TRAINING UPDATE

Lab Location:	WAH	**Date Distributed:**	6/7/2017
Department:	Core Lab	**Due Date:**	6/28/2017
		Implementation:	**6/28/2017**

DESCRIPTION OF PROCEDURE REVISION

Name of procedure:

Urine Tricyclic Antidepressants (TCA) Drug Screen WAH.U09 v2

Description of change(s):

Section	Reason
4, 6	Remove individual section labeling instructions and add general one
10.5	Move patient review from section 6
10.6	Add repeat criteria
11.3	Move LIS comment from section 10.7
15	Update to new standard wording
16	Move log from section 19

This revised SOP will be implemented on June 28, 2017

Document your compliance with this training update by taking the quiz in the MTS system.

Technical SOP

Title	**Urine Tricyclic Antidepressants (TCA) Drug Screen**	
Prepared by	Ashkan Chini	Date: 8/17/2011
Owner	Robert SanLuis	Date: 4/18/2013

Laboratory Approval	**Local Effective Date:**	
Print Name and Title	**Signature**	**Date**
Refer to the electronic signature page for approval and approval dates.		

Review		
Print Name	**Signature**	**Date**

Form revised 2/02/2007

TABLE OF CONTENTS

1. TEST INFORMATION

Assay	Method/Instrument	Local Code
Urine Tricyclic Antidepressants (TCA) Drug Screen by Syva Rapid Test Device	One-step Solid-phase Immunoassay/Manual	UTCAT

Synonyms/Abbreviations
TCA

Department
Urinalysis/Immunology

2. ANALYTICAL PRINCIPLE

The Syva® RapidTest TCA is a one step immunochromatographic test for the qualitative detection of Tricyclic Antidepressants in human urine. The test detects Nortriptyline at the cutoff concentration of 1000 ng/mL. The test is based on the principle of the highly specific immunochemical reactions between antigens and antibodies, which are used for the analysis of specific substances in biological fluids. The test relies on the competition for binding to the antibodies between drug conjugates and drugs which may be present in the urine sample.

In the test procedure, a sample of human urine is placed in the Sample (S) well of the device, and the sample is allowed to migrate upward. If drug is present in the urine sample, it forms a complex with the antibody-dye conjugate specific for that drug, and the complex migrates toward the opposite end of the card, passing the specific location on the membrane where the drug conjugate for the limited antibodies present in the form of antibody-dye conjugate. When a sufficient amount of drug is present, the drug will saturate the antibodies and the antibody-dye conjugate cannot bind to the drug conjugate on the membrane. Therefore, a drug-positive urine sample will not generate a line in the result window, indicating a positive result from positive drug competition. Conversely, if a particular drug is absent in the urine specimen, the antibody on the antibody-dye conjugate will bind the membrane-bound drug. In this case, a drug-negative urine sample will generate a line at the specific drug position in the result window, indicating a negative result from an absence of competition with free drug.

In addition to the line that may appear in the specific drug position in the result window, a Control line must appear at the Control (C) validation position in the result window to confirm the viability of the test. This Control line should always be seen if the test is conducted properly. The Control line is immobilized with polygonal anti-mouse antibody; therefore, it will capture monoclonal antibody-dye conjugates that pass the region, causing a colored line to show in the C position. This works as a procedural control, confirming that proper sample volume was used and the reagent system worked. If insufficient sample volume is used, there may not be a Control line, indicating the test is invalid.

3. SPECIMEN REQUIREMENTS

3.1 Patient Preparation

Component	Special Notations
Fasting/Special Diets	None
Specimen Collection and/or Timing	Normal procedures for collecting urine may be used for samples to be analyzed by this method.
Special Collection Procedures	Preferred method is the Urine Collection Kit with specimen transferred to Urine Chemistry Collection Tube (yellow top).
Other	If Urine Collection Kit is not used, submit to laboratory within 2 hours of collection.

