

Understanding Your Lab Values

<u>Lab Test</u>	<u>Reference Range</u>	<u>Brief Review of Laboratory Tests</u>
<u>Lipid Panel</u>		
Triglycerides Major lipid component found in the blood.	<150 MG/DL	This test measure's your body's ability to metabolize fats. It, like cholesterol, is a measure of risk for atherosclerosis and related to heart disease; but, because triglyceride levels are independent of cholesterol level, doctors often want to know both values to make a better evaluation of risk. Because this test is sensitive to diet, it is always measured on a fasting basis, i.e., you cannot have had anything to eat or drink (except water) for 12 hours before your blood is drawn for this test.
Cholesterol, Total Major lipid component found in the blood.	<200 MG/DL	This test is the most commonly used indicator of your risk for atherosclerosis and related heart disease. You're likely to have this test on a regular basis, if you had a high value at initial testing, if you are trying to lower your cholesterol by diet, or if you're on a cholesterol-lowering medication. It is reported in milligrams per deciliter.
HDL Cholesterol	> or = 40 MG/DL Men 40 to 50 MG/DL Women 50-60 MG/DL	High-density lipoprotein is popularly known as the "good" lipoprotein. It protects against heart disease by helping remove excess cholesterol deposited in the arteries. High levels seem to be associated with low incidence of coronary heart disease. In the average man, HDL cholesterol levels range from 40 to 50 mg/dL. In the average woman, they range from 50 to 60 mg/dL. HDL cholesterol that's less than 40 mg/dL is low. Low HDL cholesterol puts you at high risk for heart disease. Smoking, being overweight and being sedentary can all result in lower HDL cholesterol. If you have low HDL cholesterol, you can help raise it by: <ul style="list-style-type: none"> • Not smoking • Losing weight (or maintaining a healthy weight) • Being physically active for at least 30–60 minutes a day on most or all days of the week
LDL-Cholesterol	<130 MG/DL (CALC)	Low-density lipoprotein is popularly known as the "bad" lipoprotein or cholesterol because it deposits in the arteries when LDL levels are high.

Chol/HDL Ratio	<4.4 (CALC)	This ratio is the mathematical relationship between the Total Cholesterol and the HDL Cholesterol.
Alkaline Phosphatase	20-125 U/L	An enzyme present primarily in the liver, bone and biliary tract. In children and adolescents, an elevated level usually reflects active bone growth. In adults, however, elevated levels may indicate liver, biliary tract or bone problems.
Bilirubin, Total	0.2-1.3 MG/DL	Bilirubin is a bile pigment in the blood. It is a breakdown product of hemoglobin or red blood cells which are then handled by your liver. An increase may reflect the breakdown of the red blood cells or liver disease.
Urea Nitrogen (BUN)	7-25 MG/DL	Blood Urea Nitrogen 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, steroids, and/or strenuous exercise which raise levels, and by pregnancy which lowers it.
Creatinine	0.5-1.2 MG/DL	A waste product that is found in muscle and blood that is removed by the kidneys. High values, especially with high BUN levels, may indicate problems with the kidneys.
BUN/Creatinine Ratio	6-25 (CALC)	This ratio is the mathematical relationship between the BUN and Creatinine.
Calcium	8.5-10.4 MG/DL	A mineral that comes from the bone and is important for proper blood clotting, nerve, and cell activity. It is controlled in the blood by the parathyroid glands and the kidneys. 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; or drugs like Fosamax or furosemide type diuretics. Calcium is bound to albumin in the blood, so low albumin level will cause the total calcium level in the blood to drop.
Carbon Dioxide	21-33 MMOL/L	CO ₂ reflects the acid status of your blood. Low CO ₂ levels can be due to either to increased acidity from uncontrolled diabetes, kidney disease, metabolic disorders, or low CO ₂ can be due to chronic hyperventilation. Severe vomiting and severe diarrhea can also affect your CO ₂ levels.
Chloride	98-110 MMOL/L	This helps your cells operate properly. In between your cells is an area called the extracellular space. Molecules that need to move into and out of your cells depend on a process called osmosis, which governs the movement of molecules through permeable membranes, including the walls of your body's cells. Chloride in the extracellular spaces helps osmosis work properly.

