EXERCISE 11: MACROSCOPIC AND CHEMICAL EXAMINATION OF URINE

Skills: 30 points

Objectives:
1. State the specimen of choice for chemical analysis of urine.
2. List two macroscopic observations of urine and the most common terms used to describe each.
3. List 10 routine chemical tests performed on urine and list a condition that will cause an abnormal result for each.
4. State the time limit within which testing of urine must be performed, storage requirements of the sample and time limits for storage if testing must be delayed.
5. List 4 inaccurate results which may occur due to failure to store urine specimens properly.
6. Define the following terms: proteinuria, glycosuria, ketonuria, hemoglobinuria, and hematuria.
7. State the four confirmatory chemical tests on urine and state the substance each confirmatory test is used to detect.
8. State the quality control which must be performed on the reagent dipsticks for urinalysis.
9. State 6 precautions which must be followed when using urine testing strips.
10. State the action which must be taken when the quality control results are invalid.
11. Define the following terms: Random urine sample, Clean catch, First morning sample, 24-hour urine collection
12. Demonstrate proficiency in evaluation of urine chemical testing by performing chemical testing on 2 urine samples and 2 controls by properly selecting supplies needed, properly dipping the strips in urine, accurately timing the reaction, interpret the color to determine the results, and record the results using the correct term or units within +/- 1 unit.

Discussion
Urinalysis, the testing of urine, is the oldest laboratory test still in use today. The urine sample is very easy to obtain, and if the collection, handling, and testing procedures are performed correctly, the results can provide valuable information about a patient’s overall health and well-being.

Containers / Cups
Urine collection containers come in a variety of shapes and sizes with lids that either snap on or screw on. To protect healthcare personnel from exposure to the specimen and protect the specimen from exposure to contaminants, leak-resistant cups should be utilized. Some urine transport cup closures have special access ports that allow closed-system transfer of urine directly from the collection device to the tube.

Collection
Although there are many variations, laboratory urine specimens are usually classified by the type of collection or collection procedure used to obtain the specimen. The type of collection or collection procedure to be used is based on the purpose of the testing ordered. Examples:
- Random – a sample collected at any time of day or night. The most frequent and easiest sample to obtain, however, test results from random specimens can provide an inaccurate view of the patient’s health, if the sample is too dilute.
• First-morning – the sample collected from the patient when they first wake up in the morning. **The first-morning urine sample is the preferred specimen for chemical and microscopic urine testing as it is the most concentrated and therefore least likely to provide false negative results.**

• Timed – samples collected at a particular time of day or over a specified period of time. A two hour collection from 2-4 pm and a 24 hour collection are examples. A ‘postprandial’ specimen is collected 2-3 hours after eating and is often used to screen for carbohydrate metabolism disorders, such as diabetes mellitus. Tests on timed samples are most often performed in the clinical chemistry department and may have to be collected in special containers with added preservatives.

• Clean-catch – samples are collected when a urinary tract infection is suspected. The specimen to be cultured for microorganisms must be carefully collected into a sterile container. To minimize the number of contaminant bacteria, the patient is required to first cleanse the urethral area with a castile soap wipe/towelette. The patient must then begin voiding the first portion of the urine stream into the toilet, which also reduces the number of contaminate organisms. After a couple of seconds of voiding, the patient collects the urine flowing until 15-50 mL of sample is obtained. This process is sometimes referred to as collecting the ‘mid-stream’ sample. **The mid-stream, clean-catch specimen collected into a serial container is the specimen of choice for obtaining non-contaminated urine for culturing.** After the sample has been cultured, it can be used for routine urinalysis testing.

• Catheterized collection – procedure often performed on patients who are bedridden or who cannot urinate independently. The properly trained healthcare worker (usually a nurse) must insert a Foley catheter through the patient’s urethra into the bladder to obtain the specimen.

• Pediatric specimen collection – To collect the urine sample on an infant or small child, a special urine collection bag is adhered to the skin surrounding the urethral area. Once the child has urinated, the bag is carefully removed and the contents are sent to the lab.

• Suprapubic aspiration collection – Used to obtain a urine sample from a patient who is bedridden, cannot urinate on their own, and cannot be catheterized. In some cases, this procedure is required when an absolutely sterile sample must be obtained. A physician or other properly trained health care worker performs this procedure.

