■ **SECTION 2**
- GLUCOSE MONITORING
  - BLOOD GLUCOSE MONITORING
  - CONTINUOUS GLUCOSE MONITORING
  - FLASH GLUCOSE MONITORING

2

GLUCOSE MONITORING

There are different ways of measuring glucose.

Blood glucose (BG) monitoring is the measurement of glucose in the blood from a finger prick capillary sample that is measured by a glucose meter.

Continuous glucose monitoring (CGM) systems are available and are described later in this chapter.

Glucose monitoring is essential to manage your diabetes. Some of the reasons include:

> To learn about patterns or trends in your glucose levels.

> To adjust your insulin doses.

> To recognise hypoglycaemia **(low levels)** and hyperglycaemia **(high levels).**

> To monitor glucose levels when your activity changes e.g. exercise, sport.

> When eating different foods.

> On days when you may be unwell e.g. colds, flu, upset stomach.

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

> First you need to register with the National Diabetes Services Scheme (NDSS). Your diabetes educator will help with this. *This allows you to buy supplies at a lower cost.*

> NDSS sub-agent pharmacies sell meters and other supplies.

> You will get your first meter when you are in hospital. *Some private health insurance funds (extras cover) may cover the cost if you buy another meter later.*

nDSS
national diabetes services scheme

Diabetes
AUSTRALIA

www.ndss.com.au

http://osd.ndss.com.au/search/

SEARCH FOR HEALTH PROFESSIONALS or ACCESS POINTS

2.2   Steps to check your BGL

1. **Wash hands** with warm water and soap (if available) and dry well. Do not use alcohol wipes or gels.

2. **Prepare your meter, strips** (ensure they are in date) and lancet device. **Remember to set the gauge depth on your lancet device to your chosen level. The lancet drum needs to be changed every six days.**

3. **Place strip in the meter.**

4. **Prick the tip of the finger on the side.** Fingertips are the preferred site for testing for accuracy. **It is advised NOT to use toes.**

5. **Gently massage** the hand from the base to the tip of the finger (a drop of blood should appear).

6. **Touch the test strip to the blood** until it has absorbed enough.

7. The meter will count down and then show the result.

8. **Record the level** in your record book or pump.

9. **Discard** the used test strip.

2.3   When and how often should I check my BGLs?

> At first, more frequent BG checks are needed to work out your insulin doses.

> We recommend **at least 4 – 8 checks per day.** Sometimes overnight testing will also be required.

> You should always check your BG if you are feeling **"low" (hypoglycaemic)**, **unwell**, or **"high" (hyperglycaemic).**

> You should always check your glucose level before meals and giving insulin.

> You should always check your glucose level before and during exercise.

> A glucose check before going to bed is important.

2.4   Disposal of 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 incineration.

> In country regions, full sharps containers may be disposed of at the local district or regional hospital. **DO NOT place sharps directly into the rubbish.**

2.5 What glucose target should I aim for?

❯ In Australia, a BG is 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.

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

we aim for between 3.9 mmol/L and 8.0 mmol/L before meals.

❯ **7-day average should be ≤ 8 mmol/L.**

❯ BGLs will continually 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 BG number – high, low or within range.

❯ If many readings are outside the target range, then it may mean that changes are required around insulin, exercise or activity levels, and food.

2.6 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?**

❯ Are you **using different meters?**

Contact the company toll-free number listed in the meter's manual or warranty for further help.

CONTINUOUS GLUCOSE MONITORING

Continuous glucose monitoring (CGM) systems are a way to monitor glucose levels continuously through a sensor. There are several companies providing this type of technology.

