National Policy ☐ National Procedure ☐ National Protocol ☐ National Guideline ☐
National Clinical Guideline ☒

HSE National Clinical Guideline for the Care of the Child Newly Diagnosed with Type 1 Diabetes without DKA

DOCUMENT GOVERNANCE [1]	
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Additional headings can be inserted if required

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Note: Original document is Version 0. First revision is Version 1. Second revision is Version 2, and so on.

Note: HSE National 3PGs should be formally reviewed every 3 years, unless new legislative/regulatory or emerging issues/research/technology/audit etc. dictates sooner.

[1] Records the senior management roles involved in the governance and development of the document.
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VERSION CONTROL UPDATE [3]		
Version No. (most recent version first)	**Date re-viewed** (most recent date first)	**Comments** (1 sentence max, if required)
2	January 2025	**Pg. 9** 7.2.7 added '300 rule' for younger children and '500 rule' 7.2.8 addition of ISF is typically calculated using the '100 rule'
		Pg.10 Calculations: changed to ICR: 500/TDD = 500/50 = 1 unit per 10g carbohydrate
1	April 2021	Original Guideline updated - CDI005/2021
0	March 2019	Original Guideline published - CSP008/2019
Additional notes: If there are no amendments to the National document following a formal review, the date and detail of the review must still be recorded in the version control update box.		

PUBLICATION INFORMATION [4]
Topic:
Care of the Child Newly Diagnosed with Type 1 Diabetes with-out DKA
National Group:
National Clinical Programme for Paediatrics and Neonatology Paediatric Diabetes Working Group
Short summary:
The aim of this guideline is to provide an evidence-based guideline for the care of the child with suspected or newly diagnosed Type 1 Diabetes (T1D) without diabetic ketoacidosis (DKA).
Description:
The purpose of this guideline is to improve the management of paediatric patients with newly diagnosed Type 1 Diabetes without diabetic ketoacidosis. This guideline is for **well** children presenting with polydipsia, polyuria and weight loss. The guideline is intended for healthcare professionals, particularly those in training, who are working in HSE-funded paediatric and neonatal services. It is designed to guide clinical judgement but not replace it. In individual cases a healthcare professional may, after careful consideration, decide not to follow the guideline if it is deemed to be in the best interests of the child.

[3] Records details when a document is reviewed, even if no changes are made.

[4] Records the document information required for publication on the HSE National Central Repository.

PAEDIATRICS

NATIONAL CLINICAL GUIDELINE

TITLE:

Care of the Child Newly Diagnosed with Type 1 Diabetes without DKA

Clinical Design and Innovation

Health Service Executive

Developed by:	The National Clinical Programme for Paediatrics and Neonatology and Paediatric Diabetes	Publication date V0 : Publication date V1 (updated) : 	March 2019 October 2021
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Clinical Design & Innovation

Contents

1 Aim of Guideline

The aim of this guideline is to provide an evidence-based guideline for the care of the child with suspected or newly diagnosed Type 1 Diabetes (T1D) **without** diabetic ketoacidosis (DKA).

2 Purpose and Scope

- The purpose of this guideline is to improve the management of paediatric patients with newly diagnosed Type 1 Diabetes without diabetic ketoacidosis
- **This guideline is for well children**
- The classical presentation is polydipsia, polyuria and weight loss
- If a child presents with the following **treat as a DKA**

  ✓Acidosis - pH < 7.3 OR Std Bicarbonate < 18mmol/L

  ✓Hyperglycaemia - plasma glucose > 11 mmol/L, glycosuria

  ✓Ketosis (> 3 mmol/L) OR ketonuria (moderate/large)

  ✓>5% dehydration

  ✓± vomiting

  ✓± drowsy

- These guidelines are intended for healthcare professionals, particularly those in training, who are working in HSE-funded paediatric and neonatal services
- They are designed to guide clinical judgement but not replace it. In individual cases a healthcare professional may, after careful consideration, decide not to follow a guideline if it is deemed to be in the best interests of the child or neonate

3 Background and Introduction

Ireland is a high incidence country for type 1 diabetes with the overall incidence highest in the 10-14yr old age group (Roche 2016). Children with early signs and symptoms of Type 1 diabetes need to be diagnosed promptly, before they become acutely unwell with diabetic ketoacidosis (DKA).

