PURPOSE: To provide guidelines for the safe and uninterrupted administration intravenous treprostinil (Remodulin®).

POLICY STATEMENT: Remodulin® (treprostinil) is a prostacyclin analogue and potent vasodilator used for the treatment of refractory pulmonary hypertension (PH). To ensure patient safety, Remodulin® (treprostinil) will be prepared and administered within the guidelines established by this policy.

EXCEPTIONS: None

DEFINITIONS:
- Nanograms: 1 million Nanograms = 1mg
- A nanogram is designated as “ng” and must not be confused with “mg” (milligrams).
- High alert medication: drugs that carry a higher risk of causing significant patient harm when used in error, or drugs involved in a high percentage of medication errors and/or sentinel events.
- Independent verification: a process whereby a second licensed nurse verifies the correct dosage and rate of a medication based on the physician order independent of the primary RN caring for the patient.
- Dosage weight: the patient’s weight in kilograms at the time the medication was initiated. Unless otherwise specified by MD, a patient’s dosing weight NEVER changes and may not correlate with their current weight. The dosing weight is indicated on the solution bag label and on the comment section of the eMAR.

PROCEDURE: REMODULIN: General Information
- a. Infuse via a dedicated, central line using electronic
pump in an emergency; a peripheral line may be used until central access can be restored.

1. Approved units:
   a. Initiation: Patient must be admitted to critical care unit.
   b. Maintenance Therapy:
      - Critical Care, Cardiac Progressive 2/8ET, Cardiac Acute

2. No portion of the delivery system (catheter, catheter port, tubing or pump) is to be flushed. Flushing the line will result in the patient receiving a bolus dose and may cause excessive hypotension.

3. These medications are designed as “high risk” and require independent nurse verification. Refer to Policy: 01.PHM.07 Look-Alike/Sound-Alike and High Alert Medications.

4. Do not draw blood from the same line (infusion must not be interrupted).

5. DO NOT change the tubing every Sunday and Thursday as per the standards tubing change procedures. Each new bag is sent from Pharmacy primed with new tubing.

6. Remodulin® (treprostinil) is not compatible with heparin

**Remodulin:**

1. Remodulin® (treprostinil) is stable at room temperature for 48 hours and therefore the bag can be changed every 48 hours (preferred).
   a. Based on the patient's dosing requirements, the pharmacist will determine if the infusion will need to be changed more frequently (every 24 hours).

**Initiation of Remodulin® (treprostinil) : New starts**

1. Upon receiving an order for either therapy, the patient care pharmacist will contact the prescribing MD to determine insurance coverage has been approved for subsequent continuous outpatient administration.
   a. Treatment must be initiated in the Critical Care.

2. **DOsing**
   a. Remodulin® (treprostinil) is initiated at 1-2 ng/kg/min.
      Due to the longer half-life, the infusion rate is usually titrated at 3-4 hours intervals or as specified by MD until goal dose is reached or limiting side effects are elicited.

**Continuation of Remodulin® (treprostinil) -Maintenance therapy**

1. Patients admitted to the hospital on Remodulin® (treprostinil) are to be converted as soon as reasonably possible to the hospital supply of drug and the hospital provided electronic pump.

2. When possible, the concentration of drug provided in the
hospital will be the same as the home concentration.

a. If the hospital concentration differs from the patient’s home concentration, the drug must be aspirated from the line. Aspirating the medication from the line (required) will be done under the direction of the Pharmacist or Intervention Nurse.

b. Since Remodulin® (treprostinil) has a long half-life (2-4 hours), priming the new line is not required (optional).

3. Pharmacy or Intervention Nurse will be at bedside for transition of medication from home to hospital supply and at discharge for the transition from hospital supply to home supply.

4. In a patient being transitioned from epoprostenol to treprostinil:
   a. Two dedicated central lines are needed as both drugs will be infusing simultaneously during the transition (via separate sites)
   b. The physician must provide specific dosing parameters for weaning one agent and initiating the other.

**Nursing Monitoring/Safety:**

1. Independent verification is required when a new bag is hung or for any changes in dose.

   - The patient should receive an UNINTERRUPTED continuous IV infusion.

   - **NOTE:** Remodulin infusion may be interrupted for approximately an hour in order to conduct vital tests, such as an MRI. Consult clinical pharmacist for specific recommendations and obtain order from MD.

