Component I: Core

Module F: Medical Office Emergencies and CPR

Topic 1: Cardiopulmonary Resuscitation

Statement of Purpose
To prepare the learner with basic knowledge and skills to correctly evaluate cardiac arrest and/or obstructed airway, and to safely perform CPR intervention.

Student Learning Outcomes
Upon completion of this topic, the learner will be able to:

1. Spell and define key terms.
2. List and define the five main components of the circulatory system.
3. Describe the circulation of blood through the four chambers of the heart and the pulmonary system.
4. Describe major causes of cardiac arrest.
5. Discuss management of a patient with chest pain.
6. Explain the adult chain of survival.
7. Explain the pediatric chain of survival.
8. Understand the 2010 American Heart Association for cardiopulmonary resuscitation (CPR) and emergency cardiac care (ECC) science update.
9. Understand the basics of BLS/CPR for Adults.
10. Overview of initial BLS steps.
11. 2-rescuer adult BLS/team sequence.
12. Demonstrate the use of an AED for adults and children 8 years or older.
13. Demonstrate the BLS/CPR Sequence for children 1 year to puberty.
14. Demonstrate BLS/CPR sequence for infants.
15. Demonstrate BLS/CPR with advanced airway.
16. Demonstrate the relief of choking in victims 1year of age and older.
17. Demonstrate the relief of choking in infants.

Terminology

1. Advanced Life Support (ALS)
2. Airway
3. Arrhythmia
4. Atherosclerosis
5. Automatic External Defibrillator (AED)
6. Back blows
7. Basic Life Support (BLS)
8. Biological death
9. Brachial pulse
10. C-A-B: Chest compressions, Airway, Breathing
11. Cardiopulmonary Resuscitation (CPR)
12. Carotid pulse
13. Chain of survival
14. Clinical death
15. Compression
16. Compression
17. Coronary artery bypass graft (CABG)
18. Coronary artery disease (CAD)
19. Coronary artery spasm
20. Diaphoresis
21. Distress
22. Emergency Medical Services (EMS)
23. Emergency Medical Technician (EMT)
24. Infant CPR
25. Myocardial infarction (MI)
26. Rate of compression
27. Rescue breathing
28. Sternum
29. Supine
30. Thrusts
31. Ventilation

References

1. *BLS for Healthcare Providers; American Heart Association Guidelines for CPR 2010*, Ed. Hazinski, M.F., (2011), American Heart Association.
2. Davis, F.A. (2013). *Taber's Cyclopedic Medical Dictionary* (22nd Ed.). Philadelphia: F.A. Davis Company.
3. Dennerll, J.T., & Davis, P.E. (2010). *Medical Terminology: A Programmed Systems Approach (10th Ed.).* Clifton Park, NY: Delmar, Cengage Learning.
4. Kronenberger, J., Southard D. L., & Woodson, D. (2013). *Comprehensive Medical Assisting* (4th Ed.). Philadelphia, PA: Lippincott, Williams & Wilkins.
5. Blesi, M., Wise, B.A., Kelley-Arney, C, (2012) *Medical Assisting Administrative and Clinical Competencies* (7th Ed.) Clifton Park, NY: Delmar, Cengage Learning.
6. Lindh, W., Pooler, M., Tampara, C., Dahl, B., Morris J. (2009). *Comprehensive Medical Assisting Administrative and Clinical Competencies* (4th Ed.). Clifton Park, NY: Cengage Learning.
7. Blesi, M., Wise, B.A., & Kelley-Arney, C, (2012) *Medical Assisting Administrative and Clinical Competencies* (7th Ed.) Clifton Park, NY: Delmar, Cengage Learning.
8. French, L.L., Fordney, M.T. & Follis, J. J. (2013) *Administrative Medical Assistant* (7th Ed.) Clifton Park, NY: Delmar, Cengage Learning.
9. Booth, K.A., Whicker, L.G., Wyman, T.D., & Moaney-Wright, S. (2011). *Medical Assisting: Administrative & Clinical Competencies with Anatomy and Physiology. (4th Ed.).* New York, NY: McGraw-Hill Company, Inc.
10. Proctor, D. B., & Young-Adams, A. P. (2011). *Kinn's The Medical Assistant: An Applied Learning Approach* (11th Ed.). Philadelphia, PA: Saunders Elsevier.

