

# Managing diabetes

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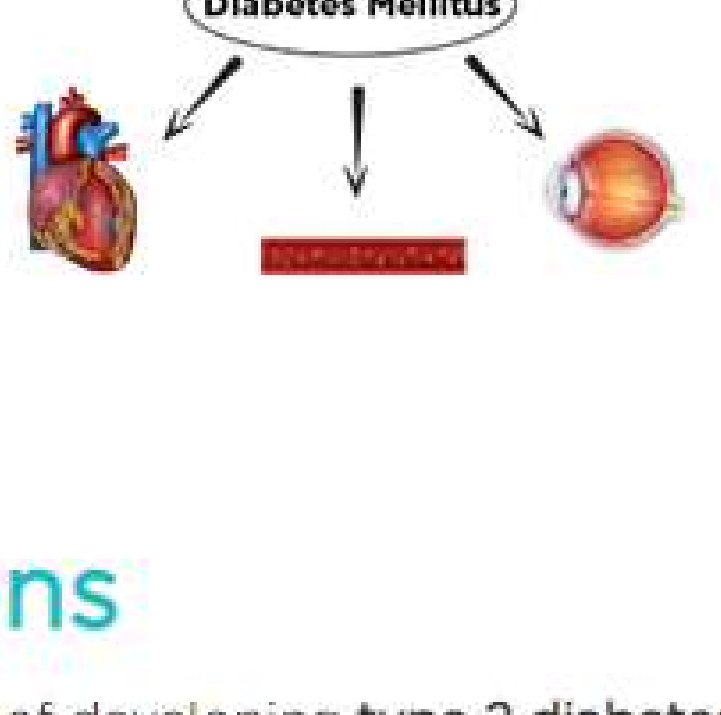
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## Why is blood glucose control important?

It is very important to keep blood glucose under control. Having diabetes will make a person five times more likely to have cardiovascular disease (eg, heart attack and stroke) than someone who does not. Diabetes can also lead to vision loss, kidney failure, nerve damage and lower limb amputation.<sup>1</sup>



## Lifestyle modifications

The first step you can take if you are at risk of developing **type 2 diabetes**, or if you have been diagnosed with type 2 diabetes, is to make diet and lifestyle modifications.<sup>1</sup>

Focus on<sup>1</sup>:

### Diet

- Take more fibre and reduce saturated fat intake. This prevents type 2 diabetes and helps manage it if you already have type 2 diabetes.<sup>1</sup>
- Consume lower glycaemic index (GI) foods (eg, brown rice, basmati rice, muesli, wholegrain bread) instead of high GI foods (eg, glutinous rice, white rice, cornflakes, white bread) to reduce your blood glucose after a meal.<sup>2</sup>
- Click here to find out more on diet and eating well.

### Physical activity

- Exercise at least 5 times a week.<sup>3,2</sup>
- You can also be active throughout the day, eg, by taking the stairs instead of the lift, and doing household chores.<sup>2</sup> This is a crucial part in type 2 diabetes prevention or management.<sup>1</sup>

\* Minimum 150 minutes/week of moderate-intensity activities, eg, cycling; or 90 minutes/week of vigorous-intensity activities, eg, jogging, swimming

### Weight

- Lose weight if you are overweight: If you have or are at risk for diabetes, target for a weight loss of 5–10% of your overall body weight over half a year.<sup>2</sup>
- Asians should target for<sup>3,1</sup>:
  - BMI of 18.5 to <23 kg/m<sup>2</sup>
  - Waist circumference of <90 cm (males)/<80 cm (females).
- You may be at increased risk of gestational diabetes (elevated blood sugar levels during pregnancy) if your BMI is ≥27 kg/m<sup>2</sup>.
- The recommended weight gain during pregnancy is<sup>1</sup>:
  - 12.5–18.0 kg if your pre-pregnancy BMI is <18.5 kg/m<sup>2</sup>
  - 11.5–16.0 kg if your pre-pregnancy BMI is 18.5–24.9 kg/m<sup>2</sup>
  - 7.0–11.5 kg if your pre-pregnancy BMI is 25.0–29.9 kg/m<sup>2</sup>

