

## Section Five

2007



### EMT-BASIC LEARNING OBJECTIVES

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## EMT-BASIC LEARNING OBJECTIVES SECTION FIVE

### THE PREGNANT TRAUMA PATIENT

1. Briefly describe any changes that occur in the following vital signs in a pregnant woman by her third trimester:

**Heart rate:** *Increases by 15-20 beats per minute, making the resting heart rate around 100 bpm, which in turn makes tachycardia hard to distinguish.*

**Blood Pressure:** *By the third trimester, BP should actually be near normal. It is during the second trimester that a drop of 5-15 mmHg may occur.*

**Respirations:** *The respiratory rate is usually not affected by pregnancy. This seems odd, as the pregnant woman has a higher basal metabolism, and therefore an increased need for oxygen, as well as a higher amount of carbon dioxide to get rid of, hers and the fetus'. To accomplish this, the pregnant patient's tidal volume increases, which of course increases the minute volume. Should a pregnant patient ever need BVM ventilation, it is very important to make sure adequate tidal volume is given, and hyperventilation is usually appropriate.*

*- It should also be mentioned that the pregnant patient's diaphragm elevates about 1.5 inches (4cm), which may cause some SOB if the patient is supine.*

2. Define **Supine Hypotensive Syndrome** and describe how this syndrome is treated in the pregnant patient with and without trauma:

*- The near term pregnant woman has a large mass in her abdomen, which comprises the weight of the fetus, the uterus, and the placenta. Should the patient be placed supine, this weight compresses the inferior vena cava, causing a*

- decrease in venous blood return to the heart, and a subsequent decrease in cardiac output by as much as 30-40%. This causes hypotension, dizziness, etc. It can usually be relieved by placing a woman on her left side. If the patient is immobilized on a long spineboard, the EMT may place a wedge under the right side of the board, tilting it 15-20 degrees to the left. Another method is manual displacement of the uterus, which is accomplished by simply pushing the enlarged abdomen to the left.*
3. Briefly describe the change in cardiac output and blood volume in a pregnant woman in her third trimester:
- *The pregnant woman has to perfuse two circulations; her own and that of the fetus, so her vascular volume increases by nearly 50% by the third trimester. To pump that increased volume, the cardiac output increases by 1.0 - 1.5 liters per minute by the tenth week of pregnancy.*
4. Explain why the EMT should maintain a high index of suspicion for hypovolemic shock in a pregnant trauma patient:
- *Because of all of the cardiovascular changes that can occur in a pregnant woman, approximately 30 –35 % of a pregnant patient's blood volume can be lost before signs and symptoms of hypovolemia become evident. The EMT should rely heavily on mechanism of injury coupled with the knowledge of the physiological changes that occur in pregnancy to appropriately treat the pregnant trauma patient early in the EMT's contact with the patient. Any abdominal trauma to a pregnant patient MUST be evaluated by a physician.*
5. List at least two other normal anatomical or physiological changes that occur during pregnancy that may present a problem to the EMT when treating a pregnant trauma patient:
- *As a pregnant woman approaches term, her abdominal quadrants are pushed into the upper abdomen, so there is a higher incidence of abdominal injuries in association with chest trauma.*
  - *The pregnant woman's bladder is displaced upward and forward so that it lies outside of the pelvic cavity, and is therefore at increased risk of injury, particularly deceleration injury from a seatbelt.*
  - *The uterus becomes quite enlarged, and this coupled with an increased blood flow (increase of 500 – 700 cc per minute by the third trimester) makes the uterus more susceptible to both blunt and penetrating trauma.*
  - *There is a redistribution of blood volume to the pelvis, a ten-fold increase of blood flow to the pelvic region. Any pelvic fracture in a pregnant patient greatly*

*increases that patient's chance of bleeding to death over that of a non- pregnant patient.*

- *There is a decrease of gastric emptying, which along with the compression of the stomach by the uterus, increases the chance of aspiration.*

## **EMERGENCY CHILDBIRTH and COMPLICATIONS**

1. Identify on a diagram the following structures and briefly explain the function of each:

- Ovaries:** *Lying in the lower lateral portions of the abdomen, these two walnut sized organs produce female sex hormones, and during each menstrual cycle, produce an egg (ovum).*

- Fallopian tubes:** *The fallopian tubes provide the ovum an avenue of travel to the uterus from the ovary.*

- **Uterus:** *The uterus is a pear shaped muscular organ in the center of the lower quadrant. This is where the ovum is implanted and begins development.*

- **Cervix:** *The cervix is the opening at the distal end of the uterus, which connects the uterus to the vagina.*

- **Vagina:** *The vagina is a distensible tube that serves as a passageway between the uterus and the outside.*

- **Placenta:** *This is a specialized organ of pregnancy that develops in the uterus about 14 days after ovulation. It serves several crucial functions during pregnancy including:*

- *Respiratory gas exchange between the mother and fetus*

- *Transport of nutrients from maternal to fetal circulation*

- *Excretion of wastes*

- *Transfer of heat*

- *Hormone production*

- *Formation of barrier against some harmful substances in the maternal circulation*

- **Umbilical cord:** *This is another specialized organ of pregnancy that serves to connect the placenta to the fetus. It contains two arteries and one vein, and maintains fetal circulation.*
- **Amniotic sac:** *A third specialized structure of pregnancy, it is a membranous bag that encloses the fetus in a watery fluid called amniotic fluid.*
- **Amniotic Fluid:** *This provides a weightless environment for the fetus to develop in and serves as insulation, shock absorption, and an avenue for certain fetal excretory processes.*

2. Describe the pathophysiology, signs and symptoms and field management of the following pre-delivery obstetrical emergencies:

**Placenta previa:** *This condition occurs when the placenta is implanted low in the uterus so that it partially or completely covers the cervical canal. Bleeding is the result of cervix dilation in preparation for delivery, which occurs late in the third trimester. The signs and symptoms of placenta previa include:*

- *Painless vaginal bleeding, usually bright red in color.*
- *Soft and non-tender uterus...(DO NOT deeply palpate.. it may cause further bleeding).*
- *Fetal distress.*

**Abruptio placenta:** *This is a premature separation of a normally implanted placenta from the wall of the uterus during the last trimester of pregnancy. It may occur spontaneously, especially in women who have been hypertensive during pregnancy, or women who have had multiple pregnancies. It may also occur as a result of trauma. Signs and symptoms include:*

- *Severe abdominal pain.*
- *Abdomen is very tender...uterus is rigid.*
- *Patient usually has dark red vaginal bleeding, although vaginal bleeding does not always occur with abruptio placenta.*
- *Shock...this is likely to be out of proportion to the amount of external blood loss. It is important for the EMT to remember that most of the bleeding from this condition occurs internally.*
- *Fetal demise*

**Spontaneous and/or induced abortion:** *Abortion is defined as expulsion of the fetus, from any cause, before the twentieth week of gestation. They are broadly classified as either spontaneous or induced.*

- *A spontaneous abortion is often referred to as a miscarriage. This occurs naturally, and can be due to many causes, including acute or chronic illness, fetal abnormalities, or placental abnormalities. Most of the time, the cause of the spontaneous abortion is not known. Approximately ten percent of pregnancies end with spontaneous abortion.*
- *An induced abortion is one that is brought about intentionally. When an abortion is induced for medical reasons and carried out in an authorized medical setting, it is called a therapeutic abortion. When abortion is carried out illegally, which usually means under conditions that may pose a hazard to the mother's life, it is called a criminal abortion. Signs and symptoms of abortion include:*
  - *Vaginal bleeding, often with passage of tissue along with the blood. It is important for the EMT to find out when the bleeding started, and how much bleeding has occurred.*
  - *Cramping.*
  - *Possible hypotension and shock. The EMT needs to check for orthostatic changes, as well as be aware of general SxS of shock.*

**Uterine rupture:** *Uterine rupture almost always occurs during labor. Women who are at risk include those who have had many children, and those who have had previous cesarean sections.*

- *Signs and symptoms include:*
  - *Patient who was in active labor.*
  - *Strong and painful contractions that decreased and stopped.*
  - *Weakness, dizziness, and thirst.*
  - *Vaginal bleeding may or may not occur.*
  - *SxS shock.*

