

UNIT 9 LABORATORY PROCEDURES

CHAPTER 44

SPECIALTY LABORATORY TESTS

Overview

Many laboratory tests are now performed in the ambulatory care setting by the medical assistant. Medical assisting students learn about laboratory safety procedures, medical terminology, and specimen collection and analysis. A basic understanding of the principles involved and proper sampling procedures are covered. Quality control programs, accurate documentation, communication and patient interaction skills, and strict observance of Standard Precautions are emphasized. Therapeutic communication with the patient to gain cooperation in obtaining good specimens for analysis is recognized as an important aspect of any laboratory testing.

Lesson Plan

I. LEARNING OUTCOMES	ABHES	CAAHEP
A. Define, spell, and pronounce the key terms as presented in the glossary.	MA.A.1.8.cc	I.P.2, IV.A.7
B. Use language/verbal skills that enable a patient's understanding.	MA.A.1. 5.g	I.A.3
C. Demonstrate respect for diversity in approaching patients and families.	MA.A.1.10.a	I.P.11
D. Discuss quality control issues related to handling laboratory specimens.	MA.A.1.10.b.	I.P.13, I.P.16
E. Explain the types of waived specialty tests performed in the POL and how specimens are collected.		
F. Obtain specimens for specialty tests as covered in this chapter.	MA.A.1.9.i	III.P.2
G. Select appropriate PPE for potentially infectious situations.	MA.A.1.10.b	
H. Perform CLIA waived chemistry tests covered in this chapter.		
I. Distinguish between normal and abnormal test results.		
J. Analyze the professionalism questions and apply them to this chapter's content.		

II. PROFESSIONALISM QUESTIONS

- A. Communication
 1. Did you introduce yourself? Did you identify the patient through name and birth date or other identifying feature?
 2. Did you speak at the patient's level of understanding?
 3. Did you provide appropriate responses/feedback?
 4. Did you explain procedures and expectations to the patient?
 5. Did you respond honestly and diplomatically to the patient's concerns?
 6. Did you demonstrate empathy in communicating with patients, family, and staff?
- B. Presentation
 1. Were you dressed and groomed appropriately?
 2. Were you courteous, patient, and respectful to the patient?
 3. Did you display a positive attitude?
 4. Did you display a calm, professional, and caring manner?
- C. Competency
 1. Did you pay attention to detail?
 2. Did you ask questions if you were out of your comfort zone or did not have the experience to carry out tasks?
 3. Did you recognize the importance of local, state, and federal legislation and regulations in the practice setting?
 4. Were you knowledgeable and accountable?

- D. Initiative
 - 1. Did you direct the patient to other resources when necessary or helpful, with the approval of the provider?
- E. Integrity
 - 1. Did you work within your scope of practice?
 - 2. Did you immediately report any error you had made?

III. REFERENCES

- A. Lindh, Wilburta Q., Pooler, Marilyn S., Tamparo, Carol D., Dahl, Barbara M., & Morris, Julie A. *Delmar's Comprehensive Medical Assisting: Administrative and Clinical Competencies* 5e
- B. Text Chapter 44, References/Bibliography
- C. Any other teacher-preferred reference material such as your program MSDS manual, website of OSHA, CLIA, and so forth

IV. VISUAL AIDS

- A. Computer access to identified Internet resources
- B. Any other teacher-preferred visual aids (PowerPoints, etc.)
- C. Copies of available OSHA regulations, Material Safety Data Sheets (MSDSs), Standard Precautions, and CLIA '88

V. EQUIPMENT AND MATERIALS

- A. Computer, TV monitor, and Internet access
- B. Samples or photos of high-cholesterol foods
- C. Pamphlets and articles on TB, PKU, IM, and pregnancy tests, diagnosis, and treatment
- D. CLIA and OSHA regulations
- E. See IV: Visual Aids

VI. SAFETY

- A. Establish basic classroom procedures.
- B. Follow Standard Precautions.
- C. Maintain confidentiality of laboratory reports and other patient information.
- D. Follow CLIA and OSHA regulations.

VII. PREPARATION

- A. Arrange for visual aids equipment.
- B. Collect materials.
- C. Review Chapter 44 in the text, the Study Guide, the Competency Manual and the Instructor's Manual.

VIII. INTRODUCTORY REMARKS/ACTIONS

- A. Read Learning Outcomes in the text with students to introduce the chapter.
- B. Display various high-cholesterol and high-fat foods.
- C. Ask, "What can you tell me about all of these foods?"
- D. After students identify them the high-cholesterol foods, ask, "How do they affect our bodies?"
- E. Have students search the labels for trans fats and hydrogenated fats.