**Handling and Transport**

The urine sample must be labeled immediately after collection and before transport to the laboratory. The label must be attached to the container, not just the lid, so that samples are not mixed up in the lab if multiple samples are being tested at the same time.

All urine sample labels must include:
1. Patient’s full name.
2. Identification number.
3. Date and time of collection.

Samples that have been collected as mid-stream, clean-catch, catheterized or by suprapubic aspiration should have that information included as well.

All urine samples must be transported to the appropriate laboratory department ASAP to limit the effects of sample deterioration. Ideally, the specimen for routine urinalysis should be examined while it is fresh; within 1-2 hours of collection. If the specimen is transferred into a Urine Tube for transport or preservation, the tube label must include the patient’s full name and ID number, the date.
and time of collection, and the initials of the health care worker who transferred the specimen into the tube. Any additional information about the type of specimen must also be listed on the tube.

**Storage and Preservation**

1. **Room Temperature** (20-24°C) — It is acceptable to store samples for routine urinalysis at room temperature in tightly capped containers for up to 2 hours.

2. **Refrigeration** (2-8 °C). - If tests cannot be performed within two hours of collection, the specimen may be preserved by refrigeration for up to 8 hours. Refrigerated specimens must be allowed to return to room temperature prior to testing.

3. **Chemical preservation** — is the least desirable way of preserving the urine sample for routine urinalysis. However, if the sample cannot be tested within eight hours, or if it is collected at a off site location, it may be necessary to place a part of the sample in one or more tubes containing special chemical preservative for urines. Preservatives that can be used to preserve urine specimens include boric acid, chloroform, chlorhexidine, formalin, thymol, toluene and formaldehyde. Most chemical preservatives interfere in some way with the testing procedure.

**Urine Transfer Devices**

There are several commercially prepared urine transfer sets that provide for convenient and hygienic urine sample transfer from the collection cup to vacuum tubes designed for urine storage.

1. **The ‘urine transfer straw’** — a non-sterile plastic tube and holder. The holder contains a needle that permits a closed-system of transferring the urine directly from the collection cup into one or more vacuum tubes designed to preserve the urine sample.

2. **The ‘collection cup with integrated transfer port’** — a standard sterile urine collection cup with a special lid that has an access port that allows for a closed-system transfer of the urine directly from the collection cup to the urine vacuum tube.

**Rationale for Urine Specimen Preservation**

Urine samples that remain at room temperature for an extended period of time begin to deteriorate, mostly due to the presence of bacteria. Failure to store specimens properly will lead to inaccurate results.

1. Color – darkens due to oxidation of substances
2. Clarity – specimen becomes less clear due to increased bacteria or precipitation of crystals
3. Odor – specimen begins to take on an ammonia smell, due to growth of bacteria
4. pH – specimen becomes more alkaline as time passes, due to growth of bacteria
5. Glucose (if present) – begins to decrease due to growth and metabolism of bacteria
6. Bilirubin and Urobilinogen – decrease due to oxidation and susceptibility to effects of light
7. Ketones (if present) – begin to decrease as they are volatile (turn into gas and evaporate)
8. Changes in microscopic structures – over time, crystals form, bacteria grow, cells disintegrate.

Macroscopic Examination
The physical appearance of a urine sample can often tell a great deal about a patient's condition. A change in color or clarity may indicate the presence of a disease and the need for additional testing.

Color is usually some shade of yellow and often varies with the concentration of the sample. The most common color descriptions of normal urine are straw, light yellow, yellow and dark yellow. Amber colored urine is seen in patients with increased bilirubin levels and may indicate hepatitis.

Clarity is an indication of the transparency of a specimen. It is best to judge clarity by observing light through a recently mixed sample. Terms used to describe clarity include clear, hazy, cloudy and turbid. Freshly voided urine that is properly collected is normally clear or slightly hazy, while contaminated urine is more likely to be hazy. Fresh urine that is cloudy is often the result of a bacterial urinary tract infection due to white blood cells in the urine. Turbid urine contains salt crystals that precipitate out as the specimen cooled.