**- The treatment of any prepartum hemorrhage of any cause includes:**

- *Transport gently but quickly to the appropriate hospital.*
- *Aggressive maintenance of ABC's, including high flow oxygen, suction, and BVM assistance if necessary.*
- *Treat the mother for shock*
- *Keep any tissue passed with vaginal bleeding for inspection at the hospital.*
- *Vigilantly assess and monitor vital signs.*
- *Estimate the amount of blood loss.*

**Pre-eclampsia:** *This condition is the first stage of a progressive condition sometimes called toxemia of pregnancy. It most frequently affects women in their twenties who are pregnant for the first time, and usually in the last trimester of their pregnancy. Women at risk are those with a history of diabetes, heart disease, kidney problems, or pre-existing hypertension. Toxemia, for reasons that are not clearly*

*understood cause problems with the mother's circulation, which affects the kidneys. The kidneys malfunction in the role of regulating blood pressure, sodium excretion, and water retention, which cause various signs and symptoms:*

- *Sudden weight gain.*
- *Abnormal, pronounced swelling of the face, fingers, legs, or feet.*
- *Decreased urinary output.*
- *Elevated blood pressure (BP above 130/80 should raise suspicion).*
- *Blurred vision and/or spots before eyes.*
- *Severe, persistent headache.*
- *Persistent vomiting.*
- *Mental confusion or disorientation.*
- *Right upper quadrant abdominal pain.*
- *Hospital laboratory tests will show proteinuria.*

**Eclampsia:** *Eclampsia is the full-blown toxemic syndrome associated with toxemia of pregnancy. It has many of the same signs and symptoms as Pre-eclampsia, with one very important exception. The onset of seizures, as well as possibly a fever. It is the occurrence of seizures that most clearly marks the transition from pre-eclampsia to eclampsia. Pre-eclampsia may progress rapidly to eclampsia before, during, or after pregnancy. It is one of the most severe complications of pregnancy, with a maternal death rate of 5-15%, and a 25% death rate for the fetus.*

*-Treatment of the pre-eclamptic and/or the eclamptic patient is aimed at the prevention of seizures, which is possible if the mother is kept calm and quiet.*

*Treatment includes:*

- *Aggressive maintenance of the ABC's, including high flow oxygen.*
- *Transport the mother in a left lateral recumbent position.*
- *Anticipate seizures, and have suction ready.*
- *Transport as gently and quietly as possible to the hospital, taking great care to keep the mother calm and quiet. Lights, sirens and a bumpy ride may cause more problems than they are worth.*
- *Consider paramedic intercept (especially if seizures occur).*

**Ectopic pregnancy:** *In an ectopic pregnancy, the ovum is implanted outside of the uterus...95% of the time in the fallopian tube, but sometimes in other areas of the mother's abdomen. When the egg is in the fallopian tube, it grows normally for the first few weeks, but the tube cannot stretch. The growing embryo and placenta eventually stretches the surrounding tissue, and causes a rupture in the tube or nearby blood vessels, and results in severe abdominal bleeding and internal hemorrhage. Women with a previous history of ectopic pregnancy, tubal ligation,*

*pelvic inflammatory disease, sexually transmitted disease or having an IUD are at a higher risk for having an ectopic pregnancy. Signs and symptoms usually occur in the first trimester (6-10wks.), so the patient may not appear pregnant.*

*The S x S include:*

- *Sudden sharp abdominal pain localized on one side. If the bleeding is extensive the pain will become more diffuse.*
- *Spotty vaginal bleeding.*
- *Missed menstrual cycle (2-6 weeks past due).*
- *Pain under the diaphragm, radiating to both shoulders.*
- *Tender, bloated abdomen.*
- *SxS of shock.*
- *Suspect ectopic pregnancy in any woman of childbearing age, if any of the above SxS are present.*
- *It is important to take a good History of Present Illness on these patients. If the patient is a younger female (versus someone who is older) they may be afraid to disclose any information regarding their sexual life or menstrual cycle in front of their parents. It may be more effective to wait until the parents are not in the immediate vicinity to ask these following questions. Some of the questions you will want to ask are: Are you currently sexually active? Are you using birth control? Is there any possibility you can be pregnant? If no, why? Remember to use OPQRST as well in regards to the pain.*

*Treatment includes:*

- *Rapid transport.*
- *Maintenance of airway and breathing, with high flow oxygen via non-rebreather or BVM if necessary.*
- *Treat the mother for shock. Consider MAST in severe cases.*

3. Define the term “labor” in relation to childbirth:

- *Labor refers to the mechanism by which the products of conception – the baby and placenta – are expelled from the mother’s uterus.*

4. Describe each of the three stages of labor, including identification of the beginning and ending of each stage:

**1<sup>st</sup> Stage:** *The first stage of labor begins with the onset of regular labor pains, which serve to maneuver the baby into position, as well as preparing the cervical opening through which the baby makes its exit. The first stage ends when the cervix*

*is fully dilated (crowning). The mucus plug (bloody show) may be discharged before or during this stage, and it is usually towards the end of this stage that the amniotic sac ruptures. The first stage may last eight to eighteen hours.*

**2<sup>nd</sup> Stage:** *The second stage begins when the cervix fully dilates and the baby enters the birth canal. It ends when the baby is fully delivered.*

**3<sup>rd</sup> Stage:** *This stage begins with the birth of the baby and ends with the delivery of the placenta, when the uterus begins to contract.*

5. List at least four questions that may indicate that delivery is imminent:

- *Is the mother multi-gravida?*
- *How frequent are the contractions?*
- *Has the amniotic sac ruptured?*
- *Has the mother lost her mucus plug (bloody show)?*
- *Does the mother feel the need to move her bowels?*
- *Is crowning (baby's head at vaginal opening) present?*

6. Describe the preparations necessary for imminent delivery on the scene or in the ambulance:

- *Remember you are ASSISTING the mother.*
- *Place the mother on a firm surface, padded with sheets or blankets. Try to have the best light available.*
- *Use several drapes if possible...one over the mother's abdomen, one over each leg and one under the mother's buttocks. Save one with which to wrap the baby.*
- *Don gloves.*
- *Make sure that your equipment is ready.*
- *Observe the vaginal and perineal area for crowning.*

7. Establish the relationship between body substance isolation and childbirth:

- *The EMT needs to make sure that PPE's are used because there is a large amount of body fluids in the delivery of the newborn. This can cause an exposure. Also*

*there needs to be adequate towels or drapes to soak up the liquid. If none are available trauma dressings work well.*

8. List, in order, the steps of management of a normal prehospital delivery beginning with the crowning of the head:

- *Support the head as it delivers, putting gentle pressure with the palm of your hand on the baby's head – without putting pressure on the fontanelles.*
- *Allow the head to rotate...most babies deliver face down.*
- *Check for the cord around the baby's neck.*
- *Suction the mouth thoroughly, then the nose.*
- *Gently guide head downward to help upper shoulder deliver.*
- *Guide the head upward to help the lower shoulder deliver.*
- *When fully delivered, wipe blood and mucus away from the mouth and nose.*
- *Suction the mouth again, and then the nose. Be careful to squeeze the suction bulb before inserting it into the baby's mouth or nose!*
- *Keep baby's head slightly down to help drainage.*
- *Keep the baby at the level of the vagina.*
- *Note the time of delivery.*
- *Evaluate the newborn, using the APGAR guide, at one minute and five minutes after birth (assuming you have time to do this and baby is in no distress).*
- *Protect the baby from heat loss (dry and wipe as soon as possible).*
- *If necessary, cut the umbilical cord.*
- *Prepare for delivery of placenta.*

9. Describe the procedure for suctioning a neonate:

- *Newborn infants are obligate nose breathers, meaning they naturally breathe exclusively through their nose. Because of this, suctioning the nose may be a stimulus for the baby to breathe. If there is fluid in the mouth, it can be aspirated, causing a variety of respiratory problems. For these reasons it is important to suction the mouth, then the nose thoroughly. Devices for neonate suctioning include a bulb syringe (compress before inserting in the baby's mouth or nose), and a DeLee suction.*

10. Explain how to identify meconium, its significance, and the field management of a delivery when meconium aspiration is a possibility:

- *Meconium is fetal stool. Should there be a period of time during the delivery when the fetus is stressed and fetal hypoxia results, the fetal colon can spasm,*

