

# Standard management for children with diabetes during surgery- Full Clinical Paediatric Guideline – Joint Derby and Burton

Reference no.: CH CLIN D06

This guideline is intended for use in the management of children and young people up to 18 years of age with diabetes mellitus undergoing surgery under the care of the Paediatricians in Derby and Burton. It is important to avoid the immediate complications of diabetes perioperatively, particularly hypoglycaemia and ketoacidosis.

Со	Contents	
1.	Introduction	2
2.	Aim and Purpose	2
3.	Definitions	2
4.	Glycaemic Targets Prior to Elective Surgery	2
5.	Pre-operative Assessment for Elective Surgery	2
6.	Pre-operative Fasting Guidelines	3
7.	Peri-operative Blood Glucose Targets	3
8.	Guidelines for Children who are Insulin Treated: a. Minor Elective Morning Surgery b. Minor Elective Afternoon Surgery c. MRI scan under general anaesthetic d. Major Elective Morning Surgery e. Major Elective Afternoon Surgery f. Emergency Surgery g. Maintenance Fluid Guidelines h. Insulin Infusion Guidelines i. Restarting Subcutaneous Insulin j. Treating hypoglycaemia	4 5 6 7 8 9 10 0
9.	Guideline for Children on Oral Medications	11
10.	. References	11
11.	11. Document Controls 12	

# 1. Introduction

Children with diabetes mellitus are at risk of blood glucose (BG) alterations when undergoing surgery. This risk results from a change in routine, change in or lack of perioperative insulin, physical and emotional stress related to the surgical procedure, surroundings, parental anxiety, and surgical pain. Adverse events which can occur include:

- Hypoglycaemia
- Hyperglycaemia

These can result from:

- Inappropriate use of intravenous insulin infusion
- Medication errors when converting from the intravenous insulin infusion to usual medication

# 2. Aim and purpose

For the above reasons, it is very important that every unit looking after children with diabetes requiring surgery has written guidelines. There should be close liaison between the surgeon, the anaesthetist and the paediatric diabetes team. Children with diabetes should not have to spend longer in hospital because their diabetes management has been unduly complicated.

# 3. Definitions

The peri-operative management of children who are on insulin treatment depends on their insulin regimen rather than on whether they have type 1 or type 2 diabetes mellitus.

**Minor surgery:** short procedures (usually less than 30 minutes) with or without sedation or anaesthesia where rapid recovery is anticipated and child is expected to be able to eat by the next meal. Examples include endoscopic biopsies, myringotomy, incision and drainage.

**Major surgery:** includes all surgery requiring more prolonged general anaesthesia lasting >30 minutes or a procedure which is likely to cause post-operative nausea, vomiting or inability to feed adequately. If you are unsure about the length of anaesthetic or risk of slow post-operative recovery from anaesthesia please discuss with anaesthetist.

**Glucose:** children and young people with diabetes may usually measure levels with a sensor rather than blood glucose. The guideline refers to blood glucose (BG) as this is the usual method for monitoring glucose in the wards however, it is reasonable to use sensor glucose measurements additionally.

**Continuous Glucose Monitor (CGM):** a device worn subcutaneously that monitors glucose levels continuously. Sometimes used in combination with a continuous insulin infusion pump when it is called a hybrid closed loop pump.

# 4. Glycaemic targets prior to elective surgery

Elective surgery should be postponed if the child/ young person has an HBA1c >75mmol/mol. Consider admission to hospital prior to elective surgery for assessment and stabilisation if this has not been achieved.

