Document Control

Title **Hypoglycaemia Guideline for Children and Young People (aged 0-18 years) With Type 1 Diabetes**			
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1. Contents

1. Purpose

The purpose of this document is to detail the process for the hospital management of hypoglycaemia in children and young people with type 1 diabetes – including inpatients, the emergency department, and outpatient clinics.

The guideline applies to medical and nursing staff at North Devon District Hospital. It is for the care of children and young people up to the age of 18 years.

2. Definitions

2.1. Hypoglycaemia

Hypoglycaemia in children and young people with diabetes is defined as blood glucose (BG) less than 4.0 mmol/l.

2.2. Abbreviations

CNS = Clinical Nurse Specialist (in Paediatric Diabetes)

BG = Blood Glucose

3. Responsibilities

3.1. Role of CNS, Consultant Paediatricians, and Consultants in Emergency Medicine

- Dissemination of the guideline to medical staff
- Training in use of the guideline
- Audit and review of the guideline

3.2. Role of Nursing Staff on Caroline Thorpe Ward and in the Emergency Department

- Ensuring that the guideline is followed
- Ensuring that the following people are informed about the episode of hypoglycaemia as soon as possible (during working hours): On-call paediatrics team; CNS – Richard Todd or Beverley Anderson

4. Guidance

4.1. Signs and symptoms of hypoglycaemia ('hypo')

These vary between individuals and may change with age. In the case of a child with pre-existing diabetes, their usual symptoms of hypoglycaemia, and treatment plan, should be recorded in the notes on admission to hospital. Some children / young people with diabetes may have no symptoms during an episode of hypoglycaemia.

If you suspect a child / young person with diabetes is experiencing hypoglycaemia their capillary blood glucose (BG) must be checked immediately.

Signs and symptoms of hypoglycaemia can be classified into 3 groups:

Autonomic	Neuroglycopaenic	Behavioural
• Pale • Sweaty/clammy • Hungry • Tremor • Restlessness	• Headache • Confusion • Weakness • Glazed expression • Lethargy • Visual / speech disturbances • Seizures • Unconsciousness	• Irritability • Mood change • Erratic behaviour • Nausea • Combative behaviour

4.2. Treatment of hypoglycaemia

The treatment varies with the degree of severity:

Mild / Moderate hypoglycaemia (see section 4.3, page 5) – able to tolerate oral treatment.

Severe hypoglycaemia (see section 4.4, page 6) – with loss of consciousness or seizures, requires parenteral therapy.

Do not leave a child with hypoglycaemia alone.

4.3. Treatment of Mild / Moderate Hypoglycaemia (can tolerate oral treatment)

Box 1. Follow this box if child is cooperative and able to tolerate oral fluids

BG 3.6-3.9 mmol/l
Give 5g of fast-acting oral carbohydrate:
- 2 glucose tablets OR
- 50 ml sugary drink (e.g. orange juice)

BG 3.2-3.5 mmol/l
Give 10g of fast-acting oral carbohydrate:
- 3 glucose tablets OR
- 100 ml sugary drink (see above)

BG <3.2 mmol/l
Give 15g of fast-acting oral carbohydrate:
- 5 glucose tablets OR
- 150 ml sugary drink (see above)

**The amount (5-15g) of carbohydrate may also vary according to the child's personal treatment plan, age / weight, and the cause of hypoglycaemia.*

Box 2. Follow this box if child refuses to drink, is uncooperative but is conscious

Give Glucogel or Dextrogel. This is a fast-acting sugary gel in an easy twist-top tube. Each tube contains 10g glucose.
Squirt tube contents in the side of each cheek (buccal) and massage gently from outside enabling glucose to be swallowed and absorbed quickly

Do not use Glucogel in an unconscious or fitting child.

After 15 minutes recheck BG

1. If still low (< 4mmol/l) and able to take oral fluids then repeat Box 1 above (once).
2. If still low (< 4mmol/l), refuses to take oral fluids but is conscious, follow Box 2 above (once).
3. If deteriorated after 1st run through above, or not responded after having administered 2nd dose of above, then proceed to Box 4 (page 6).

