Sick Day Management of Adults with Type 1 Diabetes

CONSUMER RESOURCE

December 2014

Your trusted partner in diabetes care

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Feeling sick?

What to do

Information for adults with Type 1 Diabetes

Illness can affect blood glucose levels. Good planning can avoid problems.

If you have a chronic condition, such as diabetes, preventing illnesses is advised, for example by having a yearly flu vaccine. Yet, not all illness can be avoided.

This information is for when you become unwell or sick for a few days, for example with a bad cold or stomach upset. It can help you to:

1. plan how to manage your diabetes while you are sick, and
2. know when to get medical help for your diabetes.

This is called a 'sick day' plan and relates to how you manage your diabetes during your illness. You should still treat your illness as you would normally.

- Illness usually causes a rise in blood glucose levels due to the effects of stress hormones such as adrenaline being produced by the body. Sometimes, it's difficult to predict how illness might affect your blood glucose (BG) levels. Sometimes you can feel terrible but there may not be much change in your BG levels. Although, illness such as tonsillitis and chest or urinary tract infections can cause your BG levels to rise. As BG levels rise, you are at risk of developing ketones. Ketones are produced from the breakdown of fat when there is not enough insulin in the body. Ketones are acidic and can cause a life threatening condition called diabetic ketoacidosis (DKA). In order to prevent rising BG levels and production of ketones, supplemental (extra) insulin is usually needed.
- Steroid use for the treatment of conditions such as arthritis, polymyalgia rheumatica, and respiratory disorders can also raise BG levels. Individuals have an increased risk of developing ketones whilst taking steroids therefore should check for blood or urine ketones regularly. Often, individuals need an increase in their insulin doses whilst taking steroids.
- Emotional stress, substance abuse and surgery can raise BG levels as well.
- In some people, illness can cause BGLs to drop, for example when vomiting is part of the illness.
- Having a sick day plan can help you manage your blood glucose levels by instructing you how often to monitor BGLs and blood ketones, and when to report levels outside the target range, to your diabetes team.

The Australian Diabetes Educators Association (ADEA) recommends you work with your Diabetes Educator to prepare a Sick Day Management Kit and make sure you keep it up to date. You may choose to involve family and friends to support you when you are unwell.

Your Kit should always include your personal Sick Day Action Plan.

The following pages contain information about:

» **Sick Day Management Kit**

- Contents
- When and how to use it

» **Sick Day Action Plan**

For you to complete – and keep up to date - with your Diabetes Educator and medical team

» **Quick guides:**

- Drinks, carbohydrate and maintaining fluid levels
- Extra insulin on sick days
- When to seek urgent medical care
- Quality use of medicines
- Travelling
- Pregnancy.

There is also a table showing the guidelines Diabetes Educators/medical teams use to recommend supplemental insulin on sick days for people with, and without, an insulin pump.

Sick Day Management Kit

Contents

Your plan (see template enclosed)

- ✓ Sick Day Action Plan, including telephone numbers to call for help (support people, GP, diabetes educator, local hospital or medical centre)
- ✓ Quick Guide for extra insulin on sick days

Monitoring equipment

- ✓ In-date blood glucose strips and blood ketone strips or urine ketone strips. (Please note that urine ketone strips should be replaced 3 months after they have been opened, even if they are within the expiry date, to make sure you get an accurate reading)
- ✓ Thermometer (optional)
- ✓ Record book/paper to record results of your monitoring and insulin doses taken

Supplies

- ✓ Food that contains glucose or glucose gel or tablets and glucagon
- ✓ Fluid including water, sweetened and diet drinks
- ✓ Short acting or rapid acting insulin
- ✓ Insulin syringes or insulin pen
- ✓ Spare pump consumables (if using insulin pump therapy)
- ✓ Pain relief such a paracetamol or ibuprofen

Check your kit

- ✓ Check your kit every 6 months to make sure items are not expired
- ✓ If you have used the kit, replace items as soon as possible
- ✓ Talk with your Diabetes Educator if you are using the Kit for a different situation, for example travel
- ✓ Your Diabetes Educator can assist you with any aspect of Sick Day planning.

