

Overview

**Useful For**  
Detecting toxic thallium exposure in random urine specimens

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
TLUC	Thallium/Creat Ratio, U	No	Yes
CRETR	Creatinine, Random, U	No	Yes

**Special Instructions**  

- [Metals Analysis Specimen Collection and Transport](#)

**Method Name**  
TLUC: Inductively Coupled Plasma Mass Spectrometry (ICP-MS)  
CRETR: Enzymatic Colorimetric Assay

**NY State Available**  
Yes

Specimen

**Specimen Type**  
Urine

**Specimen Required**  
**Patient Preparation:** High concentrations of gadolinium and iodine are known to interfere with most metal tests. If either gadolinium- or iodine-containing contrast media has been administered, **a specimen should not be collected for 96 hours.**  
**Supplies:** Urine Tubes, 10 mL (T068)  
**Collection Container/Tube:** Clean, plastic urine collection container with no metal cap or glued insert  
**Submission Container/Tube:** Plastic, 10-mL urine tube or a clean, plastic aliquot container with no metal cap or glued insert  
**Specimen Volume:** 7 mL  
**Collection Instructions:**  

- Collect a random urine specimen.
- See [Metals Analysis Specimen Collection and Transport](#) for complete instructions.

**Specimen Minimum Volume**  
2.3 mL

Reject Due To

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Urine	Refrigerated (preferred)	28 days	
	Ambient	14 days	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

Thallium is odorless, tasteless, and found in trace amounts in the earth's crust. It is used in the manufacturing of electronic devices, switches, and closures. It had previously been used in rodenticides. The greatest exposure can occur from eating food (eg, fruits and vegetables) since its easily taken up by plants through the roots. Cigarette smoking is also a source of exposure. Accidental ingestion may lead to vomiting, diarrhea, and leg pains, followed by a severe and sometimes fatal sensorimotor polyneuropathy. Peripheral neuropathy may occur within 1 week of exposure, while hair loss begins and continues for several weeks. Gastrointestinal symptoms, including pain, diarrhea, and constipation have also been reported in acute ingestion, along with myalgias, pleuritic chest pain, insomnia, optic neuritis, hypertension, cardiac abnormalities, Mees lines, and liver injury. Most thallium is excreted in the urine, can be found within an hour after exposure, and can be detected as long as two months after exposure.

Reference Values

THALLIUM:  
0-17 years: Not established  
> or =18 years: <2 mcg/g creatinine

CREATININE:  
> or =18 years old: 16-326 mg/dL  
Reference values have not been established for patients who are younger than 18 years of age.

Interpretation

Patients exposed to high doses of thallium (>1 g) present with alopecia, peripheral neuropathy, and seizures, and kidney failure.

Normal daily thallium excretion is less than 1 mcg/day.

Exposed patients can have urine thallium excretion greater than 10 mcg/day. The long-term consequences of such an exposure are poor.

Cautions

No significant cautionary statements

**Clinical Reference**

1. Bank WJ, Pleasure DE, Suzuki K, Nigro M, Katz R. Thallium poisoning. Arch Neurol. 1972;26(5):456-464. doi:10.1001/archneur.1972.00490110090009

2. Pelclova D, Urban P, Ridson P, et al. Two-year follow-up of two patients after severe thallium intoxication. Hum Exp Toxicol. 2009;28(5):263-272. doi:10.1177/0960327109106487

3. Zhao G, Ding M, Zhang B, et al. Clinical manifestations and management of acute thallium poisoning. Eur Neurol. 2008;60(6):292-297. doi:10.1159/000157883

4. Strathmann FG, Blum LM. Toxic elements. In: Rifai N, Chiu RWK, Young I, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:455.e55

5. Campanella B, Colombaioni L, Benedetti E, et al. Toxicity of thallium at low doses: A review. Int J Environ Res Public Health. 2019;16(23):4732. doi:10.3390/ijerph16234732

**Performance****Method Description**

The metal of interest is analyzed by inductively coupled plasma mass spectrometry.(Unpublished Mayo method)

Creatinine:

The enzymatic method is based on the determination of sarcosine from creatinine with the aid of creatininase, creatinase, and sarcosine oxidase. The liberated hydrogen peroxide is measured via a modified Trinder reaction using a colorimetric indicator. Optimization of the buffer system and the colorimetric indicator enables the creatinine concentration to be quantified both precisely and specifically.(Package insert: Creatinine plus ver 2. Roche Diagnostics; V15.0, 03/2019)

**PDF Report**

No

**Day(s) Performed**

Tuesday, Friday

**Report Available**

2 to 5 days

**Specimen Retention Time**

14 days

**Performing Laboratory Location**

Mayo Clinic Laboratories - Rochester Superior Drive

**Fees & Codes**

Fees

- Authorized users can sign in to [Test Prices](#) for detailed fee information.
- Clients without access to Test Prices can contact [Customer Service](#) 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact [Customer Service](#).

Test Classification

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

83018  
82570

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
TLUCR	Thallium/Creat Ratio, Random, U	13469-2

Result ID	Test Result Name	Result LOINC® Value
CRETR	Creatinine, Random, U	2161-8
615256	Thallium/Creat Ratio, U	13469-2