XVI. Urine Dipstick			
Effective Date:3-14	Reviewed: 5/2019	Revised: 5/2016	*Discontinue Date:*

A. Purpose/Clinical Usage

The purpose of this policy is to provide instruction for performing the urine dipstick test. Testing may consist of any or all of the following: Urobilinogen, Bilirubin, Ketones, Blood, Protein, Nitrites, Leukocytes, Glucose, Specific Gravity and pH.

The dipstick test is used as a screen on the urine. Test results are used along with other diagnostic information.

B. Policy

The urine dipstick shall be performed by laboratory personnel and designated nursing staff. Each new designated staff shall be provided training and procedures for performance. Testing personnel will be responsible for initial and yearly competencies. Initial competencies include a colorblind screen.

The urine dipstick is a waived test and requires an order from a provider. Additional testing may be performed, if requested. A specimen will be sent to the reference laboratory.

C. Test Principle

A chemical analysis is performed on a urine specimen using reagent strips to obtain qualitative and semi-quantitative results. Each chemical reaction is described below.

UROBILINOGEN: This test is based on the Ehrlich reaction in which p-diethyl amino benzaldehyde in conjunction with a color enhancer reacts with urobilinogen in a strongly acid medium to produce a pink-red color.

BILIRUBIN: The direct bilirubin and dichlorobenzene Diaz onium produce fuchsia azo dyes in a strongly acid medium.

KETONE: The acetoacetate and sodium nitroprusside cause a reaction in the alkaline medium, which produces a violet color.

BLOOD: Hemoglobin acts as a peroxidase. It can cause peroxidase to release neo-ecotypes oxide [O]. [O] oxidizes the indicator and causes the color change.

PROTEIN: The test is based on the protein-error-of-indicators principle. An ion in the specific pH indicator attracted by a carbon on the protein molecule makes the indicator further ionized, which changes its color.

NITRITE: Nitrite in the urine and aromatic amino sulphanilamide are diazotized to form a diazonium compound. The diazonium compound reacting with tetrahydro benzo (h) quinolin 3-phenol causes the color change.

LEUKOCYTES: Granulocyte leukocytes in urine contain esterase that catalyzes the hydrolysis of the pyrrole amino acid ester to liberate 3-hydroxy-5-pheny pyrrole. This pyrrole reacting with diazoium forms a purple color.

GLUCOSE: The glucose oxidized by glucose oxidase catalyzes for formation of glucuronic acid and peroxide hydrogen. Peroxide hydrogen releases neo-ecotypes oxide [O] under the function of peroxidase. [O] oxidizes iodide potassium, which causes the color change.

SPECIFIC GRAVITY: Electrolyte (M^+X^-) in the form of salt in urine reacts with poly methyl vinyl ether and maleic acid (-COOH), which is a weak acid ionic exchanger; the reaction produces hydrogenous ionogen, which reacts with a pH indicator that causes the color change.

PH: This test is based on a double indicator principle that gives a broad range of colors covering the entire urinary pH range.

D. Supplies

1. Test Strips
2. Timer
3. Paper Towel
4. PPE: gown and gloves

E. Reagent Storage and Stability
Strips must be kept in the original bottle. Transfer to any other container may shorten the expiration date of product. Do not use strips beyond the expiration date.
Replace the cap immediately after removing reagent strips.
Keep away from direct sunlight and moisture.
Store at temperatures between 2-30 degrees Celsius (39-86 degrees Fahrenheit).
Do not touch reagent areas of strips.

F. Patient Preparation
None

G. Specimen Requirements
Fresh urine in a clean, dry container is the correct specimen.
Preferred amount is 60 ml. (minimum is 25 ml)
Urine must be tested within one (1) hour after voiding.
Safety Precautions must be followed when handling patient specimens.
Specimens are kept for 24 hours.

H. Specimen Rejection
Specimens collected with preservatives are not acceptable for testing.
Specimens grossly bloody or heavily pigmented are unacceptable.
Notify provider in this case: **Urine specimen is heavily pigmented and color interference may cause invalid results.** Unable to report.
Specimens are kept for 24 hours.

I. Test Procedure

1. Wash hands. Apply gown and gloves. Gather materials.
2. Verify correct sample with two (2) patient identifiers.
3. Urine must be at room temperature before testing. Mix well.
4. Determine the color and clarity of the specimen. Document on the Urinalysis Report form.
5. Remove the test strip from the bottle and replace the cap.
6. Immerse the reagent areas of the strip in the urine specimen and take it up quickly. Start timing.
7. Run the edge of the strip against the rim of the container to remove excess urine. Lay the strip on a paper towel with the reagent areas upward.
8. Hold the strip up vertically and compare the reagent areas on the strip to the corresponding color chart on the bottle label at the exact times specified. Hold the strips close to the color blocks and match carefully. Be careful not to touch the strip to the bottle. Make note of the results on the Report Form. Color changes after two (2) minutes are of no diagnostic value.
10. Dispose of strips with laboratory waste.

11. Place urine specimen in biohazard bag and refrigerate.

J. Interpretation of Results
Refer to the table below for the reporting format.

TEST	REPORTING VALUES						
COLOR	COLORLESS	YELLOW	AMBER	OTHER			
CLARITY	CLEAR	HAZY	CLOUDY	TURBID			
LEUKOCYTE	NEGATIVE	TRACE	SMALL	MODERATE	LARGE		
NITRITE	NEGATIVE	POSITIVE					
UROBILINOGEN	0.2	1.0	2.0	4.0	8.0		
PROTEIN	NEGATIVE	TRACE	1+	2+	3+	4+	
pH	5.0	6.0	6.5	7.0	7.5	8.0	8.5
BLOOD	NEGATIVE	TRACE	SMALL	MODERATE	LARGE		
SPECIFIC GRAVITY	1.000	1.005	1.010	1.015	1.020	1.025	1.030
KETONE	NEGATIVE	TRACE	SMALL	MODERATE	LARGE		
BILIRUBIN	NEGATIVE	SMALL	MODERATE	LARGE			
GLUCOSE	NEGATIVE	TRACE	1+	2+	3+	4+	

K. Quality Control
When a new bottle of test strips is first opened, two (2) strips shall be used to test normal and abnormal controls. Document results on QC log.
Urine dipstick controls are stored (refrigerated) between 2-8 degrees Celsius. Allow controls to come to room temperature prior to testing.
The two levels of control will be run monthly. Controls will be performed when a new lot number or new shipment is received.
Do not report patient results unless quality control is acceptable.

If controls do not perform as expected:
1. Check the expiration date on the controls and the test strips.
2. Verify controls are room temperature prior to testing.
3. Rerun both levels of control.

L. Report Results

1. Fill out Urinalysis Report Form.
2. Notify Provider with results as soon as possible. Document date, time, initials.
3. Fax results to patient unit, and leave a copy of Report Form in lab.

M. Limitations

1. Medicines that dye urine red, and anything that shows red in an acid medium may affect the test results.
2. Large amounts of ascorbic acid may affect the test for glucose, bilirubin, nitrite, and blood.
3. This test is not a reliable method for the detection of porphobilinogen.
4. Refer to package insert for more details and limitations.

Citation(s):

Accutest URS 10 Parameter Package Insert October 2012.

Quantimetrix Dropper Plus Urinalysis Dipstick Control/Level 1&2 February 2016.

Ishihara Test for Color Blindness http://www.colour-blindness.com/colour-blindness-tests/ishihara-colour-test-plates/