

Protocol (Clinical)

Title: Subcutaneous Insulin Administration in Hospital and Aged Care

Protocol developed by: CHSALHN Diabetes Service

Protocol Sponsor: CHSALHN, Executive Director, Medical Services

Approved by: CHSALHN, Clinical Governance Committee on: 5/12/2018

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Summary This protocol outlines responsibilities and actions required by nurses and midwives to ensure safety and quality in the handling and administration of subcutaneous insulin in the hospital and aged care setting.

Policy/Procedure reference This protocol supports the Medications safety, medication management by nurses procedure, medication standard

Keywords Clinical, Protocol, CHSA, nursing, midwifery, syringe, blood glucose, standards.

Document history Is this a new CHSALHN Protocol? **N**
Does this protocol *amend or update* an existing protocol? **Y**
Subcutaneous Insulin Administration in Hospital and Aged Care, 2015
Does this protocol *replace* an existing protocol? **N**

Applies to This protocol applies to all community health service nursing and midwifery staff and CHSA Diabetes Service staff.

Version control and change history

Version	Date	Amendment	Amended by:
1.0	01/04/2015	Original version	Jane Giles
2.0	5/10/2018		Jane Giles

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Subcutaneous Insulin Administration in Hospital and Aged Care

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Protocol | Subcutaneous Insulin Administration in Hospital and Aged Care

1. Rationale

Correct supervision and/or administration and documentation of subcutaneous insulin for diabetes management in the hospital and aged care setting. Where appropriate, promote independence towards self or assisted administration of insulin by patients and/or their carers.

2. Scope

Nursing and midwifery staff, medical staff, patients and/or their carers. The role of a direct care worker is not defined. This protocol does not cover insulin administered via continuous subcutaneous insulin infusion (insulin pump) or intravenous insulin infusion.

3. Instruction

- > A written medication order is required from an appropriate prescriber (medical practitioner or nurse practitioner).
- > All staff who prescribe, prepare and administer subcutaneous insulin must seek additional clarification and information if unfamiliar with the specific drug.
- > Blood glucose monitoring must be performed prior to administration.
- > Each insulin cartridge, pen or vial is for single patient use **ONLY** and must be labelled with the patient's identification details and must be labelled with the date opened and date to be discarded.
- > 'In-use' insulin is stored at room temperature (not in the fridge), preferably in the locked section of the patient's bedside locker. 'In-use' insulin is to be discarded in 30 days after opening. Store 'not in use' insulin on their side in the refrigerator (2-8°C) away from the freezer or freezing coils. Discard any insulin if sediment is present in clear insulin or the cloudy insulin does not re-suspend (eg mix) after the cartridge/vial is rotated.
- > Insulin administration by nurses in a hospital and aged care setting is with an insulin syringe. Insulin syringes vary in size (eg 100 unit, 50 unit or 30 unit) and are identifiable by an orange cap and needle insitu. **Using any other syringe will result in an INCORRECT insulin dose.**



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- > **HIGH STRENGTH** insulin (Toujeo®) is 300 units/mL and **MUST NOT** be administered via insulin syringe. Toujeo® is **ONLY** available in an insulin pen. **Drawing up with an insulin syringe will result in an INCORRECT insulin dose.**
- > Insulin pens and auto delivery devices are commonly used by patients to self-administer insulin (*see appendix for current pens and auto delivery devices*).
- > Self-administration by the patient can be encouraged in the event that the patient is independent – ie the patient is able to self-inject and immediately dispose of the insulin syringe or insulin pen needle into a sharps container without assistance from nursing staff.

It is recommended that safety pen needles are used for patients self-injecting with an insulin device.



BD AutoShield Duo



Safety Pen Needle 5mm

- > Independent self-administration of insulin must be checked and supervised by nursing staff and documented in the medication chart.

The patient's ability to fully self-manage this procedure must be re-assessed on an ongoing basis.

