

# Prehospital Protocols for Children with Special Health Care Needs

## Center for Prehospital Pediatrics



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June 2002



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## Introduction

Children with Special Health Care Needs (CSHCN) are defined as “those who have or are at an increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally<sup>1</sup>.” Twelve million US children (18% of the pediatric population) have special health care needs<sup>2</sup>. Improvements in medical technology, managed care, and changing social views about institutionalizing children has increased the number of CSHCN living in the community. Due to their underlying medical condition, these children often require emergent medical care. CSHCN account for up to one-fourth of the children seen in pediatric emergency departments<sup>3</sup>. Therefore, guidelines for the treatment of CSHCN in the prehospital emergency setting are necessary.

The Center for Prehospital Pediatrics at Children's National Medical Center was tasked with revising the prehospital pediatric guidelines for the District of Columbia. This effort was conducted through an Emergency Medical Services for Children (EMSC) state partnership grant. In revising prehospital pediatric guidelines for the District of Columbia, it became evident that although there are several training programs that highlight CSHCN, there are very few EMS jurisdictions that support training with specific protocols to treat CSHCN. In fact, a comparison conducted by the Center for Prehospital Pediatrics of 25 states showed that only 32% of the states addressed CSHCN within EMS protocols. Of those with CSHCN protocols, 20% addressed tracheostomies, 8% addressed central line access (of which 8% included mediports and 4% included PICC lines), 4% addressed feeding pumps, 4% addressed pacemakers, 4% addressed colostomies, and 4% addressed apnea monitors. With the exception of the newly revised District of Columbia protocols, none of the states had a complete set of protocols addressing CSHCN.

Therefore, the following guidelines were developed by a review of the existing literature, focusing on evidence-based treatment modalities and through in-house expertise regarding prehospital treatment of CSHCN. These protocols were subsequently sent out through national list-serves and various organizations for comment and review. The reviewers of this document are listed on page 4. This document will be revised regularly. Comments or requests for revision can be sent to:

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# Acknowledgements

*The Center for Prehospital Pediatrics acknowledges revision commentary  
and contribution from the following reviewers:*

Melissa Bassett  
Emergency Medical Services for Children Program  
Florida Department of Health  
Tallahassee, FL

Tom Brazelton, MD, MPH  
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## Children with Special Health Care Needs (CSHCN) Special Concepts for General Patient Care

- ◆ ***Follow local protocols!***
- ◆ CSHCN have many allergies and children with spina bifida are often allergic to latex. ***Before treating a patient, ask the caregivers if they are allergic to latex or have any other allergies.*** If possible, keep latex-free products in your ambulance. You may also ask the parents to provide latex free equipment. (Some regularly used equipment that contains latex includes gloves, oxygen masks, IV tubing, BVM, blood pressure cuff, IV catheters etc)
- ◆ Assess and treat a child with special health care needs as you would any other patients – ***treat the ABC's first!***
- ◆ The best source of information about a CSHCN is the person who cares for the child on a daily basis. ***Listen to this caregiver and follow their guidance regarding the child's treatment.***
- ◆ Children with chronic illnesses often have different physical development from well children. Therefore, their baseline vital signs may differ from normal standards. Also, the size and developmental level may be different from age-based norms and length based tapes to calculate drug dosages may not be accurate. ***Ask the caregivers if the child normally has abnormal vital signs (i.e a fast heart rate or a low pulse ox).***
- ◆ ***Treat the child, not the equipment!*** For technology assisted children, determine if the emergency may be related to an equipment malfunction and manage the child appropriately using your own equipment.
- ◆ Some CSHCN may have sensory deficits (i.e. they may be hearing impaired or blind) but may have age-appropriate cognitive abilities. ***Follow the caregivers lead in talking to and comforting a child during treatment and transport. Do not assume that a CSHCN is developmentally delayed!***
- ◆ When moving a special needs child, ***a slow careful transfer with two or more people is preferable.*** Do not try to straighten or unnecessarily manipulate contracted extremities as it may cause injury or pain to the child.
- ◆ Caregivers of CSHCN often carry “Go Bags” or diaper bags that contains supplies to use with the child’s medical technologies and additional equipment such as extra tracheostomy tubes, adapters for feeding tubes, suction catheters etc. ***Before leaving the scene, ask the caregivers if they have a “go bag” and carry it with you.***
- ◆ Caregivers may also carry a brief medical information form or card, or the child may be enrolled in a medical alert program whereby emergency personnel can get quick access to the child’s medical history. ***Ask the caregivers if they have an emergency information form or some other form of medical information for their child.***
- ◆ Caregivers of CSHCN often prefer that their child be transported to the hospital where the child is regularly followed or the “home” hospital. ***When making the decision as to where to transport a CSHCN, take into account; local protocols, the child's condition, capabilities of the local hospital, caregiver request, ability to transport to certain locations and the ability to request helicopter transport for distant “home” hospitals.***



