

CARDIOVASCULAR CARE

Module 10

I. Statement of Purpose

The purpose of this module is to prepare the nursing assistant to perform the skills necessary to care for the cardiac patient. The student will learn to recognize and report abnormal cardiovascular signs and symptoms to the licensed nurse.

II. Terminology

- | | |
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| 1. Anemia | 41. Endocardium |
| 2. Angina | 42. Epicardium |
| 3. Angiogram (heart cath) | 42. Heart valves (mitral, tricuspid, pulmonic, aortic) |
| 4. Angioplasty | 43. Hematoma |
| 5. Anticoagulant | 44. Hemorrhage |
| 6. Anticoagulation | 45. Hypertension |
| 7. Aorta | 46. Hypotension |
| 8. Apical | 47. Infarct |
| 9. Arrhythmia/dysrhythmia | 48. Invasive |
| 10. Arteries | 49. Ischemia |
| 11. Artherosclerosis | 50. Mediastinum |
| 12. Ascites | 51. Monitor |
| 13. Asystole | 52. Myocardial infraction (MI)- heart attack |
| 14. Atrium | 53. Occlusion |
| 15. Blood transfusion | 54. Orthopnea |
| 16. Bounding | 55. Othostatic |
| 17. Brachial | 56. Pacemaker |
| 18. Bradycardia | 57. Palpate |
| 19. Cardiac arrest | 58. Percutaneous transluminal coronary angioplasty (PTCA) |
| 20. Carotid | 59. Perfusion |
| 21. Chambers | 60. Pericardium |
| 22. Chest pain | 61. Peripheral vascular disease (PVD) |
| 23. Circulation | 62. Plasma |
| 24. Code | 63. Pulmonary artery/vein |
| 25. Congestive heart failure (CHF) | 64. Pulse deficit |
| 26. Coronary artery bypass grafts (CABG) | 65. Radial |
| 27. Coronary artery disease (CAD) | 66. Risk factors |
| 28. Crash cart | 67. Septum |
| 29. Datascope | 68. Shock |
| 30. Defibrillator | 69. Syncope |
| 31. Diaphoresis | 70. Systole |
| 32. Diastolic | 71. Systolic |
| 33. Diuresis | 72. Tachycardia |
| 34. Doppler | 73. Telemetry |
| 35. Dyspnea | 74. Thready |
| 36. Echocardiogram | 75. Thrombi |
| 37. Edema | 76. Thrombolytic therapy |
| 38. Electrodes | 77. Thrombophlebitis |
| 39. Electrocardiogram (EKG/ECG) | 78. Varicose veins |
| 40. Embolus | |

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- 79. Vasoconstriction
- 80. Vasodilation
- 81. Vena cavae
- 82. Ventricles
- 83. Ventricular fibrillation

III. Performance standards (Objectives)

Upon completion of 4 hours of class plus assignments and 4 hours of clinical experience, the learner will be able to:

- 1. Define basic terminology.
- 2. Describe basic cardiovascular anatomy and physiology.
- 3. Describe procedure for monitoring in the acute care patient.
- 4. Describe the use of monitoring equipment for obtaining information regarding patient's condition.
- 5. Describe common disorders of the cardiovascular system and related care.
- 6. Describe the nursing assistant's role in caring for patients after invasive cardiac procedures.
- 7. Explain special precautions in the care of the cardiac patient. Explain the care measures for CHF & PVD.
- 8. Explain the importance of accurate I & O and weight measurements for the cardiac patient.
- 9. Describe the role of the nursing assistant with the patient who is experiencing a potential life-threatening situation such as cardiac arrest.
- 10. Explain the correct method of applying anti-embolic stockings.
- 11. Identify risk factors for coronary artery disease.

IV. References

- 1. Chancellor's Office, California Community Colleges (2004). *CNA Model curriculum*. Sacramento: Chancellor's Office, California Community Colleges.
- 2. Gerdin, J. (2004) *Health careers today* (3rd ed.) St. Louis: Mosby.
- 3. Gerdin, J. (2004) *Workbook to accompany health careers today*. (3rd ed.) St. Louis: Mosby.
- 4. Hegner, B. R., & Caldwell, E. (2003). *Nursing assistant: A nursing process approach* (9th ed.). Albany, NY: Delmar.
- 5. Sorrentino, S. A. (2004). *Mosby's textbook for nursing assistants* (6th ed.). St. Louis: Mosby Lifeline.

MODULE 10 - CARDIOVASCULAR CARE

Content Outline Theory Objectives	Suggested Learning Activities/Evaluation	Clinical Activities
Objective 1 Define basic terminology A. Terminology B. Clinical application	A. Lecture/ Discuss B. Use games from previous modules to review terms C. Written test	
Objective 2 Describe basic cardiovascular anatomy and physiology. A. Heart - a hollow organ not much larger than a fist. It lies in the center of the chest, behind the breastbone, in front of the spine and above the diaphragm. It pumps blood to the lungs and to the body. 1. The normal heart beats 60 – 100 times per minute. Each time it beats it ejects about 2 _ ounces of blood and can pump out up to 37 quarts each minute during exercise. 2. The heart has its own electrical regulating system called a pacemaker. It is located in the right atrium. This electrical impulse is transmitted to all the heart muscle by a specialized conduction system. This electrical impulse causes a contraction of the heart muscle that causes it to pump the blood out to the body. B. Heart muscle has three layers 1. Pericardium - the outer layer, a thin sac that covers the heart 2. Myocardium - the middle layer, the thick muscular portion of the heart. 3. Endocardium - the inner layer, the membrane lining the inner surface of the heart. C. Heart Chambers 1. Two upper chambers called atria a. Right atrium	A. Lecture/ Discuss B. Use diagrams/ visuals C. Handout 10.2 - Your heart and how it works: Crossword Puzzle D. Appendix 10.2 - Your heart and how it works: Crossword Puzzle-KEY E. Written test	

