



Managing sick days for adults with type 1 diabetes on an insulin pump

Acknowledgment

This fact sheet for people with diabetes is intended to partner the *Clinical Guiding Principles for Sick Day Management of Adults with Type 1 Diabetes or Type 2 Diabetes: A Guide for Health Professionals*, which were first published by ADEA in 2006, revised in 2011 and further revised in 2016 and 2020 with NDSS funding. This revised fact sheet, *Managing sick days for adults with type 1 diabetes on an insulin pump*, was developed in consultation with an expert panel of health professionals and people living with diabetes.

Disclaimer

This information is intended as a guide only. It should not replace individual medical advice. If you have any concerns about your health, or further questions, you should contact your health professional.

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Managing sick days for adults with type 1 diabetes on an insulin pump

This guide can help you plan how to manage your diabetes when feeling sick and know when to get medical help.

Illness and infection may increase or lower your blood glucose levels and make it harder to manage your diabetes. A plan to manage sick days before you become unwell is essential.

The Australian Diabetes Educators Association (ADEA) recommends you work with your Credentialed Diabetes Educator (CDE) to prepare a Sick Day Kit. Keep it up to date. Your Sick Day Kit should always include your personal Sick Day Action Plan.

When to use your Sick Day Action Plan

You should follow your Sick Day Action Plan when:

- you feel unwell – even if your blood glucose is in your target range
- your blood glucose level is greater than 15.0 mmol/L for 2-4 hours or more, even if you feel well
- there are positive ketones in your blood or urine.

Why sick day management is important

Illness often causes a rise in blood glucose levels due to the effects of stress hormones such as cortisol and adrenaline being produced by the body. In this case, extra insulin is usually needed to prevent and treat rising blood glucose levels. If extra insulin isn't given, the body can't use the glucose in your blood for energy and instead breaks down fat. This results in the production of ketones, which are acidic and in large amounts are toxic to the body. Ketones can also be produced if you are not eating and are taking less insulin due to vomiting or diarrhoea. This can lead to a serious condition called diabetic ketoacidosis (DKA) which may need urgent medical attention.

Symptoms of DKA include:

- nausea, vomiting and/or stomach pain
- increased thirst and/or a dry mouth
- increased urination
- rapid breathing or shortness of breath
- a fruity-smelling breath
- feeling drowsy, weak, or confused.

If you experience any of these symptoms, it is important that you seek urgent medical assistance.



Key steps for diabetes sick day management

These six steps can help you to manage your diabetes when you are unwell and can reduce the risk of developing diabetic ketoacidosis (DKA).

Check your blood glucose levels more regularly

- Your Sick Day Action Plan will recommend how often to check your blood glucose levels.
- If your blood glucose levels are high and/or you have high ketone levels, it is essential that you take urgent action to bring them back into range.
- If your blood glucose levels are above 15.0 mmol/L for 2-4 hours or more, it is usually recommended that you check your levels every two hours until they are back in your target range.
- If your blood glucose levels are low, it is usually recommended that you check every 10-15 minutes until they are back in your target range.
- If you use a continuous or flash glucose monitor, it is important to confirm out of range readings with a fingerprick blood glucose check before taking action to correct them, remembering that there is a lag time between the two readings.
- Some pain medications (e.g. paracetamol and aspirin) and high doses of vitamin C can affect the accuracy of certain continuous or flash glucose monitoring devices. If you use one of these devices your Sick Day Action Plan should specify which medications are safe to take.

Check ketones

- Your Sick Day Action Plan will recommend how often to check your ketone levels.
- It is usually recommended that you check ketones every 2-4 hours when you are unwell or when blood glucose levels have been above 15.0 mmol/L for 3-4 hours or more, even if you don't feel unwell.
- Once ketones are detected or if you have symptoms of DKA, it is usually recommended that you check ketones every 1-2 hours until they return to normal.
- Blood ketone testing is the most accurate way to check for ketones. If you don't have a blood glucose meter that checks for ketones, you can use urine ketone test strips.
- A blood ketone level below 0.6 mmol/L or negative/trace urine ketones is considered normal.

Continue taking insulin and adjust your doses if needed

- Your body usually needs extra insulin when you are unwell even if you are not eating much, are vomiting, or have diarrhoea.
- It is important to never stop having insulin delivery, but your pump rates may need adjusting.
- If you use a closed-loop pump ('auto mode' function) you may need to switch back to manual mode while you are unwell to allow the use of temporary increased basal rates if this is part of your Sick Day Action Plan.
- Your Sick Day Action Plan and the quick guide on page 5 will help you to work out how much extra insulin to take and when you need to take it.
- If you need extra correction insulin while unwell, it is taken in addition to your usual meal bolus and may be needed outside the usual times your bolus for meals.
- The amount of extra insulin is based on your blood glucose and ketone levels.

