

LIVE HEALTHIER,
LIVE LONGER

LOWERING
CHOLESTEROL
FOR THE
PERSON WITH
HEART DISEASE

LDL

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PERSON WITH HEART DISEASE

If you have coronary heart disease (CHD), paying attention to your cholesterol level could well save your life. Read this booklet to find out how and why.



National Cholesterol Education Program

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LIVE HEALTHIER, LIVE LONGER—

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CORONARY HEART DISEASE

If you have coronary heart disease (CHD), there are some important things for you to know. They could save your life.

Twelve to thirteen million American adults have CHD, which is a major cause of disability and the number one killer of women and of men in the United States. In 1994, almost 500,000 people died from CHD, equally divided between men and women. About 1.25 million people have heart attacks every year, and about half of these occur in persons who are already known to have CHD. For men and women with CHD, the risk of a heart attack is five to seven times higher than for people of the same age and sex who do not have CHD.

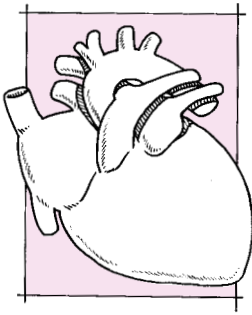
If you have CHD, that's the bad news. But the good news is that by lowering your cholesterol you can reduce your risk of having a heart attack. This booklet was written to help you make healthy changes in your life that can reduce your risk.

I Already Have Heart Disease. Is It Too Late To Reduce My Risk?

No, it's not too late to help your heart. Most CHD patients will benefit from cholesterol lowering. In fact, if you already have heart disease, you should pay even more attention to your cholesterol level, because you stand to benefit even more. A person with CHD has a much greater risk of having a future heart attack than a person without heart disease. If you lower your blood cholesterol level, you will definitely reduce your risk of a future heart attack and could actually prolong your life.

What Is Coronary Heart Disease?

You probably know that CHD is a type of heart disease caused by narrowing of the coronary arteries that feed the heart. Like any muscle, the heart needs a constant supply of oxygen and nutrients, which are carried to it by the



blood in the coronary arteries. When the coronary arteries become narrowed or clogged by fat and cholesterol deposits and cannot supply enough blood to the heart, the result is CHD. If not enough oxygen-carrying blood reaches the heart, the person may experience chest pain called angina. If the blood supply to a portion of the heart is completely cut off by total blockage of a coronary artery, the result is a heart attack. This is usually due to a sudden closure from a blood clot forming on top of a previous narrowing.

How Do You Know If You Have Coronary Heart Disease?

If you answer yes to any of these questions, you most probably have CHD.

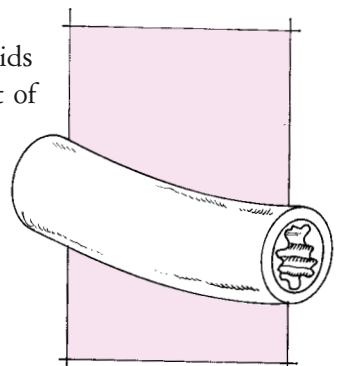
- Have you ever had a heart attack?
- Do you suffer from chest pain that has been diagnosed as angina?
- Have you had heart surgery such as a bypass operation or a balloon or angioplasty procedure?
- Have you ever had an angiogram (a special x-ray picture of the heart) that showed a blockage in your coronary arteries?

You should be sure to talk to your doctor about cholesterol if you have answered yes to any of these questions.

ROLE OF CHOLESTEROL IN CHD

What is cholesterol and what does it have to do with CHD? Cholesterol is a waxy substance that occurs naturally in all parts of the body and that your body needs to function normally. It is present in cell walls or membranes everywhere in the body, including the brain, nerves, muscle, skin, liver, intestines, and heart. Your body uses cholesterol to produce many hormones, vitamin D, and the bile acids that help to digest fat. It takes only a small amount of cholesterol in the blood to meet these needs.

However, if you have too much cholesterol in your bloodstream, it can lead to atherosclerosis, a condi-



tion in which fat and cholesterol are deposited in the walls of the arteries in many parts of the body, including the coronary arteries feeding the heart. In time, narrowing of the coronary arteries by atherosclerosis can produce the signs and symptoms of CHD, including angina and heart attack.

Lipoproteins

Cholesterol travels in the blood in packages called lipoproteins. Just like oil and water, cholesterol, which is fatty, and blood, which is watery, do not mix. In order to be able to travel in the bloodstream, the cholesterol made in the liver is combined with protein, making a lipoprotein. This lipoprotein then carries the cholesterol through the bloodstream.

There are specific kinds of lipoproteins that contain cholesterol in your blood, and each affects your heart disease risk in a different way.

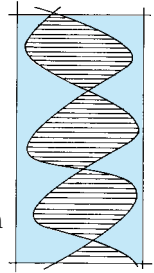
- **Low density lipoproteins (LDLs):** the “bad” cholesterol. LDLs carry most of the cholesterol in the blood, and the cholesterol from LDLs is the main source of damaging buildup and blockage in the arteries. Thus, the more LDL-cholesterol you have in your blood, the greater your risk of CHD. If you have CHD and your LDL is higher than 100 mg/dL, your cholesterol may well be too high for you.
- **High density lipoproteins (HDLs):** the “good” cholesterol. HDLs carry cholesterol in the blood from other parts of the body back to the liver, which leads to its removal from the body. So HDLs help keep cholesterol from building up in the walls of the arteries. If your level of HDL-cholesterol is below 35 mg/dL, you are at substantially higher risk for CHD. The higher your HDL-cholesterol, the better. The average HDL-cholesterol for men is about 45 mg/dL, and for women it is about 55 mg/dL.
- **Triglycerides:** a form of fat carried through the bloodstream. Most of your body’s fat is in the form of triglycerides stored in fat tissue. Only a small portion of your triglycerides is found in the bloodstream. High blood triglyceride levels alone do not cause atherosclerosis. But lipoproteins that are rich in triglycerides also contain cholesterol, which causes atherosclerosis in some people with high triglycerides. So high triglycerides may be a sign of a lipoprotein problem that contributes to CHD.

What Makes Blood Cholesterol High or Low?

Your blood cholesterol level is affected not only by what you eat but also by how quickly your body makes LDL-cholesterol and disposes of it. In fact, your body makes all the cholesterol it needs, and it is not necessary to take in any additional cholesterol from the foods you eat.

Patients with CHD typically have too much LDL-cholesterol in their blood. Many factors help determine whether your LDL-cholesterol level is high or low. The following factors are the most important:

- **Heredity.** Your genes influence how high your LDL-cholesterol is by affecting how fast LDL is made and removed from the blood. One specific form of inherited high cholesterol that affects 1 in 500 people is familial hypercholesterolemia, which often leads to early CHD. But even if you do not have a specific genetic form of high cholesterol, genes play a role in influencing your LDL-cholesterol level.

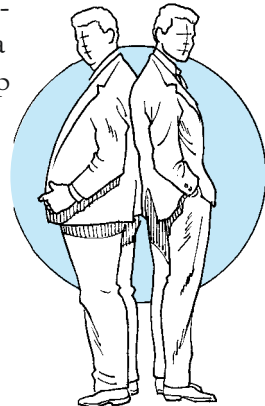


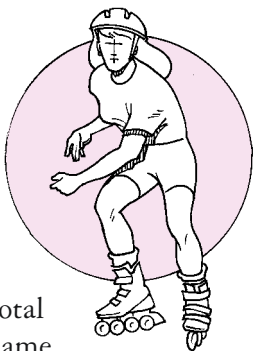
- **What you eat.** Two main nutrients in the foods you eat make your LDL-cholesterol level go up: *saturated fat*, a type of fat found mostly in foods that come from animals; and *cholesterol*, which comes only from animal products. Saturated fat raises your LDL-cholesterol level more than anything else in the diet. Eating too much saturated fat and cholesterol is the main reason for high levels of cholesterol and a high rate of heart attacks in the United States. Reducing the amount of saturated fat and cholesterol you eat is a very important step in reducing your blood cholesterol levels. See



page 12 for more information on the Step II diet, a diet low in saturated fat and cholesterol, which is recommended for people with CHD.

