

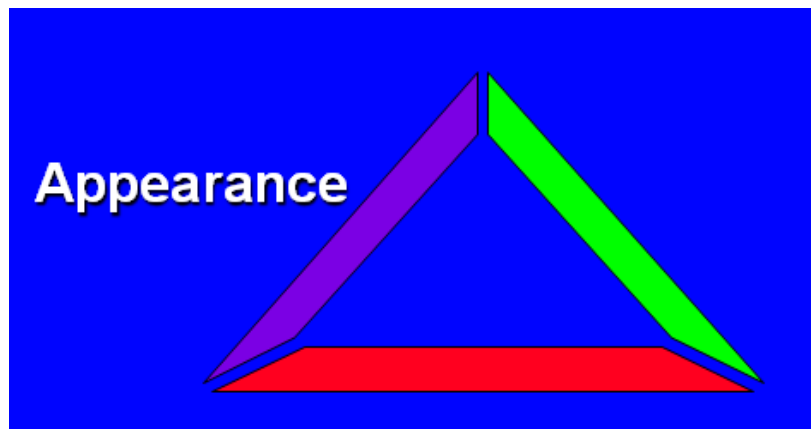
PEDIATRIC PATIENT ASSESSMENT

ASSESSMENT TRIANGLE

The pediatric assessment triangle is an easy way to conduct an initial assessment. The pediatric assessment triangle involves the **APPEARANCE, WORK OF BREATHING AND CIRCULATION TO THE SKIN**. All of these components will take no longer than a few seconds to determine the priority of your patient's illness. All of these components are based on listening and seeing and require no 'hands on' assessment initially. If you were to walk into the room and observe a very lethargic and limp 1-year-old child you may consider this child to have some sort of medical problem that may be serious. On the other hand if you find a child that is alert and quiet with no obvious signs of respiratory distress and has normal skin color and temperature you may assume initially that this child is not as seriously ill. This assessment triangle is a tool used to form a general impression of your patient as you approach; it is not intended to take the place of the ABC's or any other steps of the patient assessment.

APPEARANCE

The appearance of a child is extremely important to consider especially in the age ranges



of new born to about 5 years because of the difficulty associated with assessing this age range. A pediatric patient's appearance will reflect the adequacy of ventilation, oxygenation and central nervous system function. There are several characteristics to consider when assessing a child's appearance, they include: tone, interactiveness, consolability, gaze, and cry

A pediatric patients muscle tone will establish level of consciousness and the effect the illness is having on the child overall. Observe the child for movement , note if the child is limp or listless. Children should have good muscle tone and movement and should never appear as a "wet noodle" in the caregiver's arms.

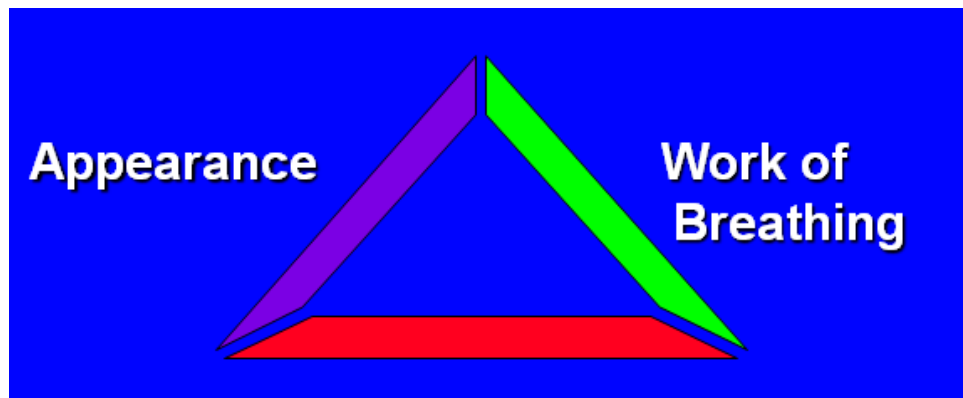
A pediatric patient should interact with you as the examiner. This may be exhibited as either resistance to the exam or interest in equipment such as a stethoscope. Failure to interact may indicate a critically ill patient. (remember that this is just visual assessment, not hands on)

The patient's gaze or look should indicate some interest in the environment as opposed to a patient that appears to have a glassy-eyed stare.

The child's cry or speech will help to establish a level of consciousness along with ability to exchange air effectively. A child that cannot or is having difficulty crying or speaking may be critically ill or injured.

