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| Title: | Urine Sediment Examination (Provider Performed) | | |
| Department/Service Line: | Laboratory | | |
| Approver(s): | CLIA Director | | |
| Location/Region/Division: | Baylor Scott & White Health | | |
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# sCOPE

This document applies to providers that perform urine sediment examinations within Baylor Scott & White Health.

# DEFINITIONS

*When used in this document with initial capital letter(s), the following word(s)/phrase(s) have the meaning(s) set forth below unless a different meaning is required by context. Additional defined terms may be found in the BSWH P&P Definitions document.*

**CLSI** – Clinical and Laboratory Standards Institute

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| method/Utility |
| Formed elements suspended in urine are precipitated by centrifugation and analyzed under the microscope. Cellular elements and casts often give valuable information as to the pathology of urinary tract disease, and the detection of metabolic or systemic diseases not directly related to the kidney. |

# PROCEDURE

**Specimen**

Collect a fresh urine specimen in a clean, dry container. Random, Clean Catch Midstream (CCMS) or catheterized specimens are acceptable, although a first morning clean catch or voided urine is preferred. Label the specimen with two unique patient identifiers.

A minimum of 12 mL (50 mL is preferred) of urine is needed to perform both macroscopic and microscopic evaluation. Urine specimens from infants and others may necessitate the use of smaller volumes.

Both macroscopic and microscopic examination must occur within two hours of collection.

**Reagents/Equipment**

* Microscope (10x and 40x Objectives)
* Microscope Slide, glass
* Coverslip, glass
* Disposable Transfer Pipettes
* Conical Centrifuge Tubes (Kova)
* Centrifuge

*Some providers may choose to utilize the Kova system. Needed supplies are listed below.*

* Kova Centrifuge tubes and caps
* Kova Petters
* Kova Glasstic Slide 10

**Quality Control**

Participation in proficiency testing as well as competency assessment serves to measure a provider’s ability to correctly identify microscopic elements.

Pictorial examples of elements found in urine sediment are presented as an attachment (CTX.LAB.PPT.006.A1\_V1) to this procedure.

**Testing Procedures**

**Specimen Preparation**

1. Transfer urine sample to a Kova (conical) centrifuge tube.
2. Centrifuge urine for 5 minutes.
3. Note: CLSI guidelines recommend centrifuging urines at a relative centrifugal force (rcf) of approximately 400 (≈1500 rpm) for 5 minutes.

rcf = 1.118 x 10-5 x r x N2

R= radius of the rotor in cm (measured from the center of the spindle to the bottom of the tube.

N= revolutions per minute

1. Discard the supernatant by quickly pouring off fluid.
2. Tap tube with index finger to mix sediment with remaining fluid.
3. Make a wet mount of sample by transferring 1 drop of material to a slide and covering with a coverslip.

**Kova System Specimen Preparation**

1. Pour 12mL of well-mixed urine specimen into a graduated Kova tube. Cap to decrease potential aerosolization during centrifugation.
2. Label Kova tube with two patient identifiers.
3. Centrifuge urine for 5 minutes.
4. Note: CLSI guidelines and Kova recommend centrifuging urines at a relative centrifugal force (rcf) of approximately 400 (≈1500 rpm) for 5 minutes.

rcf = 1.118 x 10-5 x r x N2

R= radius of the rotor in cm (measured from the center of the spindle to the bottom of the tube.

N= revolutions per minute

1. Squeeze the sed-pet pipette and insert in to the Kova tube. 
2. Decant the supernatant and mix the sediment well.
3. Withdrawal a small amount out the sediment and place in the Kova-slide being careful not to disperse air bubbles into the Kova-slide.
4. Allow specimen to settle for a few seconds before reading.

**Microscopic Examination**

1. On low power (10x objective), low light, examine for casts, crystals, and epithelial cells.
2. On high power (40x objective), low light, examine for RBC, WBC, bacteria, yeast, mucus, and *Trichomonas*.
3. In most urines, positive macroscopic readings will correlate to the following microscopic results: protein to casts, hemoglobin (blood) to RBC, leukocyte esterase to WBC, and nitrite to bacteria. Repeat testing may be performed at the provider’s discretion.
4. Record results only for those elements observed in the sediment. Below are recommended quantitation guidelines.
   * Squamous Epithelial Cells (if seen)
     + Rare (1-3 per low power field (LPF))
     + Few (4-16 per LPF)
     + Frequent (17-50 per LPF)
     + Many (50+ per LPF)
   * Other Epithelial Cells (Renal Tubular or Transitional) (if seen)
     + Rare (1-3 per LPF)
     + Few (4-16 per LPF)
     + Frequent (17-50 per LPF)
     + Many (50+ per LPF)
   * WBC (if seen)
     + 0-5 per high power field (HPF)
     + 5-10 per HPF
     + 10-15 per HPF
     + 15-30 per HPF
     + 30-50 per HPF
     + 50-100 per HPF
     + 100+ per HPF
   * RBC (if seen)
     + 0-3 per HPF
     + 3-5 per HPF
     + 5-10 per HPF
     + 10-15 per HPF
     + 15-30 per HPF
     + 30-50 per HPF
     + 50-100 per HPF
     + 100+ per HPF
   * Hyaline Casts (if seen)
     + 0-1 per LPF
     + 1-5 per LPF
     + 5-10 per LPF
     + 10-15 per LPF
     + 15-30 per LPF
     + 30-50 per LPF
     + 50-100 per LPF
     + 100+ per LPF
   * Other Casts (if seen)
     + 1-5 per LPF
     + 5-10 per LPF
     + 10-15 per LPF
     + 15-30 per LPF
     + 30-50 per LPF
     + 50-100 per LPF
     + 100+ per LPF
   * Bacteria (if seen)
     + Light (0-25 per HPF)
     + Moderate (26-50 per HPF)
     + Many (50+ per HPF)
   * Mucus, Amorphous, *Trichomonas*, Yeast, and Crystals if seen should be reported as present.
   * Other elements such as Spermatozoa, Starch Granules, etc. may be noted as well.

***Examination and Procedural Notes:***

* It is recommended that unidentifiable microscopic elements be referred to the laboratory for identification.

**Reference Ranges**

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| **Sediment Element** | **Normal Findings** |
| RBC | 0-3 per HPF |
| WBC | 0-5 per HPF |
| Hyaline Casts | 0-1 per LPF |
| Other Casts | 0 per LPF |
| Bacteria | Absent |
| Yeast | Absent |
| Crystals | Absent |
| Squamous Epithelial Cells | Few |
| Other Epithelial Cells | Absent |
| Mucus | Absent |
| *Trichomonas* | Absent |

**Reporting Results**

All testing and results should be documented in the EHR.

# ATTACHMENTS

Pictorial Examples of Elements Found in Urine Sediment (BSWH.LAB.PPT.006.A1\_V1)

Initial Training and Competency Form: Urine Sediment Examination (BSWH.LAB.PPT.006.A2\_V1)

# RELATED DOCUMENTS

Provider Performed Testing Program (BSWH.LAB.PPT.001.P\_V1)

Microscope Use in Provider Performed Testing (BSWH.LAB.PPT.002.R\_V1)

# REFERENCES

1. CLSI. *Physician and Nonphysician Provider-Performed Microscopy Testing; Approved Guideline – Second Edition.* CLSI document POCT10-A2. Wayne, PA: Clinical and Laboratory Standards Institute; 2011.
2. MTS, University of Washington, Department of Laboratory Medicine, Vaginal Wet Prep, online [www.medtraining.org](http://www.medtraining.org)

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| Revision History |

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| approvals | | | | |
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