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Content Outline Theory Objectives	Suggested Learning Activities/Evaluation	Clinical Activities
b. Left Atrium 2. Two lower chambers called ventricles a. Right Ventricle b. Left Ventricle Right Atrium - Blood returns back to the heart from the body through the superior and inferior vena cava into the right atrium. This is oxygen-depleted blood which must be replenished with oxygen. It pumps this dark, bluish-red blood to the lungs, where the blood rids itself of waste gas (carbon dioxide) and picks up a supply of oxygen, which turns it a bright red again. Right Ventricle - The blood flows into the right ventricle from the right atrium, where it is pumped out through the pulmonary artery to the lungs, where the blood is re-oxygenated and carbon dioxide removed. Left Atrium - Blood flows from the lungs through the pulmonary vein into the left atrium. This is bright red, oxygen-enriched blood. Left Ventricle - The blood flows very passively into the left ventricle. The blood in the left ventricle is oxygen-enriched blood and is pumped out the aorta to all body areas. D. Vessels – Three types of vessels are used to carry blood throughout the cardiovascular system: 1. Arteries - Carry blood through vessels that lead <u>away from</u> the heart. We often think of arteries as carrying red, oxygen-rich blood, which is needed by all body cells to function. However, the pulmonary artery, leading from the right ventricle into the lungs, carries dark, un-oxygenated blood. 2. Veins - Carry blood <u>back to</u> the heart. The veins usually carry dark colored, un-oxygenated blood, which we see in the veins of our arms and legs. However, as with the arteries, the veins are categorized by the direction they take to or from the heart. The pulmonary <u>vein</u> brings rich,		

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Content Outline Theory Objectives	Suggested Learning Activities/Evaluation	Clinical Activities
oxygenated blood back to the heart from the lungs. 3. Capillaries - Small vessels which bring nutrients and oxygen (through the blood) to the cells and tissues. Capillaries also take the waste gas, carbon dioxide, from the cells and tissues to the veins. This process occurs in the lungs, the rest of the body, and the heart muscle itself. E. Heart Valves 1. Tricuspid valve - between right atria and right ventricle 2. Pulmonic valve - between right ventricle and pulmonary artery 3. Mitral valve - between left atrium and left ventricle 4. Aortic valve - between left ventricle and aorta		
Objective 3 Describe procedure for monitoring in the acute care patient. A. Accurate vital sign measurement. B. Normal values for pulse. C. Different sites for pulses (carotid, apical, radial, brachial, pedal) D. Changes in pulse strength/amplitude E. Heart rhythm -- regular, irregular. F. Automatic blood pressure machine (i.e. Dynamap)- Reset between patients: Some machines will only inflate the cuff 10-20 mm Hg above the previous systolic pressure. G. Proper technique in obtaining orthostatic blood pressure: lying, sitting, standing. H. Doppler for determining pulses and blood pressure. I. Removal and replacement of telemetry unit and monitoring leads when showering. (Electrode Reapplication Appendix 10.3) J. Assess pain – 5th vital sign.	A. Lecture/ Discuss B. Clinical observation C. Manual skill 10.3a - Measuring Pulse D. Manual skill 10.3b - Measuring blood pressure E. Refer to <i>CNA-MC</i> Module 10, objective 16, pp. 10.11: Evaluate patient's pain.	Accurately obtains vital signs on adult patients and reports changes or abnormalities to license nurse. Locates pedal pulses and determines if strong, weak, or absent. Demonstrates correct placement of telemetry leads.

Content Outline Theory Objectives	Suggested Learning Activities/Evaluation	Clinical Activities
Objective 4 Describe common disorders of the cardiovascular system. A. Myocardial infarction (MI)/heart attack - ischemia/angina 1. Definition a. Myocardial Infarction - Heart muscle damage due to a clot in a coronary artery. b. Ischemia/Angina - lack of oxygen to heart muscle due to narrowing of coronary artery. 2. Signs and symptoms a. Chest pain/pressure b. Arm discomfort c. Indigestion d. Jaw pain e. Shortness of breath (SOB) f. Sweating g. Nausea 3. Care measures a. Report changes in bowel pattern b. Activity intolerance c. Signs and symptoms B. Congestive heart failure - 1. Definition - poor pumping of left ventricle causing back up of fluid in lung 2. Signs and symptoms a. SOB b. Edema of extremities c. Tachycardia d. Fatigue e. Decrease in activity tolerance f. Decrease in urine output 3. Care measures a. Fluid restriction b. Report change in breathing	A. Lecture/ Discuss B. Handout 10.5a - Case Studies C. Appendix 10.5a - Case Studies D. Handout 10.5b - Caring for Patients with Peripheral Vascular Disease E. Written test F. Manual skill 10.4 Electrode Reapplication	Reports all abnormal signs and symptoms to licensed nurse.

