

Additional Blood Tests

CBC W/Auto Diff

The CBC is used as a broad screening test to check for such disorders as anemia, infection, and many other diseases. It is actually panel of tests that examines different parts of the blood and includes the following:

■ WBC

- White blood cell (WBC) count is a count of the actual number of white blood cells per volume of blood. WBC assesses the ability of the body to respond to and eliminate infection. Eating, physical activity, and stress may alter white blood cell differential values. There are five types of white blood cells, each with different functions: neutrophils, lymphocytes, monocytes, eosinophils and basophils.

Ranges	Your Results
Low: 3.9 or less	
Normal: 4.0 - 12.0	4.3
High: 12.1 or Higher	

■ LYM or LY Absolute count and Percentage

- LYM or LY means lymphocyte absolute count. Lymphocytes occur in two forms: B cells, which produce antibodies, and T cells, which recognize foreign substances and process them for removal. High lymphocyte counts could be an indication of Infection (bacterial, viral, other), Cancer of the blood or lymphatic system, An autoimmune disorder causing ongoing (chronic) inflammation. Viral infections can cause low lymphocyte counts.
- Lymphocyte percent. Leukocyte that normally makes up about 25% of the total white blood cell count.

Absolute Count Ranges	Your Results	Percentage Ranges	Your Results
Low: 0.7 or less		Low: 16.9 or less	
Normal: 0.8 - 5.6	1.8	Normal: 17.0 - 50.0	42.7
High: 5.7 or Higher		High: 51.1 or Higher	

■ MID Absolute count and Percentage

- MID means mid-range absolute count. This count generally includes monocytes, eosinophils and basophils. Monocytes functions in the ingestion of bacteria and other foreign particles. Eosinophils are believed to function in allergic responses and in resisting some infections. Basophils may increase or decrease in certain diseases.
- Mid-range percent. Basophils normally constitute 1% or less of the total white blood cell count. Eosinophils, normally about 1-3% of the total white blood cell count. Monocytes make up 5-10% of the total white blood cell count.

Absolute Count Ranges	Your Results	Percentage Ranges	Your Results
Normal: 0.0 - 1.1	not tested	Normal: 0.0 - 11.0	not tested
High: 1.2 or Higher		High: 11.1 or Higher	

▪ **GRAN Absolute Count and Percentage**

- GRAN means Granulocyte absolute count. Neutrophils (also known as segs, PMNs, granulocytes, grans) normally the most abundant type of white blood cell in healthy adults. An elevated level of granulocytes is indicative of an underlying bacterial infection.
- Granulocyte percent. Granulocytes normally up to 60% of the total white blood cell count.

Absolute Count Ranges	Your Results	Percentage Ranges	Your Results
Low: 1.4 or less	not tested	Low: 32.9 or less	not tested
Normal: 1.5 - 1.8		Normal: 33 - 70	
High: 1.9 or Higher		High: 70.1 or Higher	

▪ **NEU Absolute Count and Percentage %**

- Neu means Neutrophil granulocytes are the most abundant type of white blood cells in mammals and form an essential part of the innate immune system. They are generally referred to as either neutrophils or polymorphonuclear neutrophils (or PMNs), and are subdivided into segmented neutrophils (or segs) and banded neutrophils (or bands). They form part of the polymorphonuclear cell family (PMNs) together with basophils and eosinophils. Neutrophils are normally found in the blood stream. During the beginning (acute) phase of inflammation, particularly as a result of bacterial infection, environmental exposure, and some cancers. Neutrophils are one of the first-responders of inflammatory cells to migrate towards the site of inflammation. They are the predominant cells in pus, accounting for its whitish/yellowish appearance. Neutrophils are recruited to the site of injury within minutes following trauma and are the hallmark of acute inflammation.

Absolute Count Ranges	Your Results	Percentage Ranges	Your Results
Low: 1.4 or less		Low: 42.9 or less	
Normal: 1.5 - 8.0	2.1	Normal: 43.0 - 76.0	46.7
High: 8.1 or Higher		High: 76.1 or Higher	

▪ **MON Absolute Count and Percentage**

- **Monocyte** is a type of white blood cell and is part of the human body's immune system. Monocytes play multiple roles in immune function. Such roles include: (1) replenish resident macrophages and dendritic cells under normal states, and (2) in response to inflammation signals, monocytes can move quickly (approx. 8-12 hours) to sites of infection in the tissues and divide/differentiate into macrophages and dendritic cells to elicit an immune response.

