

# MINI-DOSE SUBCUTANEOUS GLUCAGON FOR PATIENTS WITH TYPE 1 DIABETES: MILD TO MODERATE HYPOGLYCAEMIA - CHW

## PRACTICE GUIDELINE<sup>®</sup>

### DOCUMENT SUMMARY/KEY POINTS

- This practice guideline is to be used for children with Type 1 diabetes who are experiencing **persistent mild hypoglycaemia** in *conjunction with a current or recent gastrointestinal illness*.
- This protocol can only be used in the course of a conversation with a diabetes health professional.
- This guideline is not for use in cases of severe hypoglycaemia. In this instance use the Hypoglycaemia in Type 1 Diabetes: Nursing management practice guideline for severe hypoglycaemia (needs hyperlink)

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

<b>Approved by:</b>	SCHN Policy, Procedure and Guideline Committee	
<b>Date Effective:</b>	1 <sup>st</sup> October 2014	<b>Review Period:</b> 3 years
<b>Team Leader:</b>	Nurse Manager	<b>Area/Dept:</b> Endocrinology CHW

## CHANGE SUMMARY

- Document due for mandatory review – minor word changes only and the addition of a new reference.

## READ ACKNOWLEDGEMENT

- Training required for Medical and nursing staff of Diabetes Service within the dept of Endocrinology.
- The following staff are to read & acknowledge they understand the contents of this document:
  - Medical and nursing staff ED.
  - Nursing staff in Clancy and Variety ward.

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## Rationale

1. Mild hypoglycaemia is frequently encountered in children with Type 1 diabetes, usually in association with a current or recent gastrointestinal illness, as a result of inability to consume or absorb adequate carbohydrate. This situation can usually be managed conservatively by reducing insulin doses, measuring blood glucose levels more often and encouraging feeding at more frequent intervals. Alternatively, the child may need to go to the local hospital for intravenous fluids.
2. Glucagon is an important counter-regulatory hormone, which increases hepatic glucose production through increased gluconeogenesis and glycogenolysis. Although intramuscular glucagon is traditionally used to treat severe hypoglycaemia in Type 1 Diabetes, subcutaneous mini-doses have been shown to be effective in managing mild hypoglycaemia in these children.
3. This protocol is based on a published study on Mini-Dose Glucagon Rescue for Hypoglycaemia in 28 Children with Type 1 Diabetes<sup>1</sup>. The main findings were:
  - i. 95% responded by an increase in blood glucose levels after first dose of glucagon
  - ii. 5-10% did not respond to the first dose and required a double dose of glucagon.
  - iii. 50% developed recurrence of hypoglycaemia requiring a second dose of glucagon.
  - iv. 15% developed recurrence of hypoglycaemia requiring a third dose of glucagon.
  - v. There were no episodes of vomiting due to mini-dose glucagon.

## Principal Considerations

1. It is important that this protocol is only used in appropriate situations. The protocol can either be initiated by families at home (who have the patient guidelines) or may be suggested by a diabetes team member in the course of a phone call. Please note the following suitability criteria:

SUITABLE	UNSUITABLE
Mild to moderate hypoglycaemia	Severe hypoglycaemia
Mild to moderate gastrointestinal illness	Severe gastrointestinal illness
Normal neurological status	Severely impaired mental status and activity
Able to tolerate oral fluids but refuses	Unable to retain oral fluids
Parent or care giver willing & able	Parent or care giver uncertain or unable

2. if the protocol is initiated in the course of a conversation with a diabetes health professional, the following information should also be gathered:

- i. Existing insulin regimen, reduction in insulin dose, last insulin injection
  - ii. Feeding amount and pattern
  - iii. Distance from nearest hospital
3. The family must have all the following equipment to proceed with the protocol. Families who do not have these should be deemed unsuitable.
  - i. In date Glucagon (1mg/mL), insulin syringes, glucometer with sufficient strips
  - ii. Sufficient reserve glucagon (0.5mL) in case a larger dose is needed for severe hypoglycaemia or a second unopened kit.

## Protocol

(see flow diagram)

1. Re-constitute Glucagon (1mg/mL) according to the pharmaceutical instructions included in the standard emergency Glucagon kit.
2. Withdraw Glucagon dose in a standard insulin syringe.
3. The child will receive Glucagon subcutaneously on the basis of his or her age:
  - o 2 "units" (equivalent to 20microgram glucagon) on the insulin syringe for children <2 years
  - o 1 unit per each year of age for children 2-15 years
  - o For children more than 15 years, the maximum dose is 15 units on the insulin syringe (150microgram of glucagon)
4. A satisfactory response is a rise in glucose to 5.5mmol/L or above by 30 minutes. If this is not achieved, a second dose at double the initial dose should be given.
5. If hypoglycaemia recurs later (after an initial satisfactory response), a second dose can be given.
6. Non response to a second / double dose requires transfer to hospital for assessment and likely IV fluids.

## BGL Monitoring Regime

A suggested BGL monitoring regime post glucagon is:

- half hourly x 2
- 1 hourly x 2
- 2nd hourly x 2
- 3rd hourly till stable

## Further Management Considerations

1. Insulin doses will need to be reduced in the presence of gastrointestinal illnesses according to these general principles:
  - i. Total daily doses may need reducing by up to 30 to 50 percent
  - ii. Reduce or omit rapid or short acting insulin in preference to basal acting insulin
2. Recognise that the response to subcutaneous glucagon will depend on when the previous dose of insulin was administered (less effective if recent dose of insulin given). Dose adjustments should be carried out with this in mind.
3. In any doubt, the child should be transferred to the nearest hospital Emergency Department by the family or an ambulance.