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Content Outline Theory Objectives	Suggested Learning Activities/Evaluation	Clinical Activities
c. Accurate I & O d. Daily weight e. Activity level C. Peripheral vascular disease - 1. Definition - Narrowing clots in legs, veins, or arteries 2. Signs and symptoms a. Extremity change in temperature (hot/cold) b. Tingling c. Change in color (paleness, redness) d. Decreased movement e. Pain f. Change in/lack of pulse g. Loss of sensation h. Swelling D. Shock - 1. Definition - decreased delivery of oxygen and nutrients to body cells and organs 2. Signs and symptoms a. Weak & rapid pulse b. Tachycardia c. Drop in blood pressure d. Decreased urine output e. Pale & cool skin f. Decreasing level of consciousness. 3. Care measures a. Report to a licensed nurse b. Assist in obtaining crash cart E. Cardiac arrest 1. Definition - absence of heart beat. 2. Care measures a. Call emergency code b. Start CPR c. Assist with obtaining crash cart		

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Content Outline Theory Objectives	Suggested Learning Activities/Evaluation	Clinical Activities
Objective 5 Describe the nurse assistant's role in caring for patients after invasive cardiac procedures. A. Observation of arterial puncture sites for bleeding, swelling (hematoma). B. Maintain activity restriction guidelines: flat in bed, straight extremity. C. Observation of dressings over puncture sites for drainage. D. Placement of sandbag E. Recognizing and reporting changes in extremity pulses. F. Vital signs as ordered- usually q 15 min x 1 hr, q 30 min x 1-2 hr, q 1 hr x 4.	A. Lecture/ Discuss B. Clinical observation C. Written test	Cares for patient correctly post invasive procedure.
Objective 6 Explain the special precautions in the care of the cardiac patient. Explain the care measures for CHF & PVD. A. Showering -- Remind the patient to rock in place to avoid blood pooling in extremities and fainting. B. Careful observation of the patient when telemetry removed C. Telemetry unit -- careful placement of telemetry unit in gown pocket, avoid getting wet D. Electrodes secure, good contact with skin E. Importance of continual use of oxygen for patients with O₂ order F. Anticoagulant therapy (heparin, coumadin, t-PA , retavase) special precautions: avoid use of razor blade, observe for bleeding & bruising, avoid use of aspirin.	A. Lecture/ Discuss B. Clinical observation C. Written test	Appropriately considers special precautions when providing care to cardiac patients.

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Content Outline Theory Objectives	Suggested Learning Activities/Evaluation	Clinical Activities
Objective 7 Explain the importance of accurate I & O and weight measurements for the cardiac patient. A. Review I & O B. Review measurement of weight and stress importance of accuracy. 1. I & O and weight gain or loss can indicate change in fluid balance or change in cardiac function. 2. Medications and fluids are frequently adjusted based on these measurements.	A. Lecture/ Discuss B. Clinical observation C. Lab practice D. Written test including graphic documentation of I & O and weight E. Refer to <i>CNA-MC</i> Module 9, objectives 18 – 25, pp. 9.18 – 9.22: I & O; objectives 19-26, pp. 9.20-9.24 F. Refer to <i>CNA-MC</i> Module 7, objective 3 and 4, p. 7. 5 – 7.6: Measurement of weight	Accurately records I & O and weight.
Objective 8 Describe the role of the nursing assistant with the patient who is experiencing a potential life threatening situation such as cardiac arrest. A. Possible life-threatening signs and symptoms: 1. Change in respirations (especially shortness of breath) 2. Pain (in chest, arm, jaw) 3. Change in activity tolerance 4. Altered level of consciousness (LOC) 5. Bleeding 6. Changes in vital signs 7. Pallor B. Review steps of Basic Life Support (CPR)	A. Lecture/ Discuss B. Written test C. <i>CNA-MC</i> Module 12, objectives 2-5, pp. 12.3 – 12.16: Emergency procedures	Reports all abnormal signs and symptoms to licensed nurse immediately. Responds appropriately in an emergency, i.e., calls for help, starts CPR.

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Content Outline Theory Objectives	Suggested Learning Activities/Evaluation	Clinical Activities
Objective 9 Identify risk factors for coronary artery disease. A. Risk factors for coronary artery disease: 1. Smoking 2. Obesity 3. High blood pressure 4. Elevated cholesterol 5. Glucose intolerance 6. Lack of exercise 7. Emotional stress 8. Family history 9. Sex/age of patient 10. Race B. Reinforce patient teaching plan regarding risk factor & lifestyle changes.	A. Lecture/ Discuss B. Written test	Reinforces patient's teaching plan.

