DIABETES MANAGEMENT AND INSULIN ADMINISTRATION

PRACTICE GUIDELINE ©

DOCUMENT SUMMARY/KEY POINTS

- This document is solely written for the management of type 1 diabetes.
- Mandatory adherence to the NSW Health directives on Sharps Injury Protection and the *Infection Prevention and Control Policy.*
- Mandatory adherence to correct sharps disposal as per Section 3 of the NSW Health Infection Prevention and Control policy.
- Insulin can be kept at room temperature whilst in use. The date must be annotated on the label and it must be used within 28 days of opening. Store in a cool place away from direct light.
- An insulin cartridge/insulin pen device in use must have a patient ID label attached and must only be used for the patient specified. All other insulin cartridges/insulin pen devices are to remain in the ward/unit refrigerator.
- Insulin kept in the refrigerator is best removed 30 minutes before administration as cold insulin will sting.
- Glargine (Lantus™) and Detemir (Levemir™) are clear, long-acting insulins which cannot be mixed with any other insulins and therefore need to be given using a separate device.
- Insulin syringes/pen devices may be used by patients, parents or relatives of patients under Nursing Supervision and/or under the direction of the Diabetes Team.
- It is important to rotate insulin injection sites, using both the abdomen and/or the buttocks.

Approved by:	SCHN Policy Procedure and Guideline Committee	
Date Effective:	1st October 2017	**Review Period**: 3 years
Team Leader:	Manager Diabetes Clinical Services	**Area/Dept**: Endocrinology

Date of Publishing: 25 January 2019 11:02 AM Date of Printing: 25 January 2019

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CHANGE SUMMARY

- To create a SCHN network document

READ ACKNOWLEDGEMENT

- All medical and nursing staff caring for children with type 1 diabetes should read and acknowledge they understand the contents of this document.
- In-services are available for nursing education on skills required to use the new insulin delivery devices and glucose meters. Contact the Diabetes & Endocrinology Department (ext 53169-Westmead or 21456- SCH).
- All pharmacists and pharmacy technicians

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1 Patients wearing a Continuous Glucose Monitoring system

A continuous glucose monitoring system (**CGM**) is a small, self-inserted sensing device worn on the body. CGM transmits interstitial glucose levels to an insulin pump screen, or receiver device (eg. smartphone) about current sensor glucose status. Graphs and trend arrows show the direction of glucose values and rate of change, providing users additional information to help with their diabetes management. It is important to note that the sensor measures the interstitial glucose level, not the blood glucose level.

The guidelines for hospitalised patients are:

1. Sensor glucose values via CGM cannot be used for clinical decisions while an inpatient (e.g. insulin administration, dose adjustment and hypoglycaemia management). In these instances, a blood glucose level is required (finger prick) using a standard hospital glucometer. Exceptions to this need to be approved by the endocrinology team.
2. Remove the sensor and transmitter from the patient before Magnetic Resonance Imaging (MRI), Computed Tomography (CT) scan, or high-frequency electrical heat (diathermy) treatment.
3. Remove the sensor and transmitter from the patient prior to surgery. Medical and nursing staff are required to continue blood glucose monitoring (finger prick) using a standard hospital glucometer during surgery to guide clinical decisions.
4. CGM has not been evaluated or approved in persons on dialysis or in critically ill patients. It is not known how different medical conditions or medications common to the critically ill population may affect performance of CGM. Sensor glucose levels may be inaccurate in critically ill patients. Medications containing paracetamol/acetaminophen can give a false high reading and there is limited data about the effect of other medications on CGM accuracy.
5. In some circumstances, following team discussion and with the approval of the treating endocrinologist, CGM may be used in the hospital setting to provide information in addition to finger prick blood glucose levels. In these situations, the frequency of finger prick blood glucose monitoring should be stated by the treating endocrinologist and the decision to use CGM should be reviewed at least daily and also at the addition of any new medications or change in clinical situation.

2 Blood Glucose Monitoring

Introduction

Blood glucose levels (BGL) are measured using the finger prick method.

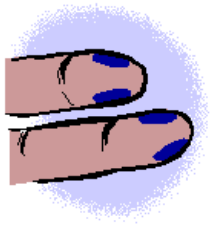
Equipment

- Bloodletting device
- Glucometer
- Blood glucose strip

- Cotton balls
- Gloves

2.1 Procedure

6. Explain procedure to patient.
7. Set up equipment.
8. Wash hands.
9. Have child wash hands in warm water and dry thoroughly.
10. Insert the blood glucose strip.
11. Using a bloodletting device, pierce area along the side of the finger. Avoid the pad of the finger and the tip. Rotate finger usage – as area will harden with repeated use.



