Palmetto Health Quality Collaborative

Care Map

Continuous Subcutaneous Insulin Infusion (CSII)

Patients admitted to Palmetto Health with a CSII (insulin pump)

IMPORTANCE OF FOCUS

CSII (Insulin pumps) have been used for more than 35 years. In the U.S. in 2005, the level of insulin pump penetration was estimated at 20 to 30% in patients with type 1 diabetes mellitus (T1DM). The CSII pump delivers a basal rate of rapid acting analogue insulin and allows the patient to hand deliver bolus dosing with meals and for correction of hyperglycemia. Because the pump is capable of delivering fractional insulin units (i.e. 0.05 unit increments), and the absorption rate is more predictable, a level of precision can be achieved that is not accomplished as frequently with multiple daily injections. This helps provide patients better blood glucose control, lower Hgb A1C levels, and ultimately decreases their long term complications from the disease.

GOALS

The goal of this Care Map is to establish uniform standards and requirements for the use of patient owned CSII pumps for self administration of insulin in the Palmetto Health inpatient setting in order to provide increased patient independence while maximizing patient safety.

KEY RECOMMENDATIONS

- **With the exception of trauma or malfunction of pump, an insulin pump should NEVER be discontinued without initiation of either subcutaneous or intravenous insulin at least 30 minutes before pump discontinuation.**

A. During the admission process, the Licensed Independent Practitioner (LIP) will verify the presence of the insulin pump and the brand of insulin.
B. The LIP will order the *PH Insulin Pump Orders #*_____ or an order to discontinue the insulin pump with alternative insulin therapy.
C. The patient will be assessed for competency by the LIP for use of their own insulin pump based on established requirements.
D. The patient will be required to provide their own infusion set supplies, change infusion sets per manufacturer recommendations (usually every 48-72 hours) or as needed, and inform the medical staff of all basal rates and bolus amounts as well as any problems they encounter.
E. If, during the hospital course, the patient no longer meets initial criteria for pump use, the pump will be discontinued and the LIP will be immediately notified to order an alternate insulin regimen for the patient.

CARE PATHWAY COMPONENTS

A. The LIP will be responsible for identifying the capability of the patient to continue insulin pump therapy while in the hospital. Input may be obtained from non-physician healthcare providers (Nurse, Pharmacy)

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B. If the patient is deemed capable of insulin pump therapy, the health care provider must document the type of pump, type of insulin used, current basal rate, etc. Palmetto Health Insulin Pump Order #_____ will be utilized.

C. If the patient is not deemed capable:
   a. The insulin pump will be discontinued.
   b. The physician will write orders for subcutaneous basal/nutritional or IV insulin drip insulin.
   c. A patient is deemed incapable to operate his/her own insulin therapy if:
      1. Patient has altered level of consciousness due to disease state, medications or other factors.
      2. Patient is critically ill (requiring ICU care).
      3. Patient is known to have uncontrolled diabetes as an outpatient or is admitted with signs/symptoms of hypo/hyperglycemia.
      4. Patient is at risk of suicide.
      5. Patient not willing to control device or does not display sufficient knowledge of how to control device.
      6. Insulin pump does not appear to be well cared for (dirty, cracked, kinked tubing, etc) or has the possibility of a mechanical malfunction.
      7. Patient does not have the appropriate supplies for the insulin pump.
      8. Healthcare provider identifies other circumstances that would prevent the safe administration of insulin via patient's insulin pump.

D. The patient will be responsible for providing all components necessary for proper function of the insulin pump (tubing, cartridges, batters, etc.). If the patient is unable to provide supplies the pump should be discontinued and an alternate regimen should be ordered.

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Palmetto Health Insulin Pump Assessment Sheet

Pump Information

- Pump model and manufacturer_____
- Pump customer support number_____
- Type of insulin used in pump_____
- Type of infusion set used_____
- Do you use an inserter? ☐Yes ☐NO
- Do you have insulin pump supplies with you? ☐Yes ☐NO
  - How many days supply do you have? _____ *Patient must provide pump supplies except for insulin.*
- Emergency person who can assist you with pump use? ☐Yes ☐NO
  - Name_____ Phone:_____

Current basal rates:

Start time	End time	Basal Rate Units/hour	Start time	End time	Basal Rate Units/hour	Start time	End time	Basal Rate Units/hour
12am	1am		8am	9am		4pm	5pm	
1am	2am		9am	10am		5pm	6pm	
2am	3am		10am	11am		6pm	7pm	
3am	4am		11am	12pm		7pm	8pm	
4am	5am		12pm	1pm		8pm	9pm	
5am	6am		1pm	2pm		9pm	10pm	
6am	7am		2pm	3pm		10pm	11pm	
7am	8am		3pm	4pm		11pm	12am	

