MAYO CLINIC LABORATORIES

Test Definition: PBUCR

Lead/Creatinine Ratio, Random, Urine

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:
1. 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	
	Ambient	14 days	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

An increased urine lead concentration relative to creatinine indicates significant lead exposure. Measurement of urine lead concentration relative to creatinine before and after chelation therapy have been used to assess 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."(1)

Blood lead measurement is the best test for clinical correlation of toxicity. For more information see PBDV / Lead, Venous, with Demographics, Blood.

Reference Values

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

CREATININE:
0-17 years: Not established
> or =18 years: 16-326 mg/dL

Interpretation

Measurements of urinary lead (Pb) levels have been used to assess lead exposure. However, like lead blood, urinary Pb excretion mainly reflects recent exposure and thus shares many of the same limitations for assessing lead body burden or long-term exposure.(2,3)

Urinary lead concentration increases exponentially with blood lead and can exhibit relatively high intra-individual variability, even at similar blood lead concentrations.(4,5)

Cautions

No significant cautionary statements

Clinical Reference

1. American College of Medical Toxicology. American College of Medical Toxicology position statement on post-chelator challenge urinary metal testing. J Med Toxicol. 2010;6(1):74-75. doi:10.1007/s13181-010-0039-0
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3. 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
4. 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;106(10):667-674
5. Skerfving S, Ahlgren L, Christoffersson JO. Metabolism of inorganic lead in man. Nutr Res. 1985;Suppl 1:601-607
6. Kosnett MJ, Wedeen RP, Rothenberg SJ, et al. Recommendations for medical management of adult lead exposure. Environ Health Perspect. 2007;115(3):463-471
7. de Burbure 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;114(4):584-590
8. 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
9. Hauptman M, Bruccoleri R, Woolf AD. An update on childhood lead poisoning. Clin Pediatr Emerg Med. 2017;18(3):181-192. doi:10.1016/j.cpem.2017.07.010

Performance

Method Description

Lead:
The metal of interest is analyzed by triple-quadrupole inductively coupled plasma mass spectrometry.(Unpublished Mayo method)

Creatinine:
This enzymatic method is based on the conversion of creatinine with the aid of creatininase, creatinase, and sarcosine oxidase to form glycine, formaldehyde, and hydrogen peroxide. Catalyzed by peroxidase the liberated hydrogen peroxide reacts with 4-aminophenazone and HTIB (2,4,6-triiodo03-hydroxybenzoic acid) to form a quinone imine chromogen. The color intensity of the quinone imine chromogen formed is directly proportional to the creatinine concentration in the reaction mixture.(Package insert: Creatinine plus ver.2. Roche Diagnostics; 07/2024)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

2 to 4 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

83655
82570

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
PBUCR	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