

# Paediatric Clinical Guideline for the management of Well Children and Young people with Newly Diagnosed Diabetes mellitus

Ref no: CH CLIN D01

## 1. Introduction

This guideline is intended for use in managing children presenting with newly diagnosed diabetes who are well, not acidotic, not significantly dehydrated, and able to tolerate oral rehydration and those recovering from Diabetes Ketoacidosis.

This guideline does not cover the management of children presenting diabetic ketoacidosis (DKA). **CH CLIN D 03 - PAEDIATRICS**

## 2. Aim and Purpose

To inform all staff of the investigation and treatment of children and young people with newly diagnosed diabetes

### WHO Diagnostic criteria for diabetes

A- Symptoms of diabetes mellitus and Random plasma glucose of  $\geq 11.1$ mmol/l

B- Fasting Plasma glucose of  $\geq 7.0$ mmol/l (Fasting is defined as no caloric intake for at least 8 hours)

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## Section 1 - Initial Assessment

- **History** ( Polyuria, Polydipsia, weight loss and Lethargy) including family history of diabetes or auto-immune disorders)
- **Examination** (particularly looking for signs of dehydration or breathlessness).
- **Height and weight, plot on appropriate chart/ iGrow**
- **Point of care blood glucose and blood ketones**

## Section 2 - Lab investigation

Derby site	Burton site
<b>Order in Lorenzo</b>  laboratory glucose, U & E Thyroid function test HbA1c (EDTA sample) Coeliac serology Venous gas for acid-base status	<b>Order in V6</b>  <b>Go to: V 6 Orders:</b> <ul style="list-style-type: none"> <li>• <b>Select New Sets:</b></li> <li>• <b>Select Category:</b></li> <li>• <b>Select Paediatrics:</b></li> <li>• <b>Tick ‘PAED.NEW DIABETIC’ – i.e. -</b> Paediatric Diabetes New patients.</li> </ul> <p>(Do not select <b>PAED.DIAB ANNUAL REV</b> <b>as</b> this is only for established patients with diabetes for their annual review bloods)</p>
<b>Diabetes autoantibodies –</b>  (Islet Antigen 2 (IA2), Glutamic acid decarboxylase (GAD) and Zinc transport 8 (ZNT8) antibodies)  Should only be requested following discussion with or on recommendation of Paediatric diabetes team	
<b>Select – Diabetes auto antibodies in Lorenzo</b>	

### Section 3 - team contact/informing team.

Inform a member of the diabetes team as soon as possible. Patients with newly diagnosed diabetes must be discussed with one of the diabetes Consultants or specialist nurses within 24 hours.

Derby site	Burton site
<p><b>Paediatric Diabetes Specialist Nurse (PDSN) ext - 86963 .</b></p> <p>8am-6pm during weekdays</p> <p>8-4 pm over weekend.</p> <p>(During these hours 'press 1' for an emergency to speak to them directly).</p> <p>Out of hours, a message can be left on this extension to be picked up at 8am the next day.</p> <p><b>Email:</b> uhdb.childrensdiabetes@nhs.net</p> <p><b>Dr Tinklin, Dr Smith and Dr Kumar</b> (secretary ext - 86824)</p> <p><b>Paediatric dietitian ext -85233)</b></p>	<p><b>Paediatric Diabetes Specialist Nurse (PDSN) – 01332 786963.</b></p> <p>8am-6pm weekdays.</p> <p>8-4 pm over weekend.</p> <p>(During these hours 'press 1' for an emergency to speak to them directly).</p> <p>Out of hours, a message can be left on this extension to be picked up at 8am the next day.</p> <p><b>Email:</b> uhdb.childrensdiabetes@nhs.net</p> <p><b>Dr Vasista, Dr Lloyd-Nash</b> (secretaries 3271/3264)</p> <p><b>Paediatric dietitian – Referral on V6 Orders - Dietician (Refer to Dietician)</b></p>

### Section 4 - Management

Dehydrated or acidotic		
No		Yes
Admit to ward for Initiation of education and treatment.		Follow DKA guidelines <b>CH CLIN D 03 - PAEDIATRICS</b>
<b>Derby site</b>	Puffin or Dolphin Ward	Admit to Paediatric Critical Care Unit (PCCU)
<b>Burton site</b>	Ward 1	Children < 2 years of age or Ph < 7.1 – Transfer to RDH

All Children and Young People under the age of 16 years should as default be admitted to paediatric wards but there may be a grey area for those nearly approaching 18yrs, and soon to be under the care of young adult services, or in full time employment or living independently. These decisions should be individualised, and take into account the patient's maturity, competence and circumstances, and may require a conversation between adult and paediatric teams to determine under which team ongoing care should continue.