*causing the meconium to be passed into the amniotic fluid. Since the fetus is becoming hypoxic, it takes deep gasps, sometimes drawing meconium stained amniotic fluid into the lungs, which then prevents the lungs from properly inflating after delivery, and causing serious respiratory problems for the baby. Normally, amniotic fluid is clear, odorless, and colorless. The presence of meconium staining gives the amniotic fluid a yellow-green hue, while heavy staining will cause a dark greenish brown color. If the mother's water has broken before your arrival, you should inquire as to the color of the fluid.*

- *If there is evidence of meconium staining, it is essential the airway be cleared as soon as the head delivers and before the baby delivers completely. Once the head delivers, tell mom to stop pushing (pushing requires the glottis being closed and the breath held; if mom is blowing out, neither of these two requirements can be met). Then carefully and completely suction the mouth and the nose. If you are unable to suction these areas well, for whatever reason, try to get ALS intervention for the infant as soon as possible. After birth, #6-8 French suction catheters are probably the correct size to continue suctioning with as necessary. Alert your receiving facility that you are dealing with a meconium delivery.*

11. Explain the importance of drying and warming a newborn as soon as possible after delivery:

- *Any newborn will have difficulty with a cold environment. Every effort should be made to be sure the infant is dried and kept warm before any other assessment is done. Premature infants or neonates who need resuscitative measures are especially affected by the cold.*
- *There are several predisposing factors to neonatal hypothermia. First, the newborn baby is wet, with a bare wet head. Second, the baby has a larger surface area to body mass, which allows for a higher evaporative cooling rate. Third, the baby has a small percent of body fat, as well as a decreased metabolic rate. And fourth, there is a diminished shiver response to the cold. The thermoregulatory mechanism of children does not develop well until they are around 2 years old. Since they have a diminished or absent shiver response, they rely on the burning of brown fat to produce heat. The byproduct of burning fat is acid, just like DKA. They use up any glucose stores that do exist, and since the metabolic rate is up trying to generate heat, the oxygen demand also goes up, and hypoxemia may result. In trying to protect itself from the cold, the baby becomes hypoxic, hypoglycemic, and acidotic...a dangerous triad. Obviously, a cold infant is in deep trouble.*
- *There are several methods of warming neonates. The best, and unfortunately, least practical for the field, is a preheated warmer for the baby. Warm towels or*

*laying the baby naked on mom and covering them both may work as well. Please remember that wrapping a baby in room temperature blankets actually lowers the baby's temperature.*

- *It is essential that the EMT remember to dry, cover, and warm the newborn baby...not do so can cause disastrous results.*

12. List three priorities of care for mother and child once the baby is delivered:

- *Keep baby warm (see #11).*
- *Massage mom's uterus to encourage uterine contractions after the delivery of the placenta.*
- *Put baby to breast, if mom agrees, to encourage uterine contractions.*

13. Describe delivery procedure for the placenta and explain what is to be done with the placenta post delivery:

- *After the baby is delivered, the EMT needs to watch for signs that the placenta is ready to deliver. When this is about to occur, the end of the umbilical cord protruding from the vagina will appear to lengthen, there may be a gush of blood from the vagina, and the patient will state that she feels contractions starting up again.*
- *Place one hand on the mother's lower abdomen...the contracting uterus should feel like a grapefruit sized ball. The placenta usually delivers within ten minutes, and most will deliver within twenty. As the uterus contracts, encourage the mother to bear down to expel the placenta and membranes.*
- *Never pull on the cord to speed things up. Some bleeding can be expected. When the placenta appears, grasp it and rotate it gently, slowly guiding the placenta and membranes from the mother's vagina.*
- *If the cord has not been cut, wrap the placenta and place it near the baby. If the cord has been cut, place the placenta in a plastic bag and take it to the hospital with you for inspection by a physician. It is important that the entire placenta delivers, as pieces retained within the uterus will lead to possible infection and hemorrhage.*

14. Describe the correct procedure for cutting the umbilical cord:

- *Before cutting the cord, check the cord first for pulsation. If the umbilical cord has a pulse, wait a few minutes for the pulsation to stop. Then place two clamps about halfway between the mother and baby (usually 6-9 inches from baby's navel). Space the clamps about 2-6 inches apart. Cut the cord between the clamps, then tie off the end coming from the baby using umbilical tape. Remember that a newborn can become very hypotensive from a small amount of blood loss.*
15. Explain how to determine if postpartum bleeding is excessive, and how to control this excessive hemorrhage:
- *Normal blood loss during the third stage of labor (the delivery of the placenta) is about 150 ml-500 ml. Controlling excessive postpartum bleeding entails the same treatment given to a normal postpartum mother.*
    - *Transport quickly to the appropriate facility.*
    - *Control any external bleeding with pressure dressings.*
    - *Do not pack vagina.*
    - *Massage the uterus, which encourages contractions of the uterus and decreases bleeding.*
    - *Put the baby to suckle, which also encourages contraction of the uterus.*
16. Explain the emergency care provided to a patient with pre-delivery emergencies:
- *The focus is on getting the patient to a hospital with an on-call OB/GYN. These patients will mostly need surgery.*
17. Define "breech" delivery:
- *A breech delivery is a delivery in which the baby's feet or buttocks presents first instead of the head.*
18. Describe the management of a breech delivery:
- *The mother should be placed at the edge of the bed or her hips should be raised with a cushion to allow the baby to drop down if needed. The body usually delivers easily and quickly. When the umbilicus is visualized, pull a loop of cord out to decrease pressure. The baby's hips are grasped with the thumbs on the buttocks. The baby will turn to one side. The body is pulled up to help deliver the*

*bottom shoulder and then pulled down to deliver the lower shoulder and head. The baby will turn again to a face down position and can be guided by the EMT to assure the turn is face down. The head delivers best if it is in a “tuck and roll” position with the chin tucked to the chest.*

19. Describe the management of a breech delivery when the head does not deliver quickly:

*- Problems occur when the head does not deliver quickly. Pressure on the cord occurs with contractions, decreasing oxygen to the fetus. The vaginal wall blocks the baby’s airway. This is the problem of delivering an “after coming head” that lodges in the pelvic cavity. Use the Mauriceau Maneuver. This maneuver is accomplished by placing a gloved hand on the child’s maxilla while applying gentle pressure to tuck the child’s head. In order to actually accomplish this, the EMT must actually slide their fingers slightly into the mother’s vagina. Tell the mother what you are going to do and that she might feel some pressure. The maneuver is to tuck, NOT pull the head. An assistant should put suprapubic pressure downward and caudally to assist with the delivery. Suprapubic pressure can be applied very forcefully if the head does not progress.*

20. Describe the correct procedure(s) for dealing with an umbilical cord that is wrapped around the infant’s neck during delivery:

*- If the umbilical cord is wrapped around the baby’s neck in the birth canal, first try to stop any further delivery of the baby, then try and slip the cord over the baby’s shoulders or head. If this will not work, and it appears to be too tight around the neck, the cord needs to be clamped and cut. To do this, place umbilical ties or clamps approximately three inches apart, and quickly cut the cord. Then unwrap the cord from around the infant’s neck. Once the baby is delivered, place another clamp or tie on the cord coming from the baby, in order to prevent any blood loss.*

21. Define “Prolapsed Cord” and describe its field management:

*- A prolapsed cord means that the umbilical cord emerges from the uterus ahead of the baby, and is the presenting part. With each contraction, the baby compresses*

*on the cord, cutting off the oxygen supply from the placenta, causing suffocation of the infant. The EMT needs to do several things:*

- *Initiate rapid transport.*
- *Position the mother supine with her hips elevated as much as possible.*
- *Treat the mother for shock.*
- *Have the mother pant with each contraction, which will prevent her from pushing with the contractions.*
- *With a gloved hand, gently push the baby back up into the vagina until the presenting part is no longer pressing on the cord.*
- *While pressure is maintained on the baby, the exposed cord should be covered with a sterile dressing moistened with saline.*

22. Explain the field management of a limb presentation:

- *In the case of an arm or leg presentation, the EMT is rather limited in options. Initiate rapid transport, treat the patient for shock, and be prepared to deliver. This type of delivery needs surgical intervention.*

23. List 2 indications, which might cause an EMT to suspect multiple births during a prehospital delivery:

- *If the mother has had prenatal care, she will probably know she is carrying twins. If there is no prenatal care, suspect a multiple birth situation if the abdomen is still quite large after the birth of a baby. There will be more strong uterine contractions, and the delivered baby's size will appear small in proportion to the size of the mother's abdomen. Expect the next delivery to occur within ten minutes.*

