

# CHOLESTEROL

### What is cholesterol?

Cholesterol is a waxy, fat-like substance (a lipid). Although we are often warned of the dangers of cholesterol, we can't survive without it. It is essential to the body's cell membranes, to the insulation of nerves and to the production of certain hormones. It is also used by the liver to make bile acids, which help digest your food.

### Cholesterol lowering eating plan

High blood cholesterol is a "risk factor" for heart disease. That means that having high blood cholesterol increases your chance (risk) of getting heart disease. The higher your cholesterol level, the greater your chances of dying of cardiovascular disease.

You can lower your risk of cardiovascular disease by lowering your cholesterol level.

### Good and bad cholesterol

Two specific kinds of blood cholesterol are called low density lipoproteins (LDL) and high density lipoproteins (HDL). LDL-cholesterol, sometimes called "bad" cholesterol, causes cholesterol to build up in the walls of arteries. Thus, the more LDL in the blood, the greater the heart disease risk. In contrast, HDL-cholesterol, or "good" cholesterol, helps the body get rid of the cholesterol in the blood. Thus, if levels of HDL are high, the risk of heart disease decreases.

### Atherosclerosis

Atherosclerosis is a silent, painless process in which cholesterol-containing fatty deposits (plaques) accumulate on the walls of arteries. Cholesterol plays a significant role in the development of narrowed or blocked arteries. Reduced flow to the coronary (heart) arteries, can lead to chest pain (angina pectoris). If the flow of blood to a part of the heart is stopped, you'll have a heart attack. If blood flow to a part of your brain stops, you'll have a stroke.

### What Causes High (or Elevated) Cholesterol?

This may result from many causes, such as genetics, various disease states, lifestyle choices and diet.

Diets high in cholesterol and saturated fat can increase blood cholesterol levels. Saturated fats mainly from meat and dairy products and can raise blood cholesterol. These increase the risk of atherosclerosis (hardening of the arteries). Unsaturated fat does not raise blood cholesterol and can sometimes even lower cholesterol. Kidney, liver and immune system diseases and stress-related conditions are associated with abnormal lipid conditions. Both heredity and diet have a significant influence on your LDL, HDL and total cholesterol levels.

One in every 500 adults has an inherited abnormality in the way they process LDL cholesterol. They have high blood cholesterol even with diet with only average fat intake.

### So You Have High Cholesterol. Now What?

Most people start to cut down on foods with a high cholesterol content immediately. But restricting cholesterol intake alone is not enough to lower blood cholesterol levels. A truly effective cholesterol lowering diet is one where total fat is restricted, has the right balance of the three types of fat namely, saturated, poly-unsaturated and mono-unsaturated fat, is high in soluble fibre and also includes enough of certain vitamins.

### Ways To Reduce Total Fat Intake

Choose foods that have a low fat content where possible – not more than 30% of the total kilojoules should come from fat. To calculate this, multiply the grams of fat by 38 and divide this by the total kilojoules. Multiply by 100 to reach a percentage. Limit how much concentrated fat you eat such as oil and margarine. Avoid frying food – rather grill, bake, steam, poach, microwave or boil it.

Saturated fat increases blood cholesterol levels to a far greater extent than the actual cholesterol content of foods. We recommend that less than one third of your total daily fat intake should be saturated fat, more or less one third poly-unsaturated fat and the rest mono-unsaturated fat. The easiest way to do this is to eat saturated fat only once a day or at either breakfast or lunch or supper (see example menus).

### Other Ways To Lower Saturated Fat Intake

- Eat small portions of meat and chicken, and fill up on grains and vegetables.
- Remove the visible fat from meat and the skin from chicken before cooking.
- Eat fish more often than red meat or chicken.
- Eat avocado on bread rather than cheese.
- Use fat-free rather than full-cream or even low-fat dairy products.
- Check food labels for ingredients containing saturated fat.

### Vital Vitamins

Certain vitamins play an important role in reducing the risk of heart disease. These vitamins, called anti-oxidant vitamins (Vitamin C, E and beta carotene), reduce fatty build up in the arteries. Eat more Vitamin C-rich foods such as citrus fruits, tomatoes, strawberries, cabbage, red and green pepper, guavas, Brussel sprouts, broccoli, sweet potatoes, sweet melon and kiwi fruit. Beta-carotene-rich foods are mangoes, dried peaches and apricots, spanspek, nectarines, carrots, sweet potatoes, spinach and broccoli. Vitamin E-rich foods include wheat germ, sunflower seeds and oil, soya bean oil, soya beans, canola and soft margarine, maize, maize oil, toasted almonds and hazel nuts.

