Definitions

**Insulin-deficient patient:** Patients requiring insulin therapy including type 1 diabetics, type 2 diabetics on insulin for more than 5 yrs 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 (approximately ½ of the total daily insulin dose divided equally amongst 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 4 mmol/l or greater than 22 mmol/l will be reported to the practitioner. (See Appendix F - Adult Hypoglycemia Protocol in Acute Care 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 preprandial unless otherwise ordered or indicated.

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)

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 made.

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


Umpierrez GE et al. Randomized study of basal-bolus insulin therapy in the inpatient management of patients with type 2 diabetes (RABBIT 2 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 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, 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. **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: http://www.fit4diabetes.com/canada-english/fit-recommendations/

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
Policies & Procedures: Insulin Administration- Subcutaneous - Adult

Appendix C

Title: Subcutaneous Insulin Management in Rural Acute Care Settings in the former SktnHR - Adult

Role performing Activity: Pharmacy & Nursing

WORK STANDARD

Location: HDHC, Lanigan, Wadena, Watrous, Wynyard, Rosthern

Department/Unit: Acute Care

Document Owner: Pharmacy

Date Prepared: April 9, 2019

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.
     o Every client prescribed subcutaneous insulin will receive a client-specific insulin pen for each type of insulin prescribed.
     o 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.
Policies & Procedures: Insulin Administration- Subcutaneous - Adult

3. Labelling Insulin pens client-specific and Insulin Vials
   - 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.
   - 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 overttop.
   - 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 overttop 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**
  - 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


Subcutaneous Insulin Order Set

**ACUTE CARE ONLY**

Adult Patient Eating, NPO, on Fluid Diet or receiving PN/EN Feeds

*Do not use if ordering Premix Insulin*

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

- Patient weight _____ kg
- A1C ordered on admission

**Type of Diabetes:**
- [ ] Type 1
- [ ] Type 2 on oral agents only
- [ ] Type 2 on insulin

**Bedside Glucose Monitoring (BGM):**
- [ ] before meals/feeds and at bedtime
- [ ] q4h
- [ ] q6h
- [ ] other ______

- If blood glucose less than 4 mmol/L, or less than 5 mmol/L in the frail/dependant patient, initiate Adult Hypoglycemia Protocol (on reverse of BGM-Insulin Administration record)
- If blood glucose greater than 22 mmol/L call MD

### Scheduled Insulin (subcutaneous) (dosing guidelines on reverse)

<table>
<thead>
<tr>
<th>BASAL</th>
<th>Intermediate or Long-acting</th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Supper OR Bedtime</th>
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<tr>
<td>[ ]</td>
<td>Insulin NPH (Humulin N)</td>
<td>_____ units</td>
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<td>_______ units</td>
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<td>[ ]</td>
<td>Insulin NPH (NovoLIN ge NPH)</td>
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**PRANDIAL** Short or Rapid-acting

<table>
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<th>Supper</th>
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<th>Give with meal</th>
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<tbody>
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<td>[ ] Insulin Regular (Humulin R)</td>
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<td>_____ units</td>
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<td>[ ] Insulin Regular (NovoLIN Toronto)</td>
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<tr>
<td>[ ] Insulin Lispro (Humalog)</td>
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</table>

- Patient adjusts own dose; reports to nurse. Order insulin type above
- Prandial insulin not required

**Correction Insulin (subcutaneous)** (dosing guidelines on reverse)

| Type of insulin: [ ] Same insulin selected for prandial insulin | [ ] Or ____________________________ |
| Times to be used: [ ] before meals/feeds ONLY | [ ] q4h | [ ] q6h | [ ] bedtime |

**Blood Glucose (BGM) mmol/L**

<table>
<thead>
<tr>
<th>Blood Glucose (BGM) mmol/L</th>
<th>Low Dose if TDI less than 60 units</th>
<th>Moderate Dose if TDI 60 to 100 units</th>
<th>High Dose if TDI more than 100 units</th>
<th>Custom Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1 – 14</td>
<td>2 units</td>
<td>3 units</td>
<td>6 units</td>
<td>_____ units</td>
</tr>
<tr>
<td>14.1 – 18</td>
<td>3 units</td>
<td>4 units</td>
<td>8 units</td>
<td>_____ units</td>
</tr>
<tr>
<td>18.1 – 22</td>
<td>4 units</td>
<td>5 units</td>
<td>10 units</td>
<td>_____ units</td>
</tr>
<tr>
<td>Greater than 22</td>
<td>Call MD</td>
<td>Call MD</td>
<td>Call MD</td>
<td>Call MD</td>
</tr>
</tbody>
</table>

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

Practitioner Printed Name

Practitioner Signature

Date/Time

Form #: 103605  06/13  Category: Orders
Guidelines for Completion of Subcutaneous Basal Bolus Insulin Order Set
This guide is to provide guidance and should not replace clinical judgement.

