



Children With Special Health Care Needs

Instructor Manual

Georgia Emergency Medical Services for Children



Division of Public Health

LESSON PLAN COVER SHEET

COURSE NAME: SPECIAL NEEDS AND TECHNOLOGY ASSISTED CHILDREN UNIT CODE:

LESSON TITLE: SPECIAL NEEDS AND TECHNOLOGY ASSISTED CHILDREN HOURS: 6 (Six)
--

PREPARED BY: GA EMS-C	DATE: 6/00	APPROVED BY:
------------------------------	-------------------	---------------------

INSTRUCTIONAL METHOD: Lecture and Discussion Academic, Suitable for Discussion	CLASSROOM SETTING:
---	---------------------------

Terminal Performance Objective (TPO): The overall objective for the instructional unit as measured by student accomplishment of action(s) closely approximating a task or function course graduates will perform on the job.

The TPO for this unit is ...

After completion of this lesson, the student will have a better knowledge of the definition of special needs and technology assisted children and will be able to manage an emergency based on the individual needs of the child.

Enabling Objectives (EO's): The objectives (in the form of action statements) which enable learners to accomplish the TPO and serve as the basis for developing test items to measure how students are progressing in learning skills and knowledge necessary to accomplish the TPO.

The Enabling objectives are...

1. Discuss the special considerations for assessing vital signs in children with special health care needs.
2. Explain the importance of getting patient information and other assistance from parents or home care provider.
3. Discuss the management of a child with a tracheostomy tube, including types of tubes, obstruction management, suctioning techniques and the correct procedure for changing a tracheostomy tube.
4. Discuss the management of a child who is ventilator dependent, including special transport considerations, breathing assessment, and types of ventilators.
5. Explain the purpose of continuous positive airway pressure (CPAP).
6. Discuss the medical purpose, types, and possible complications of central intravenous catheters, feeding tubes, and CSF shunts.
7. Discuss the management of a child with congenital heart disease, including the special circumstances of fluid overload and pulmonary edema.
8. Describe the special considerations for transporting children with mobility problems.
9. Describe special assessment considerations for children with paralysis.
10. Discuss special assessment considerations for children with chronic illness.
11. Discuss the differences between mental retardation and developmental delay.
12. Discuss the necessity of interacting with the developmentally delayed child and the importance of involving them with their assessment and healthcare.

TRAINING MEDIA (Transparency Masters & chart diagrams should be attached as App. A)

___ Transparencies

___ Videotape

___ Chalkboard

___ Flipchart

___ Audiotape

___ Other:

___ Slides

___ Poster

EQUIPMENT/MATERIALS (List Description and amount needed)

HANDOUTS: (Attach as App. B a master copy of each handout listed below)

A. Student Guide

B.

REFERENCES: (list below the sources of information used in writing this lesson plan)

NO STUDY ASSIGNMENTS REQUIRED IN THIS LESSON PLAN

Instructional Guide

Topic: **Special Needs and Technology Assisted Children**

This four-hour lesson is designed to inform prehospital providers of the special needs and technology assisted children that will be presented for treatment while working in the field.

Since the material will hopefully develop active discussion, try to arrange the classroom seating in a way which will encourage discussion, i.e. modular or horseshoe. If the room is arranged in a traditional setting, work hard to keep students involved.

The student will be issued a manual as a resource to study with. It contains narrative sections covering all information provided in this lesson plan. A copy will be issued to you upon request.

In Appendix A is a hard copy of the PowerPoint presentation used with the lesson and flipchart information. In Appendix B is a copy of the text referenced in the lesson plan and in Appendix C are copies of the exercises and practical exams.

I. Welcome and Program Overview

Note: Introduce self to group

- A. Children with special health care needs may have physical disabilities that make them particularly susceptible to medical problems involving the airway, breathing, and circulation. Since these children often find it difficult to tolerate respiratory distress or shock, pre-hospital providers should consider these medical problems urgent. Technology-assisted children may also experience medical emergencies if the medical devices on which they depend fail to function properly.

- B. Performance Objectives
 - 1. Terminal Performance Objective

After completion of this lesson, the student will have a better knowledge of the definition of special needs and technology assisted children and will be able to manage an emergency based on the individual needs of the child.

 - 2. Enabling Objectives
 - a) Discuss the special considerations for assessing vital signs in children with special health care needs.
 - b) Explain the importance of getting patient information and other assistance from parents or home care providers.
 - c) Discuss the management of a child with a tracheostomy tube, including types of tubes, obstruction management, suctioning techniques and the correct procedure for changing a tracheostomy tube.
 - d) Discuss the management of a child who is ventilator dependent, including special transport considerations, breathing assessment, and types of ventilators.
 - e) Explain the purpose of continuous positive airway pressure (CPAP).
 - f) Discuss the medical purpose, types, and possible complications of central intravenous catheters, feeding tubes, and cerebrospinal fluid (CSF) shunts.
 - g) Discuss the management of the child with congenital heart disease, including the special circumstances of fluid overload and pulmonary edema.

- h) Describe the special considerations for transporting children with mobility problems.
- i) Describe special assessment considerations for children with paralysis.
- j) Discuss special assessment considerations for children with chronic illness.
- k) Discuss the differences between mental retardation and developmental delay.
- l) Discuss the necessity of interacting with the developmentally delayed child and the importance of involving them in their assessment and healthcare.

Note: Ask the class if there are any questions about the performance objectives?

II. Introduction to Assessment

The term children with special health care needs refers to children with any type of disability, including physical limitations, mental limitations, or chronic illness. This term could be applied to a child with asthma, a child with delayed development, or a premature baby. The term technology-assisted children, refers to children with special health care needs who depend on medical devices to support bodily functions. This term could be applied to a child with a tracheostomy, mechanical ventilator, or pacemaker.

Advances in intensive care management, medical treatment, surgical interventions and medical technology have improved the survival rates for children and now allow them to receive necessary medications, equipment and medical care at home as soon as they are stable.

A. Initial Assessment Considerations

Assessment priorities for children with special health care needs are generally the same as for other children. However, these children may have unusual baseline vital signs, and their physical and mental capabilities may not be the same as those for other children of a similar age. We can more accurately determine the seriousness of the child's condition if we base our assessment of the child's own vital signs and physical or mental abilities. Begin by asking the parents or home care provider about the child's ongoing health problems, normal assessment findings, and medical devices currently in use. Also, find out whether the child has any limitations affecting growth, neurological development, physical function, or level of education.

1. Airway Considerations

Many children with special health care needs are susceptible to airway obstruction and the complications that can arise from it. This is particularly true of brain-damaged children, who may have difficulty swallowing saliva, as well as children with tracheostomies, children on home ventilators, and children with continuous positive airway pressure devices.

2. Breathing Considerations

Children with congenital heart disease or chronic illness are often unable to compensate effectively for breathing problems. As a result, their condition may worsen more rapidly than would normally be expected.

3. Circulatory Considerations

Signs of early shock may be hard to detect in some technology-assisted children because their normal heart rate is faster than usual. Children who have pacemakers or who suffer from chronic illness are often unable to tolerate shock, and their condition may worsen more rapidly.