3.2 Specimen Type & Handling

Criteria	
Type -Preferred **-Other Acceptable**	Urine, freshly voided None
Collection Container	Clean or sterile container.
Volume - Optimum **- Minimum**	1.0 mL 0.5 mL
Transport Container and Temperature	Urine Collection Kit (yellow top) or container at room temperature.
Stability & Storage Requirements	Room Temperature: Test immediately or refrigerate
	Refrigerated: (2-8°C) 48 hours
	Frozen: 48 hours
Timing Considerations	Perform stat, refrigerate specimen if testing is delayed.
Unacceptable Specimens & Actions to Take	Specimens that are unlabeled, improperly labeled, or those that do not meet the stated criteria are unacceptable. Request a recollection and credit the test with the appropriate LIS English text code for "test not performed" message. Examples: Quantity not sufficient-QNS; Wrong collection-UNAC. Document the request for recollection in the LIS.
Compromising Physical Characteristics	Specimens containing a large amount of particulate matter may give inconsistent test results. These specimens should be clarified before testing by centrifuging or allow to settle.
Other Considerations	Specimens should be brought to room temperature before testing.

NOTE: Labeling requirements for all reagents, calibrators and controls include: (1) Open date, (2) Substance name, (3) Lot number, (4) Date of preparation, (5) Expiration date, (6) Initials of tech, and (7) Any special storage instructions. Check all for visible signs of degradation.

4. REAGENTS

The package insert for a new lot of kits must be reviewed for any changes before the kit is used. A current Package Insert is included as a Related Document.

4.1 Reagent Summary

Reagents / Kits	Supplier & Catalog Number
Syva Rapid Test TCA	Siemens Cat. No. 6A119UL

4.2 Reagent Preparation and Storage

Reagent	Syva Rapid TCA Test Devices
Container	N/A
Storage	Stored at 2-30°C in the original sealed pouch. **Note**: The reagents in the foil pouch are moisture sensitive. Do not remove from pouch until ready to use.
Stability	Stable until the date stamped on the kit
Preparation	None

5. CALIBRATORS/STANDARDS

Not applicable

6. QUALITY CONTROL

6.1 Controls Used

Controls	Supplier and Catalog Number
Internal Controls	Each test device. Supplied in the kit.
Liquichek Qualitative Urine Toxicology Negative Control	Bio-Rad Laboratories Cat. No. 454
Liquichek Qualitative Urine Toxicology Positive Control	Bio-Rad Laboratories Cat. No. 455

6.2 Control Preparation and Storage

Control	Liquichek Qualitative Urine Toxicology Negative and Positive Controls
Preparation	Allow the control to reach room temperature (18-25°C) and swirl gently to ensure homogeneity. After each use, promptly replace the stopper and return to 2 - 25°C storage.
Storage/Stability	**Unopened controls** are stable until the expiration date printed on the bottle when stored at 2 - 8°C. **Opened controls** will be stable for 30 days when stored tightly capped at 2 - 25°C storage.

6.3 Frequency

Internal Controls
Performed and documented with each patient test.

External Controls
Positive and negative external controls are run once a week, and with each new lot or shipment of the same lot.

6.4 Tolerance Limits and Criteria for Acceptable QC

All controls must be read in a well-lit area.

Internal Controls
Each device has built-in controls. The Control (**C**) line is an internal positive control. A distinct reddish-purple Control line should always appear in the **C** position, if the following circumstances are present: the test procedure is performed properly; an adequate sample volume is used; the sample and reagent are wicking on the membrane; and the test reagents are working. In addition, if the test has been performed correctly and the device is working properly, the background in the drug position will become clear and show a distinct result. This may be considered the internal negative control.

The positive and negative internal controls contained in each device satisfy the requirements of testing a positive control and a negative control on a daily basis. If the Control line does not appear in the **C** position or the background in the drug position area does not clear, the test is invalid and a new test should be performed. If the problem persists, contact the Company for technical assistance.

External Controls

Negative Control: A test line at the TCA position and a test line at the C position must appear.