12. Squeeze the finger to obtain an adequate drop of blood.
13. Touch the blood drop to the white target area at the tip of the strip.
14. The meter will then count down, note the BGL as it appears on display screen.
15. Remove blood glucose strip from the meter and discard into contaminated waste bin.
16. Discard the bloodletting device in sharps container.
17. Record BGL result.

2.2 Ward Meter Quality Control Report

Quality Control Solutions

- The blood glucose meter is kept in a meter station in the wards and unit areas and must be checked daily using the High and Low Control solutions.

3 Blood Ketone Monitoring

Introduction

The hospital blood glucose meters have a feature to test for Beta-hydroxybutyrate (ketone test) from capillary blood. The clinical purpose for this method is to detect and monitor for ketosis, a sign of underinsulinisation and, potentially, the development of Diabetic Ketoacidosis (DKA). This is indicated in any child with diabetes that is unwell or hyperglycaemic.

Equipment

- Bloodletting device
- Blood glucose meter
- Ketone strips

- Cotton balls
- Gloves

3.1 Procedure

1. Explain procedure to patient.
2. Set up equipment.
3. Wash hands.
4. Have child wash hands in warm water and dry thoroughly.
5. Insert ketone test strip into the meter.
6. Put on gloves.
7. Using a bloodletting device, pierce area along the side of the finger (as per picture on page 3). Avoid the pad of the finger and the tip. Rotate finger usage as areas are likely to harden with repeated use.
8. Squeeze the finger to obtain an adequate drop of blood.
9. Touch the blood drop to the white target area at the tip of the test strip. The blood is drawn into the strip. The sensor display will give you a blood ketone reading in 10 seconds.
10. Remove strip from meter and discard into contaminated waste bin.
11. Discard bloodletting device in sharps container.
12. Record ketone result.
13. Unless otherwise advised, contact Endocrine Registrar if ketones are > 0.6 mmol/L as a "top up" dose of rapid-acting insulin may be required.

3.2 Interpretation of Results

The ketone results will show:

- **0.0 mmol/L (Negative ketones)**
- **0.1 – 0.6 mmol/L (SMALL)**
- **0.7 – 1.5 mmol/L (MODERATE)**
- **Greater than or equal to 1.5 mmol/L (LARGE)**

4 Insulin Administration

Introduction

Insulin:

- Is to be administered via subcutaneous injection.
- Can be administered via an insulin syringe, an insulin pen device or insulin pump.
- Should be kept in a locked fridge between 2-8ºC until opened for individual patient use.
- Insulin expires 4 weeks after opening
- Insulin cartridges and other insulin delivery devices in use must have a patient identification label attached. All other insulin cartridges/insulin delivery devices not in use are to remain secured in the ward/unit refrigerator. See Appendix 1.
- Insulin kept in the fridge is best removed and kept at ambient temperature for 30 minutes before administration as cold insulin 'stings'.

Note:

Insulin ***glargine*** (Lantus™) is a clear, long-acting insulin which cannot be mixed with any other insulin due to its acidity and therefore needs to be given in a separate syringe/insulin delivery device.

Insulin ***detemir*** (Levemir™) must also be administered separately and not mixed with any other insulin.

4.1 Insulin Administration with a Pen Device

- All inpatients with type 1 diabetes or their carers that have been educated about correct technique using insulin pen device.
- Whilst an inpatient, this method of insulin administration must occur under nursing supervision and insulin must not be kept at the bedside to reduce the potential for unwitnessed administration.

Equipment

- Insulin Pen device
- Pen needle (4mm)
- Insulin cartridge/penfill/pre filled pen if required

Procedure

1. Wash hands
2. Check medication order for prescribed insulin type, dose, route of administration and frequency/time of administration
3. Choose correct insulin pen, and check that there is enough insulin in the pen for the dose.
4. If administering intermediate-acting (cloudy) insulin, the pen should be inverted 10-20 times to re-suspend the cloudy solution.

5. Screw appropriate pen needle onto pen.
6. Dial up 2 units of insulin and expel via an air shot to prime needle and ensure that you see insulin come out of the needle. This step can be repeated until insulin is observed.
7. Dial up prescribed dose.
8. Explain procedure to patient.
9. Pinch skin between two fingers and insert pen needle completely at a 90 degrees angle.
10. Keep the skin pinched and inject insulin by pushing pen button down slowly until it cannot be pushed further. Slowly let skin go – keep needle inserted for 5-10 seconds and then withdraw needle.

