

Management Strategies for Patients/Clients

What is cholesterol?

Cholesterol is a type of lipid or fat that is essential to the body. It plays a role in the manufacture of cells as well as hormone production. Our bodies produce cholesterol (two-thirds of the cholesterol in our bodies is manufactured by the liver), and we also obtain cholesterol from foods such as organ meats, butter, whole milk and eggs (yolks).

Normally, the blood contains a certain amount of lipids. However, an increase in the amount of lipids in the blood can accumulate on the walls of the arteries and increase the risk of heart attack or stroke.

What are “Good” and “Bad” Cholesterol?

Blood carries cholesterol to the cells, but since fatty substances do not mix with blood, cholesterol is carried by special carriers called “lipoproteins”. There are several types of lipoproteins, but the most important ones are low-density lipoproteins (LDL) and high-density lipoproteins (HDL). Low-density lipoproteins or LDL are often called “bad” cholesterol. Excess LDL cholesterol (LDL-c) in the blood can deposit on the inside of the walls of the arteries, including the arteries that feed the heart, and form atheromatous plaque. The plaque makes arteries narrower and decreases the passage of blood and oxygen. Atherosclerosis, or narrowing of the arteries, may lead to serious health problems, such as a heart attack or a stroke.

A high LDL cholesterol level may be due to various reasons. Some are genetic, whereas others are related to lifestyle, such as a lack of physical activity and/or a poor diet.

High density lipoproteins or HDL are considered to be “good” cholesterol. HDL helps carry LDL away from artery walls.

People with a high LDL levels and a low HDL levels are more at risk for developing cardiovascular diseases.

What are Triglycerides?

Triglycerides are a type of fat essential to the smooth functioning of the human body. They constitute the body’s main energy reserve and are stored in specialized tissues called “adipose tissues”. Triglycerides have some effect on heart disease, but the exact relationship is unknown. Research has found that a large number of people with heart disease have high triglyceride levels. High triglyceride levels are often associated with excess consumption of alcohol, excess weight or poorly controlled diabetes. As with cholesterol, it is important to monitor the blood’s triglyceride levels.

Why is it Important to Monitor Your Cholesterol Level?

It is important to have your cholesterol level checked on a regular basis. A high cholesterol level along with smoking, hypertension and/or diabetes, is one of the main cardiovascular disease risk factors, especially for heart attack and stroke.

If cholesterol levels are too high, plaque can build up on the inside of the walls of the arteries, including those that feed the heart. Over time this build-up can form atherosclerosis plaques or “narrowing of the arteries”. The arteries become narrowed and eventually block or slow down blood flow.

It is important to have your cholesterol and triglyceride levels checked on a regular basis because, even if they are too high, you will not have any symptoms. These levels should be checked regularly, starting at age 40 in men and at menopause, or age 50, in women. However, screening may be done earlier and more often if you have previously had heart problems, have a family history or have any other risk factors such as hypertension, diabetes or smoking.

How Can You Find Out What Your Cholesterol and Triglyceride Levels Are?

Your cholesterol and triglyceride levels can be determined from a blood test ordered by your doctor. The test results will help your doctor determine if further screening for lipid-related cardiovascular problems is needed.

The blood test will measure, among other things, your total blood cholesterol level, the ratio of the total cholesterol (TC) to high-density lipoproteins cholesterol (HDL-c), and the triglyceride (TG) level.

Target values for cholesterol and triglycerides will be determined as soon as treatment is initiated. Your doctor will determine the values that you should ideally achieve, given your other risk factors.

How Does One Maintain Balanced Cholesterol and Triglyceride Levels?

It is important to adopt a healthy lifestyle. Hyperlipidemia or a lipid (cholesterol or triglyceride) level that is too high, may be due to many factors including a diet that is too high in fat, a sedentary lifestyle or smoking.

If making lifestyle changes is not enough to bring the blood cholesterol levels back to target levels, drug treatment will be necessary.

Here is a summary of the different types of drugs used for lowering cholesterol levels:

- Statins are among the most prescribed drugs for lowering cholesterol levels. They are very effective for lowering LDL. They reduce the production of cholesterol in the liver.
- Fibrates are prescribed to lower the triglyceride level and increase the good cholesterol (HDL-c) level.

