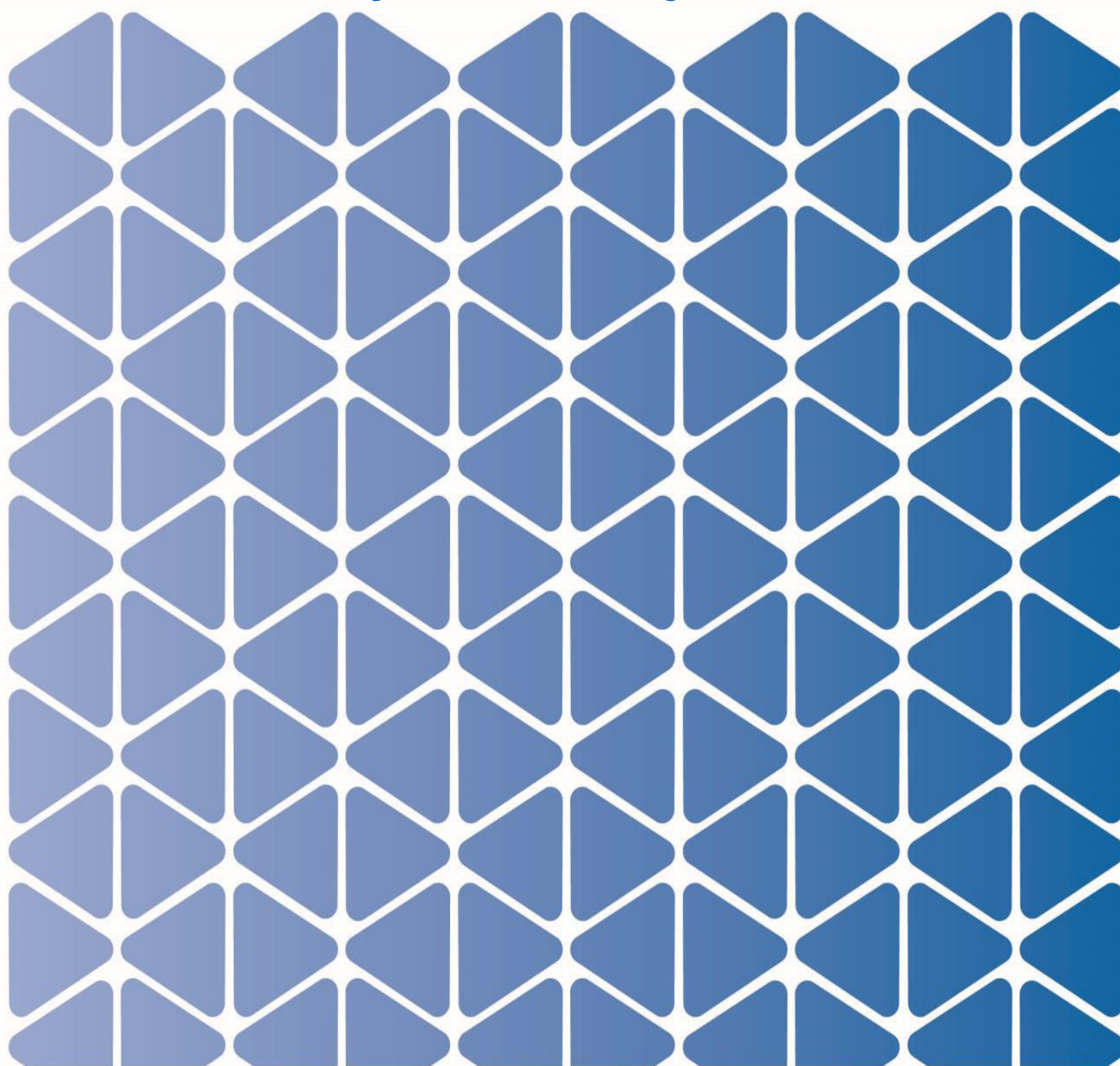


# **PAEDIATRIC DIABETES – Illness and Diabetes using Multiple Daily Insulin Injections**



## Illness and Diabetes using Multiple Daily Injections

Any illness can upset the control of your diabetes. However, if your Type 1 diabetes is well controlled, it does not mean that you are going to be unwell more often than young people without diabetes. Your blood glucose level may rise without there being any change in the carbohydrate food that you eat, or in the usual amount of insulin that you take. In some young people illness may cause the blood glucose to go down, particularly with diarrhoea and vomiting. This leaflet aims to give you the advice you need to avoid additional complications from your diabetes when unwell and keep you out of hospital where possible.