# 5. Pre-operative Assessment for Elective Surgery

### Role of surgeon carrying out surgery/procedure:

- When a decision is made to undertake surgery, the surgeon should inform both the paediatric diabetes team and the anaesthetist about:
  - Date and timing of planned procedure (if possible please put child first on the morning list).
  - The type of procedure and whether it is judged to be major or minor surgery as defined above

# Role of the paediatric diabetes team:

- Try to optimise blood glucose levels prior to planned surgery
- Where possible, the paediatric diabetes consultant will write individual guidance depending on the patient's insulin requirements and type of surgery planned based on this guideline
- Ensure patients/ carers have clear written instructions regarding the management of the child's diabetes (including any medication adjustments) prior to surgery
- In Derby, admit to Sunflower ward if unlikely to need IV insulin. If IV insulin is required, admit to Dolphin Paediatric Critical Care Unit. In Burton, admit to Ward 1.
- Where the surgery is taking place in another hospital, the local diabetes team must inform the diabetes team in the other hospital in advance of the surgery.
- Basic information to be passed on includes:
  - Recent weight
  - o Current diabetes treatment and most recent recorded doses
  - Most recent HbA1c (and date)
  - Hypoglycaemia awareness and any current issues with severe hypoglycaemia
  - Any co-morbidities (thyroid disorders/ Addison's disease/ Coeliac Disease)

## 6. Pre-operative Fasting Guidelines

- No solid food should be consumed for 6 hours before elective surgery in children.
- In infants, breast milk is safe up to 4 hours and other milks up to 6 hours before elective surgery. Thereafter, clear fluids should be given as in older children.
- Children should be encouraged to drink clear fluids (including water, low-sugar squash) up to 1 hour before elective surgery. Where this is not possible, then an intravenous (IV) infusion should be started.

# 7. Peri-operative Blood Glucose Targets

- BG should be kept between 5-11.1mmol/l during the peri-operative period
- BG should be checked at least hourly (before, during and after surgery).

There are no paediatric studies on the ideal BG targets to aim for peri-operatively. In adults, the implementation of intensive glycaemic control was associated with a higher number of patients experiencing hypoglycaemic episodes.

# 8. Guideline for Children Who Are Insulin Treated

### 8a. Minor Elective Morning Surgery

Day before	Advise normal insulin and diet
surgery	<ul> <li>For those on insulin pumps, we recommend changing the cannula site.</li> </ul>
Morning of procedure	<ul> <li>Child can be admitted on the morning of the surgery</li> <li>Child should ideally be first on the list</li> </ul>
	IV cannula not needed on admission to the ward unless IV hypoglycaemia
	treatment is needed.
	<ul> <li>No IV fluids or insulin infusion needed</li> </ul>
	<ul> <li>Measure and record the capillary BG hourly preoperatively and half hourly during the operation</li> </ul>
	For those patients on basal bolus regimen using <b>multiple daily injection regimens</b> : If BG is stable between 5-11.1mmol/L:
	Omit rapid-acting insulin (e.g insulin aspart, (NovoRapid or Fiasp), insulin lispro (Humalog), insulin glulisine (Apidra) in the morning until after procedure when they can have it with the late breakfast.
	<ul> <li>If basal insulin (glargine (Lantus), detemir (Levemir) or degludec (Tresiba)) is usually given in the morning, give it as usual. Consider reducing the dose if blood sugar levels are usually in target range.</li> </ul>
	For those patients on <b>insulin pumps</b> -
	Prior to surgery:
	<ul> <li>Consider whether the pump may need to be removed if an X-ray expected in theatre.</li> </ul>
	<ul> <li>Run the pump at the usual basal rate. Diabetes team to consider whether to ask parents to disable hybrid closed loop if used or adjust glucose target.</li> <li>Check BG hourly and ask parents to adjust basal rates or targets to maintain BG between 5-11.1mmol/l</li> </ul>
	During surgery
	Run the pump on the normal basal setting for the duration of the procedure.
	<ul> <li>BG should be checked hourly once nil by mouth and half hourly during the operation</li> </ul>
	Basal rate can be suspended for 30 minutes to correct any episodes of mild
	hypoglycaemia. If the pump is stopped for up to 1 hour, the child must be
	started on IV insulin and intravenous fluid (as per section 8g and 8h) as they
	have NO basal insulin in their body.
	For those usually on <b>premixed i</b> nsulin in the morning (twice daily or three times
	<ul> <li>delay the morning dose till after procedure when they can have it with a late breakfast</li> </ul>
	However, FOR ALL insulin regimes, if
	<ul> <li>BG &lt;5mmol/I – give 2ml/kg bolus of IV 10% Glucose; recheck BG 15 minutes later</li> </ul>
	<ul> <li>BG &gt;12mmol/I – consider correction dose (usual for child). If no</li> </ul>
	improvement, may need to start IV insulin infusion and IV fluids as per

