### Definitions

**Insulin-deficient patient**: Patients requiring insulin therapy including type 1 diabetics, type 2 diabetics on insulin for more than 5yrs or using greater than 50 units per day, history of diabetic ketoacidosis or those with a pancreatectomy

- **Type 1 diabetes**: A disease in which the pancreas does not produce insulin.
- **Type 2 diabetes**: A disease in which the pancreas does not produce enough insulin or the body does not properly use the insulin it makes (resistance) or both.

**Point of Care Testing (POCT)**: Any diagnostic laboratory test that occurs within a facility but outside the physical space of the laboratory.

**Bedside Glucose Monitoring (BGM)**: Blood sample is obtained from the patient and measured immediately at the point of care.

**Note**: Target glucose range
- for most in-patients this will be 5-10 mmol/L (non-critically ill);
- for the frail elderly/dependent 7-14 mmol/L;
- for critically-ill patients this will be individualized but will generally be 7-10 mmol/L.

**Frail Elderly/Dependent**: Persons who have multiple chronic illnesses and associated vulnerabilities such as dementia, functional decline, and geriatric syndrome including falls, impaired mobility and polypharmacy.

**Glucagon**: A naturally occurring hormone made in the pancreas. It is also available as an injectable hormone that raises blood glucose levels by stimulating the liver to release stored glucose.

**Basal insulin**: Insulin used to replace the background insulin the body makes naturally
- Maintains normal blood glucose range, covering the rise in blood glucose between meals and overnight due to glucose production by the liver.
- Long-acting or intermediate acting insulin given once or twice daily (typically every morning & at bedtime).
- Basal doses are still given if the patient is NPO, but may need a reduction in dose.
- Insulin deficient patients must always have basal insulin; they should never receive only correction insulin.

**Prandial (bolus) insulin**: Insulin used to replace natural mealtime insulin to cover rise in blood glucose due to carbohydrate intake.
• Scheduled short-acting or rapid insulin given prior to or with meals, in anticipation of the spike in blood glucose due to ingestion of carbohydrates by eating or tube feed boluses.
• It is also given when patients are receiving bolus enteral feeds or parenteral nutrition. This dose is given even when their blood glucose level is in normal range.
• Prandial insulin doses should be held if the patient is NPO, has minimal or no food intake or receiving continuous enteral feeds.
• Usually half of total daily insulin.

Correction insulin: small adjustments of short-acting insulin given at meals when pre-prandial blood glucose levels are above target range.

- May also be given alone as a supplemental insulin in patients not eating. May also be used a dose-finding strategy in a patient who is not insulin deficient.
- Used q6h if NPO or on parenteral nutrition to achieve target blood glucose range while establishing optimal daily basal insulin doses for patient.
- **Dosing is dependent on patient’s total daily insulin dose and insulin sensitivity** (obese patients with type 2 diabetes tend to be more insulin resistant).
- May initially be used as sole insulin order in patients with type 2 diabetes not previously on insulin; after 48 hours should add basal and prandial insulin if consistently needing correction insulin doses greater than 8 units/day.
- It is important that the insulin product used for the correction dose is the same as that used for the prandial dose.
- The prandial and correction doses should be combined so that patients receive only one injection.

Pre-prandial: one half hour prior to meals and evening snack.

**Total Daily Insulin Dose**: sum of all insulins used in 24 hours. It depends largely on a person’s body weight and insulin sensitivity (people with type 1 diabetes are more sensitive to insulin than people with type 2 diabetes). It is made up of **basal** insulin (approximately ½ of the total daily insulin dose) and **prandial** insulin if eating (approximately ½ of the total daily insulin dose divided equally among 3 meals)

1. **PURPOSE**

1.1 To safely administer insulin to adult patients according to the current Diabetes Canada Clinical Practice Guidelines.

1.2 To optimize glycemic control.

1.3 To ensure appropriate documentation of insulin administration and BGM.

2. **POLICY**

2.1 A registered or licensed nurse will administer insulin as ordered.

**Note**: Preparation & administration guidelines will be followed as per resource textbook Nursing Interventions and Clinical Skills by Elkin, Perry and Potter. Refer to Insulin Administration with Insulin Pens and BD Autoshield Duo (Appendix A, Work Standards for Acute Care Urban and Long Term Care (Appendix B) and Work Standard for Acute Care Rural (Appendix C)

2.2 All insulin will be independently double-checked as per High Alert Medication Region-Wide policy.

2.3 To initiate the subcutaneous insulin protocol the practitioner will utilize one of two order sets based on the patient’s insulin needs. (See Appendices D and E).

**Note**: These order sets are for subcutaneous insulin administration.

2.4 Insulin order sets shall be reviewed daily by the practitioner.

**Note**: Changes to insulin orders require a new order set to be completed by the practitioner.
2.5 Insulin vials must be refrigerated.

2.6 Bedside Glucose Monitoring (BGM) will be used to monitor glucose levels routinely. Refer to Bedside Glucose Monitoring Policy #1150

2.7 If accuracy of BGM reading is in question or does not correlate with clinical presentation, a lab specimen will be sent to confirm result.

2.8 A BGM result of less than 3 mmol/L (or altered consciousness) or greater than 20 mmol/L will be reported to the Practitioner. (See Appendix F – Bedside Glucose Monitoring (BGM) & Insulin Administration Record/Adult Hypoglycemia Protocol Form # 103616)

3. **PROCEDURE**

3.1 The Practitioner

3.1.1 Completes the appropriate Insulin order set.

3.1.2 Reviews BGM records and Insulin orders daily.

3.2 The Registered or Licensed Nurse

3.2.1 Obtains BGM Pre-prandial unless otherwise ordered or indicated. Pre-Prandial BGM’s must be performed within 30 min of the insulin being administered.

3.2.2 Prepares the insulin dose using an insulin pen. If an insulin vial is required or indicated, dates a new vial when it is first accessed. Then prepares the insulin and labels the syringe with the patient name and insulin dosages.