Sick Day Management Kit

When and how to use it

» Follow your Sick Day Action Plan if:

- You feel unwell – even if your blood glucose is normal
- There are positive ketones in your urine or blood
- Your blood glucose is greater than 15.0mmol/L for 6 hours or more, even if you feel OK
- Your Action Plan identifies a need, for example because of previous infection history or the nature of your BG levels. Discuss this with your Diabetes Educator/ medical team.

» Check glucose and ketone levels frequently, as per your Plan and the Quick Guide

- Ketone levels can be checked with urine ketone strips but this is not ideal
- Some blood glucose meters can also monitor blood ketone levels. This is more accurate and convenient.

» Expect to increase your insulin dose/s

- Your body usually needs extra insulin when you are unwell even if you are not eating much, are vomiting, or have diarrhoea.
- If extra insulin is needed, the amount is based on blood glucose and ketone levels so these need to be checked frequently. If your BG levels are above 15.0mmol/L for 6 hours or more you should check your blood glucose levels and ketones every 2 hours.
- The Quick Guide provides a guide to doses in different situations
- Your Diabetes Educator or medical team can help you plan for the extra or increased doses that might be needed
- Extra insulin should be rapid acting or short acting and are in addition to your usual dose/s
- You may not need to wait for your usual insulin times; your diabetes team can let you know if you need to take extra insulin outside of your usual times

Occasionally glucose levels can fall during illness – this would require a reduction in insulin dose.

» Ask for help

- When you're unwell it can be hard to follow your Plan, especially if it's the first time
- Include in your Action Plan details of who might stay with you to help support you
- Phone your Diabetes Educator/ medical team early for help; this may prevent you from getting worse and needing emergency care

» Keep drinking and eat if possible

- Try to have one cup (125-250mls) of fluid every hour to avoid dehydration: water, tea, coffee, sugar free cordial, sugar free lemonade, (any sugar free non-alcoholic drinks)
- Try to eat to keep up your energy levels and prevent low blood glucose levels
  If you can't eat, try to have:
  - Sweetened drinks if your glucose is less than 15 mmol/L
  - Sugar free fluids if your blood glucose is more than 15mmol/L

Sick Day Action Plan

Use with Sick Day Management Kit and Quick Guides

Date of Plan:_____ **Date for routine review***_____

**This plan should be reviewed at least every 1-2 years and after any:*

- Episode of sickness
- Change in your diabetes and your routine care plan
- Other health changes including pregnancy
- Changes in employment, where you live, or travel plans.

Keep a copy of this Plan in your Sick Day Management Kit and make a copy for your medical record.

Name: **Contact details:**

Diabetes Educator (CDE): Contact details:

Support persons who have agreed to help me when I am sick

Name: Contact details:

Name: Contact details:

Sick Day Action Plan

NAME:		
To consider	**What to do**	**Agreed special actions**
1. When to use the Plan		
2. What to do if support person cannot be contacted	*If no one available, seek medical assistance*	
3. Food	*How much* *How often* *What type*	
4. Fluid	*How much* *How often* *What type*	
5. Medications	*What to increase or decrease* *What to start or stop*	
6. Blood glucose and ketone levels at which to start giving extra short/rapid acting insulin		
7. Insulin		
• Amount for 5% of daily dose		
• Amount for 10% of daily dose		
• Amount for 15-20% of daily dose		
8. Glucagon		
9. Other medical conditions/ emergency plans		
10. Seeking supervised medical care		*24 hour medical team contact details, including out of office hours/weekend/public holidays*
11. Where to go in an emergency		*If the plan is not effective or you can't contact your medical team and you are concerned*
12. Other, including education programs available for you and your support person(s)		

Quick Guide

Drinks, carbohydrate and maintaining fluid levels

Fluids that contain carbohydrate

When you are sick, drinks with carbohydrate can reduce the risk of hypoglycaemia (a hypo) and help keep up your energy levels (if needed, the doctor can also prescribe you medicine to stop vomiting).