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	<ul> <li>sliding scale in section 8g and 8h.</li> <li>If the procedure is delayed for a further 2 hours or child has had repeated low BGs, start on maintenance IV fluids (section 8g)</li> </ul>
After procedure	<ul> <li>When well enough to eat, give usual dose of rapid acting insulin with the next meal (including correction dose if needed).</li> <li>If needing IV fluids &amp; insulin infusion - Go to section 8i for guide on how to change back to subcutaneous insulin.</li> </ul>
	<ul> <li>Insulin pump regimen         <ul> <li>Allow parents to re-start the pump at the usual settings once the child has recovered.</li> </ul> </li> <li>Home when eating and drinking if surgeon happy. This is not dependent on current BG levels as the parent will manage those effectively at home with correction doses if</li> </ul>
	needed.

# 8b. Minor Elective Afternoon Surgery

Day before	Advise usual doses of insulin night before procedure     For these on insulin numps, we recommend changing the connuls site
procedure	• For those on insulin pumps, we recommend changing the carinula site.
Morning of	Advise the child to have a normal breakfast no later than 7.30 a.m.
procedure	<ul> <li>Patient to have breakfast insulin dose dependent on regimen:</li> </ul>
	If on a Multiple Daily injection (MDI) regimen
	<ul> <li>Give FULL usual dose of rapid-acting insulin (e.g insulin aspart (NovoRapid or Fiasp) or Humalog lispro (Humalog), insulin glulisine (Apidra) according to the carbohydrate content of breakfast as well as usual correction dose depending on pre-meal BG level (BG).</li> </ul>
	<ul> <li>Glargine (Lantus), detemir (Levemir) or degludec (Tresiba), if usually given in the morning, should also be given. Consider reduction in the dose if blood sugar levels usually in target range.</li> </ul>
	<ul> <li>If on a twice daily insulin regimen</li> <li>Give ½ of rapid-acting component of morning dose as rapid-acting insulin. Example: if usual morning dose is 10 units of Novomix 30, then the usual fast acting component is 3/10 x10 = 3 units of rapid acting insulin e.g give 1.5 units of insulin aspart (NovoRapid).</li> </ul>
	Those children on insulin pumps-
	<ul> <li>Consider whether the pump may need to be removed if an X-ray expected in theatre.</li> <li>Run the pump on the normal basal setting. BG should be checked at least hourly.Carer/patient asked to alter infusion rate or glucose target as needed.</li> </ul>
Peri-	Measure and record capillary BG on arrival
operatively	<ul> <li>IV cannula not needed on admission to the ward unless IV hypoglycaemia treatment is needed</li> </ul>
	Child should be first on the list
	Measure and record capillary BG hourly once nil by mouth and half hourly during the
	operation <ul> <li>No IV fluids or insulin infusion needed routinely.</li> </ul>
	<ul> <li>However, if</li> </ul>

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	<ul> <li>BG &lt;5mmol/l – give 2ml/kg bolus of IV 10% glucose: recheck BG 15 minutes later</li> </ul>
	If the precedure is deleved for a further 2 hours or shild is continuing to have low
	• If the procedure is delayed for a further 2 hours of child is continuing to have low
	BGs, start on maintenance IV fluids as in section 8g.
	<ul> <li>BG &gt;12mmol/I – consider correction dose (usual for child). If no improvement, may</li> </ul>
	need to start IV insulin infusion and IV fluids as per sliding scale in Section 8g and
	8h
	• Children on insulin pumps should continue their pump as long as their BG remains
	between 5-11.1mmol/L
	<ul> <li>BG should be checked hourly pre-operatively and half-hourly during surgery</li> </ul>
	<ul> <li>If BG &lt;5 mmol/l suspend the pump for 30 minutes as well as giving glucose bolus</li> </ul>
	(see above)
	<ul> <li>If the pump is stopped for up to 1 hour, the child must be started on IV insulin and</li> </ul>
	intravenous fluid as per section 8g & 8h as they have <b>no</b> basal insulin in their body.
After	Once eating, give usual dose rapid acting insulin generally taken with that meal
procedure	<ul> <li>If needing IV fluids &amp; insulin infusions, go to section 8i for guide on how to change</li> </ul>
	back to subcutaneous insulin
	Insulin pump regimen
	• Allow parants to re-start the number at the usual softings once the shild has
	<ul> <li>Allow parents to re-start the pump at the usual settings once the child has recovered</li> </ul>
	l la manufa en a stiene and drivitiene it annouene hannou. This is not des andes to the second DO la value
	Home when eating and drinking it surgeon happy. This is not dependent of current BG levels
	as the parent will manage those effectively at home with correction doses if needed.