<p style="text-align: center;"><u>Glucose</u></p> <p style="text-align: center;"><u>Types of Diabetes</u></p> <p><u>Type I Diabetes:</u> Results from the body's failure to produce insulin, the hormone that "unlocks" the cells of the body, allowing glucose to enter and fuel them. It is estimated that 5-10% of Americans who are diagnosed with diabetes have type I diabetes.</p> <p><u>Type II Diabetes:</u> Results from insulin resistance (a condition in which the body fails to properly use insulin), combined with relative insulin deficiency. Most Americans who are diagnosed with diabetes have type II diabetes.</p> <p><u>Gestational:</u> Gestational diabetes affects about 4% of all pregnant women---about 135,000 cases in the United States each year.</p> <p><u>Pre-diabetes:</u> Pre-diabetes is a condition that occurs when a person's blood glucose levels are higher than normal but not high enough for a diagnosis of type II diabetes. There are 41 million Americans who have pre-diabetes, in addition to the 18.2 million with diabetes.</p>	<p>65-99 MG/DL Fasting Reference Interval</p> <p>The Fasting Plasma Glucose Test:</p> <p>FBG level between 100-125 MG/DL signals pre-diabetes</p> <p>FBG level of 126MG/DL or higher signals diabetes</p>	<p>A value that reflects the content of sugar in your blood. Increased glucose is often seen in individuals on steroids, and is usually temporary. Some patients, however, may become diabetic and require insulin treatment to control their glucose.</p> <p>Diabetes is a disease in which the body does not produce or properly use insulin. Insulin is a hormone that is needed to convert sugar, starches and other food into energy needed for daily life. The cause of diabetes continues to be a mystery, although both genetics and environmental factors such as obesity and lack of exercise appear to play roles. There are 18.2 million people in the United States, or 6.3% of the population, who have diabetes. While an estimated 13 million have been diagnosed with diabetes, unfortunately, 5.2 million people (or nearly one-third) are unaware that they have the disease. In order to determine whether or not a patient has pre-diabetes or diabetes, health care providers conduct a Fasting Plasma Glucose Test (FPG) or an Oral Glucose Tolerance Test (OGTT). Either test can be used to diagnose pre-diabetes or diabetes. The American Diabetes Association recommends the FPG because it is easier, faster, and less expensive to perform.</p> <p>With the FPG test, a fasting blood glucose level between 100 and 125 mg/dl signals pre-diabetes. A person with a fasting blood glucose level of 126 mg/dl or higher has diabetes.</p> <p>In the OGTT test, a person's blood glucose level is measured after a fast and two hours after drinking a glucose-rich beverage. If the two-hour blood glucose level is between 140 and 199 mg/dl, the person tested has pre-diabetes. If the two-hour blood glucose level is at 200 mg/dl or higher, the person tested has diabetes.</p>
<p style="text-align: center;"><u>Potassium</u></p>	<p>3.5-5.3 MMOL/L</p>	<p>Potassium is controlled very carefully by the kidneys. It is important for the proper function of the nerves and muscles, particularly the heart. Any value outside the expected range, high or low, requires medical evaluation. This is especially important if you are taking a diuretic (water pill) or heart pill (Digitalis, Lanoxin, etc.). Too high a level of potassium can be fatal.</p>
<p style="text-align: center;"><u>AST/SGOT</u></p>	<p>2-35 U/L</p>	<p>This stands for aspartate transaminase, which is an enzyme present in areas of the body that are metabolizing glucose rapidly. When cells are injured or die, AST is released into the blood stream. AST is present in your liver, muscles, and lungs, among other organs. An increase in these enzymes may reflect muscle injury, recent heart attack, or damage to the liver, such as in cirrhosis, hepatitis, viral infections, or rejection.</p>