    **Note:** Discard the vial one month after the vial was accessed.

3.2.3 Administers the insulin as per the original practitioner’s order. Refer to Appendix A regarding administration of Insulin pens.

    **Note:** To ensure medication safety practices, copies of the order sets are not to be placed in the medication administration record binder.

3.2.4 Reviews BGM / serum glucose levels as ordered.

3.3 **Documentation**:

3.3.1 Record BGM result and insulin dosage on the Blood Glucose Monitoring (BGM) & Insulin Administration Record. (See Appendix G – Bedside Glucose Monitoring (BGM) & Insulin Administration Record/Adult Hypoglycemia Protocol Form # 103616)

3.3.2 Keep Blood Glucose Monitoring (BGM) and Insulin Administration Records in the Clinical Data Base section of the chart.

    **Note:** Blood glucose readings need to be readily accessible to practitioners to ensure change in glucose levels are assessed regularly and timely adjustments to insulin therapy are made.

3.3.3 Record exact time insulin administered and location of administration site on the medication administration record.

3.3.4 The DISCONTINUED SECTION at the bottom of the insulin order sets is to identify when the order set has been discontinued. The date that the order set is discontinued should be written on the line on the bottom. There is no signature so it is not an order and either the practitioner or the
4. **REFERENCES**


Umpierrez GE et al. Randomized study of basal-bolus insulin therapy in the inpatient management of patients with type 2 diabetes (RABBIT2 Trial). Diabetes Care. 2007;30(9): 2181-2186.

5. **RELATED POLICIES**

**SHR Nursing Policy & Procedure Manual**
- Bedside Glucose Monitoring #1150
- Medications – Multidose Vials #1068
- Medication Administration # 1170

**SHR Region-Wide Policy & Procedures Manual**
- High-Alert Medications-Identification, Double Check & Labeling #7311-60-020
- Ordering of Medications # 7311-60-004
INSULIN ADMINISTRATION WITH INSULIN PEN AND BD AUTOSHIELD DUO™

1. **Check** original insulin order and MAR. **ONE PERSON, ONE PEN**
   - Check two client identifiers. Check the insulin for client’s name, expiry date, and type.

2. **Prepare the pen.**
   - Remove the cap from the insulin pen and set aside.
   - NPH and premixed insulin (cloudy); **roll 10 times and tip 10 times** to ensure insulin is properly mixed, and visually check that the insulin has a consistent milky appearance.
   - Wipe the rubber seal with an alcohol swab for 15 seconds.
   - Remove the tab from the BD Autoshield Duo™ and apply the needle straight on. Screw the needle (clockwise) onto the pen until you meet resistance.
   - Pull off the outer cover and set aside or discard.

3. **Prime the pen** by dialling to ‘2’. **PRIME EVERY TIME.**
   - Hold the pen upright (needle up)and push the bottom end (plunger) to expel any air. You should see several drops or a stream of insulin come from the end of the needle. If no insulin drops/stream is seen, repeat the process.
   - Shake off the pen needle to remove residual insulin.

4. **Dial the correct dosage.** Obtain independent double check of the dose dialled. **PRIME EVERY TIME.**
   - The pen will not allow you to dial more units than is left in the pen. In acute care settings, if the dose is greater than the amount remaining, obtain a new pen to deliver the full dose.
   - If the ordered dose of intermediate –acting insulin (Humulin N, Novolin NPH) or short-acting insulin (Humulin R, NovolinToronto) is greater than 50 units, the dose should be divided into 2 separate injection sites.
   - If the ordered dose of an insulin analogue (glargine, detemir, lispro, aspart) is greater than the amount that can be dialled up on the pen, the dose should be divided into 2 separate injection sites.

5. **Prepare to inject.**
   - Pick the injection site, which is free of lumps, bumps, and scars (the abdomen, outer thigh, upper arm, upper buttock).
   - Stabilize or lift up the skin, if necessary; fingers should be no less than one inch apart. Grip the pen in the **palm of your hand** and keep your **thumb up.**

6. **Poke.** Insert the needle into the skin at a **90° angle** until the clear shield retracts and the white shield is flush to the patient’s skin. Then, **push** the end of the pen (plunger) with your thumb maintaining constant pressure until it stops. **DO NOT LIFT THE PEN UP BEFORE THE INJECTION IS COMPLETE.**

7. **Pause.** Count **slowly up to 10 seconds** to ensure the full dose is given. Large insulin dose may require longer.

8. **Pull** the pen away from the skin. Visualize the insulin window to ensure the dial is at zero confirming all insulin was delivered. Do not rub or massage the injection site.

   → SAFETY SHIELD HAS NOW LOCKED IN PLACE. A **RED** indicator band will appear to confirm this.

9. **Remove the needle** from the pen by turning it counter clockwise. Do not place your fingers on either end of the pen needle shields. Dispose of the used pen needle in the sharps container. Recap the insulin pen.

10. **Document on the Medication Administration Record (MAR).**

11. **Clean.** Wipe the pen with the appropriate germicidal wipe and store the pen in the patient’s medication drawer.
WORK STANDARD

Title: Subcutaneous Insulin Management in Saskatoon Acute Care & Long Term Care (LTC) Settings in Saskatoon & Surrounding Area - Adult

Role performing Activity: Pharmacy & Nursing

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<thead>
<tr>
<th>Location:</th>
<th>Department/Unit:</th>
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Document Owner: Pharmacy
Date Prepared: 18/04/2019
Last Revision: Date Approved:

Related Policies/Documentation
Insulin Administration – Subcutaneous – Adult #1079

Work Standard Summary:
For the purpose of this work standard, client will be used when referring to patients and residents.

This work standard outlines the provision and use of subcutaneous insulin to ensure delivery of safe and effective care for staff and adult clients.