Methods of Chemical Analysis
Reagent strips are the most widely used technique for detecting constituents present in the urine and are available in a variety of types. A reagent strip is a firm plastic strip to which pads containing chemical reactants are attached. Most reagent strips contain reagent areas that test for pH, protein, glucose, ketone, bilirubin, and blood. Some strips may also test for urobilinogen, leukocytes, nitrites and specific gravity. The presence or absence of these constituents in the urine provides information on the status of carbohydrate metabolism, kidney and liver function, and acid-base balance of the patient.

Performing the Chemical Test by Reagent Strip
Chemical testing is performed by briefly dipping a reagent strip into fresh urine then noting the color changes on the reagent pads at the appropriate time by visually comparing to the color chart provided by the manufacturer. This can also be done on an electronic instrument which reads the color and displays it on a lighted panel or provides a print out of the results. Automation eliminates technical errors due to differences in timing or interpretation of the colors. Color changes that occur only along the edge of the test area should be ignored.

Reagent strips are designed to be used only once and discarded. Exact directions for the use of the strips are included in each package and must be followed precisely for accurate results.

Positive results for some constituents may need further testing by a confirmatory test.
Quality Control
The accurate performance of the strips should be checked by daily testing strips with positive and negative urine controls. If the results of the controls do not match the manufacturer’s published results then patient testing cannot be performed until the cause of the error is determined. The first course of action is to repeat the testing. If the results are still inaccurate then that container of strips cannot be used. Obtain a different container of strips and repeat the controls. Report the problem with the first container to the supervisor. A call to the manufacturer must be made to report the problem. Most manufacturers will replace strips which are not giving accurate results.

Causes of inaccurate results include:
- **Improper storage and/or handling of the strips.** Strips are sensitive to moisture; only remove the number of strips you need and then immediately recap the container.
- **Using the strips beyond the expiration date.** Check and record the expiration date daily.
- **Contamination of the strips.** Do not allow the pads on the strips to come in contact with fingers, gloves, or any lab surface.

Principles of Chemical Tests

**pH** - The pH is a measure of the degree of acidity or alkalinity of the urine. A pH below 7 indicates an acid urine; pH above 7 indicates an alkaline urine. Normal, freshly-voided urine may have a pH range of 5.5 - 8.0. The pH of urine may change with diet, medications, kidney disease, and metabolic diseases such as diabetes mellitus. Colors on the pH reagent pad usually range from yellow-orange for acid pH to green-blue when pH is alkaline.

**Protein** - Protein in the urine is called **proteinuria.** This is an important indicator of renal disease, but can be caused by other conditions as well. At a constant pH, the development of any green color on the protein reagent pad is due to the presence of protein. Colors range from yellow for negative to yellow-green or green for positive.

**Glucose** - The presence of glucose in urine is called **glycosuria.** This condition indicates that the blood glucose level has exceeded the renal threshold. This condition may occur in diabetes mellitus. The reagent strip is specific for glucose and uses the enzymes glucose oxidase and peroxidase, which react with glucose to form colors ranging from green (low concentration) to brown (high concentration.

**Ketone** – Ketones present in the blood is known as **ketonuria.** This occurs when the body metabolizes fats incompletely causing ketones to be excreted in the urine. The ketone test is based on the development of colors ranging from light pink to maroon when ketones react with nitroprusside. Ketonuria may be present in diabetes, starvation or fasting. Since ketones will evaporate at room temperature, urine should be tightly covered and refrigerated if not tested promptly.

**Bilirubin** – Bilirubin in the urine is known as **bilirubinuria.** Bilirubin is a breakdown product of hemoglobin which produces an extremely yellow to amber color in urine and may be an indication of liver disease, hepatitis or bile duct obstruction. Samples suspected of containing bilirubin should be handled cautiously because of the possibility of hepatitis. These samples should also be protected from light until testing is completed, since direct light will cause decomposition of bilirubin. The test for bilirubin is based on the coupling of bilirubin with a dye to form a color.
**Blood** - Hemoglobin and red blood cells in urine may be detected by the formation of a color due to the enzyme peroxidase (in red cells) reacting with orthotoluidine, a chemical which is in the reagent pad. The resulting color ranges from orange through green to dark blue.

