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
- Trace Metals Analysis Specimen Collection and Transport

Method Name

Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)

NY State Available

Yes

Specimen

Specimen Type

Urine

Necessary Information

24 Hour volume is required.

Specimen Required

Patient Preparation: High concentrations of gadolinium and iodine are known to interfere with most metals 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: 10 mL

Collection Instructions:

1. Collect urine for 24 hours.
2. Refrigerate specimen within 4 hours of completion of 24-hour collection.
3. See Trace Metals Analysis Specimen Collection and Transport in Special Instructions for complete instructions.

Additional Information: See Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens in Special Instructions 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	OK
Refrigerate	Preferred
Frozen	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

2 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

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.

For nonsmokers, the primary source of cadmium exposure is from the food supply. In general, leafy vegetables such as lettuce and spinach, potatoes and grains, peanuts, soybeans, and sunflower seeds contain high levels of cadmium. For smokers, 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.

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

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

Reference Values

0-17 years: not established
> or =18 years: <0.7 mcg/24 hour

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, the Occupational Safety and Health Administration (OSHA) cadmium standard is less than 3.0 mcg/g creatine and the biological exposure index is 5 mcg/g creatinine.

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 controls. US Department of Labor Updated 9/2/2008. Accessed July 17, 2020. 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. Avaliable at www.atsdr.cdc.gov/ToxProfiles/tp5.pdf
5. Strathmann FG, Blum LM: Toxic elements. In: Rafai 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 to 3 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 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 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	13362-9
VL83	Total Volume	3167-4