High Blood Cholesterol
What you need to know

INSIDE:

Why Is Cholesterol Important?

Your blood cholesterol level has a lot to do with your chances of getting heart disease. High blood cholesterol is one of the major risk factors for heart disease. A risk factor is a condition that increases your chance of getting a disease. In fact, the higher your blood cholesterol level, the greater your risk for developing heart disease or having a heart attack. Heart disease is the number one killer of women and men in the United States. Each year, more than a million Americans have heart attacks, and about a half million people die from heart disease.

How Does Cholesterol Cause Heart Disease?

When there is too much cholesterol (a fat-like substance) in your blood, it builds up in the walls of your arteries. Over time, this buildup causes "hardening of the arteries" so that arteries become narrowed and blood flow to the heart is slowed down or blocked. The blood carries oxygen to the heart, and if enough blood and oxygen cannot reach your heart, you may suffer chest pain. If the blood supply to a portion of the heart is completely cut off by a blockage, the result is a heart attack.

High blood cholesterol itself does not cause symptoms, so many people are unaware that their cholesterol level is too high. It is important to find out what your cholesterol numbers are because lowering cholesterol levels that are too high lessens the risk for developing heart disease and reduces the chance of a heart attack or dying of heart disease, even if you already have it. Cholesterol lowering is important for everyone–younger, middle age, and older adults; women and men; and people with or without heart disease.

What Do Your Cholesterol Numbers Mean?

Everyone age 20 and older should have their cholesterol measured at least once every 5 years. It is best to have a blood test called a "lipoprotein profile" to find out your cholesterol numbers. This blood test is done after a 9- to 12-hour fast and gives information about your:

- **Total cholesterol**
- **LDL (bad) cholesterol** – the main source of cholesterol buildup and blockage in the arteries
- **HDL (good) cholesterol** – helps keep cholesterol from building up in the arteries
- **Triglycerides** – another form of fat in your blood

If it is not possible to get a lipoprotein profile done, knowing your total cholesterol and HDL cholesterol can give you a general idea about your cholesterol levels. If your total cholesterol is 200 mg/dL* or more or if your HDL is less than 40 mg/dL, you will need to have a lipoprotein profile done. See how your cholesterol numbers compare to the tables below.

Total Cholesterol Level	Category
Less than 200 mg/dL	Desirable
200-239 mg/dL	Borderline high
240 mg/dL and above	High

LDL Cholesterol Level	LDL Cholesterol Category
Less than 100 mg/dL	Optimal
100-129 mg/dL	Near optimal/above optimal
130-159 mg/dL	Borderline high
160-189 mg/dL	High
190 mg/dL and above	Very high

**Cholesterol levels are measured in milligrams (mg) of cholesterol per deciliter (dL) of blood.*

HDL (good) cholesterol protects against heart disease, so for HDL, higher numbers are better. A level less than 40 mg/dL is low and is considered a major risk factor because it increases your risk for developing heart disease. HDL levels of 60 mg/dL or more help to lower your risk for heart disease.

Triglycerides can also raise heart disease risk. Levels that are borderline high (150-199 mg/dL) or high (200 mg/dL or more) may need treatment in some people.

What Affects Cholesterol Levels?

A variety of things can affect cholesterol levels. These are things you can do something about:

- **Diet.** Saturated fat and cholesterol in the food you eat make your blood cholesterol level go up. Saturated fat is the main culprit, but cholesterol in foods also matters. Reducing the amount of saturated fat and cholesterol in your diet helps lower your blood cholesterol level.
- **Weight.** Being overweight is a risk factor for heart disease. It also tends to increase your cholesterol. Losing weight can help lower your LDL and total cholesterol levels, as well as raise your HDL and lower your triglyceride levels.
- **Physical Activity.** Not being physically active is a risk factor for heart disease. Regular physical activity can help lower LDL (bad) cholesterol and raise HDL (good) cholesterol levels. It also helps you lose weight. You should try to be physically active for 30 minutes on most, if not all, days.

Things you cannot do anything about also can affect cholesterol levels. These include:

- **Age and Gender.** As women and men get older, their cholesterol levels rise. Before the age of menopause, women have lower total cholesterol levels than men of the same age. After the age of menopause, women's LDL levels tend to rise.
- **Heredity.** Your genes partly determine how much cholesterol your body makes. High blood cholesterol can run in families.

What Is Your Risk of Developing Heart Disease or Having a Heart Attack?

In general, the higher your LDL level and the more risk factors you have (other than LDL), the greater your chances of developing heart disease or having a heart attack. Some people are at high risk for a heart attack because they already have heart disease. Other people are at high risk for developing heart disease because they have diabetes (which is a strong risk factor) or a combination of risk factors for heart disease. Follow these steps to find out your risk for developing heart disease.

1

Step 1

Check the table below to see how many of the listed risk factors you have; these are the risk factors that affect your LDL goal.