4 Legislation/other related policies

Model of Care for All Children and Young People with Type 1 Diabetes

5 Glossary of Terms and Definitions

DKA	Diabetic ketoacidosis
T1D	Type One Diabetes
BG	Blood Glucose
TFT	Thyroid Function Test
TPO	Thyroid peroxidase (antibodies)
HbA1c	Haemoglobin A1c
EDTA	Ethylenediaminetetraacetic acid
HCP	Healthcare professional
Kg	Kilogram
ED	Emergency Department
ICR	Insulin to Carbohydrate ratio
ISF	Insulin sensitivity factor

6 Roles and Responsibilities

This guideline should be reviewed by each acute hospital senior management team to appropriately plan implementation. This guideline aims to facilitate best practice and standardise the care provided to children in Ireland to ensure that the inpatient care of children/neonates admitted to their facility is optimised irrespective of location.

7 Clinical Guideline

Discuss with Consultant Paediatrician/Consultant Paediatric Endocrinologist (to decide dose/regimen) before prescribing subcutaneous insulin

7.1 Basic Care

7.1.1 Children with suspected diabetes or confirmed new diagnosis of diabetes should always be seen on the same day via the Emergency Department (ED) or other locally agreed paediatric assessment area

7.1.2 If admission is required newly diagnosed children and their families should be accommodated on ward areas familiar with the care of a child with diabetes

7.1.3 The majority of children at presentation do not require intravenous therapy. If not >5% dehydrated and not vomiting, encourage oral sugar free fluids.

Every effort should be made at ward level to ensure consistent advice, demonstrate good self-care behaviours (BG checks on time, insulin on time, appropriate meals and snacks, appropriate treatment of hypoglycaemia) and avoidance of high sugar foods from diagnosis

7.2 Insulin

7.2.1 Doses required are tailored to time of day and carbohydrate intake

7.2.2 Children who have elevated blood ketones typically require higher insulin doses than those who do not

INSULIN ADMINISTRATION SAFETY ALERT
INSULIN ERRORS CAN HAVE EXTREMELY SERIOUS CONSEQUENCES-always act on patient/family/HCP concerns re doses and recheck - • Overdoses can cause severe hypoglycaemia, seizures, coma and even death • Under dosage can result in diabetic ketoacidosis.
Please INDEPENDENTLY <u>DOUBLE CHECK</u> doses at each stage- • When making up an infusion (an insulin syringe graduated in units to measure insulin must be used) • When infusing via a pump • When administering via pen (pens and cartridges are SINGLE PATIENT USE ONLY)
ALWAYS CHECK PRESCRIPTION: • Reconfirm order with the prescriber if unsure/ concerned about the insulin dose • Avoid abbreviations; insulin should be prescribed in units • Do not administer an unclear prescription-Prescription **MUST** be rewritten • Only use an insulin pen or an insulin syringe graduated in units to measure insulin

7.2.3 Children < 5 years of age

- Young children **MAY** be very insulin sensitive
- Generally start with 0.5 units insulin/kg/day and choice of regimen will be decided by Paediatric Consultant/Paediatric Consultant Endocrinologist on call

7.2.4 5-12 years of age/pre-pubertal

- Generally start with 0.75 units insulin /kg/day
- Choice of regimen will be decided by Paediatric Consultant/Paediatric Consultant Endocrinologist on call

7.2.5 > 12 years of age, pubertal

- Pubertal adolescents may be relatively insulin resistant
- Generally start with 1 unit/kg/day
- Usually start multiple daily injection regimen

