National Policy ☐ National Procedure ☐ National Protocol ☐ National Guideline ☐
National Clinical Guideline ☑

HSE National Clinical Guideline
Managing Children with Type 1 Diabetes who use Continuous Glucose Monitoring

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Document Owner (post holder title):	National Clinical Lead for Paediatric Diabetes
Document Owner name:	Prof Michael O Grady
Document Owner email contact: *(Generic email addresses only for the Repository)*	clinicaldesign@hse.ie
Document Commissioner(s): (Name and post holder title):	Dr Ciara Martin, National Clinical Advisor and Group lead for Children and young People
Document Approver(s): (Name and post holder title):	Dr Ciara Martin, National Clinical Advisor and Group lead for Children and young People
Lead responsibility for national implementation:	National Clinical Programme for Paediatric Diabetes
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Development Group Name:	National Clinical Programme for Paediatric Diabetes
Development Group Chairperson:	Prof Michael O Grady

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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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Change to Title - V2 titled National Clinical Guideline Managing Children with Type 1 Diabetes who use Continuous Glucose Monitoring.

V1 titled National Clinical Guideline Managing Children with Type 1 Diabetes who use Continuous Glucose Monitoring or Flash Glucose Monitoring.

PUBLICATION INFORMATION [4]
Topic:
Managing Children with Type 1 Diabetes who use Continuous Glucose Monitoring
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National Clinical Programme for Paediatric Diabetes
Short summary:
This guideline is intended to provide guidance in managing children and young people under 18 years with Type 1 diabetes mellitus (T1DM) who use real-time continuous glucose monitoring (rtCGM) or intermittently scanned continuous glucose monitoring (CGM) is also known as Flash glucose monitoring.
Description:
The purpose of this guideline is to provide a framework for the utilisation of rtCGM and isCGM in children and young people under the care of the paediatric diabetes services. 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 judgment 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. This policy applies to clinical staff in the diabetes team and sets out the process to be followed for use in managing rtCGM or isCGM for all children and young people.

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NATIONAL CLINICAL GUIDELINE

Managing Children with Type 1 Diabetes who use Continuous Glucose Monitoring

Clinical Design and Innovation
Health Service Executive

Version 2

Developed by:	National Clinical Programme for Paediatric Diabetes	Publication date V1 :	October 2020
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Contents

Aim of Guideline

This guideline is intended to provide guidance in managing children and young people under 18 years with Type 1 diabetes mellitus (T1DM) who use real-time continuous glucose monitoring (rtCGM) or intermittently scanned continuous glucose monitoring (CGM) is also known as Flash glucose monitoring.

Purpose and Scope

1. The purpose of this guideline is to provide a framework for the utilisation of rtCGM and isCGM in children and young people under the care of the paediatric diabetes services
2. These guidelines are intended for healthcare professionals, particularly those in training, who are working in HSE-funded paediatric and neonatal services
3. They are designed to guide clinical judgment 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
4. This policy applies to clinical staff in the diabetes team and sets out the process to be followed for use in managing rtCGM or isCGM for all children and young people.

Background and Introduction

1. Children with a diagnosis of T1DM require intervention, treatment and follow up care from a specialist Paediatric team with expertise in managing their condition. Each child is entitled to receive health care, treatment and intervention according to their need
2. The use of rtCGM and isCGM by children with T1DM has increased dramatically over the past number of years and it is expected that these numbers will rise as the technology becomes less expensive, easier to use and more integrated with insulin delivery in automated complete or hybrid closed loop systems
3. rtCGM and isCGM provide reliable information about glucose levels for the children, parents and their diabetes care team, and reduce the need for capillary blood glucose sampling.
4. isCGM captures the interstitial glucose every minute, records every 15 minutes and stores the data for 8 hours between scans. rtCGM devices differ slightly but generally update glucose data every 5 minutes, providing 288 readings per day

5. Both rtGM and isCGM have trend arrows that, in combination with the current glucose level, allow the child or caregiver to make decisions based, not just on current glucose levels, but also where it is going, and how quickly it is changing
6. Current rtCGM devices may be stand-alone, e.g. the Dexcom range, or may be integrated with selected insulin pumps. Integrated devices are capable of suspending insulin infusion when glucose falls below a pre-set level or when hypoglycaemia is predicted from interstitial glucose readings. They can also increase basal insulin or deliver automatic correction boluses as part of a hybrid closed loop system
7. Evidence suggests that devices should be worn at least 10 of 14 days to achieve glycaemic benefit.

Summary of the benefits of rtCGM and isCGM:

1. Immediate access to real time tissue glucose levels, avoiding need for finger pricks except in specific circumstances (e.g. hypoglycaemia, when glucose levels are changing rapidly, to check ketones or when readings don't match symptoms or expectations)
2. Trend arrows that predict a rise or fall in glucose, and the speed at which it is rising or falling
3. rtCGM and newer isCGM (e.g. Libre 2) devices have capability to alert and prompt an immediate response when the glucose level is above or below the prescribed targets.
4. Some CGM devices can predict hypoglycaemia and provide alerts to avert it
5. Both rtCGM and isCGM can provide insights into cause and effect, the ability to see how different foods, activities, stress, and other factors may affect glucose levels
6. The devices allow retrospective data review, in which patterns can be identified to inform changes to the insulin regimen
7. Predicts established metric of metabolic control (HbA1c), and identifies deteriorating control in real-time rather than relying on 3-monthly HbA1c measurement
8. Adds an additional metabolic control metric (% time in range with target of >70%)
9. Facilitates communication and virtual clinic support with diabetes services
10. Studies have demonstrated that rtCGM use can (in patients using MDI, pump or hybrid closed-loop therapy) lower HbA1c, increase time in range, reduce glucose variability, reduce mild & moderate hypoglycaemia and can reduce the percentage of time spent in hypoglycaemia.