4. Mental Status Considerations

Children with special health care needs may have an altered mental status as their normal baseline condition. This is often true of children with mental retardation or developmental delay. Parents or home care attendants are best able to judge whether the child's behavior and level of functioning are different from usual.

B. Assessment: Critical, Unstable, Potentially Unstable, Stable (CUPS)

1. At minimum, you should consider any child with special health care needs potentially unstable.

2. A child with any of the following conditions should be considered unstable:

- ◆ Partially or totally obstructed tracheostomy.
- ◆ Respiratory difficulties in the ventilator dependant child.
- ◆ Slow heart rate, irregular pulses, or signs of early shock in children with pacemakers.
- ◆ Fever, nausea, vomiting, headache, or a change in normal

mental status in children with a cerebrospinal fluid (CSF) shunt.

- ◆ Signs of worsening illness in any child who has a chronic health problem and has taken appropriate home therapy for the problem.

A child with special health care needs who is unable to maintain an open airway, requires assisted ventilations, has no pulse, or has a potentially unstable mental status has a CUPS status of critical. A ventilator dependant child always require assisted ventilations, the critical status applies only if one or more of the other signs are present.

3. Assessment findings in the CUPS assessment

- ◆ Critical – Absent airway, breathing or circulation; AVPU= P or U.
- ◆ Unstable – Compromised airway, breathing, or circulation and AVPU=V or P; OR normal airway, breathing and circulation, AVPU=A and additional risk factors are present.
- ◆ Potentially Unstable – Normal airway, breathing, and circulation; AVPU=A.
- ◆ Stable – **Children with special health care needs should not be considered stable at any time.**

4. Actions during the CUPS assessment

- ◆ Critical – Perform initial interventions simultaneously; advanced life support should be available.
- ◆ Unstable – Perform rapid initial assessment and interventions; advanced life support should be available; transport promptly to definitive care.
- ◆ Potentially unstable – Perform initial assessment and interventions; transport promptly; begin focused history and physical exam during transport.
- ◆ Stable – **Children with special health care needs should not be considered stable at any time.**

5. Focused History and Detailed Physical Examination

Children with special health care needs may have a variety of medical problems and physical findings that affect pre-hospital care. The parents or home care provider will generally alert you to these special considerations during the course of the initial assessment and interventions.

III. Special Technology

A. Tracheostomies

A tracheostomy is a surgical opening into the trachea through which a tube is passed. The child is then able to breathe through this tube. A child may have a tracheostomy to bypass an upper airway obstruction caused by birth defects, surgery, or trauma. Another reason may be to allow long-term mechanical respiratory support to offset breathing difficulties caused by certain diseases affecting the central nervous system, lungs, or muscles.

1. Tracheostomy Tubes

The tubes come in several sizes and types. Sizes are marked on the sterile packaging and on the wings of each tube and typically range from 000 (newborns) to 10 (adolescents). Sizing may vary according to manufacturer. When replacing a tracheostomy tube, try to use the same size and type of tube that is already in place.

All tracheostomy tubes have a standard external opening so that they can be attached to a bag-valve device should the patient require assisted ventilation.

Some tracheostomy tubes have a cuff on the end, which acts as a seal to eliminate or reduce airflow through the mouth and nose. There are balloon cuffs, which can be inflated and deflated, and form cuffs. Adult tracheostomy tubes usually have a cuff. Pediatric tracheostomy tubes may have a cuff, depending on the child's size and whether air leakage has been a problem. Cuffs are not necessary on newborn tracheostomy tubes because the infant's narrow trachea forms a natural cuff around the tube.

a) Types of tracheostomy tubes include the following:

Single cannula - All newborn tracheostomy tubes and most pediatric tubes are of this type. A single cannula tube provides a single passage for airflow and suctioning of secretions. There is nothing to keep the stoma open when this tube is removed for changing, so a new tube should be inserted as quickly as possible. Single cannula tubes are placed using a plastic insert called an obturator, which helps keep the flexible tube from kinking, closes off the opening to the tube during insertion, and provides a blunt tip to help prevent tissue trauma. The obturator must be

removed immediately after insertion to avoid obstructing the airway.

Double cannula - Available in sizes four to eight, these tubes have a removable inner cannula that fits inside an outer cannula or sheath. The inner cannula provides a passageway for airflow and removal of secretions, and must be in place for manual or mechanical ventilation. The outer tube is inserted into the trachea and keeps the stoma open when the inner cannula is removed for cleaning.

Fenestrated - This type of tracheostomy tube teaches the child to breathe naturally and allows the child to talk. The fenestrated tracheostomy tube has a decannulation plug attached to the outer cannula. The decannulation plug blocks airflow through the stoma, directing it instead through a small hole in the tube, past the vocal cords and out to the nose and mouth. If the child is unable to breathe through the mouth and nose due to airway obstruction, the decannulation plug must be removed so that the child can breathe through the stoma.

2. Tracheostomy Obstruction

Technology-assisted children who have tracheostomies can suffer significant airway obstruction involving the tracheostomy site of the airway itself. This child may have difficulty clearing secretions, since the surgical opening in the trachea bypasses the normal upper airway passages. Other common causes of airway obstruction include: improper airway positioning, incorrect insertion of the tube, and mechanical problems with the tube.

An obstruction should be expected if the child has no chest rise during assisted ventilation, or if the child is unable to breathe alone after assisted ventilation. Other signs of an obstruction may include: respiratory distress or failure with or without abnormal breath sounds, faint breath sounds on both sides of the chest despite significant respiratory effort, and altered mental status.

An important key to remember is before beginning aggressive airway management actions, ask the parents whether these findings are normal or unusual for the child.

3. Tracheostomy Management

- a) Place a rolled towel under the child's shoulders to maintain the airway.
- b) Make sure the tube is properly seated and the obturator has been removed or the decannulation plug is removed.
- c) If there is no improvement, inject sterile saline and attempt to suction the tracheostomy tube.
- d) If no improvement, attempt assisted ventilation through the tube. Disconnect the tube from the home ventilator if necessary and apply bag-valve device.
- e) If no improvement, attempt to remove and replace the tracheostomy tube.
- f) If no improvement, or tube replacement is not possible, attempt to perform bag-valve-mask ventilation directly over the stoma or to the patient's mouth while blocking the stoma. Always provide supplemental high-concentration oxygen during ventilation.

4. Delivering Assisted Ventilations Through a Tracheostomy Tube

Children who breathe through a tracheostomy tube should be ventilated through a tracheostomy tube. All tracheostomy tubes have a standard external opening on which you can attach a bag-valve device. If the patient has a double cannula tracheostomy tube, the inner cannula must be in place. Infrequently, the tracheostomy tube may need an adapter to fit the bag-valve device. To provide assisted ventilations:

- ◆ Remove the mask from the bag-valve device.
- ◆ Attach the bag valve device to the tracheostomy tube.
- ◆ Follow normal procedures for assisted ventilations with supplemental high concentrations of oxygen.

