



Paediatric Diabetes Network

Managing Diabetes During An Illness

Long Version

This document is to be used as a guide. It is not intended to be a substitute for medical advice, or to replace local treatment recommendations.

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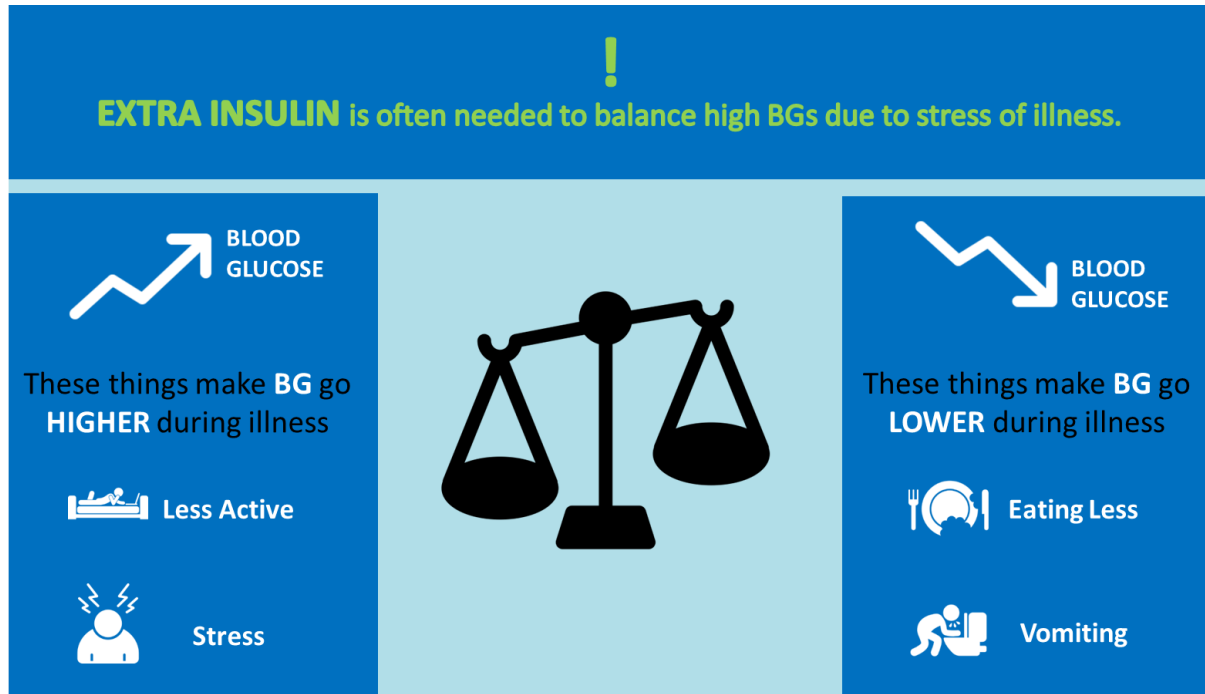
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English and French version of the guidelines can be accessed here: <https://bit.ly/2CVdMPC>



Illness can upset blood glucose (BG). BG can go up with some illness even though appetite may be poor. In this case, more insulin is needed. BG can also go down – you may need to cut back on insulin doses during these type of illnesses. **Never stop giving insulin completely.**

The Balancing Act Of Blood Glucose (BG) During Illness



The guidelines in this pamphlet will help you care for your child’s diabetes during illness and prevent possible **Diabetic KetoAcidosis** or **DKA** (a serious and life threatening condition), severe hypoglycemia, and dehydration. DKA can look like the stomach flu. **When vomiting occurs in someone with diabetes, it should always be considered a possible sign of DKA – check ketones.** It is critically important to monitor BG and ketones often. Make sure your ketone strips have not expired (6 months after opening) and be ready to give extra rapid-acting insulin as often as every 3-4 hours around the clock.

The **key care points** are: **1) getting enough fluids, 2) controlling BG, and 3) managing ketones.** If you cannot control these things, you need to seek medical attention or go to your nearest emergency department.

What To Do

- **Parents should take over** and help with BG testing and insulin injections. **Never** leave your child/teen alone while ill. Provide support, guidance and possibly take over the management of the child's diabetes during this time.
- **Check BG and ketones every 2-4 hours** around the clock.
- **Continue giving insulin – never miss a dose**, even if your child is not eating. Not enough insulin could result in DKA. If unsure, seek medical attention.
 - Give extra rapid-acting insulin when the **BG is over 14 and you find ketones**. Use the **Insulin Dose Adjustment Guidelines** in this pamphlet.
- **Treat the illness**. You may need to take your child to the doctor for a diagnosis and treatment. Use sugar-free medications, if possible.
- **Avoid dehydration**: Drink extra sugar-free fluids. Try to follow your meal plan as much as possible. If you cannot, aim for about 15 grams of carbohydrate each hour (e.g. ½ cup of juice, 1.5 sticks of popsicle, 1 cup of regular Gatorade, ½ cup ginger ale or ½ cup Jell-O). **Be sure to check the labels for your products**.
- **Take vomiting seriously**, don't just assume it is the flu. Vomiting with a high BG and ketones may be a sign of DKA. This is why it is so important to check ketones. **Vomiting can be caused by missing insulin doses, pump site failure, or illnesses**. Vomiting can also lead to dehydration and vomiting with a normal or low BG can lead to hypoglycemia.
- **Avoid hypoglycemia**: Mini-dose Glucagon® may be used to prevent or correct a low BG, especially if your child cannot eat or drink. Be sure to have an emergency **Glucagon®** kit at home.