Absolute Count Ranges	Your Results	Percentage Ranges	Your Results
		Low: 1.0 or less	
Normal: 0.0 - 0.95	0.3	Normal: 1.1 - 13.0	7.2
High: 1.0 or Higher		High: 13.1 or Higher	

▪ **EOS Absolute Count and Percentage**

- Eosinophil granulocytes, usually called eosinophils or eosinophiles (or, less commonly, acidophils), are white blood cells that are one of the immune system components responsible for combating multicellular parasites and certain infections in vertebrates. Along with mast cells, they also control mechanisms associated with allergy and asthma.

They are granulocytes that develop during [haematopoiesis](#) in the bone marrow before migrating into blood. In normal individuals, eosinophils make up about 1-6% of white blood cells. They are found in the medulla and the junction between the cortex and medulla of the thymus, and, in the lower gastrointestinal tract, ovary, uterus, spleen, and lymph nodes, but not in the lung, skin, esophagus, or some other internal organs under normal conditions. The presence of eosinophils in these latter organs is associated with disease.

Absolute Count Ranges	Your Results	Percentage Ranges	Your Results
Normal: 0.0 - 0.5	0.1	Normal: 0 - 6.0	3.1
High: 0.6 or Higher		High: 6.1 or Higher	

▪ **BAS Absolute Count and Percentage**

- Basophil granulocytes, sometimes referred to as basophils, are the least common of the granulocytes, representing about 0.01% to 0.3% of circulating white blood cells. Basophils appear in many specific kinds of inflammatory reactions, particularly those that cause allergic symptoms.

Basophils contain anticoagulant heparin, which prevents blood from clotting too quickly. They also contain the vasodilator histamine, which promotes blood flow to tissues. They can be found in unusually high numbers at sites of ectoparasite infection, e.g., ticks. Like eosinophils play a role in both parasitic infections and allergies. They are found in tissues where allergic reactions are occurring and probably contribute to the severity of these reactions.

Absolute Count Ranges	Your Results	Percentage Ranges	Your Results
Normal: 0.0 - 0.6	0.0	Normal: 0 - 3.0	0.3
High: 0.7 or Higher		High: 3.1 or Higher	

▪ **RBC**

- Red blood cell (RBC) count is a count of the actual number of red blood cells per volume of blood. Both increases and decreases can point to abnormal conditions.

Ranges	Your Results
Low: 3.7 or less	
Normal: 3.80 - 5.90	5.14
High: 5.91 or Higher	

▪ **Hemoglobin and Hematocrit**

- Hemoglobin measures the amount of oxygen-carrying protein in the blood. Hematocrit measures the percentage of red blood cells in a given volume of whole blood.

Lower-than-normal hemoglobin and hematocrit may be due to: Anemia, Bleeding, Destruction of red blood cells, Leukemia, Malnutrition, Nutritional deficiencies of iron, folate, vitamin B12, and vitamin B6, Overhydration. Higher-than-normal hemoglobin and hemotocrit may be due to: Congenital heart disease, Cor pulmonale, Dehydration, Erythrocytosis, Low blood oxygen levels (hypoxia), Pulmonary fibrosis, Polycythemia vera

Hemoglobin Ranges	Your Results	Hematocrit Ranges	Your Results
Low: 11.6 or less		Low: 34.8 or less	
Normal: 11.7 - 18.0	16.6	Normal: 34.9 - 54.1	45.8
High: 18.1 or Higher		High: 54.1 or Higher	

▪ **MCV**

- The mean cell volume (MCV) is elevated when your RBCs are larger than normal (macrocytic). When the MCV is decreased, your RBCs are smaller than normal (microcytic). When the MCV is higher or lower than the normal range, the red blood cells are larger or smaller than the normal size and are referred to as macrocytic and microcytic red blood cells respectively. Presence of such macrocytic or microcytic red blood cells indicates that the patient might be suffering from a medical condition.

An elevated MCV is usually seen in people suffering from hemolytic anemia or pernicious anemia. Nutritional deficiencies and alcohol abuse are some of the common causes of an elevated MCV. A vitamin B12 deficiency or a folic acid deficiency could also manifest in the form of a higher MCV. Low MCV may be observed in people suffering from iron deficiency anemia, thalassemia or gastrointestinal blood loss.