IX. PRESENTATION

- A. Urine Pregnancy Tests
 - 1. Indications for use
 - a. When pregnancy is suspected
 - b. To rule out pregnancy before prescribing birth control pills, x-ray studies, or certain antibiotics or other drugs
 - c. For females who are to undergo surgery
 - d. Based on detection of human chorionic gonadotropin (hCG)
 - 2. Commercial/Home Urine Pregnancy Tests
 - a. Variety readily available
 - b. Easy to perform and interpret
 - c. Give rapid results
 - d. OTC products
 - e. Should be confirmed by laboratory test using appropriate controls

3. False/positive pregnancy test results
 - a. Positive result does not necessarily indicate normal pregnancy
4. Quality control
 - a. Kits must be stored and used at temperature directed by manufacturer.
 - b. Kits have built-in controls.
 - c. Check expiration date.
- B. Infectious Mononucleosis
 1. A contagious disease
 2. May have vague clinical symptoms
 3. Can mimic other diseases
 4. Commonly called “mono” or “kissing disease”
 5. Result of common infection of lymphocytes by Epstein-Barr virus (EBV)
 6. After primary infection, virus establishes lifelong latency
 7. EBV implicated in other diseases
 8. Transmission of EBV
 - a. By saliva
 - b. Blood transfusion
 - c. In close social groups
 - d. Importance of hand washing
 9. Symptoms, of mononucleosis
 - a. Seen most often in children and young adults
 - b. Incubation of 7–14 days average
 - c. Younger children usually asymptomatic or manifest minor symptoms
 - d. Classic symptoms occur when primary infection delayed until second decade of life
 - e. Fever, swollen glands, headache, malaise, chest pain, cough, tonsillitis, rash, swollen lymph nodes, swollen spleen
 - f. Symptoms last average of 2–4 weeks
 10. Treatment of Mononucleosis
 - a. Primarily supportive
 - b. Vaccine not yet available
 11. Diagnosis of Infectious Mononucleosis
 - a. Blood test for infectious mononucleosis
 - (1) Includes WBC count
 - (2) Evaluation of patient’s lymphocytes
 - b. Serologic test for infectious mononucleosis
 - (1) Detection of heterophile antibodies
 - (2) Combined with tests and clinical findings/patient symptoms
 - (3) Positive after first week of illness
 12. CLIA Waived IM Tests
 - a. Kits available
 - b. Requires blood sample
- C. Prothrombin Time
 1. Also called protime, PT and INR
 2. Tests blood’s clotting ability
 3. Assesses effectiveness of anticoagulants
 4. Normal values
 5. Reference Procedure 41-4
- D. Blood Typing: ABO Blood Groups and Rh Factor
 1. Based on presence or absence of antigens on surface of RBC
 2. Hemagglutination reactions
 - a. Perform test in school lab as a lab practice only
 3. Types of blood typing
 - a. ABO Blood Typing
 - (1) Determined by presence or absence of antigens A and B
 - (2) Determined by slide or tube method

- b. Rh Blood Typing
 - (1) Routinely performed along with ABO typing
 - (2) Named for rhesus monkey
 - (3) Rh factor found on surface of RBC
 - (4) Rh positive and Rh negative
 - (5) About 85% of North Americans are Rh positive
 - (6) Can develop antibodies
 - (7) Importance of knowing Rh blood factor
 - (a) For transfusions
 - (b) For pregnancy
- E. Semen Analysis
 - 1. When performed
 - a. To determine sperm cell count
 - b. As part of complete fertility workup
 - c. To evaluate effectiveness of vasectomy (PVSA)
 - d. To determine paternity
 - e. To substantiate rape cases
 - 2. Reference values
 - 3. Semen Composition
 - a. Composite solution produced by testes
 - b. Spermatozoa suspended in seminal plasma
 - c. Variation in composition between different portions of fluid as ejaculated
 - 4. Altering Factors in Semen Analysis
 - a. Several drugs/chemicals
 - b. Orchitis
 - c. Testicular atrophy
 - d. Testicular failure
 - e. Obstruction of vas deferens
 - f. Cigarette smoking
 - g. Coffee drinking
 - h. Fever
 - 5. Procedure for semen analysis
- F. Phenylketonuria (PKU) Test
 - 1. About PKU
 - a. Inherited condition
 - b. Amino acid phenylalanine not metabolized
 - c. Causes urine to have mousy or musty odor
 - 2. Routine screening of the newborn
 - 3. Tests for excess phenylalanine in blood or urine
 - 4. Many other tests performed on sample as determined by individual state regulations
 - 5. Blood Testing for PKU
 - a. Guthrie screening test
 - b. Heel-stick capillary blood collected onto “filter paper” test card
 - c. Factors that may influence the Guthrie test
 - (1) Feeding problems
 - (2) Failure to ingest sufficient phenylalanine
 - (3) Premature infants
 - (4) Drugs taken by mother or infant
- G. Tuberculosis (TB): *Mycobacterium* and Testing
 - 1. Morbidity on the rise
 - 2. Advisory Council for Elimination of Tuberculosis recommends screening high-risk groups
 - 3. Cause of TB
 - a. *Mycobacterium tuberculosis*
 - b. Ziehl-Neelsen method of identification

