

## Vitamin D

Vitamin D (also known as Vitamin D2, Vitamin D3) comes from three sources:

- The sun
- Food
- Dietary supplements

Vitamin D is a fat-soluble vitamin, meaning that it can accumulate in the body because it is stored in the liver and fat tissues for long periods of time. It improves the absorption of calcium, a mineral that helps build and maintain healthy bones. It also improves the absorption of phosphorus, a mineral that is important for the development of bones and teeth.

There are two forms of vitamin D that are important to people: vitamin D2 (Ergocalciferol) and vitamin D3 (Cholecalciferol). Vitamin D2 comes from plants, while vitamin D3 is made in our skin when it is exposed to sunlight. Both forms of vitamin D can also be found in food.

There are several forms of vitamin D available as supplements including chewable tablets, capsules, drops, and liquids. Vitamin D is listed in both micrograms ( $\mu\text{g}$ ) and international units (IU). 1 microgram is 1/1000 of a milligram. 1 IU of vitamin D is the same as 0.025  $\mu\text{g}$  of vitamin D2 and 0.025  $\mu\text{g}$  of vitamin D3. Vitamin D supplements are usually shown as IU. Vitamin D is important in maintaining overall good health, developing and maintaining bones and teeth and helping to reduce the risk of developing osteoporosis. Studies have consistently shown that 800 IU of vitamin D lowers the risk of fractures of the spine, hip, wrist, and leg in adults, which are all complications of osteoporosis. Vitamin D supplementation is also beneficial for people with severe kidney failure who are receiving dialysis, as it can help prevent bone loss. Vitamin D is used as a supplement for people who do not receive enough vitamin D from sun exposure or from foods.

Although vitamin D is generally well-tolerated when taken in recommended doses, high doses of vitamin D over a long period of time can cause weakness, loss of appetite, dry mouth, and fatigue.

Women who are pregnant or breast-feeding can safely take oral vitamin D supplements in recommended amounts and it is recommended for infants who are breast-fed to be given vitamin D supplements, as they may not be receiving enough vitamin D. Always ask your doctor or pharmacist for information on how much vitamin D you should take, as it may be different depending on your age and what you are using it for.

## Asthma

Asthma is a chronic, obstructive lung condition that is characterised by inflammation, increased mucus production, and narrowing of the airways due to tightening of the muscles in the airways. This combination of problems leads to less air moving through the lungs making it difficult to breathe.

The incidence of asthma is increasing each year, especially in children

Asthma can be caused by a variety of triggers. Everyone's lungs are sensitive to different stimuli, so there is no single cause of asthma, but it may be partly an inherited condition. Asthmatics have lungs that are more sensitive to stimuli. Asthma is partially the lung's allergic response to an allergen. Common allergens include:

- Animal dander
- Pollen
- Dust or moulds
- Medications
- Foods ex: nuts
- Preservatives

Asthma typically develops in childhood, but adults can also become asthmatic due to prolonged exposure to certain allergens or non-allergic irritants such as:

- Chemicals or detergents
- Smoke
- Strong smells (perfumes or cleaning agents)
- Viral infections (like the flu)

Some symptoms (or indicators) of asthma include wheezing, chest tightness, coughing or shortness of breath. Not everyone may have all of the symptoms; some may have just one or two. The occurrence of these symptoms at night is usually an indication of more severe asthma.

While there is no cure for asthma, it is a very manageable condition. The goals of asthma management are to be as symptom free as possible, being able to engage in normal activities, using rescue medications fewer than 4 doses per week, having daytime symptoms fewer than 4 times per week and reducing instances of worsening asthma.

The best ways to manage your asthma are to avoid triggers, talking to your pharmacist or doctor about creating an action plan to tell if your asthma is in control or getting worse, talking to your pharmacist about, and using, your controller and reliever medications properly. While avoiding the triggers that can cause asthma is an important part of managing the condition, it is not always possible to do so. Proper knowledge about the medications that are often needed to prevent and treat the symptoms and how/when to use them, is equally important.

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### **Children's Asthma Education Centre**

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## High Blood Pressure

Blood pressure is the measure of how hard your blood is pushing against the inside of your arteries. A certain amount of pressure is needed to carry blood through the body. High blood pressure, or hypertension, is the phenomenon when that pressure is too great.

