

Section 2

Managing your blood glucose levels (BGLs)



Blood glucose monitoring

Blood glucose monitoring is the measurement of glucose in the blood. A finger prick blood sample is measured by a glucose meter.

Blood glucose monitoring is essential to manage your diabetes so that you can:

- monitor glucose levels when your exercise changes and know when eating different foods
- learn about patterns or trends in your glucose levels
- adjust your medications - with help from the diabetes team
- recognise hypoglycaemia (low levels) and hyperglycaemia (high levels)
- manage when you may be unwell e.g. colds, flu or upset stomach.

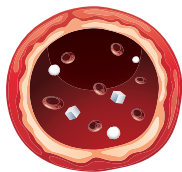
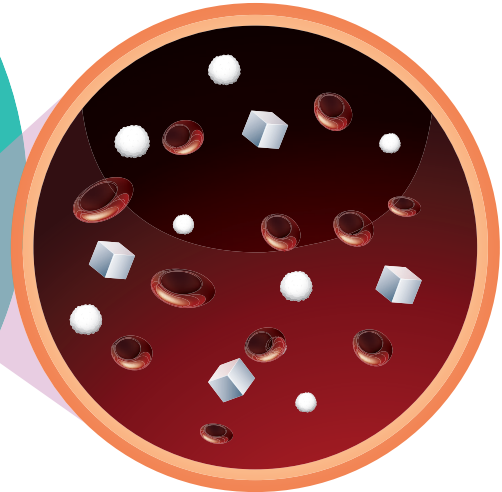
What supplies do I need to check my blood glucose levels (BGL)?

- You will need to register with **National Diabetes Service Scheme (NDSS)**. Your diabetes team will help with this. You will then be able to buy supplies at a lower cost.
- You will be given your first meter in hospital.
- Some private health insurance funds may cover the cost if you buy another meter.
- NDSS pharmacies sell meters and other supplies.

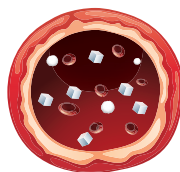


Steps to check your BGL

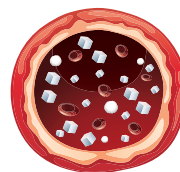
- 1 Wash hands with warm water and soap and dry well.
- 2 Prepare your meter, strips (make sure they are in date) and finger pricker. **Remember to set the gauge depth on your finger pricker to your chosen level.**
- 3 Use a new finger pricker every day.
- 4 Place strip in the meter.
- 5 Prick the tip of your finger on the side. Fingertips are the preferred site for testing for accuracy.
- 6 Relax your arm by your side and gently massage with the hand from the base to the tip of the finger (a drop of blood should appear).
- 7 Touch the test strip to the blood until it has absorbed enough.
- 8 The meter will count down and then show the result.
- 9 Record the level in your record book.
- 10 Throw out the used test strip.



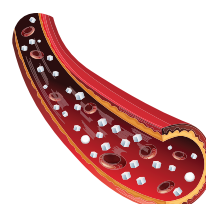
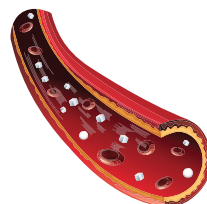
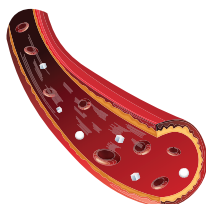
hypoglycaemia (low)



normal



hyperglycaemia (high)



When and how often should I check my BGL?

- At first, more frequent BGL checks are needed to work out your medication doses, We recommend at least 4 to 6 checks per day.
- Sometimes overnight testing will also be required.
- Once BGLs are in target it will be ok to reduce testing. This will be discussed with your team.
- You should always check your BGL if you are feeling '**low**' (**hypoglycaemic**), unwell, or '**high**' (**hyperglycaemic**).
- You should always check your glucose level before meals if you are on insulin.

Throwing out equipment

- Test strips can be put into rubbish bins.
- Any exposed lancets need to be put into an approved sharps container.
- Full sharps containers may be taken to an NDSS sub-agency/pharmacy or the local shire or city council for disposal.
- In country regions, full sharps containers may be disposed of at the local district or regional hospital.



