

Subcutaneous Injections and Diabetes Management Procedures

Appendix 1: Procedure for Subcutaneous Injections for Insulin

General

This procedure has been written as a generic guide to subcutaneous injections for insulin.

- Staff must consult their individual participant's *Subcutaneous Injection Support Plan* for specific instructions.
- This procedure should be read in conjunction with Australian Quality Care's *Management of Medication Policy and Procedure* and *Subcutaneous Injections Policy and Procedure*.
- Staff are to prepare the medication as per directive:
 - for variable dose medications only, a Registered Nurse will be administering
 - for fixed dose medications any qualified staff can administer under the supervision of a Registered Nurse.

Always follow the participant's *Subcutaneous Injection Support Plan* to ensure the correct technique and amount of medication.

- Pen devices are for individual use only and should not be administered through clothing
- Fit a new needle to the top of the pen/syringe
- Check medication solution and dispose or shake as required (e.g., some insulins are cloudy while others are clear and if cloudy are not useable)
- Depending on the device, 'Prime' the pen to ensure it is working correctly and there are no air bubbles
- Dial up the required dose of medication
- Insert the needle and push down the plunger to administer the dose
- Leave the pen needle in situ after injecting the medicine for 10 seconds (or as per the manufacturer's instructions) to allow the medicine to fully inject
- Counting past 10 seconds may be needed for higher doses
- Remove the pen needle and discard safely. Replace cap on the pen.

Injecting Technique

The type of injecting technique and site will be pre assessed by a Health Practitioner (Registered Nurse, Enrolled Nurse) when developing the *Subcutaneous Injection Support Plan* for each individual participant. Once a Australian Quality Care Staff has had training and been assessed as competent, they will then utilise the *Subcutaneous Injection Support Plan* to formalise what technique to use when administering subcutaneous injections.

Staff are to prepare the medication as per directive:

- for variable dose medications only, a Registered Nurse will be administering
- for fixed dose medications any qualified staff can administer under the supervision of a Registered Nurse.

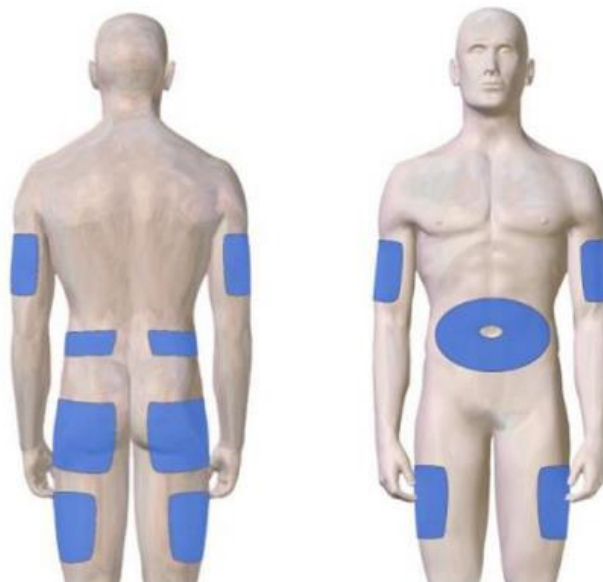
The size and angle of insertion of the needle used for injection, and the need for a lifted skinfold, should be determined according to a Health Practitioner (Registered Nurse, Enrolled Nurse) clinical examination and consideration of the likely composition of skin and subcutaneous tissue.

Below is a generic guide to administering a subcutaneous injection.

- Use thumb and index finger (or middle finger) to gently lift (not grab) the skin fold and avoid lifting accompanying muscle.
- Inject into the raised tissue at 90 degrees (or 45 degrees depending on participant's skin and fat distribution).
- Keep the skin fold raised as the medication is administered.
- Maintain a steady rate in injecting the solution 5.
- Hold the needle in situ for 10 seconds, or as per the *Subcutaneous Injection Support Plan*
- Withdraw the needle and release the skin fold.
- Observe for trauma, leakage, or pain at the site (apply a dressing if site bleeds)
- Dispose of the needle as per Australian Quality Care's *Waste Management Policy and Procedure*.
- Record on the participant's medication chart and monitor participant for any adverse reactions or complications (for a FIRST-time injection closely monitor for the first 15 minutes).