24. Describe the priorities of care for premature infants:

- *A premature baby may weigh less than five and one-half pounds, and is born before 36 weeks gestation.*
- *There are several things the EMT must do to ensure the survival of especially fragile infants:*
  - *Keep the baby warm with a blanket or infant swaddle. Use aluminum foil as and outer wrapping for extra insulation if you lack other supplies.*
  - *Keep the baby's mouth and nose clear of fluid by gentle suction with a bulb syringe.*
  - *Prevent bleeding from the umbilical cord; a "preemie" cannot tolerate even minute amounts of blood loss without being at high risk for shock.*

*-Administer blow-by oxygen, avoiding blasting oxygen directly into the baby's face which may cause chilling. A misapprehension exists that prehospital oxygen administration to neonates may cause oxygen toxicity. There should be no concern of causing oxygen toxicity for the limited time the EMT is managing the infant.*

*-Try to warm the baby during transport.*

25. Describe the APGAR scoring method for neonates and indicate when APGAR scoring is appropriate:

*- This scoring system devised is a useful means of evaluating the adequacy of a newborn's vital functions immediately after birth. Five parameters – heart rate, respiratory effort, muscle tone, reflex irritability, and color – are each given a score from 0 – 2. The majority of infants are vigorous and have a total score of 7 to 10; they cough or cry within seconds of delivery and require no further resuscitation. Infants with a score in the 4 to 6 range are moderately depressed; they may be pale or blue one minute after delivery, with poorly sustained respirations and flaccid muscle tone. Such infants will require some forms of resuscitation. The five signs to be evaluated in this scoring system can be remembered using the mnemonic APGAR:*

<b>A</b>	<i>Appearance (color)</i>
<b>P</b>	<i>Pulse</i>
<b>G</b>	<i>Grimace (reflex irritability)</i>
<b>A</b>	<i>Activity (muscle tone)</i>
<b>R</b>	<i>Respiratory effort</i>

*- One minute and five minutes after the complete birth of the infant, evaluate these five signs according to APGAR. Give each sign a score of 0, 1, or 2, according to the description of the evaluating criteria in either handouts provided or the text. A total score of 10 indicates that the infant is in the best possible condition. A score of 4 to 6 indicates a need for resuscitative measures. Of course, a score of 4 or lower indicate a severely jeopardized infant, and calls for aggressive procedures and rapid transport. Realistically, infants with low scores will be obviously in distress, and time should not be wasted performing an APGAR on these infants.*

## PEDIATRIC PATIENTS

1. Explain the rationale for having knowledge and skills appropriate for dealing with the infant and child patient:

*- Children are not little adults. They are different in the ways that we treat them. i.e. – back boarding, airway management.*

2. Explain why the EMT should attend to the feelings of the family when dealing with an ill or injured infant or child:

*- It is important to talk to the family if pt. condition permits and explain what is being done. One must understand that the emotions are going to be high for the family and all they want to do is be a good parent.*

3. Understand the provider's own response (emotional) to caring for infants or children:

*- The EMT must realize that the call may also affect themselves and their partners as well. For this reason there are partners to talk to about the call and what happened. This time should be used as a time to let the emotions get out and not a critiquing session. Also the CSID team can be called in for a debriefing.*

4. For the following age groups list the approximate normal range of the following vital signs:

Group	Age	RR	HR	Lower Limit of Normal Systolic BP
Newborn	Birth- 3 m	40-60	120-160	> 60 Hg or strong central pulse
Infant	1 -12 mo	30-60	100-160	> 60 Hg or strong central pulse
Toddler	1 - 3 yrs	24-40	90-150	> 70 Hg or strong central pulse
Preschool	4 – 5 yrs	22-34	80-140	> 75 Hg

School age	6 – 12 yrs	18-30	70-120	> 80 Hg
Adolescent	13 – 18 yrs	12-16	60-100	> 90 Hg

5. Identify the most reliable pulse location to palpate in:

*An infant: The brachial artery*

*A child: If the child is over the age of four, the radial artery is the best site. Under the age of four, the radial pulse may not be readily palpable. It may be easier to choose the brachial or carotid sites.*

6. Describe the differences in anatomy and physiology of the infant and child, versus the adult patient:

*- The infant and child have larger heads compared to the rest of their body. Also, their airway is smaller and is more easily obstructed. The other major difference is that the other body systems are not fully developed and cannot respond as well to shock.*

7. Differentiate, identify and describe the airway anatomy in the infant and child, versus the adult:

*- The airway of the child is smaller in proportion compared to the adult. Also the tongue is bigger in proportion and can cause an airway obstruction more easily.*

8. List the indications for basic life support intervention in a neonate and describe the resuscitation algorithm: (See student packet handout)

*- Indications for intervention include a respiratory rate below 30 and a heart rate below 100. The presence of meconium may indicate a potential need for intervention. The resuscitation algorithm is as follows:*

*\* Respirations that are shallow, slow (less than 30) or absent OR baby's heart rate is less than 100 = ventilation with BVM and 100% oxygen at a rate of 40-60 per minute.*

*\* If no increase in rate or depth after 15-30 seconds, continue to ventilate. If the heart rate has not improved and has dropped below 80, then continue to ventilate and begin chest compressions at a rate of 120. Contact ALS and/or transport!*

\* *If after delivering ventilations and compressions, the heart rate climbs above 100, then compressions may be discontinued. However, the ventilations should continue until the infant can maintain a spontaneous respiratory rate above 30.*

\* *If baby delivers with a respiratory rate less than 30, and a heart rate less than 60, then begin CPR immediately.*

9. Explain the significance of a slowing heart rate in a pediatric patient:

- *A slowing pulse may be caused by rising intracranial pressure, depressant drugs, various medical conditions, and perhaps most importantly, hypoxia. The EMT may need to re-evaluate the treatment being given, and become more aggressive in the care of ABC's. Ultimately, a slowing heart rate in a pediatric patient is the precursor of cardiac arrest.*

10. List the most common cause of airway obstruction in the pediatric patient:

- *Foreign objects (e.g. buttons, paper clips, marbles, coins, etc.)*

11. Identify the most common cause of cardiac arrest in pediatric patients:

- *Approximately 95% of cardiac arrests in children are a result of airway obstruction and respiratory arrest. The other 5% are caused by shock.*

12. Distinguish care between adults and kids with respiratory emergencies:

- *Good airway management and O<sub>2</sub> will help most kids. The important thing to remember is that their airways are smaller in proportion compared to adults and hence a little swelling for the adult is a major obstruction for the child.*

13. List two general indicators of a seriously ill or injured child:

- *Generalized limpness – usually related to a change in a mental status*
- *Listlessness*

14. Describe the methods of determining end organ perfusion in the infant and child patient:

*- Look at the overall picture, is the patient moving around or are they listless, the capillary refill time greater than 2 seconds, and the skin condition. Pediatric's skin condition will tell a lot about how the kid is perfusing.*

15. List three indications of dehydration in the pediatric patient:

- *sunken fontanelles*
- *decrease in urine output (dry diapers)*
- *crying without tears*
- *dry mucous membranes*

16. List four indications of respiratory distress in the pediatric patient:

- *“see-saw” breathing – alternating movement of chest and abdomen.*
- *accessory muscle retractions – supraclavicular, intercostals, sternal.*
- *grunting.*
- *decreased breath sounds/“silent chest” – indicative of little or no air exchange and impending respiratory arrest.*
- *nasal flaring*
- *head bobbing*

17. List the special concerns with the following management steps of pediatric patients:

*Oxygen delivery: It takes 40-60 hours of oxygen delivery at high concentrations to result in oxygen-related problems, so things like oxygen toxicity are not a problem. Humidified oxygen may be useful in some situations.*

*Airway positioning: Be careful not to hyperextend the necks of infants and small children as this will effectively block the airway. Padding positioned under the **shoulders** will help in maintaining the proper position.*

*Suctioning: As with adults, the airway of a pediatric patient should be clear before positive pressure ventilation is used. However, prolonged suctioning may cause apnea and bradycardia. **BUT** – the important fact is that the airway is cleared and secretions and vomitus are not blown down the trachea! Adjuncts for pediatric suctioning include bulb syringes and DeLee traps.*