<u>ALT/SGPT</u>	2-40 U/L	This stands for alanine transaminase, which is an enzyme present in the liver, with lesser concentrations in the heart, muscle, and kidneys. It is used primarily to diagnose liver disease of various kinds. An increase in these enzymes may reflect muscle injury, recent heart attack or damage to the liver, such as in cirrhosis, hepatitis, viral infections, or rejection.
<u>Sodium</u>	135-146 MMOL/L	Sodium is also regulated in the kidneys and adrenal gland. Sodium is the principal electrolyte in our blood. Like potassium and chloride, it is important in cell osmosis. It is also important in the transmission of nerve impulses. 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.
<u>Globulin, Total</u>		
Protein, Total	6.0-8.3 G/DL	Reflects the combination of blood proteins. Proteins are responsible for many functions in our bodies, including transporting certain molecules to the parts of our bodies where they're needed, regulating certain enzymes that govern our bodies' functions, and as immunologic agents. Abnormalities are seen in individuals with poor nutrition and liver disease. The total amount of protein in your blood will change when you become dehydrated or when your blood becomes hemoconcentrated due to fluid loss for some reason. This is also an indicator of a number of different problems with various organs of your body.
Albumin	3.7-5.1 G/DL	This is a blood protein manufactured in the liver. Albumin measures the amount and type of protein in your blood. It is a general index of overall health and nutrition.
Globulin	2.2-4.2 G/DL (CALC)	Globulin is the "antibody" protein important for fighting disease. It also measures the amount and type of protein in your blood. It is a general index of overall health and nutrition.
Albumin/Globulin Ratio	0.8-2.0 (CALC)	This ratio is the mathematical relationship between albumin and globulin.

CBC (includes Diff/Plt)		A CBC is a complete blood count. This means that your doctor wants to know the amounts and proportions among the various components of your blood. The term differential refers to the fact that each person has several different kinds of white cells and each type performs a different function in our bodies. The differential measures each different kind of white cell and calculates the proportion of each as a percentage of all the cells in your blood.
White Blood Cell Count	3.8-10.8 THOUS/MCL	White blood cells are also called leukocytes. The white blood cell count is simply the number of white blood cells in your blood. It is often reported in thousands. High WBC can be a sign of infection. WBC is also increased in certain types of leukemia. Low white counts can be a sign of bone marrow diseases or an enlarged spleen. Low WBC is also found in HIV infection in some cases.
Red Blood Cell Count	3.80-5.10 MILL/MCL	Red blood cells are also called erythrocytes. The red blood cell count is simply the number of red blood cells in your blood. It is reported in millions. The red blood cells reflect more about what's happening with the chemistry and physics of your blood. The life of a red blood cell in your body is usually about 120 days (4 months).
Hemoglobin	11.7-15.5 G/DL	Hemoglobin is the primary component of your red blood cells. This amount is reported as grams per deciliter. The hemoglobin carries oxygen and carbon dioxide around your body. It has one part called heme which contains iron and the characteristic red pigment of your blood called porphyrin. The other part is a protein call globin formed from a number of amino acids. The oxygen easily combines with the heme so it can get around to your body's cells. Because the oxygen actually attaches to your hemoglobin, it is important for your doctor to know how much hemoglobin you have. Low hemoglobin suggests an anemia. Anemia can be due to nutritional deficiencies, blood loss, destruction of blood cells internally, or failure to produce blood in the bone marrow. High hemoglobin can occur due to lung disease, living at high altitude, or excessive bone marrow production of blood cells.