Blood pressure is measured and described with two numbers:

- The first (and usually bigger) number is the pressure that occurs when your heart contracts (or squeezes) and pushes the blood out to the body. This is called the systolic blood pressure.
- The second (and usually lower) number is the pressure that occurs when your heart relaxes (or opens) and fills with blood. This is called the diastolic blood pressure.

Blood pressure is always recorded as the systolic number over the diastolic number, and is measured in millimetres of mercury (mmHg).

Generally, someone will be considered as having high blood pressure if several measurements of blood pressure at the doctor's office show readings of 140 systolic over 90 diastolic (140/90) or higher.

Hypertension is one of the main risk factors for heart disease, stroke, and kidney failure. It has been estimated that 20% of Canadians have high blood pressure; and many are not aware of the problem. Of those who are, less than one-third receive adequate treatment to control their blood pressure.

The cause of the majority of hypertension cases is unknown. This condition is called primary (or essential) hypertension. When there is an underlying problem such as kidney disease or hormonal disorders that can cause hypertension, it is called secondary hypertension. When it is possible to correct the underlying cause, high blood pressure usually improves and may even return to normal.

Factors that can contribute to hypertension include:

- age (blood pressure usually increases with age)
- diet
- excessive alcohol consumption
- lack of exercise
- obesity
- sleep apnea
- stress

Most people with hypertension have no symptoms; it is a 'silent' disease. Sometimes hypertension can cause headaches, vision problems, dizziness, or shortness of breath.

A patient will be diagnosed as having high blood pressure when their blood pressure is above the normal range for up to 5 readings (taken at different visits). Sometimes a diagnosis is made after a fewer number of readings, depending on how high above normal the blood pressure is and if the person has other medical conditions. Blood pressure tends to be at its highest during exercise, physical work, or stress, and lowest during sleep. Everyone can have a temporary increase in blood pressure at one time or another, which is why it's important to take multiple readings.

If blood pressure is high, a physician will also want to know if there are any other risk factors such as high cholesterol, diabetes, inactivity, obesity, smoking, or a family history of heart disease. The more risk factors someone has, the higher the chance of getting heart disease or a stroke.

The management of hypertension includes lifestyle changes and the use of medications. Proper treatment of high blood pressure can add years to a person's life. Controlling blood pressure with medications can decrease the risk of stroke and heart disease.

People who have other risk factors, especially those who have diabetes or have already suffered heart damage, may be started on medications even if their blood pressure is below "official" hypertensive levels.

In most cases, the goal of treatment is to bring down the systolic pressure to less than 140 mmHg and the diastolic pressure to less than 90 mm Hg. For people with diabetes, target blood pressure goals are lower (less than 130/80 mm Hg).

Some healthy lifestyle tips to prevent hypertension and heart disease are:

- limiting alcohol intake to no more than 2 drinks per day to a maximum of 10 drinks per week
- cutting down on salt consumption
- eating more fruits, vegetables, whole grains and fibre
- getting regular physical activity (at least 30 minutes per day 4 to 7 times per week)
- maintaining a healthy weight
- quitting smoking

It is important for people to know their blood pressure and to keep it controlled. Evidence suggests that even a small increase in blood pressure can cause a significant change in life expectancy.

# Cholesterol

Cholesterol is a fatty substance carried in the bloodstream and needed in small amounts by the body to rebuild its cells and to make certain hormones. People with high cholesterol have too much cholesterol in the bloodstream. Cholesterol levels generally rise with age and can increase the risk of heart disease, stroke, and peripheral vascular disease. The liver is responsible for making about 80% of the body's cholesterol; the rest comes from the diet. Dietary cholesterol is found in foods from animal sources, such as eggs, meats, and dairy products. There are two important types of cholesterol:

- low-density lipoprotein (LDL), or "bad" cholesterol and
- high-density lipoprotein (HDL), or "good" cholesterol

Most of the LDL or "bad" cholesterol circulates in the blood and remains unused. Normally, the liver removes this excess cholesterol, but many people have more LDL cholesterol than the liver can handle. HDL is considered "good" cholesterol because it picks up the LDL cholesterol from the arteries and tissues and carries it back to the liver, where it can be broken down.