WORK OF BREATHING

Some characteristics that you may assess when trying to establish the patient's work of breathing includes: abnormal airway sounds, abnormal position, retractions, and flaring.

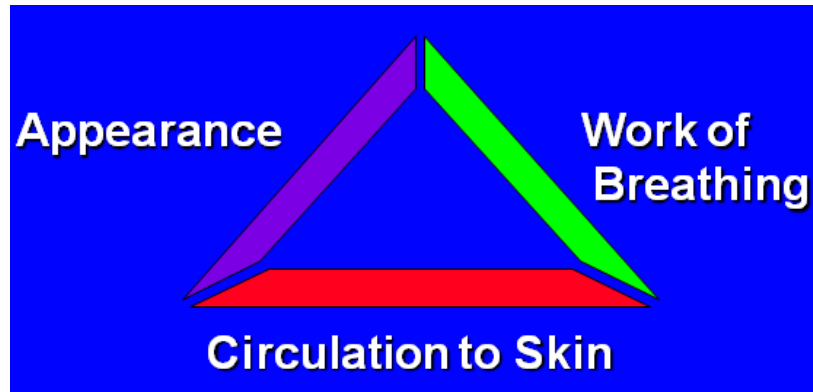


As you approach a pediatric patient listen to the breathing pattern. If you are unable to hear unusual sounds they may not be in severe respiratory distress. However, you may hear snoring, muffled or hoarse speech, stridor, grunting or wheezing coming from a child as you approach. Anytime you hear any of these sounds coming from a pediatric patient you must act quickly to assess and stabilize this patient. These sounds indicate that the child is having some sort of respiratory compromise.

You may observe a patient in an abnormal position, such as the tripod position. Anytime a patient must assume an abnormal position to facilitate breathing they are in respiratory distress. These patients need aggressive interventions to avoid irreversible shock or even death.

Retractions are not normal and are indicative of the use of accessory muscles to aid in breathing. Pediatric patients have more pliable rib cages and will exhibit retractions more readily than an adult patient. Retractions will be observed between the ribs, in the area of the sternum and around the clavicles.

Flaring is indicative of oxygen starvation. You will notice the nostrils dilate or become larger during inspiration in an attempt to draw in more air. This is a serious sign in a pediatric patient and requires immediate intervention.



CIRCULATION TO THE SKIN

The skin color and temperature will help you to determine the patient's cardiac status. Circulation to the skin will generally shutdown when a pediatric patient is in shock. This is a normal mechanism that will protect the central organs like the brain and heart. The signs of poor circulation to the skin include pallor, mottling, and cyanosis.

Pallor is white or pale skin or mucous membrane coloration and occurs because of inadequate blood flow. The patient with darker skin will often require an inspection of the mucous membranes as opposed to the skin.

Mottling is evidenced as a patchy discoloration of the skin and is usually present on the upper legs and torso area.

Cyanosis is a bluish discoloration of the skin and mucous membranes and is due to poor oxygenation of the blood. As above you may have to inspect the mucous membranes of a darker skin patient.

SCENERIO

You are called to a scene of a 2-year-old male lying limp in his mother's arms. The mother tells you that her son was shaking and stopped breathing for a few minutes before your arrival. As you look over the child you notice that his skin is pink and he is very limp with little movement or interaction with you or the mother. The child has some supraclavicular retractions on inspiration but has no audible wheezes. The child displays no signs of seizures.

How severe is this child's condition?

What are your initial interventions for this child?

HISTORY GATHERING

Because most of the medical problems with children involve some sort of respiratory ailment the following information will center on this presenting complaint. These questions can be altered to encompass most every medical problem a child may present with.

Before this information is gathered you must correct any life threatening problems that the child may have. Any respiratory ailment should have supplemental oxygen applied to correct hypoxia, "immediately!" An apnic patient should have ventilations controlled with a bag-valve-mask and supplemental oxygen. The patient assessment triangle is to aid in your initial

impression of the patient. You must still perform your ABC's and correct any life threatening conditions.

Some key questions you may consider when assessing your pediatric patient are listed below. The Cuyahoga County run report has a section for each of these questions and should be filled out with as much information as possible to aid the transport unit.

- Has your child ever had this problem before? PAST MEDICAL HISTORY
- Is your child taking any medications? MEDICATIONS
- Has your child had a fever? HISTORY OF PRESENT ILLNESS
- Did your child suddenly become ill? HISTORY OF PRESENT ILLNESS
- Does your child have any allergies? ALLERGIES

These are just some questions to ask the parent or caregiver after any life threatening problems are corrected. Assessment of the pediatric patient can be difficult however if you ask the appropriate questions and perform the appropriate interventions these calls will go more smoothly.