If you are on a pump, a high glucose with ketones is likely due to pump site failure. You should give insulin by injection and do a site change.

Seek Medical Attention If

1. Vomiting occurs twice or more in a four hour period, BGs are elevated, and ketones are present.
2. BGs and ketones remain high even after extra doses of rapid-acting insulin.
3. BGs remains low even after using mini-dose glucagon.
4. Your child shows signs of dehydration (such as dry mouth, heavy breathing, not urinating/peeing), **OR** becomes drowsy, confused, or has a seizure (convulsion).
5. You feel that you need help to manage the illness.

Insulin Dose Adjustment Guidelines*

Blood Glucose Level (mmol/L)	What to do?
Less than 4.0	Do not give extra insulin (even if there are ketones). You may need to reduce pre-meal insulin and call health care team if vomiting. Consider mini-dose Glucagon if not tolerating food or fluids.
4.0 to 14.0	Take the usual insulin dose. No changes needed.
Greater than 14.0	Take an extra 10-20% of TDD as rapid insulin right away depending on level of ketones. (See table below)

**Some centres will have different guidelines for those on insulin pumps.*

- The **total daily dose (TDD)** is the total number of units of rapid, intermediate, and long acting insulin that you would give on a normal day (corrections or sliding scale are NOT added to the TDD). If you are on Multiple Daily Injections (MDI) with ratios, use a typical rapid insulin dose for each meal in the calculation.

For example, Susan's dose of insulin is:

Breakfast: 6 units of rapid insulin*
 Lunch: 3 units of rapid insulin
 Supper: 4 units of rapid insulin
 Bedtime: 15 units of basal insulin
 2 units of rapid

(6+3+4+15+2) = 30

Susan's total daily dose (TDD) is 30 units

Extra insulin will be given as 10-20% of TDD:
 10% = 3 units 15% = 4.5 units 20% = 6 units
OR use table below

Calculate your child's TDD:

Breakfast: _____
 Lunch: _____
 Supper: _____
 Bedtime: _____
TDD: _____

10% _____ 15% _____ 20% _____

Pump: TDD = Basal + bolus, a number that can be found in the memory of your pump "daily totals"

**If on MDI using ratios, use your usual mealtime insulin dose to calculate the TDD.*

This table can be used as a guide:

Blood Ketone Level (mmol/L)	BG level (mmol/L) Greater than 14.0			
	0.6 – 1.5	1.5 – 3	Greater than 3.0	
Urine Ketone Level	Small (+)	Moderate (++)	Large (+++/++++)	This is given as extra doses of rapid insulin (e.g. NovoRapid®, Humalog®, Apidra®, Fiasp®) every 3-4 hours – it is added to your usual insulin. It replaces your sliding scale correction.
If your total daily dose is...	10% is...	15% is...	20% is...	
5-15 units	1	1.5 or 2	2	
16-25 units	2	3	4	
26-35 units	3	4.5 or 5	6	
36-45 units	4	6	8	
46-55 units	5	7.5 or 8	10	
56-65 units	6	9	12	
66-75 units	7	11	14	
76-85 units	8	12	16	

Example Using TDD calculated for Susan above (30 units)	Time	Usual Dose	Supplement	Total Insulin
BG is 18 mmol/L with Moderate Ketones	AM	Rapid 6	Rapid 4.5	Rapid 10.5
BG is 16 mmol/L with Small Ketones	Bedtime	Basal 15 Rapid 2	Rapid 3	Basal 15 Rapid 5

What to Eat When Sick

Those using insulin to carbohydrate ratios should give rapid insulin to match the carbs they eat and drink.

For those on 2-3 injections per day with fixed insulin and a meal plan or a carb target, try to follow your meal plan as closely as possible. If your child has nausea, vomiting and/or diarrhea, or no appetite, you can offer the fluid choices below instead of the usual meal plan.

