

## Pre-Lecture

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### I. You Are the EMT

In this chapter, students begin learning about the specific medical duties of the EMT-B. It is important to emphasize safety and responsibility.

#### Purpose

To introduce students to the importance of obtaining and assessing baseline vital signs and initial history.

#### Instructor Directions

1. Direct students to read the “You Are the EMT” scenario found at the beginning of Chapter 5.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question. Facilitate a class dialogue centered on the discussion questions.
3. You may also assign this as an individual activity and ask students to turn in their comments on a separate piece of paper.

## Lecture

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### I. Baseline Vital Signs and SAMPLE History

A. Thorough, properly sequenced rapid assessment is essential to identifying a patient's needs and providing proper emergency care.

B. Assessment is the most complex skill that must be learned in the EMT-B course.

C. To assess a patient, the EMT-B needs to:

1. Gather and record key information.
2. Take and evaluate the patient's vital signs, injuries, conditions, and symptoms leading to the call.
3. Learn the history of what happened before and since the accident or medical problem occurred.
4. Learn the patient's past medical history and overall health.

## II. Gathering Key Patient Information

A. During assessment, the EMT-B uses eyes, ears, nose, hands, and a few basic medical instruments.

1. Obtain the patient's full name and home address.
2. Note the patient's age, gender, and race.
3. Address the patient as "Mr.," "Ms.," "Miss", or "Mrs.," followed by the patient's last name, or you can simply say "Sir" or "Ma'am."
4. When addressing children use their first name.

B. If an unaccompanied patient is disoriented or unconscious:

1. Look in the patient's wallet or purse for a driver's license or other form of identification.
2. Check for any hospital identification or medical alert card.
3. Be sure another EMT or law enforcement officer is present when looking for patient identification.

C. Age and gender are important considerations.

## III. Chief Complaints/Mechanism of Injury

A. Chief complaints are the major signs, symptoms, or events that caused the call or complaint.

B. Symptoms are conditions that the patient feels and tells you about, such as dizziness or particular pain.

C. Signs can be seen, heard, felt, smelled, or measured, such as wounds, external bleeding, deformities, respirations, and pulse.

D. Report how and/or when the signs and symptoms began.

## IV. Baseline Vital Signs

Table 5-1: Normal Ranges for Respirations

Table 5-2: Characteristics of Respirations

Table 5-3: Normal Ranges for Pulse Rate

Table 5-4: Normal Ranges for Blood Pressure

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Table 5-5: Minimum Acceptable Systolic Blood Pressure

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- A. Initial assessment is a rapid evaluation of the patient's general condition to identify any potentially life-threatening injuries or conditions.
- B. Repeated vital signs will be compared to the baseline.
- C. Vital signs are key indicators used to evaluate and determine the patient's overall condition.
1. Because key indicators include quantitative (numeric) measurement, vital signs always include respirations, pulse, and blood pressure.
  2. Other key indicators
    - a. Skin temperature and condition in adults
    - b. Capillary refill time in children
    - c. Pupils
    - d. Level of consciousness
- D. The first vital sign is respirations.
1. A patient who is breathing on his or her own is said to have spontaneous respirations.
  2. Each complete breath includes two phases.
    - a. Inspiration: The chest rises upward and outward and oxygenated air is drawn into the lungs.
    - b. Expiration: The chest falls to its original position and air with an increased carbon dioxide level is blown out of the lungs.
    - c. The active inhalation phase lasts one third the amount of time of the passive exhalation phase.
  3. Breathing is normally a spontaneous, automatic process that occurs without conscious thought, visible effort, marked sounds, or pain.
  4. Assess breathing by observing the patient's chest rise and fall, feeling the air being expelled, and listening to breath sounds with a stethoscope.
  5. Chest rise and breath sounds should be equal on both sides of the chest.
  6. When assessing respirations, determine the rate, quality, and depth.
    - a. Rate
      1. When timing respirations, count the number of breaths in a 30-second period and multiply by two.
      2. Check respirations in a conscious, alert patient without making the patient aware of what is being evaluated.
      3. Normal ranges for respirations
        - a. Adults: 12 to 20 breaths/min
        - b. Children: 15 to 30 breaths/min
        - c. Infants: 25 to 50 breaths/min
    - b. Quality: determine the quality or character of the patient's breathing while assessing the breathing rate.
      1. Rhythm
        - a. If respirations vary or change frequently, they are considered irregular.
        - b. Note when respirations are regular or irregular.
      2. Effort
        - a. Normally, breathing is an effortless process.