Meal boluses: Based on carbohydrate count **OR** Fixed doses:

Breakfast_____units per_____grams of carbohydrate _____units at breakfast
Lunch_____units per_____grams of carbohydrate _____units at lunch
Dinner_____units per_____grams of carbohydrate _____units at dinner
Snacks_____units per_____grams of carbohydrate _____units at snacks

Correction boluses: _____unit(s) for every_____mg/dL over_____mg/dL (target glucose)
(for high blood glucose) Or One unit of insulin brings my glucose down:_____mg/dL
Or *provide a copy of written scale*

I confirm that I have been fully trained on the use of my insulin pump prior to this hospitalization and that I am capable and willing to manage it independently during my hospital stay.
If at any time I feel that I am unable to manage the pump, I will alert my medical team.

Patient: Signature_____Date/ Time:_____

MD/RN witness:_____Date/ Time:_____

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Palmetto Health Patient Insulin Pump Agreement

You may be able to use your own insulin pump during your hospital stay at Palmetto Health. In order to assure your safety and assist your health care team in coordinating your care, it is important that you understand your responsibilities before you sign this agreement. If you have any questions, please ask your physician or nurse.

During my hospital stay, I agree to:

1. Update the nurse regarding any bolus doses given by writing down bolus doses I give myself on the paper called *Palmetto Health (PH) Patient Insulin Pump Log*.
2. Only make changes to the basal rate when asked to by my physician.
3. Change the infusion set every 48-72 hours (2-3 days) or as needed.
4. Provide my own medical supplies that I may need for my pump.
5. Only use insulin supplied by the hospital.
6. Report any signs of low blood sugar, such as feeling dizzy, shaky, sweaty, to the healthcare team as soon as possible.
7. My health care team will check my blood glucose using Palmetto Health certified blood glucose equipment *as specified by the Licensed Independent Practitioner (LIP)*.
8. Report any pump malfunction or other problems to the health care team as soon as possible.
9. Tell the health care team if I am no longer able to operate my pump for any reason.

During my hospital stay, I understand the pump may be stopped or removed if:

1. The doctor orders a different method of insulin administration such as insulin shots.
2. There are any changes in my health or judgment that would prevent the safe and accurate administration of insulin.
3. Any x-ray, MRI, or radiology procedure is required.
4. I cannot provide all supplies.
5. Any other reason deemed necessary by the medical staff.

I hereby request that Palmetto Health allow me to continue use of my own insulin pump.

I release Palmetto Health and its employees from any liability regarding the use of my insulin pump during my hospitalization.

I have read and discussed this form with my nurse and/or doctor and I understand the requirements to continue using my own insulin pump while in the hospital.

_____ _____

Patient Signature Date

_____ _____

Witness Date/Time

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Page 1 of 3 | **Order #**

Palmetto Health Insulin Pump Orders #
* = Order Recommended for Inclusion

Target range (Acute and Critical Care) Fasting: 100-140mg/dL Random: 100- 180mg/dL

☒ Discontinue all Previous Diabetic Medications
☒ Initiate Hypoglycemia Protocol for finger stick blood glucose less than 70 mg/dL
☒ Notify physician for blood glucose less than 50 mg/dL
☒ Notify physician for blood glucose greater than_____mg/dL
☒ Draw HgbA1c with next a.m. labs if blood glucose is 180 mg/dl or greater and not already obtained this admission or if results not documented within the past 90 days.
☐ Diabetes Education Consult
☐ Nutritional Consult for Diabetic meal planning
☒ Diet
☐ 1800cal Diabetic ☐ 2000cal Diabetic ☐ 2200cal Diabetic
☒ HS snack

☒ Check fingerstick blood glucose (at least one choice must be selected)
☐ AC and HS ☐ at 0300 ☐ Other _____
☐ _____hours after meals ☐ every 6 hours

Insulin Pump Guidelines
Do not stop/discontinue the insulin pump without prescriber order and plans for alternate insulin administration.

☒ Assess level of consciousness every shift or per unit protocol.
☒ If the insulin pump therapy is to be discontinued, initiate subcutaneous or intravenous insulin therapy preferably 30 minutes prior to discontinuation of insulin pump therapy. Contact Licensed Independent Practitioner (LIP) for orders.
☒ Patient to self administer insulin via subcutaneous insulin pump and document all basal and boluses on the *PH Patient Insulin Pump Log.* *Nurse to review and verify documentation every shift.
☒ Patient to continue home basal rates and bolus doses as per *PH Insulin Pump Assessment Sheet* unless otherwise indicated by LIP orders or the need for pump suspension due to hypoglycemia or radiological procedures.
☒ **Insulin (for use in pump): Pharmacy to send vial so that patient can fill the cartridge:**
☐ aspart (NovoLog) ☐ lispro (Humalog) ☐ glulisine (Apidra)
☒ Patient to change insertion set/site every 48-72 hours and as needed. All pump supplies are provided by the patient/family members.
☒ Document insertion site on EMAR and date last rotated.
☒ Disconnect insulin pump prior to leaving room for radiology procedures (MRI, CT scan, X-Rays, Nuclear Stress Test, PET Scan) and restart immediately upon return to room. Pump is to remain in patient's room. **Pump should not be disconnected more than 1 hour without alternative insulin available. Call physician.**

