Brighton and Sussex University Hospitals NHS Trust

GUIDELINES FOR SICK DAY RULES IN THE CHILD WITH TYPE 1 DIABETES ON MULTIPLE DOSE INJECTION TREATMENT

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Approved by the Children and Young Person's South East Coast and London Diabetes Network

(Based on UCLH Sick Day Rules Guidelines)
(Available on Intranet)

- Children whose diabetes is well controlled should not experience more illnesses or infections than their siblings or peers without diabetes.
- However, it is likely that any illness will have an impact on the diabetes control. In general, illnesses associated with a temperature will cause blood glucose levels to rise.
- Many families notice that insulin requirements increase a few days before their child has symptoms of an illness, and this increased insulin requirement persists several days after the illness has stopped.
- Alternatively, illnesses where there is diarrhoea or vomiting are likely to cause the blood glucose level to drop and there is often difficulty in maintaining adequate carbohydrate intake. These problems may lead to a need for reduction in insulin dosage.

General principles:

Never stop the insulin.

The insulin dose may need to be increased or decreased depending on the glucose and ketone levels.

Encourage fluids to prevent dehydration

Increase frequency of monitoring of both the glucose and ketone levels.

The preference is to test **blood** ketone levels. Any rise in ketone levels will be detected in blood before it is possible to detect in urine and also normalise faster.

Insulin requirements for ketosis

- A high blood glucose level and ketones are an indication that more insulin is needed. We would normally recommend using your Insulin Sensitivity Factor (or correction ratio) to calculate correction dosages of insulin.
- However, if you have ketones you might need to be more aggressive with your insulin dosages.
- We recommend you give a percentage of your Total Daily Dose (TDD).
- To calculate your TDD, add up all the insulin given on a usual day (i.e. rapid acting injections for meals and long acting insulin injections).
- Depending on both the blood glucose level and the ketone level, we advise you give an **injection of quick acting insulin** (either NovoRapid or Humalog Lispro) equivalent to between 5 and 20% of this TDD.
- **See the tables below to calculate how much insulin to give.**

Dietary management

- Children and young people may not feel like eating when they are unwell. This does not matter – continue to give quick acting boluses of insulin for any carbohydrate eaten/drunk if blood glucose levels are within or above their target range and/or to correct high blood glucose levels.
- It is important however, to encourage child to drink more. A combination of having high blood glucose levels, a high temperature and possibly both glucose and ketones in the urine will increase the risk of child becoming dehydrated.
- Drink glucose (sugar) free fluids when the blood glucose is within or above the target range.
- If the blood glucose levels are dropping or are low, encourage your child to have drinks containing glucose (approximately 20 grams CHO). This will help prevent starvation ketones.

Sick day management tables

Blood glucose < 5.5 mmol/l **AND** **Ketone level as follows**	**Blood Ketones <0.6 mmol/l or urine ketones negative /trace**	**Blood Ketones** **0.6-0.9 mmol/l or urine ketones trace/small**	**Blood Ketones 1.0-1.4 mmol/l or urine ketones small/moderate**	**Blood Ketones 1.5-2.9 mmol/l or urine ketones moderate/large**	**Blood Ketones > 3.0 mmol/l or urine ketones large**
Action	Treat low blood glucose if hypoglycaemic	Recheck blood glucose and ketones in 2 hours. Take 20g carbohydrate and clear fluids containing sugar	Take 20g carbohydrate and clear fluids containing sugar Recheck blood glucose and ketones in 2 hours.	Take 20g carbohydrate and clear fluids containing sugar. Check blood glucose and ketones after 2 hours. Repeat above steps again. If remains unchanged after 4 hours, then seek urgent advice/ go to A&E	Take 20g carbohydrate and clear fluids containing sugar. Check blood glucose and ketones after 2 hours. If ketones remain unchanged or increasing after 2 hours, then go to A&E