- **Hemoglobinuria** is the presence of hemoglobin in the urine. Causes: hemolytic anemia, blood transfusion reactions, massive burns, renal disease
- **Hematuria** is the presence of intact red blood cells. Almost always pathological. Causes: kidney stones, tumors, glomerulonephritis, physical trauma

**Urobilinogen** - Urobilinogen is a degradation product of bilirubin which is formed by intestinal bacteria. It may be increased in hepatic disease or hemolytic disease. Urobilinogen is normally 0.1 to 1.0 Ehrlich units per deciliter of urine. The reagent strip will detect urobilinogen in concentrations as low as 0.1 Ehrlich units. The reagent pad contains a chemical which reacts with urobilinogen to form a brown-orange color.

**Leukocytes** - Leukocytes (aka white blood cells) present in large numbers usually indicate a urinary tract infection (UTI). Normal urines should produce no color change of the Leukocyte pad.

**Nitrites** - This test indicates the conversion of nitrate to nitrite by the action of certain bacteria in the urine. A positive result indicates a possible UTI and the potential need for a culture.

**Specific Gravity** - The specific gravity of a solution is the ratio of the weight of a given volume of the solution (urine) to the weight of an equal volume of water. The specific gravity of urine indicates the concentration of dissolved solids such as urea, phosphates, chlorides, or proteins present in the urine. Normal specific gravity is 1.005 - 1.030 with most normal results falling between 1.010 and 1.025. The higher the number the more concentrated the urine.

**Ascorbic Acid** – Concentrations of ascorbic acid as low as 20 mg/dL interfere with enzyme-driven reactions on the dipstick. The presence of ascorbic acid will result in falsely decreased readings of glucose, nitrite and blood. (Note – not all dipstick manufacturers offer this test on their product.)

**Compensation pad** (iChem only) – This pad is designed to compensate for urine discoloration when automation is used to read the strip.

**Screening and Confirmatory Tests**

*Screening tests* are used to determine which patients may need additional testing for a condition or disease state. *Confirmatory tests* are used to verify or confirm a positive (or negative) test result obtained using the reagent strip.

Both confirmatory and screening tests are more time consuming and require additional reagents and equipment, but are more sensitive and/or specific. Four of the most common confirmatory or screening tests are those for protein, reducing sugars, ketone, and bilirubin.

**Sulfosalicylic acid** which, when added to the urine, will cause precipitation of protein, resulting in turbidity. This is the confirmatory test for a positive dipstick protein result.
**Clinitest** is the most common screening test performed to detect reducing sugars such as glucose, lactose, fructose, galactose, and pentose. Glucose reagent pads are specific for glucose. Other sugars may be present in the urine of infants which would indicate a need for immediate investigation. Some labs perform this on all children age 2 or below.

**Acetest** is a test for ketones and is available in tablet form. This is the confirmatory test for a positive dipstick ketone test.

**Ictotest** is a specific test for bilirubin and is four times as sensitive as the reagent strip pad. This is the confirmatory for a positive dipstick bilirubin test.

**Precautions**
1. Reagent strips should be tested with positive and negative controls on each day of use to be sure that strips are working properly.
2. Failure to observe color changes at the appropriate time intervals may cause inaccurate results.
3. Reagents and reagent strips must be stored properly to retain reactivity.
4. Observe color changes and color charts under good lighting.
5. Proper collection and storage of urine is necessary to insure preservation of components such as bilirubin and ketones as well as prevent multiplication of bacteria.
6. Do not allow the reagent pads of the strip to touch the fingers, gloves, or other surfaces.

**Reference Ranges for Urine Chemical Tests**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Reference Ranges (aka Normal Values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>5.5 - 8.0</td>
</tr>
<tr>
<td>Protein</td>
<td>negative to trace</td>
</tr>
<tr>
<td>Glucose</td>
<td>Negative</td>
</tr>
<tr>
<td>Ketones</td>
<td>Negative</td>
</tr>
<tr>
<td>Bilirubin</td>
<td>Negative</td>
</tr>
<tr>
<td>Blood</td>
<td>Negative</td>
</tr>
<tr>
<td>Urobilinogen</td>
<td>0.1 - 1.0 EU/dl – do NOT report as negative!</td>
</tr>
<tr>
<td>Leukocytes</td>
<td>Negative</td>
</tr>
<tr>
<td>Nitrites</td>
<td>Negative</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.005-1.030</td>
</tr>
</tbody>
</table>
EXERCISE 11: CHEMICAL EXAMINATION OF URINE PROCEDURE

