

All You Need to Know About
Cholesterol



FOREWORD

Two out of five people in Malaysia do not know they have high cholesterol. This comprises of 38.6% or an estimated 7.8 million Malaysians. This high number is most likely attributed to high cholesterol not presenting any symptoms in the early stages. Without these warning signs or symptoms, coronary diseases are often referred to as a silent killer and detected only when an adverse event has happened.

In understanding the challenges faced by Malaysians in managing their cholesterol, Viatrix Malaysia collaborated with IJN to develop a practical handbook for cholesterol management. The development of this handbook aims to encourage more patient – doctor discussions around cholesterol management, as well as assist its readers in debunking myths around cholesterol, its management and treatment options.

This handbook includes information on the Malaysian health landscape, the relationship between cholesterol and cardiovascular diseases, insights on the function of statins, the most common myths associated with cholesterol and its treatment as well as common questions patients can ask their doctors.

With this guide, we hope to equip patients with the right knowledge and questions to ask their doctors about their health. This handbook aims to serve as a quick reference that will lead to correct diagnosis and plan of action.

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FOREWORD

Elevated presentation of cardiovascular diseases and, in specific, the incidences of hypercholesterolemia (high levels of blood cholesterol) is a matter of real concern in Malaysia. The National Health and Morbidity Survey 2019 reported 16.6% of Malaysians are currently living with high cholesterol levels and one in four of them are unaware of their condition¹. Hypercholesterolemia has been studied and is an established risk factors to developing cardiovascular conditions like heart attacks and strokes². As such, it is important to continue to invest in educational efforts to empower Malaysians towards the embodiment of health seeking behavior.

In efforts to address these gaps, Viatrix Malaysia has joined forces with IJN, the nation's largest independent cardiac center to develop this cholesterol management handbook. Thoughtfully and intentionally written, the handbook will focus on providing a clear understanding of the impact of cholesterol on matters related to the heart, breaking common myths and misconceptions of cholesterol while also sharing practical techniques for easy lifestyle modification among others. Through our joint efforts, we hope this informative handbook will allow patients and their caregivers to make joint decisions with their doctors on all matters related to their heart.

At Viatrix, we are committed to relieve the burden of NCDs by delivering healthcare solutions that extend beyond medicines. By working together with our trusted partner, we aim to provide high-quality educational resources that help to support health promotion, disease prevention, and healthy aging within our community. We hope you find this handbook beneficial and it helps you in your journey to a healthier life.

Dr Gayatri Gunasagaran

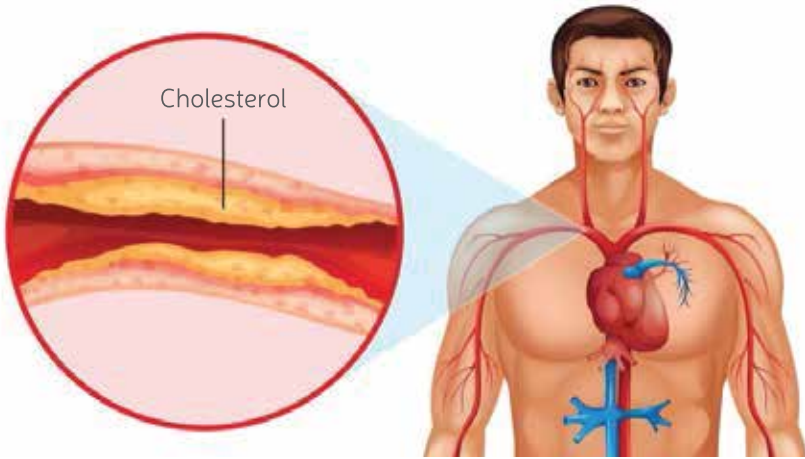
Country Medical Lead,
Upjohn (Malaysia) Sdn Bhd (a Viatrix company)

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CHAPTER ONE: WHAT YOU SHOULD KNOW

About Cholesterol



Visual 1: Illustration of cholesterol buildup in the blood vessels

Image Source: Shutterstock

What is cholesterol?³

Cholesterol is found in your blood and is a type of fat (lipid) that is needed by your cells. Your body produces all the cholesterol it needs but it can also be obtained from the food that you eat.