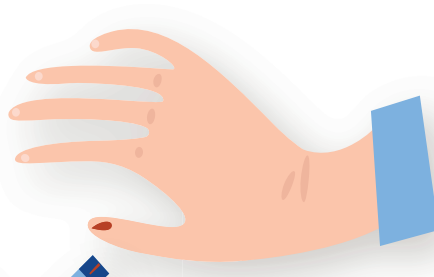
DO NOT place sharps directly in the bin

What glucose target should I aim for?

In Australia, BGLs are measured in millimoles of glucose per litre of blood (mmol/L). It is important to make sure that your meter is set to read BG in mmol/L.

Normal

In a person without diabetes, the range is approximately between 3.5 mmol/L and 8.0 mmol/L.



Type 2 diabetes

In a person with type 2 diabetes, we aim for between 4.0 mmol/L and 6.0 mmol/L before breakfast (fasting BGL)



Our target post meal reading is between 4 - 8 mmol/L.



What if I have unexplained out of target readings?

- Are the strips past their expiry date?
- Have the strips been affected by heat, light or humidity?
- Did you wash and dry your hands first?
- Is there enough blood on the strip?
- Do the batteries in the meter need changing?
- Are you using different meters?



BGLs can fluctuate and it can be difficult to keep within this range all the time. There are many factors that will affect your BGL and it is important to maintain a healthy lifestyle.

Remember, you can't fail a blood glucose check – you succeed by getting the information about your BGL number – high, low or within range.

If you have a lot of readings outside the target range, then it may mean you need to make changes to your medication, exercise or food.

Your HbA1c

When you visit the clinic, the nurses will take your HbA1c. This is a finger prick measurement different to your BGL which gives us your average BGL over the last three months. At first, your HbA1c may be high because your blood glucose levels were high before you were diagnosed.

The target HbA1c is 6.5% or lower without frequent low blood glucose (hypos). This will take time to achieve. A lower HbA1c will help you feel better, have more energy, better concentration and lower your risk of long term diabetes related health problems.



Hyperglycaemia (high blood glucose levels)

Hyperglycaemia occurs when your BGL is higher than 15 mmol/L. **Remember your target glucose range to aim for is 4 – 8 mmol/L.**

What causes hyperglycaemia?

- Too much carbohydrate, unhealthy fats or sweet foods / drinks
- Missed medication or not enough
- Lower levels of exercise
- Stress or excitement
- Illness or infection
- Growth and hormones



Signs and symptoms



- You are more thirsty than normal



- You feel very tired



- Weeing more

What if your reading is above 15 mmol/L?

- Did you wash your hands?
- Are your test strips in date and have they been correctly stored?
- Have you eaten in the last two hours?
- Is your medication in date and has it been stored correctly?



Monitor for ketones when the BGL is >15mmol/L **and** if you are feeling unwell



Remember your target glucose range to aim for is 4 – 8 mmol/L.



Occasional high blood glucose levels are expected however BGL's that are regularly over 8 mmol/L can cause problems later in life.

Ketones

Ketones are produced as result of the body breaking down fat to use as energy. This is because glucose which is the preferred source of energy, is unable to enter the cells. Ketones are an acid. Small levels of ketone, <1.0 are not harmful.



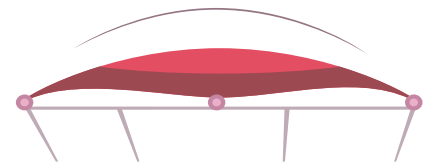
It is **uncommon** for children with type 2 diabetes to develop ketones as the pancreas is still making insulin. However, they may occur when a child is very unwell or has a bad infection which causes high blood glucose levels over a longer period of time.

Causes

- Missed medication
- Illness
- Starting other medications which can make your levels rise e.g. steroids.



Large amounts of ketones can cause **diabetes ketoacidosis (DKA)** which causes an imbalance in the blood acid levels and severe dehydration. If this occurs, you will require urgent medical attention.



