

# High blood glucose in type 1 diabetes (hyperglycaemia)

Blood glucose levels can sometimes go out of your target range. Knowing your target range is important in managing diabetes. If your blood glucose is high and you have ketones, you can become unwell and quickly develop diabetic ketoacidosis.

## What causes high blood glucose?

- > missing insulin doses or not enough insulin
- > increase in carbohydrate food and fluid intake
- > miss match of carbohydrate intake with rapid acting insulin meal dose
- > decrease in physical activity
- > increase in weight
- > illness, infection or surgery
- > some medications (eg prednisolone).

## How will I know if I have high blood glucose or blood ketones?

Symptoms of high blood glucose may include thirst, tiredness, lack of energy, passing lots of urine (eg especially at night), weight loss or blurred vision. Many people do not get any symptoms until their blood glucose level is high for some time. Some symptoms can also be mistaken or overlooked.

Home blood glucose and ketone monitoring will identify high blood glucose and the presence of ketones.

## What is the risk of high blood glucose or blood ketones?

High blood glucose is when your blood glucose is greater than your target level. Occasional higher readings are expected and should not cause long term problems. When high blood glucose persists, the body's cells cannot use glucose for energy and the body begins to burn fat to make ketones as an alternate source of energy.

Diabetic Ketoacidosis (DKA) can occur when high blood glucose and ketone levels persist over hours or days. DKA results when you don't have enough insulin to use up the ketones. Ketones can be found in both blood and urine.

DKA is a serious medical emergency and can be life threatening if not treated properly. Identifying high blood glucose and ketones early can prevent DKA.

## What should I do if I have high blood glucose or ketones?

- > Check that you are taking your insulin as directed. Try to remember if you:
  - > took your insulin at the correct calculated dose and time
  - > stored your insulin correctly and that it is within the expiry date
  - > gave the dose correctly and that the delivery device was working.
- > Check for any changes in your carbohydrate exchange intake. Your eating plan may have changed or your carbohydrate:insulin ratio may need to be reviewed.



- > Check your blood glucose level more often to see if the higher reading was a one off or not.
- > Measure blood ketones. If you have blood ketones over 0.6mmol/L or urine ketones that are small, start your **sick day action plan**.
- > If you are feeling unwell (eg fever, infection, vomiting), start your **sick day action plan**.

Physical activity is often an effective way to lower your blood glucose. However, if you have ketones, physical activity can drive your blood glucose even higher and is not recommended.

## Can I use extra insulin?

Adjustments to your insulin doses or an extra dose (eg called a 'supplemental' or 'correctional' dose) of rapid-acting insulin can help control high blood glucose and prevent DKA.

A correctional dose of insulin can be used to temporarily correct a high blood glucose level during:

- > unexpected illness
- > as part of a treatment plan (eg when another medical condition causes your blood glucose to rise for an expected period of time (eg asthma requiring prednisolone, on renal dialysis days).

Talk to your credentialled diabetes educator about how you need a correctional dose if you have high blood glucose.

## What if I am using an insulin pump?

The instructions for managing high blood glucose and sick days when on an insulin pump are different to those above. Talk to your credentialled diabetes educator about action plans for your insulin pump.

## When should I seek help?

### Contact your doctor if:

- > your blood glucose does not improve despite two correctional insulin doses or it remains above 15mmol/L. Children or frail aged should consult a doctor early.

### Go to your nearest hospital if:

- > blood ketones more than 1.5mmol/L or urine ketones are moderate to heavy
- > you are unable to eat or drink or you have been vomiting for more than 2-4 hours
- > symptoms such as drowsiness, confusion, disorientation, heavy breathing, dehydration or severe abdominal pain
- > blood glucose stays below 4mmol/L and you cannot get up
- > too unwell to stay home.

## Where can I go for more information?

Diabetes Australia

[www.diabetesaustralia.com.au](http://www.diabetesaustralia.com.au)

National Diabetes Services Scheme

[www.ndss.com.au](http://www.ndss.com.au)

Australian Diabetes Educators Association

[www.adea.com.au](http://www.adea.com.au)

Department of Health

[www.health.gov.au](http://www.health.gov.au)

## Suggestions for your plan.

1. Start your sick day action plan immediately if;
  - > blood glucose is more than 15mmol/L within a 2-6 hour timeframe, or you are unwell eg fever, vomiting, unable to eat or drink
  - > ketones are present in blood or urine.
2. Monitor your blood glucose and ketones
  - > test blood glucose 2 hourly
  - > test ketones 2-4 hourly.
3. Correctional rapid-acting insulin

Give correctional rapid-acting insulin based on blood glucose and ketone levels. If you do give correctional rapid-acting insulin, seek medical advice if no improvement in blood glucose or ketones after two correctional doses.