What happens if there is too much cholesterol in your body/blood?³

Having too much cholesterol can cause a buildup in your arteries, which are the blood vessels that are responsible for carrying blood away from your heart. Known as hardening of the arteries or atherosclerosis, this can cause the arteries to become narrow and make it harder for blood to flow through them.



Image Source: Shutterstock

Where does cholesterol come from?⁴

Cholesterol is produced and circulates through the blood by your body, and especially your liver. But it can also be found in foods from animal sources, such as poultry, meat, and full-fat dairy products. When you eat a diet high in saturated and trans fats, your liver will produce more cholesterol.



Fact Or Myth: Cholesterol Is Bad For Your Body!

MYTH: This may come as a surprise but cholesterol itself is not bad. In fact, it is one of the substances that is produced by our bodies to keep us healthy. But having too much cholesterol in your blood is a bad thing as it builds up in the walls of your arteries. The buildup will cause your arteries to harden and become narrow over time, which in turn restricts the blood flow to the heart.⁵

Types of Cholesterol

Bad vs. Good Cholesterol⁶

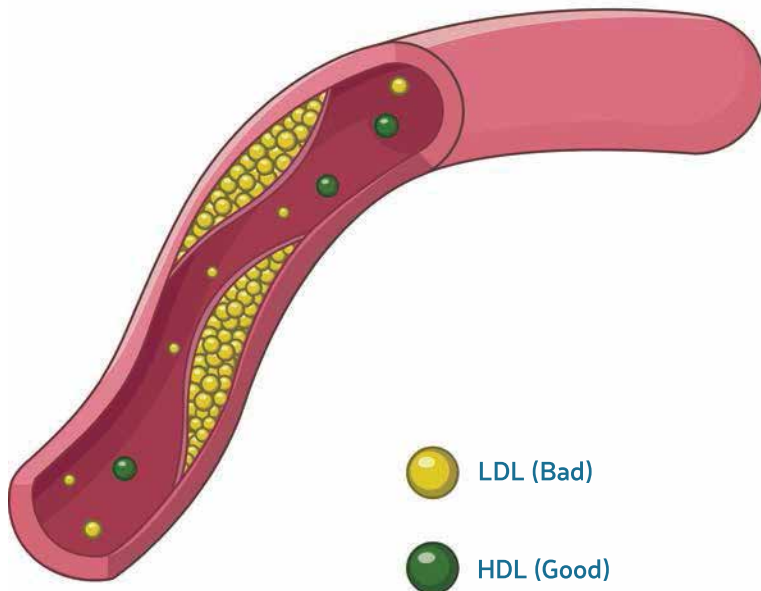
Cholesterol cannot be dissolved in the blood and must be carried through the bloodstream by lipoproteins. Lipoproteins are carriers that are made up of fat (lipid) and proteins.

LDL (bad cholesterol)⁶

LDL cholesterol is also known as the “bad” cholesterol because it causes plaque – a thick, hard deposit that can clog arteries and make them less flexible.

HDL (good cholesterol)⁶

HDL cholesterol is also known as the “good” cholesterol because it helps to absorb cholesterol and transports it back to the liver to be flushed from the body.



Visual 2: Illustration of an Artery blocked with bad cholesterol

Image Source: Shutterstock

What is Hypercholesterolemia?

Hypercholesterolemia is a condition that is caused by very high levels of cholesterol in the blood.⁷

LDL causes plaque - a thick, hard deposit that clog arteries and make them less flexible. This condition is also known as atherosclerosis. If a clot forms and blocks a narrowed artery, it can cause a heart attack if it affects the heart, or stroke if it affects the brain.⁶