Symptoms

- Headache
- Nausea and or vomiting
- Sweet smelling breath (similar to the smell of acetone) and/or shallow breathing
- Leg and abdominal cramps
- Flushed face
- Confusion
- Loss of consciousness



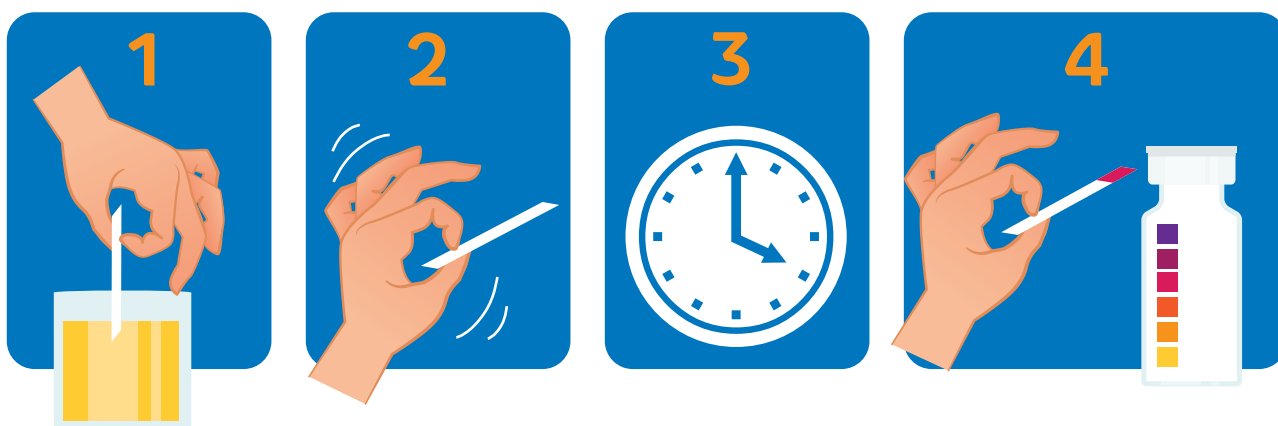
Remember if you do have ketones greater than 1 mmol/L it is important to contact the diabetes team either on the triage phone number 6456 1111 (option 2) or the on call doctor if it is after hours on 6456 5993.

How to measure ketones

- Ensure test strips are in date (ketone test strips are purple in colour)
- Wash and dry hands well
- Remove test strip from foil sleeve and insert into blood glucose meter (meter will turn on automatically)
- Prick the tip of your finger
- Apply a drop of blood on to the purple test strip area
- Record the number in your record book when it appears on the screen and follow management as per instructions above

(*Only valid for blood glucose monitors that can read ketones)

How to test urine (wee) for ketones



1. Dip the test area of the ketone test strip into a fresh sample of wee
 2. Tap the strip against the container to remove excess wee
 3. Close the lid of the ketone test strip bottle tightly and wait
 4. After 60 seconds, compare the test area with the colour chart on the bottle. (Note: timing is very important for an accurate result).
- **Record the result in your record book and follow management as per instructions above.**

(*The above information is for the Keto-Diabur 5000 ketone sticks. If you have a different brand, please refer to the product information guide inside the box).

Hypoglycaemia (low blood glucose levels)

For those using insulin

Hypoglycaemia occurs when your blood glucose level (BGL) falls to less than 4mmol/L. Some people refer to this as a '**low**' or being '**hypo**'. Because the aim is to maintain blood glucose levels between 4 – 8 mmol/L, mild to moderate hypos will occur from time to time.

Most common causes

- Too much insulin
- Not enough carbohydrate at meals or snacks
- Delayed or missed meals or snacks
- Increased activity
- Gastroenteritis
- Consumption of alcohol

Signs and symptoms

One or more of the following signs or symptoms may occur and are generally early signs of a hypo:



Hunger



Pale skin



Shaking



Sweating



Palpitations

If the hypo is untreated, there is limited glucose available for brain functioning and the following symptoms may occur:



Dizziness



Tiredness



Headache

Behavioural symptoms may include:

- irritability
- erratic behaviour
- agitation
- nightmares
- inconsolable crying.

At this stage you may not be able to follow instructions and therefore you will need treatment and someone to watch you closely. Symptoms of hypoglycaemia can also occur when the **BGL falls rapidly**.



Hypo treatment and a blood glucose meter must be accessible at all times.

If you are having repeated episodes of hypoglycaemia, please contact your diabetes clinical team for assistance.

If you check your BGL and it is less than 4 mmol/L, you will need to:

- Sit down and rest while someone watches you closely
- Immediately give fast-acting glucose - the amount will depend on age and weight.