### Fabulous Fibre!

Soluble and insoluble fibre is not equally beneficial in reducing cholesterol levels. Soluble fibre lowers blood cholesterol levels and helps to reduce the body's production of cholesterol. Try to eat more soluble fibre-rich foods such as oats, oat bran, dried peas, beans and lentils, wheat bran, rye, barley, fruit and vegetables, especially apples, citrus fruit, carrots and strawberries (see example menus).

### Cholesterol Tests

All adults older than 20 should have a non-fasting total cholesterol and HDL measured at least once every three to five years. If the total cholesterol and HDL are abnormal, a full lipid profile, which measures fasting total cholesterol, HDL, LDL and triglycerides, is recommended.

If an underlying disease or medication is responsible for the abnormal cholesterol levels, this process should be corrected.

Cholesterol levels may vary slightly as a result of biological variation, thus, if your levels are abnormal, two measurements should be taken, one to eight weeks apart, and the values averaged to obtain an accurate baseline level.

### Treatment Of High (elevated) Cholesterol

Treatment decisions are based on two criteria:

1. The lipid (cholesterol) profile.
2. Cardiovascular risk factors.

### Cholesterol profile (mmol/l)

If total cholesterol is less than 5,0 mmol/l and HDL above 0,9 mmol/l, no treatment is needed, but you should still follow a prudent diet and have your total cholesterol and HDL checked every five years.

Treatment for moderate cholesterol profiles and LDL cholesterol levels greater than 3,0 mmol/l, includes reducing dietary fat and cholesterol, stopping cigarette smoking, regular exercise and weight loss.

Cholesterol-lowering medications are recommended for those with very high LDL cholesterol (greater than 5,0 mmol/l). These medications are also recommended for those with LDL cholesterol greater than 3,0 mmol/l and two or more coronary heart disease risk factors. Future heart attacks is recommended lower levels.

For patients with either angina or a prior heart attack, a more aggressive approach to prevent future heart attacks is recommended. Total blood and LDL cholesterol in these patients is treated at lower levels. Diet and exercise are recommended if the LDL is below 3,0 mmol/l, while drug therapy is recommended for LDL above 3,0 mmol/l.

The treatment goal is an LDL of less than 3,0 mmol/l, or a reduction in LDL of at least 45% in severe cases of individuals who do not reach this level.

### Cardiovascular Risk Factors

Consider other risk factors for cardiovascular disease when evaluating your cholesterol status. Each risk factor may influence your lipid levels. The more risk factors you have, in combination with undesirable lipid levels, the greater your risk of developing cardiovascular disease. Risk factors for cardiovascular disease are divided into those you can control and those you can't control. Factors you can control include cigarette smoking, high total and LDL cholesterol, low HDL cholesterol, high blood pressure, diabetes, being overweight or obese and being physically inactive.

Factors you can't control include age, gender or a family history of heart attacks or sudden death.

### Lifestyle Guidelines

You can make many lifestyle changes to decrease blood cholesterol, notably eating a diet low in saturated fat, total fat and cholesterol, and increasing the amount of fruit, vegetables, fish, whole grains and lean meat you eat, along with regular exercise.

Losing weight and stopping smoking are also important. Adopting good lifestyle habits won't only decrease your risk of disease from raised cholesterol, they can also help control high blood pressure and diabetes.

To be successful in controlling your cholesterol levels, you need to be committed to change your lifestyle and diet. If you are on medication, you should never stop taking it without checking with your doctor.

South Africa has one of the highest incidences of raised cholesterol and related diseases in the world. It is important that you stay well informed about your cholesterol levels and move towards a healthier, more energetic lifestyle.