*Oral and Nasopharyngeal airways: OPA's and NPA's should be considered in older children. The NPA should be inserted gently, without force. When inserting*

*an OPA in a pediatric patient – consider use of a tongue depressor and insertion in normal anatomical position (OPA with curve down).*

*Cervical Collars: Cervical collars are not recommended for pediatric patients, as it is rare to find one that fits correctly. Adequate immobilization can be achieved with a blanket roll or headblock and tape.*

*BVM: The bag value mask must be the correct size (pediatric, neonate) to avoid overinflation.*

18. Define “febrile seizures” and describe the field management for febrile seizures in the pediatric patient:

- *Febrile seizures are seizures that come about in association with a very high fever or a sudden rise of a fever without evidence of intracranial infection or other definable cause. The actual diagnosis of a” febrile” seizure cannot be made in the field. This condition occurs most commonly in infants and children from the age of six months to four years of age, with approximately 3 - 5% of children under the age of five suffering from febrile seizures. They tend to occur more often in a child whose family has a history of febrile seizures, and are commonly associated with otitis media, tonsillitis, pharyngitis, GI infections, pneumonia, and recent immunizations. If a febrile seizure is going to occur at all, it is usually early in the course of an illness. This is when the child’s temperature is rapidly rising, usually above 102 degrees F. These seizures are most often generalized, grand mal seizures and are of short duration (usually lasting less than 5 minutes) and have an uncomplicated and short postictal period. Usually, there is no lasting neurologic deficit.*
- *The EMT needs to take a very good medical history, regarding previous seizures, numbers, length, and appearance of seizures, the possibility of aspiration, any recent trauma, headaches and/or complaints of a stiff neck by the patient, and any other pertinent information.*
  - *Treatment of febrile seizures includes:*
    - *Protect the patient from injury*
    - *Assure the patency of the airway*
    - *Prompt transport*
    - *Administer oxygen*

- *If the patient is febrile, the EMT may cool the patient with tepid water, being careful not to chill the patient.*
19. Describe the unique concerns associated with backboarding a pediatric patient, and list at least three alternatives to the standard backboard, depending on the size of the child:
- *Pediatric patients require plenty of padding to assure adequate immobilization. In order to fill voids and prevent the child from sliding around on the immobilization device, padding should be placed judiciously. Common areas include beneath the shoulders (to maintain good airway position), around the child, between the legs. Larger children may be immobilized on a full length spineboard, while smaller infants and children are better immobilized on a short spineboard, K.E.D., or maintained in the infant's own car seat.*
20. Identify the signs and symptoms of shock (hypoperfusion) in the infant and child patient:
- *The SxS are the same for the most part. The EMT must understand that the pediatric patient will compensate longer and look like they are doing OK just to crash into decompensated shock and die very quickly. Always suspect the worse and treat for the worse.*
21. Discuss the field management of the infant and child trauma patient:
- *As with any trauma patient, the priority is rapid transport to an appropriate facility that has a pediatric trauma team.*
22. Define SIDS and list at least three factors which may indicate a higher risk for SIDS in an infant:
- *Sudden Infant Death Syndrome, also known as crib death, is officially defined as the sudden death of any infant that is unexpected by history, and in which an autopsy fails to demonstrate an adequate cause of death. Usually what occurs is a healthy baby is put in bed to sleep, and dies for no apparent reason. SIDS is not an event associated with newborns, as it occurs beyond the first two weeks of life. The majority of cases, about 91%, occur before 6 months of age with a peak at 10 – 14 weeks of age. The incidence is higher in late fall and winter, and 60% of the victims are male. Other risk factors include:*
    - *Low socioeconomic group*

- *Adolescent mother*
- *Crowded living conditions*
- *Drug use during pregnancy (an infant whose mother was on methadone during pregnancy is 25 times more likely to die of SIDS than other infants).*
- *Infants with Black mothers (3 times more likely to die of SIDS)*
- *Infants with Native American mothers (5 times more likely)*
- *Premature infants*
- *Multiple birth groupings (twins, triplets, etc)*
- *Sibling of SIDS victim (5 – 10 times more likely to be a SIDS victim)*
- *Near SIDS event (any unexplained period of apnea)*

23. Discuss the appropriate field management of the parents of SIDS infants:

- *Commonly, the only thing that can be done in a SIDS case (if death appears recent), is to proceed with treatment and transport of the infant. This is obviously for the parent's benefit rather than the infant's. If resuscitation measures are grossly inappropriate, then providing calm, comforting emotional support for the parents becomes the priority.*

24. List the pathophysiology, signs and symptoms, and field management for the following pediatric respiratory problems:

**Croup:** *Infectious croup is a common infection of the upper airway, usually caused by a virus, but sometimes by bacteria. Different sources quote different ages at which croup is the most common, but it is generally seen in children from age 6 months to 6 years, with the majority of cases occurring at less than three years of age. The infection causes swelling beneath the glottis, affecting the larynx, trachea, and bronchi. It causes airway narrowing, especially at the level of the cricoid ring. Inhalation produces a peculiar whooping stridor. The child is typically hoarse, and frequently coughs with a harsh seal-like bark. As the condition worsens, the EMT will see the classic signs of respiratory distress: nasal flaring, tracheal tugging, retraction of intercostal muscles, restlessness, tachycardia, and cyanosis.*

*Treatment includes:*

- *Giving humidified oxygen (if possible), using a mask held near to the patient's face. Cool night air alone may make this patient feel much better.*
- *Keeping the patient in a comfortable position, either sitting up or in parents' arms.*

- *Transporting the child to the hospital, keeping the patient calm and quiet as possible.*

***Epiglottitis:*** *Acute epiglottitis is an infectious swelling of the epiglottis caused by a bacterial infection. This swelling can obstruct the tracheal opening. It typically affects children between the ages of 2 and 6 years old, but can also affect older children and adults. It has a rapid onset, usually between 10 and 12 hours. The major signs and symptoms include a high fever, a very sore throat, dysphagia, and sometimes inspiratory stridor. The child is frequently sitting upright and leaning forward with his/her weight distributed on the hands, the mouth open, the tongue protruding, and the chin thrust forward. Other signs include restlessness, drooling, a flushed face, and signs of dehydration.*

*Treatment includes:*

- *Transport ASAP*
- *Be calm and gentle, trying to keep the child relaxed, allowing the patient to stay with the parent as much as possible.*
- *Do not attempt to examine the child's throat, make the patient lie down, attempt to suction the throat, or put oxygen at a high rate over the patient's face. If the child chokes or coughs from any of these irritations or from anxiety, a complete obstruction resulting from laryngospasm can occur.*
- *Use blow-by humidified oxygen if possible, having the parent hold the mask 6 – 8 inches from the child's face. If the child doesn't like this, then leave him/her be.*
- *If the patient develops cyanosis, and decreased level of response, attempt BVM ventilations. Studies have found that gentle ventilations with a BVM can be effective in most patients with epiglottitis.*

***Asthma:*** *Asthma is characterized by an increased sensitivity of the trachea, bronchi, and bronchioles to various stimuli, with widespread, reversible narrowing of the airways – which is referred to as bronchospasm. The airway is further compromised by the swelling of the mucus membranes lining the bronchioles, and the bronchi become plugged by the production of thick mucus. In children, dehydration can worsen this aspect of the condition by making the mucus dryer and stickier, which allows it to plug the airways more effectively. Asthma may be allergic, which is usually a reaction to dust, pollen, or other irritants in the atmosphere. Asthma may also be non-allergic, which is due to infections, emotions, inhaled fumes, aspirin, cold air, or some other irritant. STATUS ASTHMATICUS is a severe, prolonged asthmatic attack that does not respond to aggressive treatment, and is a true medical emergency.*

*SxS of an Asthma attack include:*

- *Pt in an orthopneic, or “tripod” position; that is, sitting upright, leaning forward, fighting to breathe.*
- *Spasmodic, unproductive cough.*
- *High pitched wheezing can be heard, on exhalation and inhalation, often with or without auscultation of the chest.*
- *Breath sounds may present as very diminished or even SILENT due to little air movement. Remember, SILENT IS NOT CLEAR.*
- *Hyperinflated chest, due to the trapping of air in the lungs, which is a result of increased obstruction on exhalation.*
- *Rapid and shallow respirations.*
- *Rapid pulse.*
- *Fatigue...at times to the point of apnea.*

