Purpose:

To ensure safe and accurate administration of insulin for patients using their own external continuous subcutaneous insulin infusion pump during hospitalization.

Definitions:

Insulin pump: An insulin pump approved by the Ministry of Health and Long Term Care (MOHLTC) Assistive Devices Program (ADP) for delivering insulin to either a child or adult.

CDE: A diabetes educator who has a current certificate from the Canadian Diabetes Education Certificate Board.

Certified Pump Trainer: A diabetes educator who has a current pump trainer certificate from the designated pump vendors

Skill Level: RN

Policy:

This policy refers to any adult patient admitted to the hospital, using an external insulin pump to manage his/her diabetes.

1. Indications for inpatient use of an external insulin pump include all of the following:

    - alert; oriented to person, place and time
    - knowledgeable and competent to manage the insulin pump
    - have adequate insulin pump supplies, including infusion sets, reservoirs and batteries

2. Contraindication for inpatient use of an external insulin pump include any of the following:

    - Altered or changes to state of consciousness and/or cognitive status
    - At risk for suicide
    - Critically ill (sepsis, trauma) and needs intensive care
    - Persistent unexplained hyperglycemia
        - Diabetic Ketoacidosis or
        - one or more unexplained blood glucose reading greater than 16 mmol/L and ketones present or
        - two or more unexplained blood glucose readings greater than 16 mmol/L despite correction boluses with or without ketones present
    - Refusal or unwillingness to participate in self-care
    - Caregiver support/assistance required to manage insulin pump

Procedure:

1. Initiate insulin pump order sheet.

2. The nurse and/or most responsible physician (MRP) will assess the patient for indications and contraindications based on above criteria.

3. If patient meets all indications:
   a) Consult:
      - The Diabetes Education Centre for assessment of patient knowledge and ability to self-manage insulin pump
      - Endocrinologist or specialist with special interest in diabetes for a physician order to self-manage insulin pump
   b) Physician orders to include:
      - Indication that the patient may self-manage insulin pump
      - Type of insulin to be used
      - Pump's make and model
      - Basal infusion rate(s)
      - Bolus dosages for meals and correction
      - Lab-meter comparison of patient blood glucose meter
      - Self-monitoring of blood glucose 4 to 6 times a day with adherence to hospital testing protocols
      - Note that the bolus doses may be given either by pump or syringe/pen.
   c) Patient completes:
      - Agreement (see appendix A) to complete Diabetes Insulin pump log (Appendix B)

4. Management of insulin pump:
   a) The nurse will obtain and record blood glucose per physician orders using the hospital meter. The patient may monitor their own blood glucose with their personal blood glucose meter. Those results will be recorded in the hospital pump flow sheet.
   b) Patient will manage glycemic control using his/her own external pump for insulin delivery and must communicate the pump setting changes to nursing staff.
   c) Patient will be responsible to change infusion set and fill a new syringe (reservoir/cartridge) with insulin at least every 3 days and communicate change to RN. RN to document on Diabetes Insulin Pump Log and MAR.
   d) The nurse will assess the catheter insertion site and document integrity.
      Note: The infusion site may need to be changed more frequently if:
      - There are signs of site infection: redness, swelling, heat and pain
      - There is bleeding at the site or blood is backing up in tubing
      - A 'No Delivery' alarm in the pump
   e) Patient will ensure proper disposal of sharps in sharps container.

5. If at any time, the patient meets one of the contraindications, or if the pump is not functioning properly the nurse will notify the physician immediately and obtain orders to discontinue the pump and initiate alternative insulin therapy.

6. Discontinuation of an external insulin pump

   a) Suspend (stop) the pump and remove the infusion set from the insertion site.
   b) Remove the infusion set from the pump
   c) Secure the pump or give to patients family for safekeeping and document accordingly
   d) Document rationale for discontinued use of the patients insulin pump

7. Special Considerations for discontinuation/suspension of insulin pump therapy –

   a) Insulin pump therapy should be suspended and disconnected if the patient is undergoing the following tests:
      - Magnetic resonance imaging
      - Computed tomography scans
      - Radiology procedures
      - The pump should **not** be brought into the room where the test is being performed
   b) The patient can safely disconnect the pump and most infusion sets for up to **1 hour** but should check his/her blood glucose before disconnecting and after reconnecting
   c) Special care should be taken to avoid dislodging the catheter when transferring patients for procedures