Box 3. If feeling better and BG ≥ 4mmol/l

It is not routine to give a snack after a mild-moderate episode of hypoglycaemia. But if you feel that the child's blood glucose may fall again (e.g. following sustained exercise or during intercurrent illness), then a slow-acting carbohydrate snack should be given:
- 1 piece of bread / toast
- 1-2 biscuits
- Then retest the BG 1 hour later to confirm target BG (≥ 4mmol/l) is maintained.

If hypoglycaemia is just before a meal-time (when insulin is usually given) the hypoglycaemia should be treated first and once the blood glucose is ≥ 4mmol/l then the insulin should be given as usual. Do not omit insulin.

Try to identify the cause of the hypoglycaemia. Discuss this with the child and family. The insulin dose may need to be adjusted – discuss with the paediatric diabetes team.

4.4. Treatment of Severe Hypoglycaemia (with loss of consciousness / seizures)

Check BG and confirm hypoglycaemia <4 mmol/l.

- Get medical help – bleep the paediatric registrar.
- Place in the recovery position if possible and assess Airway Breathing Circulation.
- Do not attempt to give any oral fluid or Glucogel.
- **Intravenous 10% dextrose is the treatment of choice (Box 4). If intravenous access (IV) is not present and cannot be rapidly obtained then intramuscular glucagon is an alternative initial treatment (Box 5).**

Box 4. Give 10% dextrose intravenously

Administer 2ml/kg 10% dextrose as a slow IV bolus.

Box 5. If IV access is not present and cannot be rapidly obtained.

Give glucagon by intramuscular injection in the thigh. Glucagon dose:

- If age <8 years or bodyweight less than 25kg: 0.5 mg
- If age >8 years or bodyweight >25kg: 1mg

Glucagon is fast-acting and the child should respond after 5 minutes. After they have regained consciousness leave him/her on one side as one of the common side-effects of glucagon is nausea/vomiting.

After giving glucagon, obtain IV access. If no response to glucagon within 10 minutes then intravenous glucose must be given.

Note: If the hypoglycaemia is caused by alcohol or is following substantial exercise (depleted glucose stores) then glucagon may be ineffective.

Further monitoring after a severe hypo

- Check BG after 5 minutes, 15 minutes, and then half hourly until blood glucose stable above 5 mmol/l.
- Continue to monitor baseline observations: Oxygen saturations, pulse, BP, temp.
- Record presence or absence of ketones
- Document management
- Do not omit normal insulin unless instructed to do so by paediatric diabetes team.

If BG >4 mmol/l and child able to tolerate oral fluids:

- Offer clear fluids, and once able to tolerate this offer simple carbohydrates such as toast, biscuits (see Page 5, Box 3).
- Try to identify the cause of the hypoglycaemia. Discuss this with the child and family. The insulin dose may need to be adjusted.

If child not improving:

- If patients have protracted vomiting and are unable to tolerate oral fluids, hospital admission and IV dextrose infusion must be considered.
- If a patient remains unconscious on correction of BG consider cerebral oedema, head injury, adrenal insufficiency, or drug overdose.

5. Monitoring Compliance with and the Effectiveness of the Guideline

5.1. Standards/ Key Performance Indicators

Key performance indicators comprise:

- The Paediatric Diabetes Team will monitor the effective use of the guideline.

5.2. Process for Implementation and Monitoring Compliance and Effectiveness

- Dissemination of guideline to medical and nursing staff in the Paediatrics department, Emergency department, and onto BOB
- Training to medical staff at induction and an annual update for existing staff
- Training to nursing staff at teaching update sessions
- Staff to be informed of any revised documentation
- Non-adherence to the guideline should be reported by use of the DATIX system. Incidents to be monitored and reviewed by the clinical governance team and in the Paediatrics Diabetes Team meetings
  This guideline will be subject to an audit review by the Paediatrics Diabetes Team prior to the next review date.

6. References

'Hypoglycaemia in diabetes' clinical guideline, Association of Children's Diabetes Clinicians (ACDC), 2014

ISPAD guideline: *'Assessment and management of hypoglycaemia in children and adolescents with diabetes'*. Paediatric Diabetes 2014: 15 (Suppl. 20); 180-192

7. Associated Documentation

'Management of children and Young People with Newly Diagnosed Type 1 Diabetes Guideline'. NDHT. May 2015

Southwest Paediatric Diabetes Regional Network Integrated Care Pathway for Children and Young People with Diabetic Ketoacidosis, 2013

Paediatrics Resources shared drive, Diabetes folder