Type of fluid	Carbohydrate load per 100 mls
Fruit juice	10g
Cordial (1 teaspoon of concentrate)	10g/20ml
Soft drink	10g
Jelly	13g or 16g per half cup
Milk	5g
Oral rehydration solution	1.5g
Sports drink	6g
Icy pole	12g per stick
Calippo®	21g per tube
Frosty fruit®	21g per stick

Carbohydrate free drinks

- Sugar free/diet jelly
- Sugar free/diet/zero soft drink
- Sugar free/low joule cordial
- Water
- Broth.

Maintaining fluid levels when you are vomiting or have diarrhoea

- Limit or avoid caffeine – it can irritate your stomach and make nausea and vomiting worse
- Consider oral rehydration solutions (ORS) such as Gastrolyte® to help replace fluid and electrolytes.
- Some ORS contain artificial sweeteners (Gastrolyte®, Hydralyte®, Repalyte®).
- ORS have relatively low carbohydrate (1.6g/100ml made up solution) so extra carbohydrate might be needed to avoid a hypo.
- Precooked rice sachets and ice blocks are available and contain enough glucose and salts to improve fluid balance. The rice sachets also contain starch which can help people with diarrhoea.
- Sweetened fluids should be limited if you have diarrhoea - they can make it worse. They might need to be 1-5 times weaker so you can keep them down and absorb what you need. Sip slowly.
- Fizzy drinks can add to nausea and vomiting – let them go flat before you drink them.
- Sports drinks (eg Gatorade® or Powerade® can be a good alternative to ORS; they are slightly higher in carbohydrate.

Quick guide

Supplemental (extra) insulin on sick days

Supplemental doses of insulin are:

- Short acting or rapid acting
- Taken in addition to the usual insulin dose
- Taken straight away
  - Don't wait until the next regular insulin dose is due
  - Do wait at least 2 hours between each dose of short/rapid acting supplemental insulin
- Worked out as a percentage of the total of short and long acting insulin for the day.

Research shows that people feel better and stay healthier if they take supplemental insulin according to their Sick Day plan rather than wait until they get very sick.

Being proactive is better than being reactive; it's better for you to give supplemental insulin doses and preventing a rise in BGLs rather than give extra insulin once BGLs are already high.

Example:

USUAL DAILY DOSE	Morning	Lunch	Dinner	Bed
Short/Rapid acting	4 units	6 units	10 units	
Intermediate/Long acting				20 units
TOTAL DAILY DOSE	= 40 UNITS			
5% DAILY DOSE	= 2 UNITS			
10% DAILY DOSE	= 4 UNITS			

Quick guide

Quality Use of Medicines

Information about your medicines can be obtained from your Pharmacist.

When you have any medicine, it's important that you understand the following:

- Why you are taking it
- How and when to take it
- How to store it
- What effect you should expect
- Possible side-effects and when and whom to report them to
- Possible effects of taking several medicines together – including over-the-counter and complementary medicines.

Some people may experience an adverse (bad) reaction when: they have a drug for the first time; the dose is increased; or when it interacts with another prescribed or over-the-counter medicine. Some adverse drug reactions can seem just like an illness, for example vomiting, diarrhoea and sinusitis.

Seek advice from your Diabetes Educator/ medical team if you think a drug is not having the effect it should or you are experiencing side-effects.

When you are ill, you generally still take your medicines, including your glucose lowering medicines.

Note

You should still treat your illness as you would normally: this Plan relates just to your diabetes.

The use of sugar free medicines is not essential.

Quick guide

When to seek urgent medical care

Seek urgent medical help (e.g. hospital emergency department) when your Sick Day Management Plan says to do so.

