

EAST END NEUROPSYCH



Why we do blood work. By running lab tests periodically, we can monitor changes in your lab data over time. We can assess if you have a condition or deficit in your body that could be contributing to your psychological or physical issues. We also need to check some drug levels, to ensure that the medication you are prescribed is having the proper effect.

UNDERSTANDING YOUR BLOOD WORK

BASIC METABOLIC PANEL (BMP) or COMPREHENSIVE METABOLIC PANEL

A blood test that measures your sugar (glucose) level, electrolytes and fluid balance, and kidney function. More specifically it measures 9 levels: blood urea nitrogen (BUN), creatinine, glucose, albumin, carbon dioxide, calcium, sodium, potassium, chloride. The basic metabolic panel (BMP) may be used to check the health of your kidneys, the status of your electrolytes and acid/base balance, as well as your blood glucose level – all of which are related to your body's metabolism. It can be used to screen for conditions such as diabetes or kidney disease and may also be used to make sure certain medications are not causing you harm.

Normal ranges will vary slightly for adults over the age of 60 years.

Test	Normal range (adults 18-60 years old)	Normal range (adults over 60 years old)	Category
BUN (blood urea nitrogen)	6-20 mg/dL (milligrams per deciliter of blood)	8-23 mg/dL	kidney test
creatinine	0.9-1.3 mg/dL for men; 0.6-1.1 mg/dL for women	0.8-1.3 mg/dL for men; 0.6-1.2 mg/dL for women	kidney test
glucose	70-99 mg/dL	70-99 mg/dL	sugar metabolism
albumin	3.4-5.4 g/dL (grams per deciliter of blood)	3.4-5.4 g/dL	blood protein
CO ₂ (carbon dioxide or bicarbonate)	23-29 mEq/L (milliequivalent units per liter of blood)	23-31 mEq/L (adults 61-90 years old); 20-29 mEq/L (adults over 90 years old)	electrolyte panel
Ca ⁺ (calcium)	8.6-10.2 mg/dL	8.6-10.2 mg/dL	electrolyte panel
Na ⁺ (sodium)	136-145 mEq/L	132-146 mEq/L (adults over 90 years old)	electrolyte panel

K+ (potassium)	3.5-5.1 mEq/L	3.5-5.1 mEq/L	electrolyte panel
Cl- (chloride)	98-107 mEq/L	98-111 mEq/L (adults over 90 years old)	electrolyte panel

COMPLETE BLOOD COUNT (CBC)

CBC is a blood test used to evaluate your overall health and detect a wide range of disorders, including anemia, infection and leukemia. A complete blood count test measures several components and features of your blood, including:

- Red blood cells, which carry oxygen
- White blood cells, which fight infection
- Hemoglobin, the oxygen-carrying protein in red blood cells
- Hematocrit, the proportion of red blood cells to the fluid component, or plasma, in your blood
- Platelets, which help with blood clotting

The following are normal complete blood count results for adults:

Red blood cell count	Male: 4.35-5.65 trillion cells/L* (4.35-5.65 million cells/mcL**)
	Female: 3.92-5.13 trillion cells/L (3.92-5.13 million cells/mcL)
Hemoglobin	Male: 13.2-16.6 grams/dL*** (132-166 grams/L)
	Female: 11.6-15 grams/dL (116-150 grams/L)
Hematocrit	Male: 38.3-48.6 percent
	Female: 35.5-44.9 percent
White blood cell count	3.4-9.6 billion cells/L (3,400 to 9,600 cells/mcL)

Platelet count**Male:** 135-317 billion/L
(135,000 to 317,000/mcL)**Female:** 157-371 billion/L
(157,000 to 371,000/mcL)

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- * L = liter
 - ** mcL = microliter
 - *** dL = deciliter

GLUCOSE, SERUM.

Reference: (Fasting 65-99 mg/dL) (Non-Fasting 2-4 hours, 65-125)

Glucose is the simple sugar that is formed from carbohydrate ("carbs") digestion. Glucose provides energy to your cells. The main use of glucose testing is in the diagnosis and monitoring of the chronic hyperglycemia of Diabetes. One is considered to have "Diabetes" if a fasting glucose is >125 or in a 2HR glucose tolerance test it is >200. Pre-Diabetes is a condition in which sugar may be measured at borderline levels and because of other factors such as the "Metabolic Syndrome"(overweight, high Triglycerides, low HDL, Hypertension and or "central adiposity") or genetic predisposition, they may be "getting" Diabetes. New evidence tells us these persons may benefit from treatment as well.