### Essential Tasks:

#### 1. General
- Subcutaneous insulin will be administered primarily via insulin pen.
  - Every client prescribed subcutaneous insulin will receive a **client-specific** insulin pen for each type of insulin prescribed.
  - **Safety Alert:** ONE PERSON, ONE PEN – Insulin pens are designed for individual use only and must NEVER be shared; cross-contamination occurs if the same insulin pen is used between clients increasing the risk of exposure to blood-borne pathogens even if a new pen needle is used.
- In select acute care areas (i.e. short-stay areas where clients may only receive one or two doses), subcutaneous insulin will be administered from an insulin vial via syringe.
- Intravenous (IV) insulin will be administered from an insulin vial via syringe.

**Insulin is a high alert medication and requires an independent double check (or double check in LTC when working alone) with every dose.**

#### 2. Ordering and receiving insulin from pharmacy
- Insulin pens are dispensed by pharmacy with a **client-specific** label and additional safety (auxiliary) labels (see Labelling).
- Insulin vials will be supplied as ward stock in client care areas where occasional intermittent doses are required or IV infusions are mixed (i.e. Emergency department, critical care areas, observation units, operating room, short-stay areas, and some LTC respite residents). In all other areas, when insulin is required for IV purposes, **client-specific** insulin vials will be dispensed. If this medication is required STAT, please follow your site specific protocol for obtaining an insulin vial from pharmacy.

**Acute Care**
- Prefilled (disposable) insulin pens are provided by pharmacy in most cases. When a disposable pen is not available, a refillable pen will be loaded with the insulin cartridge by pharmacy. Regardless of the type of pen dispensed from pharmacy, treat both as a disposable pen.
  - **DISCARD** pen when empty, expired, or if client is no longer using insulin type (see Disposal).
After hours dispensing of insulin
- Insulin pens and vials will be stocked in the night cupboard fridge.
- Auxiliary labels will be affixed by pharmacy to the insulin pens and vials (see Labelling).
- When an insulin pen is obtained, nursing will affix a client label to barrel of pen, indicate discard date of 28 days and apply clear tape overtop of insulin pen labels to maintain integrity of labels with cleaning. Pharmacy will follow up and verify discard date indicated on label.

Long Term Care
- Please follow site specific protocol for obtaining insulin pens/cartridges from pharmacy.
- For refillable insulin pens, replace cartridge when empty or expired. The old cartridge is disposed of and a new cartridge of same insulin type is loaded. The pen is kept and reused for same resident once new cartridge is inserted.

3. Labelling

Acute Care

Insulin pens
- Pharmacy will affix client-specific label to barrel of pen (not pen lid) without obstructing information on cartridge or dose window.
- Auxiliary labels:
  - ‘Discard Date’ – pharmacy will affix label to pen barrel and fill in discard date of 28 days from dispensing.
  - ‘One Person, One Pen’ and ‘High Alert’ – pharmacy will affix these labels to pen lid.
- Pharmacy will apply clear tape overtop of insulin pen labels to maintain integrity of label with cleaning.

Insulin vials client-specific
- Pharmacy will affix client-specific label and auxiliary labels to vial without obstructing product name.
- Auxiliary labels:
  - ‘Discard Date’ – pharmacy will affix label to vial and fill in discard date of 28 days from dispensing.
  - ‘High Alert’ – pharmacy will affix label to bottom of vial.

Long Term Care
- LTC nurses must ensure that insulin pens are labelled with respective resident identifier information before each use. The resident identifier label must be affixed to pen barrel (not pen lid) without obstructing information on cartridge or dose window.
- Always document the date insulin pen is first opened or cartridge replaced using ‘Date Opened’ or ‘Discard Date’ labels. Follow site specific protocol for labelling date.

4. Provision of insulin supplies

Acute Care
- Safety engineered pen needles are supplied by Materials Management. In the case of a backorder, contact Materials Management for alternatives.
- Insulin syringes are supplied by Materials Management and are used to withdraw insulin from vials only.

Long Term Care
- The LTC home provides safety engineered needles and residents are not billed for needles.
DO NOT use Tuberculin syringes for insulin administration.

5. **Storing**
   **Acute Care**
   - **Insulin pens/vials client-specific**
     - Stored in pharmacy fridge until dispensed to specific client.
     - Pharmacy delivers client-specific insulin pens/vials to unit’s drop off bin.
     - After first use, DO NOT return to medication fridge. Store at room temperature in client-specific location (i.e. bin, drawer) on nursing unit. Return to client-specific location after each use. DO NOT store in client’s room.
     - Store insulin syringes and insulin pen needles in easily accessible location on nursing unit.
   - **Insulin vials ward stock**
     - Stored in select nursing unit’s medication fridge until first use. Once opened, indicate discard date of 28 days on auxiliary label and store vial at room temperature. DO NOT return to fridge.
   **Long Term Care**
   - Pharmacy dispenses 1 box of resident-specific insulin cartridges and/or prefilled pens at a time to LTC home.
   - All unused cartridges and/or prefilled pens are placed in medication fridge except the ones in use.
   - After first use, DO NOT return to medication fridge. Store at room temperature in resident-specific location (i.e. bin, drawer). Return to resident-specific location after each use. DO NOT store in resident’s room.

6. **Medication Administration Record (MAR) notes**
   **Insulin pens – Acute Care**
   “For subcutaneous use only. DO NOT use for withdrawing doses or IV administration. Keep in patient drawer.”