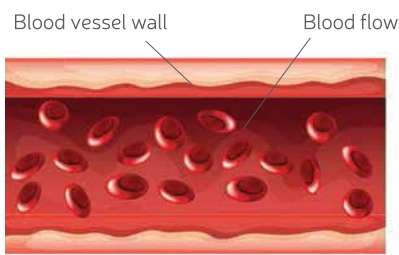


Image 1: Blood flows easily

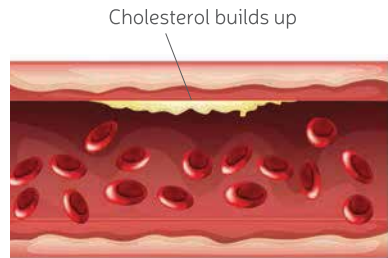


Image 2: Less flow

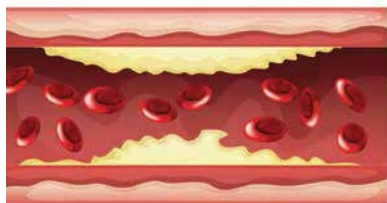


Image 3: Less flow low

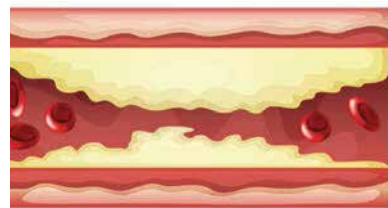


Image 4: Blood flow stops

Visual 3: Illustration of Hypercholesterolemia

Image Source: Shutterstock



Fact Or Myth: Having High Cholesterol Means You Are At Risk Of Heart Disease

FACT: By having too much cholesterol in your blood, you will be at an increased risk of heart disease and other cardiovascular diseases.⁸

Identifying Cholesterol Levels⁹

Keeping your cholesterol levels under control is a great way to keep your heart healthy – and lower your chances of getting heart disease or having a stroke. That is why knowing and understanding your cholesterol numbers may save your life.

Identifying Total Cholesterol Level (Individuals with no heart disease and no diabetes)

Total Cholesterol Level	Total Cholesterol Category
Less than 5.17 mmol/L	Desirable
5.17 - 6.18 mmol/L	Borderline high
6.21 mmol/L and above	High

Source: NIH Medline Plus

Identifying LDL (bad) Cholesterol Level

LDL (Bad) Cholesterol Level	LDL Cholesterol Category
Less than 2.59 mmol/L	Optimal
2.59 - 3.34 mmol/L	Near optimal/above optimal
3.36 - 4.11 mmol/L	Borderline high
4.14 - 4.89 mmol/L	High
4.91 mmol/L and above	Very high

Source: NIH Medline Plus

Identifying HDL (good) Cholesterol Level

HDL (Good) Cholesterol Level	HDL Cholesterol Category
Less than 1.03 mmol/L	A risk factor for heart disease
1.03 - 1.53 mmol/L	The higher, the better
1.55 mmol/L and above	May be protective against heart disease

Source: NIH Medline Plus

Do note that the numbers indicated above are general guidelines on the cholesterol levels to and that actual individual targets would vary according to a person's risks.



Talk to your healthcare provider today

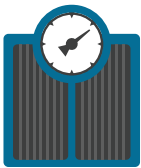
What affects cholesterol levels?⁹

There are many different things that can affect cholesterol levels. Here are some that you can do something about:



Diet

A diet that is high in saturated fat and cholesterol can cause your blood cholesterol level to rise. The main problem is saturated fat but cholesterol in foods play a key role as well. To help lower your blood cholesterol level, you need to reduce the amount of saturated fat and cholesterol in your diet.⁹ However, cholesterol is primarily produced by your liver and not all dietary cholesterol becomes blood cholesterol.¹⁰ Hence it is more important to limit the intake of saturated fat and trans fat.¹¹



Weight

Being overweight increases your risk for heart disease and tends to increase your cholesterol level. By losing weight, you can help lower your LDL and total cholesterol levels, while raising your HDL and lowering your triglyceride levels.⁹



Physical Activity

Regular physical activity is important to help lower LDL (bad) cholesterol and raise HDL (good) cholesterol levels. Not only will it help you to lose weight, but it will also decrease your risk for heart disease. You should aim to be physically active for 30 minutes every day.⁹



Fact Or Myth: Low Cholesterol is always a sign of good health

MYTH: A high blood cholesterol level increases your risk of coronary artery disease. Lower cholesterol is usually better. However, low levels are sometimes associated with other various health issues. If your low levels of cholesterol are below the recommended optimal rate (please refer to page 8), you should discuss it with your doctor.¹²



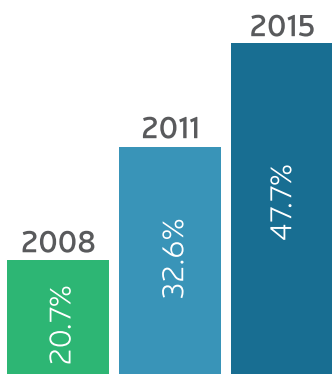
“Working out makes you sweat and it can also raise your good cholesterol levels.”¹³