SAMPLE TEST QUESTIONS

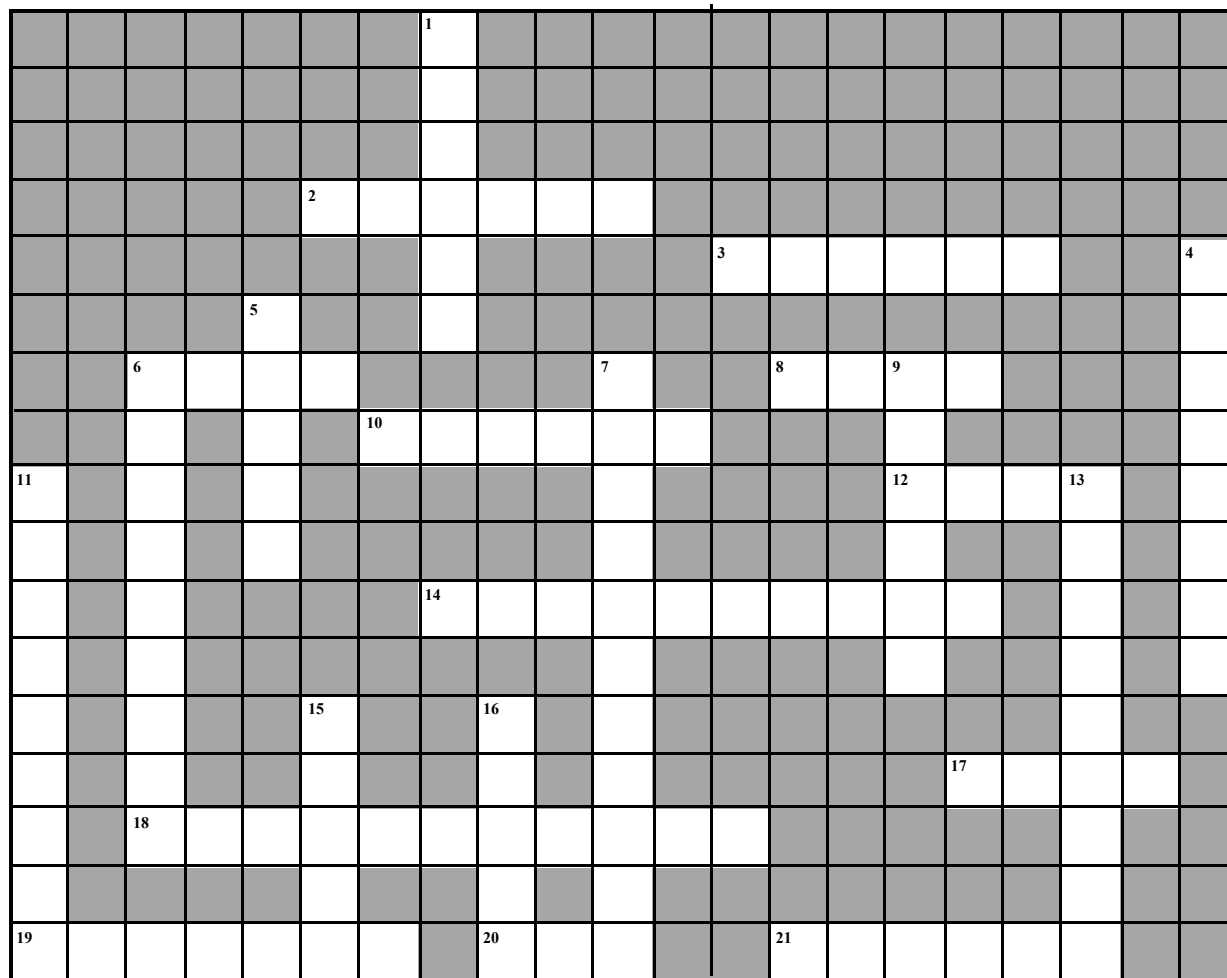
Directions: Circle the best answer

1. A patient is complaining of jaw pain. You would
 - a. Refer the patient to a dentist
 - b. Tell the patient's significant other
 - c. Inform the licensed nurse immediately
 - d. Mention in report
2. Major risk factors in coronary artery disease include
 - a. CHF, CVA
 - b. Diabetes, obesity
 - c. Alcohol, drugs and lack of exercise
 - d. Smoking, lack of exercise, high cholesterol
3. While checking on Mr. Lee, you note that he is not breathing and you cannot feel or hear a pulse. The first thing you should do is:
 - a. Initiate CPR
 - b. Call for help
 - c. Report to the licensed nurse immediately
 - d. Give oxygen
4. Mrs. Garfield had a cardiac catheterization a few hours ago. When you go in to take her vital signs, she complains of feeling wet between her legs. Your first response is to:
 - a. Check her femoral dressing for dryness
 - b. Tell her you will bring a basin to bathe her shortly
 - c. Offer the bedpan
 - d. Change the bed linens
5. The pattern of electrical activity in the heart is measured by
 - a. Cardiac catheterization
 - b. Echocardiograph
 - c. EKG
 - d. Cardioversion
6. Inflammation of a vein is called
 - a. MI
 - b. CHF
 - c. Phlebitis
 - d. Hypertension
7. The term that means the death of tissue due to lack of oxygen is
 - a. Contract
 - b. Systemic
 - c. Stenosis
 - d. Infarction
8. A collection of blood trapped in a joint is called
 - a. Hemarthrosis
 - b. Hematoma
 - c. Hypoperfusion
 - d. Hematuria