7. **Administration**
   **Insulin pens**
   - Always refer to ‘Discard Date’ or ‘Date Opened’ labels before each use.
   - Health professionals will use safety engineered pen needles.
   - DO NOT withdraw insulin from pen cartridge using a syringe and needle.
   - All health professionals will use appropriate administration technique for insulin pens, including mixing of suspensions (roll 10 times & tip 10 times), priming insulin pen prior to administration and holding pen against skin for recommended time after injection (at least 10 seconds).
   - In acute care, if there is not enough remaining insulin in pen for next insulin dose, discard pen and obtain a replacement pen from pharmacy.
   - If ordered dose of intermediate-acting insulin (HumuLIN N, NovoLIN NPH) or short-acting insulin (HumuLIN R, NovoLINToronto) is greater than 50 units, the dose should be divided into 2 separate injection sites. If ordered dose of an insulin analogue (glargine, detemir, lispro, aspart) is greater than the amount that can be dialed up on the pen, the dose should be divided into 2 separate injection sites. An independent double check (or double check in LTC) is required with every dose.
   - Remove pen needle from pen device after injection and safely dispose in sharps container.
   - Clean pens after each use using a facility approved disinfectant wipe (i.e. Accel Intervention wipes for most clients including those with Methicillin-resistant Staphylococcus aureus (MRSA), Vancomycin-resistant Enterococci (VRE), and Extended-spectrum beta-lactamases (ESBL) bacteria; clients with Clostridium difficile
require Clorox bleach wipes to clean pens).

- If a needle stick injury occurs to health care professional, follow site specific protocol for first aid and incident reporting, discard pen and obtain a replacement pen from pharmacy.

All insulin
Refer to Forum for Injection Technique (FIT) recommendations at:

Self-administration of insulin - Acute Care
- All clients who are proficient in using insulin pens and who have the cognitive reasoning ability should be encouraged to continue to self-administer insulin while in hospital. Clients are to use their own supply of regular pen needles (non-safety engineered) and dispose of needles immediately following use into a sharps container. Contact diabetic educator for additional non-safety engineered needles if needed.

8. Disposal

Acute Care
- Dispose of pen needles, prefilled pens, refillable pen device with insulin cartridge, syringes, and insulin vials into sharps container.
- Refer to ‘Discard Date’ indicated on auxiliary label and discard after 28 days.

Long Term Care
- Dispose of needles and empty or expired cartridges from refillable pens into sharps container. For prefilled (disposable) insulin pens, discard entire pen when empty or expired.
- Refer to ‘Discard Date’ or ‘Date Opened’ labels and discard after empty or expired.

9. Discharge/Transfer
- Send insulin pen with client on discharge or transfer if same insulin type prescribed.

References


University Health Network and Hamilton Health Sciences. An insulin pen implementation toolkit. August
## Work Standard

**Title:** Subcutaneous Insulin Management in Rural Acute Care Settings in the former SktnHR - Adult  
**Role performing Activity:** Pharmacy & Nursing  
**Location:** HDHC, Lanigan, Wadena, Watrous, Wynyard, Rosthern  
**Department/Unit:** Acute Care  
**Document Owner:** Pharmacy  
**Date Prepared:** April 9, 2019  
**Last Revision:**  
**Date Approved:** May 1, 2019  
**Related Policies/Documentation**  
Insulin Administration – Subcutaneous – Adult #1079

### Work Standard Summary:
This work standard outlines the provision and use of insulin to ensure delivery of safe and effective care for staff and adult clients.

### Essential Tasks:

#### 1. General Information
- Subcutaneous insulin will be administered primarily via insulin pen.  
  - Every client prescribed subcutaneous insulin will receive a client-specific insulin pen for each type of insulin prescribed.  
  - **Safety Alert: ONE PEN, ONE PERSON** – Insulin pens are designed for individual use only and must never be shared; cross-contamination occurs if the same insulin pen is used between clients increasing the risk of exposure of blood-borne pathogens even if a new pen needle is used.  
- In select client care areas (i.e. short-stay areas where clients may only receive one or two doses), subcutaneous insulin will be administered from an insulin vial via syringe. Intravenous (IV) insulin and insulin pumps will be prepared from an insulin vial.  
- **Insulin is a high alert medication and requires an independent double check with every dose.**