CHAPTER TWO: YOU ARE NOT ALONE

Prevalence of Hypercholesterolemia



Image Source: Shutterstock

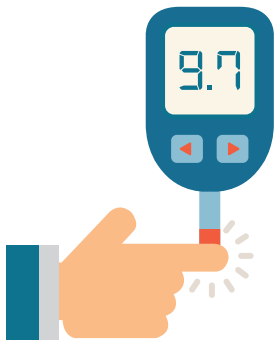


An increase of 20.7%¹⁴ in 2008, 32.6%^{13,14} in 2011 to 47.7%^{14,15} in 2015

Other Diseases Burdening Malaysians

Diabetes and hypertension are other diseases that can cause cardiovascular diseases.

Top Malaysian burden of disease:¹⁶



Diabetes

"17.5% (3.5 million) of adults 18 years and above have diabetes."

"9.2% are previously undiagnosed with diabetes."



Hypertension

"30.3% (6.1 million) of adults 18 years and above have hypertension."

"17.2% are previously undiagnosed with hypertension."



Coronary heart disease (type of cardiovascular disease) is the main cause of death in Malaysia with a prevalence of 150 people per 100,000.¹⁷



CHAPTER THREE: WHAT CAN YOU DO ABOUT IT

Symptoms of High Cholesterol and Diagnosis

What are the symptoms of high cholesterol?¹⁹

High cholesterol typically does not cause any symptoms. For instance, a heart attack or stroke can result from the damage caused by high cholesterol.



These events typically do not occur until high cholesterol leads to the formation of plaque in your arteries. Plaque can narrow arteries so less blood can pass through. This could lead to serious complications. Hence, it is important to go for regular check-ups as this condition presents no symptoms.

How can high cholesterol be diagnosed?²⁰

Your doctor will diagnose high blood cholesterol by checking the cholesterol levels in your blood. Before the test, you'll need to fast (not eat or drink anything but water) for 9 to 12 hours.



The blood test will give your doctor information on total cholesterol, triglycerides, LDL & HDL cholesterol. Testing for total and HDL cholesterol does not require fasting. If your total cholesterol is 5.17 mmol/L or more, or if your HDL cholesterol is less than 1.03 mmol/L, your doctor will likely recommend that you have a blood test to measure your cholesterol levels.



Fact Or Myth: You must fast before a cholesterol test

MYTH: Blood tests help doctors check for certain health problems and find out how well your body is working. Doctors also use them to figure out how well treatments are working. You don't need to fast before all blood tests. Your doctor will tell you if you need to.²¹

Lifestyle Adjustments²²

It does not take much to live a healthier life. By making minor lifestyle changes, on top of your recommended medication, it can greatly improve your chances to live a longer and happier life.

Exercise often and increase your physical activity

Exercise can help to improve your cholesterol while moderate physical activity can help to raise your HDL (good) cholesterol.



Image Source: Shutterstock

Consider:

- Brisk walks, riding a bicycle to work
- Swimming laps and playing sports

Eat heart-healthy foods²²



Choose healthier fats²²

Red meat and dairy products are high in saturated fats, which raise your total cholesterol and LDL (bad) cholesterol. You can still consume these products but choose healthier options such as leaner cuts of meat, low-fat dairy and monounsaturated fats, which are found in olive and canola oils, as well as polyunsaturated fats, which is a type of dietary fat. It is one of the healthy fats, along with monounsaturated fat.²³



Minimise trans fats²²

Consuming trans fats can increase your “bad” cholesterol and lower the “good” cholesterol, which can place you at an increased risk of heart attacks. Reduce consumption of fried foods and commercial products such as cookies, crackers, and snack cakes that are high in trans fats.



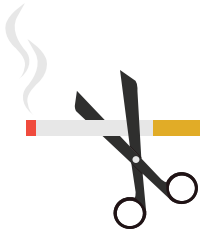
Eat foods rich in omega-3 fatty acids²²

Omega-3 fatty acids do not have an effect on LDL cholesterol. It is good for your heart and helps to increase HDL (good) cholesterol, while reducing blood pressure and triglyceride levels. Good sources of omega-3 fatty acids include fish such as salmon and mackerel, walnuts, almonds, and ground flaxseeds.



