

## EXPLANATION OF 14 PARAMETERS AND INTERPRETATION OF THE RESULTS

**UROBILINOGEN [NORMAL: NEGATIVE]** Urobilinogen is a product of the breakdown of bilirubin, a yellow pigment produced during the normal breakdown of red blood cells in the liver. When bilirubin undergoes further metabolism in the intestines, some of it is converted into urobilinogen, which is then excreted in the urine and feces. In a urine test, the presence of urobilinogen is measured as it can indicate various conditions affecting the liver or the biliary system. Abnormal levels of urobilinogen in the urine may suggest liver disease, bile duct obstruction, or hemolytic disorders (conditions where red blood cells are broken down at an increased rate).

**BILIRUBIN [NORMAL: NEGATIVE]** Bilirubin is a yellow substance that your body makes during the normal process of breaking down red blood cells. Your liver uses bilirubin to make bile, a fluid that helps you digest food. A healthy liver removes most of the bilirubin from your body. But if there is a problem with your liver, bilirubin can build up in your blood and get into your urine. High levels of bilirubin in the urine may indicate issues with the liver, gallbladder, or bile ducts.

**KETONE [NORMAL: NEGATIVE]** Ketones are substances produced when the body breaks down fat for energy, instead of using glucose as its primary energy source. This produces an acid called ketones, which can build up in blood and urine. Your risk increases if you have a medical condition, diet, or exercise habits that cause your body to use fat for energy instead of glucose, such as: Diabetes, Vomiting or diarrhea that lasts a long time, Alcohol use disorder (AUD), which can cause alcoholic ketoacidosis, Eating disorders and starvation, Certain digestive diseases, Eating a "keto diet," which is low in carbohydrates (foods that supply glucose for energy), Exercising too hard for a long time and Pregnancy. If you have diabetes, ketones in urine test can help find high ketone levels early so you can get treatment right away.

**CREATININE [NORMAL: 0.9 MMOL/L]** Creatinine is a normal waste product in your body. It's made when you use your muscles and some of the muscle tissue breaks down. Normally, your kidneys filter creatinine from your blood and remove it from your body in your urine. If there is a problem with your kidneys, creatinine can build up in your blood and less may be released in urine. If blood and/or urine creatinine levels are not normal, it may be a sign of kidney disease.

### URIC ACID (NORMAL: NONE TO RARE CRYSTALS; 24-H EXCRETION ~250-750 MG/DAY)

Uric acid is the end-product of purine metabolism. In acidic and/or concentrated urine it may precipitate as crystals. A few crystals can be incidental; persistent or numerous crystals, or high 24-hour urinary uric acid, suggests hyperuricosuria. Risk increases with dehydration, high-purine diet (certain meats/seafood), obesity, gout/hyperuricemia, rapid cell turnover (e.g., tumor lysis), and some medicines (e.g., diuretics). Uric acid crystals and stones may cause flank pain, dysuria, or hematuria.

Adequate hydration and clinician guidance are recommended if crystals are repeatedly observed or symptoms occur.

**PROTEIN [NORMAL: NEGATIVE OR TRACE]** Proteins are large molecules that are essential for your body to work properly. Protein is found in all parts of your body, including your blood. When your kidneys clean waste from your blood, tiny filters prevent the large protein molecules from leaving your body through urine. If there is a problem with your kidneys, protein can leak into your urine. High levels of protein in your urine over a period of time may be the first sign that kidney disease or another condition has damaged the filters in your kidneys. A protein in urine test can help you find kidney damage early so you can make changes to protect your kidneys.

**MICROALBUMIN [NORMAL: NEGATIVE]** Albumin is the main protein in blood, and healthy kidneys filter it out of the body. Microalbumin is a small amount of albumin that can be found in urine and is sometimes an early sign of kidney disease. When the kidneys have an abnormally high permeability to albumin, small amounts leak into the urine. Kidney damage can cause proteins to leak through the kidneys and exit the body in through urine.