#### 2. Ordering and receiving insulin from pharmacy (including after-hours dispensing of insulin)
- Insulin pens are ordered and dispensed by HDHC pharmacy with safety labels affixed (see Labelling). The pens are to be stored in your site’s ward stock medication fridge.  
- **In-Patient Unit at HDHC,** during HDHC pharmacy hours, insulin pens will be dispensed with a client-specific label and safety labels affixed by pharmacy. Nursing will be required to fill in the discard date of 28 days on the appropriate auxiliary label.  
- When an insulin pen is obtained for client use, nursing will affix a client addressograph label to the barrel of the pen (not pen lid) without obstructing information on the cartridge or dose window. Fill in the discard date of 28 days on the appropriate auxiliary label affixed by pharmacy and apply clear tape overtop of insulin pen labels. This applies to the In-Patient Unit at HDHC for when HDHC pharmacy is closed.  
- Prefilled (disposable) insulin pens are provided by pharmacy in most cases. When a disposable pen is not available, a refillable pen will be loaded with the appropriate insulin cartridge. Regardless of the type of pen dispensed (refillable or prefilled) from pharmacy, treat both as a disposable pen.  
- To obtain a replacement pen, please take from your ward stock medication fridge or order from HDHC pharmacy if needed.
<table>
<thead>
<tr>
<th>Policies &amp; Procedures: Insulin Administration- Subcutaneous - Adult</th>
<th>I.D. # 1079</th>
</tr>
</thead>
</table>
| • Insulin vials will be supplied as ward stock in client care areas where occasional intermittent doses are required or IV infusions are mixed (i.e. Emergency department).  
• Contact HDHC pharmacist for non-formulary products or unavailable insulin. |  |
| 3. Labelling Insulin pens client-specific and Insulin Vials | • Nursing will affix a client addressograph label to barrel of pen (not pen lid) without obstructing information on cartridge or dose window and apply clear tape overtop.  
• Auxiliary labels for insulin pens:  
  o ‘Discard Date’ – pharmacy will affix label to pen barrel and nursing will be required to fill in discard date of 28 days from opening.  
  o ‘One Person, One Pen’ and ‘High Alert’ – pharmacy will affix these labels to pen lid and apply clear tape overtop of auxiliary labels to maintain integrity of labels with cleaning.  
• Auxiliary labels for insulin vials:  
  o ‘Discard Date’ - pharmacy will affix label to vial and nursing will fill in discard date of 28 days with opening and first access.  
  o ‘High Alert’ – pharmacy will affix label to bottom of vial |  |
| 4. Provision of insulin supplies | • Safety engineered pen needles (SKU #214820) are supplied by Materials Management. In the case of a backorder, contact Materials Management for alternatives.  
• Insulin syringes are supplied by Materials Management and are used to withdraw insulin from vials only. DO NOT use Tuberculin syringes for insulin administration. |  |
| 5. Storage | • Insulin pens client-specific:  
  o Insulin pens are stored in ward stock medication fridge until opened and client addressograph label is affixed to the barrel of the pen by nursing. After first use, DO NOT return to medication fridge. Store at room temperature in client-specific location (i.e. bin, drawer) on nursing unit. Return to client-specific location after each use. DO NOT store in client’s room. Store insulin syringes and insulin pen needles in easily accessible location on nursing unit.  
• Insulin vials ward stock  
  o Stored in medication ward stock fridge until first use. Once opened, indicate discard date of 28 days on auxiliary label, return and store vial in medication ward stock fridge. |  |
| 6. Documentation | • Record insulin dosage and BGM on the Blood Glucose Monitoring (BGM) and Insulin Administration Record. DO NOT include insulin dose on the MAR. Continue transcribing insulin orders onto Medication Administration Record (MAR) as per current process. Record exact time insulin administered and location of the administration site on the MAR. Refer to former SHR nursing policy, Insulin Administration – Subcutaneous – Adult #1079. |  |
| 7. Administration | • Always refer to ‘Discard Date’ labels before each use.  
• Health professionals will use safety engineered needles.  
• An independent double check is required with every dose.  
• Insulin pens  
  o DO NOT withdraw insulin from the pen cartridge using a syringe and needle.  
  o All health professionals will use appropriate administration technique for insulin pens, including mixing of insulin (roll ten times and tip ten times to ensure properly mixed), priming insulin pen prior to administration (prime the pen by dialing to “2”, push the plunger to expel air and prime the needle. You should see several drops or a stream of insulin come from the end of the needle. If you do not see the insulin drops or stream, repeat the process. Shake off the pen needle to remove residual insulin) and holding the pen against the skin for the recommended time (at least 10 seconds) after injection. Refer to document: Insulin Administration With Insulin Pen and BD Autoshield Duo™.  
  o If there is not enough remaining insulin in pen for next insulin dose, discard pen and obtain a replacement pen from pharmacy. |  |
o If ordered dose of intermediate-acting insulin (Humulin N, NovoLIN NPH) or short-acting insulin (Humulin R, NovoLIN Toronto) is greater than 50 units, the dose should be divided into 2 separate injection sites. If ordered dose of an insulin analogue (glargine, detemir, lispro, aspart) is greater than the amount that can be dialed up on the pen, the dose should be divided into 2 separate injection sites. Remove pen needle from pen device after injection and safely dispose in sharps container.

o Clean pens after each use using a facility approved disinfectant wipe (i.e. Accel Intervention wipes for most clients including those with Methicillin-resistant Staphylococcus aureus (MRSA), Vancomycin-resistant Enterococci (VRE), and Extended Spectrum Beta-lactamase (ESBL) bacteria; clients with Clostridium difficile require Clorox bleach wipes to clean pens).

**All insulin:** Refer to Forum for Injection Technique (FIT) recommendations [http://www.fit4diabetes.com/canada-english/fit-recommendations/](http://www.fit4diabetes.com/canada-english/fit-recommendations/)

**Self-administration of insulin**

o All clients who are proficient in using insulin pens and who have the cognitive reasoning ability should be encouraged to continue to self-administer insulin while in hospital. Clients are to use their own supply of regular pen needles (non-safety engineered) and dispose of the needles immediately following use into a sharps container. For additional non-safety engineered needles, obtain from your site Diabetic Teach Kit or contact Rural Diabetic Nurse Educator.

8. **Disposal**

- Dispose of pen needles, prefilled pens, refillable pen device with insulin cartridge, syringes, and insulin vials into sharps container.
- Refer to ‘Discard Date’ indicated on auxiliary label and discard after 28 days.

9. **Discharge /Transfer**

- Send insulin pen with client on discharge or transfer if same insulin type prescribed.

10. **Related Policies/Documentation**

- [Bedside Glucose Monitoring #1150](#)
- [High-Alert Medications – Identification, Double Check & Labeling #7311-60-020](#)
- [Insulin Administration – Subcutaneous – Adult #1079](#)
- [Medication Administration #1170](#)
- [Medication Administration Record (MAR) #1091](#)
- [Ordering of Medications #7311-60-004](#)

10. **References**


ACUTE CARE ONLY  Subcutaneous Insulin Order Set
Adult Patient Eating, NPO, on Fluid Diet or receiving PN/EN Feeds

Discontinue All Previous Insulin Orders
(Do NOT use for insulin pump, DKA, ante/intra-partum, pediatrics)

☐ A1C date ordered ___________________________________________  Type of Diabetes:  ☐ Type 1  ☐ Type 2

Bedside Glucose Monitoring (BGM) [must check one]
☐ 4 times per day (before scheduled meals/feeds and at bedtime OR q8h if NPO or continuous PN/EN feeds) AND as needed for suspected hypoglycemia or clinical concern  ☐ Other ______________________________
☐ If blood glucose less than 4 mmol/L initiate Adult Hypoglycemia Protocol in Acute Care (on reverse of BGM and Insulin Administration Record)
☐ If blood glucose greater than 20 mmol/L call MD/NP

Scheduled Insulin (subcutaneous)  Calculated Total Daily Insulin (TDI) for this order _______ units [Instructions on reverse]