Injection site

The choice of injection site should take into consideration the requirements of different injectable medications and specified in the participant's *Subcutaneous Injection Support Plan*. The abdomen is the preferred injection site for most participants due to its convenience, consistency, and reproducible rates of absorption of injectable medications. If the site requires cleaning, soap and water is adequate. The use of alcohol swabs to cleanse the skin prior to injection should not be required and increases the risk of toughening the skin.



Subcutaneous Injections and Diabetes Management Procedures

Appendix 2: Types of Diabetes, Complications of Diabetes, Signs and Symptoms of Diabetes and Diabetes Management

General

There are two types of diabetes:

1. *Diabetes Insipidus*

There are two types of diabetes insipidus:

- a) Central Diabetes Insipidus (neurogenic)
 - there is deficiency in ADH (antidiuretic hormone)
 - caused by congenital disorder or secondary disorders such as head trauma, haemorrhage, or trauma etc.
- b) Nephrogenic Diabetes Insipidus
 - there is normal production of ADH (antidiuretic hormone) however the kidney does not respond well to it
 - caused by genetic disorder or secondary to renal disease, high calcium or low potassium or drugs like lithium.

2. *Diabetes Mellitus*

Diabetes Mellitus is a chronic, metabolic disorder characterised by abnormalities in carbohydrate, protein and fat metabolism resulting in defects in the production of insulin secretion, insulin action or both. There are three types of Diabetes Mellitus:

- a) Type 1
 - Juvenile onset
 - caused by immune-mediated destruction of beta cells of the pancreas, resulting in minimal or no production of insulin. Hence required lifelong insulin.
- b) Type 2
 - Mature aged onset (common among people over the aged of 40 years old).
 - Family history of diabetes or are overweight (makes the insulin less efficient in controlling the glucose).
 - Affects 85% of people with diabetes.
 - Responds to treatment of exercise, weight reduction and sometimes tablets and/or insulin.
- c) Gestational Diabetes
 - occurs during pregnancy (24th to 28th week of pregnancy)
 - caused by previous birth of overweight baby, family history of gestational diabetes, overweight etc.
 - managed by healthy eating, exercise and may be insulin.

Complications of Diabetes

If left untreated diabetes can cause:

- Blindness
- Poor wound healing
- Stroke
- Heart diseases
- Kidney failure
- Nerve damaged
- Birth defects.

Signs and Symptoms of Diabetes

- Blurry vision
- Frequent urination
- Itchy skin or skin infection
- Feeling lethargic
- Constant hunger
- Unexplained weight loss.

How is Diabetes Managed?

- Healthy eating
- Regular physical exercise
- Medications (tablets and/or insulin injections)
- Monitoring blood sugar levels.

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Appendix 3: Hypoglycaemia and Hyperglycaemia – Causes, Signs and Symptoms, and Treatment

Hyperglycaemia

Hyperglycaemia occurs when the blood sugar level is too high and there is not enough insulin in the body, then fat is broken down as a source of energy, which produces ketones. When there is accumulation of ketones in the body, this can make the person very ill, and it is called Diabetes Ketoacidosis.

It is caused by:

- Not enough insulin or tablets
- Infection, fever, illness
- Emotional stress
- Trauma
- Too much food (or sugar).

Signs of hyperglycaemia:

- Increase in thirst and urination
- Large amount of sugar in the blood or urine
- Ketones on the urine
- Weakness, abdominal pain, and generalised aches
- Loss of appetites, nausea, and vomiting
- Heavy laboured breathing
- Lethargy, drowsiness, mental confusion
- Blurred or double vision.

Treatment:

- If the participant is conscious, give plenty of water.
- Call the ambulance if the doctor is unable to be contacted.

Hypoglycaemia

Hypoglycaemia occurs when the blood sugar level drops to low.

It is caused by:

- Too much insulin or tablets
- Not eating enough food
- Diarrhoea and/or vomiting
- Unplanned or excessive exercise
- Missed or delayed meals
- Drinking alcohol.

