Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

PAEDIATRICS

NATIONAL CLINICAL GUIDELINE

Managing Children with Type 1 Diabetes who use Continuous Glucose Monitoring or Flash Glucose Monitoring

Clinical Design and Innovation
Health Service Executive

Version 1

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Clinical Design & Innovation
Person-centred, co-ordinated care

Contents

1.0 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 (CGM) or real-time flash glucose monitoring (Flash GM)

2.0 Purpose and Scope

2.1 The purpose of this guideline is to provide a framework for the utilisation of CGM and Flash GM in children and young people under the care of the paediatric diabetes services.

2.2 These guidelines are intended for healthcare professionals, particularly those in training, who are working in HSE-funded paediatric and neonatal services.

2.3 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.

2.4 This policy applies to clinical staff in the diabetes team and sets out the process to be followed for use in managing CGM or Flash GM for all children.

3.0 Background and Introduction

3.1 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.

3.2 The use of continuous glucose monitoring (CGM) and flash glucose monitoring (Flash GM) 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.

3.3 CGM and Flash GM provide reliable information about glucose levels for the children, parents and diabetes care team, and reduce the need for capillary blood glucose sampling.

3.4 Flash GM captures the interstitial glucose every minute, records every 15 minutes and stores the data for 8 hours between scans.

3.5 CGM devices differ slightly but generally update glucose data every 5 minutes, providing 288 readings per day

3.6 Both Flash GM and CGM 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.

3.7 Current CGM devices may be stand-alone, e.g. the Dexcom range, or may be integrated with insulin pumps. Integrated devices are capable of suspending insulin infusion when glucose falls below a pre-set level or suspend insulin infusion when hypoglycaemia is predicted from interstitial glucose readings.

3.8 Evidence suggests that devices should be worn at least 10 of 14 days to achieve glycaemic benefit.

4.0 Summary of the benefits of Flash GM and CGM:

- Immediate access to real time tissue glucose levels, avoiding need for finger pricks except in specific circumstances (e.g. hypoglycaemia, rapidly falling glucose levels or to check ketones).
- Trend arrows that predict a rise or fall in glucose, and the speed at which it is rising or falling.
- CGM devices also have functionality to alert and prompt an immediate response when the glucose level is above or below the prescribed target.
- Some CGM devices can predict hypoglycemia and provide alerts to avert it.
- Flash GM and CGM can provide insights into cause and effect, the ability to see how different foods, activities, stress, and other factors may affect glucose levels.
- The devices allow retrospective data review, in which patterns can be identified to inform changes to the insulin regimen.
- Predicts established metric of metabolic control (HbA1c), and identifies deteriorating control in real-time rather than relying on 3-monthly HbA1c measurement.
- Adds an additional metabolic control metric (% time in range with target of > 70%).
- Facilitates communication and virtual clinic support with diabetes services.
- In communication with insulin pumps, devices can reduce time spent in hypoglycaemia through suspending insulin delivery during hypoglycaemic events, or when hypoglycaemia is predicted to occur. Some studies have demonstrated that CGM alone, even without direct communication with the insulin pump, can reduce the percentage of time spent in hypoglycaemia.

5.0 Legislation/other related policies

- Children's First Policy
  - https://www.dcya.gov.ie/documents/Publications/ChildrenFirst.pdf
- HSEland Childrens 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/paedsmoc.pdf

6.0 Glossary of Terms and Definitions

T1D	Type 1 Diabetes
CGM	Continuous Glucose Monitoring
Flash GM	Flash Glucose Monitoring
CYP	Children and Young People
HbA1c	Hemaoglobin A1c
DNS	Diabetes Nurse Specialist

7.0 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.

8.0 Clinical guideline

8.1 Clinical Considerations and Recommendations

8.1.1 Children and their families require teaching from their diabetes team and support particularly in the early phase of use in order to maximize benefit from CGM and Flash GM. These devices therefore should only be prescribed by consultant led specialised diabetes teams who have training and expertise with the devices.

8.1.2 In order to benefit from the device, it must be worn for 10 of 14 days.

8.1.3 All devices require a minimum level of expertise and understanding on how to use them, interpret readings and take appropriate action, and require a commitment from the patient/parents/carer to use appropriately.

8.1.4 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

8.2 Patient Eligibility Criteria

8.2.1 Flash Glucose Monitoring (FreeStyle Libre-licensed for age >4 years) and Real-time Continuous Glucose Monitoring (rtCGM) are available for children with T1DM who

- Monitor > 8 times a day
- Are on multiple daily injections or CSII
- Are willing/able to wear the device for at least 10 of 14 days

8.2.2 Continuous Glucose Monitoring (CGM) with alarm functionality is indicated for children with T1DM who:

- Are unable to recognise or communicate hypoglycaemia symptoms, or have hypoglycaemia unawareness with adverse consequences
- Are unable to optimise control despite good self-management skills, including capillary glucose monitoring > 4 times per day.

9.0 Implementation, revision and audit

9.1 Distribution to the CEO of each Hospital Group for dissemination through line management in all acute hospitals within their group.

9.2 Implementation through Senior Management Teams of each acute hospital.

9.3 Distribution to other interested parties and professional bodies

9.4 The NCPPN Diabetes working group has agreed that this guideline will be reviewed on a 3 yearly basis.

9.5 Regular audit of implementation and impact of this guideline through outcome and process measures is recommended to support continuous quality improvement.

9.6 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.

9.7 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.

9.8 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.

10.0 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

11.0 Qualifying Statement

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

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

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

11.4 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.

12.0 Appendices

12.1 Appendix 1

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12.2 Appendix 2

Guideline Document Approval Process:

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