4. Resistance in Mycobacteria
 - a. Tolerance for desiccation and many disinfectants
 - b. Resistant to most antibiotics
 - c. Overcoming bacterial resistance
 - d. Susceptible to heat
 - e. Killed in milk by pasteurization
5. Transmission of Infectious TB
 - a. Contagious
 - b. Most new cases (75%) occur by inhalation of cough-produced airborne droplets from symptomatic or asymptomatic persons
 - c. Conditions that contribute to transmission
 - (1) Poverty
 - (2) Crowded conditions such as mental health hospitals and prisons
 - (3) Poor health or weakened immune systems
 - d. Related to rise in AIDS
6. Diagnosis of TB
 - a. Isolation, identification, and diagnosis procedures
 - b. Recommended that patients with questionable purified protein derivative (PPD) have chest x-ray
 - c. Presence of acid-fast rods in sputum
 - d. Vaccination with BCG (bacillus Calmette-Guérin)
7. Screening for TB: Skin Testing
 - a. May be part of routine examination or prerequisite for school or employment
 - b. Mantoux test
 - c. Reading the test
- H. Blood Glucose
 1. Fasting Blood Glucose
 - a. Used to screen for diabetes mellitus, Cushing syndrome, and acute stress response
 - b. Reference glucose values
 2. Two-Hour Postprandial Blood Glucose
 - a. Performed after eating
 - b. Used to screen for diabetes and to monitor insulin dosage
 - c. Glucola
 - d. Blood sample taken
 3. Glucose Tolerance Test
 - a. Follows fasting urine and blood samples
 - b. Patient consumes glucose test solution
 - c. Blood and urine samples taken at timed intervals after ingestion
 - d. Symptoms
 4. Automated Methods of Glucose Analysis
 - a. HemoCue B-Glucose system
 - b. Handheld glucose meters (glucometers)
 - c. Glucose controls
 - d. Tips for patients selecting appropriate glucose meter
 - e. Reflectance photometry analyzers
 5. Testing panels
 6. Glycosylated Hemoglobin/HbA1c
 - a. A stable molecule formed when sugar and hemoglobin bind on the RBC
 - b. The HgA1c test measures the average of the glucose levels on the RBCs over life of cells (about 120 days)
 - c. Elevated finding indicates poor glucose control
- I. Cholesterol and Lipids
 1. Chemistry of Cholesterol
 - a. Reference values for total blood cholesterol
 - b. Consists of carbon, hydrogen, and oxygen
 - c. Saturated fatty acid

2. Functions of Cholesterol
 - a. Our body produces cholesterol
 - b. Also obtained in foods of animal origin, meat, eggs and dairy products
 - c. Cells use cholesterol to manufacture steroid hormones
 - d. Important component of bile and cellular membranes
 - e. Essential for many vital functions and a normal constituent of blood
 - f. May accumulate to dangerous levels in our body
3. Lipoproteins and Cholesterol Transport
 - a. High-density lipoprotein (HDL)
 - b. Low-density lipoprotein (LDL)
 - c. Reference ranges for HDL and LDL cholesterol
4. Cholesterol testing
5. Triglycerides
 - a. Type of lipid found in blood that serves as source of energy
 - b. Liver converts fatty acids and glycerol from diet
 - c. Adipose tissue
 - d. Reference values
 - e. Factors that influence serum triglyceride levels
 - f. Inflammation
 - (1) systemic inflammation related to arteriosclerosis
 - (2) C-reactive protein tests
 - (3) Reference chapter 41
- J. Blood Chemistry Tests
 1. Measure concentration of chemistries in blood serum
 2. Blood chemistry reference values
 3. Factors that influence serum chemistries
 4. Significance of abnormal blood chemistry levels
- X. APPLICATION
 - A. Use the Learning Outcomes at the beginning of Chapter 44 in the text as a basis for questions to assess comprehension.
 - B. See the Classroom Activities section below for numerous application activities.
 - C. Assign students to complete Chapter 44 in the Study Guide.
 - D. Complete the Procedures in Chapter 44, using the Competency Manual to evaluate.
- XI. EVALUATION
 - A. Evaluate any assigned application activities.
 - B. Evaluate student participation during classroom activities, labs, and presentations.
 - C. Grade responses to Chapter 44 in the Study Guide.
 - D. Evaluate student performance on Chapter 44 Procedures.
 - E. Evaluate each student's participation in group projects to ensure that each is contributing to the group's process in a productive and positive manner.

