Edition 1

Instructor's Guide for

Essentials of Medical Laboratory Practice:

A GUIDE FOR MEDICAL ASSISTANTS

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INTRODUCTION

Getting to Know the *Essentials of Medical Laboratory Practice* Text

The authors have worked hard to provide an accurate reader-friendly informative text that contains practical information about the clinical laboratory. This text is designed for use with medical assistants, phlebotomists, and other allied health professionals training to work in the laboratory setting. Whenever possible, learning outcomes, assessment activities and other materials have been categorized according to Bloom's Taxonomy. Other special features of this text include the following:

- Six sections have been designed to assist with orientation to the laboratory.
  - Overview of the Laboratory
  - Specimen Collection and Processing
  - Hematology and Coagulation
  - Clinical Chemistry
  - Urinalysis
  - Immunology
- Features in each section include the following:
  - On the Horizon: Content overview and relevance of the information in this part of the text
  - Case in Point: A patient scenario with relative content for that section and content related questions for consideration
  - What Does It All Mean?: This feature is located at the end of each section. It reinforces the material in that section and emphasizes related knowledge for the allied health professional.
- Chapter Organization: Each chapter contains the following elements:
  - Chapter Outline
  - Learning Outcomes: Related to all assessments throughout the chapter
  - Key Terms: These are defined in context in the chapter as well as in the glossary at the end of the chapter.
  - CAAHEP/ABHES Standard correlation
  - Procedures presented where appropriate
  - Test Your Knowledge self-assessment questions throughout each chapter
  - Review questions and case studies at the end of each chapter, as well as resources and suggested readings to extend opportunities for understanding the material
- Each text includes an interactive CD and provides student access to the DavisPlus website.

Pacing the Course

This course may be offered over quarters or semesters of various lengths. A sample syllabus is provided, including a sample schedule for various time frames. To cover the material in this text, it will be necessary to allow at least 60 hours total in lecture and lab sessions. This could be accomplished with 6 class hours weekly in a 10-week quarter, 5 class hours weekly in a 12-week semester, or 3.75 class hours weekly in a 16-week semester.

Sample Syllabus Medical Laboratory Procedures

Instructor:

Office: ***E-mail:*** ***Webpage:***

Phone: ***Fax:***

Office Hours:
Course Description: Insert this from your college catalog.
Credits:
Class Times:

Required Text: Essentials of Medical Laboratory Practice: A Guide for Medical Assistants (with accompanying activity CD) by Constance L. Lieseke and Elizabeth A. Zeibig, F. A. Davis 2012.

Assessment Methods: Quizzes, tests, competency assessments, homework, etc.

Grading Policy: The final grade for this class will be based on the information presented here. This will specify the number of points available for various types of activities, including attendance and all assessment methods.

Classroom Courtesy: It is expected that all students will treat each other and the instructor with respect and courtesy. Please turn off all cell phones prior to class, and be ready to learn!

Homework: No late homework and/or projects will be accepted for credit.

LEARNING OUTCOMES

This information will come from the formal course outline for this class.

Attendance: The attendance policy is based on the preferences of the instructor. This is a suggestion:

Daily attendance is **very important**. New information will be presented each class period, and numerous absences will adversely affect your progress and grade. **It is the student's responsibility to sign in each class period. There will be no make-up sessions available. If a student misses more than 20% of this course, the grade assigned will be decreased by one entire letter grade.**

Additional Help: Suggested information:

You can get additional help with your assignments in several ways. Please get help promptly if you don't understand! Tutoring is available through the Tutoring Center on campus by appointment. Also, I have office hours (see the front page of the syllabus) and can be available at other times by appointment. I also recommend that you exchange phone numbers and/or e-mail addresses with at least one of your classmates so that you can work together if necessary. This classmate should also be contacted if you miss a class session and need to check on the material covered that day.

Students With Disabilities: It is suggested that all syllabi include information for students who need accommodations. This is a recommended statement:

Reasonable accommodations are available for students with documented disabilities. If you are a student with a permanent or temporary disability and would like to request accommodations, please contact the [Insert the appropriate information for your institution].

Safety: Insert the safety statements and rules for your classroom environment.

Academic Honesty: It is assumed that students understand the importance of doing their own work. However, if a student is caught cheating, it will result in a zero for the assignment and a possible referral to the disciplinary committee through the dean of student services.

Grading Scale: Insert the grading scale approved by your institution.