Always seek urgent medical assistance if you experience any of the following:

- Drowsy or confused
- Fast or unusual breathing
- Stomach pain
- Vomiting that is persistent, especially if greater than 4 hours, or becomes stained with red or yellow/green
- Severe dehydration (symptoms may include increased thirst, dry mouth and swollen tongue, weakness, dizziness/fainting, palpitations, headache, confusion/delirium, inability to sweat, decreased or no urine output)
- Glucose levels that continue to rise despite 2 supplemental (extra) doses of insulin
- Blood ketone levels that remain moderate/large and not decreasing despite 2 supplemental (extra) doses of insulin
- Persistent hypoglycaemia
- You or your support person(s) are unable to carry out or follow your Sick Day Action Plan.

Quick guide

Travelling

It is important to check your Sick Day Action Plan and Kit, and management plan, when you intend to travel. This is particularly important when travelling overseas, especially if going to locations without medical services. See your doctor/diabetes team at least 6 weeks before you travel to allow time to check and follow-up on special needs.

What to consider when planning to travel:

- Contact information for support people and medical services
- Whether you need any of your health documents translated
- Food safety – to prevent illness
- Vaccinations – to prevent illness
- Wearing a Medical ID bracelet or similar
- Purchase travel insurance (diabetes must be declared as a pre-existing condition). Allow time for processing
- Documentation (letter from doctor) explaining the need to carry extra medication, needles/syringes, blood glucose meters, insulin pump/ accessories, continuous glucose monitor, sharps containers, and NDSS card within Australia.
- Making sure your diabetes supplies are in carry-on luggage
- Cool packs for storing medication/ insulin
- Ongoing access to refrigeration/ice as needed/Frio packs.

And also, if you use Insulin Pump Therapy (IPT)

- Back-up insulin pens/needles and/ or a spare pump and batteries
- Managing ascent and descent
- Managing airport security, particularly full body scanners.

Speak with your doctor/diabetes team about any other travel items to add to your normal Sick Day Management Kit. Consider the following:

- Medicines to stop vomiting and diarrhoea
- Paracetamol
- Broad spectrum antibiotics
- Oral Rehydration Solution
- Betadine™
- Basic wound dressing items.

Quick guide

Diabetes care during pregnancy (for women with pre-gestation diabetes, ie existing diabetes (type 1 or type 2) before they become pregnant)

If you are pregnant, or planning to become pregnant, review your Sick Day Action Plan. Consider the following:

- How to manage 'morning sickness'
- Frequency of BG and ketone monitoring during illness
- When to seek medical care.

Type 1 Diabetes guidelines for using supplemental insulin (% of daily insulin dose given as an extra short or rapid acting dose)

Table 1: Urine ketone negative and/or blood ketone less than 1.0mmol/L (no pump)

BLOOD OR URINE KETONE LEVEL	BLOOD GLUCOSE LEVEL (BGL)			
	Below 4.0 mmol/L	**Between 4.1 and 8.0 mmol/L**	**Between 8.1 and 15.0 mmol/L**	**More than 15.0 mmol/L/L**
URINE negative *AND/OR* *BLOOD* *less than 1.0 mmol/L**	May need to reduce insulin dose Treat hypoglycaemia as per your usual hypo treatment. If unable to eat or drink IMPLEMENT INDIVIDUAL HYPO EMERGENCY PLAN. Dial 000 or intramuscular glucagon. Check BGL EVERY HOUR until normal Check ketones 2-4 hourly SEEK URGENT MEDICAL CARE if BGL do not rise	No change to insulin Drink fluids with carbohydrate containing approximately 15-20g of carbohydrate Recheck glucose and ketones IN TWO HOURS	May fall without extra insulin If elevated for more than 2 hours consider 5% supplemental insulin Drink fluids with carbohydrate Administer insulin for carb ratio if this is your usual diabetes management Recheck glucose and ketones IN TWO HOURS	5-10% supplemental insulin dose Drink carbohydrate -free fluids OR Drink fluids with carbohydrate Administer insulin for carb ratio if this is your usual diabetes management Recheck glucose and ketones IN TWO HOURS SEEK URGENT MEDICAL CARE if unable to reduce BGL after 2 supplemental doses of insulin
** For some people this will be less than 0.6 mmol/L – check your Sick Day Action Plan*				