Hematocrit	35.0-45.0 %	Hematocrit is a measure of the “mass” of your red blood cells. In this test, the blood cells and plasma are separated and the proportion of red blood cells in your whole blood is reported as a percentage. This value is calculated and, as such, is slightly less accurate than a hemoglobin count which is measured directly.
MCV	80.0-100.0 FL	MCV can be defined as the average, or mean volume, or size of a single red blood cell. This helps diagnose a cause of anemia. Low values suggest iron deficiency; high values suggest either deficiencies of B12 or Folate, ineffective production in the bone marrow, or recent blood loss with replacement by newer (and larger) cells from the bone marrow.
MCH	27.0-33.0 PG	Mean corpuscular hemoglobin is an expression of the amount (weight) of hemoglobin per average, single red blood cell. Increases in MCH may be found in some stages of hemolytic anemias because of an increase in immature and, therefore, macrocytic cells and large-“shift” erythrocytes. Low values are found in microcytic anemias. Results usually parallel MCV values.
MCHC	32.0-36.0 G/DL	Mean corpuscular hemoglobin concentration is the average amount of hemoglobin in each red cell and is expressed as a percentage of the volume of the red blood cell. A higher-than-average concentration is not possible. Values in megaloblastic (macrocytic) anemias are usually normal. A decrease will occur in iron deficiency anemias and indicate a hypochromic state.
RDW	11.0-15.0 %	Red cell distribution width is an index of the variation in red cell size, previously reported only as being present by the word “anisocytosis” or “anis” being printed on the laboratory report. The RDW could be defined as the quantitative equivalent of anisocytosis. Changes in RDW so far observed have been high normal or above normal. RDW is expressed as a percentage because it represents the coefficient of red cell variation. RDW is normal in hypoplastic disorders such as anemias of chronic disease, most thalassemias, and aplastic anemia. RDW is increased in nutritional anemias (iron, folate, or vitamin B12), hemoglobin H disease, S-beta thalassemia, leukemias, immune hemolytic anemia, and posthemorrhagic anemia.

Platelet Count	140-400 THOUS/MCL	This is a simple count of the number of platelets in your blood. Platelets are critical to clotting and preventing bleeding. 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. Low platelets also can occur from clumping of the platelets in a lavender colored tube. You may need to repeat the test with a green top tube in that case.
MPV	7.5-11.5 FL	This measures the size of your platelets. It is reported in femtoliters. Its values, with other information, help your doctor evaluate low platelet counts.
Absolute Neutrophils	1500-7800 CELLS/MCL	Multiplying the percentage of neutrophils by the total number of white blood cells will give the "absolute" number of these types of cells.
Absolute Lymphocytes	850-3900 CELLS/MCL	Multiplying the percentage of lymphocytes by the total number of white blood cells will give the "absolute" number of these types of cells.
Absolute Monocytes	200-950 CELLS/MCL	Multiplying the percentage of monocytes by the total number of white blood cells will give the "absolute" number of these types of cells.
Absolute Eosinophils	15-500 CELLS/MCL	Multiplying the percentage of eosinophils by the total number of white blood cells will give the "absolute" number of these types of cells.
Absolute Basophils	0-200 CELLS/MCL	White blood cells that work on parasitic infections among other functions. These cells are responsible for controlling inflammation and damage of tissues in the body, such as liver inflammation due to hepatitis. Multiplying the percentage of basophils by the total number of white blood cells will give the "absolute" number of these types of cells.
Neutrophils	%	White blood cells that combat infections, among other functions.
Lymphocytes	%	White blood cells that combat bacterial infections, such as strep, and viral infections, such as measles and chickenpox, among other functions.
Monocytes	%	White blood cells that work on severe infections, among other functions (one pt. refers to this as the Pac Man of blood cells).
Eosinophils	%	White blood cells that work on allergic disorders and parasitic infestations among other functions.

T-4 (Thyroxine), Total	4.5-12.5 MCG/DL	This shows the total amount of the T4. High levels may be due to hyperthyroidism; however, technical artifact occurs when estrogen levels are higher from pregnancy, birth control pills or estrogen replacement therapy.
PSA	0-3.9 NG/ML	Prostate-specific antigen (PSA) is a protein produced by the cells of the prostate gland. The PSA test measures the level of PSA in the blood. The doctor takes a blood sample, and the amount of PSA is measured in a laboratory. Because PSA is produced by the body and can be used to detect disease, it is sometimes called a biological marker or tumor marker . It is normal for men to have low levels of PSA in their blood; however, prostate cancer or benign (not cancerous) conditions can increase PSA levels. As men age, both benign prostate conditions and prostate cancer become more frequent. The most common benign prostate conditions are prostatitis (inflammation of the prostate) and benign prostatic hyperplasia (BPH) (enlargement of the prostate). There is no evidence that prostatitis or BPH cause cancer, but it is possible for a man to have one or both of these conditions and to develop prostate cancer as well. PSA levels alone do not give doctors enough information to distinguish between benign prostate conditions and cancer. However, the doctor will take the result of the PSA test into account when deciding whether to check further for signs of prostate cancer.
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