SHOCK

Shock is defined as the state where perfusion of the tissues no longer meets the minimum metabolic demands. In other words the patient is no longer getting oxygen to vital organs like the brain, liver, and heart. There are different types of shock including hypovolemic (from dehydration or hemorrhage), distributive or relative hypovolemia (sepsis, anaphylaxis), and cardiogenic (heart failure). The most common cause of shock in pediatric patients is hypovolemia; cardiogenic shock is rarely seen.

The signs of shock that you should be alert for include: increased heart rate, a prolonged capillary refill (> 2-3 seconds), cool, clammy, pale or mottled skin, weak or absent peripheral pulses, and decreased level of consciousness.

You must remember that children compensate well for decreases in cardiac output, and will maintain a stable blood pressure much longer than an adult patient. Hypotension occurs very late in children, and is a sign of severe decompensated shock.

The object of your interventions for a pediatric patient in shock will include recognition of shock and its severity and the provision of supplemental oxygen to increase oxygen delivery to vital organs.

When forming your initial impression, use the above mentioned patient assessment triangle. Then assess the ABC's assuring your patient has adequate respirations and the circulation is adequate. The initial impression helps to determine patient severity almost immediately and the ABC's will direct you to life saving interventions if needed.

When assessing a pediatric patient for symptoms of hypovolemic shock consider a prolonged (1-2 days) bout of vomiting or diarrhea. Some signs and symptoms of hypovolemia in a pediatric patient include but are not limited to: dry mouth, no tears, sunken fontanelle, sunken eyes, poor skin turgor, and decreased urination (fewer wet diapers than usual).

Treatment that should be administered by the EMT include assuring a clear and patent airway, administering high flow oxygen via non-rebreather mask or blow-by with oxygen tubing, controlling external hemorrhage if present, IV Fluids (EMT-I,P), conveyance of information to the transport unit and proper documentation of patient information.

VITAL SIGNS BY AGE			
	RESPIRATIONS	HEART RATE	BP SYSTOLIC
NEWBORN	30-60	120-160	50-70
1-6 WEEKS	30-60	100-160	70-95
6 MONTHS	25-40	90-120	80-100
1 YEAR	20-30	90-120	80-100
3 YEARS	20-30	80-120	80-100
6 YEARS	18-25	70-110	80-100
10 YEARS	15-20	60-90	90-120

Pediatric Patient Assessment
Medical

Introduction

The ill or injured child presents special problems for prehospital personnel. First, children are often not able to describe what is bothering them or what has happened. Second, in addition to the sick or injured child, you must deal with the parents. Finally, the child's size often makes routine procedures more difficult. These and other factors in pediatric emergencies may cause a great deal of anxiety and stress for both you and the parents. Children are not simply "small adults." They have special considerations and needs which will be discussed in the following pages.

Medical Emergencies

There are a variety of medical emergencies that may affect children differently than adults. Because of differences in anatomy and physiology, medical emergencies involving children should be handled with emphasis on quickly stabilizing the child, and putting them (and their parents) at ease.

Respiratory Distress: There are a number of diseases or disorders an infant or child may have that will cause respiratory distress. It is not easy to determine which respiratory problem the child may have. Many signs and symptoms are similar, and age ranges for occurrence overlap. As an EMT-B, you do not need to decide what respiratory disorder a child is suffering from. Instead, you should recognize and manage respiratory distress. It is especially important to recognize the signs of early respiratory distress and treat it before it advances to a life-threatening stage or to respiratory distress.

Gather information quickly from the parents and do a rapid assessment of the child. Unless there are clear indications of foreign body airway obstruction, do not put a tongue depressor in the child's mouth to examine the airway. This may cause spasms that can totally obstruct the airway. Rely on the following signs of early respiratory distress:

- ✓ Nasal flaring
- ✓ Retraction of the muscles above, below, and between the sternum and ribs
- ✓ Use of the abdominal muscles
- ✓ Stridor (high-pitched, harsh sound)
- ✓ Audible wheezing
- ✓ Grunting
- ✓ Breathing rate greater than 60

In addition to the above signs of early respiratory distress, watch for these additional signs:

- ✓ Cyanosis
- ✓ Decreased muscle tone
- ✓ Poor peripheral perfusion (capillary refill greater than 2 seconds)
- ✓ Altered mental status
- ✓ Decreased heart rate (a late sign)

ALL RESPIRATORY DISORDERS IN CHILDREN MUST BE TAKEN SERIOUSLY!

