Lab Tests Guide

Understand Your Tests. Empower Your Health

Medical laboratory formulas and Basic calculations play a crucial role in the field of clinical laboratory testing. These calculations are utilized to interpret and analyze laboratory results, determine diagnostic parameters, assess organ function, and guide patient management. They enable healthcare professionals to derive meaningful insights from test data and make informed decisions.

Table of Contents

Urine Protein Formula:

The test for protein in the urine measures the amount of albumin in your urine, compared to the amount of creatinine in your urine. This is called the urine albumin-to-creatinine ratio (UACR).

24 Hours Urine Protein Formula	$\frac{\text{Total Volume (ml)}}{1000} \times \frac{\text{Protein Result (mg/dl)}}{100}$

Urine Creatinine Formula:

A creatinine urine test measures the amount of creatinine in your urine. Creatinine is a chemical waste product produced by muscle metabolism. When your kidneys are functioning normally.

24 Hours Urine Creatinine Formula	$\frac{\text{Total Volume (ml)}}{1000} \times \frac{\text{Creatinine Result (mg/dl)}}{100}$

Creatinine Clearance Formula:

A creatinine clearance test compares the amount of creatinine in your blood to the amount in your urine over a 24-hour period. This shows how fast your kidneys clear creatinine from your body. Your doctor may ask you to do a creatinine clearance test to see how well your kidneys are working.

Creatinine Clearance Formula	$\frac{(140\text{-Age}) \times \text{Weight} \times \text{Sex}}{72 \times \text{Serum Creaninine (mg/dl)}}$	Sex : Male = 1.0 Female = 0.85

Urine Calcium Formula:

Calcium is one of the most common minerals in the body. All cells throughout the body use calcium for various functions. The body uses calcium to build and repair bones and teeth. Calcium also helps nerves, the heart, and muscles function properly, and helps blood to clot.

24 Hours Urine Calcium Formula	$\frac{\text{Total Volume (ml)}}{1000} \times \text{Calcium Result (mg/dl)} \times 10$

Urine Uric Acid Formula:

A uric acid test measures the amount of uric acid in the body. Uric acid is a chemical that's produced when your body breaks down purines.

24 Hours Urine Uric Acid Formula	$\frac{\text{Total Volume (ml)}}{1000} \times \text{Uric Acid Result (mg/dl)} \times 10$

Urine Phosphate Formula:

A urine phosphate test measures how much phosphate is in your pee over a 24-hour period. Your doctor might also call it a phosphorous test.

24 Hours Urine Phosphate Formula	$\frac{\text{Total Volume (ml)}}{1000} \times \frac{\text{Phosphate Result (mg/dl)}}{100}$

Urine Urea Formula:

The urine urea nitrogen test determines how much urea is in the urine to assess the amount of protein breakdown. The test can help determine how well the kidneys are functioning and whether your intake of protein is too high or low.

24 Hours Urine Urea Formula	$\frac{\text{Total Volume (ml)}}{1000} \times \frac{\text{Urea Result (mg/dl)}}{100}$

Osmolality Formula:

Osmolality is a measure of how much one substance has dissolved in another substance. The greater the concentration of the substance dissolved, the higher the osmolality. Very salty water has higher osmolality than water with just a hint of salt.

Osmolality Formula

$$2 \times \text{Sodium(Na)} + \frac{\text{Glucose (mg/dl)}}{18} + \frac{\text{BUN (mg/dl)}}{2.8} + \frac{\text{Alcohol (mmol/L)}}{3.7}$$

In Some Laboratories

Fractional Excretion of Sodium (FENa) Formula:

Fractional excretion of sodium is the amount of salt (sodium) that leaves the body through urine compared to the amount filtered and reabsorbed by the kidney. Fractional excretion of sodium (FENa) is not a test. Instead it is a calculation based on the concentrations of sodium and creatinine in the blood and urine.

