

## Overview

### Useful For

Identifying the cause of abnormal serum zinc concentrations using a 24-hour urine specimen

### 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 barium are known to interfere with this test. If barium-containing contrast media has been administered, a specimen should not be collected for at least 96 hours.

**Supplies:** Urine Tubes, 10 mL (T068)

**Collection Container/Tube:** Clean, plastic urine collection container with no metal cap or glued insert

**Submission Container/Tube:** Plastic 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

0.4 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

Zinc is an essential element; it is a critical cofactor for carbonic anhydrase, alkaline phosphatase, RNA and DNA polymerases, alcohol dehydrogenase, and many other physiologically important proteins. Zinc is a key element required for active wound healing.

Zinc depletion occurs either because it is not absorbed from the diet (excess copper or iron interfere with absorption) or it is lost after absorption. Dietary deficiency may be due to absence (parenteral nutrition), or because the zinc in the diet is bound to fiber and not available for absorption. Once absorbed, the most common route of loss is via exudates from open wounds such as third-degree burns or gastrointestinal loss as in colitis. Hepatic cirrhosis also causes excess loss of zinc by enhancing renal excretion. The peptidase, kinase, and phosphorylase enzymes are most sensitive to zinc depletion.

Zinc excess is not of major clinical concern. The popular American habit of taking megavitamins (containing huge doses of zinc) produces no direct toxicity problems. Much of this zinc passes through the gastrointestinal tract and is excreted in the feces. The excess fraction that is absorbed is excreted in the urine. The only known effect of excessive zinc ingestion relates to the fact that zinc interferes with copper absorption, which can lead to hypocupremia.

### Reference Values

0-17 years: not established

> or =18 years: 109-1,476 mcg/24 hours

### Interpretation

Fecal excretion of zinc is the dominant route of elimination. Renal excretion is a minor, secondary elimination pathway. Normal daily excretion of zinc in the urine is in the range of 20 to 967 mcg/24 hours.

High urine zinc associated with low serum zinc may be caused by hepatic cirrhosis, neoplastic disease, or increased catabolism.

High urine zinc with normal or elevated serum zinc indicates a large dietary source, usually in the form of high-dose vitamins.

Low urine zinc with low serum zinc may be caused by dietary deficiency or loss through exudation common in burn patients and those with gastrointestinal losses.

### Cautions

No significant cautionary statements

### Clinical Reference

1. Sata F, Araki S, Murata K, Aono H: Behavior of heavy metals in human urine and blood following calcium disodium ethylenediamine tetraacetate injection: observations in heavy metal workers. *J Toxicol Environ Health A*. 1998;54(3):167-178
2. Afridi HI, Kazi TG, Kazi NG, et al: Evaluation of cadmium, lead, nickel and zinc status in biological samples of smokers and nonsmokers hypertensive patients. *J Hum Hypertens*. 2010 Jan;24(1):34-43
3. Zorbas YG, Kakuris KK, Neofitov IA, Afoninos NI: Zinc utilization in zinc-supplemented and -unsupplemented healthy subjects during and after prolonged hypokinesia. *Tr Elem Electro*. 2008;25(2):60-68
4. Rifai N, Horwath AR, Wittwer CT, eds: *Tietz Textbook of Clinical Chemistry and Molecular Diagnostics*. 6th ed. Elsevier; 2018

### Performance

#### Method Description

This assay is performed on an inductively coupled plasma-mass spectrometer in dynamic reaction cell (DRC) mode. Calibrating standards and blanks are diluted with an aqueous acidic diluent containing internal standards. Quality control specimens and patient samples are diluted in an identical manner. In turn, all diluted blanks, calibrating standards, quality control specimens, and patient specimens are aspirated into a pneumatic nebulizer and the resulting aerosol directed to the hot plasma discharge by a flow of argon. In the annular plasma the aerosol is vaporized, atomized, and then ionized. The ionized gases plus neutral species formed in the annular plasma space are aspirated from the plasma through an orifice into a quadrupole mass spectrometer. The mass range from 1 to

263 amu is rapidly scanned multiple times and ion counts tabulated for each mass of interest. Instrument response is defined by the linear relationship of analyte concentration versus ion count ratio (analyte ion count/internal standard ion count). Analyte concentrations are derived by reading the ion count ratio for each mass of interest and determining the concentration from the response line.(Unpublished Mayo method)

**PDF Report**

No

**Day(s) Performed**

Monday

**Report Available**

1 to 6 days

**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.

**CPT Code Information**

84630

**LOINC® Information**

Test ID	Test Order Name	Order LOINC Value
ZNU	Zinc, 24 Hr, U	5765-3

Result ID	Test Result Name	Result LOINC Value
8591	Zinc, 24 Hr, U	5765-3
TM8	Collection Duration	13362-9
VL5	Urine Volume	3167-4