

# KEEPING HIGH BLOOD GLUCOSE OR HYPERGLYCAEMIA UNDER CONTROL



## Blood glucose and its effect on your health

This document gives you information about glucose in the blood and insulin production. It also explains how blood glucose is measured and why it's important to measure your blood glucose.

As with any medical condition, understanding what high blood glucose is and how it affects your health is an important step to taking control of your health.

### Understanding what blood glucose is

**Blood glucose is a measure of the amount of glucose (sugar) in your blood.**

Glucose comes from foods that contain carbohydrates, like starches, dairy products, fruit and vegetables. Glucose is the main source of energy used by the body and is essential for brain functioning.

### Insulin and glucose: working together to keep your body going

Insulin is a hormone that's produced in the pancreas. It helps your body's cells use glucose.

Normally, your blood glucose levels increase slightly after you eat. This increase causes your pancreas to release insulin so that your blood glucose levels do not get too high.

Blood glucose levels that remain high over time can damage your eyes, kidneys, nerves and blood vessels. And sometimes, the body produces too much insulin, which causes blood glucose levels to drop too much.

### Why it's important to test your blood glucose levels

It's important to check blood glucose levels to:

- Check if you have diabetes or if you are at risk of developing diabetes
- Monitor the treatment of diabetes
- Check for diabetes that occurs during pregnancy (gestational diabetes)
- Check if you have an abnormally low blood sugar level (hypoglycaemia).

There are several types of blood glucose tests available. You can get your blood glucose tested at ....

### What the test results mean

Blood glucose level	What it means
Less than or equal to 5 mmol/L <sup>1</sup>	Normal fasting blood glucose
Less than or equal to 6.1 mmol/L	Normal random blood glucose
Females: less than 2.2 mmol/L Males: less than 2.8 mmol/L	Hypoglycaemia (low blood glucose)

Normal results may vary from laboratory to laboratory. Many conditions can change your blood glucose levels. Your healthcare professional will discuss any significant abnormal results with you in relation to your symptoms and medical history.

### Signs that you should check your blood glucose

If you experience some or all of these problems, your blood glucose should be checked:

- Sexual problems
- Frequent urination
- Vaginal infections
- Always thirsty
- Always hungry
- Sudden weight loss
- Blurry vision

<sup>1</sup> mmol/L: millimoles per litre



- Numb or tingly hands and feet
- Wounds that don't heal

## The link between blood glucose and diabetes

**With diabetes, the pancreas does not produce enough insulin to control the blood glucose levels.**

There are two types of diabetes: type 1 diabetes and type 2 diabetes

With type 1 diabetes, the body does not produce enough insulin, resulting in high blood glucose levels. This is also called early-onset diabetes or insulin-dependent diabetes mellitus (IDDM).

With type 2 diabetes, the body can't use the insulin the body produces properly, resulting in ..... This is also called maturity-onset diabetes or non-insulin-dependent diabetes mellitus (NIDDM).

Some people are more at risk of developing diabetes than others

Type 1 diabetes usually affects younger people while type 2 diabetes may only appear much later in life. Type 2 diabetes is more likely if you have a family history of diabetes or are overweight.

## Factors that may increase the risk of developing diabetes

Factors	Type 1 diabetes	Type 2 diabetes
Family history	Rare	Is a common factor
Body weight (obesity)	Not a factor	Is a common factor
Age	More common in children and adolescents	More common in older people
Race	More common in whites	More common in Africans, Indians or Hispanics
Certain medicines	Not a factor	Is a factor
Stress	Not a factor	Is a factor
High blood pressure	Not a factor	Is a factor
Inactivity	Not a factor	Is a factor
Pregnancy	Not a factor	Is a factor
High cholesterol	Not a factor	Is a factor

## Physical activity is important to managing diabetes

**Keeping your blood glucose levels under control is an important component of managing diabetes. So is regular exercise.**

The American Diabetes Association (ADA) recommends that people with diabetes do 2.5 hours of moderate to vigorous physical activity a week or 1.5 hours of vigorous exercise a week. Exercise can help to improve glycaemic control and weight control, and reduce the risk of cardiovascular disease.

**All people with diabetes should consult with their healthcare professional before doing exercise.**

Exercise sessions should take place at least three days a week, with no more than two days in a row without physical activity.

People with type 2 diabetes are encouraged to perform resistance exercise three times a week, targeting all major muscle groups. Training should be supervised by a professional in the beginning.

People with type 1 diabetes should avoid sports where a hypoglycaemic event could prove dangerous.





