Alberta Health Services

# POLICY

**TITLE**
## GLYCEMIC MANAGEMENT - PEDIATRIC

**SCOPE**
Provincial: Acute Care

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HCS-283

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**NOTE:** The first appearance of terms in bold in the body of this document (except titles) are defined terms – please refer to the Definitions section.

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## OBJECTIVES

- To outline expectations and recommended strategies for glycemic management of pediatric **patients** presenting to, or admitted to, any Alberta Health Services (AHS) Acute Care setting including Intensive Care Units, Emergency Departments, Urgent Care Centres, Day Wards, and Addiction and Mental Health Inpatient Units.
- To assist **health care professionals** with maintaining a patient's home glycemic management regimen.
- To facilitate collaboration between health care teams, such as when to contact the **most responsible health practitioner (MRHP)** if the patient's blood glucose targets are not within the patient's glycemic target range.

## PRINCIPLES

Glycemic management is required to support patients to meet their glucose targets, prevent exacerbation of acute illness, promote wound healing, decrease risk of infections, and avoid other complications. Appropriate glycemic management supports a smooth transition into hospital for patients with diabetes. It also supports a smooth transition out of hospital, and back into the community. Attention to recommended glucose targets in hospital is consistent with how patients are taught to manage their diabetes in the community.

Maintaining glucose within the recommended targets is necessary to ensure safety for patients and mitigate the immediate risks associated with hypoglycemia. It is also necessary to decrease the risks associated with hyperglycemia including delayed wound healing, hospital-acquired infections, mortality, increased length of hospital stay, and other complications.

## APPLICABILITY

Compliance with this document is required by all Alberta Health Services employees, members of the medical and midwifery staffs, students, volunteers, and other persons acting on behalf of Alberta Health Services (including contracted service providers as necessary).

## ELEMENTS

### 1. Exclusions

1.1 This Policy Suite excludes:

a) patients equal to or less than five (5) days old and infants admitted to the Neonatal Intensive Care Unit (NICU);

b) pediatric patients who have diabetes and are pregnant; and

c) patients with diabetic ketoacidosis (DKA) on continuous intravenous insulin infusion.

1.2 For these excluded pediatric patients, the health care professional shall consult with the patient's MRHP for direction on ongoing care and treatment, or follow Zone processes. There may be other circumstances where the health care professional uses clinical judgment and consults with the MRHP.

### 2. Points of Emphasis

2.1 This Policy may be used in non-Acute Care settings. Site or Unit Managers are responsible for determining whether this Policy in whole or in part is appropriate for their patient care setting and communicating relevant information out to **AHS representatives**.

2.2 The AHS **point-of-care testing (POCT)** blood glucose meter undergoes daily quality assurance and is accurate in the Acute Care setting.

a) **Health care professionals** are required to receive education and training to remain competent in the use of the AHS-approved blood glucose meter(s).

2.3 Home glucose monitoring devices and values may be used in the Acute Care setting when:

a) an **order** from the **most responsible health practitioner (MRHP)** is obtained specifying the type of device (blood glucose meter or interstitial glucose monitor); and

b) use of a home glucose monitoring device and/or values does not interfere with patient safety as determined by the MRHP.

(i) Continuous glucose monitor (CGM) and flash glucose monitor (Flash) devices measure the glucose levels found in the interstitial fluid.

(ii) Interstitial glucose results may not be the same as capillary or lab blood glucose results.

## 3. Blood Glucose Target Ranges

3.1 For the majority of patients, random blood glucose should be in the target range of 5.0 – 10.0 millimoles per litre (mmol/L).

a) Exceptions include, but may not be limited to:

(i) patients who have been identified to have hypoglycemia unawareness; and

(ii) patients with multiple co-morbidities (where the individualized target range may be modestly higher).

3.2 For critically ill patients, the blood glucose target range is 6.0 to 10.0 mmol/L.

3.3 For patients whose blood glucose is anticipated to be outside of the recommended range, the MRHP should define the target range on the patient's **health record**.

## 4. Glycemic Management Strategies

4.1 Meeting glycemic targets requires a collaborative and multidisciplinary approach that involves an array of strategies and should include the involvement of the patient and/or patient's **parent(s)/guardian(s)**.

4.2 POCT for glucose monitoring of patients with a known history of diabetes or newly diagnosed with diabetes, shall be performed with the AHS POCT blood glucose meter:

a) a minimum of four (4) times a day and as needed (pro re nata [PRN]), for acutely ill patients and patients receiving subcutaneous insulin; and/or

b) more frequently (e.g., hourly or every two [2] hours) for patients receiving intravenous insulin.