- b. Speech is a good indicator of whether a conscious patient is having difficulty breathing. For example, a patient who can only speak one word at a time or must stop every few words to “catch” a breath is having significant difficulty breathing.
  - c. A patient who is in the sniffing position (sitting unusually upright with the head and chin thrust slightly forward) is making a significant, marked, conscious effort to breathe.
  - d. Labored breathing is described as an increased effort to breathe.
  - e. Initially, labored breathing is characterized by the patient’s position, concentration on breathing, and increased effort and depth of each breath.
  - f. As breathing becomes more labored, accessory muscles in the face and neck are used.
  - g. In labored breathing, the patient may make “grunting” sounds.
  - h. Nasal flaring and supraclavicular and intercostal retractions are commonly associated with labored breathing in infants and small children.
  - i. The patient may be gasping.
  - j. Infants and small children may become exhausted and no longer have the strength to maintain the necessary energy to breathe.
  - k. In infants and small children, cardiac arrest is generally caused by respiratory arrest.
3. Noisy respirations
- a. Normal breathing is silent.
  - b. Through a stethoscope, normal breath sounds include the sound of air movement through the bronchi accompanied by a soft, low-pitched, murmur-like sound.
  - c. Other sounds indicate that a significant respiratory problem exists.
  - d. When the airway is partially obstructed, there may be stridor (a high-pitched crowing sound).
  - e. Bubbling or gurgling indicates that the patient probably has fluid in the airway.
  - f. A patient with a fully obstructed airway will not be able to pass any air and will no longer be able to cough or talk.
  - g. Other sounds that may be heard include wheezes, snoring, gurgling, or bubbling.
  - h. Thick yellowish or greenish sputum may indicate advanced respiratory infection.
  - i. A patient with a chest injury may cough up blood or frothy whitish or pinkish foam-like sputum.
  - j. A patient with congestive heart failure may also cough up frothy sputum.
  - k. The presence of either substance indicates an urgent and potentially critical cardiovascular and respiratory problem.
4. Depth
- a. The amount of air that the patient is exchanging depends on both the rate of respirations and the tidal volume.
  - b. The depth of the breath determines whether the tidal volume is normal, less than normal, or greater than normal.
  - c. Respirations are shallow when the movement of the chest wall (chest excursion) and the exhaled air is less than normal.
  - d. Deep respirations occur when chest excursion and exhaled air are significantly greater than normal.
  - e. Note shallow or deep breaths with the respiratory rate.
  - f. Chest rise in a small child is less marked than in an adult.

## E. The second vital sign is the pulse.

1. Pulse is the pressure wave that occurs as each heartbeat causes a surge in the blood circulating through the arteries.
2. The pulse is most easily felt at a pulse point where a major artery lies near the surface and can be gently pressed against a bone or solid organ.
  - a. Palpate (feel) the pulse by holding the first two fingers together and placing the tips over a pulse point, pressing gently against the artery until intermittent pulsations can be felt.
  - b. Do not allow the thumb to touch the patient.
3. In responsive patients who are older than 1 year, the pulse is most commonly palpated at the wrist where the radial pulse can be easily located and felt.