## Type of Diabetes

The majority of children and young people have type 1 diabetes, but consider the possibility of Type 2 diabetes in a well child, with no ketosis, and no weight loss. Look for signs of insulin resistance such as obesity, acanthosis nigricans, and polycystic ovarian syndrome. Please discuss with diabetes team, in case insulin can be avoided. If in doubt, and unable to obtain advice out of hours, start insulin at the lower dose of 0.5 units / kg / day and do not prescribe correction doses.

### 4a Insulin treatment in Emergency Department

All patients start on a 'multiple dose injection' regime.

**Insulin Degludec** is the long acting insulin given once daily preferably at evening time.

**Insulin Detemir** is the long acting insulin for children less than one year

**Novorapid** is the short acting insulin given before breakfast, lunch, tea and for correcting high blood glucose.

**Derby site -Please use insulin order sets to prescribe in Lorenzo – See Guideline CHCLIN D16**

Or Click this link: [opac-retrieve-file.pl \(koha-ptfs.co.uk\)](http://opac-retrieve-file.pl(koha-ptfs.co.uk))

**Burton Site – Use prescription set on V6-** coming soon

<b>Insulin Dose calculation</b>	
<b>To be prescribed in the Emergency Department</b>	
<b>Total daily dose of insulin</b>	
Well child with Minimal weight loss and blood ketones <1mmol/l	0.5 units/kg/day
Unwell child with Significant weight loss and ketoacidosis	0.8 units/kg/day
<b>Long acting Insulin</b>	
<b>Degludec</b>  (Detemir for under 1 year)  To be prescribed at 6pm	40% of Total Daily Dose (TDD)
<b>Short acting insulin Novorapid</b>  Please prescribe as set dose  To be given 15 minutes before each meal	20% of total daily dose for Breakfast  20 % of total daily dose for Lunch  20% of total daily dose for Tea

Round doses up to nearest half unit for children under 5 years of age and to the nearest whole unit for children over 5 years of age.

**Example: well child with blood ketones <1. if weight is 20 kg**

Total daily dose of insulin = 0.5 units X20 = 10 units

Long acting insulin dose = 40% of Total daily dose

40% of 10 = 4 units

Short acting insulin = 20% of Total daily dose for breakfast, lunch and Tea

20% of 10 = 2 units for breakfast, 2 units for lunch and 2 units for Tea.

**Example: Unwell child with significant weight loss and ketosis . if weight is 20 kg**

Total daily dose of insulin = 0.8 units X20 = 16 units

Long acting insulin dose = 40% of Total daily dose

40% of 16 = 6.4 units ( round the dose to 6.5 units)

Short acting insulin = 20% of Total daily dose for breakfast, lunch and Tea

20% of 16 = 3.2 units ( round the dose to 3 units)

3 for breakfast , 3 units for lunch and 3 units for Tea.

**4b Insulin treatment on ward**

Once admitted to the ward, the diabetes team will recommend changing the Novorapid set dose pre meal to a dose calculated by carbohydrate counting.

**Derby site** -Follow instructions for insulin prescribing on Lorenzo **-Guideline CH CLIN D16**

Or Click this link: [opac-retrieve-file.pl\(koha-ptfs.co.uk\)](http://opac-retrieve-file.pl(koha-ptfs.co.uk))

**Please make sure to use insulin order sets to prescribe**

**Burton site- Prescribe on V6**

**Carbohydrate counting starting ratio for newly diagnosed patients**

Weight(kg)	At diagnosis ketones <1.0 (0.5units/kg)	At diagnosis Ketones ≥1.0 (0.8units/kg)
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10-14.9	1unit per 50 grams of carbohydrate	1unit per 40 grams of carbohydrate
15-19.9	1unit per 40 grams of carbohydrate	1unit per 25 grams of carbohydrate
20-24.9	1unit per 30 grams of carbohydrate	1unit per 20grams of carbohydrate
25-34.9	1unit per 25 grams of carbohydrate	1unit per 15grams of carbohydrate
35-39.9	1unit per 18grams of carbohydrate	1unit per 15grams of carbohydrate
40+	1unit per 15grams of carbohydrate	1unit per 10grams of carbohydrate

### For Children less than 10kg body weight

Either contact a member of diabetes team or Divide 300 by (TDD) total daily dose to get Insulin to Carbohydrate ratio	
<b>Example 1</b> 8Kg child with ketones <1.0 at diagnosis $8 \times 0.5 \text{ unit} = 4 \text{ units (TDD)}$ $300/4 = 75.$ 1 Unit for 75 grams of carbohydrate.	<b>Example 2</b> 8 kg child with Ketones >1 at diagnosis $8 \times 0.8 \text{ unit} = 6.4 \text{ units(TDD)}$ $300/6.4 = 46.8$ 1Unit for 45 grams of carbohydrate.