Always supply high concentrations of oxygen during assisted ventilations

5. Suctioning a Tracheostomy Tube

- a) Ask parents whether they have suctioning apparatus, equipment, and supplies. Use this equipment if available, since it should be appropriate for the child's needs.
- b) Use a suction catheter from patient's supplies or choose a suction catheter small enough to pass easily through the tracheostomy tube. The parents may know the correct size catheter for the tube.
- c) Before beginning suctioning, allow the child to take a few deep breaths or ventilate with high-concentration oxygen.
- d) After giving oxygen, loosen secretions by injecting up to 1 cc of normal saline into the tracheostomy tube using a 3 to 5 cc syringe.
- e) Insert the suction catheter approximately two inches into the tube. Never use force when inserting the suction catheter, as this may damage soft tissues.
- f) Apply suction for no longer than ten seconds while slowly withdrawing the catheter, rolling it between the fingers.
- g) Monitor the child's pulse rate and overall condition throughout suctioning.
- h) Stop suctioning immediately if the pulse rate slows or the child appears pale or blue.
- i) If suctioning must be repeated, reoxygenate child prior to suctioning.

6. Removing and Replacing a Tracheostomy Tube

- a) Most parents are trained in replacement procedures, so ask them for help.
- b) Ask parents for a replacement tube.
- c) If the existing tube has a balloon cuff, deflate it by connecting a syringe to the valve on the pilot balloon and drawing the air out until the balloon collapses. Note that cutting the pilot balloon will not deflate the cuff.
- d) Cut the cloth ties that hold the tube in place and remove the

tube.

- e) Gently insert the new tube, with the curve of the tube pointing downward. ***Never force the tube.*** If the tube cannot be easily inserted, withdraw the tube and begin again. Try a smaller tube if the second attempt is unsuccessful. If the smaller tube fails, a Paramedic may place an endotracheal tube through the stoma.
- f) After the tracheostomy tube has been replaced, assess breathing. Suction the tube if breathing does not appear adequate.
- g) In the case of a double cannula tube, remove the inner cannula, clean it, and reinsert it, or remove and replace the inner cannula. If replacing the inner cannula fails to clear the airway, remove the outer cannula as well, provide oxygen, and then replace the inner and outer tubes.
- h) Always check for proper placement after replacing a tube by assessing equal chest rise and breath sounds. Resistance during insertion, bleeding at the site, bleeding through the tube, lack of chest rise, unusual resistance during ventilation, or signs of air in the tissues below the skin are also indicators of improper placement.
- h) After confirming proper placement of the tube, tightly secure new cloth ties.
- i) To avoid improper placement, you can use a suction catheter as a guide. Without applying suction, insert the suction catheter through the new tracheostomy tube. Then thread the suction catheter through the opening in the windpipe, aiming the tip downward. Slide the tracheostomy tube along the suction catheter and into the opening, then withdraw the suction catheter from the tracheostomy tube. Do not let go of the suction catheter at any time before removing it from the tracheostomy tube.

7. Delivering Assisted Ventilation Through a Stoma or the Mouth

If a tracheostomy tube is obstructed and cannot be cleared, or if you are unable to insert a new tracheostomy or endotracheal tube, the child may need to be ventilated through the stoma. Attempt assisted ventilation by placing either stoma mask or a newborn

facemask directly over the stoma. While this is not ideal, it may be the only way to ventilate the child.

8. Additional Interventions

Children with tracheostomies often have asthma and may require treatment with a prescribed oral inhaler after the tube has been cleaned and replaced. Assist parents in this procedure.

B. Home Ventilators

Children who depend on home ventilators generally have a problem affecting their respiratory drive or respiratory effort; the ventilator helps these children breathe. A child with absent respiratory drive must be supported by the ventilator at all times, while children who have partial absence of respiratory drive or ineffective effort may only require occasional support during sleep or times of illness. The ventilator is almost always connected through a tracheostomy tube.

Home ventilators are similar to the models used in hospitals. Most will operate for some time on battery power. Ventilator settings may include: breathing rate, tidal volume, FiO₂, peak inspiratory pressure, and positive end expiratory pressure.

1. Types of Home Ventilators

Pressure-cycled ventilators are set to deliver a given pressure with each breath. The ventilator delivers a tidal volume that corresponds to the pressure setting.

Volume ventilators are set to deliver a fixed tidal volume with each breath. The ventilator then delivers the correct pressure to correspond to that tidal volume.

There are two common modes of ventilation:

a) Intermittent Mechanical Ventilation (IMV)

This machine delivers a mechanical breath between the patient's respiration's to ensure that the patient achieves a certain number of breaths per minute. Some devices have an alternate mode in which the ventilator gives a mechanical breath at the same time that the patient attempts

to take a breath.

b) Continuous Mechanical Ventilation (CMV)

This machine delivers a set number of breaths per minute, whether or not the patient can breathe without assistance.

2. Home Ventilator Management

When a ventilator-dependent child develops airway or breathing problems, ask the parents to help determine the cause.

Possible causes include:

- ◆ Equipment failure involving the ventilator itself
- ◆ Problems with the oxygen supply
- ◆ An obstruction in the ventilator tubing
- ◆ An obstruction in the tracheostomy tube
- ◆ A medical condition

The parents are usually familiar with the correct ventilator settings as well as necessary adjustments for respiratory difficulty or illness, and should be able to help with the equipment.

If the child shows signs of respiratory distress or failure and the source of the problem cannot be found and corrected quickly, remove the child from the ventilator and provide assisted ventilation using a bag-valve device.

- a) Disconnect the ventilator tubing from the tracheostomy tube.
- b) Ask the parents to turn the ventilator off to prevent the alarm from sounding.
- c) Attach the bag-valve device to the opening of the tracheostomy tube and begin manual ventilation.
- d) Watch and listen for equal chest rise and breath sounds.
- e) If chest rise is shallow, adjust the patient's airway positioning and check to see that the bag-valve device is securely connected to the tube. If chest rise does not improve, check the tube for obstructions.

3. Transport Considerations

Whenever possible, transport a ventilator-dependent child without interrupting the ventilator. This is appropriate as long as the ventilator is functioning properly and the child is not experiencing respiratory problems.

The parents should be able to provide information on proper transport procedures.

C. Continuous Positive Airway Pressure (CPAP)

This technique helps keep the airway open for children who have recurring problems with partial airway obstruction or weak respiratory effort. These problems may be caused by an anatomical obstruction of the airway or by a disorder affecting the muscles that keep the airway open.

CPAP involves a device that covers the child's mouth and nose, providing continuous airway pressure as the child breathes in and out. Some children wear the device at all times, while others require it only at night when airway obstruction is most likely.

When children who require a CPAP device experience serious illness or trauma, they usually have a higher than average risk for partial or total airway obstruction.

1. CPAP Management

- a) Assess for respiratory problems using the child's normal baseline vital signs if known. If the child shows signs of distress, ask the parents if this exceeds what is normal for the child. If so, prepare to transport.
- b) Excessive breathing problems may indicate that the CPAP device is not working properly. Attempt to disconnect the device to see if the child improves. If the child's condition worsens reconnect the device.
- c) The device can also be disconnected if it interferes significantly with assessment and interventions. The child will still be able to breathe, but may tire easily.
- d) Continually assess the child's respiratory status throughout

interventions and transport. Provide assisted ventilation using a bag-valve-mask if the child develops breathing problems or if the airway becomes obstructed.