Many factors determine the amount of LDL cholesterol in the body:

- age (cholesterol levels increase with age)
- alcohol consumption
- diet
- gender (men have higher cholesterol)
- heredity
- level of physical activity
- weight

Eating foods that are high in saturated fats and cholesterol also affects the amount of cholesterol in the body. Furthermore, some medical conditions, such as diabetes, hypothyroidism, liver disease, and kidney disease can raise cholesterol levels. LDL cholesterol promotes buildup of harmful fatty deposits (or plaques) in the walls of the arteries. These plaques can clog the arteries, including the coronary arteries that feed the heart. This process is called atherosclerosis (hardening of the arteries) and can result in angina (chest pain), heart attack, or stroke.

High cholesterol usually has no obvious symptoms; it's a "silent" condition that offers no early warning. Most people first discover the problem during a routine blood test and physical exam. Typically high cholesterol appears as symptoms from the complications of high cholesterol. These include angina and pain in the calves caused by narrowed arteries to the legs. The main complications of high cholesterol are heart disease and stroke. Lowering cholesterol levels with treatment reduces the risk of developing coronary artery disease, heart attack, stroke, and other disorders.

A healthy lifestyle is the best defense against high cholesterol. This also helps against other risk factors linked to coronary artery disease. Lifestyle changes are a good first step in reducing cholesterol levels:

- observing a diet low in saturated fats and cholesterol
- eating a wide variety of vegetables, whole grains, fruits, nuts and seeds
- boosting your level of physical activity
- maintaining a healthy body weight
- limiting alcohol consumption to no more than 2 drinks per day to a maximum of 10 drinks per week

Medication therapy may be added to lifestyle change if cholesterol target levels are not reached, or may be started right away in addition to lifestyle change in those people with a higher risk of coronary artery disease.

# Diabetes

Diabetes is a condition where the body doesn't produce enough insulin to meet its needs and/or the cells in the body don't respond properly to insulin. Insulin is a hormone that is used to move glucose, a simple sugar, into the body's cells from the blood. The food that people eat provides the body with glucose, which is used by the cells as a source of energy. If insulin isn't available or doesn't work correctly to move glucose from the blood into cells, glucose will stay in the blood preventing the cells in the body from getting the fuel that they need. High blood glucose levels are harmful.

There are two main kinds of diabetes:

- Type 1 diabetes occurs when the pancreas cannot make insulin. Everyone with type 1 diabetes requires insulin injections.
- Type 2 diabetes occurs when the pancreas does not make enough insulin or the body does not use insulin properly. It usually occurs in adults, although in some cases children may be affected. People with type 2 diabetes usually have a family history of this condition and are most often overweight. People with type 2 diabetes may eventually need insulin injections.

Another less common form is gestational diabetes, a temporary condition that occurs during pregnancy. According to the Canadian Diabetes Association (CDA), about 4% of women, and up to 18% of First Nations women, will develop gestational diabetes. The problem usually clears up after delivery, but women who have had gestational diabetes have a higher risk of developing type 2 diabetes later in life.

Type 1 diabetes is an autoimmune disorder. It's believed that a combination of genetic predisposition and additional (as yet unidentified) factors provoke the immune system into attacking and killing the insulin-producing cells in the pancreas. Type 2 diabetes is mainly caused by insulin resistance. This means that no matter how much or how little insulin is made, the body can't use it as well as it should. As a result, glucose can't be moved from the blood into cells. Over time, the excess sugar in the blood gradually poisons the pancreas causing it to make less insulin and making it even more difficult to keep blood glucose under control.

Obesity is a leading cause of insulin resistance - 90% of people with type 2 diabetes are overweight. Genetic factors are also likely to be involved in the cause of type 2 diabetes. A family history of the disease has been shown to increase the chances of getting it.