Increase soluble fiber²²

Fiber can be broken down into two types – soluble and insoluble. Soluble fiber can be found in products such as fruits, oats and oat bran, vegetables, beans, and lentils, which help to lower your LDL levels.



Quit smoking²²

If you smoke, stop. Quitting might improve your HDL cholesterol level and the benefits don't end there. Within one year, your risk of heart disease is half that of a smoker. Within 15 years, your risk of heart disease is similar to someone who never smoked.



Lose weight²²

Carrying even a few extra pounds contributes to high cholesterol. Losing as little as 5 to 10 percent of your weight can improve cholesterol levels. Start by evaluating your eating habits and daily routine.



Drink alcohol only in moderation²²

If you drink alcohol, do so in moderation. For healthy adults, that means up to one drink a day for women of all ages and men older than age 65, and up to two drinks a day for men age 65 and younger.

Too much alcohol can lead to serious health problems, including high blood pressure, heart failure and stroke.



Talk to your healthcare provider today

Food For Thought

Foods That Keep Your Cholesterol Levels In Check²⁴

A healthy diet that is low in saturated fat is essential in keeping your cholesterol low. Did you know that you can further reduce your cholesterol levels by incorporating the tips below in your everyday diet?



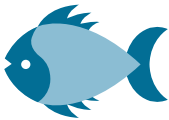
Select whole grains

Whole grains contain various nutrients that help to promote heart health. Oatmeal and oat bran are just some examples of good whole grain choices.



Pile on the fruits and vegetables

Fruits and vegetables can help to lower cholesterol as they are rich in dietary fiber.



Consume heart-healthy fish

Choose heart-healthy fish such as salmon and mackerel, which are rich in omega-3 fatty acids.

Foods That Are High in Cholesterol

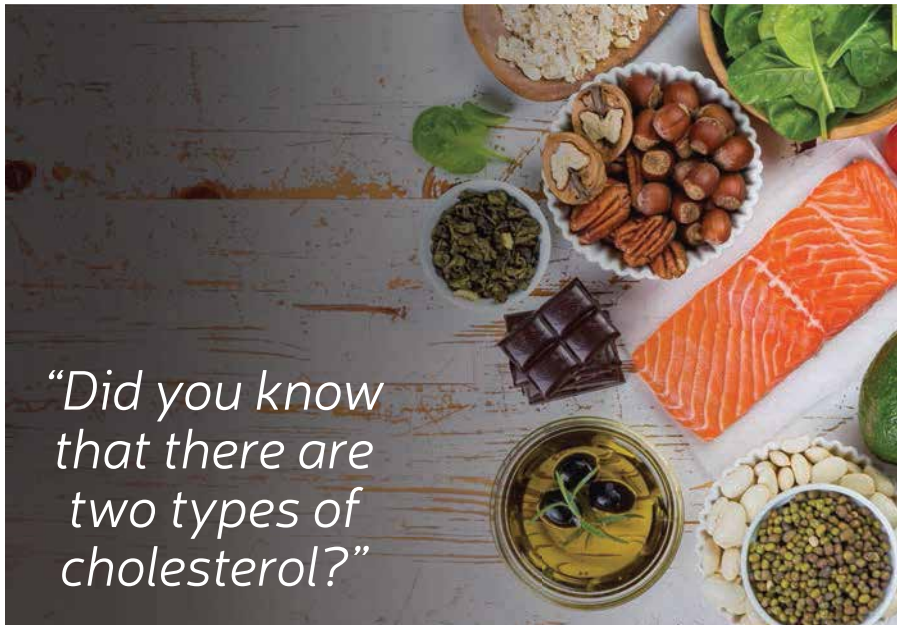


Image Source: Shutterstock

Your body's cholesterol levels are contributed by your diet and also from your own body.¹⁰

A diet that is high in dietary cholesterol has been proven to lead to high blood cholesterol in some people. However, studies have shown that it is more important to limit dietary saturated fats and trans fats than limiting dietary cholesterol to prevent heart-related diseases.¹¹

Know your fats: The good, the bad, the ugly²⁵

It's important to know more about the "good" fats, such as monounsaturated and polyunsaturated fats, and "bad" fats, such as saturated and trans fats. Here are some of the various categories of fats explained from the good, the bad and the downright ugly.

