

# HEART DISEASE AND STROKE (CARDIOVASCULAR DISEASE)

PAGE 1

## Patient Information Fact Sheet

Cardiovascular disease, or CVD, (which includes heart disease and stroke) is a major cause of death and illness in the U.S. Important risk factors include obesity, high blood cholesterol level, high blood pressure, and type 2 diabetes. CVD is also largely preventable. Although death rates from CVD are falling, it is still a major cause of premature death. According to the American Heart Association, cardiovascular disease claimed the lives of over 800,000 people in 2006, representing 29% of all deaths in the U.S. Estimates for the year 2006 are that 81,100,000 people in the United States had one or more forms of cardiovascular disease.

### What is CVD?

There are two main events that lead to CVD. The first of these is the process called atherosclerosis, which causes narrowing of the blood vessels. It happens when a type of fat in the blood called low density lipoprotein cholesterol (LDL cholesterol) accumulates and also oxidizes (becomes damaged) in the vessel walls. The walls of the blood vessel become thicker because of an overgrowth of wall tissue and an accumulation of blood clot material, forming a hardened plaque. This leads to a reduced flow of blood to the heart and may cause chest pain (angina), particularly during exercise.

The second event is called thrombosis. This is when a large blood clot forms in the vessel, sometimes as a result of the rupture of an atherosclerotic plaque, if it stops the blood supply from reaching the heart this is a heart attack. If it stops the blood supply from reaching the brain, this is a stroke. Blood clots form when cells in the blood called platelets stick together. Certain dietary factors can increase or decrease this tendency. For example, eating oily fish (e.g., salmon, mackerel, sardines, herring) regularly (e.g. once a week) can reduce the risk.

### What is cholesterol?

Cholesterol is a type of fat that is essential for the body in small amounts. It is produced in the liver and some is also obtained from the diet. It is a constituent of cells in the body, such as brain cells. Cholesterol is carried around the body in the blood by particles called lipoproteins (for example low-density lipoprotein, LDL, and high-density lipoprotein, HDL). LDL is also often called “bad cholesterol” because high levels of LDL in the blood promote the accumulation of fat in the vessel walls. HDL is often called “good cholesterol” because it retrieves cholesterol from body’s tissues and helps to transfer it to the liver for elimination. The level of cholesterol in the blood depends partly on genetic factors but diet is also very important.



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## What are the risk factors for CVD?

A large number of factors are associated with increased risk of CVD. Some of these risk factors are nonmodifiable, for example being male or older, or having a family history of the disease or possibly having been a low-birth-weight baby. Other risk factors are related to behavior and lifestyle (e.g., a poor diet, lack of physical activity, excessive alcohol consumption, smoking) and they can be changed. These risk factors include obesity, type 2 diabetes, high blood pressure, and high cholesterol. Controlling these risk factors is particularly important for those people who have nonmodifiable risk factors, such as a family history of heart disease. The risk factors interact with each other and their effect is cumulative.

Obesity is an important risk factor for CVD. Obese people tend to have increased levels of blood cholesterol, high blood pressure, and an increased risk of diabetes. Having fat deposited around the waist (“apple shaped” or central obesity), rather than the hips and thighs, is also an important risk factor for CVD. It is easier for the fat around the waist to have access to the blood supply of the liver. The fat then decreases the sensitivity of the liver to insulin (which is associated with the development of type 2 diabetes) and increases the production of very low-density lipoprotein cholesterol (VLDL cholesterol) (a risk factor for CVD). A simple way to measure whether you are ‘apple shaped’ or not, is to measure your waist circumference. It should be less than 37 inches (94 cm) in men and less than 32 inches (80 cm) in women.

People with high blood pressure (or hypertension) have a greater risk of getting CVD and stroke. Blood pressure is often elevated in people who are obese, drink too much alcohol, perform little or no exercise, and those who smoke. Eating lots of salt (sodium chloride) can also increase the blood pressure in people who are susceptible to a high sodium intake. Current intake of salt in the U.S. averages 3.7 grams per day. It is recommended that we reduce our intake to 2.3 grams per day for healthy individuals and 1.5 grams per day for those who have or are at risk for high blood pressure. Other dietary factors are important too, such as eating plenty of fruit and vegetables (for potassium) and low fat dairy products (for calcium).

Some people suffer from a number of heart disease risk factors simultaneously and may be diagnosed with Syndrome X (or metabolic syndrome). This is a term used to describe a group of heart disease risk factors, including obesity (high levels of abdominal fat), high blood lipid levels (cholesterol and triglycerides), high blood pressure, and abnormal glucose metabolism. Syndrome X is extremely concerning because it often precedes the onset of diabetes and increases the likelihood of developing CVD.



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**Fat and CVD risk.** Blood cholesterol level is affected more by the amount and type of fat in the diet than the amount of dietary cholesterol. A high intake of saturated fat, and fat of all types, can increase the amount of cholesterol produced in the liver and hence the amount in the blood. This increases the risk of CVD. The major sources of saturated fat in the U.S. diet include cheese, beef, milk, oils, ice cream, cakes, cookies, doughnuts, butter, dressings, mayonnaise, poultry, margarine, sausage, potato chips, yeast bread, and eggs. Dietary cholesterol has a weaker effect on blood cholesterol levels. Cholesterol is found only in foods of animal origin. Liver, egg yolk and shellfish are the major sources of dietary cholesterol but red meats, poultry (especially the skin), whole milk and cheese also contribute to the cholesterol content of the diet. For most people, monitoring dietary cholesterol intake is much less important than reducing saturated fat intake.