Sample Schedule for 10-Week Course

Week 1	Chapters 1, 2, 3
Week 2	Chapters 4, 5, 6
Week 3	Chapters 7, 8, 9
Week 4	Chapters 7, 8, 9 continued
Week 5	Chapters 8, 9, 10; midterm examination
Week 6	Chapters 11, 12, 13
Week 7	Chapters 14, 15
Week 8	Chapters 16, 17, 18
Week 9	Chapters 19, 20, 21, 22
Week 10	Chapters 23, 24; final examination

Sample Schedule for 12-Week Course

Week 1	Chapters 1, 2, 3
Week 2	Chapters 3, 4
Week 3	Chapters 5, 6
Week 4	Chapters 7, 8
Week 5	Chapters 7, 8 continued
Week 6	Chapters 9, 10; midterm examination
Week 7	Chapters 11, 12, 13
Week 8	Chapters 14, 15
Week 9	Chapters 16, 17, 18
Week 10	Chapters 19, 20, 21, 22
Week 11	Chapters 23, 24
Week 12	Complete venipuncture as needed; final examination

Sample Schedule for 16-Week Course

Week 1	Chapters 1, 2
Week 2	Chapters 3, 4
Week 3	Chapters 5, 6
Week 4	Chapters 7, 8
Week 5	Chapters 7, 8 continued
Week 6	Chapters 9, 10
Week 7	Chapters 9, 10 continued; midterm examination
Week 8	Chapters 11, 12, 13
Week 9	Chapters 11, 12, 13 continued
Week 10	Chapters 14, 15
Week 11	Chapters 16, 17, 18
Week 12	Chapters 16, 17, 18 continued
Week 13	Chapters 19, 20, 21, 22
Week 14	Chapters 19, 20, 21, 22 continued
Week 15	Chapters 23, 24
Week 16	Chapters 23, 24 continued; final examination

TEACHING SUGGESTIONS

This course is challenging to teach, as the instructor must find a way to allow enough time for the necessary lecture components as well as time to establish competency in the laboratory skills that are introduced throughout the text. Organization of materials, development of structured lesson plans for each class or each section, and careful recordkeeping are all imperative to successfully teach this course. Suggestions for successful class organization are listed below.

Lecture and Testing Materials

PowerPoint presentations are included with adoption of this text. These provide the basic material from each chapter, as well as additional information for suggested websites and questions to check comprehension. The PowerPoint presentations may be customized if necessary, and can also be printed for students.

In addition, a comprehensive Test Bank is available for instructors to utilize if desired. There are more than 350 test questions available including true/false, multiple choice, fill in the blank, and short answer options.

The PowerPoint presentations and the Test Bank are available on the companion site for *Essentials of Medical Laboratory Practice* on DavisPlus. The website also includes two interactive exercises for each section of the text. The accompanying CD provides an additional six interactive exercises for each section.

Frequency and Types of Assessments

Weekly quizzes allow an opportunity to check student comprehension before introduction of new material. These can be short 5- or 10-question quizzes. Instructors can also assign activities from the interactive CD or DavisPlus for students to complete before class.

It is suggested that this class include at least two exams, usually presented as a midterm and final examinations. In addition, practical examinations that assess clinical skills are recommended. These can be designed with stations where students must answer questions about the materials or processes recently introduced in the laboratory sessions.

Classroom Assistance

Since this course includes the development of invasive procedure skills as well as exposure to blood and other body fluids, it is very important that appropriate supervision is provided for student safety and success. It is recommended that there is a qualified instructor or classroom assistant (e.g., a medical assistant trained in phlebotomy and laboratory testing procedures) for every 10 students. Some class periods will be more critical than others, but appropriate supervision must be addressed before the course begins.

For invasive procedures, students should be allowed to practice and develop their skills on a manikin arm with careful supervision and immediate feedback until they have developed a level of competency that will allow them to be safe as they attempt to withdraw blood from a classmate successfully. One-on-one supervision is ideal for this skill, as it reduces the potential for bloodborne pathogen exposure.

Assumption of Responsibility

Students participating in invasive procedures that utilize other students as “patients” should all sign a statement of responsibility that includes the risks of the procedures that are included in the class. In addition, students should be required to be vaccinated against hepatitis B (or sign an appropriate form refusing the vaccination) before they begin this course.

Safety

Eating and drinking are not to be allowed in the laboratory area, and food must not be stored where the specimens are stored. Signs should be posted to remind students about these rules. Students must be instructed about appropriate hand-washing techniques and hand sanitizer should be readily available for student use.

Instructors should not be reluctant to remove a student from this course if it appears that they pose a safety risk to others or themselves. Some students are not capable of performing invasive procedures safely, and are capable of causing class disruptions so severe that the instructor cannot conduct the course. Instructors need to investigate the policy of their institution before class begins to see how they can legally remove a student who appears to be unsafe from a class section.