Other risk factors for the development of type 2 diabetes include:

- A history of gestational diabetes
- Being 40 years of age or older
- Blood vessel disease
- First Nation, Hispanic, South Asian, Asian, or African descent
- Giving birth to a large baby
- High blood pressure
- High cholesterol
- Polycystic ovary syndrome
- Schizophrenia
- Prediabetes or impaired fasting glucose

Both type 1 and type 2 diabetes present with some clear symptoms:

- The need to urinate frequently
- Excessive thirst
- Fatigue
- Severe weight loss despite normal or excessive food intake

However, the symptoms of type 2 diabetes usually appear more gradually. People with type 2 diabetes who do not have their blood glucose under control often have a persistent, mild thirst. They urinate frequently, and often feel mild fatigue and complain of blurred vision. Many women with the disease have recurring vaginal yeast infections. Diabetes is a major cause of heart disease and the biggest cause of blindness and kidney failure in adults. Older adults with diabetes are twice as likely to develop high blood pressure as people without diabetes.

People with diabetes are also 25 times more likely to undergo foot and other "lower extremity" amputations due to circulatory problems. Up to 50% of men who have diabetes will experience erectile dysfunction at some point. Currently, type 1 diabetes is not preventable. However, studies have shown that type 2 diabetes can be prevented by adopting lifestyle changes that include eating a healthy diet and exercising. In addition, some studies have shown that certain oral anti diabetes medications may play a role in preventing the development of type 2 diabetes for people who are at high risk of developing it. Lifestyle changes and medications may prevent up to 60% of type 2 diabetes.

Diabetes is a chronic condition that can last the entire lifetime of the patient. The goal of treating diabetes is to keep blood glucose levels as close to a normal range as possible thereby preventing the symptoms of diabetes and the long-term complications of the condition. It is important to work with your doctor, pharmacist or the other members of a diabetes care team to help set target blood glucose levels.

More than most conditions, treating diabetes requires a significant amount of real effort on the patient's part. Coping with diabetes is a lifelong challenge, so people with diabetes should not be afraid to speak with a doctor or pharmacist if they feel overwhelmed.

Part of a treatment plan for diabetes will involve learning about diabetes, how to manage it, and how to prevent complications. Your doctor, diabetes educator, or other health care professional will help you learn what you need to know so you are able to manage your diabetes as effectively as possible. Like many conditions, treatment of type 2 diabetes begins with lifestyle changes, particularly in regards to diet and exercise. If lifestyle changes don't get blood glucose levels to the target range, medications may be required. Medications for type 2 diabetes include anti diabetes pills, insulin injections, or a combination of both. Medications are very effective at treating diabetes and reducing the symptoms and long-term effects of the condition. However, hypoglycemia (low blood glucose levels) can occur when taking certain medications for diabetes.

Symptoms of hypoglycemia include:

- Anxiety
- Confusion
- Difficulty concentrating
- Dizziness
- Drowsiness
- Fatigue
- Headache
- Hunger
- Irritability
- Pale skin
- Sweating
- Tremors or shakiness
- Visual changes

If blood glucose level get extremely low, it is possible to have a seizure or lose consciousness. A health care professional can teach you how to recognize the warning signs of hypoglycemia. People with diabetes should carry candy, sugar, or glucose tablets to treat hypoglycemia.

Hypoglycemia is a side effect of many medications for type 1 and 2 diabetes, but it is never a reason to avoid treatment. The best way to avoid hypoglycemia is to monitor blood glucose.

Frequent measurement of blood glucose levels is the best way to know whether blood glucose levels are in the target range. This is easily done at home with a blood glucose monitor.

It is essential for all people with diabetes to self-monitor blood glucose levels. The number of times to test one's blood glucose will be based on the type of diabetes, the type of diabetes treatment and the level of control of the condition.

It is important to record blood glucose readings taken at different times of the day, especially after fasting as well as 2 hours after a meal. This allows your doctor or pharmacist to see a snapshot of how your blood glucose levels vary during the day and recommend treatments accordingly. Most blood glucose meters now have memory that stores a number of blood glucose tests along with the time and date they were taken. Some even allow for graphs and charts of the results to be created when the monitor is connected to a computer.

A blood test done in the laboratory called the glycosylated hemoglobin test (or A1C test) allows your health care team to see the average of blood glucose values over the last 3 months. This is a good indication of how well your blood glucose has been in control overall and allows your diabetes management team to manage your diabetes more effectively.

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## Heart Health

The heart is one of the largest and most important muscles in the body. A heart attack or MI (myocardial infarction) occurs when the cells in the heart are deprived of oxygen (due to blockages in the arteries that carry oxygen to the heart) and start to die.

