MAYO CLINIC LABORATORIES

Test Definition: CRUO

Chromium Occupational Exposure, Random, Urine

Overview

Useful For

Screening for occupational exposure to chromium

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
CROM1	Chromium Occupational Exposure, U	No	Yes
CRETR	Creatinine, Random, U	No	Yes

Special Instructions

- Metals Analysis Specimen Collection and Transport

Method Name

CROM1: Triple-Quadrupole Inductively Coupled Plasma Mass Spectrometry (ICP-MS/MS)
CRETR: Enzymatic Colorimetric Assay

NY State Available

Yes

Specimen

Specimen Type

Urine

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: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube: Clean, plastic urine collection container with no metal cap or glued insert
Submission Container/Tube: Plastic, 5-mL tube or a 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

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	14 days	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

Chromium (Cr) has an atomic mass of 51.996, atomic number 24, and valences ranging from 2(-) to 6(+). Hexavalent chromium, Cr(6+), and trivalent chromium, Cr(3+), are the two most prevalent forms. Cr(3+) is the only oxidation state present under normal physiologic conditions. Cr(6+) is widely used in industry to make chromium alloys including stainless steel pigments and electroplated coatings. Cr(6+), a known carcinogen, is rapidly metabolized to Cr(3+). Cr(3+) is the only form present in human urine.

Reference Values

CHROMIUM OCCUPATIONAL EXPOSURE
0-17 years: Not established
> or =18 years: The American Conference of Governmental Industrial Hygienists (ACGIH) Biological Exposure Index (BEI) for daily occupational exposure to hexavalent chromium in urine is an increase of 10.0 mcg/L between pre-shift and post-shift urine collections. The ACGIH BEI for long- and short-term hexavalent chromium in urine is an end-of-shift concentration above 24.9 mcg/L at the end of the work week.

CREATININE, RANDOM
> or =18 years old: 16-326 mg/dL
Reference values have not been established for patients who are younger than 18 years of age.

Interpretation

The National Institute for Occupational Safety and Health draft document on occupational exposure reviews the data supporting use of urine to assess chromium exposure.(1) They recommend a Biological Exposure Index of 10 mcg/g creatinine and 30 mcg/g creatinine for the increase in urinary chromium concentrations during a work shift and at the end of shift at the end of the workweek, respectively (Section 3.3.1).

Cautions

Normal specimens have extremely low levels of chromium; elevated results could easily be a result of external contamination. Precautions must be taken to ensure the specimen is not contaminated. Metal-free urine collection

procedures must be followed. Refrigeration is preferred over chemical methods of preservation.

Clinical Reference

1. Centers for Disease Control and Prevention; National Institute for Occupational Safety and Health (NIOSH). Criteria for a recommended standard occupational exposure to hexavalent chromium. CDC; September 2013. Accessed March 18, 2026. Available at www.cdc.gov/niosh/docs/2013-128/pdfs/2013_128.pdf
2. Sodi R. Vitamins and trace elements. In: Rifai N, Chiu RWK, Young I, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 39

Performance

Method Description

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

Creatinine
The enzymatic method is based on the determination of sarcosine from creatinine with the aid of creatininase, creatinase, and sarcosine oxidase. The liberated hydrogen peroxide is measured via a modified Trinder reaction using a colorimetric indicator. Optimization of the buffer system and the colorimetric indicator enables the creatinine concentration to be quantified both precisely and specifically.(Package insert: Creatinine plus ver 2. Roche Diagnostics; V15.0, 03/2019)

PDF Report

No

Day(s) Performed

Monday

Report Available

2 to 8 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

82495
82570

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CRUO	Chromium Occupat Exp, Random, U	13464-3

Result ID	Test Result Name	Result LOINC® Value
CRETR	Creatinine, Random, U	2161-8
607761	Chromium Occupational Exposure	13464-3
608390	Chromium Concentration	5623-4