### IMPORTANT REMINDERS

1. If severe hypoglycaemia is encountered, standard intramuscular Glucagon administration at full dose for age will be the treatment modality of choice until medical help is available.
2. The emergency glucagon kit must be replenished as soon as possible.
3. Glucagon (refrigerated) is only effective for 24 hours after reconstitution.

## Homecare Guidelines

Provided to parents: <http://chw.schn.health.nsw.gov.au/o/documents/policies/homecare/2010-8034.pdf>

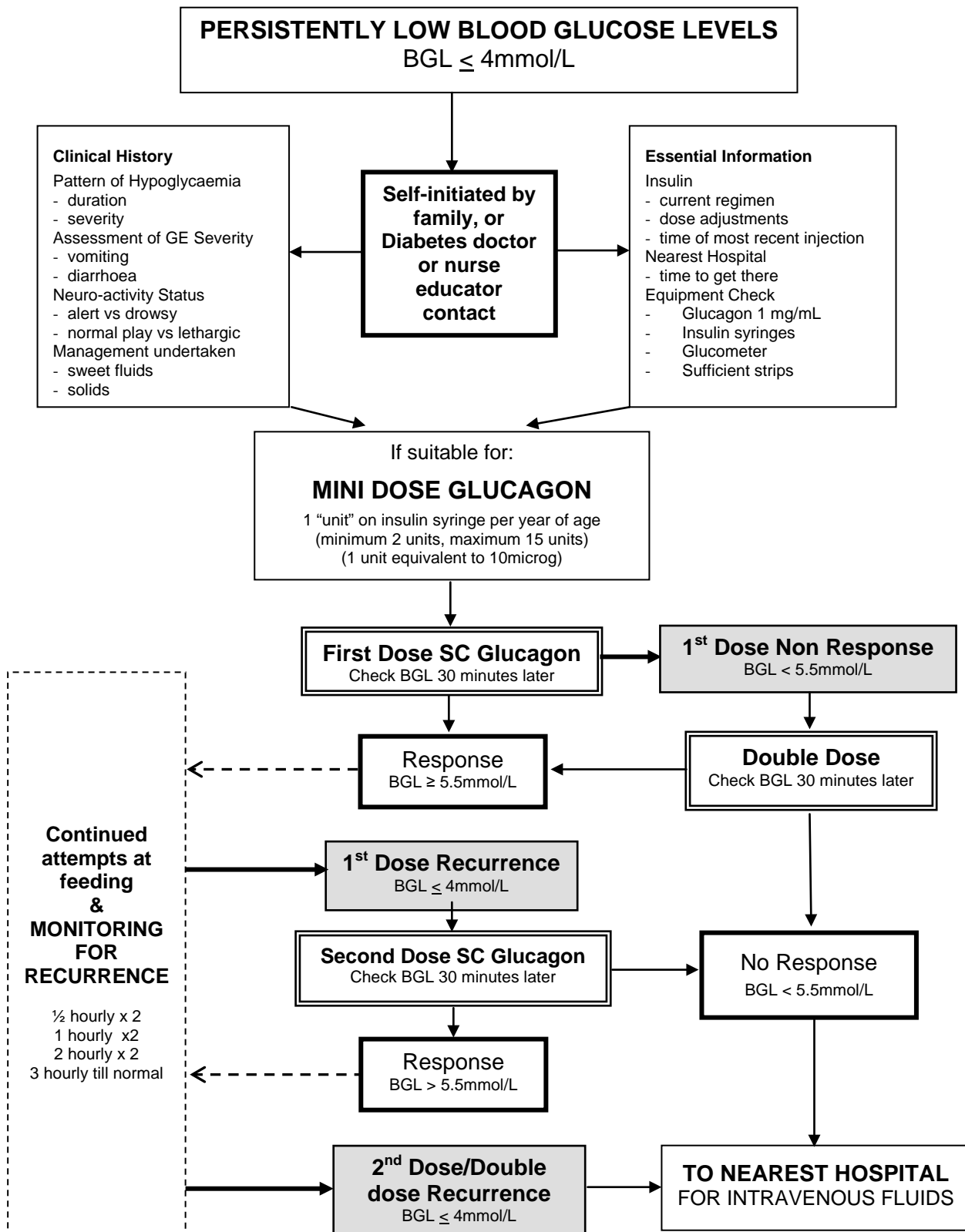
## References

1. Haymond, M.W., Schriener B., Mini-Dose Glucagon Rescue for Hypoglycemia in Children with Type 1 Diabetes *Diabetes Care*, (2001), 24 (4): 643-645
2. Craig ME, Twigg SM, Donaghue KC, Cheung NW, Cameron FJ, Conn J, Jenkins AJ, Silink M, for The Australian Type 1 Diabetes Guidelines Expert Advisory group. *National evidence-based clinical care guidelines for type 1 diabetes in children, adolescents and adults*, Australian Government Department of health and Ageing Canberra 2011.

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## Algorithm for Mini Dose Subcutaneous Glucagon Rescue



**Notes:**

1. If severe hypoglycaemia develops at any time, administer full dose of intramuscular glucagon and call for an ambulance.
2. Non-response to a double or second dose requires transfer to hospital.
3. Recurrence after a double or second dose requires transfer to hospital.