- **Weight.** Excess weight tends to increase your LDL-cholesterol level. If you are overweight and have a high LDL-cholesterol level, losing weight may help you lower it. Weight loss also helps to lower triglycerides and raise HDL. See page 18 for more information on weight management.





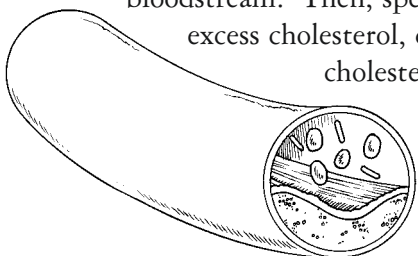
- **Physical activity/exercise.** Regular physical activity may lower LDL-cholesterol and raise HDL-cholesterol levels. See page 18 for more information on physical activity.
- **Age and sex.** Before menopause, women usually have total cholesterol levels that are lower than those of men the same age. As women and men get older, their blood cholesterol levels rise until about 60 to 65 years of age. In women, menopause often causes an increase in their LDL-cholesterol and a decrease in their HDL-cholesterol level, and after the age of 50, women often have higher total cholesterol levels than men of the same age. Some women may benefit from hormone replacement therapy (also called estrogen replacement therapy) after menopause, because estrogen lowers LDL and raises HDL. See page 24 for more information about estrogen.
- **Alcohol.** Alcohol intake increases HDL-cholesterol but does not lower LDL-cholesterol. Doctors don't know for certain whether alcohol also reduces the risk of CHD. Drinking too much alcohol can damage the liver and heart muscle, lead to high blood pressure, and raise triglycerides. Because of the risks, alcoholic beverages should not be used as a way to prevent CHD.
- **Stress.** Stress over the long term has been shown in several studies to raise blood cholesterol levels. One way that stress may do this is by affecting your habits. For example, when some people are under stress, they console themselves by eating fatty foods. The saturated fat and cholesterol in these foods contribute to higher levels of blood cholesterol.

Unstable Plaque

Cholesterol is a major ingredient of the plaque that builds up in the coronary arteries and causes CHD, so it is important to understand how plaques develop. Excess cholesterol is deposited in the artery walls as it travels through the

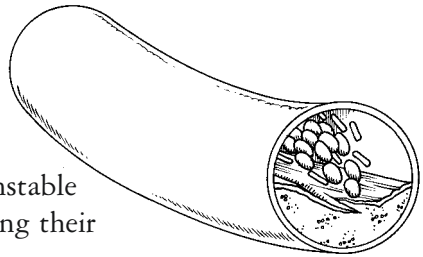
bloodstream. Then, special cells in the artery wall gobble up this excess cholesterol, creating a “bump” in the artery wall. This cholesterol-rich “bump” then is covered by a scar

that produces a hard coat or shell over the cholesterol and cell mixture. It is this collection of cholesterol covered by a scar that is called plaque.



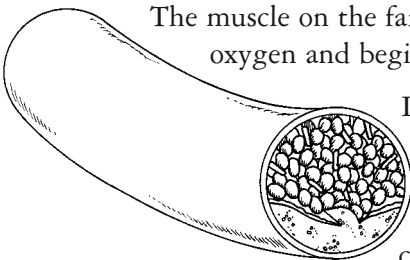
The plaque buildup narrows the space in the coronary arteries through which blood can flow, decreasing the supply of oxygen and nutrients to the heart. If not enough oxygen-carrying blood can pass through the narrowed arteries to reach the heart muscle, the heart may respond with a pain called angina. The pain usually happens with exercise when the heart needs more oxygen. It is typically felt in the chest or sometimes in other places like the left arm and shoulder. However, this same inadequate blood supply may cause no symptoms.

Plaques come in various sizes and shapes. Throughout the coronary arteries many small plaques build themselves into the walls of the arteries, blocking less than half of the artery opening. These small plaques are often invisible on many of the tests doctors use to identify coronary heart disease. It used to be thought that the most dangerous plaques and the ones most likely to cause total blockage of coronary arteries were the largest ones. The largest plaques are in fact the ones most likely to cause angina. However, small plaques that are full of cholesterol but not completely covered by scar are now thought to be very unstable and more likely to rupture or burst, releasing their cholesterol contents into the bloodstream.



When this happens, it triggers blood clotting inside the artery. If the blood clot totally blocks the artery, it stops blood flow and a heart attack occurs.

The muscle on the far side of the blood clot does not get enough oxygen and begins to die. The damage can be permanent.



Lowering your blood cholesterol level can slow, stop, or even reverse the buildup of plaque. Cholesterol lowering can reduce your risk of a heart attack by lowering the cholesterol content in unstable plaques to

make them more stable and less prone to rupture. This is why lowering your LDL-cholesterol is such an important way to reduce your risk for having a heart attack. Even in people who have had one heart attack, the chances of having future attacks can be substantially reduced by cholesterol lowering.

The Benefits of Cholesterol Lowering

A 1994 study called the Scandinavian Simvastatin Survival Study (also called 4S) found that lowering cholesterol can prevent heart attacks and reduce death in men and women who already have heart disease and high cholesterol. For over 5 years, more than 4,400 patients with heart disease and total cholesterol levels of 213 mg/dL to 310 mg/dL were given either a cholesterol-lowering drug or a placebo (a dummy pill that looks exactly like the medication). The drug they were given is known as a statin (see page 20), and it reduced total cholesterol levels by 25 percent and LDL-cholesterol levels by 35 percent. The study found that in those receiving statin, deaths from heart disease were reduced by 42 percent, the chance of having a nonfatal heart attack was reduced by 37 percent, and the need for bypass surgery or angioplasty was reduced by 37 percent. A very important finding is that deaths from causes other than cardiovascular disease were not increased, and so the 42 percent reduction in heart disease deaths resulted in a 30 percent drop in overall deaths from all causes.

The 4S researchers say that the following benefits could be expected if doctors were to treat their heart disease patients for the same 5-year period and lower cholesterol to the same extent. For every 1,000 patients:

- 40 people would be saved out of the 90 who would otherwise die from heart disease.
- 70 of the expected 210 nonfatal heart attacks would be avoided.
- Heart procedures such as bypass surgery would be avoided in 60 of the 210 patients who would be expected to need these procedures.

In 1996 the results of the Cholesterol and Recurrent Events (CARE) Study also showed the benefits of cholesterol lowering in CHD patients. This study reported that even in patients with seemingly normal cholesterol levels (average of 209 mg/dL), cholesterol lowering with a statin drug lowered the risk of having another heart attack or dying by 24 percent. These patients were also less likely to need bypass surgery (26 percent reduction) or angioplasty (22 percent reduction) during the study. Women benefited even more than men, reducing their risk of having another heart attack by 45 percent. The CARE researchers estimate that treatment of 1,000 patients similar to those in CARE would result in 153 fewer heart attacks and deaths from heart disease. If the patients were over 60, there would be 214 fewer, and if they were all women, there would be 248 fewer.