Content Outline/Theory Objectives	Suggested Learning Activities
Objective 1 **Spell and define key terms.** A. Review the terms listed in the terminology section. B. Spell the listed terms accurately. C. Pronounce the terms correctly. D. Use the terms in their proper context.	A. Games: word searches, crossword puzzles, Family Feud, Jeopardy, bingo, spelling bee, hangman and concentration. B. Administer vocabulary pre-test and post-test. C. Discuss learning gaps and plan for applying vocabulary. D. Note: This is a review session only. Student will be required to take a CPR course.
Objective 2 **List and define the five main components of the circulatory system.** A. Heart acts as pump to circulate the blood. B. Arteries and arterioles are the vessels that carry blood away from the heart. C. Capillaries, the microscopic vessels where exchange between the blood and the body's tissue take place. D. Veins and venules, the vessels that return blood to the heart. E. Blood, the fluids and cells that are circulated to carry oxygen and nutrients to tissues and wastes away from tissues.	A. Lecture/Discussion B. Assigned Readings C. Use anatomical diagrams/ posters/videos/computer assisted learning/workbook activities. D. Have students do a circulatory system web search. Ask them to print out what they consider to be the best website describing the circulatory system.
Objective 3 **Describe the circulation of blood through the four chambers of the heart and the pulmonary system.** A. Located in the center of the thoracic cavity. B. Muscular organ the size of a loose fist. C. Four chambers 1. Right atrium. 2. Left atrium. 3. Right ventricle. 4. Left ventricle. D. Heart mechanism 1. Atria contract at the same time. 2. Blood forced into the heart's lower chambers. 3. Ventricles contract simultaneously to pump blood out of heart. E. Path of the blood flow 1. Right atrium to right ventricle which pumps blood to lungs via pulmonary arteries. 2. Returned to the heart, via pulmonary veins.	A. Lecture/Discussion B. Assigned Readings C. Use anatomical diagrams/ posters/videos/computer assisted learning/workbook activities. D. Have students report from the same website the information they found about the heart. E. Print out pictures of the heart and circulatory system and share.

3. Blood re-enters heart in the left atrium. 4. To left ventricle which pumps the blood to aorta, which carries oxygenated blood to the body tissue. F. Pulmonary circulation 1. Blood enters lungs via the pulmonary arteries a. Very low in oxygen. b. Carrying waste carbon dioxide. 2. Air enters body via the nose through the trachea. 3. Air passes into lungs via the bronchioles. 4. Wastes are exchanged from the blood with fresh oxygen at the alveoli.	
Objective 4 **Describe major causes of cardiac arrest.** A. Heart disease 1. Risk factors a. High blood pressure. b. Elevated cholesterol and triglyceride. c. Cigarette smoking. d. Overweight and obesity. e. Diabetes. f. Stress. g. Family history. h. Age. 2. Disease process a. Atherosclerosis. b. Coronary artery spasm. c. Myocardial infarction. B. Drowning. C. Arrhythmia - an abnormality in heart rhythm. D. Electrocution. E. Suffocation. F. Drug intoxication. G. Trauma.	A. Lecture/Discussion B. Assigned Readings
Objective 5 **Discuss management of a patient with chest pain.** A. Chest pain 1. May have existed for several days before presenting to the doctor's office. 2. Usually patient has one or more risk factors for cardiac disease. 3. Risk factors a. Hypertension. b. Previous MI. c. History of Coronary artery bypass graft (CABG). d. Percutaneous transluminal coronary angioplasty (PTCA) with stent. e. Coronary artery disease (CAD). f. Hypercholesterolemia.	A. Lecture/Discussion. Note gender differences. B. Assigned Readings