*For some people this will be less than 0.6 mmol/L. For example people who:

- Have a history of recurrent diabetic ketoacidosis
- Have very poor glycaemic management
- Have an eating disorder
- Are known to frequently and/or inappropriately omit insulin
- Are pregnant
- Have multiple co-morbidities which may include end-stage organ failure
- Are elderly
- Live in a remote/isolated are some distance from medical support.

Table 2: Urine ketone level small and/or blood ketone level between 1.0 and 1.4 mmol/L (no pump)

BLOOD OR URINE KETONE LEVEL	BLOOD GLUCOSE LEVEL (BGL)			
	Below 4.0 mmol/L	**Between 4.1 and 8.0 mmol/L**	**Between 8.1 and 15.0 mmol/L**	**More than 15.0 mmol/L/L**
URINE small *AND/OR* *BLOOD* *between 1.0 and 1.4 mmol/L *** *** For some people this will be between 0.6 and 1.0 mmol/L – check your Sick Day Action Plan*	Treat hypoglycaemia as per your usual hypo treatment. If you cannot eat or drink, IMPLEMENT INDIVIDUAL HYPO EMERGENCY PLAN. Dial 000 or intramuscular glucagon. Check BGL EVERY HOUR & Check ketones EVERY 2 HOURS until normal SEEK URGENT MEDICAL CARE if BGL do not rise or ketones remain present	No change to insulin Drink fluids with carbohydrate containing approximately 15-20g of carbohydrate Recheck BGL and ketones in 2 HOURS	If ketones persistently elevated for more than 2 hours consider 5-10% supplemental insulin Drink fluids with carbohydrate Administer insulin for carb ratio if this is your usual diabetes management Recheck BGL and ketones in 2 HOURS	10-15% supplemental insulin Drink carbohydrate -free fluids OR Drink fluids with carbohydrate Administer insulin for carb ratio if this is your usual diabetes management Recheck BGL and ketones in 2 HOURS SEEK URGENT MEDICAL CARE if unable to reduce BGL after 2 supplemental doses of insulin

***For some people this will be between 0.6 – 1.0 mmol/L. For example people who:*

- Have a history of recurrent diabetic ketoacidosis
- Have very poor glycaemic management
- Have an eating disorder
- Are known to frequently and/or inappropriately omit insulin
- Are pregnant
- Have multiple co-morbidities which may include end-stage organ failure
- Are elderly
- Live in a remote/isolated are some distance from medical support

Table 3: Urine ketone levels moderate large and/or blood ketone level 1.5 mmol/L or more (no pump)

BLOOD & URINE KETONE	**BLOOD GLUCOSE LEVL (BGL)**			
	Below **4.0 mmol/L**	**Between** **4.1 and 8.0 mmol/L**	**Between** **8.1 and 15.0 mmol/L**	**More than** **15.0 mmol/L**
URINE moderate/large *AND/OR* *BLOOD* *1.5mmol/L –3mmol/L* *SEEK URGENT MEDICAL CARE* *If blood ketones are more than 3mmol/L*	Treat hypoglycaemia as per your usual hypo treatment. If you cannot eat or drink, IMPLEMENT INDIVIDUAL HYPO EMERGENCY PLAN. Dial 000 or intramuscular glucagon Administer 5% supplemental insulin with adequate carbohydrate intake (if cannot eat or drink will need IV glucose.) Check BGL and ketones EVERY HOUR until normal SEEK URGENT MEDICAL CARE if BGL do not rise or ketones remain present	Administer 5% supplemental insulin Drink fluids with carbohydrate containing approximately 15-20g of carbohydrate Recheck BGL and ketones in 2 HOURS	If ketones remain elevated for more than 2 hours administer 10% supplemental insulin Drink fluids with carbohydrate Administer insulin for carb ratio if this is your usual diabetes management Recheck BGL and ketones in 2 HOURS SEEK URGENT MEDICAL CARE if ketones remain present	15-20% supplemental insulin Drink carbohydrate -free fluids OR Drink fluids with carbohydrate. Administer insulin for carb ratio if this is your usual diabetes management Recheck BGL and ketones in 1 HOUR SEEK URGENT MEDICAL CARE if unable to reduce BGL and/or ketones after 2 supplemental doses of insulin

