

Overview

Useful For

Detecting clinically significant lead exposure, a toxic heavy metal, using random urine specimens

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
PBCU	Lead/Creatinine Ratio, U	No	Yes
CRETR	Creatinine, Random, U	No	Yes

Special Instructions

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

Method Name

PBCU: Triple Quadrupole Inductively Coupled Plasma-Mass Spectrometry (ICP-MS/MS)

CRETR: Enzymatic Colorimetric Assay

NY State Available

Yes

Specimen

Specimen Type

Urine

Ordering Guidance

The Centers for Disease Control and Prevention recommends venous blood collection for lead testing; see PBDV / Lead, Venous, with Demographics, Blood.

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 container with no metal cap or glued insert

Submission Container/Tube: Plastic, 10-mL urine tube or clean, plastic aliquot container with no metal cap or glued insert

Specimen Volume: 3 mL

Collection Instructions:

- Collect a random urine specimen.

2. See [Metals Analysis Specimen Collection and Transport](#) for complete instructions.

Specimen Minimum Volume
1.5 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	
	Frozen	28 days	
	Ambient	14 days	

Clinical & Interpretive

Clinical Information

Increased urine lead concentration per gram of creatinine indicates significant lead exposure. Measurement of urine lead concentration per gram of creatinine before and after chelation therapy have been used as an indicator of significant lead exposure. However, the American College of Medical Toxicology (ACMT 2010) position statement on post-chelator challenge urinary metal testing states that "post-challenge urinary metal testing has not been scientifically validated, has no demonstrated benefit, and may be harmful when applied in the assessment and treatment of patients in whom there is concern for metal poisoning."

Blood lead measurement is the best test for clinical correlation of toxicity.

For more information see PBDV / Lead, Venous, with Demographics, Blood.

Reference Values

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

Interpretation

Measurements of urinary lead (Pb) levels have been used to assess lead exposure. However, like lead blood, urinary lead excretion mainly reflects recent exposure and thus shares many of the same limitations for assessing lead body burden or long-term exposure.(1,2)

Urinary lead concentration increases exponentially with blood lead and can exhibit relatively high intra-individual variability, even at similar blood lead concentrations.(3,4)

Cautions

No significant cautionary statements

Clinical Reference

1. Sakai T: Biomarkers of lead exposure. *Ind Health*. 2000 Apr;38(2):127-142
2. Skerfving S: Biological monitoring of exposure to inorganic lead. In: Clarkson TW, Friberg L, Nordberg GF, Sager PR, eds. *Biological Monitoring of Toxic Metals*. Rochester Series on Environmental Toxicity. Springer; 1988:169-197
3. Gulson BL, Jameson CW, Mahaffey KR, et al: Relationships of lead in breast milk to lead in blood, urine, and diet of the infant and mother. *Environ Health Perspect*. 1998 Oct;106(10):667-674
4. Skerfving S, Ahlgren L, Christoffersson JO: Metabolism of inorganic lead in man. *Nutr Res*. 1985;Suppl 1:601-607
5. Kosnett MJ, Wedeen RP, Rotherberg SJ, et al: Recommendations for medical management of adult lead exposure. *Environ Health Perspect*. 2007 Mar;115(3):463-471
6. de Burbane C, Buchet JP, Leroyer A, et al: Renal and neurologic effects of cadmium, lead, mercury, and arsenic in children: evidence of early effects and multiple interactions at environmental exposure levels. *Environ Health Perspect*. 2006 Apr;114(4):584-590
7. Strathmann FG, Blum LM: Toxic elements. In: Rifai N, Chiu RWK, Young I, Burnham CD, Wittwer CT, eds. *Tietz Textbook of Laboratory Medicine*. 7th ed. Elsevier; 2023:chap 44
8. Hauptman M, Bruccoleri R, Woolf AD: An update on childhood lead poisoning. *Clin Pediatr Emerg Med*. 2017 Sep;18(3):181-192. doi: 10.1016/j.cpem.2017.07.010

Performance**Method Description**

Lead:

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

Monday through Friday

Report Available

2 to 4 days

Specimen Retention Time

14 days

Performing Laboratory Location

Rochester

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

83655
82570

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
PBU CR	Lead/Creat Ratio, Random,U	13466-8

Result ID	Test Result Name	Result LOINC® Value
CRETR	Creatinine, Random, U	2161-8
608904	Lead/Creatinine Ratio, U	13466-8