## Diabetic Ketoacidosis (DKA)

DKA is a serious complication of diabetes. It results from having less insulin than is required (sometimes from missing insulin) which causes a build-up of ketones in the blood. This can make you seriously ill and can be life threatening if not treated promptly. During illness the risk of DKA is increased. The following advice is aimed at helping you manage illness safely and preventing DKA.

## Sick Day Rules

- **Do not stop taking your insulin:** the cells in your body still need insulin to work properly, even if you cannot eat your normal food or you are being sick. If blood glucose levels are low, you may require less insulin. If your blood glucose levels are high, you will need extra insulin. **Follow the management plan on PAGE 3**
- **Do not delay seeking advice:** if you are unsure, contact your Diabetes nurse or, if out-of-hours, Riverbank Ward immediately if you have a problem.
- **Monitor blood glucose levels frequently:** if you do not have a continuous glucose monitor, you may need to increase finger-prick testing to 1-2 hourly during a period of illness to stay safe, even at night.
- **Rest:** if you have ketones present, activity can make them worse.
- **Encourage fluids:** ketones and high blood glucose levels can make you thirsty and at risk of dehydration. Try to drink your usual sized glass of no added sugar fluid every hour.
- **Test for ketones:** using your blood ketone meter. You need to check for ketones, especially if your blood glucose level is 14 mmol/l or above.

- **The plan on PAGE 3** gives you a guide on management depending on your glucose level and if ketones are also present. It will tell you when you need to give extra rapid-acting insulin and how much in a %.
- Know your **TOTAL DAILY INSULIN DOSE**. This may be near the top of your clinic letter or it can be calculated by adding up the usual number of insulin units you have at each meal together with your long acting insulin dose(s). **The grid on PAGE 4 will help you decide how many units extra to give depending if the advice is 5%, 10% or 20% extra.**
- **Maintain some intake of carbohydrate containing foods.** If you do not eat/drink carbohydrate you may get starvation ketones with a blood glucose level that is in the normal range.

### **What if I don't feel like eating?**

- Try carbohydrate alternatives such as milk, milkshakes, yoghurt, custard, ice cream, sugar containing ice lollies, fruit juice, fruit smoothies, ordinary cola or other sugary cold drink, honey, jam or soup.
- Give a bolus of insulin for any carbohydrate you have unless you are hypo. If a hypo occurs treat as usual and see note below.
- **If you really cannot eat, then aim for 10g carbohydrate eg: 90ml Lucozade Energy, 3 dextrose tablets, or two teaspoons of sugar in a drink every 45 minutes during the day.**
- If you are not tolerating food by the evening, then you or your parents need to monitor your blood glucose levels 2 hourly overnight. If you are unsure, immediately contact your diabetes team or Riverbank Ward if out-of-hours.

### **Hypoglycaemia when you are unwell**

You must never stop taking your insulin. However, you may need less meal time insulin and also a reduction in your long acting insulin if the illness is prolonged. Seek advice from your Paediatric Diabetes Nurse.

### **Other tips**

- Seek advice from your GP if you feel there may be an infection causing the illness which may need further treatment.
- Use Paracetamol/Ibuprofen for treatment of a high temperature or discomfort.