Teams

This class requires a lot of interaction with other members of the class for skills practice and performance of laboratory procedures. It is suggested that teams are established early in the course. Ideally there will be even numbers of students in each team (for capillary and venipuncture practice). Groups of 6 to 10 students work well for each team. Teams can be changed midway through the course to allow for variety in performance of phlebotomy procedures.

Stations

When practicing clinical skills or introducing new concepts, it works well to set up stations around the classroom with a different task presented at each station. This requires advanced planning and time for setup on the part of the instructor, but provides an opportunity for an organized work environment. When students arrive for class, the instructor assigns teams to each station, with a rotation after a specified period of time until all teams have experienced all the stations.

Attendance

Attendance is extremely important if students are to develop their clinical skills. It is recommended that points be assigned to classroom attendance. Instructors should decide how/if skills can be made up if an absence is unavoidable and present this information to students at the beginning of class.

Venipuncture and Capillary Puncture

These skills will be introduced early in the course. It is recommended that students work with manikin arms until the steps involved in the process have been demonstrated numerous times before they proceed to perform invasive procedures on a classmate.

It will be necessary to continue with capillary puncture and venipuncture throughout the course to allow for adequate practice to develop competency, as well as to obtain samples for processing and testing. Stations for this can be set up almost every class.

When planning the curriculum for this course, special care must be exercised when purchasing classroom supplies. Students must be provided with needles that represent the safety adaptations that they may encounter in the workplace so that they can gain comfort with these devices.

Practice Supplies

Local laboratories and physician offices often have expired tubes and culture collection materials that they are willing to donate to the program. These can be used for practice procedures without increasing the budget of the program.

Clean Up

It is important to establish a pattern for students to assist with putting away supplies and appropriate disinfection of work surfaces and equipment. It is recommended that this assignment occur early in the course so that the pattern is developed early. Appropriate cleaning materials must be used; these should be wipes or sprays that are capable of destroying hepatitis B and HIV on surfaces. Students should also be directed to wear appropriate personal protective equipment when cleaning.

Personal Protective Equipment and Appropriate Attire

Students should wear nonabsorbent shoes with closed toes and fluid-resistant laboratory coats approved by the Occupational Safety and Health Administration (OSHA) during laboratory sessions. In addition, gloves, face shields, safety glasses, safety-equipped sharps, and other materials should be utilized as appropriate for all testing procedures.

Laboratory Tour

If possible, a tour of a full-service laboratory is very beneficial for students in this course. It allows a frame of reference for the material presented. This can be accomplished in small groups if necessary.

Competency Assessments

Instructors must decide which skills require competence on the part of the student and which skills may be accomplished more as activities. For those that require competence, students must be allowed ample time to practice the skill (e.g., venipuncture) but should only be allowed two attempts to demonstrate competence. For other activities such as performance of Clinical Laboratory Improvement Amendment (CLIA) waived testing procedures, it may not be possible for students to practice the procedure numerous times due to the cost of the testing kits and reagents. These may be documented as supervised activities in which students are expected to fully participate and follow the instructions for the task, but additional practice sessions may not be available.

MASTER SHEET FOR DOCUMENTATION OF COMPETENCY

Procedure Number	Procedure Title	Competency? (X if yes)	Activity? (X if yes)	Date of Final Performance	Comments
1-1	Completing a Laboratory Requisition				
1-2	Use a Laboratory Directory				
1-3	Distinguish Between Normal and Abnormal Test Results				
3-1	Perform Hand Washing				
3-2	Sanitize Hands With an Alcohol-Based Hand Sanitizer				
3-3	Removal of Contaminated Gloves				
4-1	Documentation of Qualitative Quality Control Values				
4-2	Documentation of Quantitative Quality Control Values				
6-1	Microscope Use				
6-2	Operating the Centrifuge				
8-1	Venipuncture Using the Evacuated Tube System				
8-2	Venipuncture Using a Syringe				
8-3	Venipuncture Using the Butterfly (Winged Infusion) System				
8-4	Blood Collection From a Capillary Puncture				
8-5	Creation of Peripheral Blood Smear				
8-6	Quick Stain of Peripheral Smear Using Camco Quik Stain II				
9-1	Instructing a Patient for Collection of a Clean-Catch Midstream Urine Specimen for Urinalysis and/or Culture				
9-2	Instructing a Patient for Collection of a 24-Hour Urine Specimen				

MASTER SHEET FOR DOCUMENTATION OF COMPETENCY (Continued)