CHOLESTEROL, TOTAL

Reference: 100 - 199 mg/dL

Cholesterol is a lipid (fatty substance) that is used by the body in the formation of cell membranes, bile acids and hormones). Your body actually makes the cholesterol it needs, and sometimes more than it needs. Excess cholesterol, comes either from dietary sources, (always from animal food sources) or because of increased production. Approximately 20% of your total cholesterol is influenced by your diet, the rest is influenced by your genetic make-up. Because of high LDL cholesterol and Triglycerides, fatty deposits can build up in your coronary and other arteries and cause heart attacks or strokes. Measurement of fasting blood cholesterol levels is used to evaluate and classify a person's risk for these problems. High cholesterol should be treated with medication.

TRIGLYCERIDES

Reference: 0 -149 mg/dL

Triglycerides are the major storage form of fat in the body and, as such, serve to provide energy to the body's cells. Your level may be high IF you did not fast for at least 12 hours before your blood test. Having persistently elevated triglyceride levels is a risk factor for blood vessel disease, heart attack and stroke.

HDL CHOLESTEROL

Reference: > 39 mg/dL

HDL is a component of your total cholesterol. It is known as "cardioprotective" or "good" cholesterol because it can aid in the removal of cholesterol in the blood and LDL ("bad" cholesterol) from the arteries. The higher your HDL level, the better: High levels of HDL are associated with a low risk of developing heart disease. Low levels < 40 are associated with a High risk for heart disease.

LDL CHOLESTEROL

Reference: < 130 mg/dL

LDL cholesterol is another component of your total cholesterol. The LDL in most laboratories is a calculated number based on the other components (total, HDL and Triglycerides) of the Lipid Profile. LDL is the "bad" cholesterol implicated in the development of plaques that thicken the walls of the coronary arteries and create blockages that may lead to a heart attack. High LDL levels have proven to be associated with higher risk for heart attack. Alternatively, if one lowers their LDL, they lower their risk of a heart attack. The most effective way to lower LDL is with medication

LIVER FUNCTION TEST

Liver function tests (also known as a liver panel) are blood tests that measure different enzymes, proteins, and other substances made by the liver. These tests check the overall health of your liver. The different substances are often tested at the same time on a single blood sample, and may include the following:

- Albumin, a protein made in the liver
- Total protein. This test measures the total amount of protein in the blood.
- ALP (alkaline phosphatase), ALT (alanine transaminase), AST (aspartate aminotransferase), and gamma-glutamyl transferase (GGT). These are different enzymes made by the liver.
- Bilirubin, a waste product made by the liver.
- Lactate dehydrogenase (LD), an enzyme found in most of the body's cells. LD is released into the blood when cells have been damaged by disease or injury.
- Prothrombin time (PT), a protein involved in blood clotting.

Reference Range	Interpretation of Liver Function Test
SGOT	The normal range for the AST test is 10 to 34 IU/L (international units per liter)
GGT	The normal range for GGT in blood is 0 to 51 international units/liter.
Total Protein	The total protein is between 6 and 8.3 gm/dL (grams per deciliter)
Albumin	The typical value for albumin is 3.4 to 5.4 g/dL of blood
Bilirubin	In an older child or adult, normal values of direct (conjugated) bilirubin are from 0 to 0.3 milligrams per deciliter (mg/dL). Normal values of total bilirubin (direct and indirect) are from 0.3 to 1.9 mg/dL. In a newborn, higher bilirubin is normal due

TSH (Thyroid-stimulating hormone) Test

Reference: 0.5 to 5.0 mIU/L.

TSH stands for thyroid stimulating hormone. A TSH test is a blood test that measures this hormone. The thyroid is a small, butterfly-shaped gland located near your throat. Your thyroid makes hormones that regulate the way your body uses energy. It also plays an important role in regulating your weight, body temperature, muscle strength, and even your mood. TSH is made in a gland in the brain called the pituitary. When thyroid levels in your body are low, the pituitary gland makes more TSH. When thyroid levels are high, the pituitary gland makes less TSH. TSH levels that are too high or too low can indicate your thyroid isn't working correctly.