**GUIDE TO MANAGEMENT OF HIGH GLUCOSE LEVELS WITH OR WITHOUT KETONES WHEN UNWELL & ON MULTIPLE DAILY INJECTIONS**

Blood Glucose	Less than 0.6mmol/l ketones	0.6 – 1.4mmol/l ketones	1.5mmol/l ketones & above
<p><b>4-5.5mmol/l</b></p> <p><i>Top tip: Starvation ketones can occur with a normal blood glucose if not eating enough</i></p>	<p>Encourage normal food or carbohydrate alternative with insulin bolus as per normal ratios. Encourage sugar free fluids hourly. May need 20%-50% less insulin if experiencing hypos. <b>Seek advice if vomiting or there is difficulty maintaining blood glucose above 4mmol/l.</b></p>	<p>Encourage normal food or carbohydrate alternative with insulin bolus as per normal ratios. Encourage sugar free fluids hourly. Re-check glucose &amp; ketones after 2 hours. <b>If still remains unchanged after 6-8 hours, seek advice.</b></p>	<p>Encourage normal food or carbohydrate alternative with insulin bolus as per normal ratios. Encourage sugar free fluids hourly. Re-check glucose &amp; ketones after 2 hours. <b>If still remains unchanged after 2 hours, seek immediate advice. If ketones improving continue to encourage carbohydrate as above.</b></p>
<p><b>5.5-10mmol/l</b></p> <p><i>Top tip: Starvation ketones can occur with a normal blood glucose if not eating enough</i></p>	<p>No action needed. Continue with normal insulin doses.</p>	<p>Normal food or carbohydrate alternative with insulin bolus as per normal ratios &amp; correction. Encourage sugar free fluids hourly. Re-check glucose &amp; ketones 2 hours. Repeat insulin correction 4 hourly. <b>If no improvement after 4 -6 hours seek advice.</b></p>	<p>Normal food or carbohydrate alternative with insulin bolus as per normal ratios and correction. If correction factor unknown give 5% extra of total daily dose. See overleaf. Encourage sugar free fluids hourly. Re-check glucose &amp; ketones after 2 hours. <b>If still remains unchanged after 2 hours, seek immediate advice. If ketones improving repeat correction as above 4 hourly</b></p>
<p><b>10-14mmol/l</b></p> <p><i>Top tip: If ketones present make sure you rest until they have gone.</i></p>	<p>Normal food or carbohydrate alternative with usual insulin bolus and correction. If correction factor unknown increase insulin dose by 5% of total daily dose. See overleaf. <b>Recheck BG 4hourly. Repeat insulin increase if BG remains elevated. Seek advice if no improvement after 24 hours.</b></p>	<p>Normal food or carbohydrate alternative with usual insulin bolus and correction. If correction factor unknown give 10% extra of total daily dose. See overleaf. Encourage sugar free fluids hourly. Re-check glucose &amp; ketones in 2 hours. Repeat extra insulin 4 hourly if needed. <b>If no improvement after 4 hours– seek advice.</b></p>	<p>Normal food or carbohydrate alternative with usual insulin bolus and correction. If correction factor unknown give 10% extra of total daily dose. See overleaf. Encourage sugar free fluids hourly. Re-check glucose &amp; ketones in 2 hours. <b>If no improvement after 2 hours– seek immediate advice. If ketones have improved but still present, repeat correction dose and re check after a further 2 hours*</b></p>
<p><b>Above 14mmol/l</b></p>	<p>Normal food or carbohydrate alternative with usual insulin bolus and correction. If correction factor unknown increase insulin dose by 5% of total daily dose. See overleaf. <b>Recheck BG 4 hourly. Repeat insulin increase if BG remains elevated. Seek advice if no improvement after 12 hours.</b></p>	<p>Normal food or carbohydrate alternative with usual insulin bolus and correction. If correction factor unknown give 10%-20% extra of total daily dose. See overleaf. Encourage sugar free fluids hourly. Re-check glucose &amp; ketones in 2 hours. Repeat extra insulin 2 hourly if needed. <b>If no improvement after 2 hours– seek immediate advice.</b></p>	<p>Give extra 20% of total daily insulin dose immediately (see overleaf), plus normal insulin ratio for any carbohydrate eaten. Encourage sugar free fluids hourly. Re check blood glucose and ketones after 2 hours. <b>If no improvement – seek urgent medical advice. If ketones have improved, repeat correction dose and re check 2 hours*</b></p>