3.2 Equipment

- 3.2.1 Prescribed insulin/s (*see Reference Charts*).
- 3.2.2 Sharps container.
- 3.2.3 Gloves.
- 3.2.4 Alcohol swab.
- 3.2.5 BD AutoShield Duo Safety Pen Needle 5mm for insulin pen/delivery device **OR**
- 3.2.6 Insulin syringe with **8mm needle** (do not use 12mm insulin syringes).
- 3.2.6a **100 Unit insulin syringe** should be used for doses of 50 - 100 units.

Syringe markings are in increments of 2 units.



OR

- 3.2.6b **50 Unit insulin syringe** should be used for doses less than 50 units.

Syringe markings are in increments of 1 unit.



OR

- 3.2.6c **30 Unit insulin syringe** should be used for doses less than 30 units.

Syringe markings are in increments of 1 unit.



3.3 Preparation

3.3.1 Attend to hand hygiene.

3.3.2 No drug is to be given without a valid written or phone order.

3.3.3 Prepare space to conduct procedure.

3.3.4 **At the bedside**, a nurse should explain the procedure to the patient and gain consent. Provide for patient's privacy. Check for allergies and check blood glucose result is within target parameters. Refer to action plan if outside of target range. The nurse should check dose and type of insulin ordered as per the Medication Management and Administration – Roles and Responsibilities of Nurses, Midwives and student nurses / midwives in CHSALHN sites procedure. Both staff (registered practitioners) should remain throughout the drawing up procedure and check verbally for patient's identification to ensure correct patient receives correct insulin dose at correct time.

The two nurses should read the Medication Chart order(s) and check the:

- > right patient
- > right medication
- > right dose
- > right route
- > right time and date.

3.3.5 Drawing up insulin

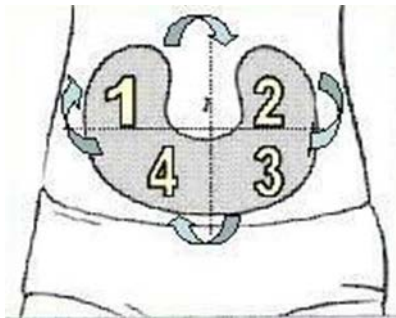
- > Perform hand hygiene.
- > Apply appropriate personal protective equipment.

<p>For a cartridge/vial with an insulin syringe</p> <ul style="list-style-type: none"> > Prepare immediately prior to use > Cloudy insulin is mixed by rolling then rotating the cartridge/vial gently in the palms to re-suspend the insulin. Ensure it is evenly mixed. > Clean the rubber top of the insulin cartridge/vial with an alcohol swab and allow to dry. > For a vial, pull back the syringe plunger to the air equivalent of dose ordered and hold vial upright, insert the needle straight through the centre of the rubber seal and push the syringe plunger completely in. > For a cartridge, simply insert the needle through the rubber seal. > Turn the cartridge/vial upside down making certain that the point of the needle inside the cartridge/vial is well beneath the level of insulin. Pull back the syringe plunger until the correct dose of insulin has been drawn up. > Withdraw the needle. Tap the side of the syringe to push air bubbles to the top. Ensure air bubbles have been removed by pushing plunger to the level of the ordered dose, ensuring the excess insulin is expelled. > Do not squirt any excess insulin back into the cartridge/vial. <p>Note: An 'in-use' cartridge MUST NOT be used in an insulin pen. Continue to use with a syringe or discard. ONLY a new full cartridge is to be loaded into an insulin pen.</p> <p>If mixing 2 insulins in the one syringe;</p> <ul style="list-style-type: none"> > Prepare immediately prior to use. > Clear insulin is drawn before cloudy to prevent contamination of clear insulin. <p>If more than the required dose of cloudy insulin is drawn up in syringe, the insulin combination is to be discarded and start again.</p> <p>Note: Mixing insulin glargine (Lantus®) or insulin detemir (Levermir®) with other insulin is not recommended.</p>	<p>For patients independently using insulin pen or delivery device</p> <ul style="list-style-type: none"> > Prepare immediately prior to use. If setting up a cartridge in a pen, use a new full cartridge. Do not place any partly-used cartridge into a pen. > Cloudy insulin is mixed by rolling then rotating the insulin pen/delivery device gently in the palms to re-suspend the insulin. Ensure it is evenly mixed. > Clean the rubber seal of the insulin cartridge in the insulin pen/delivery device with an alcohol swab and allow to dry. > Remove the cap from the pen needle (autosshield) then push and twist the pen needle hub onto the insulin pen/delivery device in a clockwise direction until it meets resistance. > Pull the cover off the autosshield (<i>the needle is hidden under the white plastic shield</i>). Do not touch the white shield prior to injecting as any pressure on the shield may cause the safety mechanism to lock, making the pen needle unusable. > Prime the pen needle by dialling up 2 units, point the insulin pen/delivery device needle upwards and depress the injector button. If insulin not visible at the needle tip, repeat this priming process with another 2 units. > Dial up the prescribed dose of insulin. > Insulin must be administered immediately. <p>Note: NEVER withdraw insulin from an insulin pen or insulin auto injecting device using an insulin syringe. This contaminates the insulin and interferes with accuracy of dosing of the insulin pen and insulin auto injecting device.</p>
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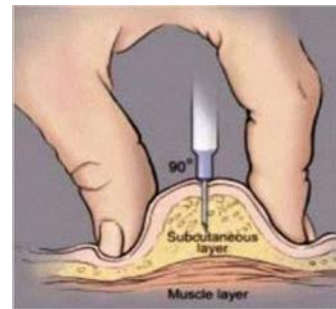
3.4 Administration