# 8c MRI scan under general anaesthetic

Before	FOR ALL MRI scans
MRI	• Remove any insulin pumps, metal canulae and continuing glucose monitoring devices – eg.
	Dexcom/Libre/Libre 2. prior to entering MRI scanner
	<ul> <li>MRI Scan must be interrupted as necessary to enable a blood glucose sample to be</li> </ul>
	obtained every 30 minutes. The blood alucose testing equipment will need to be remain
	outside the scan room
	IF on Multiple daily injections (MDI/Basal bolus) regimen or
	IF on premixed insulin in the morning. (Twice daily or three times daily regimen)
	if scan expected to be < 2 hours
	Follow guidelines in 8a and 8b as per minor elective surgery depending on timing of MRI
	If expected to be longer than 2 hours
	<ul> <li>Follow guidelines in 8d and 8e as per major elective surgery depending on timing of MRI</li> </ul>
	IF on insulin pump (with or without hybrid closed loop with continuous glucose
	monitor)
	If scan expected to be < 1 hour
	<ul> <li>Follow guidance in 8a and 8b as per minor elective surgery depending on timing of MRI</li> </ul>
	BUT remove insulin pump/ metal canulae AND any CGM (if using)
	$_{\odot}$ The insulin pump can safely be removed for up to 1 hour if BG are in target 5-11.1 mmol.
	$_{\odot}$ Provision must be made to enable reinsertion of insulin pump after 1 hour. If insulin pump
	cannot be reinstated after 1 hour from when it was discontinued then IV fluids and Insulin
	should be commenced as they have <b>NO</b> basal insulin in their body.
	If scan expected to be > 1 hour
	• • • • Follow guidance in 8d and 8e as per major elective surgery depending on timing of
	MRI BUT Remove insulin pump/ metal canulae AND any CGM (if using)
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	Reference no.: CH CLIN D06
After MRI	<ul> <li>Follow 8a, b, d, or e as per post- surgery</li> <li>Replace insulin pump and/or CGM (if used) post MRI.</li> <li>For children on insulin pump a correction bolus may be required if blood glucose is above target on reinsertion of the insulin pump. The parent/carer can deliver this as per their usual practice.</li> <li>If BG is 14mmol or more on pump re-insertion sick day rules should be followed in accordance with local guidelines</li> </ul>