4. In unresponsive patients older than 1 year, palpate the carotid pulse in the neck.
  - a. Place the tips of the index and middle fingers along the carotid artery.
  - b. Use only gentle pressure.
  - c. Never press on both sides of the neck at the same time.
5. Taking the pulse of an infant may be difficult.
  - a. Pulses are difficult to locate.
  - b. Palpate the brachial pulse (located at the underside of the upper arm) in children younger than 1 year.
  - c. Elevate the infant's arm over his or her head and firmly press your fingertips along the brachial artery.
6. Measure rate, strength, and regularity of the pulse.
  - a. Rate
    1. Count the number of pulses felt in a 30-second period and multiply by two.
    2. A pulse that is weak and difficult to palpate, irregular, or extremely slow should be palpated and counted for a full minute.
    3. Pulse rates can vary significantly from person to person. In athletes or in individuals taking heart medications such as beta-blockers, the pulse rate may be considerably lower than average.
    4. Tachycardia is a pulse rate greater than 100 beats/min.
    5. Bradycardia is a pulse rate less than 60 beats/min.
  - b. Strength
    1. A stronger-than-normal pulse is described as bounding.
    2. A pulse that is weak and difficult to feel is described as weak or thready.
  - c. Regularity
    1. The pulse should occur at a constant, regular rhythm.
    2. Note and report an irregular rhythm if the heart periodically has a premature or late beat or a pulse beat is missed.
    3. Normal ranges for pulse rate
      - a. Adults—60 to 100 beats/min
      - b. Children—80 to 100 beats/min
      - c. Toddlers—100 to 120 beats/min
      - d. Newborns—120 to 140 beats/min

## F. The skin can be assessed as part of vital signs.

1. Easily observed indicator of the peripheral circulation and perfusion, blood oxygen levels, and body temperature
2. Color
  - a. Many blood vessels lie near the surface of the skin.
  - b. Pigmentation in individuals will not hide changes in the skin's underlying color.
  - c. In lightly pigmented individuals, skin normally has a pink color.
  - d. In patients with deeply pigmented skin, changes in skin color may only be apparent in certain areas, such as the fingernail beds, mucous membranes in the mouth, the lips, the underside of the arm and hand and the conjunctiva of the eye.
  - e. Poor peripheral circulation will cause the skin to appear pale, white, ashen, gray, or waxy and translucent like a white candle. These skin colors can also appear in abnormally cold or frozen skin.
  - f. When the blood is not properly saturated with oxygen, it changes to a bluish color. Skin over the blood vessels appears blue or gray, a condition called cyanosis.
  - g. Red skin will result from carbon monoxide poisoning, significant fever, heatstroke, sunburn, mild thermal burns, or other conditions in which the body is unable to properly dissipate heat.
  - h. Color changes may also result from chronic illness.
  - i. Liver disease dysfunction may cause jaundice, resulting in a yellow cast to the skin.

### 3. Temperature

- a. Normally, the skin is warm to the touch.
- b. The skin feels hot with significant fever, sunburn, or hyperthermia.
- c. The skin feels cool in early shock, profuse sweating, heat exhaustion, and profound (decompensated) hypothermia and/or frostbite.
- d. Feel the patient's forehead with the back of your ungloved hand to determine marked fever.

### 4. Moisture

- a. The skin is normally dry.
- b. Wet, moist, or excessively dry and hot skin is considered abnormal.
- c. In descriptions of the skin, list color, temperature, and moisture condition in that order.

## G. Capillary refill can be assessed as part of vital signs.

1. Evaluates the ability of the circulatory system to restore blood to the capillary system (perfusion)
2. Evaluated at the nail bed in a finger
  - a. Place your thumb on the patient's fingernail and gently compress.
  - b. Pressure forces blood from the capillaries.
  - c. As the capillaries refill, the nail bed returns to its normal deep pink color.
  - d. Capillary refill should be both prompt and pink.
  - e. Color in the nail bed should be restored within 2 seconds, about the time it takes to say "capillary refill."
3. Capillary refill is considered an invalid test in a cold environment and in an elderly patient. In both situations, delayed capillary refill is normal.
4. Assess capillary refill in infants and children younger than 6 years by pressing on the skin or nail bed.