7.2.6 General considerations for subcutaneous insulin initiation

- Carbohydrate counting from diagnosis is considered ***essential*** for optimal outcomes

7.2.7 There are broadly 2 approaches to subcutaneous insulin initiation and the chosen approach in each centre may differ according to both staff and patient factors

- ***Fixed* insulin** dosing requires carbohydrate amounts to be fixed and fast-acting insulin subsequently adjusted as necessary
- ***Variable* insulin** dosing facilitates variable carbohydrate intake and requires the use of 'insulin to carbohydrate ratios' (ICR) at mealtimes using the '300 rule' for younger children and '500 rule' for adolescents

7.2.8 **An insulin sensitivity factor (ISF)** can be used in either system to determine the correction dose of additional fast-acting insulin for out-of-range glucose levels. ISF is typically calculated using the '100 rule'

7.2.9 **Ongoing Dose Adjustment:** Insulin doses will be reviewed daily by the Consultant Paediatrician/Consultant Paediatric Endocrinologist. Over the weekend, it will be prescribed by the on call paediatric doctors in conjunction with the Consultant Paediatrician on call who should be contacted if there is any uncertainty re: dose.

Example

14-year-old, 50kg – Well, no vomiting, Glucose 25mmol/L, Ketones 1.5 and pH 7.3 **REGIMEN:** Multiple Daily Doses
CALCULATIONS: Total daily dose (1 x 50) – 50 units **ICR:** 500/TDD = 500/50 = 1 unit per 10g carbohydrate **ISF:** 100/TDD = 100/50 = 1 unit drops glucose by 2 mmol/L
FIXED INSULIN DOSING: **Breakfast / Lunch / Dinner:** 10 units Rapid acting insulin **Bed-Time:** 20 units Long acting insulin
VARIABLE INSULIN DOSING **Breakfast / Lunch / Dinner:** 1 unit Rapid acting insulin per 10g carbohydrate **Bed-Time:** 20 units Long acting insulin

7.3 Blood Testing

7.3.1 Children should have blood glucose monitored at least 4 hourly

7.3.2 **Anytime BG > 14mmol/L, check for ketones.**

7.3.3 If BG ≥14mmol/L and If blood ketone levels > 1.0 mmol/L, the child should be reviewed, as extra fast acting insulin may be required.

7.4 Baseline blood tests

- HbA1c (1.2ml EDTA),
- TFT (1.2ml serum) and anti-TPO (1.2ml serum),
- Diabetes Autoantibodies: anti-GAD, ZnT8 ,anti-IA2 and insulin autoantibodies (IAA) (1.2ml serum to Exeter),
- IgA and tTGA (1.2 ml serum)

7.5 Family History

❖ Document detailed family history of diabetes (age at onset, symptoms at onset and treatment)

7.6 Education

The CNS Diabetes will develop an education plan for the family. The Parent/ legal guardian and/ or patient should be able to demonstrate an understanding of the following:

- ✓ Overview of Type 1 diabetes
- ✓ Blood glucose targets
- ✓ Blood Ketone values
- ✓ Testing BG and ketones using meter
- ✓ Completion of diary
- ✓ Insulin type and administration
- ✓ Low Blood Glucose –value and how to treat
- ✓ High Blood glucose value and how to check Ketones
- ✓ Food types and carbohydrate awareness
- ✓ Further incremental education (tailored to each family)
- ✓ Adjustment of Insulin doses
- ✓ Inter current illness management
- ✓ General instructions (travel, ID, school, useful websites)
- ✓ Exercise

7.7 Diet

7.7.1 Each family requires dietician input with structured education for the child and a family (dietary history, recommendations for meals and snacks, begin the process of carbohydrate counting education and dose adjustment).