Need to consider:
1. **Type of diabetes** –
   a. **Insulin deficient** patients include: Type 1 DM, Type 2 DM on insulin for more than 5 years or using more than 60 units per day, history of DKA, or pancreatectomy.
      These patients MUST always receive BASAL insulin even if not eating.
   b. **Type 1 DM** patients tend to be more insulin sensitive; higher risk of hypoglycemia.
   c. **Type 2 DM** patients tend to be more insulin resistant; when NPO for prolonged periods their basal insulin requirements may decrease dramatically.

2. **Nutritional status of patient** - If patient is NPO or on advancing fluid diet or not eating consistently do NOT order Prandial insulin. Consider lower dose of calculated Basal insulin.

3. **Target blood glucose range** - BG range is 5 to 10 mmol/L for most adults (not critically ill). Higher BG range 7 to 14 mmol/L acceptable in patients with high risk of hypoglycemia (frail or dependant patients, elderly with multiple comorbidities) or with limited life expectancy.

4. **Oral diabetic medications - can they be continued?** If patient receiving insulin for hyperglycemia it is safest to stop all oral agents except Metformin while in hospital; they can be restarted on discharge if appropriate. Hold/discontinue Metformin if impaired renal function (CrCl less than 30 mL/min), intravascular depletion, acute heart failure, patient undergoing contrast studies.

5. **Daily review of BGM and insulin orders** – adjust scheduled insulin doses based on BGM values and amount of correction insulin used.

**SCHEDULED INSULIN**

**Total Daily Insulin dose** (TDI) = total number of units of insulin used in 24 hour period

**Estimate by:**
1. Patient’s insulin dose pre-admission – add all insulin used in 24 hour period
2. Calculate based on weight:
   a. Type 1 or slim Type 2 or elderly (greater than 70yrs): TDI = weight x 0.3 to 0.5 units/kg
   b. Type 2 overweight: TDI = weight x 0.5 to 1 units/kg (may be higher in obese patient)

**Decrease in TDI** - may be required in patients with reduced renal function (eGFR less than 30 mL/min), decreased oral intake, liver failure, and history of hypoglycemia.

**Increase in TDI** - may be required if patient on steroids or if infection present.

**Basal insulin dose** (long or intermediate-acting insulin) – estimate at about ⅓ of TDI, given once or as divided dose twice daily.

**Prandial/Nutritional insulin dose** (rapid or short-acting insulin) – about ⅓ of TDI, divided equally among 3 meals if patient eating consistently. Hold if nutritional intake minimal or not consistent.

**CORRECTION (supplemental) INSULIN**
Rapid or short-acting insulin - given when BG higher than target range for patient.
Given with scheduled prandial insulin or q4 to 6h in patients who are not eating consistently, NPO or receiving PN.
Usually not given at bedtime unless BGM very high (increases risk of nocturnal hypoglycemia).
Dose is based on patient’s insulin sensitivity and therefore TDI.
Rapid-acting insulin analogues preferred because less risk of hypoglycemia.
May be used as sole insulin in patients with Type 2 DM as dose-finding strategy. Basal insulin should be considered if patient requires more than 8 units/day of correction insulin.

**NPO or Minimal nutritional intake**
Basal insulin dose should be reduced by 10 to 50% depending on risk of hypoglycemia (insulin sensitivity), type of diabetes, and duration of fasting. (Greater reduction required in Type 2 DM with prolonged fasting.)
Long-acting insulin analogues preferred as less risk of hypoglycemia.
Give IV fluids containing dextrose if patient is insulin deficient. No prandial insulin.
Order Correction insulin – dose based on TDI.

**Parenteral (PN) or Enteral Tube Feeds**
Insulin requirements will vary depending on rate and carbohydrate content of tube feeds/PN.
When on these feeds starting TDI dose should be reduced to 60 to 70% of usual/calculated TDI. Titrate as needed.

a. Patient receiving PN: TDI usually given as regular insulin mixed in PN formulation - therefore no basal insulin, no prandial insulin. Order subcutaneous Correction insulin.

b. **Patient on Bolus tube feeds**: Split reduced TDI dose into 50% basal (dosed once daily or q12h) and 50% prandial (divided equally before each bolus feed). Regular insulin is preferred with tube feeds because of longer duration of action. Order Insulin.

c. **Patient on Continuous tube feeds**: No regimen clearly superior. Consider giving reduced TDI dose as basal insulin dosed once or twice daily. Order Correction insulin q6h if Regular insulin or q4h if rapid-acting insulin.
# Appendix E

