



## Sick Day Guidance for Type 1 Diabetes

If you have diabetes, it is very important that you know what to do when you are ill.

When you are ill your body becomes more resistant to the insulin you produce or take by injection. This means that your blood glucose levels can rise, and it is likely that you will need to increase your insulin dose. You therefore need to monitor your blood glucose and ketone levels very carefully. We refer to this as '**sick day guidance**'.

### What causes blood glucose levels to rise?

Illnesses and other conditions that could increase your blood glucose levels include:

- Common cold, flu or another virus (such as coronavirus (COVID-19))
- Stomach upset
- Sore throat
- Urinary infection
- Chest infection
- Abscess
- Broken bone
- Taking a steroid tablet or injections for another condition

### What impact will being ill have on my diabetes?

The impact on your diabetes will usually depend on whether you have a minor or severe illness. The difference between minor illness and severe illness depends on your blood glucose and ketone levels:

#### Minor illness

This is when your blood glucose is either within the normal range or raised but with no ketones in your blood or urine (e.g. a minor viral infection or minor injury).

#### Severe illness

This is where your blood glucose is raised and ketones are positive in your blood or urine (e.g. a chest infection or another severe infection). Your raised blood glucose may also be caused by missed insulin injections.



Remember that testing positive for ketones is a sign that you are low on insulin and if not treated can develop into [diabetic ketoacidosis \(DKA\)](#). If your blood ketones are above 0.6 mmol/L or urine ketones are above + and you have any of the following symptoms:

- extreme thirst
- needing to urinate more than usual
- extreme tiredness
- mental confusion
- stomach pain
- vomiting and/or diarrhoea
- a strange taste in your mouth
- breath that smells like pear drop sweets

then you must immediately go to A&E (or contact your diabetes emergency care facility) as you may have DKA. If you are pregnant and have raised ketone levels, then you should also either immediately contact your diabetes/ pregnancy emergency care facility or go to A&E, even if you have no other symptoms.

It is important to remember that when you are ill, you must monitor your blood glucose and ketone levels closely and you should never stop taking your insulin.

## How can I manage diabetes when I am ill?

### Eating and drinking

If you are vomiting, you do not need to eat until you feel well enough to do so. However, it is important to keep sipping fluids to prevent dehydration. You should drink at least 100 ml per hour of sugar-free fluids aiming for a total intake of 2 ½ to 3 litres per day.

If you do not feel like eating normal meals, try to eat foods that are easy to digest (e.g. soup, ice cream, milk puddings). If you are unable to eat, sip carbohydrate-containing fluids (e.g. fruit juice or a soft drink).

### Treat your symptoms

You can use over-the-counter medicines to help treat mild symptoms. Such medicines could include painkillers such as paracetamol to improve aches and pains or lower your temperature, decongestants to help relieve a blocked nose, or cough syrups to soothe a sore throat. If you are unsure, your pharmacist will be able to help you.

### Look out for low blood glucose (hypoglycaemia)

If your blood glucose falls below the normal range, sip full-sugar drinks, fruit juice, sweetened tea or Lucozade (make sure it's full sugar), or suck an ice lolly.



## Monitor regularly

It is important to check your blood glucose and ketone levels regularly if you are unwell. We recommend checking both blood glucose and ketones:

- Minor illness: at least 4–6 times per day including during the night
- Severe illness: every 2 hours including during the night.

Although we recommend checking ketone levels regularly, it is particularly important to check ketones if your blood glucose rises above 13 mmol/L. If you have a finger-prick blood ketone checker, then we recommend you use this as it provides a more accurate result. You should be able to get a finger prick blood ketone checker from your diabetes team, but if you don't have one, then urine testing strips are okay to use too.

## Never stop taking your long-acting insulin

It is important not to stop taking your long-acting [insulin](#) if you are unwell. The body's response to illness is to produce more sugar so you may in fact need more insulin during this period. This will help your blood glucose to stay in the normal range and reduce your risk of becoming unwell with DKA.

## Know when to seek help

If you have an infection that is not clearing up, you should make an appointment to see your GP to determine whether you need further treatment.

If you continue to vomit, are unable to keep fluids down and/or can't control your blood glucose or ketone levels you must seek medical advice immediately or go to your nearest A&E department.

## What do ketone levels mean?

Ketone levels are an indication of how low your body is on insulin and your risk of developing DKA. Compare your reading to Table 1 below and follow 'What it means' for information on what to do next.



**Table 1: What do Ketone levels mean?**

Blood ketone level	Urine ketone level	What it means
Less than 1.5 mmol/L	-	You may be able to take your normal insulin (see <a href="#">Insulin adjusting flowchart</a> ). If you are ill, you should keep testing at least every 4–6 hours.
1.6 to 2.9 mmol/L	+ or ++	You are at risk of developing DKA. Take an extra dose of quick-acting insulin (see <a href="#">Insulin adjusting flowchart</a> ). <b>Seek advice from your diabetes care team, your GP or an out-of-hours service. You should test your blood glucose and ketones every 2 hours.</b>
More than 3.0 mmol/L	+++ Or ++++	You have a high risk of developing DKA. Take an extra dose of quick-acting insulin (see <a href="#">Insulin adjusting flowchart</a> ). <b>Seek advice from your diabetes care team or your GP or go straight to the nearest A&amp;E department.</b>

## Do I need to adjust my insulin?

You may need to adjust your insulin regime if your illness is causing your blood glucose to be raised and/or ketones to be present in your blood or urine. Extra insulin will reduce your blood glucose and ketone levels.