8. Documentation required in patients chart:

   1. Patient Agreement
   2. Diabetes Insulin Pump Log
      a) The make and model of the insulin pump
      b) Type of insulin
      c) Basal rate
      d) Bolus insulin doses (number of doses and units given)
      e) Any supplemental insulin given by injection
      f) Blood glucose levels, including any the patient checked with a personal monitor
      g) Condition of the infusion site
      h) Change of infusion site
      i) When the insulin pump is suspended or removed, such as for shower or procedures, the time it was removed and time it was reconnected

   3. Patient MAR:

   a) ___*Humalog/NovoRapid/Apidra* _____ insulin delivered by patient owned insulin pump to be self-managed by patient. Nurse to review pump log and verify compliance QID.

Education:

Staff designated to the insulin pump program within the hospital diabetes education program will provide training to staff in hospital with respect to the policy and procedure outlined above. They will also be responsible for providing updates to the procedure as needed. New staff will receive education through orientation.

Evaluation:

Evaluation will be on-going based on the patient compliance and glycemic control. Staff knowledge will be assessed on-going. Random audits will be done to ensure consistency with the process.

Developed by the Insulin Pump Task Force on April 7th, 2011

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- Waterloo-Wellington Diabetes Regional Coordination Centre on May 10th, 2011
- Endocrinologists of the Waterloo-Wellington Local Health Integration Network
    - Dr. Nadira Husein on May 19th, 2011
    - Dr. Peter Clarke on May 26th, 2011
- Regional Coordination Centre Steering Committee on June 9th, 2011
- Revised by Debbie Hollahan, RN BHScN CDE, Regional Director WW DRCC, April 3, 2012
- Reviewed and approved by: *Document to be reviewed by individual hospital committees*

References:

Canadian Diabetes Association Clinical practice Guidelines Expert Committee. Canadian Diabetes Association 2008 clinical practice guidelines for the prevention and management of diabetes in Canada. *Can J Diabetes.* 2008; 32(supp1): S71-S76.

Ren, JJ, Houlden, RL, "A Practical Guide to Insulin Pump Management in Adults In and Around Hospital", *Canadian Diabetes.* Autumn 2011; 24(3): 11-16.

Appendix A – Patient Agreement

Continuous Subcutaneous Insulin Infusion Pump Therapy Patient Agreement

For your safety and optimal medical care during this hospitalization, we request that you agree to the following recommendations. If you feel you cannot agree to these recommendations, we would like to treat your diabetes with insulin injections and request that you discontinue the use of your insulin pump.

During my hospital stay, I will agree to:

1. Complete my diabetes insulin pump log, including blood glucose readings, meal boluses given, correction doses and basal rate, and pump set changes.
2. Report any signs and symptoms of low blood sugar
3. Report any pump problems

I also understand that my pump may be discontinued and a different insulin delivery given for any of the following:

a) Doctor's order
b) Changes in my judgement
c) Changes in my level of awareness or consciousness
d) Radiology exam including:
   - X-ray
   - MRI
   - CT scans
   - Mammography and
   - PET scans
e) Procedures requiring general anaesthesia
f) Other reasons deemed necessary by medical staff

Patient Signature: _____ Date: _____

Family Member Signature: _____ Date:_____

Witness Signature: _____ Date: _____

Adapted from Cook et al (2005)

WaterlooWellington DIABETES

Patient Name
Unit #

Insulin Pump Log for In-Hospital Use (Appendix B)

Date: _____ Type of Rapid Insulin: _____

Make/Model of Insulin Pump: _____

	8am	9am	10am	11am	12am	1pm	2pm	3pm	4pm	5pm	6pm	7pm
Blood Glucose												
Carbohydrates												
Meal Bolus												
Correction Bolus												
Basal Rate												
Site Change												
Set Change												
Pump suspended/removed												
Pump reconnected												
Infusion site intact												
Comments												

	8pm	9pm	10pm	11pm	12am	1am	2am	3am	4am	5am	6am	7am
Blood Glucose												
Carbohydrates												
Meal Bolus												
Correction Bolus												
Basal Rate												
Site Change												
Set Change												
Pump suspended/removed												
Pump reconnected												
Infusion site intact												
Comments												

RN Signature *(reviewed pump log and verified compliance)*:

0800 hr: _____ 1200 hr: _____ 1600hr: _____

2200hr: _____