SECTION 8B: PUMPS & DRUG ADMINISTRATION	POLICY: 8B.60
POLICY: ENZYME REPLACEMENT THERAPY	PAGE: 1 OF: 7

PURPOSE:

- To provide instruction on the safe and proper administration of Enzyme Replacement therapies to patients in the home setting.

POLICY:

- Enzyme Replacement therapies will be administered by a Registered Nurse in accordance with a physician's order, any available / provided pharmacy or manufacturer instructions, and Agency policy.

- Enzyme Replacement therapies include Cerezyme®, Lumizyme®, Fabrazyme®, and Aldurazyme®.

GENERAL INFORMATION:

- Enzyme Replacement Therapy (ERT) is a medical treatment whereby replacement enzymes are given to patients who suffer from chronic conditions resulting from enzyme deficiencies or malfunction.

- The most common method of ERT is through IV infusions, in which the replacement enzyme is administered directly into the bloodstream through a controlled drip of fluids.

- Replacement enzymes for ERT are derived from human, animal, and plant cells that are then genetically modified and processed before being given to the patient.

- ERT is available for some lysosomal storage diseases: Gaucher disease, Fabry disease, MPS I, MPS II (Hunter syndrome), MPS VI and Pompe disease.

- ERT does not correct the underlying genetic defect, but it increases the concentration of the enzyme that the patient is lacking.

- ERT has also been used to treat patients with severe combined immunodeficiency (SCID) resulting from an adenosine deaminase deficiency (ADA-SCID).

- The effectiveness of ERT varies from person to person and what is being treated, but in some cases, it is the only available treatment option.

SPECIAL CONSIDERATIONS:

- A registered nurse should remain with the patient for the entirety of the infusion.
- In-line filters are required for administration.
- Medication should be allowed to equilibrate to room temperature prior to infusion.
    - Medication should be stored at 2° to 8°C (36° to 46°F). If there are any doubts about the storage and viability of the drug, reach out to the Agency immediately so that confirmation may be sought from the Pharmacy.
- RN shall monitor for infusion-related reactions and hypersensitivity reactions including anaphylaxis, dyspnea, bronchospasm, urticaria, flushing, rash, and increased blood pressure and heart rate.
    - If anaphylaxis or other serious infusion-related reactions occurs, discontinue administration of medication immediately and initiate appropriate treatment to include administration of anaphylactic medications as necessary and activating EMS.
    - Notify the Agency as soon as possible so that the Pharmacy & MD may be notified.

Cerezyme® (imiglucerase)

- Cerezyme® is indicated for treatment of adults and pediatric patients 2 years of age and older with Type 1 Gaucher disease that results in one or more of the following conditions:
    - anemia (low red blood cell count)
    - thrombocytopenia (low blood platelet count)
    - bone disease
    - hepatomegaly or splenomegaly (enlarged liver or spleen)
- The recommended dosage of Cerezyme® based upon disease severity ranges from 2.5 units/kg 3 times a week to 60 units/kg once every 2 weeks
- For patients weighing 18 kg and greater, infuse the diluted Cerezyme® solution over 1 to 2 hours. For patients weighing less than 18 kg, infuse the diluted Cerezyme® solution over 2 hours.
- Cerezyme® is a powder and must be reconstituted with sterile water then diluted with 0.9% sodium chloride for infusion.

Lumizyme® (alglucosidase alfa)

- Lumizyme® (alglucosidase alfa) is a hydrolytic lysosomal glycogen-specific enzyme indicated for patients with Pompe disease (GAA deficiency).
- The recommended dosage of Lumizyme® is 20 mg/kg body weight administered every 2 weeks.
- Lumizyme® is a powder and must be reconstituted with sterile water then diluted with 0.9% sodium chloride for infusion.
- Patients must be monitored closely due to life-threatening anaphylactic and severe allergic reactions during and up to three hours after Lumizyme® infusions.

Fabrazyme® (agalsidase beta)

- Fabrazyme® is used to treat adults and children 2 years of age and older with confirmed Fabry disease.
- The recommended dosage of Fabrazyme® is 1 mg/kg body weight infused every 2 weeks as an intravenous (IV) infusion.
- Fabrazyme® is a powder and must be reconstituted with sterile water then diluted with 0.9% sodium chloride for infusion.
- The reconstituted Fabrazyme® solution must be injected directly into the Sodium Chloride solution. **Do not** inject it into the air space within the infusion bag.
- Begin the initial infusion at a rate no more than 0.25 mg/min (15 mg/hr). Slow the infusion rate in the event of infusion-associated reactions. For patients >30 kg, after patient tolerance to the infusion is well established, increase the infusion rate in increments of 0.05 to 0.08 mg/min (increments of 3 to 5 mg/hr) with each subsequent infusion.
    - For patients weighing < 30 kg, the maximum infusion rate is 0.25 mg/min (15 mg/hr).
    - For patients weighting > 30 kg, the minimum infusion duration is 1.5 hours (based on individual patient tolerability)
- When the infusion is complete, flush the infusion line with 0.9% Sodium Chloride Injection at the last infusion rate tolerated by the patient. Do not push the flush.