4.3 For patients prescribed the use of their home glucose monitoring device, such as CGM or Flash, POCT with an AHS-approved blood glucose meter is required:

a) during suspected hypoglycemia (patient is symptomatic) or when the home glucose monitoring device reports glucose values less than 4.0 mmol/L;

b) with severe hyperglycemia when the home glucose monitoring device reports glucose values greater than 14.0 mmol/L;

c) if the user suspects the CGM or Flash may not be accurate;

d) if the glucose is changing rapidly (e.g., after treating low blood glucose);

e) if the CGM or Flash reports decreasing or increasing glucose trends; and

f) as indicated by the CGM or Flash device manufacturer instructions for accurate calibration.

4.4 PRN glucose POCT may be indicated (e.g., prior to the patient leaving the unit) when the patient will be off the unit at a location where glucose testing is not readily available and/or the patient will be engaging in physical activity.

a) Include the patient and/or parent/guardian in the management and/or monitoring of the patient's blood glucose (e.g., for the use of CGM or Flash, refer to Section 4.3 above), in addition to in-hospital POCT, where appropriate.

4.5 Appropriate blood glucose monitoring of patients without diabetes who are prescribed and taking medications known to cause hyperglycemia (e.g., glucocorticoid steroids) or hypoglycemia shall be performed a minimum of two (2) times a day.

4.6 Capillary blood is not recommended for blood glucose testing for patients with severely impaired peripheral circulation (e.g., hypovolemia, shock).

4.7 Appropriate subcutaneous insulin medication orders:

a) Insulin is the most appropriate agent for effectively controlling hyperglycemia in hospital.

b) A proactive approach using the patient's home regimen, if known, or a scheduled basal, bolus, and correction (supplemental) insulin regimen is the preferred method.

c) Sliding scale insulin alone shall be avoided in preference of a basal bolus insulin regimen to improve patient outcomes.

4.8 Timing of insulin administration shall be coordinated with meals and glucose testing in the following order:

a) glucose testing should be done within 30 minutes prior to the meal; and

b) meal/bolus and correction insulin (e.g., rapid-acting insulin) is administered based on this test no more than 15 minutes prior to meals in most instances.

(i) Meal/bolus insulin may be given immediately after the meal/feed in certain situations (e.g., feeding difficulties such as toddlers with meal or snack intake concerns, patients with strong food preferences, or those that may not be able to ingest or retain the full meal).

4.9 For patients with insulin pump therapy (IPT):

a) If the insulin pump is stopped, insulin delivery shall be replaced within two (2) hours to prevent diabetic ketoacidosis (DKA).

(i) Severe hyperglycemia and/or DKA can result when IPT is stopped for as little as two (2) to four (4) hours and the insulin is not replaced, even if blood glucose values are not elevated or low when the pump is discontinued.

b) Refer to the AHS *Guidelines for the Safe Management of Insulin Pump Therapy in Hospital* for more information.

4.10 Appropriate assessment and treatment of asymptomatic and symptomatic hypoglycemia (most often drug-induced from insulin or insulin secretagogues) includes, but may not be limited to:

a) early recognition;

b) treatment for all patients with a blood glucose less than 4.0 mmol/L, even those asymptomatic patients who meet the criteria below:

(i) patients with diabetes, who are on insulin; or

(ii) patients without diabetes who have symptomatic hypoglycemia due to insulin or insulin secretagogue overdose (e.g., glyburide, gliclazide, glimepiride or repaglinide), malnutrition, liver failure, or more rare conditions (e.g., medium chain acyl-CoA dehydrogenase deficiency [MCAD], insulinoma, dumping syndrome).

c) avoiding overtreatment of hypoglycemia to prevent rebound hyperglycemia;

(i) Patients who are able to have oral intake can have an appropriate amount of quick-acting carbohydrates as per age category, in accordance with the AHS *Treatment of Hypoglycemia – Pediatric* Procedure.

d) decreasing insulin doses rather than holding or discontinuing to promote glycemic management;

e) treatment in accordance with the AHS *Treatment of Hypoglycemia – Pediatric* Procedure; and

f) contacting the MRHP for direction when the procedure does not apply.

4.11 The AHS *Hypoglycemia Treatment* Protocol shall not be applied to:

a) asymptomatic patients whose blood glucose is less than 4.0 mmol/L and do not have diabetes; refer to the AHS *Treatment of Hypoglycemia – Pediatric* Procedure for further information.