These studies along with many others support the need to lower cholesterol levels in CHD patients. If you lower your cholesterol, you too can see benefits like those in 4S and CARE.

Persons With CHD Have a Lower Goal Cholesterol Level



For the general population, a level of LDL-cholesterol below 130 mg/dL is called desirable. But if you have CHD, your goal is lower: You should reduce your LDL-cholesterol to about 100 mg/dL or less. This is because patients with CHD, even if they have relatively low cholesterol levels (say an LDL-cholesterol of 120 mg/dL), have shown that they are susceptible to developing CHD at that level. A recent study has reaffirmed the benefit of lowering LDL-cholesterol levels in CHD patients to 100 mg/dL or less. So, if you have CHD and your LDL-cholesterol level is more than 100 mg/dL, it may well be too high for you.

Getting To Know Your Risk Factors for Coronary Heart Disease

In addition to a high total and LDL-cholesterol level and a low HDL-cholesterol level, other factors also increase your chance of CHD complications. The box below lists risk factors you can do something about. The more of these modifiable risk factors you have, the higher your chance of having another heart attack or worsening your CHD.

MODIFIABLE RISK FACTORS FOR HEART DISEASE

- High total cholesterol and high LDL-cholesterol
- Low HDL-cholesterol
- Cigarette smoking
- High blood pressure
- Diabetes
- Obesity/overweight
- Physical inactivity

You can reduce your risk of having another heart attack or other CHD problem by doing something about your modifiable risk factors. This means that, in addition to controlling your cholesterol level, you should make a major

effort to stop smoking, control your high blood pressure, lose weight if you are overweight, and increase your physical activity. Controlling high blood sugar if you have diabetes is important too.

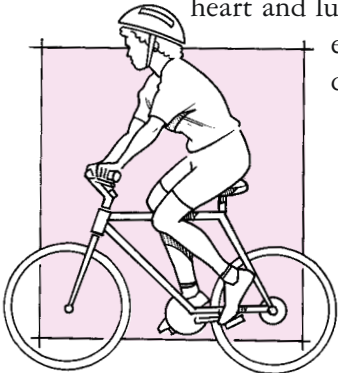
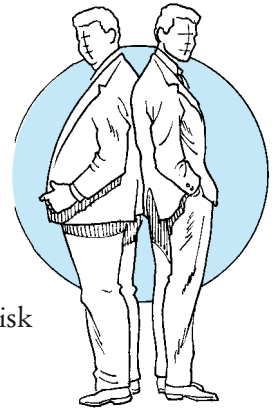
Smoking. Cigarette smoking is a strong risk factor for CHD. Stopping smoking reduces your risk for CHD and stroke, beginning with the first year after stopping smoking. It also reduces your chances of getting lung cancer and other cancers and chronic lung disease. Changing to low-tar or low-nicotine cigarettes does *not* reduce the risk for CHD.

High blood pressure. High blood pressure (or hypertension) is associated with increased rates of CHD, as well as stroke and kidney failure. Treatment of hypertension reduces your risk for all these complications.

Diabetes. Diabetes, whether insulin dependent or non-insulin dependent, increases the risk for CHD. In men, diabetes increases risk for CHD complications by about three times, and the increase in risk may be even greater for women.

Obesity. Obesity or overweight increases the risk for CHD in men and women. If you are overweight, losing weight can improve other risk factors including diabetes, high blood pressure, and cholesterol, making weight loss very important in the treatment of CHD.

Physical inactivity. Physical inactivity can increase your risk for CHD. Regular physical activity can reduce LDL-cholesterol, triglycerides, high blood pressure, and weight while raising HDL-cholesterol and improving the fitness of your heart and lungs. Regular physical activity is recommended to reduce your risk of future CHD complications.



HOW DO I FIND OUT MY CHOLESTEROL LEVEL?

Since you have heart disease, finding out your blood cholesterol should be done by a blood test called a lipoprotein profile. This test will determine not only your total and HDL-cholesterol levels, but also your LDL-cholesterol and triglyceride levels. In order to take the test, you must fast, usually overnight. That means you may have nothing to eat or drink but water (or black coffee or tea with no milk, cream, or sugar) for 9 to 12 hours beforehand.

When you get your lipoprotein profile report from your doctor, there are several numbers you should look at: total cholesterol, LDL-cholesterol, HDL-cholesterol, and triglycerides. The important thing to remember is that your doctor will decide on the best treatment for you based primarily on your LDL level. The decision to start treatment should be based on the average of two LDL tests taken 1 to 8 weeks apart. The goal of treatment for CHD patients should be an LDL of about 100 mg/dL or less, which is a lower target level than for people who do not have heart disease.

HDL-cholesterol is important to know too. If your HDL is less than 35 mg/dL, your doctor will try to help you raise it, while lowering LDL-cholesterol.

TREATMENT SUMMARY

If you have CHD, one of the keys to reducing the risk for future heart attacks or other CHD complications is to lower your LDL-cholesterol. The goal LDL-cholesterol for CHD patients is a level of about 100 mg/dL or less. You can lower LDL-cholesterol through changes in life habits: decreasing saturated fat and cholesterol in the diet, increasing physical activity, and controlling body weight. In addition, medications are available to help you lower your LDL-cholesterol level. For many patients it is necessary to combine medications with changes in life habits to get enough of a reduction in LDL-cholesterol, especially to reach the optimum level of 100 mg/dL or less. Your doctor can help to decide which combination of cholesterol-lowering activities is right for you.

Four steps you can take to reduce your high blood cholesterol:

- Follow the Step II diet (low saturated fat, low cholesterol).
- Be more physically active.
- Lose weight if you are overweight.
- Take your cholesterol-lowering medication if prescribed by your doctor.

Even if your doctor starts you on a cholesterol-lowering drug, it is important for you to adopt heart-healthy life habits. These will help to bring about a bigger drop in your LDL-cholesterol, and they will reduce your risk for future CHD in other ways as well. It is not enough just to take a drug. If you do only that, you will fail to get the full amount of risk reduction that is possible. Cholesterol-lowering drugs can significantly decrease your risk for future CHD, but you will do even better by modifying your life habits in addition.

What Your LDL-Cholesterol Means To You*

If you have heart disease and your LDL-cholesterol is 100 mg/dL or less:

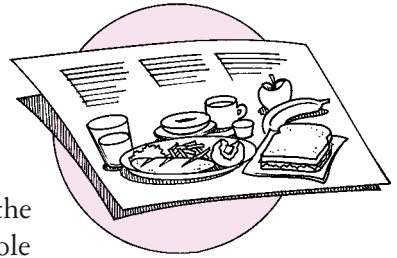
You do not need to take specific steps to lower your LDL, but you will need to have your level tested again in 1 year. In the meantime, you should closely follow a diet low in saturated fat and cholesterol, maintain a healthy weight, be physically active, and not smoke. You should also follow the medical regimen prescribed by your doctor.

If you have heart disease and your LDL-cholesterol level is greater than 100 mg/dL:

You need to have a complete physical examination done to see if you have a disease or a health condition that is raising your cholesterol levels. You will need to follow the Step II diet (see page 12), which is low in saturated fat and cholesterol, and be physically active, lose weight if you are overweight, and not smoke. If your LDL level is too high, you may need to take medication.

*For anyone 20 years of age or older

IMPROVE YOUR DIET



A diet lower in saturated fat and cholesterol than the average American diet is a healthy way for the whole family to eat (except infants under 2 years who need more calories from fat). Since you have heart disease and need to lower your blood cholesterol level more than someone who does not have heart disease, you will probably be advised by your doctor to follow a Step II diet, which is lower in saturated fat and cholesterol than the diet the rest of your family may wish to follow. Because this Step II diet may include many changes to your current eating plan, your doctor may refer you to a registered dietitian who can help you make these changes.