D. Central Intravenous Catheters

A central intravenous catheter is used to deliver nutritional substances or special medications directly into a central vein. Catheter tubes may be located on the chest, neck, groin, or arm.

1. Types of Central Intravenous Catheters

a) Broviac® catheters*

This type usually exits the skin in the chest region; there is usually a cap at the end and a clamp that closes flow to and from the vein.

b) Hickman® catheters*

Usually connect to a pouch under the skin in the chest region; you may see a slight bulge where the pouch is located.

* registered trademark of C.R.Bard, Inc. and its related company, BCR, Inc.

2. Central Intravenous Catheter Management

- a) Whenever assessing a child who has a central intravenous catheter, check the site where the tube is placed to see if it appears clean and well maintained.
- b) If the catheter is dislodged or broken, control the bleeding if present and transport promptly. If the catheter has been completely pulled out and there is bleeding at the entry site, apply direct pressure to the site using a sterile dressing.
- c) If the catheter is intact and bleeding, provide direct pressure with a sterile dressing.

- d) If the child is bleeding through a damaged catheter, clamp the exposed end of the tube. Never leave a central IV open, as air could enter the bloodstream through the catheter.
- e) Try to estimate blood loss, and assess breath sounds carefully. Internal bleeding can lead to a hemothorax and breathing problems.

Blood clots can form inside the catheter and break off, blocking blood flow to significant organs. In this case, the child may have altered mental status, signs of respiratory distress, or signs of shock and should be transported immediately. Children with central IV's are at high risk for bloodstream infections, this should be suspected if the child has a fever. If the child depends on the central IV for delivery of nutrients and glucose, attempt to transport with the catheter in place. Ask the parents for assistance.

E. Pacemakers

Pacemakers regulate the heart rate. A pacemaker may be needed if the natural heart rate is not fast enough to maintain adequate perfusion, or if there are periods when the heart rate is too fast or too slow. The pacemaker controls the heart's pumping activity to correct these problems.

1. Pacemakers usually include the following parts:

- a) Generator

This produces the electrical charge that causes the heart to contract.

- b) Controller

Containing circuitry that senses the heart's natural activity and decides when the pacemaker should fire.

- c) Leads

Connecting the generator to the heart, through which electrical current is delivered when the pacemaker fires.

2. Types of pacemakers include:

a) Demand

This pacer senses the heart's natural rhythm and fires when the heart rate falls below a preset minimum.

b) Constant

This pacer works at all times to maintain a constant heart rate. Some models can also sense when a faster heart rate is required and adjust the rate accordingly.

c) Antiarrhythmia

This pacer senses the heart's natural rhythm and fires when an abnormally fast or slow heart rate is detected.

2. Pacemaker Management

a) Ask the parents about the nature of the child's heart problem and the type of pacemaker in place.

b) These children may progress very rapidly from early shock to late shock. This is because the pacemaker will not allow the heart rate to increase in response to early shock.

c) If the pacemaker fails, the child's heart rate may become too slow to maintain perfusion.

d) Occasionally, the pacemaker leads may become dislodged, contacting with the child's diaphragm instead of the heart. This will make the diaphragm contract each time the pacer fires. Children experiencing this problem usually have periods of fast breathing with no other sign of respiratory distress. The rate will equal the pacemaker's preset rate.

e) Pacemaker leads may break when a child experiences a traumatic injury, leaving the child susceptible to the heart problem normally controlled by the device.

f) In any case, rapid transport is indicated.

F. Feeding Catheters

A feeding catheter is designed to manage nutritional needs in a child who requires supplemental nutrients or who is unable to take in food by mouth. Feeding catheters may also be used to administer medications.

If a child requires a feeding catheter for a relatively brief period, the catheter is run through the mouth or nose into the stomach or jejunum, a portion of the small intestine. These catheters may be left in place up to a few weeks.

If the child requires a feeding catheter for longer periods, the catheter is surgically implanted. In this case, the device passes through the skin and into the stomach or small intestine. Children who have one of these devices will have a button, valve, or tube in the abdominal area.

1. Non-surgical Feeding Catheters

- a) *Nasogastric tube (NGT)* - runs through the nose into the stomach.
- b) *Nasojejunal tube (NJT)* - runs through the nose into the small intestine, presenting less risk of aspiration than a nasogastric tube.
- c) *Orogastric tube (OGT) / Orojejunal tube (OJT)* - which run through the mouth into the stomach or small intestine, respectively; these catheters are used when it is not possible to place a nasal tube.

2. Surgical Feeding Catheters

- a) *Gastrostomy tube (GT)* - passes through the abdomen into the stomach.
- b) *Jejunostomy tube (JT)* - passes through the abdomen into the small intestine.
- c) *Percutaneous endoscopic gastrostomy (PEG)* - which is similar to the gastrostomy tube but is equipped with a cap and valve.

3 Feeding Tube Management

- a) When examining a child with a surgically implanted feeding tube, check for irritation and bleeding at the site where the tube enters the skin. Treat minor bleeding with direct pressure and sterile dressings. Transport the child immediately if any sign of infection is present.
- b) If the feeding tube adaptor breaks, transport the child immediately so that nutrient delivery can resume as soon as possible.
- c) If an oral or nasal feeding catheter is interfering with assessment and interventions, it can be removed without harming the child.
- d) If a surgically implanted feeding tube is pulled out, transport promptly.
- e) Feeding tubes may be attached to a pump, this can be disconnected if necessary to provide patient care and transport.

G. Cerebrospinal Fluid (CSF) Shunts

CSF shunts drain excess fluid that would otherwise build up within the skull. A CSF shunt can develop an obstruction, resulting in pressure buildup within the patient's skull. It runs under the skin from the skull to the chest or abdomen.

1. CSF Shunt Management

The child with a CSF shunt is vulnerable to brain infections and obstructions, resulting in a dangerous buildup of fluid within the skull.

- a) Signs and symptoms
 - ◆ Altered mental status
 - ◆ Listlessness
 - ◆ Increased sleep
 - ◆ Nausea or vomiting
 - ◆ Fever
 - ◆ Headaches
 - ◆ Difficulty walking

- ◆ Apnea
- ◆ Seizures
- ◆ Rapid worsening of mental status
- b) Maintain a patent airway.
- c) Provide high-flow oxygen, positive pressure with bag-valve-mask if necessary.
- d) Rapid Transport

H. Colostomies and Ileostomies

In a colostomy or ileostomy, a portion of the large or small intestine is attached to a surgical opening in the abdominal wall, and an external bag is placed to collect digestive waste matter.

1. Management Considerations

A child who has a colostomy or ileostomy is at risk for dehydration. Watch for signs of dehydration and shock, particularly if there is any history of diarrhea or decreased oral intake.

- a) Check the ostomy site for signs of infection or irritation.
 - ◆ Redness
 - ◆ Fever
 - ◆ Tenderness spreading away from the site
- b) If the collection bag breaks, the parents can usually help replace it.
- c) If another bag is not available, circle the ostomy site with moist gauze and attach any available bag that can serve as a substitute until a replacement bag is obtained.