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<thead>
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<th>BASAL (1/2 TDI: Give once/day or divided dose twice/day)</th>
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<th>Supper OR Bedtime</th>
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<td>☐ insulin Humulin N (NPH)</td>
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<td>_______ units</td>
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<td>☐ insulin Lantus (Gliargine)</td>
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<td>☐ insulin Levemir (Detemir)</td>
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<th>PRANDIAL (1/2 TDI: Divided equally into 3 doses or by number of feeds)</th>
<th>Breakfast OR Feed time</th>
<th>Lunch OR Feed time</th>
<th>Supper OR Feed time</th>
<th>Feed time</th>
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</thead>
<tbody>
<tr>
<td>☐ insulin Humalog (Lispro) with meal</td>
<td>_______ units</td>
<td>_______ units</td>
<td>_______ units</td>
<td>_______ units</td>
</tr>
<tr>
<td>☐ Other rapid insulin _______ with meal</td>
<td>Patient adjusts</td>
<td>Patient adjusts</td>
<td>Patient adjusts</td>
<td></td>
</tr>
<tr>
<td>☐ insulin Humulin R (Regular) 30 minutes before meal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Correction Insulin (subcutaneous)  Give with Prandial insulin if eating/receiving feeds/PN OR alone if NPO  

Type: The same insulin as prandial OR Humalog (default product) if prandial insulin not ordered
Times: With/before meals or feeds OR q8h if NPO or continuous PN/EN (default times)

<table>
<thead>
<tr>
<th>Correction Insulin dose at bedtime is NOT routinely advised due to increased risk of hypoglycemia</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Blood Glucose (BGM) mmol/L</th>
<th>☐ Low Dose if TDI less than 40 units</th>
<th>☐ Moderate Dose if TDI 40 to 80 units</th>
<th>☐ High Dose if TDI more than 80 units</th>
<th>☐ Custom Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1 - 14</td>
<td>1 unit</td>
<td>2 units</td>
<td>4 units</td>
<td></td>
</tr>
<tr>
<td>14.1 - 18</td>
<td>3 units</td>
<td>5 units</td>
<td>8 units</td>
<td></td>
</tr>
<tr>
<td>18.1 - 20</td>
<td>4 units</td>
<td>7 units</td>
<td>12 units</td>
<td></td>
</tr>
<tr>
<td>Greater than 20</td>
<td>Call MD/NP</td>
<td>Call MD/NP</td>
<td>Call MD/NP</td>
<td>Call MD/NP</td>
</tr>
</tbody>
</table>

Any single change to these orders requires completion of new order set

Practitioner Printed Name  Practitioner Signature  Date/Time

□ DISCONTINUED date: ___________________
SUBCUTANEOUS INSULIN ORDER SET
ADULT PATIENT EATING, NPO, ON FLUID DIET OR RECEIVING PN/EN FEEDS

Guidelines for Basal Bolus* Insulin (BBI) Orders
*Bolus insulin is the same as prandial insulin – insulin given intermittently to cover the carbohydrate in meals/feeds

BBI Principles:

1. Determine TDI (total daily insulin = sum of all insulins used in 24 hours) – Use patient’s home dose OR Calculate:
   - 0.3 - 0.5 units/kg/day if T1DM, slim T2DM, elderly, CKD
   - 0.5 - 1 units/kg/day if overweight T2DM or on glucocorticoid
   (calculated TDI has lower risk of hypoglycemia in individuals with lower carbohydrate intake while in hospital compared to home diet)

2. Order Basal insulin – 50% of TDI

3. Order Prandial/Bolus insulin – 50% of TDI divided by 3 meals or number of feeds if eating/tube feeds

4. Hold Prandial insulin if NPO or minimal caloric intake

5. Order Correction insulin – dose determined by insulin sensitivity and therefore TDI; use scale on order set

6. Adjust insulin doses – every 1-3 days based on BGM

On Admission to Hospital

<table>
<thead>
<tr>
<th>Time of BGM</th>
<th>If BGM too LOW</th>
<th>If BGM too HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>↓ basal insulin at bedtime</td>
<td>↑ basal insulin at bedtime</td>
</tr>
<tr>
<td>Lunch</td>
<td>↓ prandial insulin at breakfast</td>
<td>↑ prandial insulin at breakfast</td>
</tr>
<tr>
<td>Supper</td>
<td>↓ prandial insulin at lunch</td>
<td>↑ prandial insulin at lunch</td>
</tr>
<tr>
<td>Bedtime</td>
<td>↓ prandial insulin at supper</td>
<td>↑ prandial insulin at supper</td>
</tr>
</tbody>
</table>

Other Practical Tips:
Reduced insulin requirements:
- Type 2 diabetes with prolonged NPO/reduced intake (carbohydrate intake drives insulin resistance).
- Decreasing renal function → hypoglycemia if insulin dose not reduced.
  - eGFR 30 - 45 mL/min → reduce to 50% of usual TDI
  - eGFR 15 - 29 mL/min → reduce to 70% of usual TDI
  - eGFR less than 15 mL/min or dialysis → reduce to 50% of usual TDI

Increased insulin requirements:
- Corticosteroid use
- Obesity
- Infection

Special situations:
Enteral feeds, total parenteral nutrition, corticosteroid use, gastroparesis – useful resource www.bbii.ca

What is the maximum amount of insulin per injection?
Intermediate-acting insulin (Humulin N, Novolin ge NPH) and short-acting insulin (Humulin R, Novolin ge Toronto) - onset of insulin action is delayed if a larger volume is injected at a single site. Therefore, doses greater than 50 units should be split into 2 injections given at different sites.

Long-acting insulin analogues (Lantus, Basaglar, Levemir, Toujeo and Tresiba) and rapid-acting insulin analogues (Apidra, Humalog and NovoRapid) - action profiles do not appear to be significantly affected by the volume of the injection. Therefore, the required dose is greater than the maximum dose allowed by the pen device (e.g. 80 units for Basaglar KwikPen) the dose should be split into 2 injections given at separate sites.