g. LDL and HDL abnormalities. h. Atherosclerosis. 4. Primary approach to patient with chest pain a. Notify MD and RN to assess patient. b. Ask patient if they have medication for chest pain (Nitroglycerine-NTG) and instruct them to take it as prescribed. c. Obtain medication history and allergies. d. If MD or RN is not available, follow protocol for notifying Emergency Medical System (EMS). If in an outpatient setting, call 911 immediately. e. Get AED or send someone to get it. f. Place patient in low or high fowlers position if tolerated and/or a position of comfort. g. Loosen clothing or assist patient with a hospital gown (for EKG). h. Reassure patient in a calm manner. i. Take vital signs. 5. Gathering data about chest pain (if registered nurse or doctor not available while waiting for EMS) a. Onset. b. Activity at onset, what was the patient doing. c. Location. d. Severity/intensity (scale 1-10). e. Duration/quality (length/time of pain, pressure, jabbing). f. Radiation. g. Associated symptoms. h. Review any history of previous chest pain episodes and compare to current experience. i. Assess for any mechanism of injury. 6. Subjective signs and symptoms (what patient reports or demonstrates as discomfort) a. Central chest pain, substernal or crushing pain. b. Pressure, tightening, heaviness, cramping, burning and/or aching sensation. c. Pain radiating to the neck, jaw, back and/or arms. d. Shortness of Breath (SOB). e. Nausea and/or vomiting. f. Diaphoresis. 7. Objective signs and symptoms (what the patient physically manifests and you observe during data collection)	

a. Increased blood pressure. b. Diaphoresis. c. Dilated pupils. d. Restlessness. e. Shortness of breath. f. Anxiety. g. Facial mask of pain, chest or throat guarding (patient defending airway). h. Crying or moaning.	
Objective 6 **Explain the adult chain of survival.** A. Immediate recognition of cardiac arrest and activation of the Emergency response system. B. Early cardiopulmonary resuscitation (CPR) with emphasis on chest compressions. C. Rapid defibrillation. D. Effective advanced life support. E. Integrated post cardiac arrest care.	A. Lecture/Discussion B. Assigned Readings C. Use mannequin to demonstrate the effects of compressions. D. Use materials from American Heart Association for CPR guidelines. 1. Books: BLS for Healthcare Providers and Instructors 2. Manual: BLS for Healthcare Providers 3. DVD: BLS for Healthcare Providers 4. Assign students to look up the American Heart Association's website www.aha.org 5. Discuss findings.
Objective 7 **Explain the pediatric chain of survival.** A. Prevention of the arrest. B. Early high quality bystander CPR. C. Rapid activation of the Emergency System (or other emergency response). D. Effective advanced life support (including rapid stabilization and transport to definitive care and rehabilitation). E. Integrated post-cardiac arrest care.	A. Lecture/Discussion B. Assigned Readings C. Review website for American Heart Association: www.americanheart.org/cpr D. Ask students to share resources with class.
Objective 8 **Understand the 2010 American Heart Association for cardiopulmonary resuscitation (CPR) and emergency cardiac care (ECC) science update.** A. Change in sequence: CAB 1. C – Compressions. 2. A – Airway. 3. B – Breathing. B. Emphasis on high quality CPR 1. Compression rate of at least 100 per minute. 2. Compression depth of at least 2 inches in	A. Lecture/Discussion B. Assigned Readings C. Use mannequin to demonstrate and for student practice D. Provide a variety of scenarios.

adults. 3. Compression depth of at least one third of the anterior posterior diameter if the chest in infants approximately 1 ½ inches. 2 inches for children. 4. Allow complete chest recoil and minimize interruptions in compressions. 5. Avoid excessive ventilation. 6. No look, listen and feel. 7. Routine use of cricoid pressure is not recommended with bag-mask ventilation. 8. Continued de-emphasis of pulse check. 9. For infants a manual defibrillator is preferred to an AED.	
Objective 9 **Understand the basics of BLS/CPR for Adults.** A. Person found unresponsive, no breathing or no normal breathing (only gasping).Team-based CPR. 1. Activate emergency response. 2. Check pulse. 3. Start compressions (second rescuer) push hard and fast on the chest. 4. Get defibrillator; check rhythm, shock if indicated and repeat every 2 minutes. 5. Retrieve bag-mask for rescue breathing.	A. Lecture/Discussion B. Assigned Readings C. Use mannequin to demonstrate and for student practice D. Provide a variety of scenarios.
Objective 10 **Overview of initial BLS steps.** A. Assessment 1. Assessment and scene safety; make sure the scene is safe for the rescuer and the victim. 2. Assess the victim for response (tap the shoulder and shout “are you alright,” look for normal or abnormal breathing (i.e. only gasping), shout for help. 3. If you are alone activate the emergency response system, get an AED or defibrillator (if available) and return to the victim. 4. Check the victims pulse; palpate the carotid (take at least 5 but no more than 10 seconds). Locate the trachea using two fingers and slide the fingers into the groove between the trachea and the muscles at the side of the neck. 5. If a pulse is not felt within 10 seconds, perform 5 cycles of compressions and breaths (30:2 ratio) starting with compressions (C-A-B sequence). B. Compressions 1. To perform compressions the rescuer should position themselves at the victim’s side. 2. Victim should be face up on a hard surface. 3. If the victim needs to be turned, do so carefully. If there is a possibility of a neck injury, keep the	A. Lecture/Discussion B. Assigned Readings C. Use mannequin to demonstrate and for student practice. D. Provide a variety of scenarios.