Procedure Number	Procedure Title	Competency? (X if yes)	Activity? (X if yes)	Date of Final Performance	Comments
10-1	Collection of a Throat Specimen for Culture or Strep Screen				
10-2	Blood Culture Collection Procedures				
10-3	Gram-Staining Procedure				
10-4	Quadrant Streaking Inoculation Procedure				
13-1	CLIA-Waived Hemoglobin Testing Using the HemoCue Hemoglobin Analyzer				
13-2	CLIA-Waived Hematocrit Testing Using the StatSpin CritSpin Microhematocrit Centrifuge and Digital Reader				
14-1	Perform CLIA-Waived Sediplast Westergren Erythrocyte Sedimentation Rate				
15-1	CLIA-Waived PT/INR Testing Using the CoaguChek S Instrument				
17-1	Performance of HbA1c Using Bayer's A1c Now*plus* System				
17-2	Performance of Whole Blood Glucose Testing				
18-1	Cholesterol Testing Using the Cholestech LDX System				
18-2	Electrolyte Testing Using an Abbott iSTAT Chemistry Analyzer				
20-1	Observation and Documentation of Urine Physical Properties				
21-1	CLIA-Waived Chemical Examination of Urine Using Manual Reagent Strip Method				
21-2	Chemical Examination of Urine Using Automated Reagent Strip Method				

MASTER SHEET FOR DOCUMENTATION OF COMPETENCY (Continued)

Procedure Number	Procedure Title	Competency? (X if yes)	Activity? (X if yes)	Date of Final Performance	Comments
21-3	Fecal Occult Blood Testing Using Guaiac Method				
21-4	Fecal Occult Blood Testing using iFOB Quickvue Method				
22-1	Preparation of Urine Sediment for Microscopic Examination				
22-2	Focusing the Urine Sediment Under the Microscope				
24-1	Perform a CLIA-Waived Rapid Strep Screening				
24-2	CLIA-Waived Mononucleosis Testing Using an OSOM Mononucleosis Testing Kit				
24-3	CLIA-Waived Urine HCG Testing Using the Beckman Coulter Icon 25 Testing Kit				

OVERVIEW OF CHAPTER RESOURCES

The textbook is divided into six sections. At the beginning of each section, the answers to the Case in Point feature will be provided so that these can be discussed as the section is covered in class.

For each chapter, the following resources will be provided, as appropriate.

a. Chapter Learning Outcomes
b. Suggested In-Class and Lab Activities *(Incorporating Bloom's Taxonomy)*
c. Procedure (Competency) Assessment Sheets
d. Suggested Homework Assignments *(Incorporating Bloom's Taxonomy)*
e. Answers to Questions Not Provided in the Text
f. How and when to use any additional Instructor Resources that might be available to them for your text
   i. PowerPoint presentations
   ii. Instructor Test Banks
   iii. Online student quizzes, interactive exercises
g. Any additional resources not included elsewhere in the text or PowerPoint presentations that might be helpful (list of websites, other text references) to further the student's study in this area

Chapter Resources

SECTION I

Overview of the Clinical Laboratory

Answers to Questions for Consideration for Section I

1. **Compare and contrast the three phases of laboratory testing: pre-analytical, analytical, and post-analytical.**
   The pre-analytical phase of testing refers to patient preparation and specimen collection. Most errors associated with laboratory testing tend to occur during this phase of the process. The analytical phase of laboratory testing is the actual performance of the test and assuring quality during the process. The post-analytical phase consists of examining the results obtained, taking into account several considerations such as the effect of them due to interfering substances. Once deemed as accurate as can be, the results are released to the physician or other primary health-care provider.
2. **Government regulations allow medical assistants and other health-care support staff to perform what category of laboratory tests?**
   CLIA-waived testing and when appropriately trained, CLIA moderate complexity testing
3. **What is the purpose of practicing universal precautions when dealing with laboratory specimens?**
   Practicing universal precautions means that every specimen is handled as though it was infective for bloodborne pathogens. Considering every sample in this regard reduces the likelihood of spreading potentially infective diseases from person to person.
4. **True/False. Laboratory test results can only be reported if the quality control samples are run and found to be in range.**
   True. When quality control samples are in range, it is presumed that the actual test sample results can be considered accurate.
5. **What is the name of the federal act that regulates laboratory testing personnel?**
   Clinical Laboratory Improvement Act of 1988 (CLIA '88)

Chapter 1

The Clinical Laboratory

Learning Outcomes

1-1 Define the key terms for this chapter.

1-2 Describe the different types of laboratories presented in the text and the common tests available in each.

1-3 Identify the different departments in a hospital or reference laboratory and list some of the tests performed in these departments.

