

Overview**Useful For**

Detecting exposure to cadmium using random urine specimens

Special Instructions

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

Method Name

Only orderable as part of profile. For more information, see:

CDUCR / Cadmium/Creatinine Ratio, Random, Urine

HMUCR / Heavy Metal/Creatinine Ratio, with Reflex, Random, Urine

Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)

NY State Available

Yes

Specimen**Specimen Type**

Urine

Specimen Required

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HMUCR / Heavy Metal/Creatinine Ratio, with Reflex, Random, Urine

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	28 days	
	Frozen	28 days	

Clinical and Interpretive

Clinical Information

The toxicity of cadmium resembles the other heavy metals (arsenic, mercury and lead) in that it attacks the kidney; renal dysfunction with proteinuria with slow onset (over a period of years) is the typical presentation. Measurable changes in proximal tubule function, such as decreased clearance of para-aminohippuric acid, also occur over a period of years and precede overt renal failure.

Breathing the fumes of cadmium vapors leads to nasal epithelial deterioration and pulmonary congestion resembling chronic emphysema.

The most common source of cadmium exposure is tobacco smoke, which has been implicated as the primary sources of the metal leading to reproductive toxicity in both males and females.

Chronic exposure to cadmium causes accumulated renal damage. The excretion of cadmium is proportional to creatinine except when renal damage has occurred. Renal damage due to cadmium exposure can be detected by increased cadmium excretion relative to creatinine.

The Occupational Safety and Health Administration (OSHA) mandated (Fed Reg 57:42,102-142,463, September 1992) that all monitoring of employees exposed to cadmium in the workplace should be done using the measurement of urine cadmium and creatinine, expressing the results of mcg of cadmium per gram of creatinine.

Reference Values

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HMUCR / Heavy Metal/Creatinine Ratio, with Reflex, Random, Urine

Interpretation

Cadmium excretion above 3.0 mcg/g creatinine indicates significant exposure to cadmium.

Results above 15 mcg/g creatinine are considered indicative of severe exposure.

Cautions

Collection of urine specimens through a catheter frequently results in elevated values, because rubber contains trace amounts of cadmium that are extracted as urine passes through the catheter.

Clinical Reference

1. deBurbure C, Buchet J-P, 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;114:584-590
2. Schulz C, Angerer J, Ewers U, et al: Revised and new reference values for environmental pollutants in urine or blood of children in Germany derived from the German Environmental Survey on Children 2003-2006 (GerESIV) *Int J Hyg Environ Health.* 2009;212:637-647
3. Occupational Safety and Health Administration: Cadmium exposure and control. Updated 9/2/2008. Accessed July 17, 2020. US Department of Labor Available at [osha.gov/SLTC/cadmium/evaluation.html](https://www.osha-slc.com/cadmium/evaluation.html)
4. Agency for Toxic Substances and Disease Registry: Toxicological profile for cadmium. US Department of Health and Human Services. September 2012. Available at www.atsdr.cdc.gov/ToxProfiles/tp5.pdf

5. Strathmann FG, Blum LM: Toxic elements. In: Rifai N, Horwath AR., Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:chap 42

Performance

Method Description

Cadmium (Cd) in urine is analyzed by inductively coupled plasma-mass spectrometry (ICP-MS) in kinetic energy discrimination (KED) mode using gallium (Ga), rhodium (Rh), and iridium (Ir) as internal standards and a 5% nitric acid salt matrix calibration.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Monday through Friday

Report Available

1 day

Specimen Retention Time

14 days

Performing Laboratory Location

Rochester

Fees and 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 Regional Manager. 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. This test has not been cleared or approved by the U.S. Food and Drug Administration.

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
CDCU	Cadmium/Creatinine Ratio, U	13471-8

Result ID	Test Result Name	Result LOINC Value
608902	Cadmium/Creatinine Ratio, U	13471-8