## Healthy exercise tips for people with diabetes

You may have recently found out that you have diabetes or you may have been living with diabetes for many years. Either way, it's important that you keep healthy. Here are some useful tips to help you get started with an exercise programme.

### Guidelines for introducing exercise

1. Start with a walking programme with a heart rate intensity of 60% to 70% for 10 minutes a day, working up to 30 minutes. If you're very unfit, you may can break this up into two sessions a day (starting with 5 minutes at a time).

To work out your heart rate:

- Subtract your age from 220 to get your maximum heart rate. For example, if you are 30 years old, your maximum heart rate is 190 (220 minus 30).
  - To exercise at 60% to 70% of your maximum heart rate, you should maintain a heart rate of between 114 and 133 beats a minute.
2. Move on to weights – use light weights and do many repetitions.
  3. Introduce more intense aerobic sessions, like cycling and aqua-aerobics (if you do not have any kidney problems) and perhaps light jogging.
  4. Limit your stretching – some people tend to lose fine-nerve sensation, and this could lead to muscle tearing.

### Tips for exercising safely

- Exercise regularly, ideally at the same time each day. Also be consistent with mealtimes and when you have your insulin injections.
- Carry medical identification and try to exercise with someone else, who knows that you have diabetes.
- Learn to control blood glucose by keeping track of how long each exercise session lasts, its intensity and your blood glucose levels.
- Have a high-carbohydrate snack (for example, ...) about 15 minutes before exercising. Eat within two hours of exercising.
- Always have quick-acting high carbohydrates on hand such as hard glucose sweets if your blood sugar levels drop to dangerous levels.
- Drink enough fluids before, during and after exercise. Avoid drinking too many sports drinks, as these are high in carbohydrates and may affect your blood glucose levels.
- Learn to identify physical responses to low blood sugar (hypoglycaemia) immediately.
- Avoid heavy exercise during peak insulin action.
- Protect your feet by wearing good-fitting shoes and cotton socks. To prevent blistering, keep your toenails short and don't fold your socks over. Avoid activities that could cause blisters.

## Healthy eating tips for people with diabetes

A healthy diet can help to prevent and treat complications like hypoglycaemia and hyperglycaemia, and long-term problems like kidney disease. Here are some guidelines to follow if you have diabetes:

### Cut out refined foods and get more fibre in!

- Eat a carbohydrate-based diet with fibre-rich foods. Choose foods that are high in dietary fibre, like wholegrain cereals, breads, rice, pasta, and fresh fruit and vegetables.
- Include soluble fibre in meals by eating wholegrain foods, fruit and vegetables, beans, legumes, oats and barley. Soluble fibre dissolves in water and can help lower glucose levels.
- Eat moderate amounts of lean protein. Protein should be low in fat, especially saturated fat.
- Follow the food pyramid principles.

### Limit the sugars and sweeteners

- Limit the amount of simple sugars you take in. These are found in refined foods like white sugar, white bread, cakes and pastries.
- Also limit the use of artificial sweeteners to no more than 10 tablets a day or 5 sachets a day.

### Don't skip meals. Snack regularly (and healthily)

- Stick to regular mealtimes, for example breakfast, lunch and supper.
- Have a healthy snack every three to four hours in between meals. For snacks, combine a carbohydrate and a protein, like a slice of low-GI bread and low-fat cheese or sugar-free peanut butter, or low-GI fruit and unsweetened low-fat yoghurt.

### Keep your alcohol and sports drinks under control

- If your diabetes is well-controlled, you can have alcohol in limited amounts. Stick to one drink a day if you're a woman; two a day if you're a man. Keep the mixers sugar-free.



- Limit the amount of sports drinks you consume before and during exercise.

**Keep fats down**

- Eat limited amounts of saturated fatty acids (SFA) or “bad fats” like animal fats, hard margarines, butter and full-cream dairy products.
- Rather take in more unsaturated fats or “good fats”, such as those found in fish, seeds, nuts, avocados, canola oil and olive oils.

**Make sure you’re eating right**

Consult with a registered dietitian for an individualised meal plan.

**Should your doctor put you on medication?**

Your doctor will decide if you need medication in addition to your lifestyle changes. It’s important that you take your medication as prescribed to lower the risk of complications, like coronary artery disease and stroke.

If you are concerned about your medication, experiencing any side effects or are not feeling well, consult your doctor first – don’t suddenly stop your medication. Your doctor might be able to change the medication to help you.

It’s important to visit your doctor regularly so they can monitor your progress.