head neck and torso in line when rolling the victim into position.
4. Place the heel of one hand in the center of the chest on the lower half of the sternum.
5. Place the heel of the other hand on top of the first hand.
6. Straighten your arms and position your shoulders directly over your hands.
7. Do not move the victim while CPR is in progress unless the victim is in a dangerous environment (if the rescuer cannot perform CPR effectively in the victim's present position or location).

C. Airway/Breathing
1. Opening the airway using head tilt chin lift
    a. Place the hand on the victim's forehead and push with the palm to tilt the head.
    b. Place the fingers of the other hand under the bony part of the lower jaw near the chin.
    c. Lift the jaw and bring the chin forward.
2. Adult mouth to barrier breathing
    a. For mouth to mask breaths use a mask with a one way valve the rescuer should position themselves at the victim's side.
    b. Place the mask on the victim's face, using the bridge of the nose as a guide.
    c. Seal the mask against the face
        1) Using the hand closer to the top of the victim's head, place the index finger and thumb along the edge of the mask. Place the thumb of your second hand along the bottom edge of the mask.
        2) Place the remaining fingers of your second hand along the bony margin of the jaw and lift the jaw. While the rescuer lifts the jaw press firmly and completely around the outside edge of the mask to seal the mask against the face.
    d. Deliver over one second to make the victim's chest rise.
3. Using the bag-mask device during 2 rescuer CPR
    a. The rescuers position themselves directly above the victim's head.
    b. Place the mask on the victim's face using the bridge of the nose as a guide for correct position.

c. Use the E-C clamp technique to hold the mask in place while the jaw is lifted. d. Perform the head tilt. e. Use the thumb and index finger of one hand to make the C on the side of the mask pressing the edges to the face. f. Use the remaining fingers to lift the angle of the jaw (three fingers form an E) to open the airway and press the face to the mask. g. Squeeze the bag and give breaths (one second each) so that the chest rises. h. Deliver all breaths over one minute whether or not supplemental oxygen is used. 4. Opening the airway for breaths-jaw thrust a. Place one hand on each side of the victim's head resting the elbows on the surface on which the victim is lying. b. Place your fingers under the angles of the victim's lower jaw and lift with both hands, displacing the jaw forward. c. If the lips close push the lower lip with thumb to open lips.	
Objective 11 **2-rescuer adult BLS/team sequence.** A. The first rescuer remains with the victim to start CPR immediately. B. When a second rescuer is available to help, the second rescuer should activate the emergency response system. C. The second rescuer returns with the AED, if available. D. The rescuers will then give compressions and breaths but should switch roles after every 5 cycles of CPR (about two minutes). E. As additional rescuers arrive they can help with the bag mask ventilation and use the AED or defibrillator and crash cart.	A. Lecture/Discussion B. Assigned Readings C. Use mannequin to demonstrate and provide for student practice. 1. Provide a variety of scenarios.
Objective 12 **Demonstrate the use of an AED for adults and children 8 years or older** A. Power on the AED (the AED will guide the rescuer through the next steps). B. Attach AED pads to the victim's chest (choose adult pads). C. Peel the backing away from the AED pads. D. Place one pad on the victim's upper right chest directly below the collar bone. E. Place the second pad to the side of the left nipple with the top edge a few inches below the armpit. F. Attach the AED connecting cables to the AED box	A. Lecture/Discussion B. Assigned Readings C. Use mannequin to demonstrate and provide for student practice 1. Provide a variety of scenarios.