Major Risk Factors That Affect Your LDL Goal
❍ Cigarette smoking
❍ High Blood Pressure (140/90 mmHg or higher or on blood pressure medication)
❍ Low HDL cholesterol (less than 40 mg/dL)*
❍ Family history of early heart disease (heart disease in father or brother before age 55; heart disease in mother or sister before age 65)
❍ Age (men 45 years or older; women 55 years or older)

**If your HDL cholesterol is 60 mg/dL or higher, subtract 1 from your total count.*

Even though obesity and physical inactivity are not counted in this list, they are conditions that need to be corrected.

2

Step 2

How many major risk factors do you have? If you have 2 or more risk factors in the table above, use the risk scoring tables on the back page (which include your cholesterol levels) to find your risk score. Risk score refers to the chance of having a heart attack in the next 10 years, given as a percentage.

(Use the Framingham Point Scores on the back page.)

My 10-year risk score is _____%.

3

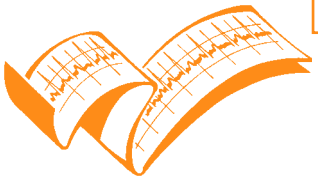
Step 3

Use your medical history, number of risk factors, and risk score to find your risk of developing heart disease or having a heart attack in the table below.

If You Have	You Are in Category
Heart disease, diabetes, or risk score more than 20%*	I. Highest Risk
2 or more risk factors and risk score 10-20%	II. Next Highest Risk
2 or more risk factors and risk score less than 10%	III. Moderate Risk
0 or 1 risk factor	IV. Low-to-Moderate Risk

**Means that more than 20 of 100 people in this category will have a heart attck within 10 years.*

My risk category is _____.



Treating High Cholesterol

The main goal of cholesterol-lowering treatment is to lower your LDL level enough to reduce your risk of developing heart disease or having a heart attack. The higher your risk, the lower your LDL goal will be. To find your LDL goal, see the box for your risk category below. There are two main ways to lower your cholesterol:

- **Therapeutic Lifestyle Changes (TLC)**–includes a cholesterol-lowering diet (called the TLC diet), physical activity, and weight management. TLC is for anyone whose LDL is above goal.
- **Drug Treatment**–if cholesterol-lowering drugs are needed, they are used together with TLC treatment to help lower your LDL.

If you are in…

Category I, Highest Risk, your LDL goal is less than 100 mg/dL. If your LDL is 100 or above, you will need to begin the TLC diet. If your LDL is 130 or higher, you will need to start drug treatment at the same time as the TLC diet. If your LDL is 100 to 129, you may also need to start drug treatment together with the TLC diet. Even if your LDL is below 100, you should follow the TLC diet on your own to keep your LDL as low as possible.

Category II, Next Highest Risk, your LDL goal is less than 130 mg/dL. If your LDL is 130 mg/dL or above, you will need to begin treatment with the TLC diet. If your LDL is 130 mg/dL or more after 3 months on the TLC diet, you may need drug treatment along with the TLC diet. If your LDL is less than 130 mg/dL, you will need to follow the heart-healthy diet for all Americans, which allows a little more saturated fat and cholesterol than the TLC diet.

Category III, Moderate Risk, your LDL goal is less than 130 mg/dL. If your LDL is 130 mg/dL or above, you will need to begin the TLC diet. If your LDL is 160 mg/dL or more after you have tried the TLC diet for 3 months, you may need drug treatment along with the TLC diet. If your LDL is less than 130 mg/dL, you will need to follow the heart-healthy diet for all Americans.

Category IV, Low-to-Moderate Risk, your LDL goal is less than 160 mg/dL. If your LDL is 160 mg/dL or above, you will need to begin the TLC diet. If your LDL is still 160 mg/dL or more after 3 months on the TLC diet, you may need drug treatment along with the TLC diet to lower your LDL, especially if your LDL is 190 mg/dL or more. If your LDL is less than 160 mg/dL, you will need to follow the heart-healthy diet for all Americans.

To reduce your risk for heart disease or keep it low, it is very important to control any other risk factors you may have such as high blood pressure and smoking.

Lowering Cholesterol With Therapeutic Lifestyle Changes (TLC)

TLC is a set of things you can do to help lower your LDL cholesterol. The main parts of TLC are:

■ **The TLC Diet.** This is a low-saturated-fat, low-cholesterol eating plan that calls for less than 7% of calories from saturated fat and less than 200 mg of dietary cholesterol per day. The TLC diet recommends only enough calories to maintain a desirable weight and avoid weight gain. If your LDL is not lowered enough by reducing saturated fat and cholesterol intakes, the amount of soluble fiber in your diet can be increased. Certain food products that contain plant stanols or plant sterols (for example, cholesterol-lowering margarines and salad dressings) can also be added to the TLC diet to boost its LDL-lowering power.