**Please note: the advice below is for individuals taking four or more insulin injections per day. If you take two injections per day or use an insulin pump to manage your diabetes, please discuss this with your diabetes team.**

Follow the [Insulin adjusting flowchart](#) for guidance on how to adjust your insulin when you are ill. If you are unsure, contact your diabetes team or NHS 24.

Insulin adjusting advice varies depending on your blood ketone results as you may need more insulin depending on your ketone level.

Insulin adjusting advice involves calculating your total daily dose. This is the total number of units of long- and short-acting insulin that you inject on average each day. Use your doses from yesterday to calculate this. For guidance on calculating your total daily dose see page 7.



## Advice if you have no way to measure ketones

If you do not have a mechanism for checking ketone levels, then we would advise the following:

- Seek medical advice as soon as possible to enable your ketones to be checked.
- Contact emergency services immediately if you are vomiting, have severe abdominal pain or are dehydrated.
- If your blood glucose is greater than 13 mmol/L then take a correction dose of quick-acting insulin (10% of your total daily dose (see page 7 for example)) (ensure it is at least 2 hours since your last quick-acting insulin injection).
- Repeat your blood glucose checks at intervals of 2–4 hours. If your blood glucose remains high, take additional insulin as correction doses at mealtimes, or if you are not eating, at intervals of around every 4 hours. Always leave at least 2 hours between quick-acting insulin injections

## Insulin adjusting if minor illness (ketones less than 1.5 mmol/L)

1. Continue taking your usual long-acting insulin and usual mealtime quick-acting insulin
2. You may only need to take your long-acting insulin if you are not eating
3. If your blood glucose is elevated, consider taking a correction dose of quick-acting insulin
4. If you are ill for more than a day, consider increasing your long-acting by 1–2 units

## Insulin adjusting if severe illness (ketones 1.6 to 2.9 mmol/L)

**\*\* YOU SHOULD SEEK MEDICAL ADVICE IF YOUR KETONES ARE GREATER THAN 1.6 mmol/L, BUT ALSO FOLLOW THE ADVICE BELOW\*\***

1. Continue taking your usual long-acting insulin and usual mealtime quick-acting insulin
2. Calculate your total daily dose (see page 7 for example)
3. Give 10% of your total daily dose by quick-acting insulin as an extra dose (see page 7 for example)
4. Re-check your blood glucose levels and ketone levels in **2 hours**
5. Follow insulin adjusting advice depending on ketone level and give a repeated quick-acting insulin dose if necessary\*

**\*Always wait 2 hours between insulin doses unless a healthcare professional advises otherwise.**



## **Insulin adjusting if severe illness (ketones greater than 3.0 mmol/L)**

**\*\* YOU SHOULD SEEK MEDICAL ADVICE IF YOUR KETONES ARE GREATER THAN 3.0 mmol/L, BUT ALSO FOLLOW THE ADVICE BELOW\*\***

1. Continue taking your usual long-acting insulin and usual mealtime quick-acting insulin
2. Calculate your total daily dose (see page 7 for example)
3. Give 20% of your total daily dose by quick-acting insulin as an extra dose (see page 7 for example)
4. Re-check your blood glucose levels and ketone levels in 2 hours
5. Follow insulin adjusting advice depending on ketone level and give a repeated quick-acting insulin dose if necessary\*

**\*Always wait 2 hours between insulin doses unless a healthcare professional advises otherwise.**

**If you are unsure, please contact your diabetes team.**

**If you continue to vomit, cannot keep fluids down or are unable to control your blood glucose or ketone levels, you must contact your on-call doctor or go to hospital as an emergency.**



## How can I calculate my total daily dose?

Here is an example calculation to help you calculate your total daily dose.

Examples of long-acting insulin include Lantus, Abasaglar, Insulatard, Humulin I, Toujeo and Degludec.

Examples of quick-acting insulin include Novorapid, Fiasp, Humalog, Apidra and Humulin S.

### Example: Alex

Alex is on a basal-bolus insulin regimen (i.e. long-acting insulin once a day and short-acting insulin with meals). Yesterday, Alex injected:

- **20 units of long-acting insulin once daily**
- **4 units of quick-acting insulin with breakfast**
- **6 units of quick acting insulin with lunch**
- **8 units of quick-acting insulin with his evening meal**

Alex' total daily dose is equal to his daily long-acting insulin **PLUS** the total quick-acting insulin he injects during the day.

**Alex' total daily dose = daily long-acting insulin + daily total quick-acting insulin**

**Alex' total daily dose = 20 + 4 + 6 + 8**

**Alex' total daily dose = 38 units**

## How can I calculate extra insulin doses?

In the above example, total daily dose is 38 units.

10% of Alex' total daily dose in this scenario would be 4 units.

20% of Alex' total daily dose in this scenario would be 8 units.

You now need to calculate your own.

## Worked examples

If you need any further help to calculate extra insulin doses in specific scenarios, this is discussed in step by step detail [here](#).