Reference: FIT Forum for Injection Technique in Canada 3rd Edition 2017
## Policies & Procedures: Insulin Administration - Subcutaneous - Adult

### Appendix E

#### Subcutaneous Insulin Order Set

**ACUTE CARE ONLY**  
Subcutaneous Insulin Order Set  
**Adult Patient Eating using Premix Insulin**

**Discontinue All Previous Insulin Orders**  
(Do NOT use for insulin pump, DKA, high intensity care, obstetrics, pediatrics)

- **A1C date ordered**
- **Type of Diabetes:**  
  - [ ] Type 1  
  - [ ] Type 2

**Bedside Glucose Monitoring (BGM) [must check one]**

- [ ] twice daily (before breakfast and supper)  
- [ ] before meals and at bedtime  
- [ ] other

- [ ] if blood glucose less than 4 mmol/L initiate Adult Hypoglycemia Protocol in Acute Care (on reverse of BGM and Insulin Administration Record).
- [ ] if blood glucose greater than 20 mmol/L call MD/NP

### Scheduled Insulin (subcutaneous)

**Calculated Total Daily Insulin (TDI) for this order**

- **units**  
  (Instructions on reverse)

#### Premixed Basal and Prandial Regular  
(give 30 mins before meals)

- [ ] insulin Humulin 30/70 (Regular 30% / NPH 70%)
- [ ] insulin NovoLinq 30/70 (Regular 30% / NPH 70%)

#### Premixed Basal and Prandial Analogue  
(give with meals)  
(patient must supply own insulin)

- [ ] insulin Humalog Mix 25 (Lispro 25% / Lispro Protamine 75%)
- [ ] insulin Humalog Mix 50 (Lispro 50% / Lispro Protamine 50%)
- [ ] insulin NovoMix 30 (Aspart 30% / Aspart protamine 70%)

#### Correction Insulin (subcutaneous)

**Give if BGM greater than 10 mmol/L**

- **Type of Insulin:** For correction, use the same short or rapid-acting insulin found in the premix.

- [ ] insulin Humulin R (Regular)
- [ ] insulin Humalog (Lispro)
- [ ] insulin NovoLinq Toronto (Regular)
- [ ] insulin NovoRapid (Aspart)

**Times to be used:**  
- [ ] before breakfast and supper ONLY  
- [ ] before meals ONLY  
- [ ] other

<table>
<thead>
<tr>
<th>Blood Glucose (BGM) mmol/L</th>
<th>Low Dose if TDI less than 40 units</th>
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<td>Call MD/NP</td>
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</tr>
</tbody>
</table>

**ANY SINGLE CHANGE TO THESE ORDERS REQUIRES COMPLETION OF NEW ORDER SET**

---

Practitioner Printed Name: ____________________  
Practitioner Signature: ____________________  
Date/Time: ____________________

Form #103606  
05/19  
Category: Orders

[ ] DISCONTINUED date: ________

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Page 15 of 18
SUBCUTANEOUS INSULIN ORDER SET
ADULT PATIENT EATING USING PREMIX INSULIN

GUIDELINES ON USE OF PREMIX INSULINS IN HOSPITAL

- Premix insulin is NOT the preferred choice in an acute care setting.
- Premix insulin cannot be easily adjusted resulting in increased risk of hypoglycemia or hyperglycemia.
- Consider converting to basal bolus/prandial regimen in patients who are acutely ill, NPO, receiving fluid diets or going for surgery.
- Premix insulins may be a reasonable choice of therapy in patients who are clinically stable and eat consistent amounts of carbohydrate at scheduled meal times with minimal variation in daily physical activity, for example living in a long term care facility.
- Premix insulin consists of a combination of short-acting (bolus) insulin and intermediate-acting insulin, with the numbers representing % short-acting/intermediate-acting. For example, Humulin 30/70 is 30% Humulin R and 70% Humulin N.

IF ORDERING PREMIX INSULIN:

1. Determine total daily dose of insulin (TDI) [see below or use the sum of all insulin used in 24 hour period if converting from basal bolus insulin (BBI) to premix insulin.]
2. Premix insulin is given twice daily at breakfast and supper times.
3. 50-70% of TDI is given at breakfast and 30-50% is given at supper time.
4. Do NOT give at bedtime, as increased risk of nocturnal hypoglycemia.
5. Correction insulin is ordered based on total daily dose of insulin.

IF CONVERTING FROM PREMIX INSULIN TO BASAL BOLUS INSULIN, add the two doses of premix insulin plus all the correction insulin used in 24 hours and use BBI principles outlined below.

WHAT IS THE MAXIMUM AMOUNT OF INSULIN PER INJECTION?

Intermediate-acting insulin (Humulin R, Novolin ge NPH) and short-acting insulin (Humulin R, Novolin ge Toronto) - onset of insulin action is delayed if a larger volume is injected at a single site. Therefore, doses greater than 50 units should be split into 2 injections given at separate sites. This also applies to Humulin 30/70 and Novolin 30/70.

Long-acting insulin analogues (Lantus, Basaglar, Levemir, Toujeo and Trebul) and rapid-acting insulin analogues (Apidra, Humalog and NovoRapid) – action profiles do not appear to be significantly affected by the volume of the injection. Therefore, if the required dose is greater than the maximum dose allowed by the pen device (e.g., 80 units for Basaglar KwikPen) the dose should be split into 2 injections given at separate sites. This also applies to Humalog mix and NovoMix insulins.