2. **Critical Care:** Upon initiation and for each dosing adjustment in the critical care setting, vital signs (BP, pulse, respiratory rate) and a pulse oximetry reading will be obtained and documented:

   - every 15 minutes for one hour
   - every 30 minutes for two hours and
   - then every hour if the patient is stable

3. For non-critical care patients on a maintenance therapy (no titrations needed), vital signs (BP, pulse, respiratory rate) and a pulse oximetry monitoring are done every 4 hours or per MD order.

4. For non-critical care patients on maintenance therapy who require a dose titration:

   - every 15 minutes for one hour
   - every 30 minutes for two hours and
   - then every hour if the patient is stable.

**NOTE:** If the patient is exhibiting adverse reactions (overdosing or under-dosing) or increased respiratory distress,
additional monitoring and/or increased in the level of care may be required. The patient may need to transfer to a higher level of care or the Rapid Response Team (RRT)/Code Blue Team may need to intervene.

5. While in the hospital, these agents must be infused via the hospital’s electronic pump with.

6. If possible, the patient should be placed in a room close to the nurse’s station so the nurse can be alerted if the pump alarms. To keep the pump alarms audible, avoid closing the patient’s door.

7. If the patient needs to leave the nursing unit for a procedure, a nurse-to-nurse communication should occur.

8. Monitoring for Adverse Reactions:

   Overdosing signs and symptoms: Facial flushing, jaw pain, hypotension, nausea and vomiting, abdominal cramping, headache, diarrhea, tachycardia, musculoskeletal pain, rash and thrombocytopenia. If the patient develops side effects related to therapy, dose modification, additional monitoring or an increase in the level of care may be required.

   Under-dosing signs and symptoms: Fatigue, worsening dyspnea, pallor and chest pain.

**Special Medication Administration Requirements:**

**Switching from one central line to another:**

1. Pharmacy or Intervention Nurse will be at bedside when switching of one central line to another. Medication must be aspirated from “old” line – Do NOT flush line. Unit based nurse may connect hospital infusion with independent verification occurring prior to administration.

2. Due to Remodulin®’s (treprostinil) long half-life, priming IV lines prior to starting/ or switching lines is not necessary.

3. Do not use an introducer sheath for infusing treprostinil.

4.

**Discharge:**

1. Immediately prior to discharge, the Home Health Care nurse (new patients) or the patient (established patients) will prepare Remodulin® (treprostinil) in a CADD cassette using the patient’s own drug and own equipment (cassette, pump). The patient and/or home health nurse will connect the drug to the patient’s pump.

2. If the home drug concentration differs from the hospital concentration, the drug must be aspirated from the line. Aspirating hospital supplied medication from the line should be done under the supervision of the pharmacist or Intervention Nurse.

**Nursing Documentation**

1. Vital Sign Flowsheet
2. Medication Administration Record (eMAR)
3. Patient Education Record:

**RESPONSIBILITY:** It is the responsibility of the Department of Pharmaceutical Care Services leadership to ensure that all appropriate pharmacy staff members are aware of, and adhere to, this policy.

It is the responsibility of Nursing leadership to ensure that all appropriate nursing staff members are aware of, and adhere to, this policy.

It is the responsibility of all appropriate pharmacy and nursing staff members to be aware of, and adhere to, this policy.

**REFERENCES:**

“Shands at the University of Florida Department of Nursing and Patients Services: Flolan (Epoprostenol Protocol”. Policy #17-75 Revision date 2004 (Adapted for Remodulin®):


SMH Policies:
Transportation and Monitoring of Patients (01.PAT.23) Handoff Communication Guidelines (01.PAT.25)
Nursing and Pharmacy Protocol for the administration of IV epoprostenol (129.060; 126.207)

Remodulin® (treprostinil). Prescribing Information. United Therapeutics Corp. 2011

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**ATTACHMENT(S):** NONE
### APPROVALS:

Signatures indicate approval of the new or reviewed/revised policy

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**Title:** Dave Jungst, Director, Pharmaceutical Services

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**Vice President/Administrative Director (if applicable):**

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**Name and Title:** Lorrie Liang, Chief Operating Officer

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**Name and Title:** Connie Andersen, Vice President/Chief Nursing Officer