6 -12 year old children will require approximately 10g

Children over 12 will require approximately 15g

Some examples of fast-acting glucose (choose one):

- Glucose tablets
- Glucodin 1.4g per tablet
- Trueplus 4g per tablet or
- Glucose drinks - Trueplus glucose drink 5g per 20mls or Lucozade Energy 5g per 30ml



NOTE: Try to avoid jellybeans or other sweets. Glucose is the fastest and safest option. If you plan to treat hypos with other foods, please discuss this with your diabetes team to see if they are appropriate.

Next steps

1. Re-check the BGL in 15 minutes.
2. Rest until all symptoms are gone.
3. If the level is still below 4 mmol/L, then repeat step 2.

Once your BGL is 4 mmol/L and above, follow up with approximately 15g of a slow-acting carbohydrate - snack to help prevent another hypo. Some examples are (choose one):



One piece of fruit



One slice of whole grain bread



One cup of milk



One muesli bar



NOTE: If the hypo occurs within 30 minutes before a meal, or morning or afternoon tea, your meal can take the place of the slow-acting carbohydrate.

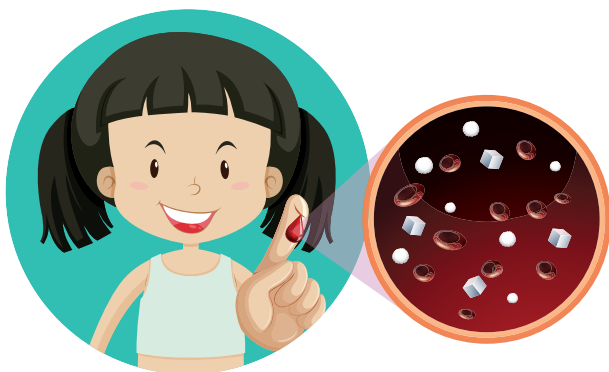
Hyperglycaemia and sick day management



Children and adolescents with diabetes are not more likely to become unwell. However, if you start feeling sick, you may need to do extra monitoring of blood sugar levels.

Here are some important steps to take if you are unwell:

- Check your blood glucose levels more regularly, every two to four hours
- Test for ketones if your blood sugar levels are over 15 mmol/L for over 8 hours
- Think about stopping your medication if you have vomiting, diarrhoea or are unable to eat.
- Continue to eat and drink if possible
- Restart your medication when you are feeling well again
- Seek help from your GP or diabetes team if you remain unwell or are unable to manage your diabetes



If you are on insulin, continue taking it and change your doses according to blood glucose levels. You will often need **more** insulin when unwell but in some cases (e.g. with persistent vomiting and/or diarrhoea) you may need to reduce your doses.



You can call
Diabetes Triage or the
on call doctor if you
need advice.