If you have **type 2 diabetes**, a healthy diet, regular [exercise](#) and weight loss (if you are overweight) might just do the trick to keep your blood glucose at a healthy level without having to use other treatments.<sup>1</sup>

If you have **type 1 diabetes**, on top of insulin therapy, regular physical activity is also very important because it lowers blood glucose levels. However, talk to your doctor before starting a new activity, because your insulin treatment or diet may need to be adjusted. Take a diet high in fibre, fruits and vegetables, and low in fat, salt and sugar. It is important to be aware of when and what to eat, and to get the correct amount of glucose. Speak to your healthcare professional about a dietary plan.<sup>4</sup>

## Medications

### Options for those with type 2 diabetes

If you have **type 1 diabetes**, you must use insulin. If you have **type 2 diabetes** and your glucose levels are still high despite lifestyle modifications, your doctor may prescribe medications for you.<sup>5</sup>

### Insulin

Insulin is a hormone secreted by the pancreas. Patients with **type 1 diabetes** require an external source of insulin because their bodies cannot make insulins.<sup>5</sup> Insulin might also be prescribed for some people with **type 2 diabetes** or **gestational diabetes** (high blood sugar during pregnancy).<sup>6</sup> For it to get into your blood, insulin must be injected (using a needle and syringe or an insulin pen),<sup>6</sup> because it would be broken down in your stomach and will not be effective if taken orally.<sup>5</sup> Insulin can also be delivered via a pump.<sup>4</sup>

Different types of insulin vary in how quickly they work, when they peak (the time during which insulin is at maximum strength to lower blood glucose), and how long they last. Your doctor will help you select the right one, based on your health and lifestyle.<sup>5</sup>

### Options for those with type 2 diabetes

The following medications may be given alone, or in combination, because they act in different ways to lower blood sugar.<sup>5</sup> For example, a sulphonylurea is sometimes given with metformin to improve glucose control.<sup>2</sup> They can sometimes cause side effects (mostly mild for medications such as metformin and dipeptidyl peptidase-4 inhibitors).<sup>1,7</sup> Hence, it is important to strictly follow prescription instructions and to inform your doctor if you notice anything amiss. These medications work best when used with meal planning and exercise.<sup>5</sup>

**Metformin** is usually the first medicine used in the treatment of type 2 diabetes.<sup>1</sup> It decreases the amount of glucose produced by the liver and makes muscle tissue more sensitive to insulin.<sup>2,5</sup> It usually does not cause hypoglycaemia (abnormally low blood glucose), because it does not stimulate insulin production.<sup>2</sup> Common side effects are nausea and diarrhoea, but these are improved when it is taken with food.<sup>2</sup> You will likely be prescribed metformin if you are overweight, because it offers weight stability or mild weight loss.<sup>1,2</sup>

**Sulphonylureas** increase the body's insulin production by stimulating the pancreas.<sup>5</sup> They are normally taken 30 minutes before meals. Weight gain and hypoglycaemia are among the side effects.<sup>2</sup> Symptoms of hypoglycaemia include trembling, paleness, sweating and blurred vision. However, sulphonylurea-related hypoglycaemia is uncommon and can be prevented by taking regular meals, not skipping meals and not drinking too much alcohol. If you experience hypoglycaemia, drink something sugary or take sweets, and then take a starchy snack such as bread.<sup>7</sup>

**Dipeptidyl peptidase-4 (DPP-4) inhibitors** prevent the breakdown of glucagon-like peptide-1 (GLP-1). Glucagon-like peptide-1 is a natural hormone which increases glucose-induced insulin production.<sup>1</sup> Insulin secretion is not stimulated if glucose levels are normal, hence DPP-4 inhibitors do not cause hypoglycaemia.<sup>1,2</sup>