## Children with Special Health Care Needs Tracheostomy

### All Provider Levels:

1. Follow general patient care guidelines.
2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
3. Check and open the airway. Assess the tracheostomy tube and insure that it is in place, if the tube is dislodged, please dress the trauma wound. If the obturator has been left in place, remove it to open the tracheostomy tube. If the child has a fenestrated tube, make sure the decannulation plug is removed. If suctioning is needed, follow step 11.
4. Position the child in a neutral position with a towel roll underneath the shoulders as needed.
5. Assess the patient's breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise and air flow.
6. If the child is in respiratory distress, attempt assisted ventilation through the tracheostomy tube. For a child who is ventilator dependent, follow the ventilator protocols in addition to the following steps. Note: if the tracheostomy is a double lumen tube, the inner cannula must be in place for the bag-valve device to connect.
7. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm. Follow the steps below for airway management.
8. If possible, obtain a pulse oximeter reading. (Note: do not delay treatment obtaining a pulse oximetry, especially on patients with poor perfusion).
9. Ask the caregiver(s) for the child's baseline vital signs, and the child is on home oxygen, and the amount and method by which the child receives the oxygen.
10. Obtain a complete history including a history of the present illness, past medical history and interventions taken to correct the emergency before EMS arrival. Obtain any medical information forms that the caregivers may have for emergency medical providers. **Note: Do not delay emergent treatment or transport to obtain a history.**

### BLS Only

11. Call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.

### All Provider Levels:

12. Check breath sounds while ventilating. If breath sounds are not clear (or gurgling sounds are heard), suction the tracheostomy tube as follows:
  - If thick secretions are noted, inject **2 to 3 cc** of **sterile normal saline** into the tracheostomy tube.

- Use a suction catheter from the patient's supplies, if available. Otherwise, select a suction catheter small enough to pass easily through the child's tracheostomy tube.

*Note: To estimate the size of the suction catheter, double the inner diameter of the tracheostomy size. For example, a neonatal or pediatric inner diameter 3.5 tracheostomy tube ( $3.5 \times 2 = 7$ ) would take a size 6 suction catheter.*

- If using a portable suction machine, set it to 100mm/Hg or less.
- Deliver high flow oxygen (i.e. 15L/min) by placing an oxygen mask directly over the tracheostomy opening or with manual ventilations. If unable to ventilate, proceed to the next step. (If the child has excessive secretions, or receives humidified oxygen at home, insert 1cc of normal saline into the tracheostomy tube every 15 minutes. (EMT-I and EMT-P providers may alternatively provide humidification through an in-line normal saline nebulizer).
- Determine proper suction catheter length by measuring the obturator. If the obturator is unavailable, insert the suction catheter approximately 2 to 3 inches into the tracheostomy tube. **Do not use force!**
- Apply suction for no more than 10 seconds while slowly withdrawing the catheter, rolling the catheter between the fingers.
- If the child has a **double cannula tracheostomy tube**, remove and suction the inner cannula. If removal of the inner cannula fails to clear the airway, the outer cannula should then be removed by following directions in step 13.
- If unable to pass a suction catheter proceed to step 13.

13. If manual ventilation continues to be difficult, change the tracheostomy tube as follows:

**Note: BLS providers should only perform this step with the permission of medical control and in the presence of a knowledgeable caregiver.**

**This procedure requires the presence of two people. Initiate the help of a knowledgeable caregiver when available.**

- Ask the caregivers for a replacement tracheostomy tube. If the caregivers do not have a replacement tube, follow the next four steps to remove the tracheostomy tube and ventilate by placing the bag-mask device with an infant mask attached, directly over the stoma. Cover the child's mouth and nose when ventilating through the stoma. Alternatively, the child *may* be ventilated by placing a mask over the nose and mouth and covering the stoma. **Note: Determine the original reason for the tracheostomy to ensure that there is no obstruction of the upper airway.**
- If the child has a **cuffed tracheostomy tube**, deflate the balloon by connecting a syringe to the valve on the pilot balloon. Draw air out until the pilot balloon collapses. **Do not cut the pilot balloon or the attached tubing as this will NOT deflate the cuff.**

- Cut the cloth or Velcro ties that hold the tracheostomy tube in place.
- Remove the tracheostomy tube using a slow, outward and downward motion.
- Gently insert the same size tracheostomy tube, with the obturator in place. Point the curve of the tube downward. **DO NOT FORCE THE TUBE!**  
**Note: The tracheostomy tube may be lubricated with normal saline.**
- **(BLS Providers should skip this step if they do not have access to an ETT)** If the tracheostomy tube cannot be inserted easily, withdraw the tube and attempt to pass a smaller size tracheostomy tube. If a smaller tracheostomy tube is not available or cannot be inserted, attempt to insert an endotracheal tube (ETT) no more than two inches into the opening. Select an endotracheal tube with an inner diameter equal to or smaller than the inner diameter of the last tracheostomy tube attempted. Aim the tip of the endotracheal tube downward to prevent tissue damage after passing it through the stoma. If the endotracheal tube has a cuff, inflate the cuff after checking proper placement.  
**Note: Make sure the outer diameter of the endotracheal tube is smaller than the outer diameter of the tracheostomy tube most recently attempted.**
- If a replacement tube cannot be inserted, ventilate by placing the bag mask device with an infant mask attached, directly over the stoma. Cover the child's mouth and nose. Alternatively, the child may be ventilated by placing a mask over the nose and mouth and covering the stoma. **Note: Determine the original reason for the tracheostomy to ensure that there is no obstruction of the upper airway.**
- If ventilations fail through the mouth and nose, or stoma, insert a suction catheter approximately two inches into the stoma. Connect oxygen and transport immediately.
- If the tracheostomy tube is successfully placed, assess breath sounds, then secure the tube with the tracheostomy ties. If an ET tube was placed and there is chest rise and equal breath sounds with manual ventilation, secure the tube with tape. **DO NOT CUT THE ENDOTRACHEAL TUBE TO MAKE IT SHORTER!**
- Assess breath sounds every 3-5 minutes.