1-4 Provide several reasons that laboratory testing might be performed.

1-5 Explain the roles a medical assistant might play in a laboratory setting.

1-6 List and justify the various pieces of information that must be included on a laboratory requisition.

1-7 Explain the concept of Advance Beneficiary Notice (ABN) of Noncoverage and how it affects laboratory reimbursement.

1-8 Explain the purpose of a laboratory directory, as well as how a laboratory directory may be used when preparing to collect a specimen.

1-9 Compare and contrast the function of a laboratory requisition and a laboratory report.

1-10 Identify the different phases of laboratory testing, and explain the flow of the laboratory testing process.

1-11 Provide examples of pre-analytical, analytical, and post-analytical procedures and how they affect the quality of laboratory testing.

Suggested In-Class and Lab Activities

1. Visit the websites for various local and/or national laboratories (e.g., Quest or LabCorp) and examine their test menus and specimen requirements. In addition, request printed copies of the laboratory directories so that they can be consulted during class periods if necessary. Interactions on the websites could also be assigned as homework. *(Bloom's: Understanding)*
2. Gather requisitions from laboratories in the local area and review them with students. Examine how some requisitions may provide the tube colors for various test procedures and where the specific items are documented on the different requisitions. Set up opportunities for students to use these requisitions with the laboratory directories from the various laboratories to verify what type of specimen is necessary for certain tests. *(Bloom's: Applying)*
3. Request examples of laboratory reports from local laboratories or physician offices. Explain how some of the information submitted on the requisition is included in this final report. Emphasize the mechanisms utilized on the report to document normal and abnormal results based on the reference ranges. Utilize reports from different specialties (microbiology, chemistry, hematology, urinalysis) if possible. *(Bloom's: Understanding)*
4. Utilize the National Coverage Determination (NCD) information from the Centers for Medicare and Medicaid Services (CMS; http://www.cms.gov/medicare-coverage-database/overview-and-quick-search.aspx) to have students work with requisitions and diagnosis codes to fill out ABN forms when necessary. This is to be introduced at this time, but it should continue to be utilized as the course proceeds. The NDC sheets can be printed and placed in three-ring binders for student reference. *(Bloom's: Analyzing)*
5. Whenever possible, stress which phase of laboratory testing the students are working with. For instance, as they work with the requisitions, clarify that this is part of the pre-analytical phase and when working with the reports, explain that this is part of the post-analytical phase. *(Bloom's: Understanding)*
6. Contact a local laboratory to arrange a tour for the students. Provide them with a worksheet to allow for a frame of reference as they tour the facility. The names of the departments, the number of

employees working in the departments, the number of specimens processed, and the areas where the different phases of laboratory testing are addressed would be good additions to a worksheet. *(Bloom's: Understanding)*

7. Provide class time for the students to complete competencies 1-1: Completing a Laboratory Requisition, 1-2: Use a Laboratory Directory, and 1-3: Distinguish Between Normal and Abnormal Test Results. *(Bloom's: Applying)*

Procedure (Competency) Assessment Sheets

PROCEDURE 1-1

Completing a Laboratory Requisition

CAAHEP/ABHES Standards

✔ None

Name _____ Date _____ Score _____

Instructor _____

TASK

Correctly fill out a laboratory requisition, including all necessary information for reimbursement. Include an ABN if necessary.

STANDARDS

In the time specified and in the scoring parameters of the instructor, the student will correctly fill out a laboratory requisition, including all required information for reimbursement and verify whether an ABN is necessary for reimbursement.

CONDITIONS

✔ Laboratory requisition
✔ Patient demographic information
✔ Patient insurance information
✔ Laboratory order from qualified health-care professional
✔ ICD-9 code for diagnosis or symptoms
✔ Advance Beneficiary Notice of Noncoverage

TIME: _____

Points assigned reflect importance of step to meeting the task.

✔ Important = 1 pt
✔ Essential = 5 pts
✔ Critical = 15 pts

Automatic failure results if any of the **CRITICAL TASKS** are omitted or performed incorrectly.

(To use a pass/fail system, instructors can record "P" or "F" in the Pts Earned (Pass/Fail) column.)