## H. Blood pressure is also considered a vital sign.

1. Pressure of circulating blood against the walls of the arteries
2. A drop in blood pressure may indicate:
  - a. Loss of blood
  - b. Loss of vascular tone
  - c. Cardiac pumping problem
3. When any of the preceding conditions occur, there is a small drop in circulation. The body can attempt to maintain normal blood pressure by:
  - a. Shunting blood away from the skin
  - b. Increasing the heart pulse rate
  - c. Constricting the arteries
4. When shock (circulatory deficit) progresses and the body's defense mechanisms can no longer keep up with the problem, the blood pressure will fall.
5. A drop in blood pressure is a late sign of shock and indicates that the critical decompensated phase has begun.
6. A patient with a markedly lowered blood pressure has inadequate pressure to maintain proper perfusion.
7. When blood pressure becomes elevated above normal range, the body's defenses act to reduce it.
8. Blood pressure may also rise to very high levels as a result of head injury.
9. Blood pressure should be measured in all patients older than 3 years.
10. Measuring blood pressure
  - a. Diastolic pressure is the residual pressure during the relaxing phase (diastole) of the heart's cycle, when the left ventricle is at rest.
  - b. Systolic pressure is the increased pressure caused along the artery with each contraction (systole) of the ventricle.
  - c. Systolic pressure is the maximum pressure to which the arteries are subjected; diastolic pressure is the minimum amount of pressure that is always present in the arteries.
  - d. Blood pressure is measured in millimeters of mercury (mm Hg).
  - e. It is reported as a fraction with the systolic pressure over diastolic pressure.

## 11. Obtaining the blood pressure

- a. Use a sphygmomanometer (blood pressure cuff) to apply pressure against the artery.
  1. A sphygmomanometer contains the following:
    - a. Wide outer cuff to fasten around the arm or leg
    - b. A bladder sewn into the cuff
    - c. A ball-pump and a turn-valve that can be closed
  - d. A pressure gauge
    2. Carry at least three sizes of blood pressure cuffs: extra-large, normal, pediatric.
    3. Select the appropriate size cuff.
      - a. If it is too small, readings will be falsely high.
      - b. If it is too large, readings may be falsely low.
- b. Auscultation is the method of listening to sounds within organs with a stethoscope.
  1. Extend the patient's arm and place the cuff with the distal end approximately 1" above the elbow. Secure the cuff.
  2. Palpate the brachial artery and place the diaphragm of the stethoscope over the artery.
  3. Close the valve tightly and pump the ball-pump until pulse sounds are no longer heard. Continue pumping to increase the cuff's pressure by an additional 20 mm Hg. Systolic and diastolic pressures should be noted as air is slowly released from the cuff.
  4. As soon as pulse sounds stop, open the valve and release the air quickly.
- c. Palpation is examination by touch.
  1. If environment is noisy, use palpation to determine systolic pressure.
  2. Secure cuff with the distal end approximately 1" above the elbow.
  3. Place fingertips on the radial artery and feel the radial pulse.
  4. Inflate cuff to 200 mm Hg.
  5. Release air until pulse is felt.
  6. This method only obtains systolic pressure.
  7. Document the reading as systolic/P.
- d. Normal blood pressure
  1. Normal ranges for blood pressure
    - a. Adults: 100 to 140 mm Hg (systolic)/60 to 90 mm Hg (diastolic)
    - b. Children (1 to 8 years): 80 to 110 mm Hg (systolic)
    - c. Infants (newborn to age 1 year): 60 mm Hg (systolic)
  2. Varies with age and gender
- e. Hypotension: Blood pressure significantly lower than the normal range. Critical hypotension: A patient with a critically low blood pressure is no longer able to compensate sufficiently to maintain adequate perfusion.
- f. Hypertension: Blood pressure significantly higher than the normal range
- g. Assessing blood pressure in an injured limb
  1. Blood pressure, pulse, skin temperature, and capillary refill should not be assessed in an injured limb.
  2. Obtain vital signs from uninjured side.
  3. May wish to compare vital signs on uninjured side to those found on the injured side.
  4. Useful in evaluating whether the injury may have compromised the circulation