# 8d. Major Elective Morning Surgery

Day Before surgery	<ul> <li>Admit day before surgery</li> <li>Weigh. Consider U&amp;E, FBC, laboratory BG, blood for ketones</li> <li>Pre-meal and pre-bedtime capillary BG on the ward</li> <li>Usual insulin the evening and night before surgery (consider reduction in basal insulin dose if BG usually in target).</li> <li>For those on insulin pumps continue pump as usual with parental management until the time of surgery. We recommend changing the cannula site.</li> </ul>
Morning of surgery	<ul> <li>Nothing to eat 6 hours before operation. For morning lists patients should be starved from 03.00, but encourage to drink clear fluids until 1 hour before surgery</li> <li>Omit rapid acting insulin (e.g. insulin aspart (NovoRapid or Elasp) or Humalog</li> </ul>
*First on list*	<ul> <li>Ispro (Humalog), insulin glulisine (Apidra) in the morning.</li> <li>Glargine (Lantus), detemir (Levemir) or degludec (Tresiba) if given in the morning, should also be given. Consider reduction in the dose if blood glucose levels usually in target range.</li> <li>Start intravenous maintenance fluids at maintenance rate and intravenous insulin according to 'sliding scale' at 06.30h, to maintain BG level between 5 and 11.1mmol/l. (see section 8g&amp; 8h)</li> <li>Measure capillary BG pre-theatre and half-hourly during surgery</li> <li>For those on an insulin pump:</li> <li>Consider whether the pump may need to be removed if an X-ray is expected in theatre.</li> <li>Parents may be able to continue with their usual management and the diabetes team may advise a reduced temporary basal rate or adjusted sugar target. If the pump needs to be stopped, start on IV insulin and intravenous fluid as per section</li> </ul>
After surgery:	<ul> <li>Capillary BG and Ketones hourly.</li> <li>Continue IV fluids and IV insulin infusion until ready to start eating</li> <li>Go to section 8i for guide on how to change back to subcutaneous insulin</li> </ul>
	<ul> <li>Always give basal insulin analogue (Glargine (Lantus), detemir (Levemir) or</li> <li>degludec (Tresiba) by subcutaneous injection at usual time even if on IV fluids and insulin.</li> </ul>

8e. Major Elective Afternoon Su
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Day before	Consider admission the day before surgery
surgery	<ul> <li>Weigh. Consider U&amp;E, FBC, laboratory BG, blood for ketones</li> </ul>
	<ul> <li>Pre-meal and pre-bedtime capillary BG on the ward</li> </ul>
	<ul> <li>Usual insulin the evening and night before surgery (consider reduction in basal insulin dose if BG usually in target).</li> </ul>
	• For those on <b>insulin pumps</b> continue pump as usual with parental management
	until a few hours before surgery. We recommend changing the cannula site.
	I he team may advise a reduced temporary basal rate or adjusted sugar target. If the
	pump needs to be stopped, start on IV insulin and intravenous fluid as per section 8g
	& 8h a fewhours before surgery to gain stability.
Morning of	Light breakfast at 0700 on the morning of procedure before fasting, but check with
surgery	anaesthetists for exact timing.
** First on	• For those on a <b>Multiple Daily injection (MDI) regimen</b> , rapid-acting insulin (should
FIISL OII	be given at the usual dose according to carbonydrate content as well as usual
lict**	(Lanus), determing on pre-meal BG level. Glargine (Lanus), determin
1151	(Levenin) of degludec (Tresida) if given in the morning, should also be given.
	For those on a twice daily insulin regime, give half the morning insulin dose
	<ul> <li>For those of a twice daily insulin regime, give half the monthing insulin dose</li> <li>Introvenous fluid infusions from 12 near and introvenous insulin infusion (see</li> </ul>
	• Initiavenous nuiu initiasions noni 12 noon and initiavenous insulin initiasion (see
	<ul> <li>Measure capillary BG pre-theatre and half-hourly during surgery</li> </ul>
	• Measure capillary be pre theatre and hair hourry during surgery
	For those on an insulin pump:
	<ul> <li>Consider whether the pump may need to be removed if an X-ray is expected in theatre.</li> </ul>
	<ul> <li>Parents may be able to continue with their usual management and the team may</li> </ul>
	advise a reduced temporary basal rate or adjusted target sugar. If the pump
	needs to be stopped, start on IV insulin and intravenous fluid as per section 8g &
	8h a few hours before surgeryto gain stability.
After surgery	<ul> <li>Capillary BG and Ketones hourly including theatre.</li> </ul>
	<ul> <li>Continue IV fluids and IV insulin infusion until ready to start eating</li> </ul>
	<ul> <li>Go to section 8i for guide on how to change back to subcutaneous insulin.</li> </ul>
	<ul> <li>Always give basal insulin analogue (Glargine (Lantus), detemir (Levemir) or</li> </ul>
	degludec (Tresiba) by subcutaneous injection at usual time even if on IV fluids and insulin.

