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## Measurement of Cholesterol

### A Patient Perspective

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**W**hat is cholesterol, and what does it have to do with disease of the blood vessels and heart? Cholesterol is a fatty substance that is present in all the cells in your body. Cholesterol travels in your blood in particles called lipoproteins. Three of the common lipoproteins are low-density lipoproteins (LDL), high-density lipoproteins (HDL), and very low density lipoproteins (VLDL). Medical studies have shown that elevated levels of LDL cholesterol are associated with an increased risk of developing blockages in the coronary arteries, whereas elevated levels of HDL cholesterol reduce that risk. Thus, doctors sometimes refer to LDL as “bad cholesterol” and to HDL as “good cholesterol.”

Cholesterol comes from 2 sources. Your body makes some cholesterol, and you also get cholesterol in foods that come from an animal (meat, milk, eggs, or anything made from these). Eating too much of these foods may increase the total amount of cholesterol in your body.

Your body needs cholesterol to work properly. However, excess cholesterol can deposit in your arteries and

promote formation of a deposit known as a plaque, which can grow larger over time; this process is called atherosclerosis. A piece of the plaque may break off and a blood clot may form on the exposed surface of the plaque. These blood clots may block or decrease the blood flow and oxygen supply to your heart, brain, and other body parts. If the blockage is significant, you may have a heart attack or stroke, need a procedure performed on your heart to improve the supply of blood to your heart muscle (bypass surgery, angioplasty, or stent placement), or die prematurely from cardiovascular disease. One of the best ways to decrease your risk of having a heart attack or stroke is to control the amount of cholesterol in your blood.

#### How Can I Find Out My Cholesterol Level?

Everyone age 20 years or more should have cholesterol measured at least once every 5 years. The best way to measure cholesterol is with a blood test called a lipid panel or lipid profile. You will need to fast (not eat) for 9 to 12 hours before your lipid panel. The test will determine the amounts of total

cholesterol, LDL cholesterol, HDL cholesterol, and triglycerides in your blood, measured in milligrams per deciliter of blood (mg/dL). The Table classifies your lipid values.<sup>1</sup>

- Total cholesterol is made up of LDL cholesterol, HDL cholesterol, and VLDL cholesterol. A desirable level of total cholesterol is less than 200.
- LDL cholesterol is the so-called bad cholesterol because it deposits on the inside of your vessels to make plaques. Elevated levels of LDL increase your risk of heart disease and stroke. Your doctor will determine your LDL goal based on your number of risk factors and medical history. An optimal level of LDL is less than 100.
- HDL cholesterol is the good cholesterol because a high HDL level decreases your risk of cardiovascular disease. For men, an HDL less than 40 is considered a risk factor for cardiovascular disease. For women, an HDL less than 50 is considered a risk factor for cardiovascular disease.<sup>2</sup>
- Triglycerides are the most common type of fat in your body. When

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## CLASSIFICATION OF LIPIDS

Total cholesterol, mg/dL	
Less than 200	Desirable
200 to 239	Borderline high
240 or more	High
LDL cholesterol, mg/dL	
Less than 100	Optimal
100 to 129	Near optimal/above optimal
130 to 159	Borderline high
160 to 189	High
190 or more	Very high
HDL cholesterol, mg/dL	
Men, less than 40	Low
Women, less than 50	Low
60 or more	High
Triglycerides, mg/dL	
Less than 150	Normal
150 to 199	Borderline high
200 to 499	High
500 or more	Very high

triglycerides are higher than normal (150 or more), your risk of heart disease or stroke may be increased. If your triglycerides are 200 or more, your doctor may talk to you about your non-HDL cholesterol value. The non-HDL cholesterol is found by subtracting your HDL cholesterol value from the total cholesterol value and reflects the amount of cholesterol in all the lipoproteins that are harmful. Your non-HDL

cholesterol should not be more than 30 above your LDL goal.

If you did not fast the appropriate amount of time before your lipid panel, the laboratory will only be able to report accurately the total cholesterol and HDL cholesterol values. The LDL, VLDL, and triglyceride measurements will be influenced by any food you have eaten within the 9 to 12 hours before the laboratory test. If your total cholesterol or triglycerides are high, your doctor will want you to have a lipid panel done again after you have fasted the appropriate amount of time.

### What If My Cholesterol Values Are Too High?

Your doctor will recommend treatment based on the results of the lipid panel. The treatment may include therapeutic lifestyle changes (heart-healthy diet, exercise, weight management, smoking cessation) and medications. The therapeutic lifestyle changes and medications will work together to decrease your chances of having a heart attack or stroke.

After initiating treatment, your doctor may measure your lipid panel several times a year to determine your response to therapy. Again, it is important to fast 9 to 12 hours before this blood work. You will need to fast the full 12 hours before your lipid panel if you have diabetes or have a history of high triglycerides. Based on your lipid panel results, your doctor may ask you to improve your diet, increase your exercise, or change your medication regimen.

### What Other Tests May the Doctor Do?

Some people have a strong family history of heart disease, or their cho-

lesterol values may indicate intermediate risk for cardiovascular disease. The doctor may want to perform additional tests for emerging risk factors<sup>3</sup> to determine further risk for cardiovascular disease, because one-third to one-half of all heart attacks occur in people who do not have high levels of LDL cholesterol. Some individuals with borderline levels of LDL cholesterol have an increased number of smaller LDL particles, which may deposit in the arteries. There are tests to measure the number and size of bad LDL particles and the number and size of protective HDL particles.

Other blood tests may be useful to determine if you are at increased risk for heart disease. Individuals with heart disease or at very high risk for heart disease, such as people with diabetes, should be treated with both lifestyle changes and lipid-lowering drugs to reduce their risk for heart attack.

**Conclusion:** Measurement of your cholesterol levels will provide you and your doctor with the necessary data to assess your risk for cardiovascular disease and to prevent, as far as possible, a cardiovascular event such as a heart attack or stroke.

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