On the Step II diet, you should eat:

- Less than 7 percent of the day's total calories from saturated fat.
- 30 percent or less of the day's total calories from fat.
- Less than 200 milligrams of dietary cholesterol a day.
- Just enough calories to achieve and maintain a healthy weight. (Ask your doctor or registered dietitian what is a reasonable calorie level for you.)

The recommendations for saturated fat and total fat are based on a percentage of the total calories you eat; the actual amount you can eat daily will vary depending on how many total calories you eat. See the chart below to get an idea of the number of grams of saturated fat and total fat you should be eating.

Step II Recommendations for Saturated Fat and Total Fat According to Total Calorie Level

Total Calories	1,200	1,500	1,800	2,000	2,500
Saturated fat (grams)*	8	10	12	13	17
Total fat (grams)**	40	50	60	65	80

* One gram of fat equals 9 calories. Amounts are equal to 6 percent of total calories for Step II; your intake should be this much or less.

** Amounts are equal to 30 percent of total calories (rounded down to the nearest 5).

NOTE: On average, women consume about 1,800 calories a day and men consume about 2,500 calories a day.

Next, here are some general ways to lower blood cholesterol through your diet:

■ *Choose foods low in saturated fat.*

All foods that contain fat have different mixtures of saturated and unsaturated fats. Saturated fat raises your blood cholesterol level more than anything else that you eat. It is found in greatest amounts in foods from animals, such as fatty cuts of meat, poultry with the skin, whole-milk dairy products, and lard, and in tropical oils like coconut, palm kernel, and palm oils. Most other vegetable oils are low in saturated fats. *The best way to reduce your blood cholesterol level is to choose foods low in saturated fat.* One way to do this is by choosing foods such as fruit, vegetables, and whole grain foods, which are naturally low in fat and high in starch and fiber. You should read the food labels in the grocery store to help you choose foods that are low in saturated fat (see page 16).

■ *Choose foods low in total fat.*

Since many foods high in total fat are also high in saturated fat, *eating foods low in total fat will help you eat less saturated fat.* Any type of fat is a rich source of calories, so *eating foods low in fat should also help you eat fewer calories*, which will help you lose weight. If you are overweight, losing weight is an important part of lowering your blood cholesterol. When you do eat fat, you should substitute unsaturated fat for saturated fat. Unsaturated fat can be either monounsaturated or polyunsaturated. Examples of foods high in monounsaturated fat are olive and canola oils. Those high in polyunsaturated fats are safflower, sunflower, corn, and soybean oils. The food label is your best guide to how much total fat, saturated fat, and unsaturated fat and how many calories are in the foods you buy (see page 16).

■ *Choose foods low in cholesterol.*

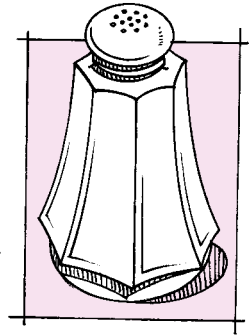
Dietary cholesterol also can raise your blood cholesterol level, although usually not as much as saturated fat. So it is important to choose foods low in dietary cholesterol. Dietary cholesterol is found only in foods that come from animals. Many of these foods also are high in saturated fat. Foods from plant sources do not have cholesterol but can contain saturated fat. Use the food label when shopping to choose foods low in cholesterol.

■ *Choose foods high in starch and fiber.*

Foods high in starch and fiber are excellent substitutes for foods high in saturated fat. These foods—breads, cereals, pasta, grains, fruits, and vegetables—are low in saturated fat and cholesterol, unless fat is added in their preparation. They are also usually lower in calories than foods that are high in fat. Foods high in starch and fiber are also good sources of vitamins and minerals.

■ *A word about sodium.*

If you have high blood pressure as well as high blood cholesterol (and many people do), your doctor may tell you to cut down on sodium or salt. As long as you are working on getting your blood cholesterol number down, this is a good time to work on your blood pressure, too. Try to limit your sodium intake to 2,400 milligrams a day.



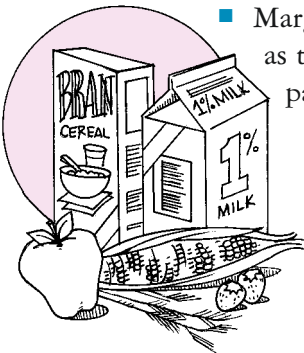
Practical Ways To Change Your Diet

Here are some tips on how to choose foods for the Step II diet.

To cut back on saturated fats, choose:

- Poultry, fish, and lean cuts of meat. Remove the skin from chicken and trim the fat from meat *before* cooking.
- Skim or 1 percent milk instead of 2 percent or whole milk.
- Cheeses with no more than 3 grams of fat per ounce (these include low-fat cottage cheese or other low-fat cheeses). Cut down on full-fat processed, natural, and hard cheeses (like American, brie, and cheddar).
- Low-fat or non-fat yogurt, sour cream, and cream cheese instead of the high-fat varieties.
- Liquid vegetable oils that are high in unsaturated fat (these include canola, corn, olive, and safflower oil).

- Margarine made with unsaturated liquid vegetable oil as the first ingredient rather than hydrogenated or partially hydrogenated oil. Choose tub or liquid



margarine or vegetable oil spreads. The softer the margarine, the more unsaturated it is. If you are watching your sodium intake, try unsalted margarine. Use the food label to choose margarines with the least amount of saturated fat.

- Fewer commercially prepared and processed foods made with saturated or hydrogenated fats or oils (like cakes, cookies, and crackers).
- Foods high in starch and fiber such as whole wheat breads and cereals instead of foods high in saturated fats.

Cutting back on saturated fat helps you to control dietary cholesterol as well, because cholesterol and saturated fat are often, but not always, found together in the same foods. Two additional points to remember when cutting back on dietary cholesterol are:

- Strictly limit organ meat (such as liver, brain, and kidney).
- Eat a total of two or fewer egg yolks a week (as whole eggs or in prepared foods). Try substituting two egg whites for each whole egg in recipes, or using an egg substitute.

To include more foods high in starch and fiber, choose:

- More vegetables and fruits. It is recommended that Americans eat five servings of fruits and vegetables every day. They are low in saturated fat and total fat and have no cholesterol. Fruits and vegetables are good sources of starch, fiber, vitamins, and minerals and are low in sodium. They are also low in calories (which helps with weight control) except for avocados and olives, which are high in both fat and calories. Many fruits and vegetables are also high in vitamin C, vitamin E, and beta-carotene—so-called “antioxidants.” A diet high in these fruits and vegetables may also help to lower risk for heart disease. So fruits and vegetables are great substitutes for foods high in saturated fat and cholesterol.
- Whole grain breads and cereals, pasta, rice, and dry peas and beans.

You should also cook the low-fat way:

- Bake, broil, microwave, poach, or roast instead of breading and frying.
- When you roast, place the meat on a rack so the fat can drip away.

Read Food Labels

We've already mentioned that reading food labels will help you choose foods low in saturated fat, total fat, cholesterol, and calories. Food labels have two important parts: nutrition information and an ingredients list.

Read the nutrition information.

Look for the amount of saturated fat, total fat, cholesterol, and calories in a serving of the product. Compare similar products to find the one with the least amounts. If you have high blood pressure, do the same for sodium.

Look at the ingredients.