CGM systems have three parts:

2 TRANSMITTER

SKIN

1 GLUCOSE SENSOR

TISSUE FLUID

CELL
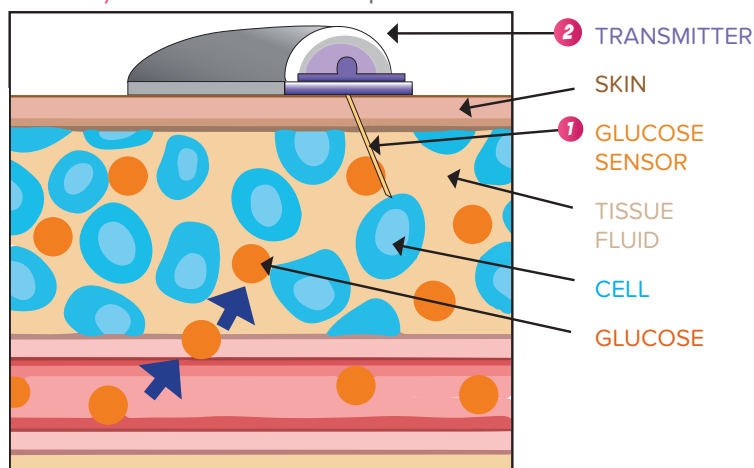
GLUCOSE

1 The sensor - is inserted under the skin by a parent or young person with type 1 diabetes, and has a very small foil that measures glucose levels in the tissue fluid. This may then require calibrating against a blood glucose level at least every 12 hours. The sensor is about the size of a 50 cent piece, and the filament that goes under the skin is about 1cm in length. The sensor stays in for 7-14 days.

2 The transmitter - attaches on top of the sensor and sends the sensor glucose readings to a receiving device.

3 The receiving device can be (i) a remote device, (ii) an insulin pump, or (iii) an app on a smartphone.

2.7   The benefits of using CGM

CGM can be useful for people who have type 1 diabetes for the following reasons:

👍 **CGM** gives you a reading every 5 minutes.

👍 **CGM** will also display a trend arrow – which tells you how fast your glucose levels are changing either up or down, and helps with making treatment decisions.

👍 **CGM** can give alarms about glucose levels that are too high or too low.

👍 **CGM technology** is reliable enough to be used to make decisions about managing your GL, without having to do a finger prick as well.

👍 **CGM technology** can be used together with an insulin pump.

👍 **Some CGM technology** will send the glucose readings to the "cloud" and allows carers to follow the glucose levels on their smartphone as long as they have internet access.

2.8   Things to consider

❯ **CGM requires** you to wear a device, which is inserted under the skin and needs to be changed regularly.

❯ Ideally **CGM** should be worn at least 95 percent of the time.

❯ The receiving device should be within 6m of the user. This may mean that a child will need to have a smartphone (if this is the receiving device) that may need to be taken with them to school.

❯ **Using CGM** does not currently completely eliminate the need for finger-prick checks.

❯ **CGM** gives a 'sensor' glucose level and measures a different fluid to blood. This may be different to blood glucose levels. The difference between CGM levels and BG levels can be greater when your glucose levels are changing rapidly.

❯ If your **symptoms do not match your sensor glucose level,** confirm with a finger prick.

Speak to your diabetes team if you require assistance in reaching these targets. Additional information on CGM is available at:

↗ www.pch.health.wa.gov.au/Our-services/Endocrinology-and-Diabetes

↗ www.childrensdiabetescentre.org.au

2.9   Interested in CGM?

1

See if you are eligible for the subsidy

In **April 2017,** the Federal Government announced **fully subsidised CGM** for eligible children and young adults under the age of 21 with **type 1 diabetes.**

Please see the below link for more information on this subsidy and the eligibility criteria.

www.ndss.com.au/cgm

2

Think about which CGM device you would like to use

Different devices have different features and capabilities, so it is important that you **choose the device that is right for you.** The following companies have CGM devices:

DEXCOM

Website: www.dexcom.com/en-AU

MEDTRONIC

Website: https://www.medtronic-diabetes.com.au/

Libre

Website: www.freestylelibre.com.au

3

See your diabetes team for more information
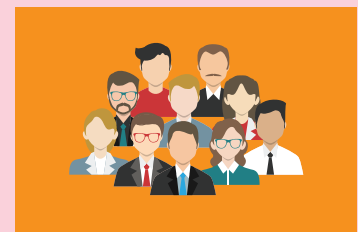
The use of CGM requires time, practice and new skills; your **diabetes team** will be able to provide you with **advice to ensure you get the most out of the system you choose.**

The manufacturer's helpline is also a good resource for ordering and technical troubleshooting.