Materials:
1. Reagent strips
2. Timer
3. Urine specimens in conical tubes
4. Urine controls - Normal and Abnormal
5. Package insert for controls with expected range for each control level
6. Biowipes or paper towel

Instructions

1. Your instructor will indicate which type of strips you are using (MultiStix or iChem). Select the appropriate recording sheet for the type of strip you are using. Fill in your name and the date.
2. Accurately record the lot number of the controls.
3. Using the urine controls package insert provided by your instructor, accurately record the Expected Range for each test pad for both controls.
4. Accurately record the name and identification number of each patient sample.
5. Carefully mix urine or control sample by inverting tube or swirling urine if it is in a cup.
6. When testing patient samples, observe and record color and clarity.
7. Carefully remove one strip from container, taking care not to allow reagent pads to touch hands or other surfaces.
8. Recap container of strips immediately finger tight. Exposure to air will cause deterioration of the chemicals on the pads.
9. Briefly (no longer than 1 second) dip test strip into the urine or control, making sure that all pads are moistened.
10. Draw the edge of the strip along rim of specimen container to remove excess urine.
11. Start the timer when you have removed the moistened strip from the urine or control.
12. **BLOT EDGE OF STRIP ON BIOWIPE OR PAPER TOWEL** to remove excess urine. Failure to blot may result in chemicals from adjacent pads “bleeding” into each other causing erroneous results.
13. Read each pad at the time shown on the strip container, starting with the shortest time. Hold the strip close to the color blocks but **Do Not Allow the Wet Strip to Touch the Color Chart**. Match the colors carefully – THIS IS CRITICAL. Failure to read the reaction at the time indicated may cause erroneous results.
14. Record results on the report form using appropriate units as necessary. Negative results should be reported out as “Neg”. Positive results should be reported in the proper format, using appropriate units where indicated.
15. Discard the reagent strip into regular trash when you have finished recording the results.
16. Perform this procedure on each control and urine specimen.
17. For each control, compare the Expected Range with your recorded results. Indicate if the control results are acceptable for each test pad by marking Yes or No in the appropriate column on the recording sheet.
EXERCISE 11: URINE TRANSFER PROCEDURE

Materials:

1. Urine Specimen in a Collection Container
2. Urine transfer straw
3. Vacutainer Urine Tube
4. Sharpie Marker
5. Biohazard Sharps Container

Instructions

1. Correctly label the Vacutainer Urine Tube with the appropriate patient information and collection data as listed on the urine collection cup.
2. After making sure the urine cup’s cap is securely fastened, gently mix the urine sample by swirling.
3. Place the urine collection cup on a clean, flat surface and carefully remove the top.
4. Place the urine transfer straw into the specimen; the container may be tipped if the volume is low.
5. Verify that the name on the container and the tube match. Insert the tube into the holder, then press on the back of the tube so that the needle punctures the stopper. Allow the tube to fill.
6. Remove the tube from the holder and invert as required by the manufacturer’s directions.
7. Place the filled Urine Tube into a test tube rack.
8. Lift the transfer straw from the collection cup and allow the straw to drain back into the cup.
9. Carefully dispose of the transfer straw into the biohazard sharps container; avoid allowing your finger to enter the back of the holder where it could contact the needle.
10. Replace the lid of the urine collection cup.
11. **Bring your lab sheet, the urine cup, and the urine tube to your instructor for verification of correct labeling.**
12. Place the collection cup and urine tube in the area designated by the instructor. Give your completed lab report to your instructor.
EXERCISE 11: CHEMICAL EXAMINATION OF URINE

Study Questions

Name _______________________________ Date _______________  Points _______/28

Points: 28

1. State the type of urine specimen which is preferred for chemical testing and why this is the preferred specimen? (1 point)
   a.
   b.

2. List two macroscopic observations of urine. (1 point)
   a.
   b.

3. State the storage temperature and length of storage for a urine specimens. (2 points)

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td></td>
</tr>
<tr>
<td>B.</td>
<td></td>
</tr>
</tbody>
</table>

4. List 4 inaccurate results which may occur due to failure to store urine specimens properly. (2 points)
   a.
   b.
   c.
   d.