Classroom Activities

1. Have students tested to determine their blood types.
2. Assign students to research pregnancy and why it is so important to perform a pregnancy test before females are prescribed certain drugs or exposed to x-rays or undergo surgery.
3. Assign students in small groups to research one of the specialty areas in this chapter. Each group should prepare a 20-minute presentation and submit a 3- or 4-page inquiry paper on their chosen area.
4. Ask your local diabetes association to send a representative to speak to your class about diabetes mellitus, particularly the importance of the regulation of blood glucose levels.
5. Have students keep track of the amount of cholesterol they consume for a 1-week period.
6. Examine food labels to determine high- and low-cholesterol products and trans fat levels.

Answers to Case Studies

Case Study 44-1

Refer to the scenario at the beginning of the chapter. Audrey takes pride in paying attention to every detail when performing lab tests. She is also committed to explaining processes to her patients and increasing their comfort level.

1. What are some key points to adhere to when performing testing using a CLIA waived test kit to ensure accuracy?

Follow manufacturer's instruction regarding the storage, handling, and performance of the test, look for expiration date, follow all quality control test instructions, make sure patient has been instructed properly and that patient samples have been obtained, prepared, handled, and tested properly.

2. What are some specific ways you can reassure a patient to have confidence in your ability?

Show the patient that you are organized, professional, and willing to explain the procedure to them and answer their questions.

Case Study 44-2

Anna Preciado, CMA (AAMA), a clinical medical assistant with Drs. Lewis and King, has performed many venipunctures during her training at college, throughout her practicum, and since her employment with Drs. Lewis and King. She has not, however, performed a heelstick capillary draw since she was in college and even then she practiced on a doll. Until now another medical assistant in the clinic was doing all the heelstick capillary draws for PKU testing, but Anna is ready to start performing them herself. She is concerned and understandably nervous about performing this procedure on an infant.

1. What course of action should Anna take to prepare herself for performing a procedure that she has not done in several years?

Anna should review the office procedures manual to be sure she knows all aspects of the specific procedure. Anna should also let her clinical supervisor or one of the providers know that she feels uncomfortable performing this procedure. The clinical supervisor or provider may be able to (a) review the procedure with Anna to give guidance and answer any specific questions; (b) actually accompany Anna while she does the procedure; or (c) perform the procedure with Anna attending. It is important to let your supervisor know of any concerns about performing clinical procedures. Inadequate or inaccurate performance can cause risks to patients and to the practice.

If the practice is relying on Anna to perform all clinical duties, Anna may not be as valuable to the practice if she is unwilling to perform procedures expected of her, within the scope of her training. Rather than telling her supervisor that she is not capable or willing to do the procedure, however, Anna should let her supervisor know that she does not feel confident she knows the procedure well enough to do it correctly but is willing to try with help.

2. Once Anna feels she is technically ready to perform the PKU blood test, what should she do to ensure that the procedure goes well?

Anna could help make the procedure an effective one by:

- a. Making sure that all necessary equipment and supplies are on hand and within easy access.
- b. Making sure she knows why the test is necessary so that she can accurately explain the procedure to the parents, especially if they have questions; if Anna knows the answers to their questions, she will feel more confident.
- c. Requesting the parents' assistance to hold and reassure the baby as much as possible.
- d. Using a steady, quick, and accurate motion when actually performing the heelstick; a slow stick of the lancet will cause more distress to the infant and will not produce a better sample.
- e. Realizing and expecting that the infant will cry when the heelstick is performed. Anna should not be upset by this and she should also let the parents know that this will happen so they are not upset.

Answers to Certification Review

1. c. pelvic inflammatory disease
2. d. refrigerated at 4°C
3. b. infectious mononucleosis
4. d. hCG hormone
5. c. type O RBCs have A and B antigens on the cell.
6. c. Rh factor was discovered by experiments on rhesus monkeys.
7. d. avoid the consumption of fats several days before the test
8. a. newborns
9. b. forearm 3 to 4 inches from bend of arm
10. a. 50–70 mg/dL

This project was funded at \$3,000,000 (100% of its total cost) from a grant awarded under the Trade Adjustment Assistance Community College and Career Training Grants, as implemented by the U.S. Department of Labor's Employment and Training Administration. Rogue Community College is an equal opportunity employer/program. Auxiliary aids and services, alternate form and language services are available to individuals with disabilities and limited English proficiency free of cost upon request.

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