SAMPLE TEST QUESTIONS - KEY

1. A patient is complaining of jaw pain. You would
 - a. Refer the patient to a dentist
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2. Major risk factors in coronary artery disease include
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YOUR HEART AND HOW IT WORKS CROSSWORD PUZZLE

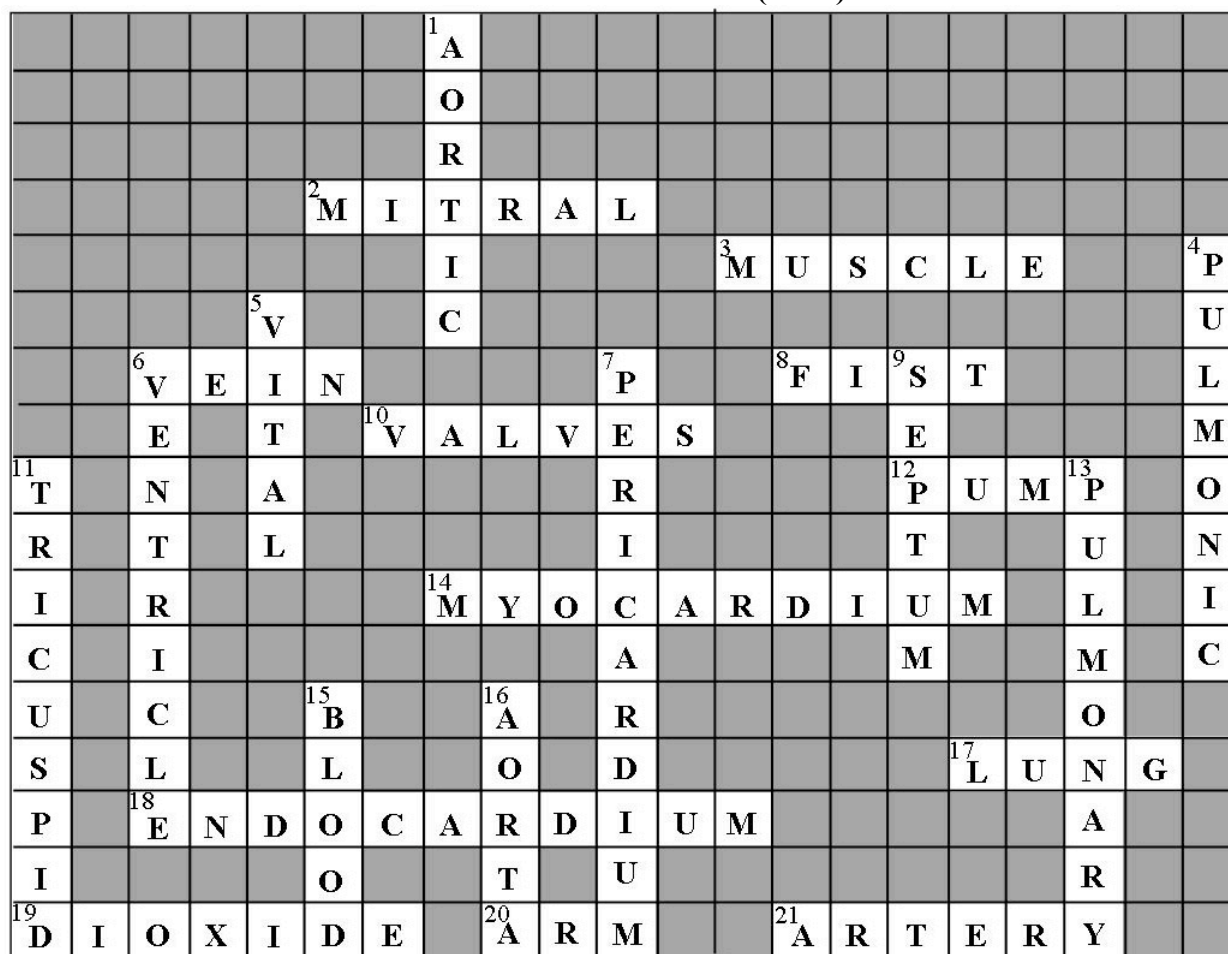
**Across:**

2. The valve between the left atrium and the left ventricle
3. The heart is classified as a _____
6. Blood vessel which carries blood to the heart
8. The heart is a little larger than your _____
10. _____ regulate the flow of blood through the heart
12. One function of the heart is to _____ blood to the lungs
14. The tough, muscular wall of the heart
16. Upper chamber of the heart
17. From the right side of the heart blood goes to the _____
18. Lining of the heart
19. Waste gas: Carbon _____
20. Warning of a heart attack: pain may radiate down the _____
21. Blood vessel which carries blood away from the heart.

Down:

1. The valve between the left ventricle and the aorta
4. The valve between the right ventricle and the pulmonary artery
5. Heart rate and blood pressure are _____ signs.
6. Lower chamber of the heart
7. Fiber-like bag surrounding the heart
9. Wall which divides heart cavity
11. The valve between the right atrium and the right ventricle
13. The artery/vein connecting lungs and heart
15. _____ is pumped through the body to nourish all of the tissues
16. Great trunk artery which receives blood from the left ventricle.