# 8f. Emergency Surgery

Before surgery	On arrival, weigh patient, measure capillary and laboratory BG, venous blood gases, bloodketones, electrolytes, urea and creatinine.
	<ul> <li>Inform diabetes team on admission if possible.</li> <li>If <b>ketoacidotic</b></li> <li>Follow Diabetes Ketoacidosis (DKA) guideline CH CLIN D03</li> </ul>
	• Operate when rehydrated, blood pressure is stable, blood gas is normal, sodium and potassium in normal range.

	<ul> <li>Blood glucose levels should ideally between 5 and 11.1mmo/l</li> </ul>
	<ul> <li>This may not be possible for some life-saving operations.</li> </ul>
	If not ketoacidotic
	<ul> <li>Follow guideline on major elective surgery and start fluid maintenance and intravenous insulin (section 8g &amp; 8h)</li> </ul>
	• For those on an <b>insulin pump</b> :
	<ul> <li>Consider whether the pump may need to be removed if an X-ray is expected in theatre.</li> </ul>
	• Parents may be able to continue with their usual management and the team may advise a reduced temporary basal rate or adjusted sugar target. If the pump needs to be stopped, start on IV insulin and intravenous fluid as per section 8g & 8h a few hours before surgeryto gain stability.
	Always give basal insulin analogue (Glargine (Lantus), detemir (Levemir) or degludec
	(Tresiba) by subcutaneous injection at usual time even if on IV fluids and insulin.
After surgery	<ul> <li>Measure capillary BG hourly and check for blood ketones on every sample (including theatre)</li> </ul>
	<ul> <li>Continue IV fluids and insulin infusion until ready to eat</li> </ul>
	Go to section 8i for guide on how to change back to subcutaneous insulin

## 8g. Maintenance Fluid Guide

## Fluid of choice – Use 500ml bags of 0.9%

### sodium chloride with 5% glucose:

Use 5% glucose,

- however if there is concern about hypoglycaemia, use 10% glucose
- If BG is high (>12mmol/l) increase insulin supply. See Section 8h.

### Sodium:

Use 0.9% sodium chloride.

### Potassium:

Monitor electrolytes, but always include potassium chloride pre- and post-operatively as per IV fluid guidelines: 10mmol per 500ml bag if patient weight <20kg and 20mmol per 500ml bag if patient weight >20kg.

### Maintenance fluid calculation

	Body weight in kg	Fluid requirements in 24 hours
For each kg between	3-9kg	100ml/kg
For each kg between	10-20kg	Add an additional 50ml/kg
For each kg over	Over 20kg	Add an additional 20ml/kg

#### 8h. Insulin Infusion Guide

- Add 50 units soluble insulin (Actrapid) to 49.5mls of 0.9% sodium chloride, giving 1 unit per ml.
- Start infusion at:
  - o 0.01 ml/kg/hour if BG is between 5-6mmol/l,
  - o 0.025 ml/kg/hour (i.e., 0.025 U/kg/hour) if BG is between 6-8mmol/l,
  - 0.05 ml/kg/hour if 8–12mmol/l,
  - o 0.075 ml/kg/hour between 12–15mmol/l
  - $\circ$  0.1 ml/kg/hour if > 15mmol/l.
- Monitor BG hourly before surgery and every 30 minutes during the operation and until the child recovers from anaesthesia. Adjust IV insulin accordingly.
- If BG <5mmol/l, stop the IV insulin infusion but only for 10–15 min. Give bolus of IV 10% glucose 2ml/kg; recheck BG 15 minutes later.

### 8i. Restarting subcutaneous insulin after being on intravenous insulin

If ready to eat lunch give:

- For patients on twice daily injection regime, e.g. Novomix 30, allow to eat but continue IV fluids and insulin until evening meal (then see below)
- For patients on multiple daily injection regimes, give rapid acting insulin (Novorapid, Fiasp or Humalog), insulin glulisine (Apidra) with lunch. Check that the long-acting basal insulin analogue e.g. Glargine (Lantus), detemir (Levemir) or degludec (Tresiba) has been continued throughout stay. If they have missed a dose, delay re-starting subcutaneous insulin until they have had the long-acting insulin.
- For those patients on an insulin pump (with or without CGM) re-start the insulin pump at the usual basal rate once the child is feeling better and BG levels are stable with no ketones. Parents should be allowed to manage according to their usual practice.