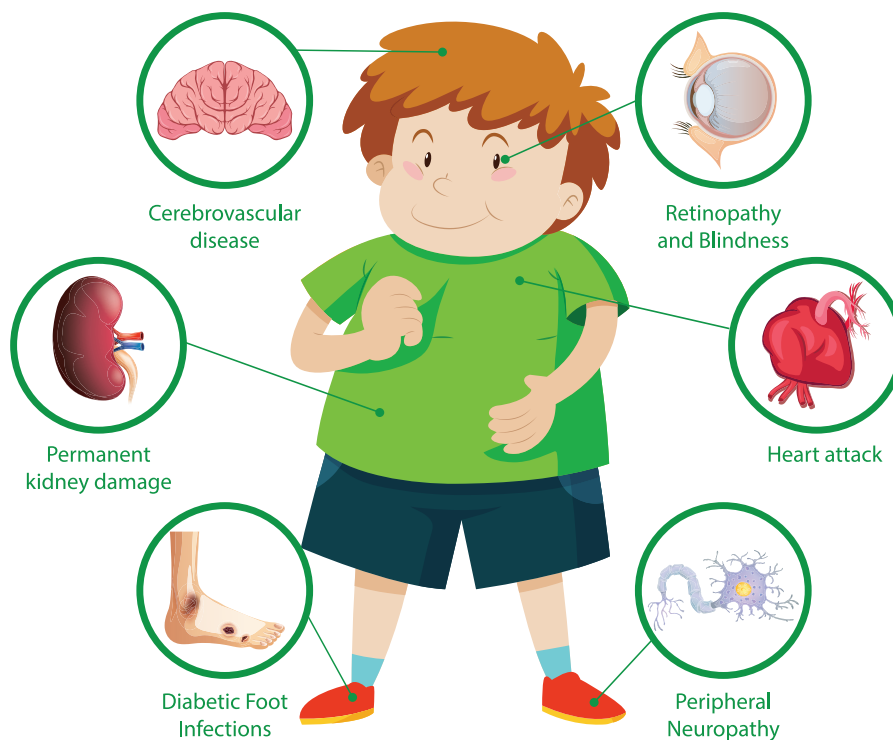
Phone: (08) 6456 1111

Staying healthy

Looking after yourself when you have diabetes means you can stay healthy and do all the things you want to do. If you don't look after your diabetes this leads to high blood glucose levels, feeling unwell and this can lead to many problems in your body.

These problems are called complications of diabetes and include damage to the:

- eyes
- kidneys
- blood vessels
- nerves
- gum diseases
- heart.



High blood glucose levels can also make you feel tired, moody, cranky and increase your risk of infections. The best way to stay healthy is to keep your blood glucose levels in a healthy range and your HbA1c below 6.5%.

It's very important that you are checked regularly by your diabetes team to pick up any early warning signs of complications of diabetes. This will involve the following checks:

- Your **HbA1c** and blood pressure every 3 months
- Having a urine test every year to check your kidneys
- Your lipids or blood fats measured every year
- Your nerves and feet checked every year by a podiatrist
- Your eyes checked every year or once a year by an eye specialist or optometrist
- Going to the dentist regularly to check your teeth



For parents – glucagon

Rarely, your child may become too drowsy to eat or drink safely or will not be able to swallow. This is known as severe hypoglycaemia. A severe hypo can also cause a seizure (fit) or your child becoming unconscious. If this occurs, **DO NOT put anything in their mouth as they are at risk of choking**. Place the child in the recovery position and check **DRSABC**:

Danger

Response

Send for help

Airway

Breathing

Circulation (pulse)

Basic Life Support

D

Dangers?

R

Responsive?

S

Send for help

A

Open Airway

B

Normal Breathing?

C

Start CPR

30 compressions : 2 breaths

- Once your child is positioned safely, an injection of glucagon (GlucaGen HypoKit) can be given.
- They should respond in 10-15 minutes.
- Consider phoning an ambulance if you are not confident with this process.
- Check blood glucose level. If the BGL is very low, the meter may read 'LO'.
- As soon as they are able to swallow, give sweet fluids such as Lucozade or sugar dissolved in water.
- Allow the child to sip this until their BGL is above 4 mmol/L (this may take more than 100ml) then follow with a slow-acting carbohydrate snack if the child can handle this.
- Some people experience a headache, nausea and vomiting after a glucagon injection. Analgesia can be given for the headache. Continue with sips of sweet fluids until they are no longer vomiting.



If vomiting persists, or if BGL is not maintained above 4 mmol/L, or your child does not respond to glucagon, call an ambulance - 000

If your child has a severe hypo, call the diabetes team for assistance with insulin adjustment. You should increase the frequency of BGL testing over the next few days, including an overnight BGL. Please ensure that you get a script to replace your glucagon (either from your GP or diabetes clinic).



For parents

Managing hypoglycaemia is possible by fixing the causes

Too much insulin

Children sometimes do not eat all carbohydrates in a meal which will need to be substituted with a different carbohydrate option. It is recommended that a child who is old enough to do their own injections is supervised by an adult to double check the dose before injecting. This is to ensure too much insulin isn't accidentally given.

Increased exercise

Adjustment to insulin dose before and after exercise may be needed to prevent hypoglycaemia. Extra carbohydrate should be given before exercise.

BGLs should be checked before and after sport, and during exercise if it takes more than 1 hour.



Hypoglycaemia can occur up to 24 hours after sport or activity. Talk with the diabetes team about how to prevent hypoglycaemia associated with increased activity.

Wrong insulin

Occasionally the wrong dose or type of insulin is given. Don't panic, this can happen to anyone. Please call the diabetes team if you are unsure of what to do.

Frequent hypos indicate that insulin, food and exercise are out of balance and some changes will be needed. If unsure, contact the diabetes clinic on **(08) 456 1111 option 2**.