### **Correction Doses:**

Please prescribe correction dose to start by second meal.

Corrections dose =  $100 \div$  by Total Daily Dose (long and fast acting insulin). **Example:** If Total Daily Dose = 20 units, then correction dose will be  $100 \div 20 = 5.$ ie: 1 unit of Novorapid will reduce blood glucose by 5mmol/l.

If blood glucose is 26 mmol/l and aiming for a blood glucose of 6 mmol/l, the correction dose needs to reduce blood glucose by 20 mmol/l

If 1 unit of Novorapid reduces blood glucose by 5 mmol/l then  $20 \div 5 = 4.4$  units will reduce blood glucose by 20 mmol/l

## Section 5 - Ward Monitoring

### Blood glucose testing

Check blood glucose before each meal, before bed, 22:00 and 02:00

Our aim is to reduce blood glucose level to the normal range of 4- 6.9mmol/l soon after diagnosis, as this may prolong intrinsic insulin secretion for some children, and achieving thenational HbA1c target of <48mmol/mol soon after diagnosis.

### Hypoglycaemia

Treat all hypoglycaemic episodes (Blood glucose <4mmol/l) by following guideline **CH CLIND05**. Remember that although we treat blood glucose levels below 4mmol/l in children and young people with diabetes, this is precautionary and it is important that the family are not afraid of “mild hypos”.

## Section 6 - Discharge

[– see Appendix A and B for both Derby and Burton site](#)

Arrange home prescription for insulin and equipment (please do this on admission even if discharge not likely that day) (See appendices)

### To prescribe discharge medication for newly diagnosed patient with type 1 diabetes

Derby site	Burton site
Step 1: Search for one of ‘Insulin, Diabetes, Paediatric Diabetes, Newly Diagnosed,’ and <u>tick ‘Search order sets’</u>  Step 2: Select either Newly diagnosed diabetes under 1 years old OR  Newly diagnosed 1 years and over  Step 3: Select ‘Diabetic starter kit’.  Step 4: Press OK  Step 5: Double check prescription and press FINISH NOW	Go to: V 6 Orders:  Step 1: Select New Sets:  Step 2: Select Category:  Step 3: Select Paediatrics:  Step 4: Tick ‘Paed <i>diabetic take home kit.</i> ‘  Step 5: File the full order set.  The insulin to take home: Basal and Bolus insulin’s (penfill cartridges) are ordered separately as to the CYP’s requirements and are added to the Discharge Meds.

Discuss any concerns with Consultant on call. If the consultant on call is still concerned, he/she may contact Dr Tinklin, Dr Smith, Dr Kumar via switchboard at Derby site and Dr Vasista, Dr Lloyd-Nash at Burton site. If they are unavailable, use Paediatric Endocrine rota (copy available in CED or via switchboard, QMC Nottingham)

### Discharge

This is to be determined by the diabetes team and is dependent on completion of newly diagnosed education package.

#### 1. References (including any links to NICE Guidance etc.)

International Society of Pediatric and Adolescent Diabetes Clinical Practice Consensus guidelines 2009. Pediatric Diabetes 2018

Diabetes (type 1 and 2) in Children and Young People- Diagnosis and Management, NICE Guidelines NG18 August 2015

### Documentation Controls

<b>Reference Number</b> CH CLIN D01	<b>Version:</b>		<b>Status</b> Final	
<b>Version / Amendment History</b>	<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Reason</b>
	V1	Jan 2021	Dr Julie Smith	Review and Renew
	V14	June 2024	Dr Julie Smith	Amend
<b>Intended Recipients:</b> Paediatric Consultants & Nursing staff at Derby Hospital				
<b>Training and Dissemination:</b> Cascade the information via BU newsletter and address training				
<b>Development of Guideline:</b> Dr Julie Smith <b>Job Title:</b> Consultant Paediatrician - Clinical lead Paediatric diabetes				
<b>In Consultation with:</b> Paediatric diabetes team, Consultant Paediatricians, Chemical Pathology, Paediatric Pharmacist, Dietetics, Paediatric Diabetes specialist nurses.				
<b>Linked Documents:</b> (Nice guidance/Current national guidelines)				
<b>Keywords:</b> Type 1, Paediatric Diabetes				
<b>Business Unit Sign Off</b>			<b>Group:</b> Paediatric Guidelines Group <b>Date:</b> 19/01/2021	
<b>Divisional Sign Off</b>			<b>Group:</b> Women's and Children's Clinical Governance Group <b>Date:</b> 19/01/2021 <b>Amendment – June 2024</b>	
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<b>Review Date</b>			June 2027	
<b>Contact for Review</b>			Dr Julie Smith	



## **Section 7 - Discharge Medication**

### **Appendix A**

Prescription for children with newly diagnosed type 1 diabetes all ages:

#### **Diabetic starter kit**

Accu-chek fastclix Lancets	1 box (204)
GLUCOFIX TECH Sensors	4x boxes of 50
Glucose Oral Gel	3x25g tube
Glucagon 1mg injection	1x1ml syringe pack
Needle BD Microfine 32g 4mm	1 x box of 50
GLUCOFIX TECH Ketone Sensors	4 x box of 10
Sharps box	1x0.5 litre

**Insulin prescription for children with newly diagnosed type 1 diabetes, less than 1 year**

Novorapid 3 ml penfill cartridge 100 units/ml	1 box of 5 cartridges
Insulin Detemir(Levemir) 3ml penfill cartridge 100 units/ml	1 box of 5 cartridges

**Insulin prescription for children with newly diagnosed type 1 diabetes, 1 year and above**

Novorapid 3 ml penfill cartridge 100 units/ml	1 box of 5 cartridges
Insulin Degludec (Tresiba) 3ml cartridge 100 units/ml	1 box of 5 cartridges

**Items to be supplied by CED/ward for children with newly diagnosed type 1 diabetes less than 1 years**

Novo Nordisk: Novopen ECHO (red ) – for novorapid	X1
Novo Nordisk: Novopen ECHO (blue)- for Detemir	X1
Gluko juice (lift) for under 5s	Gluko juice (lift) x 2

**Items to be supplied by CED/ward for children with newly diagnosed type 1 diabetes 1 year and above**

Novo Nordisk: Novopen ECHO (red)- for Novorapid	X1
Novo Nordisk: Novopen ECHO (blue)- for Degludec	X1
Glucose (Dextro Energy) Tablets	2 x47g pack
Gluko juice (lift)	Gluko juice (lift) x 2

**Items to be supplied by paediatric diabetes team for children with newly diagnosed type 1 diabetes: all ages**

GLUCOFIX TECH GK meter (A.Menarini Diagnostics)	X1
Novopen needle remover device	X1

**Appendix B**

**Newly Diagnosed Type 1 Diabetic Ward discharge checklist**

To be completed in collaboration with diabetes team

Please ensure all items are checked and present before discharge.

Discharging Ward		
Discharging Nurse		
Date of discharge		
<b>Equipment Required - from CED or ward stock</b>	<b>Present</b>	<b>Sign and Date</b>
<p><i>Insulin Pens – to be provided to patients on admission from either CED or ward stock.</i></p> <p><b><u>Under 1yrs</u></b></p> <ul style="list-style-type: none"> <li>- NovoPen Echo ½ unit pen (Red) – Novorapid Cartridge inserted</li> <li>- NovoPen Echo ½ unit pen (Blue) – Detemir cartridge inserted</li> </ul> <p><b><u>Over 1yrs</u></b></p> <ul style="list-style-type: none"> <li>- NovoPen Echo ½ unit pen (Red) – Novorapid Cartridge inserted</li> <li>- NovoPen Echo ½ unit pen (blue)-Degludec cartridge inserted.</li> </ul> <p><i><u>Two nurses to double check the correct insulin cartridges are present and correctly inserted in the appropriate pens prior to discharge</u></i></p>		
<b>Equipment - To be provided by Diabetes Team</b>		
Blood glucose and Ketone meter – GLUCOFIX TECH GK meter (A.Menarini Diagnostics)		
Novo pen – needle remover		
Blood Glucose Diary		

'My Diabetes' Booklet		
Diabetic Starter Kit - To be provided by pharmacy - two nurses to double check prior to discharge.	Present	Sign and Date
GLUCOFIX TECH Sensors (blood glucose strips) – 4 Boxes		
Accu-check fast click lancets – 1 Box		
GLUCOFIX TECH Ketone Sensors – 40 strips		
Insulin pen needles 4mm – 1 Box		
Sharps Bin		
Glucogen emergency injection		
Gluco Gel – 1 Box (three tubes)		
Insulin Pen Cartridges Under 1's Novorapid 1 Box - 5 cartridges Detemir 1 Box - 5 cartridges  Over 1yrs Novorapid - 1 Box - 5 cartridges Degludec 1 Box - 5 cartridges		
Following items to be provided from ward stock		
Dextrose Tablets - 1 Packet (for 5yrs and over )		
Glucose Juice (Lift) - 3 bottles (for under 5's)		
<b>PDSN to arrange prior to discharge</b>	<b>Sign and Date</b>	
GP letter given to parents – to be dropped at surgery ASAP		
Seen by Dietitians – follow up review arranged		
Seen by Clinical Psychology (contact may be made post discharge)		
Clinic appointment given before discharge Time/date:		
Emergency contact details given to family.		

**Paediatric Diabetes Nurses - 01332 786963**