## I. Level of consciousness (LOC) should also be assessed as a vital sign.

1. AVPU scale is a rapid method of assessing LOC.
2. A 5 Alert and awake
  - a. Signifies orientation to person, place, time, event
  - b. Reported as patient oriented 3 (1, 2, 3, or 4), noting areas not oriented to
3. V 5 Response to verbal stimulus
  - a. Response to normal voice stimuli
  - b. Response to loud voice stimuli
  - c. Response to finger tap, if patient is hearing impaired
4. P 5 Responsive to pain
  - a. Use if patient does not respond to verbal stimuli.
  - b. Gently but firmly pinch patient's skin.
  - c. Note if patient moans or withdraws from the stimulus.
5. U 5 Unresponsive
  - a. If the patient does not respond to painful stimulus on one side, try the other side.
  - b. A patient who remains flaccid without moving or making a sound is unresponsive.
6. Glasgow Coma Scale
  - a. Assessment based on numeric scoring of a patient's response based on eye opening, motor response, and verbal response
  - b. Eye opening
    1. Spontaneous 5 4
    2. To voice 5 3
    3. To pain 5 2
    4. None 5 1
  - c. Verbal response
    1. Oriented 5 5
    2. Confused 5 4
    3. Inappropriate words 5 3
    4. Incomprehensible words 5 2
    5. None 5 1
  - d. Motor response
    1. Obeys command 5 6
    2. Localizes pain 5 5
    3. Withdraws (pain) 5 4
    4. Flexion (pain) 5 3
    5. Extension (pain) 5 2
    6. None 5 1
  - e. Report total score (3 to 15) and score for each category.

## J. Pupils

1. Key vital signs that can reflect the status of the brain's perfusion, oxygenation, and condition
2. Adjusts in size depending on the available light
3. Dilate (become larger) when less light is available
4. Constrict (become smaller) when light levels are high
5. Constrict equally when a brighter light is in one eye
6. Normally appear equal in size

7. Depressed brain function should be assumed if the pupils react in any of the following ways:
  - a. Fixed with no reaction to light
  - b. Dilate with light and constrict when light is removed
  - c. React sluggishly
  - d. Unequal in size
  - e. Unequal with light or when light is removed
8. Constrict so small as to be described as pinpoint in the presence of opiates
9. A blown pupil occurs when the pupil becomes fully dilated and fixed.
10. May dilate unequally or not react appropriately if medication is placed into one or both eyes or if there is an injury or condition of the eye.
11. Use the guide PEARRL when assessing the pupils:
  - a. P 5 Pupils
  - b. E 5 Equal
  - c. A 5 And
  - d. R 5 Round
  - e. R 5 Regular in size
  - f. L 5 react to Light

## V. Reassessment of the Vital Signs

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Time: 5 Minutes

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Slide: 31

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Lecture/Discussion

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- A. The first set of vital signs establishes an important initial measurement of the patient's condition and serves as a key baseline.
- B. Monitor vital signs for any changes from initial findings throughout care.
- C. Reassess and record vital signs at least every 15 minutes in a stable patient and at least every 5 minutes in an unstable patient.
- D. Reassess and record vital signs after all medical interventions.

## VI. Obtaining a SAMPLE History

- A. Signs and Symptoms—What signs and symptoms occurred at onset?
- B. Allergies—Is the patient allergic to medications, food, or other substances?
- C. Medication—What medications is the patient taking?
- D. Pertinent past history—Does the patient have any medical history?
- E. Last oral intake—When did the patient last eat or drink?
- F. Events leading to the injury or illness—What events lead to this incident?

## VII. Skill Drills

Remember to maintain an adequate instructor-to-student ratio. A ratio of 1 instructor to 6 students is recommended by the DOT National Standard Curriculum. Also remember that each student is to be evaluated on each skill prior to the completion of the course.

### Purpose

To allow students opportunity to observe, practice, and perform patient care skills associated with blood pressure auscultation.

### Materials Needed

1. Exam gloves (minimum 1 set per 6 students)
2. Stethoscopes (minimum 1 per 6 students)
3. Blood pressure cuffs, assorted sizes (adult, infant, child, thigh) (minimum 1 per 6 students)

### Instructor Directions

1. Demonstrate each skill, emphasizing any critical points or procedures.
2. Based on the specific skill, assign each student to a partner or team. Provide each partner/team with equipment or materials as may be needed.
3. Direct students to practice each skill using team members as patients and observers. Closely monitor the practice sessions and provide constructive comments and redirecting.
4. As individual students achieve success, conduct skill proficiency exams. Students failing the exam should be given redirection and an opportunity to practice before being retested.

### Skill

- A. Obtaining a Blood Pressure by Auscultation or Palpation (Skill Drill 5-1)