## 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)

- **Patient weight** ______ kg
- **A1C** ordered on admission

**Type of Diabetes:**
- [x] Type 1
- [ ] Type 2 on oral agents only
- [x] Type 2 on insulin

**Bedside Glucose Monitoring (BGM)**
- [ ] Twice daily (before breakfast and supper)
- [ ] Before meals and at bedtime
- [ ] Other _______

- [x] If blood glucose less than 4 mmol/L or less than 5 mmol/L in the frail/dependant patient, initiate Adult Hypoglycemia Protocol (on reverse of BGM-Insulin Administration record)
- [x] If blood glucose greater than 22 mmol/L, call MD

### Scheduled Premixed Insulin (subcutaneous)

<table>
<thead>
<tr>
<th>Premixed Basal and Prandial Regular (give 30 mins before meals)</th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Supper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin Regular 30% / Insulin NPH 70% (Humulin 30/70)</td>
<td>_______ units</td>
<td>_______ units</td>
<td></td>
</tr>
<tr>
<td>Insulin Regular 30% / Insulin NPH 70% (Novolin ge 30/70)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Premixed Basal and Prandial Analogue (give with meals) (patient must supply own insulin)</th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Supper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin Lispro 25% / Lispro Proamine 75% (Humalog Mix 25)</td>
<td>_______ units</td>
<td>_______ units</td>
<td></td>
</tr>
<tr>
<td>Insulin Lispro 50% / Lispro protamine 50% (Humalog Mix 50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin Aspart 30% / Aspart protamine 70% (NovoMix 30)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Correction Insulin (subcutaneous)**

<table>
<thead>
<tr>
<th>Type of Insulin:</th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Supper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin Regular (Humulin R)</td>
<td>_______ units</td>
<td>_______ units</td>
<td></td>
</tr>
<tr>
<td>Insulin Regular (Novolin Toronto)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Times to be used:**
- [ ] Before breakfast and supper ONLY
- [ ] Before meals ONLY
- [ ] Bedtime

<table>
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<tr>
<th>Blood Glucose (BGM) mmol/L</th>
<th>Low Dose if TDI less than 60 units</th>
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**ANY SINGLE CHANGE TO THESE ORDERS REQUIRES COMPLETION OF NEW ORDER SET**

Practitioner Printed Name: __________________________
Practitioner Signature: ___________________________
Date/Time: __________________________

Form #: 103606 06/13 Category: Orders
**Guidelines for Completion of Subcutaneous Premix Insulin Order Set**

This guide is to provide guidance and should not replace clinical judgement.

Premixed Insulins should only be used for patients who are metabolically stable and who are eating consistently, and for whom the premix will provide effective glycemic control.

**Need to consider:**

1. **Type of diabetes** –
   a. **Insulin deficient** patients include: Type 1 DM, Type 2 DM on insulin for more than 5 years or using more than 50 units per day, history of DKA, or pancreatectomy.
      These patients MUST always receive BASAL insulin even if not eating.
   b. **Type 1 DM** patients tend to be more insulin sensitive; higher risk of hypoglycemia.
   c. **Type 2 DM** patients tend to be more insulin resistant; when NPO for prolonged periods their basal insulin requirements may decrease dramatically.

2. **Nutritional status of patient.** If patient is NPO or on advancing fluid diet or not eating consistently do NOT use Premix Insulin.

3. **Oral diabetic medications - can they be continued?** If patient receiving insulin for hyperglycemia it is safest to stop all oral agents except Metformin while in hospital; they can be restarted on discharge if appropriate.
   Hold / discontinue Metformin if: impaired renal function (CrCl less than 30 mL/min), intravascular depletion, acute heart failure, patient undergoing contrast studies.

4. **Target blood glucose range.** BG range is 5 to 10 mmol/L for most adults who are not critically ill.
   Higher glucose range 7 to 14 mmol/L is acceptable in patients with high risk of hypoglycemia (frail or dependant patients, elderly with multiple comorbidities), or with limited life expectancy.

5. **Daily review of BGM and insulin orders** – adjust scheduled insulin doses based on BGM values and amount of correction insulin used.

**Scheduled insulin**

**Total Daily Insulin - TDI** is the total number of units insulin used in 24 hours.
TDI depends largely on type of diabetes, patient weight, renal function, nutritional intake.

**Estimate TDI:**

1. Patient’s insulin dose pre-admission – add all insulin used in 24 hour period, OR
2. Calculate based on weight:
   - Type 1 or slim Type 2 or elderly (greater than 70yrs): TDI = weight x 0.3 to 0.5 units/kg
   - Type 2 overweight: TDI = weight x 0.5 to 1 units/kg (may be higher in very obese)

**Decrease in TDI** - may be required in patients with reduced renal function (eGFR less than 30 mL/min), decreased oral intake, liver failure, and history of hypoglycemia.