(some are pre-connected). G. "Clear" the victim to analyze the rhythm. The AED may take 5-15 seconds to analyze. H. If the AED advises a shock, it will tell the rescuer to clear the victim. I. Press the shock button. J. If no shock is indicated and after any shock delivery immediately resume CPR starting with compressions. K. After 5 cycles of CPR (approximately 2 minutes) repeat the process from the step to "clear' the victim.	
Objective 13 **Demonstrate the BLS/CPR Sequence for children 1 year to puberty** A. The Child CPR sequence is similar to the adult BLS/CPR sequence. B. Activation or the emergency response system. C. If un-witnessed cardiac arrest and lone rescuer, perform 2 minutes of CPR before leaving the child to activate the emergency response system and get the AED. D. If the cardiac arrest is witnessed, leave the child to activate the emergency response system and get the AED and return to the child. E. The pulse check for a child may be performed at the carotid or femoral. To find the femoral pulse place 2 fingers in the inner thigh, midway between the hip bone and the pubic bone and just below the crease where the leg meets the abdomen. F. The compression-ventilation rate for 2 rescuer child CPR is 15:2. G. The compression-ventilation rate for a single rescuer child CPR is 30:2. H. Compression depth for children: compress at least one third the depth of the chest; approximately 2 inches. I. Compression technique: one or two handed chest compressions may be used for small children. J. Use child ventilation with barrier devices in the same manner as for adults. K. Defibrillation 1. Manual defibrillator is preferred over an AED. 2. If manual defibrillator is not available, use an AED equipped with a pediatric dose attenuator. 3. If the AED has a key or switch that will deliver a child shock, turn the key of switch. 4. If neither is available a regular AED may be used. 5. Use child pads, if available. If not, use adult pads, but make sure they do not touch.	A. Lecture/Discussion B. Assigned Readings C. Use mannequin to demonstrate and provide for student practice 1. Provide a variety of scenarios.

Objective 14 **Demonstrate BLS/CPR sequence for infants.** A. The term infant means zero to one year of age (12 months). B. The infant BLS sequence and skills are similar to the child and adult child CPR 1. Activation or the emergency response system. 2. If un-witnessed cardiac arrest and lone rescuer, perform 2 minutes of CPR before leaving the child to activate the emergency response system and get the AED. 3. If the cardiac arrest is witnessed, leave the child to activate the emergency response system and get the AED and return to the child. 4. Use the brachial artery to locate pulse, place 2 or 3 fingers on the inside of the upper arm between the infant's elbow and shoulder. 5. Technique for delivering compressions for a single rescuer a. Place 2 fingers in the center of the chest just below the nipple line b. Do not press on the bottom of the sternum. 6. Technique for delivering compressions for two rescuers a. Place both thumbs side by side in the center of the infant's chest on the lower half of the breastbone. b. The thumbs may overlap in very small infants. c. Encircle the infant's chest and support the infant's back with the fingers of both hands. d. With hands encircling the chest, use both thumbs to depress the breastbone approximately one third of the infants chest (approximately 1 ½ inches). 7. Compression-ventilation rate and ratio for a lone rescuer is 30:2. 8. Compression-ventilation rate and ratio for 2 rescuers is 15:2. 9. Keep head in a neutral position. If the head is tilted beyond a neutral (sniffing) position, the infant's airway may become blocked. Maximize airway patency by positioning the infant with the external ear canal level with the top of the infant's shoulder.	A. Lecture/Discussion B. Assigned Readings C. Use mannequin to demonstrate and provide for student practice. 1. Provide a variety of scenarios.