- 3.4.1 Attend to hand hygiene.
- 3.4.2 Maintain aseptic procedure throughout the procedure.
- 3.4.3 Expose the abdomen and examine with the flat of the fingers. Take note of any signs of redness, bruising or lumpy areas (lipohypertrophy), and avoid these areas when choosing the injection site.
- 3.4.4 Cleanse the skin with an alcohol swab and allow to dry.
- 3.4.5 Ensure rotation of sites. Avoid an area of 5cm diameter at the umbilicus (see diagram of recommended abdominal site and rotation).
- 3.4.6 Ensure that insulin is being injected into the subcutaneous adipose tissue and muscle tissue is avoided. Lift up a skin fold between thumb and forefinger (*see Skin Lift*) and insert the needle at a 90 degree angle. In a very thin individual or paediatric patient (<18yrs) with minimal abdominal adipose tissue, inject at a 45 degree angle.

Recommended site and rotation of sites



Skin lift



- 3.4.7 Inject the insulin slowly. An insulin syringe can be withdrawn once plunger has been fully pressed. For insulin pen, count 10 seconds prior to withdrawing needle as it takes more time for a pen to dispense the full dose.
- 3.4.8 Withdraw needle at the same angle it was inserted to reduce risk of trauma.
- 3.4.9 If using an insulin pen or delivery device, check the dial has returned to '0'. This confirms that the full has been injected. Most injecting devices prevent the dialling of a dose greater than the amount of remaining insulin. However, if a number remains, this equals the amount of insulin not injected. In this instance, a new insulin pen or delivery device is required to administer the dose outstanding.
- 3.4.10 Immediately discard syringe into sharps container. Do not re-sheath the syringe needle.
- 3.4.11 **FOR PATIENTS AND/OR CARERS INJECTING USING A SAFETY PEN NEEDLE** – a red indicator band will appear confirming shield is locked in place and the needle has been used. The patients and/or carer should be instructed to hold by white sleeve when removing and discard the safety pen needle immediately into sharps container.
- 3.4.12 If soreness, bruising, welts, redness, swelling, rash or lumps occur at injection site, document and report to the medical practitioner.
- 3.4.13 Remove personal protective equipment.
- 3.4.14 Attend hand hygiene.

