

Patient Advice for Management of Type 1 Diabetes Mellitus during illness in children and young people under 18 years (Sick Day Rules)

Note to parents and patients: This guideline should be discussed with your Paediatric Diabetes team before you use it as in some cases they may have to adapt it for your individual use

Sickness is an unavoidable part of everyday life. The body's natural response to illness results in higher blood glucose levels due to the release of stress hormones. During illness, you will need frequent blood glucose monitoring and often more insulin than usual.

What are ketones?

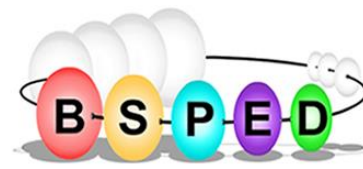
Ketones are acids which can make you feel very sick. They are produced when body is not getting enough food (glucose) or your body is not able to use glucose due to lack of insulin. If you do not get rid of ketones, you can become dehydrated and eventually develop Diabetic ketoacidosis. **Check for ketones whenever you are ill**, regardless of your glucose levels as you can have raised ketones with normal glucose levels i.e. starvation ketones with gastroenteritis

Sick day rules

1. **Never stop the insulin.** Even if you are eating less than normal, your body needs insulin to use glucose and to get rid of ketones.
2. Check your blood glucoses more frequently eg every 2 hours including throughout the night.
3. Check for blood ketones. Give additional fast acting insulin every 2 hours if blood glucose is above target. **(See Table 1)**
4. If ketones are present when blood glucose is low, they are called 'starvation ketones' and respond to drinking extra fluids containing sugar. Monitor blood glucose very closely and extra insulin may be required when blood glucose starts rising.
5. Keep well hydrated by drinking plenty of fluids.
 - a. Water, or sugar-free fluids are probably most appropriate in the majority of cases where blood glucose levels are normal or high
 - b. If blood glucose levels are low, drinks containing sugar are required, or eat carbohydrates if possible.
 - c. Avoid carbonated drinks if possible
6. Inform the diabetes team early to seek advice

Using Sick day rules for pump patients

1. Same principles apply for pump patients with regards to glucose testing and fluid intake.



2. In addition, even if unwell and blood glucoses are high, standard checks on the pump should be made for occlusions, disconnection and battery failures.
3. Give correction doses through the pump if blood ketone levels are less than 0.6mmol/l. If one correction dose given via the pump has no effect in 1 hour, repeat the correction dose with insulin pen.
4. If blood ketones are higher than 0.6mmol/l, give additional fast acting insulin using an insulin pen.
5. When blood glucose levels are rising in an unwell child needing frequent additional insulin doses, think about using higher temporary basal rates.

Specific pump management during illness

Aggressively manage elevated blood glucose levels during times of illness

If blood glucose above 15mmols and blood ketones 0-0.6mmols can give the correction bolus via the pump and if effective you can carry on using the insulin pump to gain control of the blood glucose levels

If correction via pump not effective then need to have next correction via pen device

If blood glucose levels are above 15mmol/L and blood ketones above 0.6mmols deliver the appropriate correction dose via pen device as detailed in table 1.

Change the giving set and cannula and check for any problems with the pump

Use the temporary basal rate (TBR) to increase your basal rate by +20% (120%) and recheck your blood glucose and ketone level in 2 hours

Continue to correct high blood glucose levels and increase the basal rate in 20% increments on a 2 hourly basis until blood sugar targets are achieved.

Give all correction doses by a pen or syringe until blood ketones are below 0.6mmols.

When to reduce basal rates

Once blood glucose levels are generally 5-10mmol/L can start to reduce the basal rate:

Reduce the basal rate by 20% providing that the result was not due to the correction dose within the last 2 hours

Continue to do decrease the rate by 20% increments in response to blood glucose levels until you have returned back to your usual basal rate (100%)

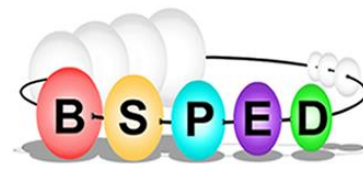
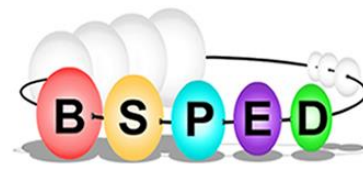


Table1

Negative ketones <0.6mmol/l (Blood)	Small to moderate ketones 0.6 – 1.5mmol/l (Blood)	Moderate to large ketones >1.5mmol/l (Blood)
Take a correction dose (CD) to correct high blood glucose (BG) in addition to normal bolus for carbohydrates eaten	Give <ul style="list-style-type: none"> 10% of your total daily dose (TDD) of insulin as additional fast acting insulin OR 0.1 units/kg body weight as additional fast acting insulin 	Give <ul style="list-style-type: none"> 20% of your total daily dose (TDD) of insulin as additional fast acting insulin. OR 0.2 units/kg body weight as additional fast acting insulin
Then: <ul style="list-style-type: none"> Re-check BG and ketones in two hours 	Then: <ul style="list-style-type: none"> Monitor fluid intake and ensure you are drinking enough fluids to keep well-hydrated Re-check BG and ketones in two hours (See below) 	Then: <ul style="list-style-type: none"> Monitor fluid intake and ensure you are drinking enough fluids to keep well-hydrated Re-check BG & ketones in two hours (see below)
<p>If your BG is going down that is a good sign but monitor closely throughout the day.</p> <p>If BG is increasing but ketones less than 0.6 mmol/l:</p> <ul style="list-style-type: none"> Take another correction dose using a pen <p>If ketones 0.5 – 1.5mmol/l, follow orange column advice</p> <p>If ketones >1.5mmol/l, follow the red column advice</p>	<p>If ketones negative follow green column advice</p> <p>If BG is increasing but ketones still 0.6 – 1.5mmol/l:</p> <ul style="list-style-type: none"> Continue to give 10% of TDD or 0.1 Units/kg as additional fast acting insulin every 2 hours using a pen Give usual boluses for food Re-check BG and ketones every 2 hours even through the night! <p>If ketones increase to >1.5mmol.l, follow the red column advice</p>	<p>If ketones negative follow green column advice</p> <p>If BG is increasing but ketones have reduced to 0.6 – 1.5mmol/l, follow orange column advice</p> <p>If ketones are still >1.5mmol.l:</p> <ul style="list-style-type: none"> Give another 20% TDD or 0.2units/kg as additional fast acting insulin every 2 hours using a pen Give usual boluses for food Once vomiting with high ketones, go to Accident and Emergency



When to contact team for advice:-

- If ketones are above 3mmols and/or vomiting
- If blood ketones continue to rise despite sick day corrections
- If had more than 2 sick day corrections with no improvement
- If first time unwell after diagnosis
- If not sure how to manage illness
- If ketones continue to rise this will lead to diabetic ketoacidosis (DKA)

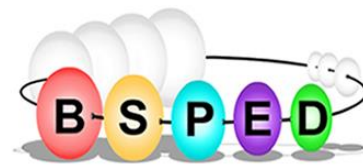
Who to contact for advice

Paediatric Diabetes Nurse Specialists during office hours 08.30- 16.30

- Office: 0161 922 5262 (Mon-Thur)
- Karen Wright 0161 922 4844 (Mon-Fri)
- Jenny Butterworth 0161 922 5433 (Tues-Fri)

Mobile: 07760991621(Karen)
07775032136 (Jenny)

Out of hours: 0161 922 6000 - hospital switchboard and ask for on-call paediatric registrar



Sick day doses

Date	
Weight	
10% sick day correction	
20% sick day correction	