Performance Standards	Pts	Pts Earned (Pass/Fail)	Comments
1. Greet and identify patient using at least two unique identifiers.	15	_____	_____
2. Verify the test ordered.	15	_____	_____
3. Fill in the requisition with the patient's demographic information by printing it clearly, or by using a data entry program if available at your location.	15	_____	_____
4. Ask the patient for a copy of his/her insurance card.	5	_____	_____
5. Copy both sides of the insurance card and add the information to the requisition in the appropriate site.	5	_____	_____
6. Establish the relationship of the patient to the insured. Document that on the requisition.	5	_____	_____
7. If the patient has a medication level ordered (e.g., Digoxin), ask when the patient took	15	_____	_____

PROCEDURE 1-1

Completing a Laboratory Requisition (Continued)

their last dose. Utilize the laboratory directory if necessary to verify whether it is the correct time to draw the specimen. Note the time of the last dose on the requisition.			
8. If the patient has Medicare Part B as their primary insurance coverage, verify whether an Advance Beneficiary Notice of Noncoverage is necessary. This must be completed and signed before the specimen collection begins.	15	_____	_____
9. Clarify which physician ordered the test and document that on the requisition. If additional copies are to be sent to other health-care providers, add this information to the requisition as well.	5	_____	_____
10. Document whether the test was ordered as STAT or routine.	5	_____	_____
11. Check the requisition for an ICD-9 code for each test to be performed. If a code is not present, contact the health-care provider or check the chart to obtain a code.	15	_____	_____
12. Have the patient wait in a comfortable environment until the sample can be collected. Place the requisition in an appropriate location to alert other staff members that a specimen collection is waiting.	5	_____	_____
Total Points	**120**		

Documentation

Comments

_____

_____

_____

_____

_____

PROCEDURE 1-2

Use a Laboratory Directory

CAAHEP/ABHES Standards

✔ None

Name _____ Date _____ Score _____

Instructor _____

TASK

Utilize a laboratory directory to clarify the collection requirements and processing procedures for a laboratory order.

STANDARDS

In the time specified and in the scoring parameters of the instructor, the student will utilize a laboratory directory to ascertain collection requirements and processing procedures for a given laboratory order.

CONDITIONS

✔ Laboratory requisition
✔ Laboratory order from qualified health-care professional
✔ Laboratory directory book or database including laboratory service information

TIME: _____

Points assigned reflect importance of step to meeting the task.

✔ Important = 1 pt
✔ Essential = 5 pts
✔ Critical = 15 pts

Automatic failure results if any of the **CRITICAL TASKS** are omitted or performed incorrectly.

(To use a pass/fail system, instructors can record "P" or "F" in the Pts Earned (Pass/Fail) column.)

Performance Standards	Pts	Pts Earned (Pass/Fail)	Comments
1. Obtain the laboratory requisition or the laboratory order from the health-care provider. Verify the test ordered, especially if it is a test that may be performed on more than one body fluid.	15	_____	_____
2. Look up the test alphabetically using the computer database or the laboratory directory reference book.	15	_____	_____
3. Identify the type of specimen to be collected.	15	_____	_____
4. Verify any restrictions on specimen type, or notations of unacceptable specimens.	15	_____	_____
5. Verify the acceptable minimum volume, if listed.	15	_____	_____
6. Identify the specimen processing instructions.	15	_____	_____
7. Identify the schedule for performance of the test ordered.	5	_____	_____

PROCEDURE 1-2

Use a Laboratory Directory (Continued)

8. Prepare the necessary supplies to perform the specimen collection.	15	_____	_____
Total Points	**110**		

Documentation

Comments

PROCEDURE 1-3

Distinguish Between Normal and Abnormal Test Results

CAAHEP/ABHES Standards

CAAHEP 2008 Standards:
✔ II.A.2: Distinguish between normal and abnormal test results.

ABHES Standards:
✔ None

Name _____ Date _____ Score _____

Instructor _____

TASK

Utilize a laboratory report to identify normal and abnormal test results for a patient.

STANDARDS

In the time specified and in the scoring parameters of the instructor, the student will correctly identify normal results and abnormal results on the laboratory report.

CONDITIONS

✔ Laboratory report
✔ Pen, pencil, or highlighter

TIME: _____

Points assigned reflect importance of step to meeting the task.

✔ Important = 1 pt
✔ Essential = 5 pts
✔ Critical = 15 pts

Automatic failure results if any of the **CRITICAL TASKS** are omitted or performed incorrectly.

(To use a pass/fail system, instructors can record "P" or "F" in the Pts Earned (Pass/Fail) column.)

Performance Standards	Pts	Pts Earned (Pass/Fail)	Comments
1. Examine the laboratory report for all necessary information. This includes: patient name, gender and age, patient ID, laboratory results with documented reference ranges, date and time of collection and specimen testing, name of laboratory where testing performed.	15	_____	_____
2. Identify the column where the reference ranges are provided for the laboratory results.	15	_____	_____
3. Compare the patient results with the ranges or values listed in the reference range column.	15	_____	_____

PROCEDURE 1-3

Distinguish Between Normal and Abnormal Test Results (Continued)

4. Circle or highlight the results that are not within the reference ranges. Document High or Low next to the values in the provided area.	15	_____	_____
Total Points	**60**		

Documentation

Comments

Suggested Homework Assignments

There are no additional suggested homework assignments for this chapter.