The Good²⁵

Monounsaturated Fat – Found in:



A good fat



Reduces levels of LDL or "bad" cholesterol



Increases levels of HDL or "good" cholesterol



Nuts and seeds



Olive oil



Avocados



Canola oil

Polyunsaturated Fat – Found in:



A good fat



Reduces levels of LDL or "bad" cholesterol



Salmon & Mackerel



Trout & Sardines



Corn & soybean oils



Safflower & Sunflower oils

The Bad²⁵

Saturated Fat



A bad fat



Increases overall cholesterol levels, specifically LDL or "bad" cholesterol

Found in:



Meat & poultry



Eggs



Butter



Cream & Dairy Products

And in plant-based products and tropical oils:



Coconut & Coconut oil

85% Saturated Fat²⁶



Palm oil

50% Saturated Fat²⁶



Cocoa butter

60% Saturated Fat²⁷

The Ugly²⁵

Trans Fat



A bad fat



Reduces levels of HDL or "good" cholesterol



Increases levels of LDL or "bad" cholesterol

Found in hydrogenated fats:



Margarine



Vegetable Shortenings

Used in:



Cookies



Crackers



Chips



Fast food



Fact Or Myth: Switching from butter to margarine will help lower my cholesterol

MYTH: Margarine contains trans-fat which is unhealthy.²⁵ However, it is important to note that not all margarines are created equal, some margarines contain trans-fat. In general, the more solid the margarine, the more trans-fat it contains. So, stick margarines usually have more trans-fat than tub margarines do.²⁸ All fatty foods need to be consumed in moderation if you have high cholesterol.²⁹



Talk to your healthcare provider today

Treating High Cholesterol



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You should make diet and lifestyle changes if you are concerned about unhealthy cholesterol levels. For some people, it is enough to make diet and lifestyle changes. But others may require medication, especially if you have a medical condition.³⁰

You can assess your risk of heart attack or stroke based on your cholesterol levels and other risk factors by checking with your doctor. Upon assessment, you can then work together with your doctor to develop a treatment or plan that will suit you.

Cholesterol-Lowering Drugs³⁰

There are various medications available that can help to lower blood cholesterol levels. Statins are usually recommended for most patients as they have been proven to reduce the risk for heart attack or stroke. If you have serious side effects or do not respond adequately to statin therapy alone, your doctor may recommend other medications as well.

We recommend that you talk with your doctor if you are in one of the following groups who are at higher risk of having an event:



Adults with high levels of LDL and a 7.5 percent or higher, risk having a heart attack or stroke within 10 years.

Note: Please check your CV risk level with your doctors.



