Blood Glucose Monitoring in type 1 diabetes (adults)

Blood glucose goes up and down during the day depending on carbohydrate intake, insulin doses, physical activity, time of day and general wellness. The blood glucose tends to be lower before meals and higher after meals.

Monitoring shows you what the blood glucose levels are and guides your self-care. The first step in blood glucose monitoring is knowing your blood glucose target ranges.

Blood glucose (BG) targets

Time	Target BG
Before breakfast	5.0 – 7.0 mmol/L
Before other meals	5.0 – 7.0 mmol/L
2 hours after meals	5.0 – 10.0 mmol/L
Before bed	6.0 – 10.0 mmol/L
Before driving	Above 5.0 mmol/L
3 am	5.0 – 8.0 mmol/L

Note: For most people, it is recommended that blood glucose be as close to normal as possible to reduce the risk of long term complications (eg aim for the lower end of the target ranges).

For some people (eg with cardiovascular disease, impaired hypoglycaemia awareness, infants and young children, elderly, frail, or with other health problems), blood glucose targets will need to be set higher.

If you are pregnant or trying to get pregnant, your blood glucose targets will be set lower.

Blood glucose testing guide

Your blood glucose levels will identify if your insulin doses are correct and when changes are needed.

A blood glucose test before breakfast tells you how well your diabetes is controlled overnight by the basal insulin. Blood glucose tests before lunch, before the evening meal and at bedtime tell you if your meal time rapid acting insulin doses are right. A blood glucose test overnight can check that your basal insulin dose is correct.

Extra tests are recommended if you:

> feel that your blood glucose is low, as part of your **hypo action plan**
> feel unwell, as part of your **sick day action plan**
> are planning some physical activity, during and after physical activity
> are using machinery
> are about to drive
> are concerned about unstable, unexpected or unexplainable results.

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How to blood glucose monitor

Blood glucose monitoring involves putting a blood glucose testing strip into a blood glucose testing meter and placing a drop of blood from a finger prick on to the strip. The blood glucose level is then displayed on the screen. To obtain an accurate result, it is important to:

- wash your hands before pricking your finger and obtaining a blood sample
- calibrate your meter to each new packet or bottle of strips (if required)
- check expiry date of strips and don't use if out of date
- store the strips and meter away from direct sun and moisture.

Other methods of monitoring glucose

The **HbA1c** test is different to the finger prick test as it checks long term blood glucose. It measures how much glucose is in the blood over the last 8-12 weeks. This test is usually done 4 times a year by your endocrinologist or doctor. The general target for HbA1c is less than 53mmol/mol (7%), however this target may also be modified to suit your individual need.

Continuous glucose monitoring (CGM) and flash glucose monitoring systems measure glucose in the interstitial fluid (not blood) and track glucose levels over a period of 7-14 days. Depending on the CGM or FGM system, your blood glucose can be viewed immediately or the results can be downloaded later.

Blood ketone monitoring

Blood ketone monitoring is used to detect low insulin levels and aid the prevention of diabetic ketoacidosis (DKA). It is also used to guide insulin dose adjustments when you have high blood glucose (hyperglycaemia) or when you are unwell.

Blood ketone monitoring is done the same way as blood glucose monitoring, just using a blood ketone testing strip. Ketones can also be monitored using urine with a different strip that is dipped into urine however, this method is less accurate.

Blood ketones testing guide

Testing for ketones is recommended if you have an infection, are unwell, nauseous, vomiting and/or your blood glucose level is greater than 15.0 mmol/L. If ketones are present, specific instructions are in your **sick day action plan**.

Supplies and equipment

Registration with the National Diabetes Services Scheme (NDSS) gives you access to cheaper glucose and ketone testing strips. Blood monitoring meters and all of the equipment needed is available from NDSS community pharmacies and some diabetes centres. NDSS also provides access to fully subsidised CGM and FGM products if you have concessional status and risk.

Key points to remember

- know your blood glucose targets and have a plan for testing
- know your blood ketone targets and have a plan for testing
- dispose of sharps safely
- your **action plans** will advise you on what to do if your blood glucose level is out of target.
- if you have **persistent high or low readings** talk to your endocrinologist, doctor or credentialled diabetes educator**.**

Where can I go for more information?

National Diabetes Services Scheme	www.ndss.com.au
Diabetes Australia	www.diabetesaustralia.com.au

My monitoring action plan

Contact details Family / Friend: _____ Doctor: _____ Credentialled diabetes educator: _____ Health Direct (24hr health advice line) Phone: 1800 022 222	*Affix Patient Identification Label*

My blood glucose target range is: ↓ Less than 15.0 mmol/L to avoid symptoms of high blood glucose ↓ Less than 10.0 mmol/L to reduce risk of diabetes complications	Fasting: _____ mmol/L Pre meals: _____ mmol/L 2 hours after meals: _____ mmol/L Before bed: _____ mmol/L Overnight (2:00 - 3:00am): _____ mmol/L
My blood glucose testing plan is:	> fasting > pre meals > 2 hours after meals > before bed > overnight (2:00 - 3:00am)
Extra blood glucose testing plan is:	> feel that blood glucose is low > feel unwell > before, during or after physical activity > are using machinery > are about to drive > are concerned about unstable, unexpected or unexplainable results > other _____
My blood ketone target range is: ↑DKA risk if more than 0.6 mmol/L	Less than 0.6mmol/L
HbA1c target is:	_____ mmol/mol _____ %
Hypo action plan	Dated:
Sick day action plan	Dated:
School care plan	Applicable: Yes / No Dated:
Supplies	NDSS Community Pharmacy / Diabetes Service
Sharps disposal	NDSS Community Pharmacy / Council / Diabetes Service
Dated:	Name: Sign:

For more information

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Country Health SA LHN
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www.chsa-diabetes.org.au

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