All food labels list the product's ingredients in order by weight. The ingredient in the greatest amount is listed first. The ingredient in the least amount is listed last. *So, to choose foods low in saturated fat or total fat, limit your use of products that list any fat or oil first—or that list many fat and oil ingredients.* If you are watching your sodium intake, do the same for sodium or salt.

Nutrition Facts	
Serving Size 1 cup (228g)	←
Servings Per Container 2	←
Amount Per Serving	
Calories 250	Calories from Fat 110
% Daily Value*	
Total Fat 12g	18%
Saturated Fat 3g	15%
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A 4%	• Vitamin C 2%
Calcium 20%	• Iron 4%
<small>* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:</small>	
	Calories: 2,000 2,500
Total Fat	Less than 65g 80g
Sat Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 2,400mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g
Calories per gram: Fat 9 • Carbohydrates 4 • Protein 4	

- Serving size
- Number of servings

- Calories
- Total fat in grams
- Saturated fat in grams
- Cholesterol in milligrams

Here, the label gives the amounts for the different nutrients in one serving. Use it to help you keep track of how much fat, saturated fat, cholesterol, and calories you are getting from different foods. Pay attention to the actual amounts (in grams or milligrams). Don't use the percents shown (percent daily value) because they are not geared to the Step II diet.

How Soon Will You See Results?

Generally your blood cholesterol level should show a drop a few weeks after you start on the Step II diet. LDL-cholesterol levels should be measured after being on the diet for 3 to 4 weeks. You should set up a schedule for followup cholesterol measurements with your doctor. This schedule will depend on your specific cholesterol level and management program. If your LDL is still too high, your doctor may want you to begin cholesterol-lowering medicine. Once you have reached your goal for LDL-cholesterol, long-term monitoring can begin.

How Much Cholesterol Reduction Can You Expect?

How effective diet is in lowering your LDL-cholesterol level depends on your dietary habits before starting the diet, how well you follow your diet, and how your body responds to your new way of eating. In general, those with higher cholesterol levels have greater reductions in LDL-cholesterol levels than those with lower starting levels. If you are overweight and lose weight, a low-fat diet may work even better to lower your high cholesterol.

Dietary equations predict that the Step II diet can reduce total cholesterol levels in CHD patients who are consuming an average American diet by about 8 to 14 percent. Many people with CHD and elevated cholesterol levels consume more saturated fat and cholesterol and have higher blood cholesterol levels than average and will have an even bigger reduction. Every 1 percent reduction in cholesterol levels lowers your risk for a future heart attack by about 2 percent. So an 8 to 14 percent reduction in cholesterol levels from the Step II diet would lower the CHD risk by about 16 to 28 percent.

Lifetime Changes in Diet

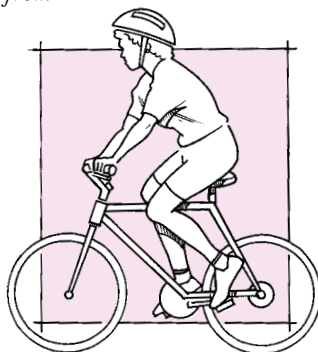
Many people find that advice from a registered dietitian or other qualified nutritionist can help them to be more successful with the Step II diet. Whoever prepares the meals in your house should also participate in these sessions. Your new diet should be maintained for life. You may want to continue diet education sessions with your dietitian quarterly for the first year of long-term monitoring and twice yearly thereafter.

In addition to making changes in the way you eat, there are other changes you should make.

BECOME MORE PHYSICALLY ACTIVE

Regular physical activity by itself may help reduce deaths from heart disease by:

- Lowering LDL levels
- Raising HDL levels
- Lowering high blood pressure
- Lowering triglyceride levels
- Reducing excess weight
- Improving the fitness of your heart and lungs



Since you have heart disease, talk with your doctor before starting an activity to be sure you are following a safe program that works for you.

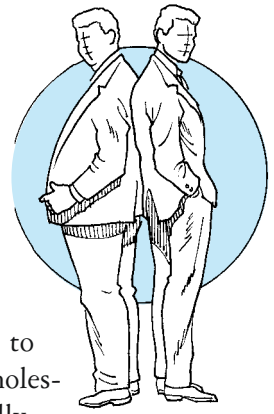
Your doctor will recommend an activity program to meet your needs. If you have been inactive for a long time, you will be instructed to start with low-to-moderate level activities such as walking, taking the stairs instead of the elevator, gardening, housework, dancing, or exercising at home. Begin by doing the activity for a few minutes most days. Your doctor will then increase your activity level, allowing you to work up to a longer program—your goal is at least 30 minutes per day, 3 or 4 days a week. This can include regular aerobic activities such as brisk walking, jogging, swimming, bicycling, or playing tennis. If you have chest pain, feel faint or light-headed, or become extremely out of breath while exercising, stop the activity at once and tell your doctor as soon as possible.

If you are currently recovering from a heart attack or heart surgery, your doctor may suggest that you begin your new exercise program in a cardiac rehabilitation center. A cardiac rehabilitation center is a place that you can go to exercise under the supervision of a nurse or doctor.

LOSE WEIGHT IF YOU ARE OVERWEIGHT

People who are overweight usually have higher blood cholesterol levels than people of desirable weight. When you cut the fat in your diet, you cut down on the richest source of calories. An eating pattern high in starch and fiber

instead of fat is a good way to lose weight. Many starchy foods, such as bread, pasta, and rice, have little fat (unless fat is added in preparation) and are lower in calories than high-fat foods. Check the food label to be sure. If you are overweight, losing even a little weight can help to lower LDL-cholesterol and raise HDL-cholesterol. You don't need to reach your desirable weight to see a change in your blood cholesterol levels. But, as a person who has CHD, you should really try to reduce your risk as much as possible by getting your weight down to the desirable level.



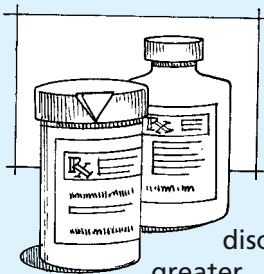
Two steps are key to weight loss:

- Eat fewer calories (cutting back on the fat you eat will really help).
- Burn more calories by becoming more physically active.

CHOLESTEROL-LOWERING MEDICINES

To reach an LDL-cholesterol goal of 100 mg/dL or below, you may need to take a cholesterol-lowering medicine in addition to making the life habit changes already mentioned. CHD patients need to lower their LDL more than people without heart disease. As a result, medications are more often used by patients with CHD than by those who do not have CHD.

CHD Patients and Cholesterol-Lowering Medications



CHD patients with LDL levels of 130 mg/dL or greater will generally need to take medicine. If your LDL level is 100 to 129 mg/dL, your doctor will consider all the facts of your case in deciding whether to prescribe medication. If you have been hospitalized for a heart attack, your doctor may choose to start you on a medication at discharge if your LDL-cholesterol is 130 mg/dL or greater. Also, if your LDL-cholesterol is far above the goal level of 100 mg/dL when first measured, your doctor may choose to start a cholesterol-lowering medication together with diet and physical activity right from the beginning of treatment.

If your doctor prescribes medicine, you also will need to:

- Follow your cholesterol-lowering diet.
- Be more physically active.
- Lose weight if overweight.
- Control all of your other CHD risk factors, including smoking, high blood pressure, and diabetes.

Taking all these steps together may lessen the amount of medicine you need or make the medicine work better—and that reduces your risk for a heart attack. The following is a description of cholesterol-lowering medicines.