Respiratory disease is the primary cause of cardiac arrest not due to trauma. If you treat the respiratory system, the heart will also respond. The EMT-B's primary concern when caring for infants and children with respiratory problems, whether medical or trauma related, is to establish and maintain an open airway. *About one-third of all pediatric trauma deaths are related to airway management.* **PROVIDE OXYGEN TO ALL CHILDREN WITH RESPIRATORY DISTRESS.** For children in early respiratory distress:

- ✓ Provide oxygen by pediatric nonrebreather mask or blow-by technique.

For children in severe respiratory distress (those with respiratory distress and altered mental status, cyanosis even with oxygen administered, poor muscle tone, or inadequate breathing):

- ✓ Provide assisted ventilations with a bag-valve mask and supplemental oxygen.

For children in respiratory arrest:

- ✓ Ventilate with a pediatric bag-valve mask and supplemental oxygen.

Croup: Croup is caused by a group of viral illnesses that result in inflammation of the larynx, trachea and bronchi. It is typically an illness of children about 6 months to 4 years of age that occurs at night. This problem sometimes follows a cold or other respiratory infection. Tissues in the airway (particularly the upper airway) become swollen and restrict the passage of air. During the day, the child will usually have these signs:

- ✓ Mild fever
- ✓ Some hoarseness

At night, the child's condition will worsen and he or she will develop:

- ✓ A loud "seal bark" cough
- ✓ Difficulty breathing
- ✓ Signs of respiratory distress including nasal flaring, retraction of the muscles between the ribs, tugging at the throat
- ✓ Restlessness
- ✓ Paleness with cyanosis

Emergency care of a pediatric patient with croup is as follows:

- ✓ Place the patient in a position of comfort (usually sitting up)
- ✓ Administer high concentration oxygen
- ✓ Walking the patient to the ambulance on a cool night may provide relief as the cool air reduces the edema in the airway tissues

Epiglottitis: Epiglottitis is most commonly caused by a bacterial infection that produces swelling of the epiglottis and partial airway obstruction. The typical patient is between 3 and 7 years old. Although epiglottitis has become much less common with the development of vaccines, it is a life-threatening illness that must be suspected when treating any child with stridor. Signs include:

- ✓ A sudden onset of high fever
- ✓ Painful swallowing (the child will often drool to avoid swallowing)
- ✓ Patient will assume a "tripod" position, sitting upright and leaning forward with the chin thrust outward (sniffing position) and the mouth wide open in an effort to maintain a wide airway opening
- ✓ Patient will sit very still, but the muscles will work hard to breathe, and the child can tire quickly from the effort
- ✓ Child appears more generally ill than with croup

All cases of epiglottitis must be considered life threatening, no matter how early the detection. Emergency care for the pediatric patient with epiglottitis is as follows:

- ✓ Immediately transport the child, with the child sitting on the parent's lap
- ✓ Provide high-concentration oxygen. Do not increase the child's anxiety. If he or she resists the mask, let the parent hold it in front of the child's face
- ✓ Constantly monitor the child for respiratory distress or arrest and be ready to resuscitate
- ✓ **DO NOT PLACE ANYTHING INTO THE CHILD'S MOUTH.** To do so may set off spasms along the upper airway that will totally obstruct the airway

The child will not want to lie down, and you should not force him to do so. The child must be handled gently, since rough handling and stress could lead to a total airway obstruction from spasms of the larynx and swelling tissues.

Fever: Above-normal body temperature is one of the most important signs of an existing or impending acute illness. Fever usually accompanies infections (ear infections are common) as well as such childhood diseases as chicken pox, mononucleosis, pneumonia, epiglottitis and meningitis. A fever may also be due to heat exposure, any infection, or some other noninfectious disease problem. Never regard a fever as unimportant. Use relative skin temperature as a sign. Either a skin temperature or information provided by the parents should be used for determining the patient's temperature. The ungloved back of your hand applied to the patient's forehead or to the abdomen beneath the clothing is another way to determine relative skin temperature. A high relative skin temperature is always enough reason to transport and seek medical opinion. Other signs include:

- ✓ Fever with a rash is a sign of a potentially serious condition
- ✓ A seizure or seizures may accompany a high fever