Consider whether you need to cease any other medications you are taking

- Metformin (brand names include Diabex, Diaformin, Metex, Formet), and SGLT-2 inhibitors (brand names include Forxiga, Qtern Xigduo, Jardiance, Jardiamet, Glyxambi) are medications used to treat type 2 diabetes but are sometimes used in people with type 1 diabetes. If you are vomiting and/or have diarrhoea you need to temporarily stop taking these medications. Your Sick Day Action Plan should explain when to stop taking them. You can restart these medications when you are feeling well again (normally when you have been eating and drinking normally for 24-48 hours).
- There are other medications you might be taking that should be temporarily stopped if you are vomiting and/or have diarrhoea. Discuss with your doctor whether you are taking any other medications that need to be stopped when you are unwell.



Keep up food and fluids if possible

- Try to have half to one cup (125-250mls) of fluid every hour to avoid dehydration – this could include water, tea, sugar-free cordial or lemonade or any other sugar-free non-alcoholic drinks.
- Eat foods containing carbohydrate regularly to keep up your energy levels and prevent low blood glucose levels and ketones. If you feel nauseous, try having foods such as toast, cracker biscuits, plain rice or pasta, or mashed potato. If you are unable to eat your normal meals, aim to have around 15g of carbohydrate every hour from easy to digest carbohydrate foods.
- If you can't eat, try to replace the carbohydrate in your usual meals with carbohydrate-containing fluids.
- If you are eating carbohydrate foods and your blood glucose level is more than 10 mmol/L, choose carbohydrate-free fluids or give insulin to cover the carbohydrate in carbohydrate-containing fluids.

Seek help if needed

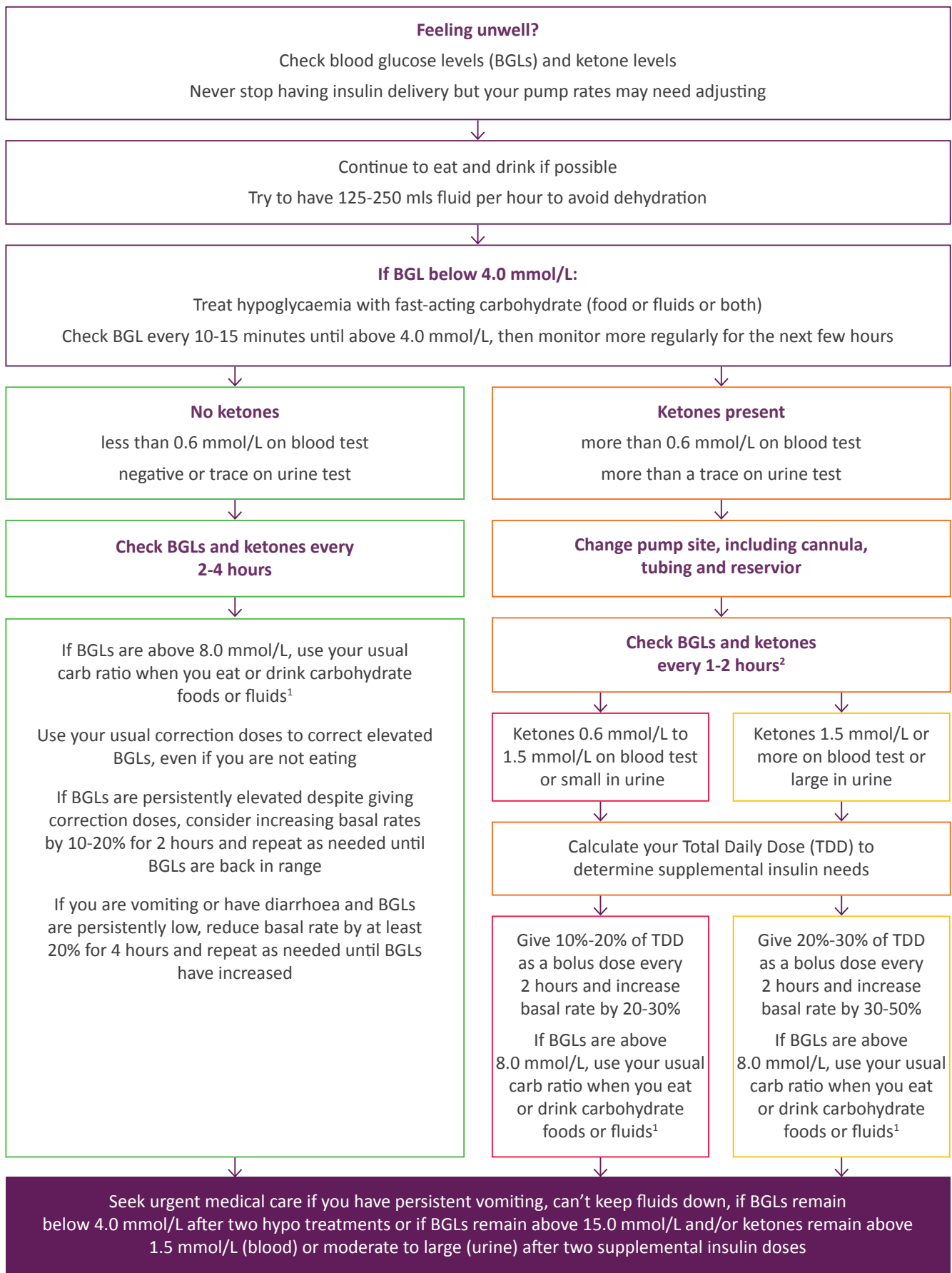
- When you're unwell it can be hard to follow your Sick Day Action Plan, especially if it's the first time.
- Include in your Sick Day Action Plan details of who might stay with you to help support you – this could be a family member, friend, or neighbour.
- Phone your CDE/ medical team early for help - this may prevent you from getting worse and needing emergency care.
- Seek medical advice to treat the underlying illness or infection.