4.12 Appropriate assessment and treatment of hyperglycemia includes, but may not be limited to:

a) stat ketone testing when blood glucose is greater than 14.0 mmol/L (to be ordered by the MRHP) for:

(i) patients with diabetes (type 1 or type 2) displaying symptoms of DKA, and/or if unable to decrease the patient's blood glucose; and/or

(ii) patients on IPT when blood glucose is greater than 14.0 mmol/L, and/or if unable to decrease the patient's blood glucose.

b) contacting the MRHP for further orders when the patient's glucose is greater than 14.0 mmol/L and/or when indicated in the AHS *Treatment of Hyperglycemia - Pediatric* Procedure; and

c) referring to the AHS *Diabetic Ketoacidosis, Pediatric – Emergency & Inpatient* Clinical Knowledge Topic for care and treatment guidance.

4.13 Unless otherwise indicated, the MRHP shall ensure patients with diabetes receive a diet that provides meals and snacks to promote glycemic control.

4.14 An order from the MRHP is required for patients to leave the unit when:

a) the patient's blood glucose is greater than 14.0 mmol/L; and

b) the patient tests positive for ketones.

4.15 Patients should not be sent off unit, especially for physical activity, when their blood glucose is less than 4.0 mmol/L.

4.16 Patient consultation and referrals:

a) Newly diagnosed patients (with diabetes):

(i) consult and referral to pediatric endocrinology or a Pediatrician; and

(ii) referral to specialty diabetes multidisciplinary care team with pediatric expertise for ongoing education and management as available.

b) Patients with a known diagnosis of diabetes with other medical conditions:

(i) ensure the patient and parent/guardian (and/or **family**) are followed by a specialty diabetes multidisciplinary care team with pediatric expertise for ongoing diabetes care; and

(ii) consider a referral to local providers for further assessment or other pediatric specialty care (e.g., pediatric mental health providers) as required.

## DEFINITIONS

**AHS representative** means Alberta Health Services employees, members of the medical and midwifery staffs, students, volunteers, and other persons acting on behalf of Alberta Health Services (including contracted service providers as necessary).

**Guardian** means, where applicable:

For a minor: a guardian as defined by the *Family Law Act* (Alberta), a divorced parent with custody of the minor, or a person appointed pursuant to a will, personal directive, court order, agreement or by authorization of legislation (e.g., *Child, Youth and Family Enhancement Act* [Alberta]).

For an adult: an individual appointed by the Court in accordance with the *Adult Guardianship and Trusteeship Act* (Alberta) to make decisions on behalf of the adult patient when the adult patient lacks capacity

**Family(-ies)** means one or more individuals identified by the patient as an important support, and who the patient wishes to be included in any encounters with the health care system, including but not limited to, family members, legal guardians, friends, and informal caregivers.

**Health care professional** means an individual who is a member of a regulated health discipline, as defined by the *Health Professions Act* (Alberta), and who practices within scope and role.

**Health record** means the collection of all records documenting individually identifying health information in relation to a single person.

**Most responsible health practitioner (MRHP)** means the health practitioner who has responsibility and accountability for the specific treatment/procedure(s) provided to a patient and who is authorized by Alberta Health Services to perform the duties required to fulfill the delivery of such a treatment/procedure(s), within the scope of their practice.

**Order** means a direction given by a regulated health care professional to carry out specific activity(-ies) as part of the diagnostic and/or therapeutic care and treatment to the benefit of a patient. An order may be written (including handwritten and/or electronic), verbal, by telephone or facsimile.

**Parent** means the guardian of a child with the legal authority to make decisions on behalf of the minor in accordance with the *Family Law Act* (Alberta).

**Patient** means an adult or child who receives or has requested health care or services from Alberta Health Services and its health care providers or individuals authorized to act on behalf of Alberta Health Services. This term is inclusive of residents, clients and outpatients.

**Point-of-care testing (POCT)** means any testing that typically occurs outside a designated laboratory environment, and is completed nearer to, or at the site of the patient/client. This includes all testing performed by non-laboratory personnel regardless of the location of the examination.

## REFERENCES

- Alberta Health Services Governance Documents:
  - *Medication Administration* Policy (#HCS-244)
  - *Point of Care Testing (POCT)* Policy (#PS-90)
  - *Treatment of Hyperglycemia Pediatric* Procedure (#HCS-283-02)
  - *Treatment of Hypoglycemia Pediatric* Procedure (#HCS-283-01)
- Alberta Health Services Resources
  - *Diabetic Ketoacidosis, Pediatric - Emergency & Inpatient* Clinical Knowledge Topic
  - *Guidelines for the Safe Management of Insulin Pump Therapy in Hospital* (Diabetes Obesity Nutrition Strategic Clinical Network)
- Non-Alberta Health Services Documents:
  - *Clinical Practice Guidelines, 2018* (Diabetes Canada)