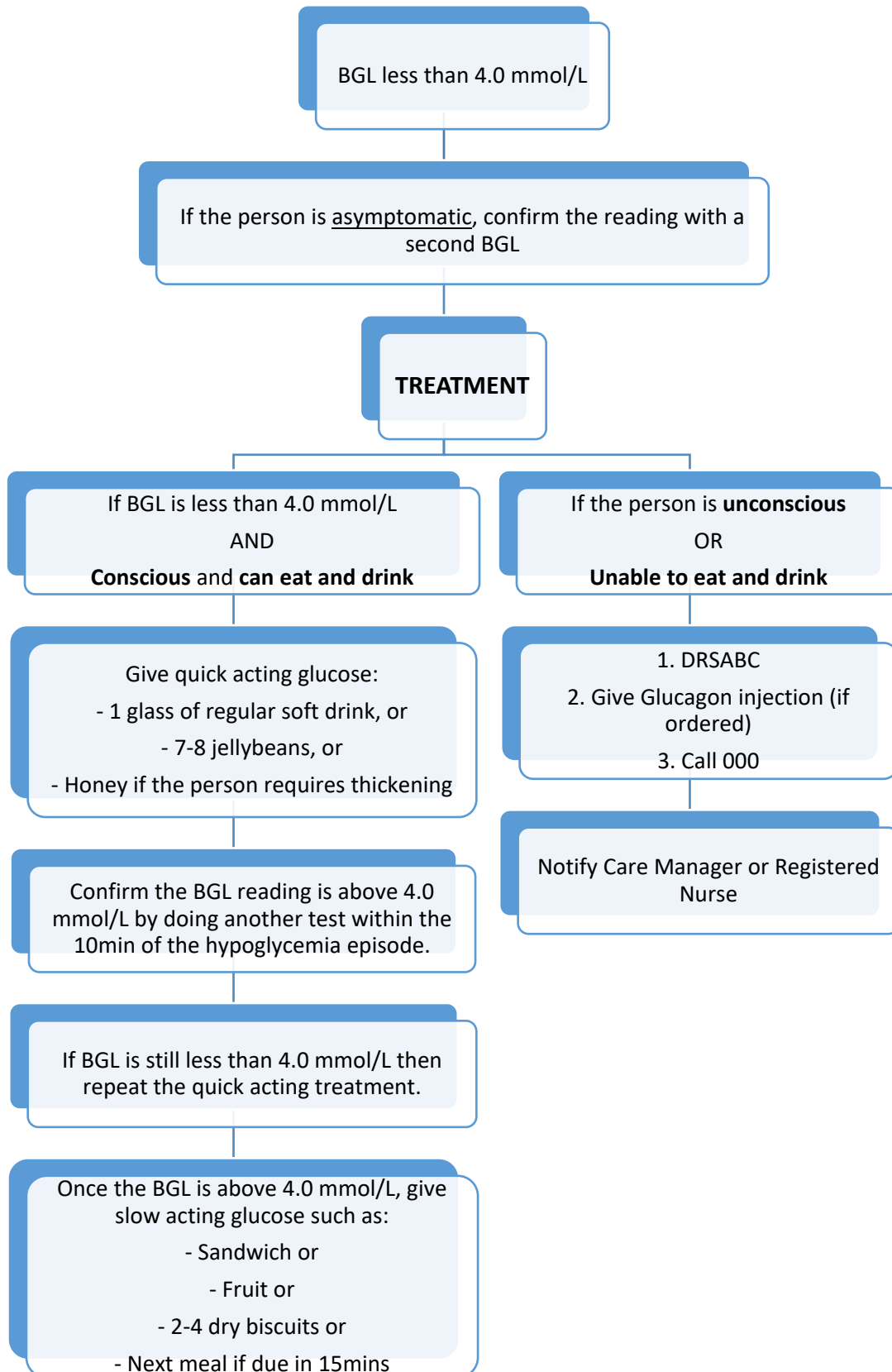
Signs of hypoglycaemia:

- Sweating
- Faintness
- Trembling and heart pounding
- Hunger
- Pallor
- Vagueness, irritability
- Slurred speech
- Blurred vision
- Poor coordination, drowsiness
- Unconsciousness.

Treatment of hypoglycaemia:

- If the participant is conscious give quick acting sugars such as jellybeans, soft drink/juice 3 tablespoons of sugar or honey. If no improvement in 10 minutes, give the quick acting sugars again. Once the participant has recovered, give carbohydrates such as sandwiches, biscuits, cheese, fruits, or milk.
- If the participant is UNCONSCIOUS, do not give anything and apply first aid (DRSABC) and call the ambulance immediately.

Management of Hypoglycaemia Flowchart



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Appendix 4: BGL (Blood Glucose Level) Testing, BGL Range and Insulin

BGL Testing

Only staff trained by a Health Professional, such as a Registered Nurse, Diabetic Nurse Educator or Pharmacist, can perform the BGL Testing procedure.

