCOL
HEATED/HUMIDIFIED HIGH-FLOW NASAL CANNULA (HHFNC) INTERFACILITY
PARAMEDIC/SCT PARAMEDIC ONLY**



A3. AIRWAY MANAGEMENT: HEATED/HUMIDIFIED HIGH-FLOW NASAL CANNULA (HHFNC) (NEW '20)

1. PURPOSE

To define the indications for the initiation of HHFNC by a Paramedic (for patients 13 years or older) or SCT Paramedic (for patients less than 13 years old).

2. INDICATIONS

- a) Patients with hypoxic respiratory failure, which may be due to the following causes: pulmonary edema, pneumonia, pulmonary embolism, pulmonary hypertension, or interstitial lung disease.

3. CONTRAINDICATIONS

- a) Inability to provide continuous, heated humidification using an approved delivery device.
- b) Inability to provide therapy through an appropriately sized nasal prong.
- c) Insufficient supply of oxygen to complete the transport.
- d) Basilar skull fracture or severe facial trauma.
- e) Circumstances in which endotracheal intubation or a surgical airway is indicated.
- f) Circumstances in which the patient does not improve or continues to deteriorate despite CPAP administration.

4. PROCEDURE

- a) Ensure that an adequate supply of oxygen is available for the transport.
 - (1) Calculate the amount of oxygen needed prior to departure.
 - (2) Ensure that you have at least two times the amount of oxygen anticipated.
- b) Perform appropriate patient assessment, including obtaining vital signs, pulse oximeter (SpO₂) reading, and cardiac rhythm.
- c) Set FiO₂ to maintain SpO₂ at or above 94% (or to patient's baseline oxygen saturation, if known).
- d) Set flow rate in liters per minute (L/min) to decrease work of breathing.
 - (1) Flow calculation: 2 L/kg/min up to the first 12 kg, plus 0.5 L/kg/min for each kg thereafter, up to a maximum flow rate of 60 L/min.
- e) Reassess vitals, work of breathing, mental status and breath sounds.
- f) Consider the need for escalation of respiratory support if patient remains in respiratory failure on more than 2 L/kg/min of flow or maximum settings for the delivery device.



FOR CIRCUMSTANCES IN WHICH THE PATIENT DOES NOT IMPROVE OR CONTINUES TO DETERIORATE ON HHFNC, TERMINATE HHFNC ADMINISTRATION AND ESCALATE RESPIRATORY SUPPORT TO PROVIDE POSITIVE PRESSURE VENTILATION VIA CPAP, BIPAP, BVM OR ENDOTRACHEAL INTUBATION, IF NECESSARY.

**OPTIONAL SUPPLEMENTAL PROTOCOL
HEATED/HUMIDIFIED HIGH-FLOW NASAL CANNULA (HHFNC) INTERFACILITY
PARAMEDIC/SCT PARAMEDIC ONLY**



Pediatric Section

- g) Pediatric patients (under 13 years of age) who require HHFNC must be transported by a nurse, nurse practitioner, respiratory therapist or physician, who is credentialed, educated, and competent in dealing with the ventilator and the ventilated patient.
- h) Exception: If a critical interfacility transfer is needed and a credentialed, educated, and a competent healthcare clinician (as listed in "a" above) is genuinely unavailable, then a credentialed, educated and competent SCT paramedic may attend the patient with the addition of a second ALS provider.
 - (1) SCT service (medical director or nurse) will screen the call prior to transport.
 - (2) Both the sending and receiving physicians must be in agreement with the team configuration prior to transport.