Trans fatty acids are produced during the hydrogenation (or hardening) process whereby oils are used to make margarines. These fatty acids can raise blood LDL-cholesterol levels and high intakes can increase the risk of heart disease. The main dietary sources are hard margarine and foods made using this type of fat, such as many processed baked goods. Replacing saturated fat in the diet with either monounsaturated fatty acids or polyunsaturated fatty acids can lower LDL-cholesterol levels. Monounsaturates, found for example in olive oil, rapeseed oil, meat, and meat products, cereal products and dairy products may have additional benefits in terms of heart disease.

The type of polyunsaturated fatty acid found in oily fish (omega 3 or n-3 fatty acids) does not affect blood cholesterol levels but may protect against heart disease in other ways. When a heart attack occurs, the blood supply to the heart has usually been cut off by a blood clot (thrombus). The stickiness of the blood is thought to be less in people who eat oily fish such as salmon, mackerel and herring regularly. This is because oily fish contains long chain polyunsaturated fatty acids (n-3 or omega 3 fatty acids), which makes the blood less viscous (thinner) and therefore less likely to form a clot. These types of fatty acids also seem to protect against abnormal heart beats (arrhythmias).

**Other dietary factors and CVD risk.** Soluble fiber is a type of fiber found in foods such as whole grains, fruits, vegetables, beans and legumes. It has been shown to reduce blood cholesterol levels by reducing the amount of cholesterol absorbed from the intestine. It may therefore help reduce the risk of CVD. Another type of dietary fiber called resistant starch may also reduce the risk of CVD. Resistant starch is a type of starch that resists digestion to its component sugar, glucose, in the small intestine and passes unchanged into the large intestine. Here, resistant starch is fermented by gut bacteria producing short chain fatty acids. It is these short chain fatty acids that may help reduce blood cholesterol levels. Some foods rich in resistant starch are whole or partly milled grains



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and seeds, beans, and some breakfast cereals. Soy protein (more than 25g/day), included in a diet low in saturated fat, has been shown to reduce blood cholesterol concentrations.

There are also some “cholesterol-lowering spreads” on the market that contain plant stanols/sterols. These can help reduce the level of blood cholesterol if used as a part of a healthy balanced diet. Research has shown that people consuming a diet rich in whole-grain cereals (eg, whole-wheat cereals, whole grain bread, and brown rice) have significantly lower rates of CHD. Whole-grain cereals contain a number of components that may contribute to a reduced risk of heart disease, such as vitamin E and dietary fiber. They also contain resistant starch (see above) and oligosaccharides that are fermented by intestinal bacteria to short chain fatty acids that may help reduce blood cholesterol, as well as plant sterols that may also have cholesterol lowering effects.

Recent research has indicated that residents of countries with high rates of heart disease have low body levels of **antioxidant vitamins and minerals**. It has been suggested that vitamin C, beta carotene and vitamin E may offer some protection against coronary heart disease by preventing free radicals from damaging arteries and the cells that repair such damage. However, more research is needed into their role in helping to prevent CVD before dietary recommendations (in this respect) can be made. However, there is good evidence that eating plenty of fruit and vegetables is protective. Finally, several studies indicate that middle-aged and older people who regularly drink small amounts of alcohol (1–2 units/day) are at lower risk of CVD than non-drinkers. Much of this effect has been attributed to an increase in “good” (HDL) cholesterol, although drinking moderate amounts of alcohol may also influence several other CHD risk factors. Heavy drinking, however, can increase the risk of heart disease and stroke.

### What can we do to reduce the risk of CVD?

As CVD is the leading cause of death in the U.S., more attention should be paid to prevention of the disease. Prevention is important for everyone but particularly for people with many risk factors. Recommendations for all people include:

- Maintain a healthy body weight (BMI, or body mass index, of 20–25kg/m<sup>2</sup>)
- Keep physically active
- Eat a healthy and varied diet of less fat and fatty foods.
- Use vegetable oil that is high in unsaturated fat in cooking, but only in small amounts, e.g., olive oil or rapeseed oil.
- Eat more fruits and vegetables--at least 5 portions a day.



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- Eat more starchy foods, such as potatoes, rice, pasta, bread and breakfast cereals.
- Choose high fiber, whole-grain products.
- Eat fish at least twice a week, of which one portion should be oily fish.
- Choose lean meat, poultry, beans, and alternatives instead of fatty meat or meat products.
- Choose low-fat dairy foods, like skim and low-fat milk or low-fat yogurt.
- Choose low-salt products and use less salt in cooking.
- If you drink alcohol, do so moderately. The guidelines for safe consumption are no more than 3-4 units per day for men and 2-3 units per day for women.

### Further information

American Heart Association: [www.americanheart.org](http://www.americanheart.org)

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