Positive Control: Only a test line at the C position must appear. The TCA position must remain blank.

IF the result is …	**THEN…**
not acceptable	• Verify it is the correct control/reagent. • Verify the control/reagent has not expired. • Check for technical/clerical errors. • Visually inspect the condition of the control/reagent (tablets are not to be discolored). • Repeat the QC test. • Notify the Supervisor if these results are not acceptable.

6.5 Documentation

Both Internal and External controls recorded on the "TCA Quality Control log" sheet located in the serology QC binder.

6.6 Quality Assurance Program

- Each new lot number of reagent must be tested with external control materials. Performance of the new lot must be equivalent to the previous lot.
- Training must be successfully completed and documented prior to performing the test.
- The laboratory participates in CAP proficiency testing.

7. EQUIPMENT and SUPPLIES

7.1 Assay Platform

N/A

7.2 Equipment

N/A

7.3 Supplies

None

8. PROCEDURE

NOTE: For all procedures involving specimens, buttoned lab coats, gloves, and face protection are required minimum personal protective equipment. Report all accidents to your supervisor.

8.1	Test Run
1.	For each test, open one pouch and label the device with the patient identification (**ID**).
2.	Holding the dropper vertically, dispense 3 full drops (110 µL) of the urine sample into the Sample (**S**) well
3.	In a well-lit area read the result after 5 minutes, but within 10 minutes of sample application.

NOTE: In the event that the test system becomes inoperable, notify supervision or designee for further direction. Patient specimens must be stored in a manner that maintains the integrity of the specimen.

9. CALCULATIONS

Not applicable

10. REPORTING RESULTS AND REPEAT CRITERIA

10.1 Interpretation of Data

Negative: The appearance of a reddish-purple Control (**C**) line and a line for a specific drug indicates a negative test result; i.e., no drug concentration at or above the cutoff level has been detected. The color intensities of the Control line and specific drug line may not be equal. *A negative test result does not indicate the absence of drug in the sample; it only indicates, in qualitative terms, that the sample does not contain drug at a concentration at or above the cutoff level.*

Positive: The appearance of only a reddish-purple Control line and no distinct line next to TCA position indicates the test result is positive for Nortriptyline. *A positive test result does not indicate the level of intoxication or the specific concentration of drug in the sample; it only indicates, in qualitative terms, that the sample contains drug at a concentration at or above the cutoff level.*

Invalid: A distinct Control (**C**) line should always appear. The test is invalid if no Control line forms at the **C** position and should be repeated using a new device.

Note: Visible in 5 - 10 minutes, a very faint line in the TCA position is interpreted as negative and may indicate that the amount of drug in the sample is near or below the cutoff level of the test. Before positive determinations can be made, these urine specimens should be retested, or confirmed using a more specific method, such as GC/MS.

Negative Patient: A reddish-purple line at the TCA position in the result window indicates the sample **DOES NOT** contain the specific drug above the cutoff level. Both “C” and “TCA” lines must appear.

Positive Patient: When the TCA position is left blank in the result window, it indicates the sample **DOES** contain the specific drug above the cutoff level. Only “C” line must appear.

10.2 Rounding

None

10.3 Units of Measure

N/A

10.4 Clinically Reportable Range (CRR)

N/A

10.5 Review Patient Data

Review patient results for unusual patterns, trends or distributions in patient results, such as an unusually high percentage of positive results.

10.6 Repeat Criteria and Resulting

If …	**Then ….**
no Control line forms at the C position	The result is considered invalid. Repeat using a new device.

10.7 Reporting

Record the results in the LIS using the MEM function and the **WUR1** worksheet.

- Negative results are reported as **NDT** which translates to "None Detected."
- Positive results are reported as **POS** which translates to "Positive."

11. EXPECTED VALUES

11.1 Reference Ranges

None detected

11.2 Critical Values

None established

11.3 Standard Required Messages

The following comment is automatically added to the report by the LIS:

This is a screening assay. TCA is detected in concentrations at or above 1000 ng/mL nortriptyline.