IV. Special Patients

A. Mental Retardation/Cognitive Impairment

Mental Retardation is the most common developmental disability in the United States. It effects 3 % of the population.

The definition of mental retardation is “significantly sub-average general intellectual functioning”. The majority of those with this disorder acquired it genetically. Some of the genetic disorders that contribute to cognitive impairment are:

- ◆ Down’s Syndrome
- ◆ Fragile X Syndrome
- ◆ Prader-Willi Syndrome

Mental retardation is a permanent condition of impaired cognition. Although some individuals with this disorder can overcome their disabilities to a certain degree and improve their quality of daily living, they remain cognitively impaired for their life span. These patients can look very normal in appearance or they may show signs of obvious physical markers for mental retardation such as: obesity, facial abnormalities or cranial abnormalities.

Use a sensitive approach and ask for the child's name and use it in conversation.

1. Assessment

Start by asking the parent about the child's normal abilities and behavior in the following areas.

- ◆ Mental status or cognitive development
- ◆ Interaction with parents
- ◆ Interaction with strangers
- ◆ Communication abilities
- ◆ Motor development - ability to sit, stand, and walk
- ◆ Muscle tone and strength
- ◆ Vision and hearing

Ask the parent whether the child's overall behavior seems different from usual. This information will give you the basis to judge severity of illness or injury.

Interact with the child in an age-appropriate manner. Keep in mind that children with mental retardation may act younger than their age.

Talk to the parents, and involve them in the care as much as possible.

B. Developmental Delay/Maturational Lag

The overall growth and development of children is measured in levels of developmental accomplishments within each age group. Each developmental “milestone” builds on the previous age group accomplishments. In the chronically ill child, these “milestones” may be delayed due to their illness and other factors, such as prolonged hospitalization. The chronically ill child may fall behind in normal developmental parameters for their age group, but often catch up with assistance and improvement in their health condition.

Maturational lag should not be confused with mental retardation. Mental retardation is a permanent condition of cognitive impairment that is present at birth. Developmental delay is the result of a lack of exposure to the usual developmental environment that healthy children are exposed to everyday. Although, some of the delays may remain permanent conditions, the majority of children exhibiting the signs and symptoms of maturational lag overcome these shortcomings and eventually mature normally.

Although you may have to approach the developmentally delayed child from a specific age group level that is younger than their chronological age, you should involve the child in as many aspects of their assessment and health care as possible. It will give them a heightened sense of accomplishment to participate in their own health care.

1. Assess the child accurately, ask the parents or home care provider about the child’s usual abilities and behavior in the following areas:
 - ◆ Mental or cognitive development
 - ◆ Interaction with parents
 - ◆ Interaction with strangers
 - ◆ Communication abilities
 - ◆ Motor development – ability to sit, stand and walk
 - ◆ Muscle development
 - ◆ Vision and hearing
 - ◆ Retention of learned skills
 - ◆ Knowledge level of health care problems

Ask the parents whether the child’s overall behavior seems different from usual. This information will give you the basis to judge how seriously the child is affected by the current illness or injury. Interact with the child in

an age appropriate manner.

Keep in mind that children with maturational lag may act younger than their age. Talking to the parents and involving them in the care of the child, as much, as possible, will help put the child at ease.

C. Premature Babies

A baby who is born prior to 37 weeks gestation is called a premature baby.

1. Management of a Premature Baby

- a) Follow neonatal resuscitation protocol.
- b) Hold the infant at the level of mother's pelvis.
- c) Suction mouth and nose with bulb syringe. (mouth before nose).
- d) Tie/clamp and cut cord (leave 3 inches between ties/clamps).
- e) Place infant on flat surface in the air-sniffing position.
- f) Open the airway with jaw-thrust maneuver.
- g) Look, listen and feel for spontaneous respirations.
- h) Dry, warm and vigorously stimulate the infant. (replace wet towels/blankets).
- i) Keep the baby warm at all times, remembering to cover the head.
- j) If dusky but pulse greater than 100, administer blow-by oxygen and continue stimulation.
- k) If pulse is less than 100, respirations are irregular, or muscle tone or color is poor, provide positive pressure ventilation and oxygen.
- l) If pulse remains less than 100 despite positive pressure ventilation, intubate.

- m) If pulse is less than 60 (or 60 - 80 and not increasing), administer chest compressions and medications. Consider a saline bolus.

Babies that are born premature can have numerous health problems. Ask the parents whether the baby depends on any special medical devices, or is on any medication.

Pay special attention to suctioning if the baby shows any sign of respiratory distress. Do not suction the airway for more than ten seconds, and watch the infant carefully throughout the process. Stop suctioning if the baby begins to turn pale or blue, or if the heart rate slows.

2. Conditions of Prematurity

Babies that are born prematurely can have numerous health problems during birth and after going home from the hospital. When responding to a child with a history of prematurity, ask the parents whether the child has any medical problems, if the baby depends on any special medical devices, or is on any medication. Provide appropriate interventions for problems involving those devices.

Some of the conditions of prematurity that may be encountered when responding to a child with a history of prematurity include:

- ◆ Bronchopulmonary Dysplasia (BPD) – usually caused by prolonged exposure to mechanical ventilators, high concentrations of oxygen and endotracheal intubation. Delicate alveolar tissues are scared and damaged.
- ◆ Apnea of Prematurity – persistent apneic spells lasting for 20 seconds or longer with the possibility of bradycardia and color changes.
- ◆ Hemorrhagic Disease of the Newborn – related to a vitamin K deficiency. Vitamin K is necessary for blood clotting. May be responsible for bleeding in any organ of the body.
- ◆ Patent Ductus Arterious (PDA) – failure of the fetal ductus arterious (artery connecting the aorta and pulmonary artery) to close within the first few weeks of birth. Results in the shunting of blood from the aorta to the pulmonary artery leading to congestive heart failure.
- ◆ Anemia – a lack of circulating red blood cells. Can occur for various reasons. Results in a decrease in the oxygen caring capacity of the blood. Will result in hypoxia in all cells of the body.
- ◆ Intracranial Hemorrhage – various causes. Infant may appear to have suffered a stroke or to exhibit other various neurological deficit signs and symptoms.

As with all other patients experiencing a medical emergency, support of airway, breathing and circulation should be the priority. The parents will be under a great deal of stress, remember to be supportive and understanding.

C. Children with Congenital Heart Disease

These children are born with a structural abnormality affecting the heart.

Congenital heart disease may involve:

- ◆ Heart valve problems that prevent blood from pumping out of the heart properly or allow some blood to flow back into the heart when it pumps; this can lead to inadequate perfusion, making the child susceptible to shock.
- ◆ Problems in which the arteries do not bring enough oxygenated blood to the heart, putting the child at risk for heart attacks during the first weeks after birth.
- ◆ Cyanotic heart disease, in which blood from the veins and the arteries mix in the heart, causing constant low blood oxygen levels.
- ◆ Problems caused from disorders with the electrical stimulation of the heart which can cause the heart to beat irregularly.

