Insulin pump hyperglycaemia and sick day management plan

Baker HEART & DIABETES INSTITUTE

Having a sick day management plan to manage blood glucose levels is important in preventing an emergency or a hospital visit.

This guide has been developed for people using insulin pumps and **NOT** Multiple Daily Injections. You should discuss this with your health care team.

When to use your sick day management plan

- If you are unwell or have an infection, even if your blood glucose level is normal.
- When blood glucose levels are higher than 13mmol/L for 6 hours or more, even if you feel OK.
- When you have ketones in your blood or urine.
- Based on your previous experience. For example, if you have an infection or taking steroid medication.

Key steps to take

1 Test your blood glucose level and adjust insulin, *as per pages 2–5.*

2 Test your blood or urine ketone levels as per sick day recommendation and adjust insulin, *as per pages 2–5.*

3 Continue to take your insulin.

Extra insulin may be required. This is dependent on your blood glucose and ketone levels, *as per pages 2–5.*

4 Try to continue to eat and drink if possible.

Refer to fluid options Page 6.

5 Seek urgent medical attention at your nearest emergency department if you remain unwell, your blood glucose level is not coming down or if your ketones measure more than 3mmol/L.

If your blood glucose levels are less than 4.0mmol/L and

Your blood ketones are less than 0.6 mmol/L (urine ketones negative or trace), you should

- Treat hypoglycaemia as per usual treatment.
- Recheck blood glucose level in 15 minutes.
- Once blood glucose levels have returned to target range, recheck blood glucose levels and ketones in 1 hour.
- If blood glucose levels persistently low, you have been vomiting and/or have diarrhoea, consider reducing basal rate by 20% for 2–4 hours.
- If unable to eat or drink, phone 000 and give intramuscular glucogon injection as prescribed if you have this available.

Your blood ketones more than 0.6mmol/L (urine ketones small), you should

- Treat hypoglycaemia as per usual treatment.
- Recheck blood glucose level in 15 minutes.
- Change your cannula and reservoir.
- Once blood glucose levels have returned to your target range recheck blood glucose levels and blood ketones in 1 hour.
- If blood glucose levels persistently low, you have been vomiting and/or diarrhoea, consider reducing basal rate by 20% for 2–4 hours.
- If unable to eat or drink, phone 000 and give intramuscular glucagon injection if you have this available.

Your blood ketones more than 1.5mmol/L (urine ketones moderate/large), you should

- Treat hypoglycaemia as per usual treatment.
- Recheck blood glucose level in 15 minutes.
- Change your cannula and reservoir.
- Once blood glucose levels have returned to your target range recheck blood glucose levels and ketones every hour.
- If blood glucose levels persistently low, you have been vomiting and/or diarrhoea, consider reducing basal rate by 20% for 2–4 hours.
- If unable to eat or drink, phone 000 and give intramuscular glucogon injection as prescribed if you have this available.

Your blood ketones more than 2.0mmol/L, you should

- Seek urgent medical attention at your nearest emergency department.

IMPORTANT: You should seek urgent medical attention if blood glucose levels do not rise or ketones remain present.

If your blood glucose levels are between 4.1 – 8.0mmol/L and

Your blood ketones are less than 0.6 mmol/L (urine ketones negative or trace), you should

- Continue normal basal rate.
- Use your normal bolus advice as per pump for carbohydrates consumed and for correction.
- Drink fluids containing 15–20 grams of carbohydrate.
- Recheck blood glucose levels and ketones in 2 hours.

Your blood ketones are between 0.6 – 1.5 mmol/L (urine ketones small), you should

- Change your cannula and reservoir.
- Give a bolus of 5–10% based off your pumps total daily dose for the last few days (not including today).
- Continue this 5–10% of pump total daily dose every 2 hours until your ketones have returned to less than 0.6mmol/l.
- Drink fluids containing 15–20 grams carbohydrate.
- Recheck blood glucose level and ketones in 2 hours.

Your blood ketones are more than 1.5mmol/L (urine ketones moderate/large), you should

- Change your cannula and reservoir.
- Give a bolus of 10–15% based off your pumps total daily dose for the last few days (not including today).
- Continue this 10–15% of pump total daily dose every 2 hours until your ketones have returned to less than 0.6mmol/l.
- Drink fluids containing 15–20 grams carbohydrate.
- Recheck blood glucose level and ketones in 2 hours.