*Treatment:*

- *Rapid transport ASAP.*
- *Consider ALS intercept.*
- *Aggressive and vigilant maintenance of airway and breathing, including high flow HUMIDIFIED oxygen if possible, and BVM if necessary. Be on the watch for respiratory arrest, and intervene as necessary.*
- *Keep the patient as calm as possible, and monitor vitals.*
- *If the patient has his or her own MDI contact medical control for authorization to administer it. The EMT may administer 2.5 mg of albuterol pre-diluted in 3.0 cc to the pediatric patient via a nebulizer. Also, if the patient has had his/her MDI or a nebulizer of albuterol and is not improving, the EMT may contact an MCEP for orders to utilize an Epi Pen Jr. (0.15 mg of epinephrine 1:1000) or a regular Epi-Pen (0.3 mg of epi 1:1000) if the child is over the age of about 10 years old, and administer it per the manufacturer’s guidelines.*

**Foreign body obstruction:** *The child or infant with foreign body aspiration usually is a previously healthy child with a history of choking on something who now exhibits signs of upper airway obstruction, i.e., stridor, tachypnea, and difficulty moving air.*

*The main considerations in the patient with upper airway obstruction are:*

- *Is the obstruction partial or complete?*
- *Is immediate intervention needed or can the patient wait?*
- *Is the obstruction caused by an infectious process or a foreign body?*
- *It is important to perform a primary survey and take a good history. Determine whether the obstruction is partial or complete, assess for LOC, air exchange, and ability to speak or cry. Take a brief history regarding recent upper respiratory infections, fever, and barking cough, or a history of choking after eating or playing with objects in the mouth. If there are sufficient reasons to suspect infectious causes to the obstruction, it is prudent to treat as epiglottitis, that is, do not manipulate or attempt to examine the airway. If the*

*child is alert, even with stridor and a rapid respiratory rate, keep your management to a minimum. Keep the child and parents as calm as possible, allowing the child to choose the position of comfort in the parent's arms or whatever he/she likes. Supply humidified oxygen without agitating the child and transport quickly. This holds true regardless of whether the EMT suspects croup, epiglottitis, or a foreign body obstruction, and the patient is remaining ALERT.*

*For treatment of the unresponsive, nonbreathing airway obstruction victim, refer to the AHA BLS guidelines.*

25. Describe the pathophysiology of an asthma attack:

- *Asthma is a chronic, episodic disease in which the large and small airways are hyper-responsive. 8-9% of the pediatric population has it, with males and females being equally affected. The disease is generally considered controllable but not curable. With the inflammation of the airway wall in response to an irritant, fluid (mucus) is secreted into the airway. This is followed by contraction of the smooth muscle around the bronchioles (bronchospasm), resulting in decreased airway diameter.*

26. Describe the signs and symptoms of an acute asthma attack, including signs particular to children, and the breath sounds typical of asthma:

*SxS: Signs of dyspnea, including use of accessory muscles and positioning; wheezing breath sounds (although absence of wheezing may indicate the patient is not moving enough air to wheeze), decreased level of responsiveness (critical patient), poor skin color (pale or cyanotic), and possible cough to clear secretions. Signs particular to children include nasal flaring, retraction of the soft tissue between the ribs, above and below the clavicles, and in the suprasternal notch during inspiratory efforts, ventilatory fatigue (chest wall muscle fatigue), and see-saw breathing (chest and abdomen moving paradoxically) in very young children.*

- *Breath Sounds: The combination of inflammation, increased fluid production and muscle constriction results in narrowed airways. As air moves through them, it makes a musical whistling or wheezing sound. Wheezing is often first noticed on expiration, but as the attack progresses, the wheezing can be heard in all fields during all phases of inspiration and expiration; sometimes it is even audible without a stethoscope. However, the most worrisome asthmatics are those that are in respiratory distress without audible wheezing; they are not moving enough air to wheeze.*

- *In pediatric patients the most reliable place to assess breath sounds is the mid-axillary area. An asthma patient in respiratory distress who is not wheezing is a critical patient needing immediate transport. LOC is another clue in children of the seriousness of the attack. A child who is lethargic is a child who is approaching ventilatory failure and respiratory arrest.*

27. List at least six common triggers of asthma that are easy to control.

- *Fireplace smoke*
- *Cigarette smoke*
- *Animals*
- *Dust*
- *Mold*
- *Perfumes*
- *Aerosol sprays*
- *Chemical fumes*

28. List the least five common triggers of asthma that are more difficult to control

- *Change of weather*
- *Pollen*
- *Grasses*
- *Cold, dry air*
- *Night time*
- *Emotions*
- *Viral infections*

## **CHILD ABUSE**

1. List 4 types of child abuse:

*The four types of child abuse are:*

- *Physical: Includes beatings, burns, shaking, throwing against the wall or ground, binding and gagging, poisoning, starving, etc.*

- *Sexual: Includes intercourse, fondling, sodomy, exhibitionism, child pornography, child prostitution, etc.*
- *Neglect: Includes inadequate nutrition, inadequate medical care, lack of education, abandonment or lack of daily care, etc.*
- *Emotional: Includes excessive intimidation and threats, repeated rejections, excessive negative criticism, continual physical punishment, or continual deprivations of needs and desires, etc.*

2. List at least 6 possible indications of child abuse:

- *Physical: Cigarette burns or scars; slap marks; welts, especially in shape of ropes, cords, belts, hangers; tie down wounds on wrists and or ankles; burns in shape of heaters, irons, or radiators; dipping burns; bite marks; bruises or wounds in various stages of healing; new or old fractures.*
- *Sexual: Injuries in the genital area; semen on body or clothing; child's sexual knowledge base is out of proportion for age of child.*
- *Neglect: Dirty, "unbathed for days" look; poor hygiene; poor nutrition; inadequately dressed for weather.*
- *Emotional: Extremely fearful or insecure child; may be very shy and hard to evaluate.*

*The EMT may also find a history of inconsistent or unlikely stories associated with child's injury. The EMT needs to be very observant of parent's and child's reactions, SxS of struggle or abuse, as well as a myriad of other aspects of the abusive home.*

3. Describe the appropriate procedure for an EMT who suspects child abuse:

*The EMT's responsibilities on a child abuse call include:*

- *Treating the child's injuries*
- *Transporting the child even if the child's injuries are minor, in order to allow a MD at a hospital to examine and document the child's injuries.*
- *Report any suspected child abuse to the MD, to the police, or child protection agency.*

4. Describe the appropriate treatment of a suspected child abuse victim:

- *Avoid confrontation with the parents. Establish a need for treatment and transport of the child (with parents following in separate vehicle). Don't expect to elicit the truth from the child. Instead, report your suspicions to the receiving MD and law enforcement.*

## ACETAMINOPHEN

1. Describe the following details about Acetaminophen:

*GENERIC NAME: Acetaminophen*

*TRADE NAME: Tylenol, Anacin Free, Bayer Select, Vanquish*

*TYPE OF DRUG: Antipyretic (anti-fever), Analgesic (anti-pain)*

*MECHANISM OF ACTION: Works on the heat regulating center in the hypothalamus (inner brain). Mechanism of pain relief is unknown.*

*PREHOSPITAL INDICATIONS: Fever in children. Minor pain in adults and children.*

*CONTRAINDICATIONS: A known sensitivity to the drug. Very rare.*

*PRECAUTIONS: Liver disease, kidney disease.*

*ADMINISTRATION: Pediatric dose: 10 mg/kg*

*Adult dose: 650-1000 mg*

*SIDE EFFECTS: Rare.*

*TOXIC EFFECTS: Extremely rare in the amounts given in the prehospital setting.*

*OVERDOSE THERAPY: Toxicity is rarely seen in dosages under 10 grams except occasionally in patients with liver disease. Discontinue use of drug. The EMT-B should not encounter an overdose situation through the administration of acetaminophen. When encountered as the primary call as an overdose, the patient is supported as needed. Prompt transport is initiated.*

2. Identify the approved situation in which the EMT-B may administer Acetaminophen in the prehospital setting:

- *The only approved indication for the administration of Acetaminophen for New Mexico EMT-Basics is in the pediatric patient, for the relief of fever, with an "extended" transport time (usually greater than 20 minutes).*

3. Explain the use of the following:

MDI ( Metered Dose Inhaler):

- *Use:* Used to deliver medication in normally prescribed or possible acute situations to conscious, cooperative patient. The MDI should be checked for quantity and expiration date. Expiration date refers not only to drug effectiveness but also to pressure in the canister. To administer, the MDI is shaken to mix the medication, the mouthpiece cap is removed, and the mouthpiece is inserted with the patient and the unit upright and the patient's head tilted back slightly. If possible the patient should exhale as much as possible before placing the inhaler in the mouth. The canister portion is pressed to release the medication while the patient inhales slowly (3-5 seconds). Patient should hold breath for 10 seconds to allow medication to reach lungs. Usual dose is two puffs.