1. Management of Children with Congenital Heart Disease

- a) Provide aggressive treatment for any breathing difficulties.
- b) Offer oxygen if tolerated, position appropriately, and begin positive pressure ventilation for apnea, gasping, or cyanosis.
- c) Watch for signs of shock and treat appropriately.
- d) Provide a fluid bolus of 20 cc/kg of Normal Saline or Ringers Lactate if indicated. Can be repeated at same dose if there is some response to first bolus, or no response and severe fluid loss is obvious. (Must be provided by certified or licensed personnel.) ***Excessive fluid administration can lead to fluid overload.***
- e) Assess for fluid overload or pulmonary edema frequently.

- f) Monitor heart rate for irregularities.
- g) Many of these children are treated with Digoxin/Lanoxin. The child should be placed on a cardiac monitor and monitored for lethal cardiac dysrhythmias.
- h) The most common pediatric dysrhythmias are bradycardia, tachycardia, asystole, and PEA. Once a dysrhythmia is identified on the cardiac monitor, follow approved guidelines and treatment protocols.

D. Children with Mobility Problems

Children with paralysis, spasticity or muscle/limb contractures may present special challenges when positioning them for immobilization or transport. Attempt to position the child in a way that is comfortable for them. ***Remember to always pad all voids, pad under bony prominences and utilize pillows and blankets/towels to support contracted limbs when immobilizing or transporting these special children.***

Spasticity is a condition in which the muscles and tendons become tight, restricting movement of joints and extremities (contractures) or the muscles have an abnormal involuntary movement. This will present a problem in positioning and transport because most of these children are unable to be placed on a long spine board as in the case of trauma. Always remember to ask the parents what the best method of immobilization or transport is. Never force a child into an uncomfortable or even painful position.

Children with paralysis pose similar problems regarding positioning. These children are unable to feel anything in the paralyzed area so they cannot report pain in these areas. Make sure to perform a good exam in these areas to compensate for this.

Also remember, since the paralysis prevents them from feeling pain, use extreme caution when moving and handling these children. They could accidentally be injured but can not respond as feeling patients would.

Conditions Causing problems with Mobility

- ◆ Cerebral Palsy – is the most common permanent disability of movement found in children. It is due to various types of injury to the brain before, during or just after delivery. This disorder presents with various forms of abnormal muscle tone and coordination. It results in various types of mobility dysfunction: spasticity, contracted limbs,

involuntary muscle contractions, ataxic gait, involuntary jerking, unconscious repetitive movement.

- ◆ Osteogenesis Imperfecta/Brittle Bone Disease – This disorder causes the child to have osteoporosis and makes them very susceptible to fractures. Even the gentlest handling can cause a fracture to occur.
- ◆ Spina Bifida – term most commonly utilized to describe the congenital birth defects of neural tube closure. The spine and spinal cord are formed during the first six weeks of gestation. In some instances the spinal column fails to close around the spinal cord, leaving it exposed and unprotected. The spinal cord bulges through the opening in the vertebral bones. It can be as minor as a small portion of the vertebral bone not developing, to an entire portion of the spinal cord protruding through the skin on the back. Another severe secondary condition, Hydrocephalus or increased production of cerebral spinal fluid, can be present.

The three most common forms of Spina Bifida are:

Spina Bifida Occulta – failure of the posterior portion of the vertebral bone to close completely without herniation of the spinal cord or meninges through the opening of the bone. Many individuals have this condition and are never aware of it. There are no serious manifestations with this form of Spina Bifida.

Meningocele – failure of the posterior vertebral bone to close completely with the meninges, or protective cover of the spinal cord, protruding through the opening in the vertebra and the skin of the back, forming a sac called a meningocele. Rarely is the spinal cord involved. It can be repaired with little or no damage to the spinal cord.

Myelomeningocele – is the most severe form of spina bifida. A portion of the spinal cord actually protrudes through the back. In some cases, it is covered with a protective sac. In other cases, the tissue and nerves are exposed completely. These patients are the ones who suffer from paralysis and hydrocephalus. The level of paralysis depends on the location of the defect. Myelomeningoceles usually occur in the lumbar and sacral regions of the spinal cord. This results in a loss of bladder and bowel control and paralysis to the lower limbs. Because of the excessive amount of cerebral spinal fluid produced with this type of defect, the patients usually has to have a CSF shunt inserted to prevent a serious build up of cerebral spinal fluid and increased intracranial pressure in the skull.

Wheelchairs

Many of these children utilize special wheelchairs. Most ambulances do not have the special locking devices needed to safely transport these special wheelchairs. Unless the transport vehicle is properly equipped, these children must be transported on a stretcher with safety straps in place and proper padded support utilized.

E. Children with Chronic Illness

Some children may have a continuing or chronic illness that affects them at all times. Chronic conditions do not usually require emergency care; however, children with chronic illness may have medical emergencies for other reasons:

- ◆ They may experience an unrelated illness or traumatic injury.
- ◆ They may suffer a sudden worsening of their underlying chronic condition.

1. Management Considerations

- a) Ask the parents about the child's normal vital signs and combine this with your assessment findings to help determine child's CUPS status.
- b) Ask the parents about the child's normal development and activity level. This will help determine current level of consciousness.
- c) Monitor these children closely because they generally have a decreased ability to tolerate illness or trauma.
- d) Ask the parents about medications and allergies.
- e) Provide appropriate care for the current illness or injury.
- f) The child may have received significant medical treatment at home before emergency providers are called to respond. The child may be in the later stages of illness or injury by the time they arrive.
- g) Ask about treatments and interventions that have already

been provided prior to the emergency providers arrival. This will help judge how greatly the child is affected by the current illness or injury.

2. Common Chronic Illnesses

a) Chronic Lung Diseases/Disorders

- ◆ Bronchial Asthma – responsible for more absences from school than any other disease process. It is responsible for more pediatric hospital admissions and is believed by many to be the single most important cause of death in childhood. Asthma is a condition that increases the responsiveness and irritability of the lower airway. This causes the airway to constrict and decrease the amount of air and oxygen that can enter and exit the lungs. It is believed that asthma's primary cause is allergy related. A hypersensitivity to foreign substances, such as pollen, increase the chance of an asthmatic response if exposed to the allergen.
- ◆ Reactive Airway Disease – similar to Asthma, Reactive Airway Disease is a man made disease. With the increase of industrial air pollution, carbon monoxide released by cars, chemicals in the home and other air pollution, there has been an increase in children experiencing respiratory distress, when exposed to these airway irritants. It presents with symptoms similar to Asthma, wheezing, shortness of breath, cough and increased work of breathing. It is treated the same way as Asthma, oxygen and medications. As the pollution in our air increases, so will the incidence of Reactive Airway Disease.
- ◆ Congestive Heart Failure (CHF) – in children, CHF most frequently occurs secondary to structural abnormalities of the heart that result in increased blood volume and blood pressure. It is usually caused by increased work on the heart. There are multiple heart defects that children can be born with that will contribute to CHF. The inability of the heart to circulate blood properly causes a back up of fluid into the lungs. This fluid is called Pulmonary Edema. In children, CHF is usually treated with digitalis glycosides (Digoxin/Lanoxin). Monitor these patients closely for signs of dysrhythmias.