PTT, PT & INR

The prothrombin time (PT) test measures how quickly blood clots. The partial thromboplastin time (PTT) is mainly used to monitor a person's response to anticoagulant therapies. The international normalized ratio (INR) calculation helps ensure that PT test results are standardized and accurate. Coagulation studies involve one or more blood tests that measure how quickly blood clots. The tests can help detect bleeding disorders, check a person's response to anti-clotting or pro-clotting therapies, and assess a person's risk for bleeding prior to surgery. Coagulation studies require a simple blood draw. Prothrombin time test results are given in a measurement called an INR (international normalized ratio). Results vary with age, and medication use.

TEST RELATED TO B12 LEVELS

These measure the serum levels of vitamin B12 and provide information as to whether the level is adequate for the body's needs. The two tests involved are:

- Vitamin B12
- Methylmalonic acid

Depending on the situation, if an older adult is found to have low vitamin B12 levels, additional testing may be pursued, to determine the underlying cause of this vitamin deficiency.

What these tests are often used for:

- Vitamin B12 deficiency is quite common in older adults and can be related to common problems such as fatigue, memory problems, and walking difficulties.
- Methylmalonic acid levels in the body are related to vitamin B12 levels and can help confirm a vitamin B12 deficiency.
 - It is especially important to check this, if an older person has vitamin B12 levels that are on the low side of normal.
 - Low vitamin B12 levels are associated with higher-than-normal methylmalonic acid levels

LITHIUM

Lithium Results are given in milliequivalents per liter (mEq/L). For lithium to be effective, your level should be between 0.6 and 1.2 mEq/L, but not more than 1.2 mEq/L. This test is used to find out the right dose for you if you're just starting lithium treatment. The test is also used to make sure you continue to get the right amount for as long as you take this medicine. If you take too much lithium, it can cause more side effects. If you take too little, the medicine might not help your condition. You may need this test once or twice a week when you first start taking lithium to help your healthcare provider figure out the best dose for you. You may also have this test after you've been taking lithium for a while to see whether your dose needs to be changed. You may have this test again 5 to 7 days after your dosage is changed. You may also have this test if you have symptoms, such as tremor, nausea, vomiting, or diarrhea. This will let your healthcare provider know if your symptoms are because your lithium level is too high or if you have other conditions that need to be treated.

PROLACTIN LEVEL

A prolactin (PRL) test measures the level of prolactin in the blood. Prolactin is a [hormone](#) made by the pituitary gland, a small gland at the base of the brain. There are some medications that can alter your prolactin levels. The normal values for prolactin are:

- Men: less than 20 ng/mL (425 µg/L)
- Nonpregnant women: less than 25 ng/mL (25 µg/L)
- Pregnant women: 80 to 400 ng/mL (80 to 400 µg/L)

GLOMERULAR FILTRATION RATE (GFR)

A glomerular filtration rate (GFR) is a blood test that checks how well your kidneys are working. Your kidneys have tiny filters called glomeruli. These filters help remove waste and excess fluid from the blood. A GFR test estimates how much blood passes through these filters each minute. Your [kidneys](#) get rid of waste in your body and help you hold on to the right amount of fluid. They also send out hormones that keep your [blood pressure](#) steady, and they play a role in making red blood cells. They even make a form of [vitamin D](#) that's good for your bones. Some [medications](#) can make those things hard for your kidneys to do and keep them from working the way they should. **What is a normal eGFR number?** In adults, the normal eGFR number is more than 90. *Your GFR declines with age, even in people without kidney disease.* See chart below for average estimated eGFR based on age.

Age (years)	Average eGFR
20–29	116
30–39	107
40–49	99
50–59	93
60–69	85
70+	75

GLYCATED HEMOGLOBIN- A1C

An A1C test result reflects your average blood sugar level for the past two to three months. Specifically, the A1C test measures what percentage of hemoglobin proteins in your blood are coated with sugar (glycated). The higher your A1C level is, the poorer your blood sugar control and the higher your risk of diabetes complications.



- If your A1C level is between 5.7 and less than 6.5%, your levels have been in the prediabetes range.
- If you have an A1C level of 6.5% or higher, your levels were in the diabetes range.

EKG or ECG

An electrocardiogram records the electrical signals in your heart. It's a common and painless test used to quickly detect heart problems and monitor your heart's health. ECGs or EKGs — are often done in a doctor's office, a clinic or a hospital room. An electrocardiogram (ECG) is one of the simplest and fastest tests used to evaluate the heart. Electrodes (small, plastic patches that stick to the skin) are placed at certain spots on the chest, arms, and legs. The electrodes are connected to an ECG machine by lead wires. The electrical activity of the heart is then measured, interpreted, and printed out. No electricity is sent into the body.