12. CLINICAL SIGNIFICANCE

Tricyclic antidepressants (TCAs) are a type of prescription drug intended for clinically depressed patients. Unfortunately, they are becoming more frequently abused and are now one of the leading caused of death by drug overdose in the United States. There are two broad chemical classes of TCAs. The tertiary amines-amitriptyline, imipramine, trimipramine and doxepin-boost serotonin levels and are prescribed for insomnia, irritability, and overstimulation. The secondary amines-nortriptyline, desipramine and protriptyline-enhance norepinephrine levels and are prescribed for opposite types of symptoms, such as excessive fatigue, withdrawal, and inertness. Abuse of TCAs may lead to coma, respiratory depression, convulsions, blood pressure deviations, hyperpraxia and severe cardiac conditions. TCAs are excreted in the urine mostly in the form of metabolites for up to ten days.

13. PROCEDURE NOTES

- **FDA Status:** Approved/cleared
- **Validated Test Modifications:** None

The Syva® RapidTest TCA is a qualitative test. The amount of tricyclic antidepressants present in human urine cannot be estimated by the test panel. The results distinguish drug-positive from drug-negative samples. Positive results indicate the samples contain the specific drug at a concentration giving a response at or above the cutoff level.

14. LIMITATIONS OF METHOD

14.1 Analytical Measurement Range (AMR)

N/A

14.2 Precision

Performance of the Syva® RapidTest TCA test was determined by testing serially diluted standard drug solutions. Approximately 95% of the samples containing nortriptylline concentrations 25% greater than the cutoff level consistently showed positive results.
Cutoff precision was challenged by testing more than 40 samples with drug concentrations ± 25% of the cutoff level. Results obtained using the Syva® RapidTest TCA test consistently agreed with expected test results.

14.3 Interfering Substances

Adulterants, such as bleach, or other strong oxidizing agents, added to urine specimens may produce erroneous results regardless of the method of analysis. If adulteration is suspected, obtain another specimen.

14.4 Clinical Sensitivity/Specificity/Predictive Values

A positive result indicates the presence of the drug or drug metabolite and does not indicate the level of intoxication, route of administration or urinary concentration.

15. SAFETY

Refer to your local and corporate safety manuals and Safety Data Sheet (SDS) for detailed information on safety practices and procedures and a complete description of hazards.

16. RELATED DOCUMENTS

Current package insert Syva® One-step Tricyclic Antidepressants
TCA Quality Control Log (AG.F38)

17. REFERENCES

1. Package Insert, Syva® One-step Tricyclic Antidepressants Test, Cat. No. 6A119UL, Siemens Diagnostics, revised 04/2008.
2. Package insert, Liquichek Qualitative Urine Toxicology Control Negative and Positive, Bio-Rad Laboratories, revised 08/2012.

18. REVISION HISTORY

Version	Date	Section	Reason	Reviser	Approval
			Supersedes WAH U011.001		
000	4/19/13		Update owner	L. Barrett	R. SanLuis
000	4/19/13	3.1	Add urine collection kit	L. Barrett	R. SanLuis
000	4/19/13	6.1, 6.2	Revised QC material to new product	A. Chini	R. SanLuis
000	4/19/13	17	New QC product added	A. Chini	R. SanLuis
001	5/24/17	4, 6	Remove individual section labeling instructions and add general one	L Barrett	R SanLuis
001	5/24/17	10.5	Move patient review from section 6	L Barrett	R SanLuis
001	5/24/17	10.6	Add repeat criteria	L Barrett	R SanLuis
001	5/24/17	11.3	Move LIS comment from section 10.7	L Barrett	R SanLuis
001	5/24/17	15	Update to new standard wording	L Barrett	R SanLuis
001	5/24/17	16	Move log from section 19	L Barrett	R SanLuis
001	5/24/17	Footer	Version # leading zero's dropped due to new EDCS in use as of 10/7/13	L Barrett	R SanLuis

19. ADDENDA

None