4. Briefly explain how a chemical reagent strip is used. (1 point)

5. State what must be done if the results of the quality control do not fall within the published results provided by the manufacturer? (1 point)
6. List 2 situations which may cause inaccurate results which will be detected by the proper performance of the quality control on the reagent strips. (2 point)
   a. 
   b. 

7. Define each term AND name a condition that may cause an increase in each of the following constituents in urine (5 points):

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Abnormal Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Glycosuria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Ketonuria</td>
<td></td>
<td></td>
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<tr>
<td>c. Proteinuria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Hemoglobinuria</td>
<td></td>
<td></td>
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<tr>
<td>e. Hematuria</td>
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</tbody>
</table>

8. State an abnormal condition which would cause the following constituents to be present in the urine (2 points):
   a. Bilirubin
   b. Nitrites
   c. Urobilinogen
   d. Leukocytes

9. State four confirmatory or screening tests performed on urine AND the constituent of urine detected. (4 points)

<table>
<thead>
<tr>
<th>Confirmatory Test</th>
<th>Substance Being Confirmed or Detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
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<tr>
<td>b.</td>
<td></td>
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<tr>
<td>c.</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td></td>
</tr>
</tbody>
</table>
10. List four precautions which must be followed in utilizing or testing the urine dipsticks. (2 points)
   
a.
   
b.
   
c.
   
d.

11. State the reference ranges for each of the following substances, making sure to state the appropriate units when necessary. (5 points)

<table>
<thead>
<tr>
<th>Substance</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. pH</td>
<td></td>
</tr>
<tr>
<td>b. protein</td>
<td></td>
</tr>
<tr>
<td>c. glucose</td>
<td></td>
</tr>
<tr>
<td>d. ketone</td>
<td></td>
</tr>
<tr>
<td>e. bilirubin</td>
<td></td>
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<tr>
<td>f. blood</td>
<td></td>
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<tr>
<td>g. urobilinogen</td>
<td></td>
</tr>
<tr>
<td>h. leukocytes</td>
<td></td>
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<tr>
<td>i. nitrites</td>
<td></td>
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<tr>
<td>j. specific gravity</td>
<td></td>
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</tbody>
</table>
EXERCISE 11: CHEMICAL EXAMINATION OF URINE
Recording Results Using Multistix

Name ____________________________  Date _______________________     Points ____/30

Instructions: Follow the steps as outlined on the EXERCISE 11: CHEMICAL EXAMINATION OF URINE PROCEDURE page.

<table>
<thead>
<tr>
<th></th>
<th>Level 1 Control</th>
<th>Level 2 Control</th>
<th>Name</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot #</td>
<td>Lot #</td>
<td>Patient #</td>
<td></td>
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<tr>
<td><strong>Dipstick Pad</strong></td>
<td></td>
<td>Color:</td>
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<tr>
<td></td>
<td>Expected Range</td>
<td>Results</td>
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<td></td>
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<tr>
<td>Glucose</td>
<td></td>
<td>Acceptable Yes or No</td>
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<tr>
<td>Bilirubin</td>
<td></td>
<td>Expected Range</td>
<td></td>
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<tr>
<td>Ketones</td>
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<td>Results</td>
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<tr>
<td>Specific Gravity</td>
<td></td>
<td>Acceptable Yes or No</td>
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<tr>
<td>Blood</td>
<td></td>
<td>Color:</td>
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<tr>
<td>pH</td>
<td></td>
<td>Clarity:</td>
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<tr>
<td>Protein</td>
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<tr>
<td>Urobilinogen</td>
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</tr>
<tr>
<td>Nitrite</td>
<td></td>
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<tr>
<td>Leukocytes</td>
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</table>

Urine Transfer Procedure: Follow the steps as outlined on the EXERCISE 11: URINE TRANSFER PROCEDURE page.

Instructor Notes on Labeling of Urine Transfer Tube (see grading notes below:) _____________________________________

Grading: Lot #, Patient name and ID#, Color and Clarity worth 0.5 points each (5 points total). Each pad worth 0.5 each (20 points total) Correct labeling of Transfer must include patient name, ID#, date and time of collection and initials of student (5 points total)