- Niacin (vitamin B) at high doses can reduce the triglyceride and LDL cholesterol levels while at the same time increasing the HDL cholesterol level. Very high doses of niacin are needed to lower cholesterol and should only be used when prescribed by a doctor.
- Resins have been used for a long time to reduce cholesterol levels. They work in the intestine to bind and remove cholesterol.
- Cholesterol absorption inhibitors are part of a new class of drugs that block the absorption of cholesterol in the small intestine. They may be used in combination with a statin to further lower LDL cholesterol levels in those patients where statin alone has failed to achieve target levels.

The effectiveness of cholesterol-lowering drugs varies from one individual to another. Your doctor will prescribe the one best suited to your health. If you have any questions or comments about your cholesterol medications, feel free to speak with your pharmacist.

How Does One Calculate the Level of Risk For Heart Disease?

It is true that the lipid (cholesterol and triglyceride) levels play a major role in the onset of cardiovascular disease. However, there are other risk factors to consider. The more risk factors and severity of these factors increase the risk of cardiovascular disease. The presence of a single risk factor, be it hypertension, diabetes, hypercholesterolemia or some other factor, will have determining effects on cardiovascular disease screening, treatment and monitoring.

A prediction table based on the Framingham Study is used to calculate your risk level. The table is used to determine the probability of developing heart disease over the next ten years:

Low:	Risk ≤ 10%
Moderate:	Risk of 11% to 19%
High:	Risk ≥ 20%

Framingham Study data can be used to fairly accurately determine target cholesterol levels, taking your risk factors into consideration:

Risk Categories and Target Lipid Levels

Risk Category	Target Levels		
	LDL-C mmol/L	Total Cholesterol: HDL-C ratio	APO-B g/L
High* 10-year risk > 20% or history of diabetes, chronic kidney disease or atherosclerotic disease	< 2.5 and	< 4	< 0.9
Moderate† 10-year risk 11 – 19 %	< 3.5 and	< 6	< 1.05
Low 10-year risk < 10%	< 4.5 and	< 6	< 1.2

A specific target for triglyceride levels is no longer recommended, however, the guidelines emphasize that a plasma triglyceride concentration of less than 1.7mmol/L is optimal.

Recommendations for the management of dyslipidemia and the prevention of cardiovascular disease; 2003 update. Jacques Genest, Jiri Frohlich, George Fodor and Ruth McPherson (the Working Group on Hypercholesterolemia and Other Dyslipidemias) CMAJ • October 28, 2003; 169 (9). Available on-line at <http://www.cmaj.ca/cgi/data/169/9/921/DC1/1> (pdf)

Feel free to ask your doctor or pharmacist for information that will further explain this method of risk assessment, its usefulness as well as its limitations and how to interpret it.

Once your doctor knows your blood lipid levels, he/she will be able to determine the target lipid levels that you should achieve or maintain to reduce your risk of cardiovascular disease, considering your own risk factors.

WHAT LIFESTYLE CHANGES CAN BE MADE TO REDUCE CARDIOVASCULAR DISEASE?

Eating a healthy diet, exercising, going outdoors, taking the time to see your friends and laughing are all surefire methods of reducing the risk of cardiovascular disease. A healthy lifestyle does contribute to preserving cardiovascular health. A healthy lifestyle also increases the chances of any drug treatment being successful. If you really want to maximize your chances to enjoy a healthy heart for a long time, it is advisable to make the following changes:

Limit alcohol consumption

In addition to significantly increasing your calorie intake, drinking alcoholic beverages can result in increased blood pressure. It is advisable to limit your consumption of alcohol to less than two drinks per day with weekly maximum of 9 standard drinks per week for women, and 14 standard drinks per week for men.

Stop Smoking

People who smoke have a cardiovascular disease rate 70% higher than people who do not smoke. Smoking reduces the good cholesterol (HDL) level. Before you stop smoking, discuss a cessation plan with your doctor or pharmacist in order to determine the best way for you to succeed. Remember, it takes most people several attempts before they quit for good, so don't be discouraged and keep trying!

If you are a woman and smoke, watch out for a particularly hazardous combination: smoking + oral contraceptives + age greater than 35 = increased risk of clots forming in your blood vessels!

Exercise

Physical activity can be very useful in controlling blood pressure, to say nothing of its benefits in obtaining and maintaining a healthy weight. Walking up the stairs instead of taking an elevator and walking instead of driving are a sure and simple start to good physical activity and performing these activities on a regular basis increases the good cholesterol level.