Answers to Questions Not Provided in the Text

ANSWERS TO TIME TO REVIEW QUESTIONS

1. c. Someone who is asymptomatic does not exhibit symptoms. (Outcome 1-1)
2. True (Outcome 1-1)
3. Both types of labs have a wide variety of tests performed; both have different departments such as hematology, chemistry, etc.; both are staffed by laboratory professionals with specialized training in laboratory medicine, such as Medical Laboratory Technicians. (Outcome 1-2)
4. No. This type of testing may be performed in a POL, hospital, or reference laboratory. (Outcome 1-2)
5. c. Serology (Outcome 1-3)
6. Specimen Processing Department (Outcome 1-3)
7. b. Ongoing assessment of the patient's progress and treatment (Outcome 1-4)
8. e. All of the above (Outcome 1-5)
9. False. Always include a diagnosis code on all requisitions at the time the test is ordered. (Outcome 1-6)
10. No. The requisition is also used for reimbursement documentation, and to enter demographic information into the laboratory database. (Outcome 1-6)
11. a. Advance Beneficiary Notice of Noncoverage (Outcome 1-7)
12. Storage (Outcome 1-8)
13. False. These terms refer to two different forms, and are not interchangeable. (Outcome 1-9)
14. All three phases. A medical assistant may be involved in collection, testing the specimen, and handling the laboratory report after testing. It is imperative that medical assistants fully realize their potential impact on the process. (Outcome 1-11)

ANSWERS TO CASE STUDY QUESTIONS

Case Study 1-1

1. a. Yes, as the agar may not perform as expected when used in the laboratory because the storage requirements have not been followed.
   b. The pre-analytical and analytical phases may both be impacted. The pre-analytical phase includes all the procedures performed before the collection of a specimen, so the storage of the agar used to help support microbiology specimen growth is part of this phase. The analytical phase includes all the testing components and procedures, so since the agar may not support specimen growth properly, this phase may be impacted as well.

Additional Instructor Resources for the Text

1. Utilize the PowerPoint Presentations created for Chapter 1.
2. Instructor Test Bank: The Test Bank has an additional 21 questions for this chapter that can be utilized for assessment.
3. Interactive exercises for this chapter are on the CD included with the text. These can be assigned to students as homework or performed as a group project to provide specific emphasis for a certain concept. Additional exercises are available on DavisPlus.

Additional Resources

Excellent information about the phases of laboratory testing may be found on the Centers for Disease Control and Prevention (CDC) website at this link: http://wwwn.cdc.gov/mpep/labquality.aspx.

The Center for Phlebotomy Education also offers videos emphasizing appropriate phlebotomy principles and practices, as well as other information. The website for this organization is http://www.phlebotomy.com/.

Becton Dickinson has an extensive library of educational material. The website for this company is http://www.bd.com/.

Chapter 2

Regulations Governing Laboratory Personnel

Learning Outcomes

2-1 Define the key terms.

2-2 List the laboratory professionals present in a typical hospital, reference or physician office laboratory.

2-3 Describe the personnel structure of the laboratory settings presented in the text.

2-4 Explain how the duties of laboratory professionals may vary dependent on their education and credentials.

2-5 Describe the role of a medical assistant in the clinical laboratory.

2-6 Explain the focus of CLIA '88, and why it was developed.

2-7 Demonstrate understanding of the levels of laboratory testing designated by CLIA '88.

2-8 Identify the laboratory professionals qualified to perform the various levels of laboratory testing as allowed by CLIA '88.

2-9 Identify the agencies responsible for overseeing CLIA '88 compliance.

Suggested In-Class and Lab Activities

1. Bring in guest speakers from a large laboratory and also from a physician's office laboratory to discuss the structure of their organization and their daily duties. *(Bloom's: Understanding)*
2. Visit the U.S. Food and Drug Administration (FDA) website (specified in the PowerPoint presentations for this chapter) to examine the lists of CLIA-waived procedures. *(Bloom's: Remembering)*
3. Use a catalog from a laboratory supply company to stress the CLIA level labeling that is provided when ordering test kits. *(Bloom's: Remembering)*

Procedure (Competency) Assessment Sheets

There are no procedures for this chapter.