Children can tolerate a high temperature, and only a small percent will have a seizure due to fever. It is the rapid rise in temperature rather than the temperature itself that causes seizures. Should you find an infant or child with a high fever, take the following steps:

- ✓ Remove the child's clothing, but do not allow him to be exposed to conditions that may bring on hypothermia
- ✓ If the condition is the result of heat exposure, cover the child with a towel soaked in lukewarm water.
- ✓ Monitor for shivering and avoid hypothermia
- ✓ Give the child fluids by mouth
- ✓ *If the infant or child feels very warm-to-hot to the touch, prepare the patient for immediate transport*

There are also some "do nots" in treating the infant or child with fever:

- ✓ Do not submerge the child in cold water, or cover with a towel soaked in ice water (which can cause hypothermia rapidly)
- ✓ Do not use rubbing alcohol to cool the patient. (It can be absorbed in toxic amounts and is a fire hazard)

Diarrhea and Vomiting: Diarrhea and vomiting are common childhood illnesses. Either one can cause dehydration that worsens whatever other condition the child may have and may lead to life-threatening shock. Infants are more susceptible to the effects of dehydration because, compared to adults, a greater percentage of their body is water and their fluid maintenance needs are greater. For any patient with diarrhea and vomiting:

- ✓ Monitor the airway
- ✓ Monitor respirations
- ✓ Be alert for signs of shock

Emergency care includes the following:

- ✓ Maintain an open airway, and be prepared to provide oral suctioning
- ✓ Provide oxygen if respirations are compromised
- ✓ If signs of shock are present, contact medical direction immediately prepare for transport

Seizures: Fever is the most common cause of seizures in infants and children. Epilepsy, infections, poisoning, hypoglycemia, trauma including head injury, or decreased levels of oxygen can also bring on seizures. Some seizures in children are idiopathic; that is, they have no known cause. Seizures, including those caused by fever, should be considered life threatening by the EMT-B. Usually, you will arrive after the seizure has passed. You should interview the patient as well as family members and bystanders who saw the seizure. Ask them if the child has a history of seizures. Ask:

- ✓ Has the child had prior seizures?
- ✓ If yes, is this the child's normal seizure pattern? (How long did the seizure last? What part of the body was seizing?)
- ✓ Has the child had a fever?
- ✓ Has the child taken any anti-seizure medication? Other medication?

Assess the child for signs and symptoms of illness or injury. All infants and children who have undergone a seizure require medical evaluation. The seizure itself may not be serious, but it may be a sign of an underlying condition. If the patient has a seizure in your presence, provide the following care:

- ✓ Maintain an open airway. Do not insert an oropharyngeal airway or bite stick
- ✓ Position the patient on his side if there is no possibility of spinal injury
- ✓ Be alert for vomiting. Suction as needed
- ✓ Provide oxygen. If the patient is in respiratory arrest, provide artificial ventilations with supplemental oxygen
- ✓ Prepare for transport
- ✓ Monitor for inadequate breathing and/or altered mental status, which may occur following a seizure

Altered Mental Status: Altered mental status may be caused by a variety of conditions, including hypoglycemia, poisoning, infection, head injury, decreased oxygen levels, shock, or the aftermath of a seizure. Assessment of the patient with altered mental status focuses on life-threatening problems discovered during the initial assessment.

- ✓ Be alert for the mechanism of injury that may have caused the altered mental status, such as head injury
- ✓ Be alert for signs of shock
- ✓ Look for evidence of poisoning by ingested, inhaled, or absorbed substances
- ✓ Attempt to obtain a history of any seizure disorders or diabetes

Emergency care of a pediatric patient with altered mental status includes the following:

- ✓ Assure an open airway. Be prepared to suction
- ✓ Protect the spine while managing the airway if a head injury or other trauma is present
- ✓ Administer high concentration oxygen by pediatric nonrebreather mask or blow-by technique. Be prepared to perform artificial ventilations with a bag-valve mask and supplemental oxygen
- ✓ Treat for shock
- ✓ Prepare for transport

Poisoning: Children are often the victims of accidental poisoning. Poisoning often results from the ingestion of household chemicals or medications. Certain poisons can quickly depress the respiratory system, cause respiratory arrest, and cause life-threatening conditions to the circulatory and nervous systems. The airway and gastrointestinal tract can also be burned by corrosive substances upon ingestion and subsequent vomiting. Some types of poisonings are not often associated with adult patients but are common to children. These special cases include:

