INFORMATION FOR PATIENTS, PARENTS, GUARDIANS AND CARERS

Paediatric diabetes

Advice for management of Type 1 diabetes mellitus during illness in children and young people under 19 years (sick day rules)

Sickness is an unavoidable part of everyday life. The body's natural response to illness results in higher blood glucose levels due to the release of stress hormones. During illness, you will need frequent blood glucose monitoring and often more insulin than usual.

What are ketones?

Ketones are acids which can make you feel very sick. They are produced when the body is not getting enough food (glucose), or your body is not able to use glucose due to lack of insulin. If you do not get rid of ketones, you can become dehydrated and eventually develop diabetic ketoacidosis. Check for ketones whenever you are ill, regardless of your glucose levels as you can have raised ketones with normal glucose levels i.e. starvation ketones with gastroenteritis.

Sick day rules for all patients:

1. **Never stop the insulin**. Even if you are eating less than normal, your body needs insulin to use glucose and to get rid of ketones.
2. Check your blood glucoses more frequently e.g. every two hours including throughout the night.
3. Check for blood ketones. Give additional fast acting insulin every two hours if blood glucose is above target (above 7mmols/l pre meal or above 10mmols/l two hours post meal **(see Table 1 for advice about doses).**
4. If ketones are present when blood glucose is low, they are called starvation ketones and respond to drinking extra fluids containing sugar. Monitor blood glucose very closely and extra insulin may be required when blood glucose starts rising.
5. Keep well hydrated by drinking plenty of fluids:
   a. Water, or sugar-free fluids are probably most appropriate in most cases where blood glucose levels are normal or high.
   b. If blood glucose levels are low, drinks containing sugar are required, or eat carbohydrates if possible.
   c. Avoid carbonated drinks if possible.
6. Inform the diabetes team early to seek advice.

Ketones with associated vomiting/abdominal pain can be a sign of DKA - seek urgent medical attention.

TABLE 1 - How to calculate correction doses if glucose levels are above the target of 7mmols pre meal or above 10mmols/l two hours post meals, dependent on ketone levels

Negative ketones < 0.6mmols/l (blood)	Small to moderate ketones 0.6 to 1.5mmols/l (blood)	Moderate to large ketones >1.5mmols/l (blood)
Take a correction dose (CD) to correct high blood glucose (BG) in addition to normal bolus for carbohydrates eaten.	Give: • Correction dose plus an extra 10% as additional fast acting insulin. OR • 0.1 units/kg body weight as additional fast acting insulin.	Give: • Correction dose plus an extra 20% of insulin as additional fast acting insulin. OR • 0.2 units/kg body weight as additional fast acting insulin.
Then: • Re-check BG and ketones in two hours.	Then: • Monitor fluid intake and ensure you are drinking enough fluids to keep well-hydrated. • Re-check BG and ketones in two hours (see below).	Then: • Monitor fluid intake and ensure you are drinking enough fluids to keep well-hydrated • Re-check BG and ketones in two hours (see below).
If your BG is going down that is a good sign but monitor closely throughout the day. If BG is increasing but ketones less than 0.6mmol/l: • Take another correction dose **using a pen.** If ketones 0.5 – 1.5mmol/l, follow orange column advice. If ketones >1.5mmol/l, follow the red column advice.	If ketones negative follow green column advice. If BG is increasing but ketones still 0.6 – 1.5mmol/l: • Continue to give correction plus an extra 10% or 0.1 units/kg as additional fast acting insulin every 2 hours using a pen. • Give usual boluses for food. • Re-check BG and ketones every two hours even through the night. If ketones increase to >1.5mmol/l, follow the red column advice.	If ketones negative follow green column advice. If BG is increasing but ketones have reduced to 0.6 – 1.5mmol/l, follow orange column advice. If ketones are still >1.5mmol/l: • Give another correction plus an extra 20% or 0.2units/kg as additional fast acting insulin every two hours using a pen. • Give usual boluses for food. • Once vomiting with high ketones, have a low threshold for admission to hospital.

Example

Blood glucose level 18mmols/l and ketone level 1.3mmols/l. Therefore 10% extra needed on top of total dose calculated (include dose for food if eating).

Using a calculator enter total dose of insulin and then add 10% = dose to be given.