YOUR HEART AND HOW IT WORKS CROSSWORD PUZZLE (KEY)



Across:	Down:
2. The valve between the left atrium and the left ventricle	1. The valve between the left ventricle and the aorta
3. The heart is classified as a _____	4. The valve between the right ventricle and the pulmonary artery
6. Blood vessel which carries blood to the heart	5. Heart rate and blood pressure are _____ signs.
8. The heart is a little larger than your _____	6. Lower chamber of the heart
10. _____ regulate the flow of blood through the heart	7. Fiber-like bag surrounding the heart
12. One function of the heart is to _____ blood to the lungs	9. Wall which divides heart cavity
14. The tough, muscular wall of the heart	11. The valve between the right atrium and the right ventricle
16. Upper chamber of the heart	13. The artery/vein connecting lungs and heart
17. From the right side of the heart blood goes to the _____	15. _____ is pumped through the body to nourish all of the tissues
18. Lining of the heart	16. Great trunk artery which receives blood from the left ventricle.
19. Waste gas: Carbon _____	
20. Warning of a heart attack: pain may radiate down the _____	
21. Blood vessel which carries blood away from the heart.	

MEASURING PULSE

The pulse can be felt at many different locations. This material will concentrate on just the radial, brachial, pedal (dorsalis pedis) and apical pulse sites.

1. **Radial** – the most commonly measured pulse. It is measured at the radial artery in the wrist. Feel for the radial artery with the patient's arm positioned along side the body, palm downward. Curl two or three of your fingers around the wrist on the thumb side and palpate gently. This site for measuring pulse is **convenient and accurate**. Occasionally, if a patient has had many arterial blood gases (ABG's) drawn, the radial pulse is difficult to feel, and the ulnar pulse or brachial pulse must be used. Never feel for the pulse with your own thumb. It has a pulse of its own and you may be counting your own pulse.
2. **Brachial** – located near the center of the antecubital space, toward the little finger side of the arm (the inner aspect). Have the patient rest the arm palm upward, and use two or three fingers to locate the pulse. This pulse is commonly used to measure blood pressure by placing the stethoscope diaphragm over the site.
3. **Pedal pulse (dorsalis pedis)** – This pulse is felt on top of the foot while it is plantar flexed, if possible. This pulse is easily obliterated (pushing so hard you close off the artery), so feel gently. This pulse is used to check peripheral circulation when the femoral artery has been used for an invasive test such as a heart catheterization (cath) or arteriogram of extremities. It is also the pulse that is used to check circulation when a patient is in a cast or has had orthopedic surgery, such as a joint replacement.
4. **Apical pulse** – This pulse is used when the radial pulse is irregular or is difficult to palpate. You must use the auscultation method (listening with the stethoscope) when taking an apical pulse. The apical rate represents the actual beating of the heart. When auscultating the apical rate, the "lub-dub" heard represents one cardiac cycle, or heart beat. The apical pulse is counted for one full minute. Most hospitals require that all patients on telemetry in the hospital have an apical pulse taken with vital signs.
Apical pulses are checked:
 - for one full minute
 - whenever you are uncertain of the accuracy of the radial pulse or it is irregular, difficult to obtain or too fast to count
 - whenever a pulse deficit exists or is suspected
 - before the licensed nurse administers drugs that alter the heart rate or rhythm
 - on any patient on telemetry
 - in children whose rapid rates might be difficult to count at the radial or brachial artery and any child under 12 months of age
5. **Apical-radial deficit** – This occurs when a difference exists between the radial and apical pulse rates. This usually means that some of the contractions of the heart are so weak that sufficient blood cannot be sent to the arteries to expand them. When this happens, no radial pulse is felt. The **pulse deficit** is the difference between the apical and radial pulse rates. The nurse may wish you to assist in taking an **apical-radial pulse**. Two persons are needed to take this pulse. Nurse One measures the pulse apically using a stethoscope, while at the same time Nurse Two takes the pulse by palpating the radial artery. The pulses are measured for a full minute using a single watch that is placed in a convenient location where both nurses can see it. If the radial

pulse is lower than the apical, the difference is called a **pulse deficit**. The **pulse deficit** is the difference between the apical and radial pulse rates. To obtain the **pulse deficit**, subtract the radial rate from the apical rate. The apical pulse rate is never less than the radial pulse rate.

Implications for Acute Care

The pulse (along with the blood pressure) is probably the most important vital sign. It reflects the condition of the heart and other factors going on in the body during acute illness and also is affected by many medications. The ability to measure and record the pulse accurately cannot be stressed enough. Hypotension will usually be reflected in a rapid pulse when the patient stands up or ambulates for the first time after surgery. Pulmonary drugs can cause a very rapid heart rate, weakness and hypotension. Cardiac drugs, by definition, affect the rate and force of the heart beat and alter both pulse and blood pressure. Many cardiac drugs must be held (not given) if the pulse is too low and that information must be given to the licensed nurse immediately. Even patients at home often are not taking their medications properly and will have critical vital signs. Low blood count (anemia) will cause the heart to try to circulate more oxygen carrying hemoglobin to compensate, resulting in a rapid heart rate. Irregular rhythms must be reported since they can reflect serious conditions that can be life threatening.