Fractional Excretion of Sodium (FENa)

$$\frac{\text{Serum Creatinine (mg/dl)} \times \text{Urine Sodium (mmol/L)}}{\text{Serum Sodium (mml/L)} \times \text{Urine Creatinine (mg/dl)}} \times 100$$

Prerenal cause: FENa <1%
Intrinsic Renal cause: FENa 1-4%
Postrenal cause: FENa >4%

Ionized Calcium (Ca^{2+}) Formula:

Ionized calcium (Ca^{2+}) is calcium in your blood that is not attached to proteins. It is also called free calcium. All cells need calcium in order to work. Calcium helps build strong bones and teeth. It is important for heart function.

Ionized Calcium Formula	Total Calcium (mg/dl) + 0.8 (40 – Serum Albumin (g/L))

Transferrin Saturation Formula:

Transferrin saturation (TS), measured as a percentage, is a medical laboratory value. It is the value of serum iron divided by the total iron-binding capacity of the available transferrin, the main protein that binds iron in the blood, this value tells a clinician how much serum iron is bound.

Transferrin Saturation Formula	$\frac{\text{Iron (µg/dL)}}{\text{TIBC (µg/dL)}} \times 100$

Urine Sodium Formula:

A sodium blood test is a routine test that allows your doctor to see how much sodium is in your blood. It's also called a serum sodium test.

24 Hours Urine Sodium Formula	$\frac{\text{Total Urine Volume}}{1000} \times \text{Sodium (mmol/l)}$

Urine Potassium Formula:

A potassium blood test measures the amount of potassium in your blood. Potassium is a type of electrolyte. Electrolytes are electrically charged minerals in your body that help control muscle and nerve activity, maintain fluid levels, and perform other important functions.

24 Hours Urine Potassium Formula	$\frac{\text{Total Urine Volume}}{1000} \times \text{Potassium (mmol/l)}$

Urine Chloride Formula:

A chloride blood test is used to diagnose a variety of health conditions. Here's what the results mean and what happens after taking the test.

24 Hours Urine Chloride Formula	$\frac{\text{Total Urine Volume}}{1000} \times \text{Chloride (mmol/l)}$

Microalbuminuria Formula:

The microalbuminuria test is a urine test that measures the amount of albumin in your urine. Albumin is a protein that your body uses for cell growth and to help repair tissues. It's normally present in the blood. A certain level of it in your urine may be a sign of kidney damage.

24 Hours Urine Microalbuminuria Formula	$\frac{\text{Total Urine Volume}}{1000} \times \text{Result (mg/l)}$

Urine Amylase Formula:

Amylase is an enzyme, or special protein, produced by your pancreas and salivary glands. The pancreas is an organ located behind your stomach.

Urine Amylase Formula	$\frac{\text{Total Volume x Result (u/l)}}{\text{Hours x 1000}}$

Lipid Profile Formula :

Lipid profile or lipid panel is a panel of blood tests that serves as an initial screening tool for abnormalities in lipids, such as cholesterol and triglycerides.

Total Lipid	Chol + TG + HDL + LDL + VLDL
LDL	Chol-HDL-VLDL
VLDL	TG ÷ 5
Chol/HDL Ratio	Chol ÷ HDL

BUN Formula:

A blood urea nitrogen (BUN) test measures the amount of nitrogen in your blood that comes from the waste product urea. Urea is made when protein is broken down in your body. Urea is made in the liver and passed out of your body in the urine. A BUN test is done to see how well your kidneys are working.

Blood Urea Nitrogen (BUN)	S. Urea ÷ 2.14

INR Formula:

An INR test measures the time for the blood to clot. It is also known as prothrombin time, or PT. It is used to monitor blood-thinning medicines, which are also known as anticoagulants. The INR, or international normalised ratio, can also be used to check if you have a blood clotting problem.

INR (International Normalized Ratio)	Result ÷Control x ISI

eGFR Formula:

eGFR stands for estimated glomerular filtration rate. It is a measure used to estimate how well the kidneys are functioning in filtering waste products from the blood. The eGFR is calculated using formulas that take into account factors such as age, sex, race, and the blood level of a waste product called creatinine. It is used to assess kidney function and to determine the stage of chronic kidney disease (CKD). A higher eGFR indicates better kidney function, while a lower eGFR suggests decreased kidney function.

eGFR Formula	**186 x [Creatinine-1.154] x [Age-0.203] x (1.210 if female) x (0.742 if African American)**