Nebulizer:

- *Use:* Used to deliver medication in normally prescribed or possibly acute situations. Medication is placed in the bowl of the neb unit, and either oxygen or compressed air is hooked up through a supply tube and adjusted to nebulize the medication. Nebulized medication can be delivered through a mouthpiece, through a mask, or by blow-by, depending on the age and condition of the patient. Some ALS services are equipped to "bag" the medication in the nebulizer directly in to the patient using a BVM. **NOTE: MANY HOME NEBULIZER UNITS RUN ON COMPRESSED AIR, NOT OXYGEN!!!**

## **GERIATRIC PATIENTS**

1. List at least 6 attributes of the geriatric patient which make assessing and caring for the geriatric patient a unique challenge for the EMT:
  - *May suffer from multiple illnesses and conditions.*
  - *May be changes in the physiologic functions of the geriatric patient.*
  - *May take multiple medications – which can also affect physiological functions – Physiological changes may result in altered presentation of signs and symptoms.*
  - *Many illnesses may simply present as confusion in the geriatric patient.*
  - *Psychosocial factors (e.g. depression, poverty) can increase the geriatric patient's susceptibility to illness.*
2. For each of the following systems, describe some general physiological changes that occur with aging:

**Cardiovascular system:** Cardiac output and electrical conduction decrease – which may lead to bradycardia. Arteriosclerosis and hypertension are often present. “Silent MI’s” are more common in the elderly patient (AMI that presents without pain).

**Respiratory system:** Lung elasticity decreases and the chest wall muscles “stiffen” – leading to a decreased capacity to exhale and a greater amount of residual air left in the lungs. The proportion of air involved in active gas exchange decreases – leading to a decreased respiratory drive. Cough and gag reflexes also diminish – leading to an increased possibility of aspiration.

**Renal system:** Decline in weight of kidneys reflects a loss in function and smaller effective filtering surface. Renal blood flow may decrease by up to 50%. Kidneys are slower to react to changes in fluid/electrolyte balance. Imbalances in sodium and potassium may not be detected early enough resulting in life threatening conditions such as dehydration or hyperkalemia.

**Digestive system:** Digestion is slower; food stays in stomach longer – which increases possibility of aspiration in the presence of vomiting, Senses of taste and smell are diminished – leading to a decrease in appetite and a tendency toward dehydration and malnutrition.

**Musculoskeletal system:** Bone and muscle mass decrease with age. Osteoporosis as a result of inefficient calcium absorption leads to porous, brittle bones that are easily fractured.

**Nervous system:** Hearing and vision may be impaired. Additionally, some patients may suffer from senile dementia or Alzheimer’s syndrome.

**Thermoregulatory disorders** may exist – which can predispose the elderly patient to hyperthermia or hypothermia, as well as enabling an illness to present without the expected fever.

3. List at least two common causes of trauma in the elderly:

-Falls                      The #1 cause of trauma in the elderly. May result from accidental causes (tripping), or an intrinsic cause such as a dizzy spell or syncopal episode. A thorough history should reveal this important information.

-MVC’s                      The #2 cause of trauma in the elderly.

4. Discuss each of the following with emphasis on the special considerations that must be taken with the elderly:

*Taking a medical history: Often need to corroborate Hx with family member. Elderly patients may have a tendency not to report significant SxS due to apprehension of hospital stay, loss of independence, considering it a normal part of aging, modesty, etc. Because of the possibility of multiple underlying conditions, it is important to find out what exactly prompted the call for EMS. What is different today? What is the chief complaint?*

*Spinal immobilization: Use plenty of padding. Patients may actually be further injured by immobilization without sufficient padding. (i.e. formation of decubitus ulcers)*

*Communication with an elderly patient: Always assume that you are dealing with an elderly person whose mental status (and hearing!) are intact until you have evidence that shows otherwise. Try to conduct your assessment/Hx taking in a quiet, well-lit environment. Match your vocal pitch and speed to the patient's level of comprehension and hearing. Ask one question at a time, and wait for the patient's response – even if it is slow in coming. Be aware that depression can also effect a patient's comprehension and communication skills. Establish rapport early by using the patient's proper name (Mrs. Smith as opposed to Sally or "Honey") until you are given permission to move to a first name basis. A warm, reassuring manner will often result in improved communications between the EMT and patient. Be patient and listen!*

## **SPECIALLY ABLED PATIENTS AND SPECIAL SITUATIONS**

1. For each of the following "crisis" patients, discuss their appropriate field management:

*Suicidal patients: Attempt to establish rapport; this may include discussing the patient's suicidal ideation with them. Treatment priority must be the patient's physical injuries, but emotional/psychological support can accompany this. Be aware of scene safety issues: Is the patient likely to put others in jeopardy as well as themselves?*

*Depressed/withdrawn patients: Treat patient's physical injury/illness. A calm, comforting presence will likely help in establishing a rapport and dialogue with the patient. Continuing dialogue even if patient does not respond is better than allowing communication to lapse on part of patient and rescuer.*

*“Surviving” patients/victims: Priority is to assess and treat these patient’s physical injuries/illnesses. However, emotional support is often necessary for these distraught, “emotionally traumatized” victims. Lying about the condition of their fellow victims will not help these patients.*

*Rape victims: Explain the need for a physical assessment if one exists. Be sensitive to patient’s emotional state. If patient is more comfortable with same-sex EMT, try to accommodate if possible. Explain necessity of preserving evidence (No showering, going to bathroom, changing clothes) until examined at hospital, provide emotional support.*

*Parents of SIDS infants: Commonly, the only thing that can be done in a SIDS case (if death appears recent), is to proceed with treatment and transport of infant. This is obviously for parents’ benefit rather than infant’s. If resuscitation measures are grossly inappropriate, then providing calm, comforting emotional support for parents becomes the priority.*

*Child Abuse Victims: Avoid confrontation with parents. Establish need for treatment and transport of child (with parents following in separate vehicle). Don’t expect to elicit the truth from the child. Instead, report suspicions to receiving MD and law enforcement.*

2. Describe the appropriate prehospital management of the following types of “specially-abled patients”. Additionally, discuss any special concerns when communicating with these patients:

*Blind patients: Allow patient to take arm when walking. Verbal communications is paramount! Explain/describe every physical procedure you are going to perform before you perform it.*

*Deaf patients: Speak slowly, clearly and distinctly. Allow patient to see your mouth when talking and don’t exaggerate lip movements. Communication in writing may be necessary. A sign language interpreter is ideal, but remember not all deaf patients read lips or even use sign language.*

*Non-English speaking patients: Determine if any English is spoken, use visual clues/gestures. Get a translator, or minimally, alert the ER so they can arrange for a translator.*

*Physically handicapped patients: Transport any aids with patient (i.e. crutches/wheelchair). Ask patient how you can best assist them. Remember that*

*assessment of a physically handicapped patient must be extremely thorough as often the patient will be unable to identify or feel injuries.*

Mentally handicapped patients: *Match your vocabulary and communication level to the patient's understanding level. This may involve speaking slowly and repeating often. Try to minimize fear.*

## **THE PREGNANT TRAUMA PATIENT**

Because pregnancy causes anatomical and physiological changes in a woman's body, it is important that the EMT be familiar with the patterns of injuries that may be seen with a pregnant trauma patient. In order to identify these patterns, the EMT must first recognize those changes that take place during pregnancy.

**Heart Rate:** During the course of pregnancy, heart rate *increases* by the third trimester to 15-20 beats per minute above normal.