Your blood ketone more than 2.0mmol/L, you should

- Seek urgent medical attention at your nearest emergency department.

IMPORTANT: You should seek urgent medical attention if your blood glucose levels or ketones continue to increase after two extra doses of insulin.

If your blood glucose levels are 8.1 – 13.0mmol/L and

Your blood ketones less than 0.6mmol/L (urine ketones negative or a trace), you should

- Continue your normal basal rate.
- Use your normal bolus advice as per pump for carbohydrates consumed and for correction.
- If your blood glucose levels are still high after two correction doses, consider a temporary basal rate increase of 10–20% for 2 hours. Your pump is will show 110% or 120%. Repeat as required until your blood glucose levels are less than 8mmol/l.
- Recheck your blood glucose level and ketones in 1–2 hours.

Your blood ketones between 0.6 – 1.5mmol/L (urine ketones small), you should

- Change your cannula and reservoir.
- Give a bolus of 10–20% based off your pumps total daily dose for the last few days (not including today).
- Continue this bolus of 10–20% of pump total daily dose every 2 hours until yours BGL are less than 8mmol/l and ketones have returned to less than 0.6mmol/l.
- If your blood glucose levels are still high, run a temporary basal rate increase of 10–20% for 2 hours. Your pump is will show 110% or 120%. Repeat as required until your blood glucose levels are less than 8mmol/l and ketones less than 0.6mmo/l.
- Check your blood glucose level and ketones every hour.

Your blood ketones more than 1.5mmol/L (urine ketones moderate/large), you should

- Change your cannula and reservoir.
- Give a bolus of 20–30% based off your pumps total daily dose for the last few days (not including today).
- Continue this bolus of 20–30% of pump total daily dose every 2 hours until yours blood glucose level are less than 8mmol/l and ketones have returned to less than 0.6mmol/l.
- If your blood glucose levels are still high, run a temporary basal rate increase of 10–30% for 2 hours. Your pump is will show 110% or 120% or 130%. Repeat as required until your blood glucose levels are less than 8mmol/l and ketones less than 0.6mmo/l.
- Check your blood glucose level and ketones every hour.

Your blood ketones more than 2mmol/L, you should

- Seek urgent medical attention at your nearest emergency department.

IMPORTANT: You should seek urgent medical attention if your blood glucose levels or ketones continue to increase after 2 extra doses of insulin.

If your blood glucose levels are more than 13mmol/L and

Your blood ketones less than 0.6 mmol/L (urine ketone negative), you should

- Use your normal bolus advice as per pump for carbohydrates consumed and for correction.
- Recheck your blood glucose level and ketones in 1 hour.

Your blood ketone 0.6 – 1.5 mmol/L (urine ketone small), you should

- Change your cannula and reservoir.
- Give a bolus of 10–20% based off your pumps total daily dose for the last few days (not including today).
- Continue this bolus of 10–20% of pump total daily dose every 2 hours until your blood glucose levels are less than 8mmol/l and ketones are less than 0.6mmol/l.
- Run a temporary basal rate of 20–30% for 2 hours. This will show 120% or 130% on your pump. Continue this every 2 hours until blood glucose levels are less than 8mmol/l and ketones less than 0.6mmol/l.
- Check your blood glucose levels and ketones every hour.

Your blood ketones more than 1.5mmol/L (urine ketone moderate/large), you should

- Change your cannula and reservoir.
- Give a bolus of 20–30% based off your pumps total daily dose for the last few days (not including today).
- Continue this bolus of 20–30% of pump total daily dose every 2 hours until your blood glucose levels are less than 8mmol/l and ketones are less than 0.6mmol/l.
- Run a temporary basal rate of 30–50% for 2 hours. This will show 130% or 150% on your pump. Continue this every 2 hours until blood glucose levels are less than 8mmol/l and ketones less than 0.6mmol/l.
- Check your blood glucose levels and ketones every hour.

Your blood ketones more than 2 mmol/L, you should

- Seek urgent medical attention at your nearest emergency department.