### **ALS Only**

14. If ventilation is successful through the nose and mouth, and a replacement tube is unable to be passed through the stoma, orally intubate with an appropriately sized endotracheal tube.
15. Initiate cardiac monitoring. Treat any dysrhythmias following the appropriate protocol. (Please note: consider bradycardia as secondary to ventilatory/oxygenation problem until proven otherwise).

### **All Provider Levels:**

16. If breathing is adequate, place the child in a position of comfort and administer high concentration oxygen by placing an infant mask directly over the stoma (or as tolerated by the child).

17. Obtain the child's medical history from the caregiver, including a history of the present illness and past medical history.
18. Assess circulation and perfusion.

### **ALS Only**

19. If bronchospasm is present in a patient with adequate ventilation, administer **2.5 mg albuterol** via nebulizer over a 10-15 minute period by placing the aerosol mask directly over the tracheostomy tube. If the patient is being assisted with ventilations, set up an in-line albuterol **nebulizer** treatment and administer directly through the tracheostomy tube.
20. Continue cardiac monitoring. If a dysrhythmia is present, follow the appropriate algorithm.
21. If bronchospasm persists, repeat **2.5 mg albuterol** via nebulizer up to two times at 15 minute intervals throughout transport.

### **All Provider Levels**

22. Contact medical control for additional instructions.
23. Initiate transport to the nearest appropriate facility as soon as possible. (Follow local protocols.)
24. Bring any of the child's medical charts or medical forms that the caregiver may have, the child's "go bag" or other similar bag and any supplies that the caregiver may have for the tracheostomy tube.
25. If the child has a ventilator or apnea monitor, bring it to the hospital whenever possible (do not delay treatment or transport and secure the device in the ambulance).
26. Perform focused history and detailed physical exam en route to the hospital.
27. Reassess the child at least every 3-5 minutes, more frequently as necessary and possible.



## Children with Special Health Care Needs Ventilators

### All Provider Levels:

1. Follow general patient care guidelines.
2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
3. Assess the patient's airway and breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. Follow protocols to assess and manage the tracheostomy tube in addition to these protocols.
4. Look at the ventilator and determine the reason for the alarm code. **(Caution: Do not delay treatment assessing the ventilator, treat the patient, not the machine).**
5. If no breathing is present, follow the steps below:
  - Disconnect the ventilator tubing from the tracheostomy tube.
  - Ask the caregivers to turn the ventilator off to prevent the alarm from sounding.
  - Attach the bag-valve device to the opening of the tracheostomy tube and begin manual ventilation. If the tracheostomy has an inner cannula, it must be present in order to attach the bag-valve device.
  - Assess for equal chest rise and breath sounds on both sides.
  - If chest rise is shallow, adjust the patient's airway position and check to see that the bag-valve device is securely connected to the tracheostomy tube. Depress the pop off valve on the resuscitation bag if present. If chest rise does not improve, assess the tracheostomy tube for obstructions by following the tracheostomy protocols.
6. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm.
7. Assess circulation and perfusion.
8. If possible, obtain a pulse oximeter reading. (Note: do not delay treatment obtaining a pulse oximetry, especially on patients with poor perfusion).
9. Ask the caregiver for the child's baseline vital signs, ventilator settings and if, they are on home oxygen, the amount and method by which they receive the oxygen.
10. Obtain a complete history including a history of the present illness, past medical history and interventions taken to correct the emergency before EMS arrival. Obtain any medical information forms that the caregivers may have for emergency medical providers. **Note: Do not delay emergent treatment or transport to obtain a history.**

11. Ask the caregivers or assess the ventilator to determine if the machine is a ventilator or a BiPAP or CPAP machine. BiPAP and CPAP are designed to assist or augment patient breathing and do not ventilate. A child can be transported on CPAP and BiPAP providing his or her respiratory drive *is not compromised*. If the child has a poor or non-existent respiratory drive or does not ventilate well, manual ventilations must be initiated immediately. **Please note: BiPAP and CPAP machines do not have internal batteries and only function if they are powered by a source of electricity.**

**BLS Only**

12. If the child has respiratory distress or cardiac arrest, call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.

**ALS Only:**

13. Initiate cardiac monitoring. Treat any dysrhythmias with the appropriate algorithm.
14. If bronchospasm is present in a patient with adequate ventilation, administer **2.5 mg albuterol** via **nebulizer** over a 10-15 minute period by placing the aerosol mask directly over the tracheostomy tube. If the patient is being assisted with ventilations, set up an in-line albuterol nebulizer and administer directly through the tracheostomy tube.