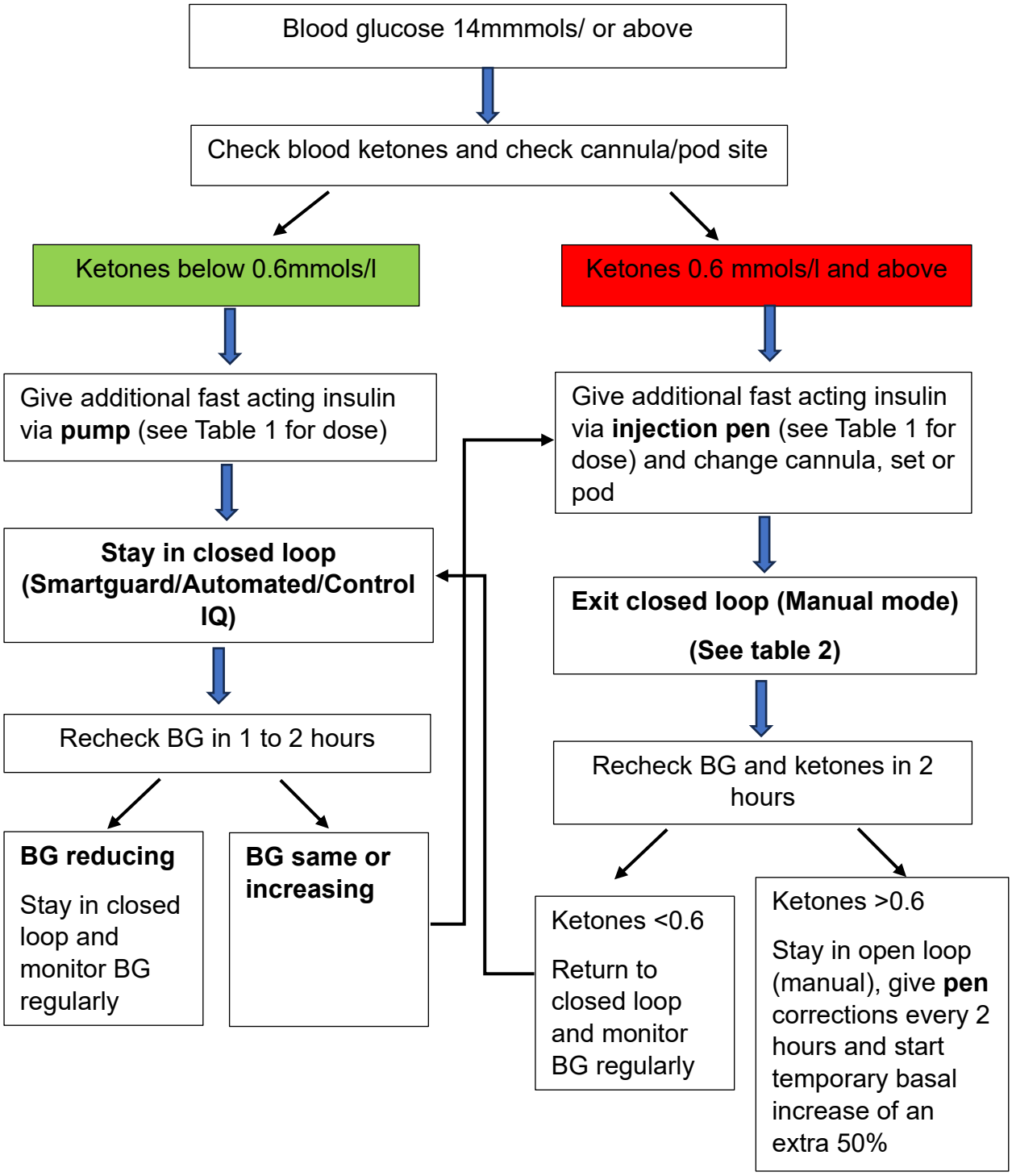
Example one: 6 units plus 10% = 6.6 units or 6.5 units if on injection pens.

Example two: 8 units plus 10% = 8.8 units or 9 units if on injection pens.

Using sick day rules if you are on an insulin pump

The same principles apply for pump patients with regards to glucose testing and fluid intake.

In addition, follow the below flowchart for episodes of **unexplained hyperglycaemia or sick days**. See **Table 2** for additional sick day management specific to each individual closed loop pump.



If you have been trying to address hyperglycaemia with no improvement, seek medical advice.

If ketones are persisting with associated vomiting and/or drowsiness this could be a sign of DKA, seek urgent medical attention.

TABLE 2 - Specific advice for sick days for hybrid closed loop pump users

MEDTRONIC 780G
• Stop Smartguard and run in manual mode during sick days when ketones are above 0.6mmol/l. • Set up a temporary basal increase as advised. Initially start with 50% increase. • Recommence Smartguard when ketones less than 0.6mmols/l. • If taking PARACETAMOL run in manual mode and fingerpick test as sensor glucose may register higher than a fingerpick test. Alternatively, you can stay in Smartguard but run a temp target for duration of action of the paracetamol.
OMNIPOD 5
• May remain in Automated mode during periods of illness/high glucose levels (even with ketones above 0.6mmols/l). • If you have switched into manual mode; switch back to Automated mode once ketone level below 0.6mmols/l.
TANDEM T:SLIM with CONTROL IQ
Two options when ketones above 0.6mmols/l: 1. Remain in Control IQ and switch to sick day profile (if set). Enter pen bolus into pump and give while **disconnected** from body so that it is included in the active insulin. 2. Switch Control IQ off and run in manual mode until resolved. Use temporary basal increase as advised. Initially start with 50% increase.

Further sources of information

Diabetes UK: https://www.diabetes.org.uk/
NHS Choices: www.nhs.uk/conditions
Our website: www.sfh-tr.nhs.uk

Patient Experience Team (PET)
PET is available to help with any of your compliments, concerns or complaints, and will ensure a prompt and efficient service.

King's Mill Hospital: 01623 672222
Newark Hospital: 01636 685692
Email: sfh-tr.PET@nhs.net

If you would like this information in an alternative format, for example large print or easy read, or if you need help with communicating with us, for example because you use British Sign Language, please let us know. You can call the Patient Experience Team on 01623 672222 or email sfh-tr.PET@nhs.net.

If you require a full list of references for this leaflet (if relevant) please email sfh-tr.patientinformation@nhs.net or telephone 01623 622515, extension 6927.

To be completed by the Communications office
Leaflet code: PIL202505-01-SDR
Created: May 2025 / Review Date: May 2027