To derive maximum benefit from physical activity, you should perform about 30 minutes of activity per day on a regular basis. Before starting any strenuous activity program, check with your doctor for a program tailored to your needs and state of health.

Control your weight

People who are overweight have an increased risk of high blood pressure, high cholesterol and diabetes, all of which can increase the risk of cardiovascular disease. It is important to determine your healthy weight with the help of a health professional and to work to maintain it. Weight control goes hand in hand with making wise food choices and engaging in physical activity on a regular basis.

Improve your diet

A healthy, balanced nutrition plan is key to reducing the risk and treating cardiovascular disease. In the case of hypertension, simple eating habits may help maintain blood pressure at optimal levels:

- Reduce salt intake: do not put a salt shaker on the table, avoid canned and precooked foods, choose fresh and frozen foods and use herbs, spices lemon juice or garlic instead of salt.
- Eat fresh fruits and vegetables: foods high in potassium such as bananas, oranges, melons, kiwis, potatoes and tomatoes.
- Avoid sweets and high-fat foods: read the labels on food products closely to determine how much sugar and fat they contain.
- Incorporate fibre-rich foods into your daily meal plan.

If your cholesterol and triglyceride levels tend to be high, adopting the following eating habits may help:

- Cut down on the amount of meat by eating smaller portions of lean meats and fish more often (at least twice a week). Legumes (lentils, beans, chick peas) are a good meat substitute.
- Opt for low-fat dairy products.
- Use less butter and margarine.
- Choose monounsaturated (peanut, canola, olive, sunflower) and polyunsaturated (safflower, nut, corn, soy) fats and oils.
- Avoid eating too many eggs (no more than one per day) or eat egg whites, which are fat and cholesterol free.
- Avoid sweets and high-fat foods. Read the labels on food products closely to determine how much sugar and fat they contain.
- Eat more fresh fruits and vegetables.

ARE WOMEN AFFECTED BY CARDIOVASCULAR DISEASE IN THE SAME WAY AS MEN?

Current studies show that women differ from men with regard to screening, symptoms and the treatment of cardiovascular disease. It is still poorly understood why the profile differs between the sexes. Here are some hypotheses that have been put forward:

Women are NOT less likely to suffer from cardiovascular disease

It is still often believed that women are less susceptible than men to developing cardiovascular problems. As a result, there is less tendency to monitor women for certain risk factors. This is a false belief. According to the Heart and Stroke Foundation of Canada, more women die of cardiovascular disease than men. It is, in fact, the leading cause of death in women. Eight times more women die of cardiovascular disease than breast cancer. Furthermore, the number of heart attacks is on the rise in women in their 30s and 40s.

Women have different heart attack symptoms

It seems that symptoms in women differ from those in men. Symptoms experienced by women are more subtle and therefore more difficult to detect and consequently likely to be ignored longer causing more severe damage. Only 20% of women who have a heart attack say they experienced numbness in the left arm and intense chest pain, the classic symptoms of a heart attack in men. Instead, women seem to experience pain radiating up their necks, into the jaw or the back, sudden exhaustion, vague chest pain and nausea.

The Estrogen Factor

Up until menopause, women enjoy natural protection against cardiovascular disease, thanks to estrogen. Estrogen promotes good cholesterol and helps decrease bad cholesterol. But this protection only pushes back the deadline. As women get older, they become more susceptible than men to the risk of cardiovascular disease. Women tend to be older when they experience heart problems. Women who take estrogen containing medications by mouth may have increased triglycerides.

Women's Roles

Women play many different roles in their lives. Trying to balance all of this may take up a significant amount of time, the result being that women may not give enough attention to their own health needs. Women tend to see themselves as the caregivers and not the ones who need care.