URINALYSIS

A urinalysis is a test of your urine. It's used to detect and manage a wide range of disorders, such as urinary tract infections, kidney disease and diabetes. A urinalysis involves checking the appearance, concentration and content of urine. You might collect a urine sample at home or at your health care provider's office. Providers typically give out containers for urine samples. You might be asked to collect the sample at home first thing in the morning, when your urine is more concentrated

There are three ways to analyze urine, and your test might use all of them.

One is a visual exam, which checks the color and clarity. If your pee has blood in it, it might be red or dark brown. Foam can be a sign of kidney disease, while cloudy urine may mean you have an infection.

A microscopic exam checks for things too small to be seen otherwise. Some of the things that shouldn't be in your urine that a microscope can find include:

- Red blood cells
- White blood cells
- Bacteria
- Crystals (clumps of minerals, a possible sign of kidney stones)

The third part of urinalysis is the dipstick test, which uses a thin plastic strip treated with chemicals. It's dipped into your urine, and the chemicals on the stick react and change color if levels are above normal. Things the dipstick test can check for include:

- Acidity, or pH. If the acid is abnormal, you could have kidney stones, a urinary tract infection (UTI), or another condition.
- Protein. This can be a sign your kidneys aren't working right. Kidneys filter waste products out of your blood.
- Glucose. A high sugar content is a marker for diabetes.
- White blood cells. These are a sign of infection or inflammation, either in the kidneys or anywhere else along your urinary tract.
- Nitrites. This means that there is an infection with certain kinds of bacteria.
- Bilirubin. If this waste product, which is normally eliminated by your liver, shows up, it may mean your liver isn't working properly.
- Blood in your urine. Sometimes this is a sign of infections or certain illnesses.

MAGNETIC RESONANCE IMAGING (MRI)

MRI is a medical imaging technique that uses a magnetic field and computer-generated radio waves to create detailed images of the organs and tissues in your body. Most MRI machines are large, tube-shaped magnets. When you lie inside an MRI machine, the magnetic field temporarily realigns water molecules in your body. Radio waves cause these aligned atoms to produce faint signals, which are used to create cross-sectional MRI images — like slices in a loaf of bread. The MRI machine can also produce 3D images that can be viewed from different angles. MRI is a noninvasive way for your doctor to examine your organs, tissues and skeletal system. It produces high-resolution images of the inside of the body that help diagnose a variety of problems.

Because MRI uses powerful magnets, the presence of metal in your body can be a safety hazard if attracted to the magnet. Even if not attracted to the magnet, metal objects can distort the MRI image. Before having an MRI, you'll likely complete a questionnaire that includes whether you have metal or electronic devices in your body.

Unless the device you have is certified as MRI safe, you might not be able to have an MRI. Devices include:

- Metallic joint prostheses
- Artificial heart valves
- An implantable heart defibrillator
- Implanted drug infusion pumps
- Implanted nerve stimulators
- A pacemaker
- Metal clips
- Metal pins, screws, plates, stents or surgical staples

- Cochlear implants
- A bullet, shrapnel or any other type of metal fragment
- Intrauterine device

What you can expect

During the test

The MRI machine looks like a long narrow tube that has both ends open. You lie down on a movable table that slides into the opening of the tube. A technologist monitors you from another room. You can talk with the person by microphone.

If you have a fear of enclosed spaces (claustrophobia), you might be given a drug to help you feel sleepy and less anxious. Most people get through the exam without difficulty.

The MRI machine creates a strong magnetic field around you, and radio waves are directed at your body. The procedure is painless. You don't feel the magnetic field or radio waves, and there are no moving parts around you.

During the MRI scan, the internal part of the magnet produces repetitive tapping, thumping and other noises. You might be given earplugs or have music playing to help block the noise.

An MRI can last anywhere from 15 minutes to more than an hour. **You must hold still because movement can blur the resulting images.**

COMPUTERIZED TOMOGRAPHY (CT) SCAN

CT scan combines a series of X-ray images taken from different angles around your body and uses computer processing to create cross-sectional images (slices) of the bones, blood vessels and soft tissues inside your body. CT scan images provide more-detailed information than plain X-rays do. A CT scan has many uses, but it's particularly well-suited to quickly examine people who may have internal injuries from car accidents or other types of traumas. A CT scan can be used to visualize nearly all parts of the body and is used to diagnose disease or injury as well as to plan medical, surgical or radiation treatment. A CT scan is very similar to an MRI, except it is faster and less noisy.