Legislation/other related policies

Children's First Policy

https://www.gov.ie/en/publication/114c50-children-first-national-guidelines-for-the-protection-and-welfare-of/

HSEland Children's First Training

https://childrenfirst.hseland.ie/

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

http://www.hse.ie/eng/about/Who/clinical/natclinprog/paediatricsandneonatology/pae dsmoc.pdf

Glossary of Terms and Definitions

T1D	Type 1 Diabetes
isCGM	Intermittently scanned Continuous Glucose Monitoring
rtCG	Real-time Continuous Glucose Monitoring Children and Young People
CYP	Children and Young People
HbA1c	Haemoglobin A1c
DNS	Diabetes Nurse Specialist

Roles and Responsibilities

This guideline should be reviewed by each acute hospital senior management team to appropriately plan implementation. This facilitates best practice and standardises the care provided to children in Ireland.

Clinical Considerations and Recommendations

1. Use of CGM is recommended in all children and young people with T1DM (ISPAD 2022) and initiation in the first year post diagnosis is associated with superior long-term glycaemic outcomes
2. CGM should only be prescribed by consultant led specialised diabetes teams
3. In order to benefit from the device, it must be worn for at least 10 out of 14days
4. Education and training, from a specialist team, both at initiation and on an ongoing basis (including interpreting and acting on data) are necessary to achieve optimum benefit
5. Where devices are prescribed, it is expected that children and families will share their glucose data with the diabetes team to facilitate remote dose adjustment in order to optimise their diabetes control
6. In young children who are unable to communicate hypoglycaemia symptoms or in children with impaired awareness of hypoglycaemia, **rtCGM or isCGM with alarm functionality** should be considered
7. When setting alarms, low and high targets of **3.9 and 14 mmol/L** should beconsidered
8. Careful consideration needs to be given to the benefit of each alarm to the child or family in order to avoid alarm fatigue
9. When selecting a CGM device for use, consider interoperability with hybrid closed loop systems if the patient is likely to be using such a system in the short to medium term
10. Commonly used rtCGM e.g. Dexcom is licensed from age 2 and upwards. isCGM e.g. Freestyle Libre/Libre 2 are licensed from age 4 and upwards.

Implementation, revision and audit

1. Distribution to the CEO of each Hospital Group for dissemination through line management in all acute hospitals within their group.
2. Implementation through Senior Management Teams of each acute hospital.
3. Distribution to other interested parties and professional bodies
4. The NCPPN Diabetes working group has agreed that this guideline will be reviewed on a 3 yearly basis.
5. Regular audit of implementation and impact of this guideline through outcome and process measures is recommended to support continuous quality improvement.
6. 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
7. 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.
8. 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.

References

1. Gimenez M, Tannen AJ, Reddy M, Moscardo V, Conget I, Oliver N. Revisiting the relationships Between Measures of Glycemic Control and Hypoglycaemia in Continuous Glucose Monitoring Data Sets. *Diabetes Care 2018; 41 (2): 326-332.*
2. Burckhardt MA, Roberts A, Smith GJ, Abraham MB, Davis EA, Jones TW. The Use of Continuous Glucose Monitoring With Remote Monitoring Improves Psychosocial Measures in Parents of Children With Type 1 Diabetes: A Randomized Crossover Trial. *Diabetes Care*. 2018; 41(12):2641-2643
3. http://www.londonscn.nhs.uk/networks/cardiovascular/diabetes/freestyle-libre

Qualifying Statement

1. These guidelines have been prepared to promote and facilitate standardisation and consistency of practice

2. Clinical material offered in this guideline does not replace or remove clinical judgement or the professional care and duty necessary for each child

3. Clinical care carried out in accordance with this guideline should be provided within the context of locally available resources and expertise

4. 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.

Appendices

Appendix 1 Acknowledgements

This guideline has been developed by the National Clinical Programme for Paediatrics and Neonatology 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.

Professor Michael O'Grady	National Clinical Lead Paediatric Diabetes, Consultant Paediatric Endocrinologist
Professor Colin Hawkes	Consultant Paediatric Endocrinologist
Professor Nuala Murphy	Consultant Paediatric Endocrinologist
Ms. Aisling Egan	Candidate Advanced Nurse Practitioner, Paediatric Diabetes
Dr Kate Gajewska	Health Promotion and Research Manager, Diabetes Ireland
Ms. Laura O'Shea	Senior Paediatric Diabetes Dietitian
Dr Orla Neylon	Consultant Paediatric Endocrinologist
Dr Vincent McDarby	Senior Paediatric Psychologist
Ms. Claire Maye	Candidate Advanced Nurse Practitioner, Paediatric Diabetes
Ms Jacqueline de Lacy	Programme Manager National Clinical Programme for Paediatrics and Neonatology and Paediatric Diabetes

Appendix 2 Guideline Approval Process:

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