**\* IF BG ABOVE 14MMOL/L AND KETONES 3MMOL/L OR HIGHER – HIGH RISK IF DKA – SEEK URGENT MEDICAL ADVICE.**

**ILLNESS AND KETOSIS EXTRA INSULIN DOSES - TO BE GIVEN USING NOVORAPID/HUMALOG  
OR APIDRA ONLY**

Total Daily Insulin dose	5% extra	10% extra	20% extra
5 units		1/2 unit	1 unit
6 units		1/2 unit	1 unit
7 units		1/2 unit	1.5 units
8 units	1/2 unit	1 unit	1.5 units
9 units	1/2 unit	1 unit	2 units
10 units	1/2 unit	1 unit	2 units
11 units	1/2 unit	1 unit	2 units
12 units	1/2 unit	1 unit	2.5 units
13 units	1/2 unit	1.5 units	2.5 units
14 units	1/2 unit	1.5 units	3 units
15 units	1 unit	1.5 units	3 units
16 units	1 unit	1.5 units	3 units
17 units	1 unit	1.5 units	3.5 units
18 units	1 unit	2 units	3.5 units
19 units	1 unit	2 units	4 units
20 units	1 unit	2 units	4 units
21 units	1 unit	2 units	4 units
22 units	1 unit	2 units	4.5 units
23 units	1 unit	2.5 units	4.5 units
24 units	1 unit	2.5 units	5 units
25 units	1 unit	2.5 units	5 units
26 units	1.5 units	2.5 units	5 units
27 units	1.5 units	2.5 units	5.5 units
28 units	1.5 units	3 units	5.5 units
29 units	1.5 units	3 units	6 units
30 units	1.5 units	3 units	6 units
31 units	1.5 units	3 units	6 units
32 units	1.5 units	3 units	6.0 units
33 units	1.5 units	3.5 units	6.5 units
34 units	1.5 units	3.5 units	7 units
35 units	2units	3.5 units	7 units
38 units	2units	4 units	8 units
39 units	2units	4 units	8 units
40 units	2units	4 units	8 units
45 units	2units	4 units	9 units
50 units	2units	5 units	10 units
55 units	3units	5 units	11 units
60units	3units	6 units	12 units
65units	3units	6 units	13 units
70 units	3 units	7 units	14 units
75 units	4 units	7 units	15 units
80 units	4 units	8 units	16 units

## **Frequently asked questions**

### **Why are my glucose levels high?**

Common reasons for glucose levels to be high are:

- Illness
- Stress
- Taking less insulin or missing insulin
- Eating too much

### **What will happen if my glucose levels remain high?**

If left untreated, high blood glucose levels can make you feel unwell, dehydrated and may result in DKA (Diabetic Ketoacidosis)

### **What are the symptoms of DKA?**

- Increased thirst
- Passing more urine
- Feeling sick or vomiting
- Feeling tired
- Dryness in mouth and lips
- Drowsiness
- Breathing fast
- Breath smelling of acetone or pear drops
- Severe tummy pain

### **How do I know it is DKA and not a tummy bug?**

With DKA both your blood glucose and ketone levels will be quite high. With a tummy bug your blood glucose will be normal or low and your blood ketones will be negative or minimally raised. So monitoring ketones at home will help to determine whether it is DKA or an infection.

### **What are ketones?**

Ketones are produced in the liver when there is a lack of insulin and your body cannot use glucose to provide energy. Your body breaks down fat for energy instead and ketones are produced as part of this process.

### **What are other causes of raised ketones?**

Ketones are also produced during starvation (fasting) or strenuous exercise. In both these situations the blood glucose is low/normal and not raised.

### **Contact your Diabetes nurse or, if out of hours, Riverbank Ward immediately if:**

- Vomiting persists.

- Blood glucose levels continue to rise and/or
- Blood ketones persist after using management plan on **PAGE 3**, the young person is becoming exhausted, confused, is breathing fast, has tummy pain or is dehydrated.
- Difficulty maintaining blood glucose levels above 4mmol/l.
- You are concerned.

**If your symptoms or condition worsens, or if you are concerned about anything, please call your GP, 111, or 999.**

### **Patient Experience**

We know that being admitted to hospital can be a difficult and unsettling time for you and your loved ones. If you have any questions or concerns, please do speak with a member of staff on the ward or in the relevant department who will do their best to answer your questions and reassure you.

### **Feedback**

Feedback is really important and useful to us – it can tell us where we are working well and where improvements can be made. There are lots of ways you can share your experience with us including completing our Friends and Family Test – cards are available and can be posted on all wards, departments and clinics at our hospitals. We value your comments and feedback and thank you for taking the time to share this with us.

### **Patient Advice and Liaison Service (PALS)**

If you have any concerns or questions about your care, we advise you to talk with the nurse in charge or the department manager in the first instance as they are best placed to answer any questions or resolve concerns quickly. If the relevant member of staff is unable to help resolve your concern, you can contact the PALS Team. We offer informal help, advice or support about any aspect of hospital services & experiences.

Our PALS team will liaise with the various departments in our hospitals on your behalf, if you feel unable to do so, to resolve your problems and where appropriate refer to outside help.

If you are still unhappy you can contact the Complaints Department, who can investigate your concerns. You can make a complaint orally, electronically or in writing and we can advise and guide you through the complaints procedure.

### **How to contact PALS:**

**Telephone Patient Services: 0300 123 1732 or via email at: [wah-tr.PALS@nhs.net](mailto:wah-tr.PALS@nhs.net)**

### **Opening times:**

The PALS telephone lines are open Monday to Friday from 8.30am to 4.00pm. Please be aware that you may need to leave a voicemail message, but we aim to return your call within one working day.

If you are unable to understand this leaflet, please communicate with a member of staff.