Aldurazyme® (laronidase)

- Aldurazyme® is indicated for adult and pediatric patients with Hurler and Hurler-Scheie forms of Mucopolysaccharidosis I (MPS I) and for patients with the Scheie form who have moderate to severe symptoms.
- Aldurazyme® is dosed at 0.58 mg/kg of body weight administered once weekly as an intravenous infusion.
- Withdraw and discard a volume of the 0.9% Sodium Chloride Injection, USP from the infusion bag, equal to the volume of Aldurazyme® concentrate to be added.
- Avoid excessive agitation and do not use a filter needle when drawing up, as this may cause agitation. Agitation may denature Aldurazyme®, rendering it biologically inactive.
- Slowly add the Aldurazyme® solution to the 0.9% Sodium Chloride Injection, USP using care to avoid agitation of the solutions. Do not use a filter needle.
- Gently rotate the infusion bag to ensure proper distribution of Aldurazyme®. Do not shake the solution.
- The entire infusion volume (100 mL for patients weighing 20 kg or less and 250 mL for patients weighing greater than 20 kg) should be delivered over approximately 3 to 4 hours.
    - The initial infusion rate of 10 µg/kg/hr may be incrementally increased every 15 minutes during the first hour, as tolerated, until a maximum infusion rate of 200 µg/kg/hr is reached.

Elaprase® (Idursulfase)

- Elaprase® is indicated for patients with Hunter syndrome (Mucopolysaccharidosis II, MPS II).
- In patients 16 months to 5 years of age, no data are available to demonstrate improvement in disease-related symptoms or long-term clinical outcome; however, treatment with ELAPRASE has reduced spleen volume similarly to that of adults and children 5 years of age and older.
- The safety and efficacy of Elaprase® have not been established in pediatric patients less than 16 months of age.
- Elaprase® is administered as an intravenous infusion at a recommended dose of 0.5 mg per kg of body weight given once a week.

- The recommended dose of Elaprase® is dependent on the body weight of the Hunter syndrome patient. It is therefore important to weigh patients before each infusion to ensure correct dosing.

- Elaprase® is supplied as a sterile, nonpyrogenic clear to slightly opalescent, colorless solution that must be diluted prior to administration in 0.9% sodium chloride injection, USP.

- Each vial contains an extractable volume of 3 mL with an idursulfase concentration of 2 mg/mL. Therefore, the number of vials required to supply the volume needed for a patient must be calculated for each patient at each administration.

- Withdraw the calculated volume of Elaprase® from the appropriate number of vials and add to a 100 mL bag of 0.9% Sodium Chloride Injection, USP for IV infusion – using aseptic technique.

- Mix gently. Do not shake the solution.

- The total volume of infusion should be administered over a period of 3 hours, which may be gradually reduced to 1 hour if no hypersensitivity reactions are observed.

- Patients may require longer infusion times if hypersensitivity reactions occur; however, infusion times should not exceed 8 hours.

- The initial infusion rate should be 8 mL per hour for the first 15 minutes.
    - If the infusion is well tolerated, the rate of infusion may be increased by 8 mL per hour increments every 15 minutes.
    - The infusion rate should not exceed 100 mL per hour.

- After the Elaprase® solution has been infused, flush the infusion line with 50 ml 0.9% Sodium Chloride Injection at the last infusion rate tolerated by the patient. Do not push the flush.

PROCEDURE:

1. Obtain and verify physician's orders including any pre-medication orders, concentration, rate of infusion, and emergency protocols (in-date anaphylactic kit on-hand). If you notice any discrepancies in the orders, notify the Agency before proceeding.

2. Explain procedure and purpose to patient and caregiver.

3. Perform initial Hand Hygiene and maintain throughout the procedure.

4. Assemble supplies on a clean, dry surface. Ensure all supplies needed to complete the infusion from beginning to end are available. If any supplies are missing, notify the Agency immediately, prior to starting the infusion process.

5. Assess and record patient's vital signs to establish a baseline and ensure vital signs are not contraindicative to starting the infusion.

6. Visually inspect each vial of medication.

7. Check the expiration dates on each vial to ensure they are within date.

8. Establish peripheral IV access or ensure access is in working condition. DO NOT tamper with medication until IV access is established. After 2 unsuccessful IV attempts, notify Agency immediately for further instruction on how to proceed.

9. Remove the flip off cap(s) from the vials and wipe the top of the vial(s) with alcohol.

10. Reconstitute or mix medication per pharmacy’s instructions.

11. Flush IV access device with 5 -10 ml 0.9% sodium chloride or 5% dextrose to assure patency.

12. Attach primed tubing directly into IV line.

13. Program infusion rates into infusion pump.

14. Begin the infusion. Administer intravenously per the rate(s) on the order.

15. Assess vital signs at baseline, every 15 minutes for the first hour, hourly and with each rate change, and post infusion.

16. Once infusion is complete, flush the IV with 10mL of saline (unless a different amount is noted in the physician’s order).
17. Disconnect the patient and remove the IV.

18. Place a pressure dressing at the IV site.

19. Clean up your workspace and properly discard all waste ensuring that all needles have been placed in a sharp’s container.

20. Document the procedure, the patient’s response to the procedure, and all lot numbers and expirations dates for vials used.

21. **Note:** If the infusion is not completed for any reason, notify the Agency immediately so the Pharmacy can be notified, and advisement received on how to store or dispose of the medication properly.

- Examples for incomplete infusions include losing IV access that is unable to be re-established, symptoms of intolerance, medication is unusable or compromised (broken / leaking vial or discolored or altered in normal appearance). **NEVER** discard the medication without speaking to the Agency first.