The BGL testing guideline are as follows:

Type 2 diabetes:

- Once or twice a day as instructed by the GP (ideally before breakfast, before other meals or 2 hrs after a meal).
- More frequent in times of instability.
- The frequency can be reduced once the BGL is stable.
- If the participant is on insulin, BGL testing should be done before each insulin injection.

Hand hygiene must be performed prior to the testing of participant's BGL. Advise the participant to also perform hand hygiene. Prepare the BGL machine by using the manufacturer's instruction. Ensure the test strip is not expired or exposed to heat or humidity.

The following are examples of when a reading may become incorrect:

- The strips have expired
- The strip is not right for the meter
- Not enough blood for the strip
- Strip may have been affected by light or heater
- The participant has not washed and dried their hand before the test
- The calibration code is incorrect
- The battery may be low or flat.

BGL Range

- Aim: (4.0 mmol/L – 12 mmol/L)
- Type 1 Diabetes:
 - 4-8 mmol/L (before meals)
 - >10 mmol/L (2 hours after starting meals)
- Type 2 Diabetes:
 - 6-8 mmol/L (before meals)
 - 6-10 mmol/L (2 hours after starting meals)

Any abnormal reading that is reportable, should be documented in the progress notes along with the action taken and the participant's response to the action taken.

Insulin

Time Course	Agent	Onset	Peak	Duration
Rapid-Acting	Lispro (Humalog) Aspart (Novorapid)	10-15 min 10-15 min	1hr 40-50 min	3 hr 4-6 hr
Short-Acting	(Humalog R) (Actrapid)	30min-1 hr	2 -3 hr	4-6 hr
Intermediate Acting	Isophane (Humalin NPH, Protophane) Lente (Humalin L, Monotard)	2-4 hr 3-4 hr	6-12 hr 6-12 hr	16 – 20 hr 16- 20 hr
Long-Acting	Ultralente (Ultratard)	6-8 hr	12-16 hr	20-30 hr

For fixed insulin doses, a qualified support worker can assist however with variable doses only a qualified nurse (EN/RN) can assist. This will be demonstrated on participants' *Medication Plans*, with staff following the *Management of Medication Policy and Procedure*.

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Appendix 5: Management of Diabetics – Use of Insulin

Management of Diabetes – Use of Insulin

Insulin is the most common treatment for a majority of Diabetics. If a person is diabetic, his or her body fails to produce sufficient insulin (Type 1 Diabetes) or effectively makes use of insulin the body produces (Type 2 Diabetes). Insulin normalises blood glucose and avoids spikes in glucose levels and assists in preventing complications.

Hypoglycaemia is the most common and serious side effect of insulin.

The insulin a person can take can be determined in several different ways:

Fixed Dose Insulin - A definite amount of insulin units are taken in this method at each meal. The amount doesn't modify upon the person's glucose levels or the quantity of food the person eats. This method is simple for individuals just beginning on insulin therapy or are stable diabetics.

Carb to Insulin Ratio - In this variable approach, a person takes a particular quantity of insulin for a particular quantity of carbs. For example, if a person's breakfast carb to insulin is 10 : 1 and the person consumes 30 grams of carbs, the person can take 3 units of insulin prior to having breakfast to cover the meal.

Sliding Scale Insulin Therapy (SSI) - In this approach, the dose depends upon a person's blood glucose level measured via a glucometer just prior to having food. The higher the levels of blood glucose, the more amounts of insulin the person can use. In most cases, fast acting insulin is used 15-30 minutes prior to having food. Insulin dose based on blood sugar is matched using an insulin dosage chart.

In addition to those mealtime rapid acting doses, individuals may take a long-acting insulin dosage one or two times each day.

Note: Studies have found that using a sliding scale failed to improve sugar control but caused more recurrent high blood glucose or *hyperglycaemic* signs. The doses that appear on the insulin dosage chart may also be too much if an individual misses out on meals, is more susceptible to insulin on a certain day. As these dosages accumulate during the day, they may bring about hazardous low blood sugar levels, *hypoglycaemia*, which can become a serious medical emergency.

Considerations Associated with Sliding Scale Insulin (SSI) Therapy

- Diet - what a person consumes has a great effect on insulin requirements - e.g. a diet rich in carbs needs a higher dose of insulin compared to a person on a low-carb diet.
- Weight Factoring - an individual with more weight might require more insulin.
- Insulin History - fails to consider how sensitive the person's body is to insulin effects.