Blood glucose 5.5 – 9.9 mmol/l **AND** **Ketone level as follows**	**Blood Ketones <0.6 mmol/l or urine ketones negative /trace**	**Blood Ketones** **0.6-0.9 mmol/l or urine ketones trace/small**	**Blood Ketones 1.0-1.4 mmol/l or urine ketones small/moderate**	**Blood Ketones 1.5-2.9 mmol/l or urine ketones moderate/large**	**Blood Ketones > 3.0 mmol/l or urine ketones large**
Action	None	Recheck blood glucose and ketones in 2 hours. Take 20g carbohydrate and clear sugar free fluids Give insulin bolus for half of carbohydrate amount (i.e. insulin for 10g)	Take 20g carbohydrate and clear sugar free fluids. Give insulin bolus to match 20g carbohydrate	Take 20g carbohydrate and clear sugar free fluids. Give insulin bolus – calculated as 5% of TDD Check blood glucose and ketones after 2 hours. Repeat above steps again. If remains unchanged or increasing after 4 hours seek urgent medical advice/ go to A&E	Take 20g carbohydrate and clear sugar free fluids. Give insulin bolus – calculated as 5% of TDD Check blood glucose and ketones after 2 hours. If ketones improving, then repeat steps above If ketones remain unchanged or increasing go A&E as high risk of ketoacidosis

Blood glucose 10.0 – 13.9 mmol/l **AND** **Ketone level as follows**	**Blood Ketones <0.6 mmol/l or urine ketones negative /trace**	**Blood Ketones** **0.6-0.9 mmol/l or urine ketones trace/small**	**Blood Ketones 1.0-1.4 mmol/l or urine ketones small/moderate**	**Blood Ketones 1.5-2.9 mmol/l or urine ketones moderate/large**	**Blood Ketones > 3.0 mmol/l or urine ketones large**
Action	Increase dose of insulin for next meal if blood glucose is still elevated pre meal No further action required	Give clear sugar free fluids. Give 5% of TDD as correction dose. No further action required	Give clear sugar free fluids. Give 5-10% of TDD as correction dose. Recheck Blood glucose and ketones in 2 hours. Repeat above steps again. If remains unchanged after 4 hours, seek urgent medical advice/ go to A&E	Give clear sugar free fluids. Give 10% of TDD as correction dose Check blood glucose and ketones after 2 hours. Repeat above steps again If remains unchanged after 4 hours, seek urgent medical advice/ go to A&E	Give clear sugar free fluids. Give 10% of TDD as correction dose Check blood glucose and ketones after 2 hours. If ketones improving, then repeat above steps again. If ketones remain unchanged or increasing, then go to A&E as high risk of ketoacidosis

Blood glucose 14.0 – 22.0 mmol/l **AND** **Ketone level as follows**	**Blood Ketones <0.6 mmol/l or urine ketones negative /trace**	**Blood Ketones** **0.6-0.9 mmol/l or urine ketones trace/small**	**Blood Ketones 1.0-1.4 mmol/l or urine ketones small/moderate**	**Blood Ketones 1.5-2.9 mmol/l or urine ketones moderate/large**	**Blood Ketones > 3.0 mmol/l or urine ketones large**
Action	Give correction dose using your usual ISF or correction ratio. Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. Repeat above steps again. Recheck in 2 hours.	Give 5-10% of TDD as correction dose. Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. Repeat above steps again. If remains unchanged after 4 hours, seek urgent medical advice/ go to A&E	Give 10% of TDD as correction dose Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. Repeat above steps again. If remains unchanged after 4 hours, seek urgent medical advice/ go to A&E	Give 10-20% of TDD as correction dose Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. Repeat above steps again. If remains unchanged after 4 hours, seek urgent medical advice/ go to A&E	Give 10-20% of TDD as correction dose Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. If ketones improving, then repeat above steps and recheck in 2 hours If ketones remain unchanged or increasing, go to A&E as high risk of ketoacidosis

Blood glucose > 22.0 mmol/l **AND** **Ketone level as follows**	**Blood Ketones <0.6 mmol/l or urine ketones negative /trace**	**Blood Ketones** **0.6-0.9 mmol/l or urine ketones trace/small**	**Blood Ketones 1.0-1.4 mmol/l or urine ketones small/moderate**	**Blood Ketones 1.5-2.9 mmol/l or urine ketones moderate/large**	**Blood Ketones > 3.0 mmol/l or urine ketones large**
Action	Give 10% of TDD as correction dose Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. Repeat above steps again. Recheck in 2 hours.	Give 10% of TDD as correction dose Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. Repeat above steps again. Recheck in 2 hours.	Give 10% of TDD as correction dose Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. Repeat above steps again. If remains unchanged after 4 hours, seek urgent medical advice/ go to A&E	Give 10-20% of TDD as correction dose Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. Repeat above steps again if ketones do not decrease. If remains unchanged after 4 hours, seek urgent medical advice/ go to A&E	Give 10-20% of TDD as correction dose Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. If ketones improving, then repeat above steps and recheck in 2 hours If ketones remain unchanged or increasing, then go to A&E as high risk of ketoacidosis