# Test Definition: OSM24

Osmolality, 24 Hour, Urine

## Overview

### Useful For

Assessing the concentrating and diluting ability of the kidney using a 24-hour urine collection

### Method Name

Freezing Point Depression

### NY State Available

Yes

## Specimen

### Specimen Type

Urine

### Necessary Information

**24-Hour volume (in milliliters) is required.**

### Specimen Required

**Supplies:**

-Diazolidinyl Urea (Germall), 5.0 mL (T822)

-Urine Tubes, 10 mL (T068)

**Container/Tube:** 24-hour graduated urine container with no metal cap or glued insert

**Specimen Volume:** 10 mL

**Collection Instructions:**

1. Collect urine for 24 hours

2. Add 5 mL of diazolidinyl urea as preservative at start of collection or refrigerate specimen during and after collection.

**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 **at the beginning of the collection**.

| | |
|---|---|
| Ambient (no additive) | No |
| Refrigerate (no additive) | Preferred |
| Frozen (no additive) | OK |
| 50% Acetic Acid | No |
| Boric Acid | No |
| Diazolidinyl Urea (Germall) | OK |
| 6M Hydrochloric Acid | No |
| 6M Nitric Acid | No |

| | |
|---|---|
| Sodium Carbonate | No |
| Toluene | No |

### Specimen Minimum Volume
1 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) | 14 days | |
| | Ambient | 72 hours | |
| | Frozen | 14 days | |

## Clinical & Interpretive

### Clinical Information
Osmolality is an index of the solute concentration. Urine osmolality is a measure of the concentration of osmotically active particles, principally sodium, chloride, potassium, and urea; glucose can contribute significantly to the osmolality when present in substantial amounts in urine. Urinary osmolality corresponds to urine specific gravity in nondisease states.

The ability of the kidney to maintain both tonicity and water balance of the extracellular fluid can be evaluated by measuring the osmolality of the urine either routinely or under artificial conditions. More information concerning the state of renal water handling or abnormalities of urine dilution or concentration can be obtained if urinary osmolality is compared to serum osmolality and urine electrolyte studies are performed. Normally, the ratio of urine osmolality to serum osmolality is 1.0 to 3.0, reflecting a wide range of urine osmolality.

### Reference Values
0-11 months: 50-750 mOsm/kg
> or =12 months: 150-1,150 mOsm/kg

### Interpretation
With normal fluid intake and normal diet, a patient will produce urine of about 500 to 850 mosmol/kg water. Above the age of 20 years, there is an age dependent decline in the upper reference range of approximately 5 mOsm/kg/year.

The normal kidney can concentrate urine to 800 to 1400 mosmol/kg and with excess fluid intake, a minimal osmolality of 40 to 80 mosmol/kg can be reached.

With dehydration, the urine osmolality should be 3 to 4 times the plasma osmolality

When a patient is drinking relatively large amounts of fluid the urine can be maximally diluted to approximately 100 mosmol/kg water.

A 24-hour urine osmolality will reflect the average urine osmolality over the day. Thus, a 24-hour urine osmolality will provide information regarding patient's ability to either dilute or concentrate the urine, and also their habitual water intake throughout the day in relation to their osmole intake. This information is most commonly used to determine if a patient with a risk of kidney stone disease is ingesting enough fluid to maintain a relatively dilute urine. Rough guidelines would suggest a treatment target of less than 400 mosmol/ kg water in a stone forming individual, which correlates with a total urine volume of greater than 2 L in an average individual.

### Cautions

No significant cautionary statements

### Clinical Reference

1. Newman D, Price C. Renal function and nitrogen metabolites. In: Burtis CA, Ashwood ER, eds. Tietz Textbook of Clinical Chemistry. 4th ed. WB Saunders Company; 2006
2. Delaney MP, Lamb EJ. Kidney disease. In. Rifai NF, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:1306

## Performance

### Method Description

Measurement of the freezing point of urine is the most widely used principle in osmometers. The extent of lowering below 0 degrees C (the freezing point of water) is a function of the concentration of substances dissolved in the urine. By definition, 1 milliosmole per kilogram lowers the freezing point 0.001858 degrees C.(Schindler EI, Brown SM, Scott MG. Electrolytes and blood gases. In: Rifai N, Horwath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:610-612)

### PDF Report

No

### Day(s) Performed

Monday through Sunday

### Report Available

Same day/1 day

### Specimen Retention Time

7 days

### Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

## 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 has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

### CPT Code Information

83935

### LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---|---|---|
| OSM24 | Osmolality, 24 HR, U | 2694-8 |

| Result ID | Test Result Name | Result LOINC® Value |
|---|---|---|
| UOS24 | Osmolality, 24 HR, U | 2694-8 |
| TM02 | Collection Duration (h) | 13362-9 |
| VL02 | Volume (mL) | 3167-4 |