# Serum Osmolality/Osmolarity

## INPUTS

|  |  |
| --- | --- |
| Sodium | **Options:** |
| BUN | **Options:** |
| Glucose | **Options:** |
| Serum alcohol concentration  *Enter 80, not 0.08 if in US units (mg/dL)* | **Options:** |
| Measured serum osm  *Normal value is 285 mmol/kg* | **Options:** |

## FORMULA

**Traditional equation:**

Serum osmolality, US units = (2 × Na + (BUN / 2.8) + (glucose / 18) + (ethanol / 4.6)

[**Purssell et al**](https://www.sciencedirect.com/science/article/pii/S0196064401166667) **equation:**

Serum osmolality, US units = (2 × Na + (BUN / 2.8) + (glucose / 18) + (ethanol / 3.7)

*Note:* the range displayed in the calculator uses the equations above.

**Osmolal gap equation:**

Osmolal gap = measured serum osm - calculated serum osm

*Note:* the osmolal gap displayed in the calculator uses the Pursell et al equation.

## FACTS & FIGURES

If values are in SI units, these are already molar (mmol/L for example), so these do not need to be divided by their molecular weight.

## EVIDENCE APPRAISAL