

## Overview

### Useful For

Assessing acid-base balance, water balance, water intoxication, and dehydration

### Method Name

Potentiometric, Indirect Ion-Selective Electrode (ISE)

### NY State Available

Yes

## Specimen

### Specimen Type

Urine

### Specimen Required

**Supplies:** Sarstedt 5 mL Aliquot Tube (T914)

**Container/Tube:** Plastic, 5-mL tube

**Specimen Volume:** 4 mL

#### Collection Instructions:

1. Collect a random urine specimen.
2. No preservative.

### 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	7 days	
	Frozen	30 days	

## Clinical & Interpretive

**Clinical Information**

Sodium ( $\text{Na}^+$ ) is the primary extracellular cation.  $\text{Na}^+$  is responsible for almost one-half the osmolality of the plasma and, therefore, plays a central role in maintaining the normal distribution of water and the osmotic pressure in the extracellular fluid compartment. The amount of  $\text{Na}^+$  in the body is a reflection of the balance between  $\text{Na}^+$  intake and output. The normal daily diet contains 8 to 15 grams of sodium chloride ( $\text{NaCl}$ ), which is nearly completely absorbed from the gastrointestinal tract. The body requires only 1 to 2 mmol/day, and the excess is excreted by the kidneys, which are the ultimate regulators of the amount of  $\text{Na}^+$  (and thus water) in the body.  $\text{Na}^+$  is freely filtered by the glomeruli. Approximately 70% to 80% of the filtered  $\text{Na}^+$  is actively reabsorbed in the proximal tubules with chloride and water passively following in an iso-osmotic and electrically neutral manner. Another 20% to 25% is reabsorbed in the loop of Henle along with chloride and more water. In the distal tubules, interaction of the adrenocortical hormone aldosterone with the coupled sodium-potassium and sodium-hydrogen exchange systems directly results in the reabsorption of  $\text{Na}^+$  and indirectly of chloride from the remaining 5% to 10% of the filtered load. It is the regulation of this latter fraction of filtered  $\text{Na}^+$  that determines the amount of  $\text{Na}^+$  excreted in the urine.

**Reference Values**

No established reference values.

Random urine sodium may be interpreted in conjunction with serum sodium, using both values to calculate fractional excretion of sodium.

The calculation for fractional excretion (FE) of sodium (Na) is

$$\text{FE}(\text{Na}) = ([\text{Na}(\text{urine}) \times \text{Creat}(\text{serum})] / [\text{Na}(\text{serum}) \times \text{Creat}(\text{urine})]) \times 100$$

**Interpretation**

Urinary sodium ( $\text{Na}^+$ ) excretion varies with dietary intake, and there is a large diurnal variation with the rate of  $\text{Na}^+$  excretion during the night being only 20% of the peak rate during the day.

$\text{Na}^+$  may be lost in the kidneys as a result of diuretic therapy, salt-losing nephropathies, or adrenal insufficiency, with the urinary  $\text{Na}^+$  concentration usually more than 20 mEq/L. In these hypovolemic states, urine  $\text{Na}^+$  values less than 10 mEq/L indicate extrarenal  $\text{Na}^+$  loss. In hypervolemic states, a low urine  $\text{Na}^+$  (<10 mEq/L) may indicate nephrotic syndrome in addition to non-kidney causes.

**Cautions**

No significant cautionary statements.

**Clinical Reference**

1. Delaney MP, Lamb EJ: Kidney disease. In: Rifai N, Horwath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:1308-1309

**Performance****Method Description**

The ion-selective electrode (ISE) module performs indirect measurement of electromotive force (EMF). The ISE module measures the EMF difference between an ion-selective electrode and a reference electrode. The EMF of the ion-selective electrode is dependent on the ion concentration of the sample. The EMF of the reference electrode is

constant. An electronic calculation circuit converts EMF of the sample to the ion concentration of the sample. (Package insert: Sodium. Roche Diagnostics; V14.0, 02/2018)

**PDF Report**

No

**Day(s) Performed**

Monday through Sunday

**Report Available**

Same day/1 to 2 days

**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**

84300

**LOINC® Information**

Test ID	Test Order Name	Order LOINC® Value
RNAUR	Sodium, Random, U	2955-3

Result ID	Test Result Name	Result LOINC® Value
RNAUR	Sodium, Random, U	2955-3