Suggested Homework Assignments

1. Print out copies of the manufacturer insert for a CLIA-waived test procedure. Ask students to identify different parts of the insert and answer questions about the test procedure steps, required specimens, interfering substances, and so forth. *(Bloom's: Analyzing)*

Answers to Questions Not Provided in the Text

ANSWERS TO TIME TO REVIEW QUESTIONS

1. a. Is not fixed and is easily destroyed (Outcome 2-1)
2. False. Ambulatory care generally refers to the population who can walk into and out of a medical facility for treatment, not inpatients. (Outcome 2-1)
3. e. a, b, and c (Outcome 2-2)
4. True. Pathologists usually are the directors for reference laboratories. (Outcome 2-3)
5. e. a, b, and c (Outcome 2-4)

6. A medical assistant may perform phlebotomy, assist with specimen processing, answer phones, perform CLIA-waived testing, prepare specimens for examination in specific departments, and with more advanced training perform arterial blood draws and other duties. (Outcome 2-5)
7. b. Clinical Laboratory Improvement Amendment of 1988 (Outcome 2-6)
8. a and b (Outcome 2-7)
9. False. Those performing CLIA-waived procedures MUST follow the manufacturer directions exactly to comply with the regulations. (Outcome 2-8)
10. c. CMS handles all laboratory registration procedures. (Outcome 2-9)

ANSWERS TO CASE STUDIES

Case Study 2-1

1. If given these two choices, it would be correct to choose that CLIA '88 was created to protect patients, as the regulations were designed to ensure the validity of laboratory results.
2. Documented training is always necessary, regardless of the level of the tests performed.
3. All laboratories must be registered with CMS to legally perform laboratory testing.

Additional Instructor Resources for the Text

1. Utilize the PowerPoint Presentations created for Chapter 2.
2. Instructor Test Bank: The Test Bank has an additional 18 questions for this chapter that can be utilized for assessment.
3. Interactive exercises for this chapter are on the CD included with the text. These can be assigned to students as homework, or performed as a group project to provide specific emphasis for a certain concept. Additional exercises are available on DavisPlus.

Additional Resources

No additional resources are suggested for this chapter. Additional websites are included in the PowerPoint presentation as well as in the text.

Chapter 3

Laboratory Safety and Preventing the Spread of Disease

Learning Outcomes

3-1 Define the key terms.

3-2 List the major types of infectious agents.

3-3 Restate the difference between pathogenic and nonpathogenic microorganisms

3-4 Describe the various shapes of bacteria presented in the text.

3-5 Compare and contrast bacteria and viruses.

3-6 Describe medical asepsis.

3-7 Explain what the chain of infection concept refers to, and describe how the chain may be broken.

3-8 Explain how the CDC Standard Precautions are utilized in a laboratory setting.

3-9 Analyze the importance of proper hand-washing procedures and appropriate use of personal protective equipment.

3-10 Explain appropriate procedures for hand sanitization for health-care workers.

3-11 Examine the fundamental concepts included in the OSHA Hazard Communications Standard.

3-12 List the required components on a Material Safety Data Sheet (MSDS).

3-13 Explain how a chemical label provides safety information.

3-14 Describe how a laboratory employee may protect themselves from other physical dangers in the laboratory.

3-15 Identify who is protected by the OSHA Bloodborne Pathogens Standard.

3-16 Interpret the key terms included in the OSHA Bloodborne Pathogens Standard.

3-17 List the essential components of an exposure control plan.

3-18 Discuss the appropriate use and disposal of sharps in the laboratory environment.

3-19 Define biohazardous waste and explain proper disposal methods for this type of laboratory waste.

3-20 Compare and contrast the major bloodborne pathogens that are considered to be a threat in the laboratory environment.

3-21 Detail the appropriate follow-up procedure in case of an accidental bloodborne pathogens exposure.

Suggested In-Class and Lab Activities

1. Design a safety scavenger hunt for the students. Have them locate the supplies in the classroom necessary for blood clean up, gloves, MSDS information, emergency evacuation procedures, eye wash, first aid kit, fire extinguisher, materials for disinfection of work areas, hand sanitizer, additional paper towels, biohazard disposal containers, and so forth. *(Bloom's: Remembering)*
2. Introduce the safety equipment to be utilized in class. This is a good time to show the students how to activate the safety devices on needles, demonstrate use of face shields and appropriate laboratory coat use, and how to assemble sharps containers. *(Bloom's: Remembering)*
3. Obtain an Exposure Control plan from a local laboratory and discuss the components in class. *(Bloom's: Remembering)*
4. Arrange training for the use of fire extinguishers by the local company serving the institution or by a representative of the fire department. *(Bloom's: Applying)*