**All Provider Levels:**

15. If breathing is adequate, place the child in a position of comfort and administer high concentration oxygen.
16. Check the ventilator and correct any ventilator problems per the following table:

<b>Alarm</b>	<b>Possible Causes</b>	<b>Interventions</b>
Low Pressure / Apnea (results in inadequate ventilations or chest rise)	<ul style="list-style-type: none"> <li>▪ Loose or disconnected circuit</li> <li>▪ Leak in the circuit</li> <li>▪ Leak around the tracheostomy site</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ensure that all circuits are connected</li> <li>▪ Check the tracheostomy balloon</li> <li>▪ Ensure that the tracheostomy is well seated</li> </ul>
Low Power	Internal battery is nearly depleted	Plug the ventilator into a power outlet
High Pressure	<ul style="list-style-type: none"> <li>▪ Plugged or obstructed airway or circuit (secretions, water)</li> <li>▪ Patient coughing or bronchospasm</li> </ul>	<ul style="list-style-type: none"> <li>▪ Clear obstruction</li> <li>▪ Suction tracheostomy</li> <li>▪ Administer bronchodilator (ALS Only)</li> </ul>
Setting Error	Ventilator settings are not within equipment capacity (settings have been incorrectly adjusted)	<ul style="list-style-type: none"> <li>▪ Manually ventilate the patient</li> <li>▪ Transport the patient and ventilator</li> </ul>
Power Switchover	The unit has switched from AC power to internal battery	Press the “Alarm silent” button after ensuring that the battery is powering the ventilator

17. If the child has excessive secretions, or receives humidified oxygen at home, insert 1cc of normal saline into the tracheostomy tube every 15 minutes. (ALS providers may alternatively provide humidification through an in-line normal saline nebulizer).
18. Contact medical control for additional instructions.
19. Bring any of the child's medical charts or medical forms that the caregiver may have, the child's "go bag" or other similar bag and any supplies that the caregiver may have for the tracheostomy tube or ventilator.
20. **Bring the ventilator to the hospital.** If the child is not experiencing respiratory distress, ensure that the ambulance can power the ventilator, or that the ventilator has adequate battery power. If not, disconnect the child from the ventilator and manually ventilate the child. Be sure to secure the ventilator during transport.
21. Initiate transport to the nearest appropriate facility as soon as possible. (Follow local protocols.)
22. Perform focused history and detailed physical exam en route to the hospital.
23. Reassess the child at least every 3-5 minutes, more frequently as necessary and possible.



## Children with Special Health Care Needs Apnea Monitors

### **All Provider Levels:**

1. Follow general patient care guidelines.
2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
3. Assess the patient's airway and breathing including determination of rate and effort and adequacy of ventilation as determined by inspection and auscultation. If possible, obtain a pulse oximeter reading. (Note: do not delay treatment obtaining a pulse oximetry, especially on patients with poor perfusion).
4. If child is not breathing, open the airway and begin bag valve ventilation using high concentration oxygen. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.
5. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm.
6. Assess circulation and perfusion.
7. Ask the caregiver for the child's baseline vital signs.
8. Look at the apnea monitor and determine the alarm code (i.e. heart rate, apnea etc).
9. Check the electrodes or monitor chest belt and ensure proper placement.
10. Make sure that the monitor is powered and is not low on batteries.

### **BLS Only**

11. If the child has respiratory distress or cardiac arrest, call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.
12. Transport the child on the apnea monitor if possible.

### **ALS Only:**

13. Initiate cardiac monitoring. Treat any dysrhythmias with the appropriate algorithm.
14. Disconnect and power off the apnea monitor to prevent interference. Transport the apnea monitor.

**All Provider Levels:**

15. If breathing is adequate, place the child in a position of comfort and administer high concentration oxygen.
16. Contact medical control for additional instructions.
17. **Bring any of the child's medical charts or medical forms that the caregiver may have, as well as any supplies for other adjuncts the child needs.** Bring the child's "go bag" or other similar bag.
18. **Bring the apnea monitor to the hospital with the child.** Secure the monitor in the ambulance during transport.
19. Initiate transport to the nearest appropriate facility as soon as possible.
20. Perform focused history and detailed physical exam en route to the hospital.
21. Reassess the child at least every 3-5 minutes or more frequently as necessary and possible.