IMPORTANT: You should seek urgent medical attention if blood glucose levels do not start to decrease or ketones remain present.

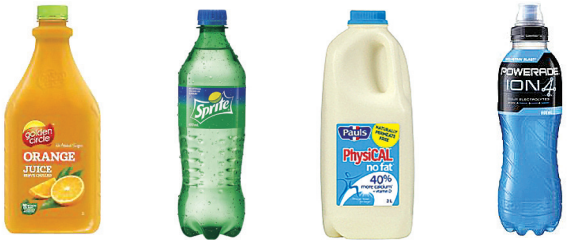
Nutrition tips

- ✓ **To avoid dehydration, you should keep drinking and eating if possible.**
- ✓ **Aim to have 125mls – 250mls of fluid per hour.**

If your blood glucose levels are **less than** 15mmol/L

Have fluids containing carbohydrate (15 – 20 grams per hour)

e.g. fruit juice, soft drink, milk, sports drinks

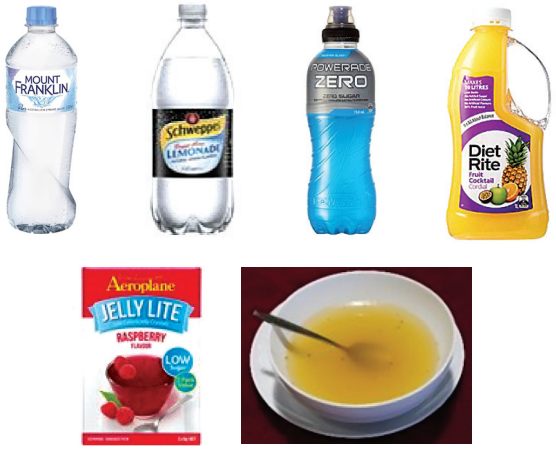


100mls 150mls 300mls 250mls

If your blood glucose levels are **more than** 15mmol/L

Have fluids which don't have carbohydrates (125 – 250 ml per hour)

e.g. water, diet soft drink, Powerade Zero, diet cordial, diet jelly, broth



Contents of a sick day kit

Sick day kit should include:

- ✓ Copy of your sick day plan
- ✓ List of important telephone numbers
- ✓ Glucose meter
- ✓ Glucose testing strips
- ✓ Meter to check ketones
- ✓ Ketone test strips
- ✓ Blood glucose diary
- ✓ Thermometer
- ✓ Pain relief medication
- ✓ Food and drink for sick days
- ✓ Hypoglyceamia treatment
- ✓ Insulin pens and needles
- ✓ Cannula and reservoir x2
- ✓ Insulin

Need to check sick day kit every 6 months to make sure still in date and restock as required.

Signs and Symptoms of an Emergency

- **Extreme thirst**
- **Going to the toilet often**
- **Nausea and vomiting**
- **Stomach pain**
- **Weakness or fatigue**
- **Shortness of breath**
- **Fruity scented breath**
- **Confusion**
- **High glucose**
- **High ketones**

Our insulin pump service is one of the largest in Australia

What can we do for you?

Our service is here to assist you with:

- ✔ Starting insulin pump therapy.
- ✔ Upgrading your existing insulin pump.
- ✔ Providing more information if you want to learn more about this exciting technology.
- ✔ We can help identify patterns of low blood glucose levels and develop personalised tips for prevention and management.

Who can attend?

Our service is available to everyone and a referral is not required. To qualify for the insulin pump service, you need to:

- ✔ Have private health insurance for a minimum of 12 months.
- ✔ Be under the care of a specialist diabetes doctor.
- ✔ Be willing to learn and practice carbohydrate counting.
- ✔ Be prepared to test your blood glucose for tracking your levels up to 8 times/day in the beginning.
- ✔ Be prepared to attend a number of pump preparation and follow up appointments.

More information

Call us on **(03) 8532 1800** or

visit **baker.edu.au/insulin-pumps**

This fact sheet has been adapted from ADEA Managing sick days for adults with type 1 diabetes on an insulin pump Consumer Resource. Available from: **https://www.adea.com.au/wp-content/uploads/2015/12/sick-day-booklet-type-1-single-page-final.pdf.**

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