Test Definition: CDOU

Cadmium Occupational Exposure, Random, Urine (Non-Orderable)

Overview

Useful For

Only orderable as part of profile. For more information see:
CDUOE / Cadmium Occupational Exposure, Random, Urine
HMUOE / Heavy Metal Occupational Exposure, with Reflex, Random, Urine

Detecting occupational exposure to cadmium using random urine specimens

Method Name

Only orderable as part of a profile. For more information see:
CDUOE / Cadmium Occupational Exposure, Random, Urine
HMUOE / Heavy Metal Occupational Exposure, with Reflex, Random, Urine

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

NY State Available

Yes

Specimen

Specimen Type

Urine

Specimen Required

Only orderable as part of a profile. For more information see:
CDUOE / Cadmium Occupational Exposure, Random, Urine
HMUOE / Heavy Metal Occupational Exposure, 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 & Interpretive

Clinical Information

Cadmium toxicity resembles that of the other heavy metals, including arsenic, mercury, and lead. The kidney is the primary organ affected Kidney dysfunction with proteinuria and 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 develop over several years and precede overt kidney failure.

Inhalation of cadmium vapor can cause nasal epithelial deterioration and pulmonary congestion resembling chronic emphysema.

For nonsmokers, food is the primary source of cadmium exposure. In general, leafy vegetables such as lettuce and spinach, potatoes, grains, peanuts, soybeans, and sunflower seeds contain high levels of cadmium. For smokers, tobacco smoke is the most common source of exposure is and has been implicated as the primary source of cadmium associated with reproductive toxicity in both men and women.

Chronic cadmium exposure can cause cumulative kidney damage. Cadmium excretion is proportional to creatinine unless kidney damage is present. Cadmium-induced kidney damage may be detected by increased cadmium excretion relative to creatinine.

For Occupational Safety and Health Administration-mandated workplace exposure monitoring (Fed Reg 57:42,102-142,463, September 1992), measurement urine cadmium and creatinine should be ordered and results reported as mcg of cadmium per gram of creatinine.

Reference Values

Only orderable as part of a profile. For more information see:
CDUOE / Cadmium Occupational Exposure, Random, Urine
HMUOE / Heavy Metal Occupational Exposure, with Reflex, Random, Urine

Biological exposure indices (BEI): <5.0 mcg/g creatinine

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. 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
2. Schulz C, Angerer J, Ewers U, Heudorf U, Wilhelm M. Human Biomonitoring Commission of the German Federal Environment Agency. 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(6):637-647
3. Occupational Safety and Health Administration. Cadmium exposure and control. Updated 09/02/2008. Accessed August 30, 2024. US Department of Labor Available at osha.gov/SLTC/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, Chiu RWK, Young I, Burnham CD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 44
6. Zhang H, Reynolds M. Cadmium exposure in living organisms: A short review. Sci Total Environ. 2019;678:761-767. doi:10.1016/j.scitotenv.2019.04.395
7. Wang M, Chen Z, Song W, Hong D, Huang L, Li Y. A review on cadmium exposure in the population and intervention strategies against cadmium toxicity. Bull Environ Contam Toxicol. 2021;106(1):65-74. doi:10.1007/s00128-020-03088-1

Performance

Method Description

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

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

82300

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CDOU	Cadmium Occupational Exposure	13471-8

Result ID	Test Result Name	Result LOINC® Value
608892	Cadmium Occupational Exposure	13471-8