- ✓ *Aspirin poisoning.* Look for hyperventilation, vomiting, and sweating. The skin may feel hot. Severe cases cause seizures, coma, or shock
- ✓ *Acetaminophen poisoning.* Many medications have this compound, including Tylenol, Comtrex, Bancap, Excedrin PM, and Datril. Initially, the child may have no abnormal signs or symptoms. The child may be restless (early) or drowsy. Nausea, vomiting, and heavy perspiration may occur. Loss of consciousness is possible.
- ✓ *Lead poisoning.* This usually comes from ingesting chips of lead-based paint. It is often chronic (building up over a long time). Look for nausea with abdominal pain and vomiting. Muscle cramps, headache, muscle weakness, and irritability are often present.
- ✓ *Iron poisoning.* Iron compounds such as ferrous sulfate are found in some vitamin tablets and liquids. As little as one gram of ferrous sulfate can be lethal to a child. Within 30 minutes to several hours, the child will show nausea and bloody vomiting, often accompanied by diarrhea. Typically the child will develop shock, but this may be delayed for up to 24 hours as the child appears to be getting better.
- ✓ *Petroleum product poisoning.* The patient will usually be vomiting with coughing or choking. In most cases you will smell the distinctive odor of a petroleum distillate (e.g., gasoline, kerosene, heating fuel)

Emergency care for a responsive patient includes:

- ✓ Contact medical direction or the poison control center
- ✓ Consider the need to administer activated charcoal
- ✓ Provide oxygen
- ✓ Prepare for transport
- ✓ Continue to monitor the patient. The patient may become unresponsive

Emergency care for an unresponsive patient includes:

- ✓ Assure an open airway
- ✓ Provide oxygen
- ✓ Be prepared to provide artificial ventilation
- ✓ Prepare for transport
- ✓ Contact medical direction or the poison control center
- ✓ Rule out trauma as a cause for altered mental status

Meningitis: Meningitis is caused by either a bacterial or a viral infection of the lining of the brain and spinal cord (the meninges). The majority of meningitis cases occur between the ages of 1 month and 5 years. The following are signs and symptoms of meningitis:

- ✓ High fever
- ✓ Lethargy
- ✓ Irritability
- ✓ Headache
- ✓ Stiff neck
- ✓ Sensitivity to light
- ✓ In infants, the fontanelles may be bulging unless the child is dehydrated
- ✓ Movement is painful and the child does not want to be touched or held
- ✓ Sudden excitement may cause seizures
- ✓ A rash may be present in the bacterial-type infection

It is most important to carefully take appropriate BSI precautions. Wear a surgical mask, since this is an airborne disease. When meningitis is suspected, provide the following care:

- ✓ Monitor airway, breathing, circulation, and vital signs
- ✓ Provide high concentration oxygen by nonrebreather mask
- ✓ Ventilate with a bag-valve mask with supplemental oxygen if necessary
- ✓ Provide CPR if necessary
- ✓ Be alert for seizures
- ✓ Prepare for transport immediately. This is a TRUE EMERGENCY. Do not delay!

SAFETY NOTE: All EMS personnel should immediately get a follow-up evaluation by a physician after any call where meningitis is suspected.

Drowning - means that a patient has been submerged in water and has suffered either a cardiac or respiratory arrest. If heart and respiratory function are not restored, it is a drowning. However, if the patient has a return of pulse and/or breathing, even temporarily, it is a near drowning. Patients who have been submerged in cold water have been revived 30 minutes or more after submersion. The drowning patient should be assessed like any other unresponsive patient.

- ✓ Establish unresponsiveness, breathlessness and pulselessness
- ✓ If alone, call for help **after 1 minute** of resuscitation

- ✓ If trauma may have been a cause or result of the submersion incident (such as, injury from a dive), maintain spinal stabilization and follow trauma assessment procedures. Remember, however, that resuscitation is your first priority.
- ✓ Consider possible ingestion of alcohol as a cause of the drowning, especially in adolescents
- ✓ Consider the possibility of **secondary lung injury** - deterioration after normal breathing resumes, minutes to hours after the event.

For the drowning, provide the following care:

- ✓ Provide artificial ventilation or CPR as necessary. This is your first treatment priority
- ✓ Protect the airway. Suction as necessary
- ✓ Protect against possible hypothermia, especially if the patient has been in cool or cold water. As soon as practical, remove wet clothing, dry the skin, and cover with a blanket
- ✓ Treat any trauma
- ✓ All drowning patients should be transported to the hospital, even if they seem to have recovered.