Know the range of normal pulse rates and report any abnormal results to the licensed nurse immediately.

Normal Ranges in Age-Related Vital Signs

	Blood Pressure	Pulse	Respirations
Infant (birth to one year)	74/50 – 100/70	120 – 160	30 – 60
Toddler	80/50 – 112/80	90 – 140	24 – 40
Preschooler	82/50 – 110/78	80 – 110	22 – 34
School-Age	84/54 – 120/80	75 – 100	18 – 30
Adolescent	94/62 – 140/88	60 – 90	16 – 20
Adult	100/70 – 140/90	60 – 100	12 - 20

(These are a compilation of normal ranges found in textbooks. Your facility may have other values to use as guidelines. Also, in individual cases the nurse may request a report for vital signs of different values. Be sure to follow your facility policy.)

MEASURING BLOOD PRESSURE

Guidelines for Taking Blood Pressure

Make sure the blood pressure cuff is the right size

- The width of the cuff should be able to wrap at least halfway around the upper arm.
- Normal sizes of cuffs
 - Approximately 5 inches wide for the normal adult
 - Narrower cuffs (about 3 inches wide) for an infant, child or adult with thin arm
 - Larger cuff (about 8-9 inches wide) for obese patients and for taking blood pressure on the thigh

Do not use an extremity that:

- has an intravenous infusion.
- is diseased or injured.
- is paralyzed.
- is severely edematous or swollen.
- contains a renal dialysis shunt or fistula.
- is on the side where a mastectomy has been performed.

Procedure

- Position the patient's arm so that it is level with the heart. The palm should be up.
- Squeeze the cuff to expel any remaining air. Close the valve on the bulb.
- Find the brachial artery at the inner aspect of the elbow.
- Place the arrow on the cuff over the brachial artery. Wrap the cuff around the upper arm at least 1 inch above the elbow. It should be even and snug.
- Palpate radial artery and inflate cuff until pulse can no longer be felt. Note that value.
- Deflate cuff.
- Place the stethoscope earpieces in your ears.
- Position the diaphragm over the brachial artery.
- Inflate the cuff 30 mm Hg beyond the point at which you last felt the pulse.
- Deflate the cuff at an even rate of 2 to 4 millimeters per second.
- Note the point on the scale where you hear the first sound. This is the systolic reading.
- Note the point where the sound disappears for the diastolic reading.

Inaccurate Blood Pressure Readings

Causes of inaccurate blood pressure readings include:

- use of wrong size cuff
- an improperly wrapped cuff
- incorrect positioning of arm (should be in line with heart)
- not using the same arm for all readings
- not having the gauge at eye level
- deflating the cuff too fast or too slowly
- mistaking an auscultatory gap (sound fadeout for 10 to 15 mm Hg, which then begins again) as the diastolic pressure or not going high enough to hear correct systolic pressure.
- Improper use of automatic blood pressure machines

ELECTRODE REAPPLICATION**EQUIPMENT:**

Telemetry transmitter box

Batteries

Lead wires

Electrodes

Alcohol swabs

Safety razor with shave cream or lubricant

CRITERIA:**Correctly reapplies electrodes and telemetry unit**

1. Gather equipment. Make sure transmitter number matches the monitor number assigned to the patient.
2. Snap or clip lead wires onto electrodes. When the snap type is used, make sure they are snapped on before applying to patient to prevent pressing against chest wall and causing discomfort.
3. If necessary, shave excess hair on sites needed for application of electrodes, then cleanse sites with alcohol swabs or acetone per your facility policy. Gently rubbing the skin surface with a gauze pad to remove dead skin cells helps the electrodes adhere to the skin.
4. Remove backing from self-adhesive electrode and apply to prepared skin site. Follow your facility policy for placement of electrodes as there are different systems used for monitoring and the leads must be placed in the correct positions.
5. Make sure lead wires are securely inserted into transmitter box and, if it has an "ON-Off" switch, that it is turned "ON".
6. Place the transmitter box into pouch that is usually supplied on hospital gowns of telemetry patients. If there are no pouches in your facility gowns, have the patient place the box in a pocket of robe or sleepers when up walking. Care should be taken not to drop the box or allow it to get wet.
7. Electrodes should be changed every day and the sites moved slightly to prevent skin breakdown. If the patient is complaining of itching or burning under the electrode, hypoallergenic electrodes are available at most facilities. Notify the RN of any skin irritation.
8. Document date, time, and preparation of the skin, where you applied the electrodes and obtain a rhythm strip for documenting the heart rhythm.

CASE STUDY

(1) Mrs. Hanson is one of your 11 patients on a busy telemetry unit. She is 67 years old and has a history of severe hypertension, cardiac arrhythmias and diabetes. She is hospitalized for stabilization of her blood sugar levels and is due to be discharged soon. It is now 10:30 AM and you check on Mrs. Hanson before you start a bed bath down the hall. She is sitting up reading a magazine, but has a frown on her face. She seems anxious, but says she feels this way often and is anxious to go home. You step closer and notice that she is shaky and says she has a headache.

What would you do?