Table 4: Sick day management (no vomiting or diarrhoea) for people using Insulin Pump Therapy

BLOOD & URINE KETONE	**UNWELL - NO VOMITING OR DIARRHOEA**			
URINE negative OR BLOOD Less than 1.0mmol/L (or 0.6-1.0mmol/L for at risk individuals)* AND BGL less than 15.0 mmol/L	**Basal insulin**	**Correction bolus**	**Food bolus**	**Extra fluids**
	Maintain basal rate	If BGL above target, correct blood glucose level using the pump with 'usual' settings	If BGL above target, cover all carbohydrate intake If BGL below target, do not cover carbohydrates, if carbohydrate amount is approx 15grams or less	If BGL low or in range, have fluids containing carbohydrate (Do not cover carbohydrate amount of approx. 15grams or less)

**At risk individuals include:*

- Have a history of recurrent diabetic ketoacidosis
- Have very poor glycaemic management
- Have an eating disorder
- Are known to frequently and/or inappropriately omit insulin
- Are pregnant
- Have multiple co-morbidities which may include end-stage organ failure
- Are elderly
- Live in a remote/isolated are some distance from medical support.

BLOOD & URINE KETONE	UNWELL - NO VOMITING OR DIARRHOEA			
	Basal insulin	**Correction bolus**	**Food bolus**	**Extra fluids**
URINE small OR BLOOD Between 1.0mmol/L and 1.4mmol/L (or 0.6-1.4mmol/L for at risk individuals)* AND BGL more than 15.0 mmol/L	Change pump site including cannula, tubing and reservoir. Maintain basal If BGL is over target range after giving a correction dose via injection, increase basal rate on pump by 10-20% over next 2 hours Repeat above steps until BGL returns to normal. [Sometimes basal rate is increased by as much as 50-100%].	Give first correction with an injection. This is 10% of the Pump Total Daily Dose (found in pump memory). Recheck BGL in 2 HOURS and if BGL is greater than 15.0 mmol/L give another correction by injection. Recheck BGL in 2 HOURS CALL FOR MEDICAL ADVICE if still more than 15.0 mmol/L	Cover all carbohydrates	Change to non-carbohydrate fluids if BGL is more than 15.0 mmol/L OR Ensure carbs's are covered with extra bolus's

Table 5: Sick day management for people using Insulin Pump Therapy and who are vomiting/have diarrhoea

BLOOD & URINE KETONE	**UNWELL - WITH VOMITING OR DIARRHOEA**			
	Basal insulin	**Correction bolus**	**Food bolus**	**Extra fluids**
Vomiting and/or diarrhoea **AND/OR** URINE moderate/large **AND/OR** BLOOD 1.5 mmol/L OR MORE **REGARDLESS OF BGL**	BGL 5.5 mmol/L or more: maintain basal rate If BGL less than 5.5 mmol/L, use a temporary basal: Decrease basal rate by 10-20% for 4 hours then review SEEK URGENT MEDICAL CARE if BGL does not rise or ketones remain	Correct BGL to target every 2 HOURS as needed	Don't cover carbohydrate until vomiting/diarrhoea slows Wait 30 minutes after eating to bolus for carbohydrate (to make sure food is kept down)	Drink fluids with carbohydrate. SEEK URGENT MEDICAL CARE if no improvement within a few hours. Likely to need intravenous fluids.

Notes

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