4. Documentation

- 4.1 Record and sign the dose of insulin administered on the appropriate chart (eg National Inpatient Medication Chart, or the Basal Bolus Insulin Chart – Adult MR62A).
- 4.2 When rotating sites, record the area in which the injection was given and skin condition in progress notes. If soreness, bruising, welts, redness, swelling, rash or lumps occur at injection site, document any education provided and any unplanned effect (medication allergy and any Adverse Drug Reaction (ADR)).
- 4.3 In the event that the medication is not administered (eg missed dose, drug unavailable, patient refuses) document reason in medical record and notify senior nurse/medical practitioner.
- 4.4 Report any hazards and incidents (no harm or with injury) that affect patients, their carers and staff to Safety Learning System.
- 4.5 If the patient and/or carer demonstrate safe administration of insulin, document that the patient and/or carer is competent to be discharged to the medical practitioner.

5. Definitions

Carer - a parent/family carer, a resident's representative, medical power of attorney or guardian. A carer freely and willingly provides assistance a few hours a week or all day every day, depending on the level of support needed to a client or patient who is dependent on receiving treatment.

Care worker - an unlicensed health care worker providing direct care in the health or disability care environment which may include; residential aged care and supported accommodation facilities, community care in client's homes. Some care workers may have completed vocational training. They are individually accountable for their own actions and accountable to the health care professional (eg registered nurse or allied health professional) and their employer for delegated actions.


Client or patient – person receiving treatment.

Hyperglycaemia – abnormally increased blood glucose levels which is a sign of diabetes. Hyperglycaemia is accompanied by symptoms of polyuria, polydipsia and polyphagia. Hyperglycaemia left untreated can progress to severe conditions such as ketoacidosis and hyperglycaemic non-ketotic hyperosmolar state.

Hypoglycaemia – abnormally low blood glucose levels of less than 4mmol/L. A risk for people who require medication to control diabetes

Insulin – is a hormone that is secreted by the beta cells of the pancreas and is the major fuel regulating hormone. Insulin is secreted in response to a rise in blood glucose and facilitates the utilisation of glucose by the cells. Insulin enables the transport of glucose across the cell membrane. Insulin is responsible for the storage of glucose and amino acids, increases protein and fat synthesis and inhibits the breakdown of fat.

6. Reference charts



Insulin is universally recognised as a **high risk medicine**. Insulin has a narrow therapeutic range – there is little difference between a sub-therapeutic dose, therapeutic dose and a toxic dose. Serious client harm and death can occur when insulin is not managed safely. Underdosing or failing to administer required doses of insulin can cause hyperglycaemia (high glucose levels) and may lead to life-threatening diabetic ketoacidosis. An insulin overdose may cause hypoglycaemia (low blood glucose levels) and lead to seizures, coma and death.

Insulin Available in Australia

Type (brands [®])	Onset of Action	Peak Action	Duration of Action	Client Concerns
Rapid Acting Insulin (Analogues) • insulin aspart (NovoRapid) • insulin lispro (Humalog) • insulin glulisine (Apidra)	0-25 minutes	1 hour	4 -5 hours	• clear solution • take immediately before meals
Short Acting Insulin (Neutral) • Actrapid • Humulin R • Hypurin Neutral	0 – 30 minutes	2-3 hours	6-8 hours	• clear solution • take 30 minutes before meals
Intermediate Acting Insulin (Isophane) • Protaphane • Humulin NPH • Hypurin Isophane	1-2 ½ hours	4-12 hours	16 – 24 hours	• cloudy solution • used once or twice a day
Long Acting Insulin (Analogues) • insulin glargine (Lantus) 100units/mL • Insulin glargine (Toujeo) 300units/mL	1-2 hours 1-6 hours	No peak	24 hours 24-36 hours	• clear solution • used once a day • do not mix with other insulins
Long Acting Insulin (Analogues) • insulin detemir (Levemir)	3-4 hours	9 hours	12-24 hours	• clear solution • used once or twice a day
Biphasic (Mixed) Insulins Intermediate Acting Insulin (Isophane) and Rapid Acting Insulin NovoMix 30 Humalog Mix25 Humalog Mix50	0 – 25 minutes	1 hour	16-18 hours	• cloudy solution • used once or twice a day
Biphasic (Mixed) Insulins Intermediate Acting Insulin (Isophane) and Short Acting Insulin Mixtard 30/70 Humulin 30/70 Mixtard 50/50	½ - 1 hour	2-12 hours	16-24 hours	• cloudy solution • used once or twice a day