■ **Weight Management.** Losing weight if you are overweight can help lower LDL and is especially important for those with a cluster of risk factors that includes high triglyceride and/or low HDL levels and being overweight with a large waist measurement (more than 40 inches for men and more than 35 inches for women).

■ **Physical Activity.** Regular physical activity (30 minutes on most, if not all, days) is recommended for everyone. It can help raise HDL and lower LDL and is especially important for those with high triglyceride and/or low HDL levels who are overweight with a large waist measurement.

Drug Treatment

Even if you begin drug treatment to lower your cholesterol, you will need to continue your treatment with lifestyle changes. This will keep the dose of medicine as low as possible, and lower your risk in other ways as well. There are several types of drugs available for cholesterol lowering including statins, bile acid sequestrants, nicotinic acid, and fibric acids. Your doctor can help decide which type of drug is best for you. The statin drugs are very effective in lowering LDL levels and are safe for most people. Bile acid sequestrants also lower LDL and can be used alone or in combination with statin drugs. Nicotinic acid lowers LDL and triglycerides and raises HDL. Fibric acids lower LDL somewhat but are used mainly to treat high triglyceride and low HDL levels.

Once your LDL goal has been reached, your doctor may prescribe treatment for high triglycerides and/or a low HDL level, if present. The treatment includes losing weight if needed, increasing physical activity, quitting smoking, and possibly taking a drug.

Foods low in saturated fat include fat free or 1% dairy products, lean meats, fish, skinless poultry, whole grain foods, and fruits and vegetables. Look for soft margarines (liquid or tub varieties) that are low in saturated fat and contain little or no *trans* fat (another type of dietary fat that can raise your cholesterol level). Limit foods high in cholesterol such as liver and other organ meats, egg yolks, and full-fat dairy products.

Good sources of soluble fiber include oats, certain fruits (such as oranges and pears) and vegetables (such as brussels sprouts and carrots), and dried peas and beans.

Resources

For more information about lowering cholesterol and lowering your risk for heart disease, write to the NHLBI Health Information Center, P.O. Box 30105, Bethesda, MD, 20824-0105 or call 301-592-8573, or visit the Web sites listed below:

"Live Healthier, Live Longer"–information on cholesterol lowering (www.nhlbi.nih.gov/chd)
"Aim for a Healthy Weight" (www.nhlbi.nih.gov)
"Your Guide to Lowering High Blood Pressure" (www.nhlbi.nih.gov/hbp)
www.nutrition.gov
www.fitness.gov
www.cdc.gov/tobacco
"Healthfinder"–a free gateway to reliable consumer health and human services information developed by the U.S. DHHS (www.healthfinder.gov)
"MedlinePlus"–up-to-date, quality health care information from the National Library of Medicine at the National Institutes of Health (www.medlineplus.gov)

Men

Estimate of 10-Year Risk for Men

(Framingham Point Scores)

Age	Points
20-34	-9
35-39	-4
40-44	0
45-49	3
50-54	6
55-59	8
60-64	10
65-69	11
70-74	12
75-79	13

Total Cholesterol	Points				
	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
<160	0	0	0	0	0
160-199	4	3	2	1	0
200-239	7	5	3	1	0
240-279	9	6	4	2	1
≥280	11	8	5	3	1

	Points				
	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
Nonsmoker	0	0	0	0	0
Smoker	8	5	3	1	1

HDL (mg/dL)	Points
≥60	-1
50-59	0
40-49	1
<40	2

Systolic BP (mmHg)	If Untreated	If Treated
<120	0	0
120-129	0	1
130-139	1	2
140-159	1	2
≥160	2	3

Point Total	10-Year Risk %
<0	< 1
0	1
1	1
2	1
3	1
4	1
5	2
6	2
7	3
8	4
9	5
10	6
11	8
12	10
13	12
14	16
15	20
16	25
≥17	≥ 30

10-Year risk _____%

Women

Estimate of 10-Year Risk for Women

(Framingham Point Scores)

Age	Points
20-34	-7
35-39	-3
40-44	0
45-49	3
50-54	6
55-59	8
60-64	10
65-69	12
70-74	14
75-79	16

Total Cholesterol	Points				
	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
<160	0	0	0	0	0
160-199	4	3	2	1	1
200-239	8	6	4	2	1
240-279	11	8	5	3	2
≥280	13	10	7	4	2

	Points				
	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
Nonsmoker	0	0	0	0	0
Smoker	9	7	4	2	1

HDL (mg/dL)	Points
≥60	-1
50-59	0
40-49	1
<40	2

Systolic BP (mmHg)	If Untreated	If Treated
<120	0	0
120-129	1	3
130-139	2	4
140-159	3	5
≥160	4	6

Point Total	10-Year Risk %
< 9	< 1
9	1
10	1
11	1
12	1
13	2
14	2
15	3
16	4
17	5
18	6
19	8
20	11
21	14
22	17
23	22
24	27
≥25	≥ 30

10-Year risk _____%

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National Heart, Lung, and Blood Institute

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