For an effectual low-dose regular insulin sliding scale therapy, the person needs a predictable and consistent lifestyle.

Alternatives to Sliding Scale Insulin (SSI)

The *Australian Diabetic Association (ADA)* suggests other methods of using insulin instead of the sliding scale model.

- Conventional Insulin Therapy - this treatment includes injections of the following:
 - Long Acting Insulin - One dose per day. To make this method effective, the individual should consume their meals at the same time on a daily basis, otherwise unnecessary variations in blood sugar may result.
 - Short-Term Insulin - The individual takes two to three doses of insulin daily. They should systematize their meals with peak activity times of the injections. The doses are similar every day and does not take into account pre-meal blood sugar levels.
- Insulin Pens - An individual can use an insulin pen to inject insulin. These pens are modifiable so that different doses can be injected at the same time. The pen is quite simple for use compared to a syringe. It comes in the form of a pre-filled or refillable device.
- Intensive Insulin Therapy - This is also called basal-bolus therapy or tight control. The individual must make daily calculations to keep their sugar levels as close to their intended level as best as they can. This therapy is only effective if an individual follows it appropriately, but can be difficult to use.
- Insulin Pump Therapy - Has the same mechanism of action as basal-bolus insulin, but eliminates the necessity for regular injections. An insulin pump is a small, digital device offering a steady supply of insulin throughout the day (basal) with an added dose around mealtimes (bolus). The pump is worn on the body. The pump makes sure that insulin travels through it via a small tube as well as a needle, into the body. The individual needs to work with their health practitioner to program the pump as well as work out which doses they require. They may still require injecting insulin at meal times or after doing physical activity. They will also require checking their sugar levels on a regular basis just like other means of insulin therapy.

Insulin therapy is unique to each individual's needs and each person should consult their health practitioner to determine the appropriateness of their specific insulin needs.

Managing Insulin

Insulin errors can be deadly and insulin is the most common drug likely to result in an adverse outcome if it's not administered correctly. Effective Diabetes Management is all about a careful balance between the foods a person eats, how active they are and the medication taken for diabetes. This is a delicate balance and can be quite difficult to achieve the best possible blood glucose management all the time.

The target range for blood glucose levels is 4 to 6 mmol/L (fasting) to prevent complications. Target ranges may differ depending on age, duration of diabetes, types of medication taken, other medical problems the individual may have. Individual target ranges must be discussed with attending health practitioner. Normal blood glucose levels are between 4.0 - 7.8 mmol/L.

Type 1 Diabetes

Target levels - 4 - 8 mmol/L before meals
< 10 mmol/L two hours after starting meals

Type 2 Diabetes

Target levels - 6 - 8 mmol/L before meals
6 - 10 mmol/L two hours after starting meals

Administering Insulin

Support workers can assist with giving insulin only if Australian Quality Care's Registered Nurse is satisfied the care can be competently managed by support workers and provides:

- the required education to attain the appropriate competency levels
- training on actions to be taken in emergency management of hyperglycaemia and hypoglycaemia
- skills evaluation
- current understanding of policy and procedure requirements
- A *Subcutaneous Injection Support Plan* addressing the specific needs of the individual

Support workers must successfully complete a course in the knowledge and skills to safely administer insulin and be competent and experienced to support the participant to have the insulin.

Consent must be obtained prior to administering insulin.

The support worker must not work outside their area of expertise and never administer insulin if not properly trained and/or completed a course to do so.

Support workers are able to monitor glucose levels and give insulin or other diabetes medication for participants with stable diabetes as a delegated task.

A Registered Nurse (RN) must monitor glucose levels and give insulin if a participant has unstable diabetes and or complex disability needs.

Storage

Insulin must be stored in the fridge not freezer.

General Guidelines for Administering Insulin

Check the medication administration records for the prescribed insulin regime to be given.

Before administering insulin:

1. Wash your hands
2. Put on gloves
3. Clean the injection site with an alcohol swab

Administering:

The insulin needs to go into the fat layer under the skin.

1. Pinch the skin and put the needle in at 45° angle
2. If skin tissue is thicker – inject straight up and down 90° angle
3. Push the needle all the way into the skin

4. Leave the syringe in place for 5 seconds after injecting
5. Dispose of the needle into the Sharps container
6. Do **not** inject insulin in the same place on the body each time

Document Control

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