- ◆ Cystic Fibrosis (CF) – the most common serious pulmonary and gastric disease in children. It is a multi-system disorder affecting the exocrine (mucous producing) glands and accounts for a large portion of lung disease in children. The primary disease mechanism is mechanical obstruction of the lungs and gastrointestinal tract by increasing the thickness of mucous produced in these two systems. In the GI tract, the most common complication seen is a bowel obstruction., which is a true emergency. If not detected and relieved promptly, a bowel obstruction could cause the bowel to rupture. This could lead to death rapidly. Pulmonary complications constitute the most serious threat to life. Because of the build up of thick, viscous mucous in the bronchus and bronchioles, the child is unable to cough it up. The retained mucous is an excellent medium for bacterial growth. It also interferes with oxygen and carbon dioxide exchange causing various degrees of hypoxia, hypercapnia and acidosis. During a crisis, the focus is on supporting respirations and oxygenation.

When responding to children with chronic illnesses of the respiratory tract, support them with high concentrations of oxygen, assist ventilations with a bag-valve mask if needed, administer medications and perform endotracheal intubation if necessary, as directed by receiving facility.

b) Diabetes Mellitus

Diabetes Mellitus the most common endocrine disorder in children. It is characterized by a deficiency in the production of the hormone Insulin by the pancreas. It can be classified into three major groups:

- ❖ Insulin-dependant (IDDM) or type I – child needs daily injections of Insulin to regulate the metabolism of glucose.
- ❖ Non-Insulin-dependant (NIDDM) or type II – child may or may not need daily injections of Insulin to regulate the metabolism of glucose. It is usually controlled by diet.

- ❖ Maturity-onset-diabetes of youth (MODY) – developed late in adolescence. Child may or may not need injections of Insulin to regulate the metabolism of glucose. Usually controlled by diet and/or oral medication.

Insulin-dependant diabetes or IDDM is the most common form of diabetes in children. The two most serious complications of Diabetes in children are: hypoglycemia and ketoacidosis. It is important to check glucose levels in all children with a history of Diabetes. Stress, infectious processes and other factors will contribute to the depletion/elevation of glucose levels in the diabetic child. Assure obtaining a good history from the parents or health care provider about meals and Insulin administration.

If it is determined that the child has hypoglycemia it may be necessary to administer glucose. If it is determined that the child has a glucose level of 200 or higher, with a fruity odor to their breath and evidence of hyperventilation, the child should be considered in ketoacidosis. Therapy in the field should consist of high concentrations of oxygen, assist ventilations as needed and administer an IV. It is also important to monitor the cardiac rhythms of the diabetic child. These children can suffer from severe dehydration as a result of polyuria (excessive urination) and their potassium levels can be severely altered. This could lead to potentially lethal dysrhythmias. Another condition secondary to polyuria is hypovolemia., monitor the child's skin, capillary refill, distal pulses, mental status and blood pressure carefully to discover the early signs of volume depletion and treat accordingly.

c) Gastrointestinal (GI) Dysfunction

There are multiple disorders of the gastrointestinal tract that can become chronic disease processes. Some of these will eventually lead to colostomies or ileostomies in the pediatric patient.

- ❖ Crohn's Disease – A chronic inflammatory process of the GI tract that can involve any part, from the mouth to the anus. Inflammation eventually leads to severe edema and deep ulcers in the intestinal walls. These ulcers can lead to rupture or obstruction of the GI tract. This can be a truly life-threatening situation. Diet and medications typically control this disorder. When diet

and medication can no longer control the disease process, surgery is the only solution. A colostomy or an ileostomy will be performed as a last resort. The performance of surgery however, will not halt the disease process. Over time this surgery will have to be repeated multiple times.

- ❖ Ulcerative Colitis – a less severe disease process, ulcerative colitis effects only the colon and rectum. Inflammation, edema, bleeding and ulceration of the walls of the colon and rectum characterize it. This disease process leaves the colon and rectum narrowed by scar tissue and effects the GI tracts ability to function properly. Unlike Crohn’s Disease, performing a total colectomy (complete removal of the colon) will cure this disease process. Trying to control the disease with diet and medication are always tried first.
- ❖ Failure to Thrive – inadequate growth resulting from the inability to obtain and/or use calories required for growth. Failure to thrive can be related to the chronic disease process of the child. Often they are unable to take in the proper amount of nutrients or process these nutrients, for various reasons, to grow and develop adequately. These children may appear malnourished and wasted, even when they are properly fed. Utilize extreme caution, not to jump to the conclusion that the child may suffer from neglect.
- ❖ Malabsorption Syndrome – a group of disorders, which for various reasons, prevent the child from absorbing the proper nutrients (proteins, simple sugars, fats, etc.) in the gastrointestinal tract. The outward signs can be anything from a potbelly and wasted limbs to extreme signs of malnutrition.
- ❖ Cystic Fibrosis – the primary concern for the cystic fibrosis patient, involving the gastrointestinal tract, is bowel obstruction by the thick mucous production. Bowel obstruction is a life-threatening emergency. If the child exhibits severe abdominal pain and/or absent bowel sounds, assume that a bowel obstruction has occurred until it can be ruled out. Support airway, breathing and circulation and transport rapidly to the closest appropriate facility.

d) Sickle Cell Anemia

Named for the unique sickle shaped red blood cells it creates, Sickle Cell Anemia can reduce the oxygen carrying capacity of the red blood cells and can cause loss of blood flow to the vital organs of the body. The unique sickle shape of the red blood cells increases the friction of circulating blood. This causes increased thickness to the blood. This slows the circulation and causes stoppage of the blood flow in organs. The sickle shaped cells will clump together and block adequate blood flow to the tissues and organs, causing severe pain. This causes scarring and tissue death in the affected organs. The red blood cells also have a shorter life span than normal red blood cells. This decreases the oxygen carrying capacity of the red blood cells, resulting in anemia.

The most acute symptoms of the disease occur during periods of worsening of the child's condition called a Sickle Cell Crisis. Stress, infection and cold, high altitude environments usually bring on these crises. The symptoms of a crisis may include: severe pain, fever, edema in the hands and feet, painful joints, severe abdominal or chest pain, non-productive cough, slurred speech, altered mental status, visual disturbances, blood in the urine, priapism (in the male patient) and paralysis on one side of the body.

The two most serious complications of Sickle Cell Anemia is chest syndrome (chest pain, fever and a dry, hacking cough) and stroke. Stroke can be a fatal consequence of Sickle Cell Anemia.

The care of the Sickle Cell Anemia patient is mostly supportive, high concentrations of oxygen, assist ventilations if necessary, and pain medication at the discretion of the receiving facility.

e) Seizures

Convulsions are among the most frequently observed neurologic dysfunction in children. Seizures in children may be caused from: high fevers, exposure to chemicals and toxins, hypoxia, electrolyte imbalances, head trauma, brain tumors, increased intracranial pressure, infections, hypo/hyperglycemia and epilepsy.