If you do not have instructions to change your usual insulin doses or use correctional rapid-acting insulin doses, ask your doctor, diabetes specialist or credentialed diabetes educator.
4. Contacts
  - > if you are sick and home alone, phone and tell someone
  - > you may need to consult your doctor.
5. Prevent hypoglycaemia (low blood glucose)
  - > nausea, vomiting or diarrhoea may cause hypoglycaemia – reduce insulin doses as per correctional insulin instructions
  - > treat any low blood glucose using your **hypo action** plan. Mini doses of glucagon may be advised.
6. Have a list of other carbohydrate foods and drinks you can use
  - > ½ to 1 cup of fluid (125-250ml) every hour to avoid dehydration. If you **can't** eat – replace food with:
    - > sweetened fluids if blood glucose 15mmol/L or less (eg soft drink, juice, ordinary jelly)
    - > sugar free fluids if blood glucose more than 15mmol/L (eg diet drinks, diet jelly, diet ice blocks.
  - > Gastrolyte can help replace fluid lost because of vomiting or diarrhoea.
7. A sick day kit should include (but is not limited to):
  - > telephone numbers to call (eg family, doctor, local hospital/diabetes clinic, credentialed diabetes educator, diabetes specialist)
  - > list of foods and fluids you can have if you can't eat or drink normally
  - > a thermometer and paracetamol for pain relief and fever treatment
  - > in-date blood glucose and ketone testing strips and spare record book
  - > glucose jelly beans, glucose drink
  - > extra syringes or injecting devices
  - > rapid-acting insulin
  - > a copy of your sick day action plan and hypo action plan
  - > a copy of the ADEA Sick Day Management Guidelines for supplemental rapid-acting insulin doses.

## My sick day plan

Contact details	Doctor: _____ Credentialed diabetes educator: _____ Health Direct (24hr health advice line) ph 1800 022 222	
My target range is:	Fasting: _____ Pre meal: _____	Before bed: _____ Overnight: _____
Instructions for blood glucose monitoring and ketones	Fasting: _____ Pre meal: _____ Before bed: _____ Overnight: _____	2 hourly: _____ 4 hourly: _____ If hypo: _____
Hypo action plan	Updated: _____ Not applicable: _____	
Instructions for usual insulin	Never stop taking your basal insulin unless advised.	
Instructions for correctional rapid-acting insulin	Extra insulin may be needed. <i>CHSA Diabetes Service 2017 'Basal Bolus Insulin Fact Sheet'</i> <p style="text-align: right;"><b>discussed / not discussed</b></p> <i>ADEA 2014 'Supplemental Insulin Guidelines'</i> <p style="text-align: right;"><b>discussed / not discussed</b></p>	
Instructions for metformin	You may need to stop taking your metformin when sick. <i>ADEA 2014 'Management of glucose lowering medicines during illness'</i> <p style="text-align: right;"><b>discussed / not discussed</b></p>	
Instructions for types of fluids and food	Alternative food: _____ _____ Alternative fluid: _____ _____	
When to visit your nearest hospital	Feeling drowsy, confused, unable to eat or drink, vomiting persists. Blood glucose more than 15mmol/L for _____ hours. Blood ketones more than 1.5mmol/L or urine ketones more than moderate. Unable to give insulin (eg pump or injectable device failure).	
Sick day kit	Checklist List of medication/s Vaccination history Guidelines for diabetes medication / insulin management Individual instructions	
Dated:	Name:	Sign:

\*ADEA 2014 Clinical guiding principles for sick day management of adults with type 1 and type 2 diabetes.

### For more information

**CHSA Diabetes Service**  
**Country Health SA LHN**  
 PO Box 287, Rundle Mall  
 ADELAIDE SA 5000  
 Telephone: (08) 8226 7168  
[www.chsa-diabetes.org.au](http://www.chsa-diabetes.org.au)