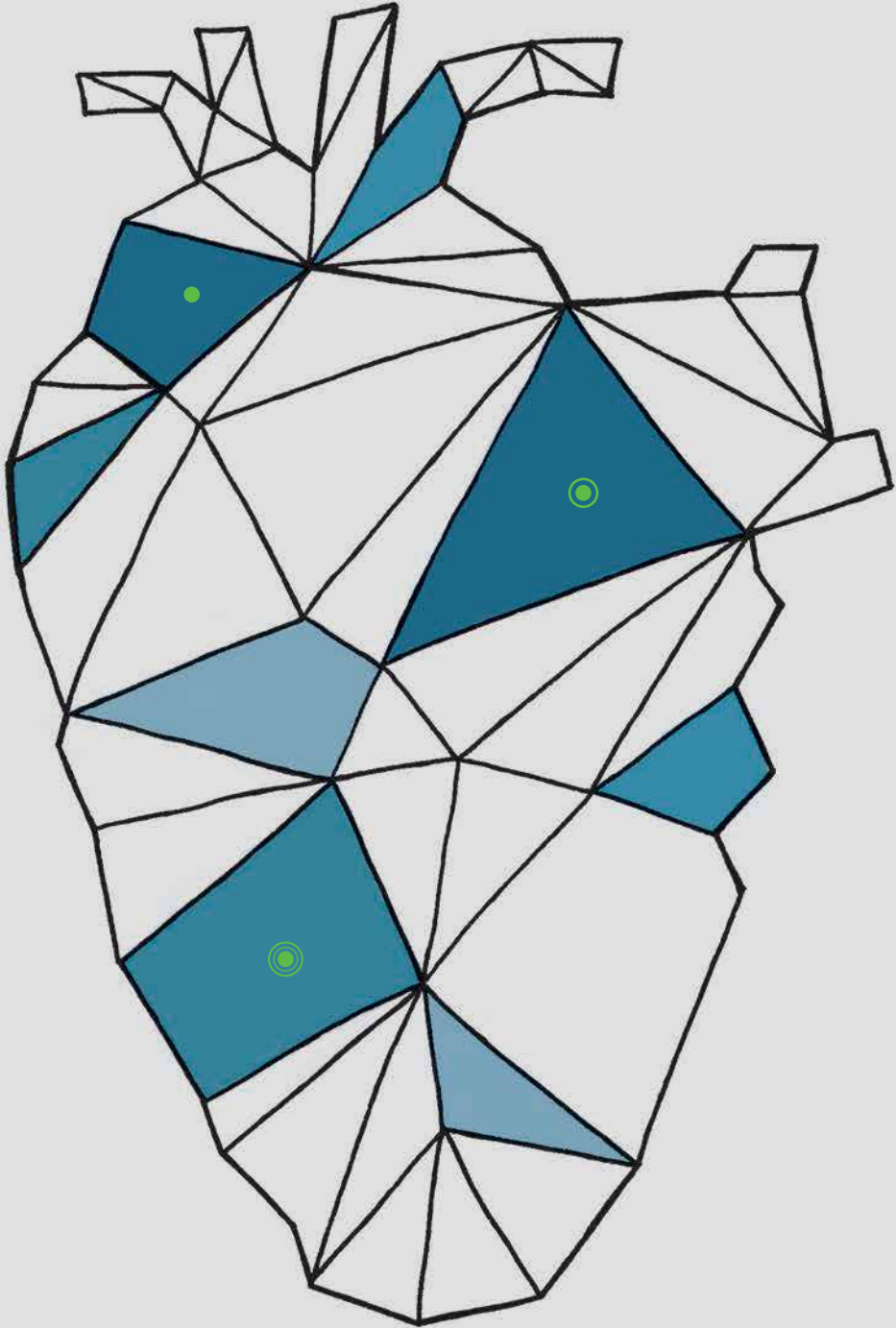
People with a history of a cardiovascular event (heart attack, stroke, stable or unstable angina, peripheral artery disease, or coronary or other arterial revascularization).



People 21 years and older who have a very high level of LDL (bad) cholesterol (*4.91 mmol/L or higher*).



People with diabetes and a high LDL cholesterol level who are 40 to 75 years old.



Statins

- **What are statins?**

Statins are a type of drug that doctors prescribe to help lower cholesterol levels in the blood.

- **Why do I need statins to lower my cholesterol?³¹**

Statins help to lower the amount of “bad” cholesterol that your body produces.

Cholesterol is constantly being produced by your body so if you stop taking a statin, it is likely that your cholesterol levels will rise back up. If you are prescribed a statin by your doctor, you will need to follow his/her advice.

If you have suffered from a heart attack or stroke, you may be prescribed statins to help minimise the risk of another event. If you suffer from diabetes, you are at a higher risk of developing cardiovascular disease. By taking statins, you can reduce that risk.

- **When should I take my statin?³¹**

Your medication needs to be taken regularly as prescribed. Consult with your doctor as to when you should be taking your statin.

Know Your Facts

While many people take statins to protect their heart health and manage cholesterol, these drugs often are misunderstood – especially when it comes to the safety of these life-saving medicines.

Here are common myths about statins and the real truth about them:

Myths on Cholesterol



Myth 1: Fasting affects cholesterol test results³²

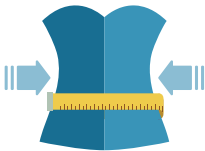
A fasting cholesterol test is a test that is performed after a period of time on an individual who has not consumed any food or drink with the exception of plain water. There is also a non-fasting cholesterol test which is also known as a random cholesterol test. This test is able to measure your cholesterol level without any fasting required. Some cholesterol tests require you to do so, while others are not affected by consumption of food.

