MAYO CLINIC LABORATORIES

Test Definition: CDU

Cadmium, 24 Hour, Urine

Overview

Useful For

Detecting exposure to cadmium, a toxic heavy metal, in 24-hour urine specimens

Special Instructions

- Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens
- Metals Analysis Specimen Collection and Transport

Method Name

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

NY State Available

Yes

Specimen

Specimen Type

Urine

Ordering Guidance

If employees are being monitored in the workplace, Occupational Safety and Health Administration requires that laboratory reports express the cadmium excretion rate per gram of creatinine rather than per 24 hours. Order CDUOE / Cadmium, Occupational Exposure, Random, Urine to accommodate that requirement. Mayo Clinic Laboratories is certified to provide this test.

Necessary Information

24-Hour volume (in milliliters) is required.

Specimen Required

Patient Preparation:

High concentrations of gadolinium and iodine are known to potentially interfere with most inductively coupled plasma mass spectrometry-based 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 urine for 24 hours and record the total volume.

2. Refrigerate specimen within 4 hours of completion of 24-hour collection.
3. See Metals Analysis Specimen Collection and Transport for complete instructions.

Additional Information: See Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens for multiple collections.

Urine Preservative Collection Options

Note: The addition of preservative or application of temperature controls **must occur within 4 hours of completion** of the collection.

Ambient (no additive)	OK
Refrigerate (no additive)	Preferred
Frozen (no additive)	OK
50% Acetic Acid	OK
Boric Acid	No
Diazolidinyl Urea	No
6M Hydrochloric Acid	OK
6M Nitric Acid	OK
Sodium Carbonate	No
Thymol	No
Toluene	No

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.

The concentration of cadmium in the kidneys and urine is elevated in some patients exposed to cadmium.

Reference Values

0-17 years: Not established
> or =18 years: <0.7 mcg/24 h

Interpretation

Urine cadmium levels primarily reflect total body burden of cadmium. Cadmium excretion above 3.0 mcg/g creatinine indicates significant exposure to cadmium.

For occupational testing, Occupational Safety and Health Administration cadmium standard is less than 3.0 mcg/g creatinine, and the biological exposure index is 5.0 mcg/g creatinine.

Collection of urine over 24 hours minimizes fluctuations of observed cadmium concentrations in random urine samples.

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 September 2, 2008. Accessed October 12, 2026. 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. October 2026. Accessed October 12, 2026. 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

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
1 to 3 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
CDU	Cadmium, 24 Hr, U	5612-7

Result ID	Test Result Name	Result LOINC® Value
31106	Cadmium, 24 Hr, U	5612-7
TIME7	Collection Duration (h)	13362-9
VL83	Volume (mL)	3167-4