Carbohydrate-containing fluids*	Carbohydrate-free fluids
Fruit juice (10g/100mls)	Water
Regular lemonade (9g/100mls)	Diet lemonade
Regular cordial (10g/20mls concentrate)	Diet cordial
Gatorade original (6g per 100mls)	Broth
Tea with sugar (5g per teaspoon sugar)	Tea without milk or sugar
Milk (5g/100mls)	Herbal tea
Regular jelly (15g per half cup)	Sugar-free jelly
Lemonade ice-block (~11g per 75g serve)	Hydralyte ice-block (~1g per serve)

* approximate carbohydrate values given in brackets – may vary between brands



Sick day management flowchart – Insulin pump therapy



1. If vomiting, wait for 30 minutes after eating to bolus for carbohydrate (to make sure food is kept down)
2. Don't correct more often than every 2 hours

Sick Day Kit

Your diabetes Sick Day Kit should include the following:

- your Sick Day Action Plan including emergency contact details (people you can call on for help if needed such as family, friends or neighbours, members of your healthcare team and your local hospital emergency department)
- your insulin pump back-up plan (a plan to follow if your pump stops working)
- a blood ketone meter and in-date blood ketone test strips, or urine ketone strips (note that urine ketone strips should be replaced three months after opening, even if they are still within their expiry date)
- spare pump cannulas and infusion sets
- spare insulin pens and pen needles or syringes
- a thermometer (optional)
- foods to treat hypoglycaemia such as glucose gels, tablets, or jellybeans
- easy to consume carbohydrate foods such as plain biscuits or crackers
- fluids including water, sweetened and sugar-free drinks
- fluids such as Gastrolyte® or Hydralyte® (these can help to keep you hydrated if you are vomiting or have diarrhoea)
- pain relief medications (if you use a continuous glucose monitor, check whether some pain medications (paracetamol and aspirin) may affect the accuracy of your device)
- a GlucaGen® HypoKit® (for treatment of severe hypoglycaemia) - a family member, carer or support person will need education on how to give this if you experience a severe hypo.

Remember to check your Sick Day Kit at least every three months to make sure items haven't expired. Replace used items. It is also important to make sure you always have spare insulin (including basal/long-acting insulin) – this should be kept in the fridge.

When to seek urgent medical help

Your Sick Day Action Plan can help you to manage sick days at home. However, there are times where you may need to seek urgent medical help (e.g. visiting your local hospital emergency department). You should always seek urgent medical assistance if you:

- have glucose levels that continue to rise despite two supplemental (extra) doses of insulin
- have blood ketone levels that remain moderate/large (blood ketones >1.5 mmol/L) and not decreasing despite two supplemental (extra) doses of insulin, with at least one given by injection using an insulin pen or syringe
- your blood glucose levels remain below 4.0 mmol/L despite two hypo treatments
- have persistent vomiting, especially if greater than 4 hours, or if it becomes stained with red or yellow/green
- become drowsy or confused
- develop deep or unusual breathing
- have stomach pain
- have symptoms of significant dehydration (including increased thirst, dry mouth, weakness, feeling faint or dizzy, rapid heartbeat, headache, confusion, blurred vision, dry skin and lack of sweating and reduced urination or dark urine)
- you or your support person(s) are unable to carry out or follow your Sick Day Action Plan.

It is important that you don't drive if you have any of the symptoms above. If you don't have someone to drive you to the hospital, call 000 for an ambulance.