7.7.2 It is important that a child is not left hungry and appropriate meals and snacks are given on time on the ward.

7.8 Referrals

7.8.1 Refer to Diabetes Retinal Screening programme if ≥12 years

7.8.2 Diabetes Register Consent forms

7.8.3 Long-term illness form to be completed

7.8.4 Diabetes Psychosocial team (if available and if required)

7.8.5 Diabetes Ireland information (for peer support)

7.9 Discharge summary for GP

- ❖ Full typed discharge summary needs to be sent if patient was ill at presentation or is following up in another service

7.10 Equipment required on Discharge

- ✓ Needs to be prescribed as soon as diagnosed to facilitate early discharge– liaise with Clinical Nurse Specialist Diabetes
- ✓ Blood glucose strips
- ✓ Blood ketone strips
- ✓ Preferred CGM sensor (with application on PCRS portal)
- ✓ Lancets for finger pricking device
- ✓ Mediswabs
- ✓ Lift Hypojuice
- ✓ Glucagon Hypokit x 2
- ✓ Insulin and device depending on regimen
- ✓ Pen needles
- ✓ Blood Glucose Diary

8 Implementation, Revision and Audit

- Implementation via REO of each Regional Health Areas (RHA) and senior management team of each acute hospital
- Distribution to other interested parties and professional bodies
- The guideline development group has agreed that this guideline will be reviewed on **3** yearly basis
- Regular audit of implementation and impact of this guideline through outcome and process measures is recommended to support continuous quality improvement
- It is the responsibility of each unit providing care for children with diabetes and intercurrent illness to audit the unit practise regularly in order to ensure that care in being provided in line with guidelines and that any deviations are clinically justified
- The audit process should be coordinated in each paediatric unit under local paediatric clinical governance and should be taken from a multidisciplinary perspective where appropriate
- Where the audit identifies areas for practise improvement, it is the responsibility of each individual unit to implement changes and re-audit to support continuous quality improvement

9 References

- http://www.olchc.ie/Healthcare-Professionals/Nursing-Practice-Guidelines/Diabetes-New-Patient-Competency-Checklist.pdf
- https://www.ispad.org/resources/ispad-clinical-practice-consensus-guidelines.html
- Irish Medication Safety Network (2020) Best Practice Guidelines for the Safe Use of Insulin in Irish Hospitals https://imsn.ie/wp-content/uploads/2020/07/insulin-best-practice-March-2020-with-appendices.pdf

10 Qualifying Statement

- These guidelines have been prepared to promote and facilitate standardisation and consistency of practice
- Clinical material offered in this guideline does not replace or remove clinical judgement or the professional care and duty necessary for each child
- Clinical care carried out in accordance with this guideline should be provided within the context of locally available resources and expertise
- This Guideline does not address all elements of standard practice and assumes that individual clinicians are responsible for:
    - ✓ Discussing care with the child, parents/guardians and in an environment that is appropriate and which enables respectful confidential discussion
    - ✓ Advising children, parents/guardians of their choices and ensure informed consent is obtained
    - ✓ Meeting all legislative requirements and maintaining standards of professional conduct.

11 Appendices

11.1 Appendix 1 Acknowledgements

This guideline has been developed by the National Paediatrics and Neonatology Paediatric Diabetes Working Group. The members of this group include medical, nursing and dietetic representatives from paediatric diabetes services. The Diabetes Working Group also wish to thank those who provided input and feedback on draft versions of this guideline throughout development, and those who provided valuable input during the consultation process and revision of the guideline

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11.2 Appendix 2 Approval Process

Paediatric Diabetes Working Group	July	2020
Paediatric Clinical Advisory Group, Faculty of Paediatrics, RCPI	August	2020
National Clinical Advisory Group Lead (NCAGL), HSE	September	2020
Approved by the CCO CAG (23.10.2020)	October	2020
Version 2 approved by Paediatric Diabetes working group	**December**	**2024**
Version 2 approved by Paediatric CAG	**February**	**2025**
Version 2 approved by NCAGL for Children and Young People	**April**	**2025**
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