Heart attacks are directly responsible for about 10% of all Canadian deaths each year. Although having a heart attack is very serious, the chances of survival are greatly increased if you are able to get to a hospital right away.

The myocardium (the muscle that makes up the wall of the heart), like every other organ in the body, needs oxygen to stay alive. The coronary arteries are the vessels that supply the heart with oxygen. In coronary heart disease, the coronary arteries are plugged or narrowed by fatty deposits (plaques) that reduce the amount of blood flow that gets to the heart; a process called atherosclerosis.

Most heart attacks occur when the plaques lining the coronary arteries rupture resulting in a blood clot that may partially or completely block blood flow. If the blockage is severe enough, the heart cells start to die and the symptoms of a heart attack appear. Most people that experience a heart attack will also experience symptoms in the days leading up to the attack. The most common symptom of a heart attack is chest pain (or angina) but other symptoms may include extreme fatigue, shortness of breath, anxiety, sweating, nausea and vomiting or light-headedness. Chest pain occurs when the heart muscle is not getting enough oxygen; a condition called ischemia, and tends to get worse or more frequent as the heart attack approaches. It is often difficult to distinguish angina from a heart attack. The symptoms of a heart attack are usually more severe and longer lasting (at least 20 minutes) than angina. Chest pain often presents as a tightness, pressure or squeezing feeling in the chest, often associated with sharp pain. The pain may also radiate to the back, jaw, or left arm and shoulder. Although chest pain is usually the first symptom, up to 20% of people suffering a heart attack may not experience any chest pain.

Most people that experience a heart attack also experience arrhythmias or irregular heartbeats. When the heart fails to receive enough blood, the main pumping chamber of the heart, the left ventricle, begins to quiver uselessly instead of pumping fully. This condition, ventricular fibrillation, is quite serious and if left untreated can result in death in less than 5 minutes. However, not all heart attacks are this severe and many may go unnoticed for quite some time, or be thought of as heartburn. In fact, distinguishing a heart attack from heartburn is not that easy. Antacids or belching can temporarily relieve heart attack pain. Additionally, the nitroglycerin sprays or pills that people with angina often carry with them may also temporarily relieve the pain, but the pain may quickly return. It is important to use discretion and common sense when trying to distinguish a heart attack from angina or heartburn; if the pain is worse, different, or more frequent than usual, it is important to see a doctor.

The best way to prevent a heart attack is by identifying and eliminating the risk factors such as smoking, obesity, high cholesterol or fatty diets. Talking to your doctor or pharmacist about your risk factors and how to make the right lifestyle changes to reduce your chances of a heart attack are crucial. Simple changes may include exercising more often to reduce weight and cholesterol, eating healthy and reducing or eliminating high salt and fatty foods in your diet. Your pharmacist, doctor or nutritionist can help you make the right changes and choices.

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## Osteoporosis

Osteoporosis is a bone disease where parts of the bone become weak and prone to fracture. This condition is more common in seniors, but can affect men and women of all ages. Osteoporosis is responsible for a large number of bone fractures that occur in seniors, as the weakened bones can no longer support their body weight.

At least 2 million Canadians have osteoporosis. While men also develop osteoporosis, this condition is particularly common among women who have reached menopause. Because women have 30% less bone mass than men, women are particularly prone to osteoporosis as they age. However, by the age of 65 to 70 years, men and women lose bone at about the same rate. Eating foods rich in calcium and vitamin D and participating in weight-bearing exercises are important steps in preventing osteoporosis.

Bone is made up mostly of minerals such as calcium. The bones in our bodies are constantly being broken down and replaced with new bones. This bone-building cycle takes about 100 days and is influenced by the hormones produced in our bodies as well as by the levels of calcium and vitamin D. Osteoporosis occurs when bone tissue and minerals are lost faster than the bone is replaced.