## Children with Special Health Care Needs Central Lines

### All Provider Levels:

1. Follow general patient care guidelines.
2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
3. Assess the patient's breathing including rate, inspection, and auscultation. Assess effort and adequacy of ventilation as indicated by chest rise. If possible, obtain a pulse oximeter reading. (Note: do not delay treatment obtaining a pulse oximetry, especially on patients with poor perfusion).
4. Open the airway using a head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning. (Remember proper positioning is still needed when an oral or nasal airway is in place). Suction as necessary. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.
5. If no breathing is present then position the airway and start bag mask ventilation using high concentration oxygen. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.
6. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm. Follow the steps below to manage the central line.
7. Assess circulation and perfusion.
8. Ask the caregivers for the child's baseline vital signs.
9. Determine if the cause of the emergency is related to the central line by examining the central line and its site of placement. Also determine whether it is an implanted catheter, peripherally inserted central venous catheter (PICC) or tunneled central venous catheter. **(Do not delay treatment or transport to perform a lengthy assessment)**
10. If the central venous line is partially or completely dislodged, or if there is bleeding from the site, apply direct pressure to the skin site. Estimate the amount of blood loss and evaluate for signs of a hemothorax and air embolus.
11. If the catheter is damaged, clamp the catheter proximal to the break with a hemostat wrapped in gauze. Estimate the amount of blood that may have been lost.
12. If there are fluids infusing through the central line, determine the nature of the fluids and the time that the fluids were started.

13. Obtain a complete medical history for the patient, including a history of the present illness and the past medical history. Obtain any medical information forms that the caregivers may have for emergency medical providers. **Note: Do not delay emergent treatment or transport to obtain a history.**
14. Assess for signs and symptoms of an air embolism (tachypnea, chest pain, shortness of breath, or loss of consciousness) or blood clots. If an air embolism is suspected, clamp the central line with the clamp on the tube itself, place the child on the left side in a head down position, and administer high flow oxygen. (If the position makes the child uncomfortable, place the child in his/her position of comfort).

### **BLS Only**

15. Call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.
16. If there are fluids infusing through the central line and ALS transport is not available, ask the caregiver if the infusion can be stopped and to stop the infusion before transport. (Note: if the infusion cannot be stopped, call medical control for further instructions).

### **ALS Only:**

17. Initiate cardiac monitoring. Treat any dysrhythmias with the appropriate algorithm.
18. If the child has a fever or if the central line is damaged, stop fluid infusion immediately. If the child does not have a fever, contact medical control to determine whether fluid infusion should be restarted or changed to normal saline. If the fluid infusion can not be stopped, call medical control for further instructions.
19. If the child is in cardiac arrest, the central line is not damaged, and the catheter is not an implanted catheter, utilize the central line to infuse fluids and medications. Access the central line using the guidelines outlined in step 20.
20. Obtain IV access. If IV access is not available, obtain IO access as allowed by local protocols. If IO access is not available, **and** the patient presents with signs and symptoms of shock, contact medical control for permission to access the central line. Note: If the central line is damaged, or it is an implanted catheter and the appropriate needle is not available, it cannot be used. (If you do not have the equipment to access the central line, ask the caregivers for supplies).
21. With permission from medical control access the central line as follows: Note: Do not use the catheter if it is damaged.

### ***For a central venous catheter:***

- Wash hands and wear sterile gloves.
- Scrub the injection cap with alcohol, (not Providine-iodine).
- Clamp the catheter 3 inches from the cap prior to removing the injection cap.
- Remove the cap and secure a 10 cc or 12 cc syringe filled with 5 cc's of normal saline onto the injection port site of the central line.

- Unclamp the catheter and attempt to slowly aspirate 5cc's of blood (**if blood clots are aspirated, immediately clamp the catheter, contact medical control and do not proceed further**). Clamp the catheter and discard aspirate. (Note: if no blood is aspirated, continue with the next step)
- Secure a new syringe filled with 10 cc's of normal saline, unclamp and slowly infuse 5 to 7 cc's into the catheter to ensure patency. (**If resistance is met, immediately stop procedure and clamp catheter**).
- Clamp the catheter and remove the syringe.
- Place a well-primed IV line onto the injection port and secure with tape.
- Unclamp the line.
- Administer fluids and medications as necessary.

***For a Peripherally Inserted Central Venous Catheter (PICC):***

- Wash hands and wear sterile gloves.
- Access the catheter using the same procedure as that of an IV line. Follow the precautions below:
- Do not place a tourniquet on the same arm as the PICC.
- Do not clamp the PICC tubing, instead, clamp the extension tubing.
- Do not flush or aspirate from a PICC with less than a 10 CC syringe (smaller size syringes generate too much pressure and can damage the catheter)
- The maximum flow rates for a PICC line is 125 ml/hour for less than 2.0 Fr. sized catheters and 250 ml/hour for catheters over 2.0 Fr. sized catheters.

**Note: Do not take a blood pressure in the same arm as the PICC line.**

22. If signs and symptoms of shock exist, infuse a fluid bolus of **20cc/kg of normal saline**. This bolus may be repeated up to two times. If signs and symptoms of shock do not exist, infuse normal saline at a KVO rate.

**All Provider Levels:**

23. If breathing is adequate, place the child in a position of comfort and administer high concentration oxygen.
24. Contact medical control for additional instructions.
25. Bring any of the child's medical charts or medical forms that the caregiver may have, the child's "go bag" or other similar bag and any supplies that the caregiver may have for the central line.
26. Initiate transport to the nearest appropriate facility as soon as possible. (Follow local protocols.)
27. Perform focused history and detailed physical exam en route to the hospital.
28. Reassess the child at least every 3-5 minutes, more frequently as necessary and possible.



