



## Blood Sugar and Fats

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People with HIV have their blood sugar and blood fat levels tested more frequently because [antiretroviral medications \(ARVs\)](#) may cause abnormally high levels. This is especially true for one type of medication called [protease inhibitors \(PIs\)](#). For more information, [read about lipodystrophy \(body shape changes\)](#).

Every laboratory has its own reference range or [normal values](#) for the results of each test. Most lab reports show the normal range and highlight any test results outside the normal range.

### **BLOOD SUGAR**

**Glucose** is sugar. It is broken down in the cells to provide energy. Blood sugar increases after you eat or drink anything besides water. A high glucose level (hyperglycemia) can be a sign of the disease [diabetes mellitus \(DM\)](#). High blood sugar levels can eventually damage your eyes, nerves, kidneys, and heart. High blood sugar can be a side effect of HIV protease inhibitors.

Low blood sugar (hypoglycemia) can cause [fatigue](#) but there are other more common causes of fatigue for people with HIV.

In a healthy person, blood sugar is controlled by insulin. Insulin is a hormone produced by the pancreas. It helps glucose move from the blood into the cells to produce energy.

High blood sugar levels could mean that the pancreas is not making enough insulin. However, some people make plenty of insulin but their bodies don't respond to it normally. This is called insulin resistance. In either case, the cells don't get enough glucose to use for energy and glucose builds up in the blood.

Some people who take HIV protease inhibitors develop insulin resistance and have high blood glucose levels. This condition is sometimes treated with the same medications used to treat diabetes. There is no simple blood test for insulin resistance.

There are three ways to test for blood glucose (sugar) levels:

- **Random blood glucose:** measures the glucose in a sample of blood taken when you have been eating on your usual schedule.
- **Fasting glucose:** measures the glucose in a sample of blood taken when you have not had anything to eat or drink (except water) for at least 8 hours.
- **Glucose tolerance test:** starts with a fasting glucose test. Then you are given a measured amount of glucose in a sweet drink. Glucose is measured in several more blood samples taken at

specific time intervals.

If your blood glucose is too high, you might have diabetes. Treatment for diabetes involves weight loss, diet, and exercise. It can also involve oral medications or insulin shots. [Read more about HIV and diabetes.](#)

## **BLOOD FATS**

Fat is a source of energy. It carries some vitamins around the body. It is used to make hormones and cell membranes, to protect organs, and to lubricate some moving body parts. However, too much fat in the blood increases the risk of heart disease or pancreatitis.

Triglycerides are the most common form of fat in the body. Cholesterol is another form of fat. Fats are wrapped in protein molecules as they are carried in the bloodstream. These bundles of protein-wrapped fats are called lipoproteins.

Lipoproteins come in different sizes. Smaller ones are called low-density lipoproteins (LDL) or very-low-density lipoproteins (VLDL). These molecules carry fats from the liver to other parts of the body. Too much LDL or VLDL can cause fat to build up on the walls of the arteries. This can reduce the oxygen supply to the heart muscle and cause heart disease or a heart attack.

Larger lipoproteins are called high-density lipoproteins (HDL). These are called good lipoproteins because they remove fats from your arteries and return them to the liver for processing. High levels of HDL seem to protect people from heart disease.

Blood fats are measured as the amount (in milligrams) contained in one tenth of a liter (a deciliter) of blood, or mg/dL.

### **Measuring Triglycerides**

Triglyceride levels in the blood rise quickly after you eat. You cannot eat for at least 8 hours before you give a blood sample to check triglyceride levels. Many people living with HIV have unusually high levels of triglycerides. This is especially true for people taking protease inhibitors. Triglyceride levels under 150 are considered normal. Levels greater than 1,000 mg/dL can cause pancreatitis.

### **Measuring Cholesterol**

**Total cholesterol** includes the bad low-density and the good high-density lipoproteins. Total cholesterol does not change too quickly after you eat, so you can give blood any time for this test. Total cholesterol levels below 200 are considered good and levels over 240 are considered bad.

**HDL Cholesterol** is good cholesterol. It can be measured in any blood sample. You don't have to be fasting. Higher levels of HDL cholesterol are better and levels over 40 are considered good.

**LDL Cholesterol** is bad cholesterol. LDL levels are calculated using a formula that includes the level of triglycerides. You need a fasting blood sample to measure triglycerides or to calculate LDL cholesterol. Levels below 100 are good and levels over 160 are considered to increase the risk for heart disease. For very high-risk patients, some health care providers try to lower LDL levels to 70 or less.

HIV healthcare providers are treating more of their patients with high cholesterol levels, especially if they have a family history of heart disease. If your cholesterol level is high, discuss treatment options with your healthcare provider. [Read more about HIV and cardiovascular disease.](#)

***MORE INFORMATION***

[Normal Laboratory Values](#)

Lab Tests Online: [Glucose Tests](#)

MedlinePlus: [Blood Glucose Test](#)

Lab Tests Online: [Lipid Panel](#)

MedlinePlus: [Cholesterol Levels](#)

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