Fluid choices (15 grams)	Age	Approximate rate for fluid choices
e.g. ½ cup of juice, 1.5 stick of popsicle, 1 cup of Gatorade, ½ cup ginger ale or ½ cup Jell-O.	0 – 5 years	1 fluid choice / hour
	6 – 12 years	1.5 fluid choices / hour
	13+ years	2 fluid choices / hour

Mini Dose Glucagon

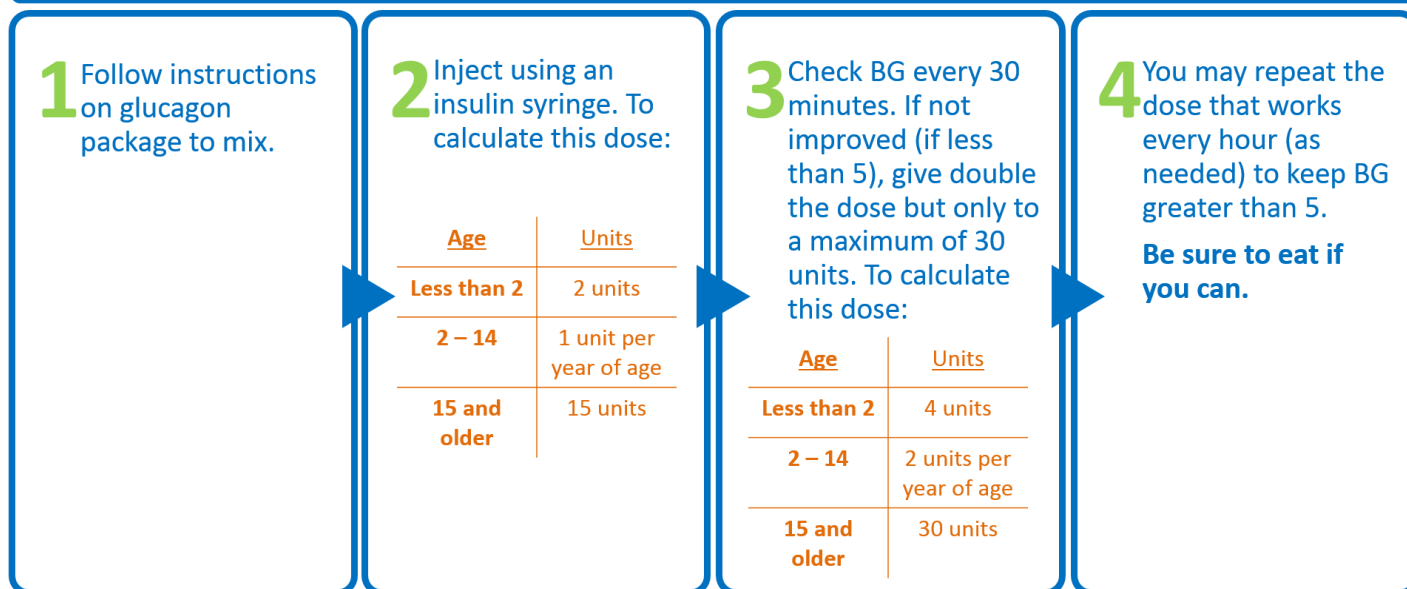
When should you give mini-dose glucagon?

- Use mini-dose glucagon when your child's BG level is **under 4.0 AND** they are unable or unwilling to take food or fluids to increase BG level due to the illness, nausea and/or vomiting.
- **Note: Give the full dose of glucagon if your child is experiencing severe low blood sugar symptoms such as confusion, unconsciousness or seizure.**

To give mini-dose glucagon, you will need:

Glucagon & an insulin syringe

Once mixed, glucagon is good for 24 hours in the fridge.



Medications

- For pain or fever, acetaminophen (e.g. Tylenol®) or ibuprofen (e.g. Motrin®, Advil®) may be used as directed. Please note: continuous blood glucose monitor readings may be falsely raised when taking acetaminophen.
- For nausea or vomiting, Gravol® by tablets or suppositories, or Zofran® may be used.
- Be aware that many cold medications contain decongestants, which may increase BGs. Also, drowsiness is a side effect of many cold medications, which may make your child less able to sense a

low BG. Health Canada advises against the use of cough and cold medications formulations in children younger than six years of age, with caution being exercised when these formulations were used in children older than six years of age.

- Link for parents from the Canadian Pediatric Society:
http://www.caringforkids.cps.ca/handouts/over_the_counter_drugs.
<http://www.cps.ca/documents/position/oral-ondansetron>
- Use prescription medication as directed by your doctor.

Sources

1. BC Children's Hospital, Diabetes handouts for patients and families, *Managing Sick Days and Preventing Ketoacidosis*, found online at www.bcchildrens.ca/Services/SpecializedPediatrics/EndocrinologyDiabetesUnit/ForFamilies/DiabetesHandouts.htm
2. ISPAD Clinical Practice Consensus Guidelines 2014 Compendium
3. The NOPDP Advisory Committee and the Northern Diabetes Health Network, *Guidelines for Managing "Sick" Days for Children with Type 1 Diabetes*, 2010