Statins

There are currently five statin drugs on the market in the United States: lovastatin, pravastatin, simvastatin, fluvastatin, and atorvastatin. The major effect of the statins is to lower LDL-cholesterol levels, and they lower LDL-cholesterol more than other types of drugs. Statins inhibit an enzyme, HMG-CoA reductase, that controls the rate of cholesterol production in the body. These drugs lower cholesterol by slowing down the production of cholesterol and by increasing the liver's ability to remove the LDL-cholesterol already in the blood. Statins were used to lower cholesterol levels in both the 4S and CARE studies. The large reductions in total and LDL-cholesterol produced by these drugs resulted in large reductions in heart attacks and CHD deaths. Thanks to their track record in these studies and their ability to lower LDL-cholesterol, statins have become the drugs most often prescribed when a person with CHD needs a cholesterol-lowering medicine.

Studies using various statins have reported from 20 to 60 percent lower LDL-cholesterol levels in patients on these drugs. Statins also produce a modest increase in HDL-cholesterol and reduce elevated triglyceride levels.

The statins are usually given in a single dose at the evening meal or at bedtime. It is important that these medications be given in the evening to take advantage of the fact that the body makes more cholesterol at night than during the day.

You should begin to see results from the statins after several weeks, with a maximum effect in 4 to 6 weeks. After about 6 to 8 weeks, your doctor can

do the first check of your LDL-cholesterol while on the medication. A second measurement of your LDL-cholesterol level will have to be averaged with the first for your doctor to decide whether your dose of medicine should be changed to help you meet your goal.

The statins are well tolerated by most patients, and serious side effects are rare. A few patients will experience an upset stomach, gas, constipation, and abdominal pain or cramps. These symptoms usually are mild to moderate in severity and generally go away as your body adjusts. Rarely a patient will develop abnormalities in blood tests of the liver. Also rare is the side effect of muscle problems. The symptoms are muscle soreness, pain, and weakness. If this happens, or you have brown urine, contact your doctor right away to get blood tests for possible muscle problems.

Bile Acid Resins

Bile acid resins bind with cholesterol-containing bile acids in the intestines and are then eliminated in the stool. The major effect of bile acid resins is to lower LDL-cholesterol by about 10 to 20 percent. Small doses of resins can produce useful reductions in LDL-cholesterol. Bile acid resins are sometimes prescribed with a statin for patients with CHD to increase cholesterol reduction. When these two drugs are combined, their effects are added together to lower LDL-cholesterol by over 40 percent. Cholestyramine and colestipol are the two main bile acid resins currently available. These two drugs are available as powders or tablets. They are not absorbed from the gastrointestinal tract and 30 years of experience with the resins indicate that their long-term use is safe.

Bile acid resin powders must be mixed with water or fruit juice and taken once or twice (rarely three times) daily with meals. Tablets must be taken with large amounts of fluids to avoid gastrointestinal symptoms. Resin therapy may produce a variety of symptoms including constipation, bloating, nausea, and gas.

The bile acid resins are not prescribed as the sole medicine to lower your cholesterol if you have high triglycerides or a history of severe constipation.

Although resins are not absorbed, they may interfere with the absorption of other medicines if taken at the same time. Other medications therefore should be taken at least 1 hour before or 4 to 6 hours after the resin. Talk to your doctor about the best time to take this medicine, especially if you take other medications.

Nicotinic Acid

Nicotinic acid or niacin, the water-soluble B vitamin, improves all lipoproteins when given in doses well above the vitamin requirement. Nicotinic acid lowers total cholesterol, LDL-cholesterol, and triglyceride levels, while raising HDL-cholesterol levels. There are two types of nicotinic acid: immediate release and timed release. Most experts recommend starting with the immediate-release form; discuss with your doctor which type is best for you. Nicotinic acid is inexpensive and widely accessible to patients without a prescription but must not be used for cholesterol lowering without the monitoring of a physician because of the potential side effects. (Nicotinamide, another form of the vitamin niacin, does not lower cholesterol levels and should not be used in the place of nicotinic acid.)

All patients taking nicotinic acid to lower serum cholesterol should be closely monitored by their doctor to avoid complications from this medication. Self-medication with nicotinic acid should definitely be avoided because of the possibility of missing a serious side effect if not under a doctor's care.

Patients on nicotinic acid are usually started on low daily doses and gradually increased to an average daily dose of 1.5 to 3 grams per day.

Nicotinic acid reduces LDL-cholesterol levels by 10 to 20 percent, reduces triglycerides by 20 to 50 percent, and raises HDL-cholesterol by 15 to 35 percent.

A common and troublesome side effect of nicotinic acid is flushing or hot flashes, which are the result of the widening of blood vessels. Most patients develop a tolerance to flushing, and in some patients, it can be decreased by taking the drug during or after meals or by the use of aspirin or other similar medications prescribed by your doctor. The effect of high blood pressure

medicines may also be increased while you are on niacin. If you are taking high blood pressure medication, it is important to set up a blood pressure monitoring system while you are getting used to your new niacin regimen.

A variety of gastrointestinal symptoms including nausea, indigestion, gas, vomiting, diarrhea, and the activation of peptic ulcers have been seen with the use of nicotinic acid. Three other major adverse effects include liver problems, gout, and high blood sugar. Risk of the latter three increases as the dose of nicotinic acid is increased. Your doctor will probably not prescribe this medicine for you if you have diabetes, because of the effect on your blood sugar.

Other Drugs

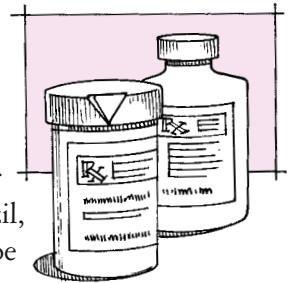
Fibrates

The cholesterol-lowering drugs called fibrates are primarily effective in lowering triglycerides and, to a lesser extent, in increasing HDL-cholesterol levels. Gemfibrozil, the fibrate most widely used in the United States, can be very effective for patients with high triglyceride levels.

However, it is not very effective for lowering LDL-cholesterol. As a result, it is used less often than other drugs in patients with CHD for whom LDL-cholesterol lowering is the main goal of treatment. Gemfibrozil therapy by itself is not recommended by the Food and Drug Administration for patients with CHD.

Fibrates are usually given in two daily doses 30 minutes before the morning and evening meals. The reductions in triglycerides generally are in the range of 20 to 50 percent with increases in HDL-cholesterol of 10 to 15 percent.

Fibrates are generally well tolerated by most patients. Gastrointestinal complaints are the most common side effect and fibrates appear to increase the likelihood of developing cholesterol gallstones. Fibrates can increase the effect of medications that thin the blood, and this should be monitored closely by your physician.



Hormone Replacement Therapy

The risk of CHD is increased in postmenopausal women, whether the menopause is natural, surgical, or premature. This increasing risk may be related to the loss of estrogens after menopause. Hormone replacement therapy (HRT) is treatment with estrogen, either alone or with another hormone called progestin. HRT may be prescribed when women experience symptoms from menopause.

HRT can be given in many different forms and amounts. Your doctor will help you select the best form for you.

A recent study called the Postmenopausal Estrogen/Progestin Interventions (PEPI) Trial looked at whether estrogen acts on some of the factors that define a woman's risk of heart disease. Results from the PEPI study showed that:

- Estrogen-only therapy raises the level of HDL-cholesterol.
- Combined estrogen-progestin therapies also increased HDL levels, although less than estrogen alone.
- All of the hormone regimens decreased the level of LDL-cholesterol about equally well.
- None of the hormone regimens caused a significant weight gain.
- All of the hormone regimens caused a rise in triglyceride levels.