BBI PRINCIPLES:

1. Determine TDI (total daily insulin = sum of all insulins used in 24 hours) – use patient’s home dose OR calculate:
   - 0.3 – 0.5 units/kg/day if T1DM, slim T2DM, elderly, CKD
   - 0.5 – 1 units/kg/day if overweight T2DM or on glucocorticoid
   [calculated TDI has lower risk of hypoglycemia with reduced carbohydrate intake while in hospital]
2. Order Basal insulin – 50% of TDI
3. Order Prandial/Bolus insulin – 50% of TDI divided by 3 meals or number of feeds if eating/tube feeds
4. Hold Prandial insulin if NPO or minimal caloric intake
5. Order Correction insulin – dose determined by insulin sensitivity and therefore TDI, use scale on order set
6. Adjust insulin doses – every 1-3 days based on BGM

ADJUSTMENT OF SCHEDULED INSULINS

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>If BGM too LOW</th>
<th>If BGM too HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>↓ basal insulin at bedtime</td>
<td>↑ basal insulin at bedtime</td>
</tr>
<tr>
<td>Lunch</td>
<td>↓ prandial insulin at breakfast</td>
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OTHER PRACTICAL TIPS:

REDUCED INSULIN REQUIREMENTS:
- Type 2 diabetes with prolonged NPO/reduced intake (carbohydrate intake drives insulin resistance)
- Decreasing renal function — hypoglycemia if insulin dose not reduced eGFR 30 – 45 mL/min – reduce to 80% of usual TDI eGFR 15 – 29 mL/min – reduce to 70% of usual TDI eGFR less than 15 mL/min or dialysis – reduce to 50% of usual TDI

INCREASED INSULIN REQUIREMENTS:
- Corticosteroid use
- Obesity
- Infection

SPECIAL SITUATIONS:
- Enteral feeds, total parenteral nutrition, corticosteroid use, gastroparesis — useful resource www.bbbi.ca
BEDSIDE GLUCOSE MONITORING (BGM) AND INSULIN ADMINISTRATION RECORD/ADULT HYPOGLYCEMIA PROTOCOL

Appendix F

Page 2 of 2

Obtain a MD/NP order to follow this protocol if patient is NOT on insulin

Blood glucose ≤ 4 mmol/L

Treat patient with or without symptoms

If patient has symptoms and BGM (Bedside Glucose Monitoring) not possible, TREAT first, check blood glucose AFTER

Conscious/Able to Swallow/Tube Fed

Oral Treatment

1-a. Give 15 g of fast-acting carbohydrate, choose one of:
   - 4 glucose 4 g chewable tablets, OR
   - 2 sugar packets or 3 teaspoon sugar dissolved in water, OR
   - 1/4 cup (175 mL) apple juice, OR
   - 3 teaspoon honey
   - For tube feeds use sugar water or juice; flush with water pre and post
   - For dysphagia patients use honey
   - Patients on anabolic agents (oral diabetic drug) use glucose tablets or honey

Observe patient taking treatment

1-b. Check BGM in 15 minutes

1-c. Check BGM in 15 minutes

If remains ≤ 4 mmol/L and/or patient remains asymptomatic after 2 treatments with oral carbohydrate

Proceed to step 2-a OR step 2-b if no IV access

STAT laboratory glucose

Notify MD/NP

Altered Consciousness/Not Able to Swallow/IVPO

Check Circulation, Airway, Breathing

Establish or use large IV vein access (central line or antecubital)

Attempt to establish IV access for 1-2 minutes if unconscious or having seizure
give glucagon first, then attempt IV access

IV Treatment

2-a. Administer 50 mL of 50% dextrose IV over 1-2 minutes

Notify MD/NP STAT if altered level of consciousness

2-a-b. Check BGM in 15 minutes

If ≤ 4 mmol/L, not able to swallow/alter consciousness—repeat step 2-a

If ≤ 4 mmol/L and conscious/able to swallow/tube feed—give oral treatment step 1-a

IM/Subcutaneous Treatment

2-a-c. Administer glucagon 3 mg subcutaneous or IM deltoid or anterior thigh (turn patient on side as may cause emesis)

Notify MD/NP STAT

Start IV line IV STAT

2-b. Check BGM in 15 minutes

If ≤ 4 mmol/L, not able to swallow/alter consciousness—No IV access repeat step 2b-a

IV access follow step 2a-a

If ≤ 4 mmol/L and conscious/able to swallow/tube feed—give oral treatment step 1-a

2-c. Check BGM in 15 minutes

If ≤ 4 mmol/L

STAT laboratory glucose

Call MD/NP for further treatment

If hypoglycemia occurs with blood glucose less than 3 mmol/L OR altered consciousness, MD/NP must be contacted to review insulin orders BEFORE administration of next insulin dose

When blood glucose ≤ 4 mmol/L or greater:

• Patient able to eat/tube feed:
  • If more than 1 hour away, give meal OR tube feed
  • If more than 1 hour to next meal, give snack of approximately 15 grams of protein plus 15 grams carbohydrate** OR give 100 mL of ordered tube feed formula

• Patient NOT able to eat:
  • IV D10W at 150 mL for 1 hour and obtain orders from MD/NP for further management and IV rate if renal/cardiac patient
  • Redo BGM in 1 hour to ensure glucose remains above 4 mmol/L

**Suggested Snack Options:

Carbohydrate choices: 1 slice bread or 2 cookies or 6 soda crackers
Protein choices: 1 package (15 mL) peanut butter or 1 package (30 g) cheese
1 container (115g/142g) in sure or boost pudding – for dysphagia patients

Form #1035.15 (Saskatoon Area) 05/2019 Category: Flow Sheets
## Appendix G

### Saskatchewan Health Authority

**Patient Label**
- NAME: ________________________
- HSN: ________________________
- D.O.B.: ________________________

**BEDSIDE GLUCOSE MONITORING (BGM) AND INSULIN ADMINISTRATION RECORD/ADULT HYPOGLYCEMIA PROTOCOL**

Page 1 of 2

See reverse for Adult Hypoglycemia Protocol.

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>BGM (mmol/L)</th>
<th>Insulin/Dosage (Units) Document time on the MAR</th>
<th>Intervention/ Concern</th>
<th>Initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basal:</td>
<td>Prandial:</td>
<td>Premix:</td>
<td>Correction: Intraavenous (units/hour)</td>
<td>Minimal or no food intake</td>
<td>See nurses notes</td>
</tr>
<tr>
<td>Basal:</td>
<td>Prandial:</td>
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Form #103616 (Saskatoon Area) 05/2019 Category: Flow Sheets