## Children with Special Health Care Needs CSF Shunts

### All Provider Levels:

1. Follow general patient care guidelines.
2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
3. Assess the patient's airway and breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. If the child has a tracheostomy tube, follow protocols to assess and manage the tracheostomy tube in addition to these protocols.
4. If no breathing is present, manually ventilate the patient at an age appropriate rate. **DO NOT HYPERVENTILATE!**
5. If possible, obtain a pulse oximeter reading. (Note: do not delay treatment obtaining a pulse oximetry, especially on patients with poor perfusion). If CO<sub>2</sub> monitor available use it to assure proper ventilatory support.
6. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm.
7. Assess circulation and perfusion.
8. Ask the caregiver for the child's baseline vital signs.
9. Assess for signs and symptoms of shunt obstruction or shunt infection. (Signs and symptoms of shunt obstruction or infection include headache, nausea, vomiting, increased sleep, blurred vision, irritability, loss of coordination, altered mental status, bradycardia or other dysrhythmias, redness along the shunt track, apnea, seizures, high pitched cry, fever, or full or bulging fontanel, unequal pupils and irregular respiratory pattern).
10. Assess for signs and symptoms of increased intracranial pressure (listed in step 9).
11. Obtain a complete history including a history of the present illness and past medical history. Obtain any medical information forms that the caregivers may have for emergency medical providers. **Note: Do not delay emergent treatment or transport to obtain a history.**

### BLS Only

12. Call for ALS support.

### ALS Only:

13. Initiate cardiac monitoring. Treat any dysrhythmias with the appropriate algorithm.

14. If signs and symptoms of increased intracranial pressure, contact medical control to administer Mannitol at 0.25-1 gm/kg IV/IO. (Follow local protocols).

**All Provider Levels:**

15. If breathing is adequate, place the child in a position of comfort and administer high concentration oxygen. Elevate the child's head keeping it in midline position.

16. Contact medical control for additional instructions.

17. Bring any of the child's medical charts or medical forms that the caregiver may have, the child's "go bag" or other similar bag and any supplies that the caregiver may have.

18. Initiate transport to the nearest appropriate facility as soon as possible. (Follow local protocols.)

19. Perform focused history and detailed physical exam en route to the hospital.

20. Reassess the child at least every 3-5 minutes, more frequently as necessary and possible.



## Children with Special Health Care Needs Feeding Tubes

### All Provider Levels:

1. Follow general patient care guidelines.
2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
3. Open the airway using a head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning. Suction as necessary. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.
4. Assess the patient's breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. Obtain a pulse oximeter reading. (Note: do not delay treatment obtaining a pulse oximetry, especially on patients with poor perfusion).
5. If no breathing is present then position the airway and start bag mask ventilations using high concentration oxygen. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.
6. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm.
7. Assess circulation and perfusion.
8. Ask the caregivers for the child's baseline vital signs.
9. Assess the abdomen for signs of distention. If distention is present follow step 15.
10. Obtain a complete medical history for the patient, including a history of the present illness and the past medical history.
11. Determine if the cause of the emergency is related to the feeding tube by examining the feeding tube and its site of placement. Determine the type of feeding tube that is in place.

### BLS Only

12. Call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.

**All Provider Levels:**

13. Treat problems associated with the tube as per the following table:

<b>Nasal or oral feeding tube</b>	<b>Treatment</b>
Complete catheter dislodgement	Assess respiratory status. Assess for dehydration. Ask if the child has missed any feedings.
Partially dislodged catheter	Ask the caregiver to check the tube position. If the tube's position cannot be confirmed, remove the tube by gently pulling the tube out of the nose or mouth. (ALS Only)
Gastric distention	Connect an appropriately sized syringe to the external opening of the feeding tube. Aspirate until resistance is met. (See step 15). If blood is seen in the aspirated contents, contact medical control and report findings.
<u>Button or Gastrostomy Tube</u>	<u>Treatment</u>
Complete catheter dislodgement	Assess for dehydration. Ask if the child has missed any feedings. Place some gauze over the site with direct pressure to site. Rapidly transport to an appropriate hospital. Reinsertion of the tube is immediately needed.
Insertion site is irritated or bleeding	Cover the site with a sterile dressing and control any bleeding with direct pressure.
Gastric contents are leaking around catheter	Cover the site with sterile gauze and assess the abdomen. Causes for leakage may include balloon deflation, coughing, constipation, bowel obstruction, and seizure. Treat any medical problem according to the appropriate protocol.
Gastric distention	Connect the appropriate tubing and syringe to the external opening of the feeding tube. (If the equipment is not available on the ambulance, ask the caregivers for supplies). Slowly aspirate until resistance is met. Distention may be a cause of bowel obstruction or air in the stomach.
Obstructed tube	Transport immediately to an appropriate facility. The tube needs to be cleared or replaced immediately. Do not force fluids through the tube. Clamp tube.
Feeding tube adaptor breaks	Clamp the tube and transport immediately to an appropriate facility. The tube needs to be replaced.

14. If there are fluids infusing through the feeding tube, determine the nature of the fluids and the time that the fluids were started. If the feeding tube appears damaged, or the site is irritated, stop all infusing fluids, flush the tube with enough water to clear the tube (in the same port that was being used for infusion), then clamp the tube.