Ranges	Your Results
Low: 79.9 or less	
Normal: 80.0 - 99.0	89
High: 99.1 or Higher	

▪ **MCH**

- Mean corpuscular hemoglobin (MCH) is a calculation of the average amount of oxygen-carrying hemoglobin inside a red blood cell. Macrocytic RBCs are large so tend to have a higher MCH, while microcytic red cells would have a lower value. Generally, if the MCH level is over 34, this is considered to be too high. The main reason that the MCH level would be too high is because of macrocytic anemia. Macrocytic anemia is a blood disorder in which not enough red blood cells are produced, but the ones that are present are large (thus fitting more hemoglobin). Generally, if the MCH level is below 26, this is considered too low. The MCH level can be too low because of blood loss over time, too little iron in the body, or microcytic anemia. Microcytic anemia is a condition in which abnormally small red blood cells are present. Smaller red blood cells means that less hemoglobin fits in each cell. Hemoglobinopathy, which is a group of disorders characterized by changes in the structure of hemoglobin, can also cause a low MCH level.

Ranges	Your Results
Low: 26.4 or less	
Normal: 26.5 - 34.0	32.4
High: 34.1 or Higher	

▪ **MCHC**

- Mean corpuscular hemoglobin concentration (MCHC) is a calculation of the average concentration of hemoglobin inside a red cell.

Ranges	Your Results
Low: 31.4 or less	
Normal: 31.5 - 36.0	
High: 36.1 or Higher	36.4

▪ **RDW**

- RDW is the abbreviation for "red blood cell distribution width." RDW calculates the varying sizes of red blood cell (RBC) volume in a blood sample.

Ranges	Your Results
Low: 9.9 or less	
Normal: 10.0 - 15.0	12.3
High: 15.1 or Higher	

▪ **Platelet**

- The platelet count is the number of platelets in a given volume of blood. Both increases and decreases can point to abnormal conditions of excess bleeding or clotting. High values can occur with bleeding, cigarette smoking or excess production by the bone marrow. Low values can occur from premature destruction states such as Immune Thrombocytopenia (ITP), acute blood loss, drug effects (such as heparin), infections with sepsis, entrapment of platelets in an enlarged spleen, or bone marrow failure from diseases such as myelofibrosis or leukemia.

Ranges	Your Results
Low: 149 or less	
Normal: 150 - 450	212
High: 451 or Higher	

▪ **MPV**

- Mean Platelet Volume. MPV is a count of how large your platelets actually are. The purpose of measuring the size of the platelets is also to determine whether or not there is an issue with the platelet production in the bone marrow. The MPV is an accurate test that can easily help doctors determine what's wrong with your platelets.

Ranges	Your Results
Low: 6.4 or less	
Normal: 6.5 - 11.0	
High: 11.1 or Higher	12.3

Comprehensive Metabolic

The Comprehensive Metabolic Panel (CMP) is a frequently ordered panel of tests that gives your doctor important information about the current status of your kidneys, liver, and electrolyte and acid/base balance as well as of your blood sugar and blood proteins.

CMP includes the following:

■ Sodium

- Sodium is regulated by the kidneys and adrenal glands. There are numerous causes of high and low sodium levels, but the most common causes of low sodium are diuretic usage, diabetes drugs like chlorpropamide, and excessive water intake in patients with heart or liver disease. This test is used to determine whether your sodium concentration is within normal limits and to help evaluate electrolyte balance and kidney function; to monitor chronic or acute hypernatremia or hyponatremia.

Ranges	Your Results
Low: 135.9 or less	
Normal: 136.0 - 150.0	142
High: 150.1 or Higher	

■ Potassium

- Potassium is controlled very carefully by the kidneys. It is important for the proper functioning of the nerves and muscles, particularly the heart. This test is used to determine whether your potassium concentration is within normal limits and to help evaluate an electrolyte imbalance; to monitor chronic or acute hyperkalemia or hypokalemia.

Ranges	Your Results
Low: 3.4 or less	
Normal: 3.5 - 5.3	5.3
High: 5.4 or Higher	

■ Chloride

- Abnormal Chloride (CL) levels usually accompany abnormalities of sodium or potassium. Borderline low or high levels of chloride generally have no significance. This test is used to determine if there is a problem with your body's electrolyte or acid-base balance and to monitor treatment.