In postmenopausal women with CHD, HRT can play a role in improving LDL- and HDL-cholesterol levels.

Combination Drug Therapy

If your goal LDL level is not reached after 3 months with a single drug, your doctor may consider starting a second medicine to go with it. Combination therapy can increase your cholesterol lowering, reversing or slowing the advance of atherosclerosis and further decreasing the chance of a heart attack or death. The use of low doses of each medicine may help reduce the side effects of the drugs.

OTHER MEDICATIONS COMMONLY PRESCRIBED FOR CHD

In addition to cholesterol lowering and control of the other risk factors, there are other treatments to help lower your risk from CHD. Aspirin, a drug that has been used for centuries to relieve pain and reduce fever, has been shown to reduce the risk of future heart attacks in patients who have already had one. Aspirin seems to work by reducing the stickiness of the platelets (the cells that cause blood clotting) so that blood clots do not form as readily. After bypass surgery, patients treated with aspirin have fewer early closures of the newly grafted blood vessels in their hearts.

Beta-blockers, another type of drug, have been shown to reduce death rates in patients who have CHD. Beta-blockers slow the heart and make it beat with less contracting force—so blood pressure drops and the heart works less hard.

Many patients with CHD have high blood pressure. Other drugs in addition to beta-blockers may be needed to reach a normal blood pressure.

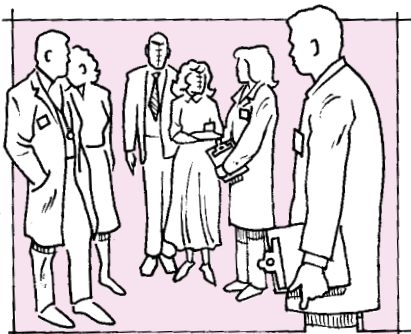
The amount of risk reduction shown by aspirin and beta-blockers is similar to that of cholesterol lowering, making all three important in the treatment of heart disease.

NEXT STEPS

Talk to Your Doctor—Be Part of Your Health Care Team

There are two key people in your health care team, you and your doctor. You are just as important as your doctor in directing your health care. Only you know how you feel, what you are doing or not doing to improve your health, what you expect from your health, and any difficulties you may be having. It is important for you to tell your doctor these things so he or she can recommend the best treatment.

The first step you should take in becoming an active member of your health care team is to understand what you are being treated for and why. Continue to ask questions until you understand the answer.



It is important for you to understand your coronary heart disease, the special diet you are on, medicines you may be taking, and the tests needed to follow your progress. Ask about the benefits of medications as well as possible side effects. If you are aware of possible side effects of a treatment, you will be able to manage them better. (See suggestions for remembering your medicine on page 30.)

By paying attention to your health and maintaining your own records, you will become an active decision maker in your health care. (See cholesterol-monitoring log on page 31.)

Get Support

In addition to your doctor, other health professionals can help you control your blood cholesterol levels. These persons include:

- Registered nurses (RNs) can explain your treatment plan to you, show you how to take your medication, and help you find other sources of information and help. As the health care provider you see the most, nurses are a key resource when you are lowering your cholesterol.
- Registered dietitians (RDs) or qualified nutritionists can explain food plans, show you how to make changes in what you eat, and give you advice on shopping for and preparing foods and eating out. They also can help you set goals for changing the way you eat, so you can successfully lower your high blood cholesterol without making big changes all at once in your eating habits or in your lifestyle. Information on how to find a dietitian in your area can be found on page 33.
- Lipid specialists are doctors who are experts in treating high blood cholesterol and similar conditions. You may be referred to a lipid specialist if the treatment your doctor is prescribing does not successfully lower your blood cholesterol levels.
- Pharmacists are aware of the best ways to take medicines to lessen side effects and of the latest research on drugs. They can help you stay on your drug treatment program.

Many people need help while making changes in life habits to reduce their risk; do not be afraid to ask for help from family, friends, and your health

care team. Involve your spouse, family members, or significant others in your treatment plan. By sharing your problem and the importance of cholesterol-lowering goals (LDL of 100 mg/dL or less), your current treatment plan, and your medication schedule, you can get the help you need to succeed in controlling your cholesterol and lowering your risk.

Long-Term Monitoring

Because you have CHD you will need to monitor your cholesterol and other risk factors for the rest of your life. By discussing your monitoring plan with your health care provider, both you and your physician will be more likely to stick to this plan. Several helpful hints are provided in the box below to help you avoid relapsing to a less healthy lifestyle. If you have a specific problem that is not listed here, discuss it with your doctor, nurse, or dietitian.

Helpful Hints To Monitor Your New Lifestyle

1. Record your test results at each visit.
2. Set realistic short-term goals and write them down.
3. Review your goals during each visit with your health care provider.
4. Share your goals with your family and friends. Support is often the key to success.
5. If you find yourself unable to keep to your plan, write down all of the reasons that you think are responsible. Next, write down what alternatives you have if that situation happens again. If you prepare an alternate strategy in advance, you are more likely to stick to your plan and reach your goals.

When setting your goals with your health care provider, remember the target cholesterol level for persons with CHD:

LDL-cholesterol: 100 mg/dL or lower

In addition, since a low HDL-cholesterol level increases CHD risk, patients with CHD should aim to have an HDL-cholesterol higher than 35 mg/dL.

Maintaining Healthy Behaviors and Overcoming Relapse

Question: My last cholesterol level was within my goal. Does that mean I do not have to worry about my cholesterol any more?

Answer: High cholesterol and heart disease are not cured but are only controlled by diet and drug therapy. Stopping your treatment quickly returns your cholesterol to the level that existed before therapy was started.

The goal of diet, physical activity, weight loss, and medicine is to keep your blood cholesterol under control. A slowing in the progression or a regression of atherosclerotic plaque in your coronary arteries is likely to be seen after 1 to 2 years of intensive cholesterol lowering. These observations support the need to continue cholesterol-lowering therapy for years. It seems that maximum benefit is achieved only if therapy is sustained for the rest of your life.

Many people find lifelong changes in diet and activity difficult to manage. It is important to remember that because you may not always stick with your new diet or exercise plan, you are not a failure—just human. The most important part of your new healthy lifestyle is learning how to overcome these challenges and quickly return to your goal.

Eat Right at Social Events

Eating at social events like parties, receptions, family gatherings, and church socials can be a challenge to your heart-healthy eating style. Since you can't control what is served, you may feel pressured to eat foods high in saturated fat and cholesterol.

Here are some tips that will help you eat healthfully at social events:

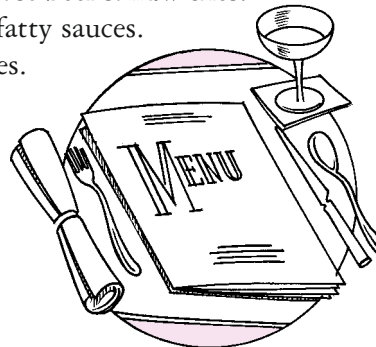
- At a buffet, look ahead in line to see what low-fat foods are available. Fill up on low-fat items and take only small servings of high-fat foods.
- Bring a low-fat dish to a potluck dinner. That way, you'll have at least one low-fat item from which to choose.
- At parties, focus on activities other than eating. Sit away from the area where the food is being served so you won't be tempted to overeat.

- Ask for help from your family and friends who know you are following a cholesterol-lowering diet. See if they will include some low-fat dishes on the menu.
- Have a few ready answers to politely say no to high-fat foods. For example, “Thank you, but I couldn’t eat another bite—everything was delicious.”
- If you do eat too many high-fat foods at a social event, don’t feel guilty. Just eat lightly the next day and get back on track.