15. If abdominal distention is noted, decompress the stomach as follows:

- Ask the caregivers for an appropriate size syringe (or tubing adaptor if the child has an anti-reflux valve).
- Unclamp the distal end of the tube.
- Connect the syringe and tubing adaptor (if indicated), to the external opening of the tube.
- Gently and slowly aspirate air and gastric contents until resistance is met.
- The tube can either then be re-clamped or left open. If left open, place the distal end of the tube in a cup below the level of the stomach so the contents can drain.

**BLS Only:**

16. If there are fluids infusing through the feeding tube and ALS transport is not available, ask the caregiver to stop the infusion and flush the tube with water before transport.

**ALS Only:**

17. If appropriate and indicated, initiate cardiac monitoring.

18. Obtain IV access. If IV access is not available, obtain IO access (as per local protocols).

19. If signs and symptoms of shock exist, infuse a fluid bolus of **20cc/kg of normal saline**. This bolus may be repeated up to two times. If signs and symptoms of shock do not exist, infuse normal saline at a KVO rate. If a history consistent with possible dehydration is noted, infuse one fluid bolus at **20cc/kg of normal saline**.

**All Provider Levels:**

20. If breathing is adequate, place the child in a position of comfort and continue to administer high concentration oxygen.

21. Contact medical control for additional instructions.

22. If fluids are infusing through the feeding tube, transport the feeding pump if there is space on the ambulance and if there is a power source for transport. If the pump cannot be transported, stop infusing fluids (**ALS only**) or ask the caregivers to stop fluid infusion and flush the tube with water.

23. If the fluid infusion was stopped within 30 minutes of transport time, (either before or after EMS arrival), transport the child sitting up.

24. Bring any of the child's medical charts or medical forms that the caregiver may have, the child's "go bag" or other similar bag and any supplies that the caregiver may have.
25. Initiate transport to the nearest appropriate facility as soon as possible. (Follow local protocols.)
26. Perform focused history and detailed physical exam en route to the hospital.
27. Reassess the child at least every 3-5 minutes, more frequently as necessary and possible.



**Special Care Protocols:  
Children with Special Health Care Needs  
Internal Pacemakers/Defibrillators**

**All Provider Levels:**

1. Follow general patient care guidelines.
2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
3. Open the airway using a head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning. Suction as necessary. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.
4. Assess the patient's breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. Obtain a pulse oximeter reading. (Note: do not delay treatment obtaining a pulse oximetry, especially on patients with poor perfusion).
5. If no breathing is present then position the airway and start bag valve ventilations using high concentration oxygen. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.
6. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm. Determine if the child has a pacemaker or a defibrillator. The internal pacemaker can easily be felt near the clavicle, or in the abdomen in younger children. If defibrillation or pacing is needed, do not place the defibrillator paddles or pacemaker patches directly over the internal pacemaker or defibrillator generator.
7. Assess circulation and perfusion.
8. Ask the caregiver for the child's baseline vital signs.

**BLS Only**

9. Call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.

**ALS Only**

10. Initiate cardiac monitoring. Treat any dysrhythmias with the appropriate algorithm.

**All Provider Levels:**

11. Obtain a complete medical history for the patient, including a history of the present illness and the past medical history. Specifically ask the following questions and document the answers.

***For a child with an internal pacemaker:***

- What type of heart problem does the child have?
- What is the child's baseline rhythm and what is his/her baseline or underlying heart rate?
- What type of pacemaker does the child have?
- Is the child dependent on the pacemaker?
- When was the pacemaker implanted? (Note: Pacemakers may only have a 3-5 year battery life.)

***For a child with an internal defibrillator:***

- What is type of heart problem does the child's have?
- What is the child's baseline rhythm and what is his/her baseline or underlying heart rate?
- What is the setting for the child's defibrillator or at what heart rate does the defibrillator fire?
- How many shocks has the child felt?
- Has the child experienced any of the following:
  - Felt more than 3 shocks in a row
  - Unusual symptoms after experiencing a shock (such as dizziness, **palpitations**, etc.)
  - Sensations of dizziness, light headedness, palpitations, etc. for a period of time with out any shocks.
- When was the defibrillator implanted? (Note: Defibrillators may only have a 3-5 year battery life).

12. Determine if the cause of the emergency is related to a malfunction of the pacemaker/defibrillator.

13. Obtain IV access. If IV access is not available and the child is unstable, obtain IO access (as per local protocol).

**All Provider Levels:**

14. If breathing is adequate, place the child in a position of comfort and continue to administer high concentration oxygen.

15. Contact medical control for additional instructions.

16. Bring any of the child's medical charts or medical forms that the caregiver may have, the child's "go bag" or other similar bag and any supplies that the caregiver may have.

17. Initiate transport to the nearest appropriate facility as soon as possible. (Follow local protocols.)

18. Perform focused history and detailed physical exam en route to the hospital.

19. Reassess the child at least every 3-5 minutes, more frequently as necessary and possible.



## Special Care Protocols: Children with Special Health Care Needs Vagus Nerve Stimulator\*

A **Vagus Nerve Stimulator** is a device that is surgically implanted in the patient's chest, under the skin with electrodes to the vagus nerve on the left side of the neck. This pulse generator produces electrical energy and is used for epilepsy patients to break up electrical disturbances caused by seizures.