(2) The licensed nurse does a fingerstick blood glucose and finds Mrs. Hanson's blood sugar is 45. The licensed nurse has you go and get a small glass of orange juice and some crackers and cheese. Later, after you have given her the snack, she says she is all right, but as you begin to leave the room she starts to rub her left arm and shoulder. She says she has just been sitting up too long, but as you step closer you notice she is sweating and pale.

What would you do?

(3) After you call for help and get a set of vitals, you find that Mrs. Hanson's blood pressure is 210/112 and her heart rate is very irregular. You decide that Mrs. Hanson needs help right away and go to get the licensed nurse since no one answered the call light. As you go out to report your findings to the licensed nurse, you notice the patient has slumped over in her chair.

What is your first action?

CASE STUDY KEY

(1) Mrs. Hanson is one of your 11 patients on a busy telemetry unit. She is 67 years old and has a history of severe hypertension, cardiac arrhythmias and diabetes. She is hospitalized for stabilization of her blood sugar levels and is due to be discharged soon. It is now 10:30 AM and you check on Mrs. Hanson before you start a bed bath down the hall. She is sitting up reading a magazine, but has a frown on her face. She seems anxious, but says she feels this way often and is anxious to go home. You step closer and notice that she is shaky, diaphoretic, and says she has a headache.

What are the signs and symptoms that you feel should be reported to the nurse?

The Acute Care Nursing Assistant should know from the study of the cardiac and diabetic patient that many diabetic patients have cardiovascular disease and complications of both diseases are seen often on a telemetry unit. Changes in blood pressure, heart rhythm and blood sugar can cause signs of shakiness, diaphoresis (sweating) and headache. It is not the Acute Care Nursing Assistant's responsibility to connect a diagnosis with the symptoms, but they should recognize these symptoms are new and reflect a change for this patient. Even though the patient says this happens often at home, any change in a patient's condition should be reported to the licensed nurse.

The signs and symptoms that the students should identify would be the shakiness, diaphoresis (sweating), headache, frown and anxiety. These could all be symptoms of blood sugar changes, cardiovascular disease or medication side effects.

What would you do?

The Acute Care Nurse Assistant should report the signs and symptoms mentioned above to the licensed nurse right away. The information should be relayed to the licensed nurse before beginning the bed bath that needed to be given to a patient down the hall.

(2) The nurse does a fingerstick blood glucose and finds Mrs. Hanson's blood sugar is 45. The nurse has you go and get a small glass of orange juice and some crackers and cheese. Later, after you have given her the snack, she says she is all right, but as you begin to leave the room she starts to rub her left arm and shoulder. She says she has just been sitting up too long, but as you step closer you notice she is sweating and pale.

What would you do?

These are new symptoms and are similar to symptoms a patient might have when having cardiac problems. You realize the nurse should know about these new symptoms right away, but with these serious symptoms **you should not leave the patient**. Depending on the layout of the nursing unit, you may just call for the nurse with a spoken message or put on the call light. While you are waiting, you could take the patient's vital signs and try to relieve anxiety by speaking in calm tones.

(3) After you call for help and get a set of vitals, you find that Mrs. Hanson's blood pressure is 210/112 and her heart rate is very irregular. You decide that Mrs. Hanson needs help right away and start to go get the nurse since no one answered the call light. As you are going out the door to report your findings to the nurse, you notice the patient has slumped over in her chair.

What is your first action?

You cannot leave the patient now that you have seen her slump over in the chair and you return to assist the patient and push the emergency button or appropriate call signal for your facility to get help immediately. You begin the ABC steps of CPR. Determine unresponsiveness and maintain an open airway. If the patient is breathing, give support to prevent falling until help arrives. If the patient were not breathing, you would need to follow guidelines of CPR and the limitations of your role as outlined by your facility.

CARING FOR PATIENTS WITH PERIPHERAL VASCULAR DISEASE

- Elevate the feet when the patient will be sitting in a chair for a long time. When the feet are not elevated, make sure that the patient's feet are flat on the floor. If they are not, support the feet with a footstool. Discourage the patient from crossing the legs when sitting or in bed. Discourage the patient from using circular garters.
- Discourage smoking- it interferes with circulation.
- Avoid using the knee gatch of the bed.
- Avoid using heating pads or hot water bottles. The patient may not feel temperatures that are too hot.
- Maintain body warmth. Make sure the patient has warm clothes, including socks that fit well. Provide blankets for the bed.
- Prevent injury to the feet:
 - Instruct the patient to wear shoes when out of bed.
 - Check to see that the shoes are in good repair and that they fit well.
 - Avoid pressure to the legs and feet from any source.
- Inspect the feet carefully when you bathe the patient or if the patient complains of any discomfort in the feet. Promptly report any signs of inflammation, injury, or circulatory problems;
 - Broken skin
 - Color change (redness, whiteness, or cyanosis)
 - Heat or coldness
 - Cracking between toes
 - Corns or calluses
 - Swelling
 - Pain
 - Loss of function
 - Drainage
- Bathe the feet regularly
 - Dry thoroughly and gently between the toes.
 - Use a moisturizing lotion on the feet and legs if the skin is dry.
- Do not cut the toenails of patients who have peripheral vascular disease.