Eating Out

Are you a smart customer when eating out? You will be if you follow these tips:

- Choose restaurants that have low-fat, low-cholesterol menu choices. And don’t be afraid to make special requests—it’s your right as a paying customer.
- Control serving sizes by asking for a small serving, sharing a dish with a companion, or taking some home.
- Ask that gravy, butter, rich sauces, and salad dressing be served on the side. That way, you can control the amount you eat.
- Ask to substitute a salad or baked potato for chips, fries, or other extras—or just ask that the extras be left off your plate.
- When ordering pizza, order vegetable toppings like green pepper, onions, and mushrooms instead of meat toppings or extra cheese. To make your pizza even lower in fat and saturated fat, order it with half the cheese or no cheese.
- At fast-food restaurants, go for salads, grilled (not fried or breaded) chicken sandwiches, regular-sized hamburgers, or roast beef sandwiches. Go easy on the regular salad dressings and fatty sauces. Limit jumbo or deluxe burgers or sandwiches.



How To Stay on Your Cholesterol-Lowering Medication

The first step to staying on your medication is understanding what you are taking and why.

- Ask your doctor what you are being treated for and how each medicine helps.

For example: If you are taking a statin, you should know that is for lowering your LDL-cholesterol to lower your heart disease risk.

- Know the side effects of any medications you are taking. You can find this out by asking your doctor or pharmacist.
- Ask your doctor how your medicine works with your other medications and the foods you eat.

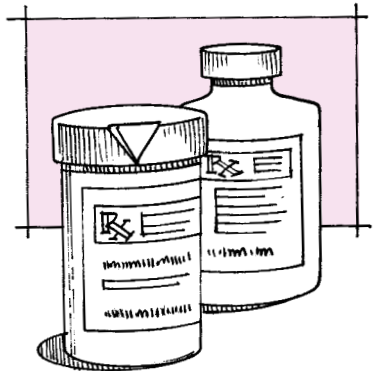
For example: Some medicines work best if you take them with food, and others work best if you take them at bedtime.

- Ask your doctor what to do if you miss a dose of medicine or have problems with side effects. It is important that you keep your doctor informed of how the medicine is working for you. It may be useful to ask your doctor for help in completing a chart on all of your medicines that includes the name of the medication, what the medication is being taken for, when to take it, what side effects to watch for, and whom to call if you should have a problem.

Remembering to take your medicine is important. Daily reminders are often helpful when scheduling your medication doses. Try to time taking your medicine around activities that you do daily such as setting your alarm clock, brushing your teeth, eating your meals, going to work, or doing other daily activities.

Other ways to help yourself remember to take your medicine could be:

- Setting your watch alarm to go off when it's time to take your medicine
- Placing a reminder card in a visible place
- Having a family member or a friend remind you



- Use a medication box that will hold your entire day’s supply of medicine. This will let you know if you missed a dose of medicine.

If you have tried these tricks and still have trouble remembering your medicine, talk to your doctor or pharmacist. It may be possible to simplify your medication schedule or to put your medicine in special containers called blister packs to help you.

Cholesterol-Monitoring Log						
Date	Medication Name	Dose	LDL-Cholesterol	Total Cholesterol	HDL-Cholesterol	Triglycerides

QUESTIONS YOU MAY BE WONDERING ABOUT

Do I need to worry about lowering my blood cholesterol now that I’m over 70?

A recent study (4S) showed that cholesterol lowering in older patients with CHD significantly reduced the risk for heart attacks and deaths from CHD and prolonged the lives of study participants, just as it did in middle-aged patients. Older Americans who have CHD should lower their LDL-cholesterol levels to reduce the risk of having a future heart attack. They should also reduce other cardiovascular risk factors by not smoking and controlling high blood pressure.

Should I be concerned about my child’s blood cholesterol?

Children from families in which a parent or grandparent has developed heart disease at an early age (before age 55 in father or grandfather, or before age 65 in mother or grandmother) should have their cholesterol levels tested. If a child from such a “high-risk” family has a cholesterol level that is high, it should be lowered under medical supervision, primarily with diet. By follow-

ing a low-saturated fat and low-cholesterol eating pattern, by being physically active, and by avoiding obesity, even healthy children can lower their risk of developing heart disease as adults.

How useful is it to know my cholesterol ratio?

Although the cholesterol ratio can be a useful predictor of heart disease risk, especially in the elderly, it is more important for treatment purposes to know the value for each level separately because both LDL- and HDL-cholesterol separately affect your risk of heart disease and the levels of both may need to be improved by treatment. If you have LDL-cholesterol above 100 mg/dL, lowering your LDL-cholesterol is the main goal of treatment. Your doctor will, however, also consider your HDL when deciding on treatments and goals. The ratio is useful if it helps you and your doctor keep the entire picture of your LDL and HDL levels in mind, but it should not take the place of knowing your separate LDL and HDL levels.

What if I need heart surgery?

Bypass surgery or balloon angioplasty will improve the blood supply to the heart, but it does not mean you can ignore your cholesterol level or the other CHD risk factors. Even though surgery restores blood flow in the heart, poor life habits will clog your new arteries even faster than they clogged your old ones. So pay attention to your risk factors especially after surgery. Trying to lower LDL-cholesterol to about 100 mg/dL or less is an important goal for CHD patients. Many patients who have bypass surgery or balloon angioplasty have not actually had a heart attack. Cholesterol-lowering treatment in these patients is very important to lessen the chances of a future heart attack.

What if I have the warning signs of a heart attack?

If you have coronary heart disease, you should know the symptoms of a heart attack so that you can get immediate medical help. The most common symptoms are:

- Uncomfortable pressure, fullness, squeezing or pain in the center of the chest that lasts more than a few minutes, or goes away and comes back.
- Pain that spreads from the chest to the shoulders, jaw, or arms.
- Chest discomfort with lightheadedness, fainting, sweating, nausea, or shortness of breath.

These symptoms may be severe from the start, or they may be mild at first, then gradually worsen. In some people, the warning symptoms come and go.

If you experience any symptoms of a heart attack, get medical help immediately. Be sure you know the phone number so you can get emergency transportation to the hospital. If you are having a heart attack, getting to the hospital fast is very important. Medical treatment, including clot-dissolving medicine, can save lives and reduce damage to the heart muscle, but only if it is started very soon after a heart attack occurs.

Talk with your doctor about the symptoms of a heart attack and what to do if you experience them.

GET MORE INFORMATION

The National Cholesterol Education Program (NCEP), coordinated by the National Heart, Lung, and Blood Institute (NHLBI), has a pamphlet called *Step by Step: Eating To Lower Your High Blood Cholesterol*. This pamphlet gives details on how to change your eating habits in order to lower your blood cholesterol levels. The NCEP also has booklets for children with high blood cholesterol levels and their parents. In addition, the NHLBI has a booklet, *Exercise and Your Heart: A Guide to Physical Activity*. To receive these publications please see the Government Printing Office (GPO) order form on page 34. The NHLBI can also provide you with the names of additional agencies and organizations able to answer questions on cholesterol and the other risk factors for heart disease. To obtain this information please write to:

NHLBI Information Center
P.O. Box 30105
Bethesda, MD 20824-0105

The American Heart Association can also provide you with additional information. Contact your local American Heart Association or call 1-800-AHA-USA1 (1-800-242-8721).

To find a registered dietitian contact:

The National Center for Nutrition and Dietetics' Consumer Nutrition
Hotline 1-800-366-1655



National Heart, Lung, and Blood Institute Order Form

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