Ranges	Your Results
Low: 97.9 or less	
Normal: 98.0 - 110.0	107
High: 110.1 or Higher	

■ Total Carbon Dioxide

- CO₂ reflects the acid status of your blood. Low CO₂ levels can be due to either to increased acidity from uncontrolled diabetes, kidney disease, metabolic disorders, or low CO₂ can be due to chronic hyperventilation. This test is used as part of an electrolyte panel to screen for an electrolyte or acid-base imbalance or to monitor a known imbalance.

Ranges	Your Results
Low: 21.9 or less	107
Normal: 22.0 - 32.0	
High: 32.1 or Higher	

▪ **Calcium**

- Calcium is controlled in the blood by the parathyroid glands and the kidneys. Calcium is found mostly in bone and is important for proper blood clotting, nerve, and cell activity. An elevated calcium can be due to medications such as thiazide type diuretics, inherited disorders of calcium handling in the kidneys, or excess parathyroid gland activity or vitamin D. Low calcium can be due to certain metabolic disorders such as insufficient parathyroid hormone. This test is used as part of a routine metabolic panel, when you have kidney, bone, or nerve disease, or when symptoms of significantly increased or decreased calcium concentrations are present.

Ranges	Your Results
Low: 8.3 or less	
Normal: 8.4 - 10.5	9.4
High: 10.6 or Higher	

▪ **BUN**

- Blood Urea Nitrogen (BUN) is a waste product produced in the liver and excreted by the kidneys. High values may mean that the kidneys are not working as well as they should. BUN is also affected by high protein diets and/or strenuous exercise which raise levels, and by pregnancy which lowers it. This test is used to evaluate kidney function or monitor the effectiveness of dialysis and other treatments related to kidney disease or damage.

Ranges	Your Results
Low: 5.9 or less	
Normal: 6.0 - 22.0	13
High: 22.1 or Higher	

▪ **Creatinine**

- Creatinine is a waste product largely from muscle breakdown. High values, especially with high BUN levels, may indicate problems with the kidneys. This test is used to determine if your kidneys are functioning normally and to monitor treatment for kidney disease.

Ranges	Your Results
Low: 0.5 or less	
Normal: 0.6 - 1.5	1.1
High: 1.6 or Higher	

▪ **Bilirubin, Total**

- Bilirubin is a brownish yellow substance found in bile. It is produced when the liver breaks down old red blood cells. Bilirubin is then removed from the body through the stool (feces) and gives stool its normal brown color. When bilirubin levels are high, a condition called jaundice occurs, and further testing is needed to determine the cause. Too much bilirubin may mean that too much is being produced (usually due to increased hemolysis) or that the liver is incapable of adequately removing bilirubin in a timely manner due to blockage of bile ducts, liver diseases such as cirrhosis, acute hepatitis, or inherited problems with bilirubin processing. This test is used to screen for or monitor liver disorders.

Ranges	Your Results
Normal: 0 - 1.3	0.70
High: 1.4 or Higher	

▪ **ALT and AST**

- AST (SGOT) and ALT (SGPT) are sensitive indicators of liver damage or injury from different types of diseases. It must be emphasized that higher-than-normal levels of these liver enzymes should not be automatically equated with liver disease. They may mean liver problems or they may not. For example, elevations of these enzymes can occur with muscle damage. **The interpretation of elevated AST and ALT levels depends upon the entire clinical evaluation of an individual, and so it is best done by physicians experienced in evaluating liver disease and muscle disease.** These tests are used to screen for liver damage and/or to help diagnose liver disease.

Absolute Count Ranges	Your Results	Percentage Ranges	Your Results
		Low: 4.9 or less	
Normal: 0.0 - 72.0		Normal: 5.0 - 58.0	58
High: 72.1 or Higher	100	High: 58.1 or Higher	

▪ **Albumin**

- Albumin is made mainly in the liver. It helps keep the blood from leaking out of blood vessels. Albumin also helps carry some medicines and other substances through the blood and is important for tissue growth and healing. This test measures the amount and type of protein in your blood. It is a general index of overall health and nutrition. It is also used to screen for a liver disorder or kidney disease or to evaluate nutritional status.

Ranges	Your Results
Low: 3.4 or less	
Normal: 3.5 - 5.0	4.7
High: 5.1 or Higher	

▪ **Total Protein**

- The total protein test is a rough measure of all the proteins found in the fluid portion of your blood. This test is used as part of a general health checkup, to determine your nutritional status or to screen for certain liver and kidney disorders as well as other diseases.