Objective 15 **Demonstrate BLS/CPR with advanced airway.** A. Advanced airway. B. Endotracheal intubation. C. Laryngeal mask airway. D. Compression rate of at least 100/minute without pauses. E. One breath every 6-8 seconds (8-10 breaths per minute).	A. Lecture/Discussion B. Assigned Readings C. Use mannequin to demonstrate and provide for student practice. 1. Provide a variety of scenarios.
1. Good air exchange. 2. Can cough forcefully. 3. May wheeze between coughs. 4. Rescuer action a. Encourage the victim to cough and do not interfere with the victims own attempts to expel foreign body. b. If mild airway obstruction persists, activate the emergency response system. B. Severe airway obstruction 1. Poor air or no air exchange. 2. Weak ineffective cough or no cough at all. 3. High pitched noise while inhaling or no noise at all. 4. Increased respiratory difficulty. 5. Possible cyanosis. 6. Unable to speak. 7. Clutching neck with thumb and fingers making the universal choking sign. 8. Ask the victim if they can talk. If victim nods yes and cannot talk, severe airway obstruction is present and the obstruction must be relieved. C. Relieving choking in a responsive victim one year or older 1. Stand or kneel behind the victim and wrap your arms around the victim's waist. 2. Make a fist with one hand. 3. Place the thumb side of the fist against the victim's abdomen, in the midline slightly above the navel and well below the breastbone. 4. Grasp your fist with the other hand and press your fist into the victim's abdomen with quick, forceful upward thrusts. 5. Repeat thrusts until the object is expelled from the airway or the victim becomes unconscious. 6. Give each new thrust with a separate, distinct movement to relieve the obstruction. 7. Pregnant and obese victims a. If the victim is pregnant or obese give chest thrusts. D. Relieving choking in an unresponsive victim one year	A. Lecture/Discussion B. Assigned Readings C. Use mannequin to demonstrate and provide for student practice. 1. Provide a variety of scenarios.

or older 1. When victim becomes unconscious activate the emergency response system. 2. Lower the victim to the ground and begin CPR with chest compressions (do not check for a pulse). 3. Every time the airway is opened to give breaths open the victim's mouth wide and look for the object. 4. If you see an object that can easily be removed, remove it with your fingers. 5. Do not perform a blind finger sweep in children because sweeps may push the foreign body back into the airway causing further obstruction and injury. 6. Use the finger sweep in the unconscious patient with a suspected airway obstruction only if solid material is visible in the oropharynx. 7. A choking victim maybe unresponsive when you encounter him or her. The rescuer would not know that an airway obstruction exists. Activate the emergency response system and start CPR (C-A-B sequence).	
b. If mild airway obstruction persists, activate the emergency response system. B. Severe airway obstruction 1. Poor air or no air exchange. 2. Weak ineffective cough or no cough at all. 3. High pitched noise while inhaling or no noise at all. 4. Increased respiratory difficulty. 5. Possible cyanosis. 6. Unable to cry. 7. Rescuer Action a. Clearing an infant's airway requires a combination of back slaps and chest thrusts. Abdominal thrusts are not appropriate. b. Kneel or sit with the infant on your lap. c. If it is easy to do so, remove clothing from the infant's chest. d. Hold the infant face down with head slightly lower than the chest, resting on your forearm. Support the infant's head and jaw with your hand. Take care to avoid compressing the soft tissues of the infant's throat. Rest your forearm on your lap and thigh to support the infant. e. Using the heel of your hand, deliver up to 5 back slaps forcefully between the infant's shoulder blades. Deliver each	A. Lecture/Discussion B. Assigned Readings C. Use mannequin to demonstrate and provide for student practice. 1. Provide a variety of scenarios.

	slap with sufficient force to attempt to dislodge the foreign body. f. After delivering up to five back slaps, place your free hand on the infant's back, supporting the back of the infant's head with the palm of your hand. The infant will be adequately cradled between the rescuers two forearms, with the palm of one hand supporting the face and the jaw while the palm of the other hand supports the back of the infant's head. g. Turn the infant as a unit while carefully supporting the head and neck. Hold the infant face up, with your forearm resting on your thigh. Keep the infants head lower than the trunk. h. Provide up to five quick downward chest thrusts in the middle of the chest over the lower half of the sternum (the same as for chest compressions during CPR). Deliver the chest thrust at the rate of about one per second with the intention of creating enough force to dislodge the foreign body. i. Repeat the sequence of up to five back slaps and up to five chest thrusts until the object is removed or the infant becomes unconscious j. Do not perform a blind finger sweep in infants because sweeps may push the foreign body back into the airway causing further obstruction and injury k. If the infant becomes unresponsive, stop giving back slaps and begin CPR	