Healthy Eating to Lower LDL Cholesterol

LIMIT	FOOD SOURCES	CHOOSE	FOOD SOURCES
<p>Animal Fats</p> <p>Contain cholesterol and saturated fat that can increase LDL cholesterol levels</p>	<p>Butter</p> <p>Fatty meats</p> <p>Poultry skin</p> <p>2% or whole milk</p> <p>Cream – sour, whipping</p> <p>Lard</p> <p>Processed meats</p> <p>Gravy</p> <p>Cheese</p>	<p>Mono-unsaturated and Omega-3 fat</p> <p>Improves healthy cholesterol (HDL)</p>	<p>Canola oil</p> <p>Peanut butter</p> <p>Seeds</p> <p>Fatty fish (salmon, sardines, tuna, herring, trout and mackerel)</p> <p>Olive oil</p> <p>Nuts</p> <p>Avocado</p>
<p>Saturated / Trans Fats</p> <p>Increase LDL cholesterol and risk for heart disease</p>	<p>Shortening</p> <p>Hydrogenated or partially hydrogenated oil</p> <p>Palm oil</p> <p>Coconut oil</p>	<p>Cholesterol-rich foods in moderation</p> <p>Some foods may be high in cholesterol, yet low in fat and high in nutrition</p>	<p>Egg yolks – 4 per week; unlimited egg whites</p> <p>Lean red meat – 3 – 4 times per week</p> <p>Shellfish – once per week</p> <p>Liver – once per month</p>
		<p>Soluble Fibre</p> <p>Eating more soluble fibre encourages your body to produce less cholesterol</p>	<p>Oat bran</p> <p>Oatmeal</p> <p>Oat-based cereals (Cheerios, Oat Squares, muesli)</p> <p>Barley</p> <p>Barley Flour</p> <p>Rye bread</p> <p>Rye Crackers</p> <p>Legumes (beans, split peas, lentils and chick peas)</p> <p>Fruits and vegetables</p> <p>Substitute peanut butter for margarine</p> <p>Sprinkle nuts and seeds on salads, cereal and yogurt</p> <p>Psyllium-containing cereal (1 – 2 tbsp All Bran Buds daily)</p>
		<p>Vegetables</p> <p>Excellent antioxidant benefit – the antioxidant vitamins in fruits and vegetables may help prevent LDL cholesterol in the blood from converting into artery-clogging plaque</p>	

	Recommendations	Benefits	Other
Physical Activity	<ul style="list-style-type: none"> Regular physical activity is an important aspect of good health for all people including those with dyslipidemia Any increase in physical activity is a good increase! Recommend increasing duration and intensity gradually to help avoid injury Consult with your doctor prior to initiating a strenuous (more exertion than moderate walking) exercise program Goal: be active for 30-45 minutes most days of the week Activity may include jogging, swimming, walking, cycling, or any other type of activity that appeals to you Note: higher intensities of activity are no more effective than moderate levels 	<ul style="list-style-type: none"> helps with weight loss / weight maintenance helps control blood glucose lowers the level of bad blood fats (LDL and TG's) increases the level of good blood fats (HDL) helps lower blood pressure decreases the risk for heart disease helps improve sleep quality increases circulation in the body improves wellbeing 	<ul style="list-style-type: none"> Important tips to prevent injury: <ul style="list-style-type: none"> ➤ start exercise with a gentle warm up or stretching session ➤ gradually increase the duration and intensity of exercise (start with 5 min per day and gradually increase to 30-45 min per day) ➤ finish with gentle stretching to help prevent muscle stiffness
Alcohol	<p>Canadian low risk drinking guidelines are appropriate for all lipid patients and include the following:</p> <ul style="list-style-type: none"> Limit alcohol consumption to < 2 standard servings per day Weekly consumption for men should not exceed 14 standard drinks Weekly consumption for women should not exceed 9 standard drinks 		<p>Important:</p> <p>If you have increased triglycerides, alcohol has a significant impact on increasing triglycerides even further. If triglyceride levels are above 8.0 mmol/L, consider abstinence due to the high risk of pancreatitis.</p>
Stress	<ul style="list-style-type: none"> If stress is a contributing factor to hypertension or may be an implicated factor, consider stress management interventions There are various approaches to stress management including: cognitive behavioral therapy, relaxation techniques, exercise, etc. Combination therapy is most likely to yield successful reductions in blood pressure 		
Smoking Cessation	<ul style="list-style-type: none"> Is essential for reducing cardiovascular risk in any individual with CV risks 		

Client Checklist for Dyslipidemia

What to expect to discuss at each office visit with your family physician:



	Monitor Cholesterol levels (you must fast for 12 – 14 hours)
	Review Medications
	Check Liver enzymes
	Discuss Cholesterol goals
	Measure weight
	Measure waist circumference
	Body Mass Index
	Discuss tobacco use
	Discuss alcohol use
	Discuss activity
	Review nutrition (i.e. low-fat, low cholesterol)

Tests & Measurements that should be done or discussed on a yearly basis, or as recommended by your health care team:



	Update family history
	Referral for further education (BHL)