If ready to eat by the evening meal give:

- For those patients on twice daily injection regime e.g. Novomix 30, give usual dose of insulin with evening meal.
- For those patients on multiple daily injection regimes, give rapid acting insulin (Novorapid, Fiasp or Humalog) insulin glulisine (Apidra) with the evening meal and long-acting insulin analogue e.g. Glargine (Lantus), detemir (Levemir) or degludec (Tresiba) at theusual time.
- **Always** give dose of long acting basal insulin analogue at the usual time even if still on intravenous fluids and intravenous insulin overnight to prevent rebound hyperglycaemia.
- For those patients on an insulin infusion pump (with or without CGM) re-start the insulin pump at the usual settings once the child is feeling better and capillary BG levels are stable with no ketones. Parents should be allowed to manage according to their usual practice.

### When to take down IV infusions:

- Stop IV insulin 60 minutes after subcutaneous insulin has started if the child is first given a pre mixed insulin (e.g. Novomix 30) or long acting basal insulin analogue dose.
- Stop IV insulin 10 minutes after subcutaneous insulin has started if the child is first given a rapid

Suitable for printing to guide individual patient management but not for storage Review Due: May 2027 Page **10** of **10**  acting insulin dose/ re-started pump.

## 8j Treating hypoglycaemia

Peri-operatively, we consider BG levels <5mmol/l as hypoglycaemia (in comparison with our usual definition in diabetes of <4mmol/l).

For those children who 'are nil by mouth'

- BG <5mmol/I give 2ml/kg bolus of IV 10% glucose; recheck BG 15 minutes later.
- If still nil by mouth, follow on with IV maintenance fluids (8f) until able to eat and drink.
- For those using an insulin infusion pump, suspend the pump for 30 minutes in addition to giving the glucose bolus.

For those children able to drink and eat, please follow guideline for the management of hypoglycaemia in children with diabetes (CH CLIN D05)

### 9. Guideline for children on oral medications

#### Metformin:

- Discontinue at least 24 hours before procedure for elective surgery.
- In emergency surgery and when metformin is stopped < 24 hours, ensure optimal hydration to prevent risk of lactic acidosis.
- The main concern regarding metformin therapy during surgery relates to the rare complication of lactic acidosis. Metformin has a long biological half-life (17-31 hours) hence the need to stop it at least 24 hours prior to surgery.

Other oral medications e.g. sulphonylureas or thiazolidinediones: stop on day of surgery

### 10. References:

Association of Children's Diabetes Clinicians Clinical Guideline: Care of children under 18 years with diabetes mellitus undergoing surgery. 2021 (due update 2024)

International Society or Paediatric and Adolescent Diabetes Clinical Practice consensus guideline 2018: management of children and adolescents with diabetes requiring surgery.

# 11. Documentation controls

Reference Number	Version		Status					
CH CLIN D06	9		Final					
Version /	Version	Date	Author	Reason				
Amendment History	8	May 21	T Tinklin	Update with national quidance				
	9	April 24	T Tinklin	Update required				
Intended Recipients: Clinical staff in children's wards at Derby and Burton								
<b>Training and Dissemination:</b> Cascade the information via BU newsletter and address training								
<b>Development of Guideline:</b> Tracy Tinklin <b>Job Title:</b> Consultant Paediatrician								
In Consultation with: (Relevant peer review) Drs Smith, Vasista, Lloyd-Nash and Kumar. Paediatric diabetes team. Sarah Rushman(on behalf anaesthetists with an interest in paediatrics) Ellie Cheale ( on behalf paediatric pharmacists) Senior nursing staff, Sunflower ward								
Linked Documents: Current national and international guidelines as referenced								
<b>Keywords: (Search term for KOHA)</b> Diabetes Children and young people Surgery								
Business Unit Sign Off		Group: Paediatric Guidelines Group Date:						
Divisional Sign Off		<b>Group:</b> Women's and Children's Clinical Governance Group <b>Date: 21/05/2024</b>						
Date of Upload		04/06/2024						
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<b>Contact for Review</b>			Dr Tracy Tinklin					