### **All Provider Levels:**

1. Follow general patient care guidelines.
2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
3. Open the airway using a head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning. Suction as necessary. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.
4. Assess the patient's breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. Obtain a pulse oximeter reading. (Note: do not delay treatment obtaining a pulse oximetry, especially on patients with poor perfusion).
5. If no breathing is present then position the airway and start bag valve ventilations using high concentration oxygen. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.
6. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm. Determine if the child has a pacemaker or a defibrillator.
7. Assess circulation and perfusion.
8. Ask the caregiver for the child's baseline vital signs.

### **BLS Only**

9. Call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.

### **ALS Only**

10. Initiate cardiac monitoring. Treat any dysrhythmias with the appropriate algorithm.

### **All Provider Levels:**

11. Obtain a complete medical history for the patient, including a history of the present illness and the past medical history. Specifically ask the following questions and document the answers.
  - Has the child had any recent trauma to the left side of his or her neck or the chest over the device?
  - If the child is able to communicate and understand the presence of the VNS, has he or she noticed anything different lately regarding the stimulations from the device?
  - When was the vagus nerve stimulator (VNS) implanted?
  - When was the VNS last checked by the child's doctor?
  - What are the current settings, if available?
  - Is the child having seizures when the device is functioning properly?
  - If seizures are still present, have you been using the magnet? If so, how often? What happens when you use the magnet?
  - Have you noticed any change in your child's seizures recently? Increase intensity? Increase in frequency?
12. Determine if the cause of the emergency is related to a malfunction of the vagus nerve stimulator.
13. Obtain IV access. If IV access is not available and the child is unstable, obtain IO access (as per local protocol).

### **All Provider Levels:**

14. If breathing is adequate, place the child in a position of comfort and continue to administer high concentration oxygen.
15. Contact medical control for additional instructions.
16. Bring any of the child's medical charts or medical forms that the caregiver may have, the child's "go bag" or other similar bag and any supplies that the caregiver may have.
17. Initiate transport to the nearest appropriate facility as soon as possible. (Follow local protocols.) Add: Be sure to tell the hospital staff that the child has a vagus nerve stimulator. The hospital may want to have a pediatric neurologist standing by if available.
18. Perform focused history and detailed physical exam en route to the hospital.
19. Reassess the child at least every 3-5 minutes, more frequently as necessary and possible.

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***\*Protocol Developed in Part by: Elizabeth M. Wertz RN, BSN, EMT-P***



## Children with Special Health Care Needs Colostomy

### All Provider Levels:

1. Follow general patient care guidelines.
2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
3. Assess the patient's airway and breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. Obtain a pulse oximeter reading. (Note: do not delay treatment obtaining a pulse oximetry, especially on patients with poor perfusion).
4. If no breathing is present then position the airway and start bag mask ventilations using high concentration oxygen. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.
5. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm.
6. Assess circulation and perfusion.
7. Assess the child's colostomy container and note any damage to the container or irritation around the site of the colostomy.
8. If the colostomy site appears irritated or infected (signs of infection include red, warm, tender skin spreading away from the stoma site), empty the colostomy container (or ask the caregivers to empty the container) and transport immediately.
9. If the collection container breaks or is torn off, ask the caregivers for a replacement container and ensure that it fits and seals over the stoma. If a replacement container is not available, place moist gauze over the stoma opening and place a plastic bag over the gauze to collect any contents. Alternatively, several layers of dressing may be applied over the stoma to collect any contents.
10. Assess the abdomen and note any significant findings.
11. Obtain a complete medical history including history of the present illness. Also, ask the time and amount of the last feeding. Obtain any medical information forms that the caregivers may have for emergency medical providers. **Note: Do not delay emergent treatment or transport to obtain a history.**
12. Assess for signs and symptoms of dehydration.

13. Ask the caregivers for the child's baseline vital signs.

**BLS Only**

14. If signs and symptoms of dehydration exist, call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.

**ALS Only:**

15. Initiate cardiac monitoring. Treat any dysrhythmias with the appropriate algorithm.

16. Obtain IV access. If IV access is not available and the child is unstable, obtain IO access (as per local protocol).

17. If signs and symptoms of shock exist, infuse a fluid bolus of **20cc/kg of normal saline**. This bolus may be repeated up to two times. If a history consistent with possible dehydration is noted, infuse one fluid bolus at **20cc/kg of normal saline**.

**All Provider Levels:**

18. If breathing is adequate, place the child in a position of comfort and administer high concentration oxygen.

19. Contact medical control for additional instructions.

20. Bring any of the child's medical charts or medical forms that the caregiver may have, as well as any supplies that the parent may have for the colostomy. Bring the child's "go bag" or other similar bag.

21. Initiate transport to the nearest appropriate facility as soon as possible. (Follow local protocols.)

22. Perform focused history and detailed physical exam en route to the hospital.

23. Reassess the child at least every 3-5 minutes, more frequently as necessary and possible.

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