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An **insulin pen** is a convenient way to administer insulin and is available in two basic types: disposable and reusable. **Disposable insulin pens** come already filled with insulin. When a pen is empty or expired, it is simply discarded. **Re-useable insulin pens** have a replaceable cartridge of insulin. The cartridge is replaced when the insulin is used or expired.

An **insulin delivery device** is larger and easier to handle than insulin pens. They have clear, readable dials and easy-to grip shapes that are designed for people with vision problems and poor hand control. An insulin delivery device works like a disposal pen, when it is empty or expired, it is simply discarded.

An **insulin pump** is a small battery-operated electronic device that holds a reservoir of insulin. It is worn 24 hours a day and is programmed to deliver insulin into the body through an infusion set or giving set. The infusion set has a fine needle or flexible cannula that is inserted subcutaneously. The insertion site and consumables must be changed every three days. The insulin pump is not disposable.

Insulin Pens and Insulin Injecting Devices Available in Australia (as at 14th May 2018)

	Novo Nordisk		SANOFI		Lilly	
Disposable Insulin Pens						
Reusable Insulin Pens						
Disposable Insulin Delivery Device						

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Linked Documents

Document Name
CHSA Injectable Treatments for Adults with Diabetes: Clinical Support Guide (2018)
CHSA Inpatient Blood Glucose Monitoring Chart (MR59H) (2014)
CHSA Inpatient Blood Glucose & Ketone Monitoring Protocol (2016)

References

Document Name
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Accreditation Standards

National Safety and Quality Health Service Standards (NSQHSS)

1 <input checked="" type="checkbox"/>	2 <input type="checkbox"/>	3 <input checked="" type="checkbox"/>	4 <input checked="" type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	8 <input type="checkbox"/>	9 <input checked="" type="checkbox"/>	10 <input type="checkbox"/>
Governance for Safety and Quality in Healthcare	Partnering with Consumers	Preventing & Controlling Healthcare Associated Infections	Medication Safety	Patient Identification & Procedure Matchng	Clinical Handover	Blood & Blood Products	Preventing & Managing Pressure Injuries	Recognising & Responding to Clinical Deterioration	Preventing Falls & Harm from Falls

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Subcutaneous Insulin Administration in Hospital and Aged Care

Country Health SA Local Health Network

Evaluation and Quality Improvement Program (EQuIP)

11 <input type="checkbox"/>	12 <input checked="" type="checkbox"/>	13 <input type="checkbox"/>	14 <input type="checkbox"/>	15 <input type="checkbox"/>
Service Delivery	Provision of Care	Workforce Planning and Management	Information Management	Corporate Systems and Safety

Australian Aged Care and Quality Agency (AACQA) – Residential Aged Care Standards

1 <input type="checkbox"/>	2 <input checked="" type="checkbox"/>	3 <input type="checkbox"/>	4 <input checked="" type="checkbox"/>	<i>Specific criteria: (e.g. 1.1, 4.5)</i>
Management Systems, Staffing and Organisational Development	Health and Personal Care	Care Recipient Lifestyle	Physical Environment and Safe Systems	

Consultation

Version	Consultation
1.0	SA Health Metropolitan Diabetes Services, NP-Diabetes - Mt Gambier, CHSA Diabetes Specialist Nurse Network, Director of Endocrinology.
2.0	SA Health Metropolitan Diabetes Services, Flinders University SA, NP-Diabetes - Mt Gambier, CHSA Diabetes Specialist Nurse Network, Clinical Pharmacists, CHSA Director of Endocrinology.