**Blood Pressure:** During the second trimester, the systolic and diastolic pressures may *drop* 5-15 mmHg. By the third trimester, blood pressure should be near normal. Even without trauma, a pregnant woman may suffer from temporary low blood pressure when lying supine. This is known as **SUPINE HYPOTENSIVE SYNDROME**, and is caused by compression of the inferior vena cava. This condition can usually be relieved by placing a woman on her left side. If the patient is immobilized on a long spineboard, the EMT may place a wedge under the right side of the board, tilting it 10-15 degrees toward the left. Another method is manual displacement of the uterus: The EMT firmly pushes the enlarged abdomen to the left.

**Respirations:** Respiratory rate is not usually affected by pregnancy. However, the diaphragm is elevated approximately 4cm which may cause dyspnea when the patient is supine.

**Other Considerations:** Pregnant women have *increased cardiac output*. By the 10<sup>th</sup> week of pregnancy, a woman's cardiac output is increased by 1.0 to 1.5 liters per minute. In addition, there is an increase in blood volume of almost 50% by the third trimester. As a result, **about 30 to 35% of the circulating blood volume can be lost before signs and symptoms of hypovolemia become evident.**

While other abdominal organs remain relatively unchanged during pregnancy, the uterus becomes markedly enlarged. This increased size, as well as the increase in its blood flow (500-700cc per minute by 3<sup>rd</sup> trimester) make the uterus more susceptible to both blunt and penetrating trauma.

Peristalsis is slowed during pregnancy, so food may remain in the stomach for hours after a meal. This may put the pregnant patient at higher risk for vomiting followed by aspiration.

**Management:** The key to managing the pregnant trauma patient is to keep in mind several important concepts:

1. Changes that occur during pregnancy, such as increased blood volume, may mask shock. **MAINTAIN A HIGH INDEX OF SUSPICION FOR SHOCK IN THE PREGNANT TRAUMA PATIENT.**
2. Even when the trauma seems minor, the pregnant trauma patient should be transported to the hospital. *Any abdominal trauma to a pregnant trauma patient MUST be evaluated by a physician.*
3. **REMEMBER SUPINE HYPOTENSIVE SYNDROME.** Blood pressure may be position dependent.
4. The key to the survival of the fetus is rapid treatment and transport of the mother. Remember: **YOU HAVE TWO PATIENTS!**

## **NEONATAL RESUSCITATION**

This handout is designed to supplement the information you have received on cardiopulmonary resuscitation of adults, children, and infants. The algorithm for resuscitation of newborns differs significantly from the AHA standards for infants, and while there is no skill sheet or skill testing of neonate resuscitation, written exams in the EMT-B curriculum may reflect the following information:

### **NORMAL NEONATE DELIVERY:**

1. As the head delivers: Look for meconium, suction the mouth first, then the nose.
2. As the body delivers: Dry the baby and keep warm. Position laterally for drainage and continue to suction the mouth and nose if needed.
3. Continue to assess, no intervention is necessary if the heart rate is above 100 and the respiratory rate is above 30.
4. Do an APGAR rating at 1 and 5 minutes. Clamp and cut the cord. Frequently reassess and make sure that the baby stays warm.

### **NEONATE DELIVERY WITH MECONIUM:**

1. As the head delivers: Suctioning of mouth and nose is imperative!
2. As the body delivers: Keep baby warm. Position supine and continue to suction until the airway is clear. Advanced airway management may be necessary. Contact ALS if possible.
3. Continue to reassess baby's skin color, respiratory rate, and heart rate.

## NEONATE IN RESPIRATORY AND/OR CARDIAC DISTRESS:

1. If respirations are shallow, slow (less than 30), or absent **OR** if baby's heart rate is less than 100 – then ventilate with a BVM and 100% oxygen at a rate of 40-60 per minute.
2. A positive response should be seen within 15-30 seconds after intervention. If baby's respiratory rate improves and/or the heart rate increases to above 100 – then continue to monitor during transport and provide tactile stimulation and blow-by oxygen.
3. If after 30 seconds the heart rate stays above 100, but spontaneous respirations above 30 are **not** present – then continue to bag with 100% oxygen.
4. If the heart rate and respiratory rate do **not** improve after 15-30 seconds of bagging, and if the heart rate is less than 80 – then continue to bag with 100% oxygen and begin compressions at a rate of 120. Contact ALS and/or transport.
5. If after delivering ventilations and compressions the heart rate climbs above 100 – you may discontinue compressions but continue to ventilate until the spontaneous respiratory rate is sustained above 30.

If the baby delivers with a respiratory rate of less than 30 and a heart rate of less than 60, then begin CPR immediately. However, remember that compressions may be started on a neonate with a heart rate of 80 or less **after the baby shows no response to 15-30 seconds of bagging with 100% oxygen.**

Here is a simple table that may help you remember the above algorithms:

If HR less than 100 – BVM with O<sub>2</sub>

If RR less than 30 – BVM with O<sub>2</sub>

If HR less than 60 – CPR

If HR less than 80 – CPR (if no improvement after BVM and O<sub>2</sub>)

Remember that your best chance for improving a neonate's respiratory rate and heart rate is to recognize that they are in distress **early** and then provide aggressive ventilation with 100% oxygen.

## **GERIATRIC PATIENTS**

This material is intended to supplement the reading in your textbook concerning geriatric patients.

As an EMT, you will find that there are unique challenges involved in assessing and caring for the elderly. In part, the challenge arises from the following attributes of the aged:

- The geriatric patient may suffer from multiple illnesses and conditions.
- There may be changes in the physiologic functions of the geriatric patient.
- The geriatric patient may take multiple medications – which can also affect physiological functions.
- Signs and symptoms may be altered in the geriatric patient.
- Many illnesses may simply present as confusion in the elderly.
- Psychosocial factors (ie: depression, poverty) can increase susceptibility to illness in the geriatric patient.

As mentioned above, physiologic functions may change as part of the aging process. Listed below are some changes that may occur in various body systems that may be of concern to the EMT who is attempting to assess and care for an elderly patient.

### ***PHYSIOLOGIC TRENDS IN THE ELDERLY:***

**Cardiovascular system:** Cardiac output decreases as does electrical conduction – which may lead to bradycardia. The elderly patient may suffer a “silent MI” which is an AMI that presents without pain. Arteriosclerosis and hypertension are often present. Like any other muscle the rule of “use it or lose it” holds true. Many elderly patients get no cardiovascular exercise at all.

**Respiratory system:** Lung elasticity decreases and the chest wall muscles stiffen – leading to a decreased capacity to exhale and a greater amount of residual air left in the lungs. The proportion of air involved in active gas exchange decreases – leading to a decreased respiratory drive. Cough and gag reflexes also diminish with age – leading to an increased possibility of aspiration.

**Digestive system:** Digestion is slower, so food stays in the stomach longer – which may pose a problem if vomiting is a concern. The senses of taste and smell are also diminished – which can cause a decrease in appetite and a tendency toward malnutrition and dehydration.

**Musculoskeletal system:** Bone and muscle mass decrease with age. Osteoporosis is often a problem.

**Nervous system:** Hearing and vision may be impaired. Additionally, some patients may suffer from senile dementia or Alzheimer’s. Thermoregulatory disorders may also exist – which can predispose an elderly patient to heat stroke or hypothermia, as well as enabling an illness to present without the expected fever.

#### **OTHER CONSIDERATIONS IN ASSESSMENT AND TREATMENT:**

Trauma in the elderly is a very real concern. The number one cause of traumatic injury in the geriatric patient is due to falls. The number two cause is trauma sustained in MVC’s. Because of osteoporosis, fractures are common – even with a seemingly insignificant mechanism. Consideration should be given to “bumping” geriatric patients up a category as is done with pregnant and pediatric patients when they are injured.

When immobilizing the elderly patient on a long spineboard, padding is **critical!** Imagine trying to backboard a frail, elderly lady with kyphosis (hunchback). You can see how important it would be to be generous with the padding.

Obtaining a thorough history is also important. There may be a tendency in an elderly patient to **not** report significant signs or symptoms – simply because they assume it is a “normal” part of their aging process.

When questioning an elderly patient it is usually easier to establish rapport if you begin by addressing the patient as Mrs. or Mr. This may seem like a minor concern – and it is in the face of serious injury or illness – but good communication skills are an important

part of overall patient care, and it is usually easier to communicate with a patient if you haven't started out by offending them by being too casual.