**Increase in TDI** - may be required if patient on steroids or if infection present.

Premix insulin is most commonly split with **50 to 70%** of TDI dose given with **breakfast** and **30 to 50%** with supper.
Dosing with each meal (3 times per day) may be considered in some patients.

**Correction (Supplemental) Insulin**

Rapid or short-acting insulin given when blood glucose values are higher than acceptable for individual patient.
Usually is same short or rapid-acting insulin used in Premix but a rapid acting insulin may be given with 30/70 Premix.
Given with meals in addition to scheduled Premix insulin doses.
Usually not given at bedtime unless glucose very high (increases risk of nocturnal hypoglycemia).
Dose is based on patient’s insulin sensitivity, and therefore TDI.
Rapid-acting insulin analogues preferred for correction insulin because lower risk of hypoglycemia.

**NOTE:** If patient is not eating consistently discontinue Premix insulin, and implement the insulin order set for “Adult Patient Eating, NPO, on Fluid Diet or receiving PN/EN Feeds”.
## ADULT HYPOGLYCEMIA PROTOCOL

### Page 2 of 2

**Appendix F**

**Patient Label**

NAME: __________________________
HSN: __________________________
D.O.B.: ________________________

---

**Adult Hypoglycemia Protocol in Acute Care**

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

**Treat patient with or without symptoms**

*If patient has symptoms and testing not possible, TREAT first. Check blood glucose AFTER.*

**BGM = Bedside Glucose Monitoring**

<table>
<thead>
<tr>
<th>MILD / MODERATE</th>
<th>SEVERE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood glucose less than 4 mmol/L or less than 5 mmol/L in the frail elderly/dependent</td>
<td>Blood glucose typically less than 2.8 mmol/L</td>
</tr>
</tbody>
</table>

**Treat with 15-16 grams fast-acting carbohydrate using ONE of the following options:**

**Oral intake allowed and able to swallow safely**

- Administer ONE of the following:
  - 4 tablets Glucose 4 gram Chewable
- OR
  - 3 teaspoons of sugar (15 ml) or 3 sugar packets dissolved in warm water
- Observe patient consuming treatment
- Repeat BGM and treatment q 15 min until BGM is greater than target (4 or 5 mmol/L)*

**NPO or unable to swallow safely - IV access**

- Administer 25 mL of 50% Dextrose IV over 1-3 minutes
- Repeat BGM and treatment q 15 min until BGM is greater than target (4 or 5 mmol/L)*

**NPO or unable to swallow safely - No IV access**

- Start IV STAT
- Administer 25 mL of 50% Dextrose IV over 1-3 minutes
- Repeat BGM and treatment q 15 min until BGM is greater than target (4 or 5 mmol/L)*

**Feeding Tube in place**

- Administer ONE of the following via feeding tube:
  - 3 teaspoons of sugar (15 ml) or 3 sugar packets dissolved in warm water
- OR
  - 30 mL of 50% Dextrose and flush with warm water
- Repeat BGM and treatment q 15 min until BGM is greater than target (4 or 5 mmol/L)*

**Note:** Patients on Acarbose (oral diabetics drug)
- Administer glucose tablets (sugar not effective)
- OR may use 1 cup of low-fat milk or 1 tablespoon (15 ml) honey if available

**Feeding Tube in place**

- Administer ONE of the following via feeding tube:
  - 4 teaspoons of sugar (20 ml) or 4 sugar packets dissolved in warm water
- OR
  - 50 mL of 50% Dextrose and flush with warm water
- Repeat BGM and treatment q 15 min until BGM is greater than target (4 or 5 mmol/L)*

**Any episode of severe hypoglycemia should prompt MD/NP review of insulin, diet, parenteral nutrition or tube feed orders before next insulin dose**

---

*"Once Stable (BGM is greater than target (4 or 5 mmol/L)*

- If oral intake is allowed and if next scheduled meal is more than 1 hour away, offer a snack containing 15 grams of carbohydrate and a protein:
  - Carbohydrate choices: 1 slice bread or 2 cookies or 6 soda crackers
  - Protein choices: 2 tablespoons peanut butter or 1 oz. cheese/meat

*Document hypoglycemia and action taken in Nursing Progress Record. Identify possible cause and document (e.g., missed or late snack or meal).*
# Appendix G

**Bedside Glucose Monitoring (BGM) and Insulin Administration Record/Adult Hypoglycemia Protocol (See Reverse)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>BGM (mmol/L)</th>
<th>Insulin/Dosage (Units) Documented on the MAR</th>
<th>Intervention/Concern</th>
<th>Init.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Basal: Prandial: Premix: Correction: Intraocular: (units/hour)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Minimal or no Food Intake Insulin Dose Held See Nurses Notes MD/NP Notified</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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Form #103616  01/2017  Category: Flow Sheets