Ranges	Your Results
Low: 6.2 or less	
Normal: 6.3 - 8.3	7.7
High: 8.4 or Higher	

▪ **ALK Phos**

- Alkaline phosphatase is an enzyme found primarily in bones and the liver but can also be found in other tissues of the body as well such as the intestine, kidney, placenta and in white blood cells. This test is used to screen for or monitor treatment for a liver or bone disorder.

Ranges	Your Results
Low: 39.9 or less	
Normal: 40 - 160	84
High: 160.1 or Higher	

▪ **Globulin**

- Globulin is one of the three types of serum proteins, the others being albumin and fibrinogen. Some globulins are produced in the liver, while others are made by the immune system. The globulin level may be **elevated** in: Chronic infections (parasites, some cases of viral and bacterial infection), Liver disease (biliary cirrhosis, obstructive jaundice), Carcinoid syndrome, Rheumatoid arthritis, Ulcerative colitis, Multiple myelomas, leukemias, Waldenstrom's macroglobulinemia, Autoimmunity (Systemic lupus, collagen diseases, Kidney dysfunction (Nephrosis))

The serum globulin level may be **decreased** in: Nephrosis (A Condition in which the kidney does not filter the protein from the blood and it leaks into the urine), Alpha-1 Antitrypsin Deficiency (Emphysema), Acute hemolytic anemia, Liver dysfunction, Hypogammaglobulinemia/Agammaglobulinemia

Ranges	Your Results
Low: 1.9 or less	
Normal: 2.0 - 4.8	3.0
High: 4.9 or Higher	

▪ **A/G Ratio**

- Albumin to Globulin ratio. The AG ratio may be **elevated** in: Hypothyroidism, High protein/high carbohydrate diet with poor nitrogen retention, Hypogammaglobulinemia (low globulin), Glucocorticoid excess (can be from taking medications with cortisone effect, the adrenal gland overproducing cortisol, or a tumor that produces extra cortisol like compounds, low globulin)

The AG ratio may be **decreased** in: Liver dysfunction

Ranges	Your Results
Low: 0.5 or less	
Normal: 0.6 - 2.2	1.6
High: 2.3 or Higher	

▪ **B/C Ratio**

- BUN to Creatinine Ratio. The ratio may be used to determine the cause of acute kidney injury.

Ranges	Your Results
Low: 8.5 or less	
Normal: 8.6 - 36.0	11.8
High: 36.1 or Higher	

▪ **GFR (IDMS) or eGFR Calculated IDMS**

- Glomerular filtration rate (**GFR**) is a test used to check how well the kidneys are working. Specifically, it estimates how much blood passes through the tiny filters in the kidneys. This test is used to assess kidney function.

GFR IDMS		eGFR Calculated IDMS	
Ranges	Your Results	Percentage Ranges	Your Results
Low: <= 60		Low: <= 60	
Normal: > 60	>60	Normal: > 60	72.7

■ **TSH**

The TSH test is often the test of choice for evaluating thyroid function and/or symptoms of hyper- or hypothyroidism. TSH testing is used to diagnose a thyroid disorder in a person with symptoms, screen newborns for an underactive thyroid, monitor thyroid replacement therapy in people with hypothyroidism, diagnose, monitor female infertility problems, help evaluate the function of the pituitary gland (occasionally), and screen adults for thyroid disorders.

Ranges	Your Results
Low: 0.29 or less	
Normal: 0.30 - 4.82	
High: 4.82 or Higher	15.8

■ **PSA**

PSA test is used as a screening tool; increased levels may indicate an increased risk of prostate cancer, while lower levels indicate a decreased risk. American Cancer Society (ACS), recommend that doctors offer total PSA tests annually to all men, beginning at age 50 and to those at an increased risk of prostate cancer, such as American men of African descent and men with a family history of the disease, beginning at age 40 or 45. The ACS recommends that doctors discuss the testing options, benefits, and potential side effects with their male patients so that they can make informed choices.

PSA Ranges	Your Results
Normal: 0 - 4.0	0.53
High: 4.1 or Higher	

*****Reference Ranges may vary depending upon where your lab work was processed. The reference ranges used in this report are general guidelines. We encourage you to always review your lab report with a qualified medical provider.*****