There are two main types of osteoporosis. Primary osteoporosis occurs most commonly in women after menopause. Osteoporosis affects twice as many females over the age of 70 years as males in the same age group. Secondary osteoporosis can affect young and middle-aged people as well. It may be caused by:

- Medications such as corticosteroids
- Chronic illnesses
- Too much exercise - women who exercise excessively may lose their menstrual cycle and the normal production of estrogen by the ovaries may stop

Factors that may increase the risk of osteoporosis include:

- A drop in estrogen after menopause: The rate of bone loss increases significantly after menopause because the ovaries stop producing estrogen, a hormone that plays a major role in the bone repair process. Female athletes and women who suffer from anorexia nervosa may also be at increased risk for osteoporosis. In both cases, the menstrual cycle is disrupted or lost and levels of estrogen in the body drop dramatically. Women who experience early menopause (before the age of 45 years) are more likely to have osteoporosis.
- Family history and body type: Osteoporosis tends to run in families, and the risk of this condition is greater for individuals with elderly relatives who have had a bone fracture, especially if it is a parent who has had a hip fracture. People of European and Asian descent are most at risk. People who are thin or "small-boned" also have a higher risk of osteoporosis. People who have had a fracture in the vertebrae are also at increased risk.
- Lifestyle factors and health conditions: Lifestyle factors such as smoking and excessive drinking, taking specific medications (such as corticosteroids), and having certain medical conditions may also contribute to bone loss. People with type 2 diabetes are more likely to suffer a hip or shoulder fracture than those without diabetes.
- Lack of exercise: Bones need to be used daily in order for them to stay healthy. People who are physically active are less at risk of developing osteoporosis, as their bones are stronger and less likely to lose strength with age. By contrast, a person who is bedridden or inactive for a lengthy period of time loses bone mass very quickly and is at high risk of osteoporosis.
- Lack of calcium: Children, adolescents, and adults need to eat the recommended amounts of vitamins and minerals. Calcium and vitamin D are very important in the maintenance of healthy and strong bones throughout life and in the prevention of osteoporosis.

Osteoporosis itself does not usually cause noticeable symptoms. However, weakened bones that are no longer able to support body weight can break even under slight pressure. Such fractures most commonly occur in the hipbones,

wrists, or spine. Hip fractures are more frequent in people over the age of 75 years. Some fractures caused by osteoporosis, such as hairline breaks in the spine, may cause little or no pain and may go unnoticed, even when they show up on an X-ray. By contrast, spinal crush fractures, where the vertebral column crumbles or collapses, are much more painful and can lead to deformed posture. Another symptom caused by osteoporosis is chronic back pain. This pain can worsen even with the slightest movements such as regular activities around the house, or while coughing, laughing, or sneezing or may be present when standing still.

The key steps to diagnosing osteoporosis involve assessing the risk for fracture and evaluating bone density. The presence of risk factors (such as being over 65 years of age or previous history of breaks or fractures) and low bone density results will likely result in a diagnosis of osteoporosis. If your doctor decides that you require medication to treat osteoporosis, bone mineral density testing may be conducted every 1 to 3 years to see if the therapy is working. Once the medication is shown to be effective, you may not need to be tested as often. Testing may also be repeated to monitor for rapid bone loss in people who are not started on medications for osteoporosis but are at risk for developing the disease.

Treatment of osteoporosis is aimed at preventing or reducing bone fractures and maintaining or increasing bone density. There are several treatments for osteoporosis, but prevention is still very important. A regular intake of calcium and vitamin D is of paramount importance for the maintenance of good bone strength. Osteoporosis Canada recommends 1,000 mg of elemental calcium daily for men and women between the ages of 19 and 50 years, and 1,200 mg for men and women over the age of 50 years. They recommend vitamin D in daily doses of 400 IU to 1,000 IU for adults without osteoporosis under 50 years of age, and 800 IU to 2,000 IU for both adults over the age of 50 and people with osteoporosis to help increase calcium absorption in the bones. Higher doses over 2,000 IU require medical supervision. Osteoporosis Canada also recommends regular weight-bearing exercises and a healthy lifestyle with no smoking or excessive intake of alcohol. Weight-bearing exercises (such as walking, weight training, or climbing stairs) play a role in strengthening bones and preventing fractures. Posture and balance can be improved through exercise and can significantly reduce the risk of bone fractures. There are several medications that can be used to treat osteoporosis. Many of these treatments may also be used to prevent osteoporosis for people who are at high risk of developing it. Speak to your doctor or pharmacist to determine if these medications are right for you.

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