Component III: Clinical

Module E: Laboratory Procedures

Topic 3: Collection, Processing and Testing of Urine Specimens

Statement of Purpose
To prepare the learner with basic knowledge and skills necessary to properly collect, process and perform testing of urine specimens.

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

1. Spell and define key terms.
2. Describe the basic characteristics of urine including its formation, physical composition and chemical properties.
3. Explain OSHA Standards for Specimen Collection.
4. Demonstrate the proper procedure for collecting various types of urine specimens.
5. Describe how to maintain the chain of custody when processing urine specimens.
6. Explain how to preserve and store urine specimens.
7. Explain the purpose and demonstrate the procedure for performing a routine urinalysis.

Terminology

1. Anuria
2. Bacteriuria
3. Bilirubinuria
4. Catheterization
5. Chain of custody
6. Dysuria
7. Glycosuria
8. Hematuria
9. Ketonuria
10. Proteinuria
11. Pyuria
12. Urinalysis
13. Urinary pH
14. Urine specific gravity
15. Urinometer
16. Void

References

1. Kronenberger, J., Southard D. L., & Woodson, D. (2012). *Comprehensive Medical Assisting* (4th Ed.). Philadelphia, PA: Lippincott, Williams & Wilkins.
2. Booth, K.A., Whicker, L.G., Wyman, T.D., & Moaney-Wright, S. (2011). *Medical Assisting: Administrative & Clinical Competencies with Anatomy and Physiology. (4th Ed.).* New York, NY: McGraw-Hill Company, Inc.

Content Outline/Theory Objectives	Suggested Learning Activities
Objective 1 **Spell and define key terms.** A. Review the terms listed in the terminology section. B. Spell the terms listed accurately. C. Pronounce the terms correctly. D. Use the terms in their proper context.	A. Games: word searches, crossword puzzles, Family Feud, Jeopardy, bingo, spelling bee, hangman and concentration. B. Administer vocabulary pre-test and post-test. C. Discuss learning gaps and plan for applying vocabulary.
Objective 2 **Describe the basic characteristics of urine including its formation, physical, chemical and microscopic properties.** A. Urine formation 1. Filtration. 2. Reabsorption. 3. Secretion. B. Composition of urine 1. Urine is composed mostly of water (95%). 2. It also contains organic wastes as well as some salts (5%) a. Organic wastes include urea, creatinine, ammonia, and uric acid. b. Salts or ions 1) Positive ions like sodium, potassium, magnesium, and calcium. 2) Negative ions including chlorides, sulfates, phosphates. C. Physical properties 1. Color 2. Clarity 3. Odor 4. Specific gravity D. Chemical properties 1. Albumin (protein) 2. Bacteria 3. Bilirubin 4. Blood (red blood cells, hemoglobin) 5. Leukocyte esterase (white blood cells) 6. Glucose 7. Ketone bodies 8. Nitrites 9. pH 10. Urobilinogen 11. Specific gravity E. Microscopic properties 1. Red blood cells	A. Lecture/Discussion B. Assigned Readings C. Find pictures of various types of urine or simulate urine samples. D. Ask students to document color, clarity, odor and specific gravity. E. Obtain urine test lab slips and give to each student for review of each of the elements identified for testing.

2. White blood cells 3. Casts 4. Bacteria 5. Crystals 6. Artifacts	
Objective 3 **Explain OSHA Standards for Specimen Collection** A. Hand washing 1. When performing clinical procedures, before and after patient contact, before and after applying gloves and after contact with blood or other potentially infections materials. 2. Nonsterile gloves are not a substitute for hand washing. B. Biohazard containers 1. Infectious waste into these containers (closable and clearly marked.) 2. Containers leak-proof and properly constructed to contain the contents during handling, transport or shipping. 3. Urine specimen not qualified for placement into biohazard containers. C. Nonsterile gloves 1. Worn when in contact with blood and other body fluids that are potentially infectious. 2. Examples include body fluids, mucous membranes, non-intact skin and contaminated articles or surfaces. D. Appropriate protective clothing 1. Gown. 2. Apron. 3. Laboratory coat. 4. Face shields or masks in combination with eye protection devices a. In case of splashes splatter, or droplets of blood. b. Other potentially infectious materials.	A. Lecture/Discussion B. Assigned Readings C. Divide class into groups of four 1. On multiple tables place personal protective equipment for each group. 2. Create scenarios of specimen collection and ask groups to decide which protective equipment will be needed. 3. Have each group decide whether equipment will need to be placed in biohazard waste containers.
Objective 4 **Demonstrate the proper procedure for collecting various types of urine specimens.** A. Types of urine specimens 1. 24 hour. 2. Random. 3. Mid-stream. 4. Clean catch. 5. Mid-stream, clean catch. 6. First morning void. 7. Postprandial. 8. Catheterized (not in California Medical Assistant's scope of practice.) B. Collection methods	A. Lecture/Discussion B. Assigned Readings C. In the lab, divide students in to pairs and have each student 1. Explain to their partner how they will collect their own midstream specimen. 2. Explain to partner how to collect and demonstrate way to collect 24 hour

1. 24 hour collection. 2. Random. 3. Mid-stream, clean catch. 4. Catheterization (not in California Medical Assistant's scope of practice.)	specimen.
Objective 5 **Describe how to maintain the chain of custody when processing urine specimens.** A. Chain of custody 1. Used for a. Post-accident testing. b. Pre-employment testing. c. Random. d. Reasonable suspicion/cause testing. e. Return to duty/follow up. 2. Specimen documentation form. 3. Labels. 4. Patient identification. 5. Ensure accountability. B. Collection procedure 1. Preparation of restroom. 2. Collection container. 3. Patient instruction.	A. Lecture/Discussion B. Assigned Readings C. Demonstrate correct chain of custody, documentation form, labels and patient identification.
Objective 6 **Explain how to preserve and store urine specimens.** A. Preservation 1. Boric acid. 2. Hydrochloric acid. 3. Dark container. 4. Refrigeration. B. Storage 1. Refrigeration. 2. Freeze. 3. Aliquot. 4. Dark container.	A. Lecture/Discussion B. Assigned Readings C. Provide students with a list of types of urine collection procedures. Then ask each student to name the type of preservative and storage container for each procedure. D. For each type of specimen ask student to name the method of required storage.
Objective 7 **Explain the purpose and demonstrate the procedure for performing a routine urinalysis.** A. Purpose 1. To establish and/or rule out disease process. 2. To set up treatment program. B. Performance 1. Observe and record physical characteristics. 2. Perform chemical analysis (Multistix). 3. Record chemical analysis results. 4. Prepare aliquot for centrifugation. 5. Prepare slide with sediment for microscopic examination.	A. Lecture/Discussion B. Assigned Readings C. Each student will perform urine collection procedure to demonstrate competency.