**Glucagon-like peptide-1 receptor agonists** are given by injection, and mimic the natural GLP-1 hormone. They have been associated with weight loss. The main side effects are nausea and vomiting.<sup>1,2</sup>

**Meglitinides** also increase the body's insulin production, but their effects do not last very long.<sup>1</sup> They are taken just before meals, and are mainly used to control high blood glucose that occurs after a meal.<sup>1,2</sup> They may cause hypoglycaemia.<sup>5</sup>

**Alpha-glucosidase inhibitors** slow the rise blood glucose level after a meal by blocking the breakdown of carbohydrates.<sup>5</sup> They should be taken with main meals. Common side effects are bloating, abdominal discomfort, diarrhoea and flatulence.<sup>2</sup>

**Thiazolidinediones** make body cells more sensitive to insulin and reduce glucose production in the liver.<sup>1,5</sup> They can cause weight gain, bone fracture and fluid retention, and should be avoided if you have heart failure.<sup>1,2</sup>

**Sodium-glucose co-transporter 2 (SGLT-2) inhibitors** block glucose reabsorption in the kidneys. Unabsorbed glucose is passed out in the urine. Genital and urinary tract infections are potential side effects, due to increased glucose levels in the urine.<sup>2,5</sup>

## How do I measure blood glucose at home?

There are different tests which can be used to monitor your diabetes. Blood glucose monitoring is a test that you will be able to perform yourself. The test<sup>8</sup>:

- Helps with lifestyle and treatment decisions; and
- Helps you monitor for abnormally low or high glucose levels (hypo- or hyperglycaemia).

Blood glucose testing tells you your blood glucose level at the time of the test.<sup>9</sup> It is usually performed using a finger pricking device, called a lancing device, and an electronic glucose monitor.<sup>9</sup>

Steps<sup>8–10</sup>:

- Wash your hands with soap and warm water. Dry them.
- Insert a test strip into the monitor.
- Prick the side of your finger with a lancing device to get a drop of blood. (Holding your hand down will make it easier for the blood to appear)
- Hold the edge of the test strip so that it touches the drop of blood.
- The result will appear on the screen after a few seconds.
- Keep a record of your results, and show it to your doctor during your next appointment. \*Refer to your meter's user manual for steps specific to your meter, because not all meters are the same.

### More about the lancing device

It contains a fine needle (lancet) which pierces the skin to extract a drop of blood for testing. You can adjust the depth at which it pricks, depending on how thick your skin is. Do not use the lancet more than once, because it will become blunt and painful when reused.<sup>8</sup>



Some (not all) people with diabetes will test their glucose at home.<sup>8</sup> You may benefit from it if you<sup>10</sup>:

- Use insulin
- Are pregnant
- Find it hard to control blood glucose levels
- Have low blood glucose levels
- Have ketones from high blood glucose levels

Talk to your doctor about how often you should be testing your blood glucose at home, and how you can use the numbers to adjust food intake, exercise or your medications.<sup>2</sup> The following table may be used as a guide for suitable times to test<sup>2</sup>:

| Mode of treatment              | Breakfast |       | Lunch  |       | Dinner |                  |
|--------------------------------|-----------|-------|--------|-------|--------|------------------|
|                                | Before    | After | Before | After | Before | After/before bed |
| Diet only                      | ✓         | ✓     |        | ✓     |        | ✓                |
| Oral anti-diabetic medications | ✓         | ✓     |        | ✓     |        | ✓                |
| Insulin                        | ✓         | ✓     | ✓      | ✓     | ✓      | ✓                |

### Tips to record your blood glucose

A blood glucose monitoring diary is helpful if you need to test your blood glucose levels on a regular basis.<sup>11</sup> Record the date, time, test results, medication and dosage.<sup>9</sup> Make a remark of<sup>11</sup>:

- Exercise, illnesses or periods of stress, because these can affect blood glucose levels
- Times when a meal has been delayed or missed
- Meals which make your blood glucose control more difficult
- Shift work or irregular sleeping times

## What are the treatment targets I should look out for?

Your targets depend on<sup>10</sup>:

- How long you have had diabetes
- Your age and life expectancy
- Comorbidities
- Whether you have cardiovascular or microvascular (smallest blood vessels) complications
- Risk of hypoglycaemia (abnormally low blood glucose)

Blood glucose targets should be individualized. Your doctor will advise on what targets you should look out for. The ranges below serve as a guide.<sup>8</sup>

If you have **type 2 diabetes**, aim for blood glucose levels of<sup>2</sup>

|                |                        |
|----------------|------------------------|
| 4.4–7.0 mmol/L | Fasting glucose        |
| 4.4–8.5 mmol/L | 90 minutes after meals |

If you are an adult with **type 1 diabetes**, aim for blood glucose levels of<sup>9</sup>

|                |                                        |
|----------------|----------------------------------------|
| 5.0–7.0 mmol/L | On waking                              |
| 4.0–7.0 mmol/L | Before meals at other times of the day |
| 5.0–9.0 mmol/L | 90 minutes after meals                 |

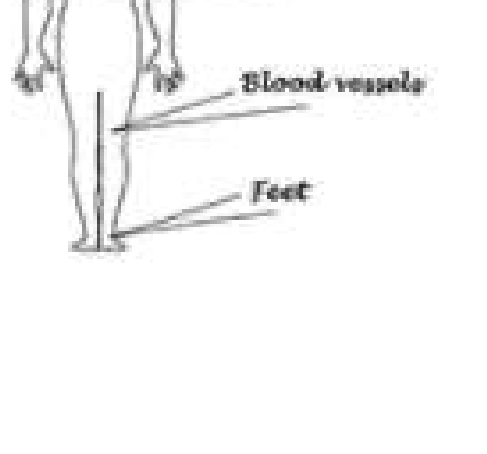
If you have diabetes, your doctor should also check your long-term control. The HbA<sub>1c</sub> test is the most common way to do so.<sup>8</sup> It provides a good indication of glucose control over the previous 2–3 months, and is normally performed every 3–6 months, depending on whether your targets are achieved.<sup>2,8</sup>

| HbA <sub>1c</sub> target | Target individuals                                                                                                                                                                                                   |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6.0–6.5%                 | <ul style="list-style-type: none"><li>Newly diagnosed</li><li>Younger age</li><li>Healthier (no cardiovascular disease complications)</li><li>Low risk of hypoglycaemia</li></ul>                                    |
| 6.6–7.0%                 | <ul style="list-style-type: none"><li>All others</li></ul>                                                                                                                                                           |
| 7.1–8.0%                 | <ul style="list-style-type: none"><li>Those with other medical conditions (coronary disease, heart failure, renal failure, liver dysfunction)</li><li>Short life expectancy</li><li>Prone to hypoglycaemia</li></ul> |

## Preventing complications

If blood sugar levels are constantly high, tiny blood vessels supplying the eye can be damaged causing diabetic retinopathy, and this can lead to blindness. Blindness can be prevented if diabetic retinopathy is detected early. Hence, it is important to screen for retinopathy at least once a year if you have diabetes.<sup>2,12</sup> Find out more about diabetic retinopathy [here](#).

Diabetes can also lead to a type of nerve damage called diabetic neuropathy. A common complication is foot problems such as sores and ulcers, and unattended foot ulcers can eventually lead to tissue death and require amputation. This can be prevented through early detection and treatment. It is therefore important to have good foot care and to stay alert for signs and symptoms of diabetic neuropathy. Have a comprehensive foot examination by your doctor at least once a year.<sup>2,13</sup> Click [here](#) to read more about diabetic neuropathy.



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