A total cholesterol test combines bad cholesterol and good cholesterol in a single measurement. While a total cholesterol test does not require you to fast as the reading will not change significantly with food intake, a lipid profile will require you to fast. The lipid profile will include values for your total cholesterol, as well as individual values for both LDL and HDL cholesterol, and triglycerides.



Myth 2: Oats can reduce cholesterol levels³³

Oatmeal contains soluble fiber which is beneficial in lowering cholesterol level in our bloodstream. Oats contain a substance called beta-glucan, which is a water soluble fiber. This fiber will prevent the body from absorbing excessive amount of dietary cholesterol and thus, reduce the level of LDL cholesterol. Therefore, regular consumption of oats balanced with other healthy diets are good for lifestyle management. However, it is important to talk to your doctor for the best treatment option for your condition.



Myth 3: Thin people don't have high cholesterol³⁴

While people who are overweight are more likely to have high cholesterol, thin people may also have it so be sure to have your cholesterol checked regularly.

Myths on heart disease



Myth 1: If you have heart disease, you should eat as little fat as possible³⁵

It's true you should eat a diet low in saturated fat and avoid trans-fat. But other fats, notably the unsaturated fats in vegetable oils and other foods, are good for your heart.



Myth 2: Heart disease is mostly a man's problem³⁵

Heart disease is a problem for both men and women. In fact, more women than men have died each year from heart disease since 1984. Just as it is the leading killer of men, it is also the leading cause of death in women over the age of 65.



Myth 3: People who are fit can't suffer from heart disease³⁶

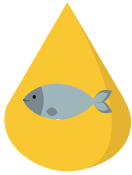
While people who maintain a healthy lifestyle through exercise and a healthy diet have a reduced risk of certain heart disease factors, it does not mean that they do not need to be concerned about it at all. Individuals who are in excellent physical condition should still regularly check their blood pressure and cholesterol levels to be safe.

Myths on statin



Myth 1: Statins will hurt your ability to exercise³⁷

Statins and exercise are both good for heart health. Most people are not affected by statins when they exercise. However, there are up to 10 percent of patients who do have some muscle pain and weakness with statins. Therefore, it is important to talk to your doctor to map out the best treatment option for your condition.



Myth 2: Fish oil or omega-3 supplements can be used as replacement for statin³⁸

While fish oil supplements have been known to be beneficial, there have been no evidence of it being able to lower LDL.

Even if fish oil is able to decrease triglycerides and reduce the risk of cardiovascular disease, there isn't enough evidence to show that it has positive effects on lowering LDL cholesterol.



Myth 3: Statins can do more than lower your cholesterol³⁹

Statins have more benefits that go beyond lowering cholesterol levels. They are able to prevent heart attacks, which is known as pleiotropic effects. These include stabilising plaque and preventing them from rupturing. This is why statins may be prescribed even after suffering from a heart attack.



Myth 4: I can stop taking statins when my cholesterol levels are low or normal²⁹

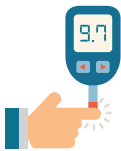
You can't stop taking your prescribed statins as your LDL cholesterol might rise back to where it was when you first started. As your cholesterol increases, so does your risk of a heart attack and stroke. You cannot "cure" high cholesterol but you can manage it successfully, which requires a lifelong commitment to your health and involves taking your statins every day.



Myth 5: Statins cause dementia/memory loss⁴⁰

Some patients that take statins experience memory loss but these incidences are rare. These symptoms are generally reversible.⁴⁰ It is important to remember that dementia/memory loss can also be caused by the same things that cause heart disease. Thus, there may be a chance that these symptoms may be associated with lifestyle choices, rather than the medication itself.⁴¹

In the event that you are experiencing these symptoms, discuss with your doctor on what can be done to help you.



Myth 6: Statins cause diabetes⁴⁰

While there are cases where some patients on statins developed diabetes or an increase in their blood sugar, experts believe that the heart benefits provided by statins outweigh the risk of increase in blood sugar.⁴⁰ In patients with diabetes, statins reduce the risk of heart problems by 37% and stroke by 48%.⁴²



Talk to your healthcare provider today

Acknowledgement

This is a book of collective facts dedicated to all who inspired the idea of making a simple and practical book.

The authors have contributed their knowledge and experience to make this handbook a reality.

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