Managing Illness in Children with Diabetes on Insulin Injections

Key diabetes management principles when your child is unwell:

- More frequent blood glucose and ketone monitoring is required
    - Check glucose levels every 2-4 hours
    - Check ketone levels 4-6 hourly, particularly if vomiting
- When vomiting occurs, it should always be considered a sign of insulin deficiency and ketones (due to reduced or forgotten insulin dose or increased insulin requirements), until proven otherwise
- Insulin doses may need to be increased or decreased based on blood glucose and ketone levels, but NEVER STOP INSULIN COMPLETELY
- Drink more fluids to maintain hydration
    - If glucose level above 8mmol/L, drink water or sugar-free drinks
    - If glucose level below 8mmol/L, drink fluids containing carbohydrate
- Parents should always take over diabetes management/decision making when their child is unwell
- Treat the underlying illness

If blood glucose levels are very high (above 15mmol/L):

Illness usually causes high glucose levels and can dramatically increase your insulin requirements. This is due to the higher levels of stress hormones during illness, which make you more resistant to insulin. This resistance can often last for several days after you have recovered.

High glucose levels are managed by giving extra insulin:

- Give more frequent correction doses - corrections may be needed every 2 to 3 hours
- If ketones are present, higher correction doses are usually required (see Table 1)

Always ask yourself could high ketones be making my child feel unwell?

- High ketone levels cause nausea, vomiting and abdominal pain
- High ketones develop when there is not enough insulin (for example reduced or forgotten insulin dose or increased insulin requirements)
- When you have high glucose levels and high ketone levels you need extra insulin urgently.
- The amount of extra insulin required will depend on the level of ketones

Drink more fluids (water or low calorie drinks) to maintain hydration

If blood glucose levels are low (below 4mmol/L):

Low glucose levels often occur in gastroenteritis, as food is not able to be absorbed normally

Low glucose levels are managed by reducing insulin doses (never stop insulin completely):

- Reduce meal time insulin (Humalog/Novorapid) – start with a 50% reduction, then review and adjust
- Reduce basal insulin (Lantus/Levemir) – start with a 20% reduction, then review and adjust

Call WCH Diabetes team for advice on insulin dose adjustment if unsure

Treat hypos in the usual way

If your child is vomiting and unable to tolerate hypo treatment by mouth – a **mini dose glucagon injection** at home may save you from coming into hospital. Call WCH Diabetes team for advice, if you do not have the instructions at home

When to call the Diabetes Team for help:

- Your child has persistent vomiting or is becoming more unwell
- Your child has blood ketones above 3mmol/L
- You are unable to keep blood glucose above 4mmol/l
- You need help working out how much insulin to give
- You are worried, exhausted or just don't know what to do next
- Your child is very young

Mon- Fri 9am -5pm: Call Diabetes Centre on 8161 6402 to speak with your Diabetes Educator

After hours: Call WCH Switchboard 8161 7000 and ask for the Diabetes Doctor on Call

Table 1: Guide to extra rapid acting insulin correction doses and monitoring

Use rapid acting insulin only for correction doses (Novorapid or Humalog).

Give an extra 5%, 10% or 20% of the total daily dose of insulin according to the table below.
To calculate the **Total Daily Dose (TDD)** of insulin, add up all the rapid acting and long acting insulin doses given in a usual day.

5% TDD **= TDD x 0.05**

10% TDD **= TDD x 0.1**

20% TDD **= TDD x 0.2**

BGL (mmol/L)	Blood ketones (mmol/L)		
	Under 0.5 (urine ketones negative)	0.5-1.5 (urine ketones +)	Over 1.5 (urine ketones ++/+++)
Over 15	Consider rapid acting insulin (5% TDD). Check BGL and ketones in 2 hours.	Give rapid acting insulin (5-10% TDD). Check BGL and ketones in 2 hours.	Give rapid acting insulin (10-20% TDD). Check BGL and ketones in 1 hour.
8-15	Recheck BGL in 2 hours. If persistently elevated, consider 5% TDD.	Recheck BGL and ketones in 2 hours. If persistently elevated, give 5-10% TDD.	Give rapid acting insulin (10% TDD). Check BGL and ketones in 2 hours.
4-8	No cause for concern. Check BGL again in 2 hours.	Ketones indicate carbohydrate and insulin deficiency. Give extra glucose / carbohydrate to maintain or increase BGL. Check BGL and ketones in 2 hours.	Ketones indicate carbohydrate and insulin deficiency. Give extra glucose / carbohydrate to maintain or increase BGL. Consider extra insulin (5% TDD) if ketones not clearing. Check BGL hourly and ketones 2 hourly.
Under 4	Treat hypo by giving sweet fluids/food and ongoing carbohydrate to maintain BGL. Ketones indicate carbohydrate and insulin deficiency. Do not stop insulin completely, but doses may need to be lowered especially if not eating or if vomiting and diarrhoea present. Consider mini-dose glucagon if BGL cannot be maintained. Hospital admission for IV fluids may be needed if BGL cannot be maintained.		