Brighton and Sussex University Hospitals NHS Trust

GUIDELINES FOR SICK DAY RULES IN THE CHILD WITH TYPE 1 DIABETES ON SUBCUTANEOUS CONTINUOUS INSULIN INFUSION (SCII – INSULIN PUMPS)

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

(This Guideline is based on UCLH Sick Day Rule Guidelines)
(Available on Intranet)

These are general guidelines. They may be altered to suit individual situations.

- Children whose diabetes is well controlled should not experience more illness 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 the blood glucose levels to rise. Many families notice that insulin requirements increase a few days before their child has symptoms of an illness, and that this increased 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 the 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 the frequency of monitoring of both the glucose and ketone levels.
- The preference is to test **blood** ketone levels. Any rise in the ketone levels will be detected in blood before it is possible to detect in urine and also normalise faster.

Diarrhoea and vomiting

- The amount of insulin reduction will depend on the blood glucose levels and presence of vomiting and/or diarrhoea.
- If the blood glucose levels keep dropping despite intervention, we advise to set a reduced temporary basal rate of between 50 - 75% of the normal basal rate whilst the diarrhoea or vomiting continues.

Insulin requirements for ketosis

- A high blood glucose level and ketones are an indication of a need for extra insulin, which is best given initially as a bolus correction dose.
- When ketones are present, it is advisable that all additional correction dosages are given by pen or syringe in case there has been a problem with the pump or the infusion site.
- Additional insulin can also be given by setting an increased temporary basal rate and might need to be programmed for several days.

Does my insulin correction factor/ correction ratio need recalculating?

- If you are using increased temporary basal rates for longer than a couple of days, you may need to recalculate your ISF (Insulin Sensitivity Factor).
- Correction doses of insulin failing to bring the blood glucose level back down to target is an indication that this is required.
- Recalculate your ISF using the '100 rule' and compare this to what is currently programmed in your insulin pump.

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 their blood glucose level is within or above their target range and/or to correct high blood glucose levels.
- It is important however, to encourage your 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 your 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 If experiencing recurrent hypos, set decreased temporary basal rate for 2 hours (50% or -50%)	Recheck blood glucose and ketones in 2 hours. Take 20g carbohydrate and clear fluids containing sugar Recheck blood glucose and ketones in 2 hours. If experiencing recurrent hypos, set decreased temporary basal for 2 hours (80% or -20%)	Take 20g carbohydrate and clear fluids containing sugar Recheck blood glucose and ketones in 2 hours. Repeat above steps again if necessary.	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 remains 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 Program pump calculator with 10g carbohydrate and give this bolus.	Take 20g carbohydrate and clear sugar free fluids. Program pump calculator with both BG + 20g carbohydrate and give this bolus.	Take 20g carbohydrate and clear sugar free fluids. Program pump calculator with both BG + 20g carbohydrate and give this bolus. 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	Take 20g carbohydrate and clear sugar free fluids. Program pump calculator with both BG + 20g carbohydrate and give this bolus. Check blood glucose and ketones after 2 hours. If ketones improved, then repeat above steps again If ketones remain unchanged or increasing, go to 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	Recheck blood glucose and ketones in 2 hours.	Program pump calculator with BG and give correction bolus. Recheck blood glucose after 1 hour. If BG has not improved: Calculate correction dose and give as pen injection Change infusion set Set increased temporary basal rate for 2 hours (150 or +50%) Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. If no improvement, Calculate correction dose and give as pen injection Set increased temporary basal rate for 2 hours (200 or +100%) If remains unchanged after 4 hours, seek urgent medical advice/ go to A&E			Change infusion set Program pump calculator with BG and give correction bolus. Set increased temporary basal for 2 hours (200% or +100%) Give clear sugar free fluids. Check blood glucose and ketones after 2 hours -If ketones improved, then repeat above steps again. - If ketones unchanged or increasing, then go to A&E as high risk of ketoacidosis

Blood glucose >14.0 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	Program pump calculator with BG and give correction bolus. Recheck blood glucose after 1 hour. If BG has not improved: Calculate correction dose and give as pen injection Change infusion set Set increased temporary basal for 4 hours (200 or +100%) Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours. If no improvement, calculate correction dose and give as pen injection. If remains unchanged after 4 hours, seek urgent medical advice/ go to A&E			Change infusion set Calculate correction dose and give as pen injection. Set increased temporary basal for 4 hours (200 or +100%) Give clear sugar free fluids. Recheck blood glucose and ketones after 2 hours: - If ketones improved, repeat correction dose as a pen injection - If remains unchanged or increasing, then go to A&E as high risk of ketoacidosis	