Note: The cartridge/penfill in use can remain in the pen.

Insulin cartridges, penfills and disposable insulin pens must be discarded within 28 days of opening.

Note: Insulin may only be stored at room temperature (at or below 30ºC) for up to 28 days and then must be discarded, even if unopened.

5 Telephone Orders

Note: A medical officer or the diabetes nurse practitioner must prescribe insulin therapy.

1. A medical officer or diabetes nurse practitioner employed by the hospital must prescribe the insulin.
2. Two registered nurses (RN) must be present to take the telephone order.
3. The prescribing medical officer must specify the patient's name, MRN, date of birth, the insulin type, route of administration, dose and indicate that it is for a single dose and specify the timing of the dose. This must be repeated to a second registered nurse for confirmation. The registered nurse receiving the telephone order must read back orders to the prescriber and record the prescription (at CHW, this must be performed in eMM where it is in use). This must be completed at the time of the telephone call with the prescriber.
4. The prescriber must confirm the telephone prescription by checking and counter-signing the entry within twenty-four hours. This telephone procedure must be followed if a prescriber wishes to change the insulin therapy prescribed, or the prescribed dose, where access to a prescriber who is able to place a new order is not practicable.

References and Associated Documents

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Appendix 1 Insulin Labelling

Children's Hospital Westmead

Labelling of Insulin Penfills and Vials (CHW)

ALL insulin penfills and vials will have a small plastic bag provided by pharmacy (photo below)

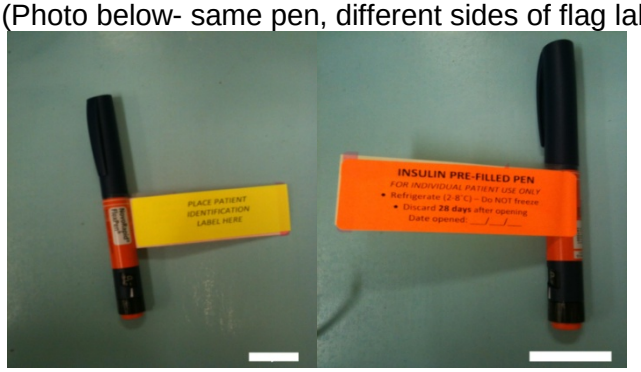
- This will be supplied with the penfills/vials and placed in the fridge.
- This will assist to more clearly:
  - ✓ **identify** which patient the penfill/vial is for (insulin penfills/vial cannot be shared between patients, as per NSW Health Infection Prevention and Control Policy PD2017_013 and Medication Handling in NSW Public Health Facilities PD2013_043.)
  - ✓ document the **date** the penfill/vial was opened (insulin has a 28-day expiry once opened)
- When a penfill/vial is required for a patient, the person taking it from the original container needs to :
  - ✓ complete the date opened and discard date sticker
  - ✓ place the Patient Identification Label on the bag (if insulin is dispensed from pharmacy it will already have patient details on the dispensing label)
  - ✓ store the penfill/vial in the zip-lock bag

Labelling of Insulin Pens (CHW)

Insulin Pens will be labelled by pharmacy with labels as below. When an insulin pen is required for a patient, and is obtained from imprest, the person taking it from the original container needs to:

- ✓ complete the date opened and discard date on the label
- ✓ place the Patient Identification Label on the appropriate side of the flag label

(Photo below- same pen, different sides of flag label)



Sydney Children's Hospital

Labelling of Insulin Penfills and Pens (SCH)

Insulin vials or penfills are available on select SCH wards as imprest items and will be stored in the medication room refrigerator.

Once removed from the refrigerator the registered nurse will label insulin vials with:

- the patient's identification label
- a label documenting the date the vial was opened (opened vials should be discarded within 28 days)

Opened insulin vials should be separated from other insulin stock on the ward and stored in a patient specific medication tray. Care should be taken to ensure insulin is protected from light.

Insulin vials or penfills *supplied by SCH Pharmacy* will arrive to the ward in a box labelled with the patient's name and medical record number and pre-labelled with a 28 day expiry. The insulin should be separated from other insulin stock on the ward and stored in a patient specific medication tray. Insulin is to be kept within the box supplied from Pharmacy to ensure it is protected from light.

Insulin pens are provided by the diabetes nurses. The registered nurse will label the pen with the patient's identification label, the expiry or opening date will be documented on the label (according to the supply method above). The insulin pen will be stored in a patient specific medication tray in the medication room. Pen devices protect insulin from light.