### Example Menus

	Example menu 1	Example menu 2	Example menu 3
Breakfast	Brain-rich cereal with skim milk and sliced banana.	Oats with skim milk. Papaya.	Bran muffin with canola margarine and jam. Fat-free yogurt.
Mid-morning	Nectarine.	Orange.	Mango.
Lunch	Bread roll with avocado, tomato and lettuce.	Peanut butter sandwich.	Low-fat cheese and tomato sandwich on rye bread.
Mid-afternoon	Strawberries.	Apples.	Grapes.
Supper	Beef lasagne (lean mince), added oat bran, skim milk, low-fat cheese. Pumpkin and broccoli	Grilled skinless chicken. Samp and dried beans. Cabbage salad with low oil mayonnaise (egg free).	Grilled sole, baked potato with fat-free cream cheese. Carrot and pineapple salad. Creamed spinach (white sauce made with skim milk).

### Recommended Eating Plan

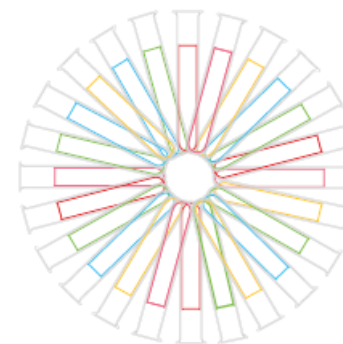
	Eat most often	Eat in moderation	Eat sparingly
Meat and meat Alternatives	Fish, soya.	Lean red meat, skinless poultry, lean bacon, game.	Fatty cuts of meats, processed meat, sausages, organ meat, shellfish, beef bil tong.
Dairy products and eggs	Skim or fat-free yogurt, fat-free or low-fat cottage cheese, fat-free cream cheese and egg whites.	Low fat milk, low-fat yogurt, low-fat buttermilk, low-fat evaporated milk, low-fat cheese (less than 15g fat per 100g), low-fat processed cheese, creamed cottage cheese and sorbet.	Full-cream milk, full-cream yogurt, condensed milk, cream and cream substitutes, coffee creamers, dairy blends, cream cheese, high-fat cheese, ice-cream and egg yolks.
Fruit and vegetables	Fresh, frozen or tinned vegetables, fresh or dried fruit, fruit tinned in natural juices.	Glazed fruit or fruit tinned in syrup.	Vegetable prepared in butter or cream sauces.
Starches	Pasta, rice, potatoes, mealies, samp, pearl wheat mealie rice, sweet potato, whole-wheat, brown and rye bread, high fibre breakfast cereals, oats, mealie meal, low-fat whole-wheat crackers, rye crackers, rice cakes, air popped popcorn, dried peas, beans and lentils.	Low-fat refined crackers, for example matzo, white bread, home-made baked products using unsaturated oils sparingly and no egg yolk, for example muffins and refined breakfast cereal.	Commercially baked products, for example, pies, pastries, cakes, tarts, croissants, doughnuts, high fat refined biscuits or crackers, buttered or commercial popcorn and muesli with coconut.

### Recommended Eating Plan

	Eat most often	Eat in moderation	Eat sparingly
Fats and oils		Unsaturated oils, eg. sunflower, canola, maize, soya, olive oil, soft margarine, low oil mayonnaise and salad dressing, olives, avocado, seeds e.g sunflower, sesame, nuts, e.g. pecan, cashew and peanut butter.	Palm kernel oil, coconut oil, coconut, coconut milk, lard, suet, cocoa butter, butter, hard margarine and mayonnaise.
Miscellaneous	Tea	Coffee, sugar and pretzels	French fries, crisps, chocolate sweets, cream soups and alcohol

### Types Of Fat

	Saturated fat	Poly-unsaturated fat	Mono-unsaturated
Animal origin	Red meat, pork, bacon, processed meat, organ meat, poultry, full-cream milk and yogurt, cream, cheese, butter, hard cheese, margarine, lard, suet and eggs.	Fish and fish oils.	
Plant origin	Coconut, coconut oil and Palm kernel oil	Sunflower and seeds, vegetable oils, for example, sunflower oil, soya bean oil and maize oil.	Avocado, olives, olive oil, canola oil, nuts and peanuts.
Other	Hardened or hydrogenated vegetable oils eg. vegetable fat, hardened or hydrogenated margarine, fish oils, biscuits, cakes, pie crusts, tarts, pastries, chocolate, coffee creamers, milk or dairy solids, ice cream, non-dairy cream substitutes and shortening.	Salad dressing made with sunflower oil and soft poly-unsaturated margarine.	Olive oil margarine, canola margarine and peanut butter.



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