**NITRITE [NORMAL: NEGATIVE]** Nitrites in urine may be a sign of a urinary tract infection (UTI). UTIs are caused by different types of bacteria. Many of these types of bacteria change a normal chemical in your urine, called nitrates, into another chemical, called nitrites. So, if you have nitrites in your urine, it usually means that you have a UTI. UTIs are one of the most common types of infections, especially in women. Most UTIs affect the bladder and urethra (the tube that carries urine out of your body). Fortunately, most UTIs are not serious. They are usually treated with antibiotics. UTIs that aren't treated could spread to the kidneys, which can be serious. So, it's important to diagnose and treat UTIs early.

**LEUKOCYTES [NORMAL: NEGATIVE]** Leukocytes are white blood cells. The body produces them as part of the immune response to fight an infection or other unwanted invader. In small quantities, leukocytes in the urine are normal however high levels of leukocytes (>10 leu/uL) imply that white blood cells are present in the urinary tract, meaning a urinary tract infection, kidney stones, and/or inflammation may also be present.

### MAGNESIUM (NORMAL: NONE TO RARE CRYSTALS; 24-H EXCRETION ~73-122 MG/DAY)

Magnesium in urine can participate in struvite (magnesium ammonium phosphate) crystal formation, which is favored by alkaline urine and may be associated with UTIs from urease-positive bacteria. Occasional crystals can be benign; persistent struvite crystals may indicate stone risk or underlying infection. Urine pH, hydration, and infection status strongly influence crystal formation. Manage hydration, review diet/medications with a clinician, and seek medical advice if crystals persist or urinary symptoms develop.

**SPECIFIC GRAVITY [NORMAL: 1.005-1.030]** Urine specific gravity is a test that measures the total concentration of all chemical particles in the urine. The normal range for urine specific gravity is 1.005 to 1.030. Increased urine specific gravity may be due to conditions such as: Adrenal glands do not produce enough hormones (such as Addison disease), glucose in the urine, heart failure, high sodium level in the blood, loss of body fluids (dehydration), narrowing of the kidney artery (renal artery stenosis), shock and Syndrome of inappropriate ADH secretion (SIADH)

Decreased urine specific gravity may be due to; damage to kidney tubule cells (renal tubular necrosis), diabetes insipidus, drinking too much fluid, kidney failure, low sodium level in the blood and severe kidney infection (pyelonephritis).

**PH [NORMAL: 4.5 - 8]** The pH scale is used to measure the acidity of a fluid. Urine has the widest range of pH compared to other bodily fluids. The American Association for Clinical Chemistry says the normal urine pH range is between 4.5 and 8. Any pH higher than 8 is basic or alkaline, and any under 6 is acidic. The following conditions can cause your urine to measure at an acidic pH level; Kidney stones, Diabetic ketoacidosis, Dehydration, Acidosis and Starvation. Similarly, urine that is more basic than normal (high pH>8) could indicate that you are experiencing one of the following conditions; Kidney failure, Gastric suctioning, Respiratory alkalosis happens when you breathe too deep or too fast. Kidney tubular acidosis occurs when the kidneys are unable to remove acid, Pyloric obstruction and Urinary tract infection. Diet plays a significant role in affecting urine pH. Consuming a diet rich in fruits and vegetables can increase your urine pH, while a diet high in meat products or cheese can decrease your urine pH. Certain medications can also alter the normal pH of urine.

**ASCORBATE [NORMAL: 0 - 2.8 MMOL/L]** Ascorbate (vitamin-c) can be found in various foods and supplements. Concentrations of ascorbic acid greater than 20 mg/dL can be expected to cause strong interference with glucose, blood and nitrite can cause false-positive and false-negative results for glucose, blood and nitrite.

**CALCIUM [NORMAL: 2.5 - 7.5 MMOL/L]** Most of your calcium is stored in your bones and teeth. About 1% of the calcium in your body is in your blood. Having the right amount of calcium in your blood is necessary for your nerves, muscles, and heart to work properly. Normally, your kidneys filter out a small amount of calcium from your blood, which leaves your body in urine. Checking the amount of calcium in urine can help diagnose kidney problems and other conditions that can affect calcium levels in your blood.

**References:** [medlineplus.gov](https://medlineplus.gov), [mayoclinic.com](https://mayoclinic.com), [ucsfhealth.com](https://ucsfhealth.com), [webmd.com](https://webmd.com)