☒ Transitioning from one insulin delivery method to another:
a. From the pump to subcutaneous insulin or insulin drip- comparable amounts of insulin are required. When transitioning to subcutaneous insulin, use subcutaneous insulin order set # 6001.
b. Transitioning patient back to the insulin pump- Key points:
- From insulin drip, pump may be started immediately with no delay.
- From basal-bolus regimen, restart pump 24 hours after last Lantus dose.

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Palmetto Health Insulin Pump Log

To be completed by patient/caregiver

Date:_____/_____/_____
Pump model and manufactor:_____
Pump Site_____ Date Changed_____
Catheter Insertion Site: _____ Date Changed: _____
Continuous Glucose Monitor Insertion Site:_____ Date Changed: _____

Type of insulin (check one): ☐aspart (Novolog®) ☐ lispro (Humalog®) ☐ glulisine (Apidra®)

Time	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	Noon	1p	2p	3p	4p	5p	6p	7p	8p	9p	10p	11p	MN
Glucose																								
Nutritional Bolus																								
Correctional Bolus																								
Basal Rate (units/hr.)																								

Carbohydrate Ratio
_____ units per_____grams of carbohydrate (Breakfast)

_____ units per_____grams of carbohydrate (Lunch)

_____ units per_____grams of carbohydrate (Dinner)

OR Fixed Doses
_____ units at breakfast

_____ units at lunch

_____units at dinner

_____units with snacks

High Glucose Correction
_____unit for every_____mg/dL over _____mg/dL (target glucose) OR provide copy of written scale

_____unit for every_____mg/dL over _____mg/dL (target glucose)

Completed by_____ Reviewed by _____

*****This form is available on digipath*****

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Definitions:

1. Continuous Subcutaneous Insulin Pump: Insulin pumps are portable computerized devices that deliver a steady, basal dose of insulin through a small subcutaneous catheter. This continuous release of small doses of insulin closely mimics the body's normal release of insulin. Most devices utilize rapid acting insulin (aspart, lispro, glulisine) which allows for additional mealtime bolus doses on command.

2. Basal Insulin / Rate: The basal rate is programmed to deliver insulin continuously over 24 hours, providing a "background" of insulin at all times. The patient may have multiple basal rates programmed during the 24 hour period.

3. Bolus/Nutritional Dose (insulin to Carbohydrate Ratio**:** A dose of rapid-acting insulin delivered with meals that are individually calculated to match and utilize the amount of carbohydrates eaten in a meal or snack. Many patients who use pumps start with one unit of rapid-acting insulin for each 15 grams of carbohydrate.

4. Correction Bolus: A dose of rapid- acting insulin delivered quickly to bring high blood glucose back into a target range. The amount one unit of insulin will lower blood glucose varies widely by individual. This is called a Correction Factor or a Sensitivity Factor. For most people, one unit will lower the blood glucose between 20 to 100mg/dL.

5. Cannula (or catheter): The tip of the plastic tube at the end of the infusion set through which insulin is delivered beneath the skin (subcutaneously).

6. Infusion Set: Refers to the reservoir, catheter, and insertion set.

7. Reservoir/Syringe/Cartridge: A glass or plastic container that holds the rapid-acting insulin inside the pump.

RESOURCES

American Association of Clinical Endocrinologists: AACE/ACE Insulin Pump Consensus Statement**.** Endocrine Practice 2014; 20 (No 5) Retrieved from **http://resources.aace.com/index.asp**

American Diabetes Association: Clinical Practice Recommendations, Diabetes Care January 2015 38: doi:10.2337/dc15-in01

For Additional Information

Please contact Connie Hopkins at constance.hopkins@palmettohealth.org with any questions.

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Reviewed/Updated September 2015

This Care Map presents a model of best care based on the best evidence available at the time of publication. It is not a prescription for every patient, and it is not meant to replace clinical judgment. Although physicians are encouraged to follow the Care Map, variation from the pathway may occur as clinical freedom is exercised to meet the need of the individual patient. Please send feedback to Elizabeth 'Libbi' Sheridan, MSN, RN Manager of PHQC Clinical Integration, at Elizabeth.sheridan@palmettohealth.org or 803 434-6906