There are many types of seizures with the most common type being tonic-clonic. This is when the entire body convulses and there is a brief period of unconsciousness afterwards. Petit Mal seizures or absence attacks are characterized by brief periods of disorientation or staring spells. This type of seizure can be missed as they are usually attributed to daydreaming or inattentiveness.

Partial seizures can affect just one part of the body like the face or just one arm. Psychomotor seizures in children are bizarre in appearance and the child may appear to be chewing, smacking their lips, or swallowing over and over again. They may also start running, kicking, laughing, or speaking incoherently. Special sensory seizures are characterized by various sensations such as: numbness, tingling, prickling, parasthesia, or pain in one part of the body that spreads to other body parts.

Regardless of the type of seizure a child may have, the primary care goals are to protect the child from hurting themselves, and supporting airway, breathing and circulation. Never restrain a child while they are actively seizing. Move objects that the child may strike, while seizing, away from them so they do not hurt themselves. Never place objects into a patient's mouth while they are actively seizing. If you want to protect their airway, gently roll them onto their side in the recovery position. This will prevent the tongue from blocking the airway and prevent them from aspirating fluids into their lungs. Monitor the airway for blood (from biting their tongues) and other secretions. Suction the airway as soon as the seizure has stopped. Be alert for another seizure at all times. Continuous seizures, without the patient regaining consciousness, or a seizure that sustains and doesn't stop is known as "Status Epilepticus" and is a medical emergency. Transport the patient rapidly to the closest appropriate facility. For the advanced health care provider, utilize the appropriate medications to control the seizure at the discretion of the receiving facility.

f) Genitourinary Dysfunction

- ❖ Nephrotic Syndrome/Glomerulonephritis – occurs as a result of damage to the primary organ of function in the kidneys called the Glomerulus. Damage can be caused by exposure to toxic chemicals, congenital abnormalities and infectious processes. In nephrotic syndrome, the glomerulus becomes unable to hold large protein molecules in the blood as it filters through the kidneys. Because the protein molecules are not maintained in the circulating blood, it affects the osmotic pressure in the capillary beds and fluid leaks out into the tissues and the body cavities causing edema. The edema can also effect the lungs causing fluid to back up into the lungs. This loss of fluid from the vascular space can also cause hypovolemia in the child with nephrotic syndrome.

❖ Renal Failure – for various reasons, pediatric patients may suffer from renal failure. The kidneys produce little or no urine and a serious build up of toxins in the body and other serious health conditions may result. Some of the health conditions are:

- 1) Hyperkalemia/High Potassium Levels – a serious life-threatening condition that could cause the child to experience lethal cardiac dysrhythmias.
- 2) Hypertension – the kidney plays a major role in the regulation of blood pressure. The renin-angiotension system helps to control blood pressure by regulating water balance in the body. If the kidneys fail to function normally this system fails to function properly
- 3) Seizures – as toxins build up in the body and are not eliminated by the kidneys, a condition known as uremia develops. These toxins will lead to seizures if not eliminated.
- 4) Cardiac Failure – as the kidneys become unable to eliminate fluid from the body, it begins to back up into the tissues of the body (hypervolemia), including the lungs. The result is the condition of Pulmonary Edema. This fluid backup in the body and lungs puts more stress on the heart. Cardiac failure is ultimately the cause of death in the Renal Failure patient.

g) Indwelling Urinary Catheters

Many children with chronic illnesses experience the inability to control their urinary elimination. Whether it is because of paralysis, chronic immobility due to the nature of their illness, or other reasons, they require a urinary drainage catheter to help eliminate urine from their bodies. These catheters pose no problem in and of themselves; however, they can be a primary source of infection if they are not maintained properly. When caring for a child with a urinary catheter be alert for the signs of infection such as: dark colored urine, foul odor, cloudy appearance to the urine, material floating in the urine, blood in the urine and fever.

When caring for the patient with urinary system disorders, the priority is as usual, airway, breathing, and circulation. Support with high concentrations of oxygen, assist ventilations as

necessary, restrict the introduction of IV fluids I children who show signs of fluid overload, swollen feet, hands and face, and monitor their cardiac status very closely.

V. Traumatic Brain Injury

A traumatic brain injury (TBI) is an injury to the brain caused by the head being hit by something or shaken violently. This injury can change how the person acts, moves and thinks. A traumatic brain injury can also change how student learns and acts in school. The term TBI is used for head injuries that can cause changes in one or more areas, such as thinking and reasoning, understanding words, remembering things, paying attention, solving problems, thinking abstractly, talking, behaving, walking and other physical activities, seeing and/or hearing, and learning. The term TBI is not used for a person who is born with a brain injury. It is also is not used for brain injuries that may occur during birth.

More than one million children receive brain injuries each year. More than 30,000 of these children have lifelong disabilities as a result of the brain injury.

The signs of brain injury can be very different depending on where the brain is injured and how severely. Children with TBI may have one or more difficulties, including:

- ◆ Physical disabilities: Individuals with TBI may have problems speaking, seeing, hearing, and using their other senses. They may have headaches and feel tired a lot. They may also have trouble with skills such as writing and drawing. Their limbs may become contracted or tighten or they may move spontaneously or uncontrollably (spasticity). They may also have seizures. Their balance and walking may also be affected. They may be partially or completely paralyzed on one side of the body, or both sides.
- ◆ Difficulties with thinking: Because the brain has been injured, it is common that the person's ability to use the brain changes. For example, children with TBI may have trouble with short term memory. People with TBI may have problems concentrating and only be able to focus their attention for a short time. They may think slowly. They may have trouble talking and listening to others. They may also have difficulty with reading and writing, planning, understanding the order in which events happen and judgement.
- ◆ Social, behavioral, or emotional problems: These difficulties may include sudden changes in mood, anxiety, and depression. Children with TBI may have trouble relating to others. They may be restless and may laugh or cry a lot. They may not have much motivation or

much control over their emotions.

A child with TBI may not have all of the above difficulties. Brain injuries can range from mild to severe, and so can the changes that result from the injury. This means that it's hard to predict how an individual will recover from the injury. Early and ongoing help can make a big difference in how the child recovers. This help can include physical or occupational therapy, counseling, and special education.

It's also important to know that, as the child grows and develops, parents and teachers may notice new problems. This is because, as students grow, they are expected to use their brain in new and different ways. The damage to the brain from the earlier injury can make it hard for the student to learn new skills that come with getting older. Sometimes parents and educators may not even realize that the student's difficulty comes from an earlier injury.

VI. Summary

It is important to remember that the parent or health provider is your best resource when treating a child with special health care needs. They will know if the child's vital signs, assessment findings, or capabilities are different from normal. This information will help determine severity of the child's condition.

The physical assessment of a child with a special care need is no different than for any other child. An age-related approach should be used and general appearance will still be a very useful key to severity. Just keep in mind that you may need to be a little more creative when immobilizing these kids because they can't lay flat on a long spine board, or can't breathe flat on their back. Rely on the parents as well as the child to determine the best position, equipment settings, and even normal behavior or distress levels. They will be your best resource.

Note: Ask if there are any questions.