# MEDICATION ADMINISTRATION

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# MEDICATION ADMINISTRATION

## CALCULATING IV FLOW RATES AND DOSAGES

### Policy

Prescribed intravenous medications will be infused at an accurate rate of administration.

### General Guidelines

1. The Nurse responsible for administering IV medications and solutions shall be knowledgeable of:
    a. indications for use;
    b. appropriate doses and diluents;
    c. side effects;
    d. toxicities;
    e. incompatibilities;
    f. stability;
    g. storage requirements; and
    h. potential complications.
2. Verify with State Nurse Practice Act the scope of practice for RNs and LPNs regarding this procedure.
3. Always verify calculations with a second Nurse or the Pharmacist.
4. An electronic pump or flow control device is recommended for more accurate rate control.
5. The method of counting drops can be used to verify rate.

### Equipment and Supplies

1. Calculator for accurate calculation
2. Labeled infusate bag with pharmacy recommended (or Physician ordered) rate and infusion time
3. Administration set

### Assessment

1. Inspect medication label for accuracy (correct name, dose, medication, route of administration and time). Compare to physician order.
2. Confirm type of infusate, route, and rate of administration with second professional if necessary.
3. Assess resident's physical status and intravenous catheter/insertion site.
4. Ensure compatibility between medication and infusion solution.
5. Review the resident's care plan to assess for medical history of problems with fluid overload which would require any rate adjustment.

# MEDICATION ADMINISTRATION

## Procedure

1. **Calculating mL/hr**

   $\frac{\text{mL to be infused}}{\text{Total infusion time}} = \text{mL/hour}$

   Example: 1000 mL to infuse over 8 hours

   $\frac{1000\ \text{mL}}{8\text{hr}} = 125\ \text{mL/hr}$

2. **Calculating drops per minute using the hourly rate**

   $\frac{(\text{Hourly rate})(\text{Drop factor})}{\text{Time in minutes}}$ OR $\frac{\text{mL}}{\text{hr}} \times \frac{\text{gtts}}{\text{mL}} \times \frac{1\text{hr}}{60\ \text{mins}} = \text{gtts/minute}$

   Example: 1000 mL at 125 mL/hour; Drop factor 20 gtts/mL

   $\frac{125\ \text{mL}}{1\ \text{hour}} \times \frac{20\ \text{gtts}}{1\ \text{mL}} \times \frac{1\ \text{hour}}{60\ \text{minutes}} = 42\ \text{gtts/minute}$

3. **Calculating drops per minute using the total volume**

   $\frac{(\text{Volume})(\text{Drop factor})}{\text{Total time in minutes}}$ OR $\frac{\text{mL}}{\text{total hrs}} \times \frac{\text{gtts}}{\text{mL}} \times \frac{1\text{hr}}{60\ \text{mins}} = \text{gtts/minute}$

   Example: 1000 mL to infuse over 10 hours; Drop factor 20 gtts/mL

   $\frac{1000\ \text{mL}}{10\ \text{hr}} \times \frac{20\ \text{gtts}}{\text{mL}} \times \frac{1\ \text{hr}}{60\ \text{min}} = 33\ \text{gtts/minute}$

4. **Calculating drug dosage in milliliters (mL)**

   $\frac{(\text{Desired dosage})(\text{volume on hand})}{\text{Dosage on hand}}$ OR $\text{mg} \times \frac{\text{mL}}{\text{mg}} = \text{mL}$

   Example: Ordered ampicillin 350 mg IV q 6 hours. The vial on hand contains 500 mg/5 mL. How many mL of medication should be added to mini bag?

   $350\ \text{mg} \times \frac{5\ \text{mL}}{500\ \text{mg}} = 3.5\ \text{mL}$

# MEDICATION ADMINISTRATION

## Documentation

1. If the Pharmacist is contacted to calculate rate, document Pharmacist's name and pharmacy name.
2. Type of infusion device that was used to infuse medication or solution – pump, flow control device, gravity tubing.
3. Calculated flow rate.

## Reporting

Any change in rate from the physician order. Reason for changing rate.

# MEDICATION ADMINISTRATION

## WITHDRAWAL AND TRANSFER OF FLUID FROM A VIAL

### Policy

Staff will be knowledgeable regarding proper medication withdrawal and transfer from a vial.

### General Guidelines

1. Injectable medication vials are containers with a rubber stopper secured to its top by an aluminum band. A cap or aluminum cover usually protects the rubber stopper. Most protective caps do not ensure sterility of the rubber closure.
2. Vials with noted or suspected contaminants or abnormal properties will be discarded.
3. After initial opening, the beyond-use date of multiple-dose medication vials is 28 days unless otherwise specified by the manufacturer.
4. Vials labeled as "single dose" or "single use" will not be used on multiple residents. Such vials will be used only for one resident in a single procedure.
5. Single-dose vials may be used for up to one hour after initial puncture.

### Equipment and Supplies

1. Medication vial;
2. Alcohol wipes;
3. Syringe of appropriate size;
4. Needle of appropriate gauge; and
5. Sterile Luer Lok™ cap, if applicable.

### Procedure

1. Assemble equipment and supplies.
2. Inspect the vial's protective cap and rubber stopper for physical integrity. Remove the vial's protective cap.
3. Disinfect by wiping the rubber stopper with alcohol wipe, leaving no excess on top of the closure.
4. Attach a Luer Lok™ needle to a syringe of appropriate size. An 18-gauge needle is a common size.
5. Pull the syringe plunger back to approximately 2 to 3 mL less than the required volume of medication, not touching any part of the plunger except the flat portion at the end.
6. Remove the needle's protective cover by pulling straight off. Do not twist.
7. Grasp the vial base with one hand.
8. With the other hand hold the syringe barrel and place the needle at a 45 degree angle to the rubber stopper.
9. Insert the needle with the bevel facing upward and with a slight pressure away from the bevel, applying lateral and downward pressure.
10. Once the needle has penetrated the rubber closure, bring the needle and syringe to a vertical position and complete the penetration.
11. Keeping the needle inserted into the vial, invert the vial and syringe so that the vial is now above the syringe.
12. Gradually inject the air in the syringe barrel into the vial in small increments.

13. Avoid injecting all the air at once to prevent unnecessary foaming and ultimately excessive build-up of pressure inside the vial to avoid a potential blowout.
14. Holding the index finger on the lip of the syringe, gently pull the plunger with the thumb and middle finger to withdraw fluid.
15. Remove air bubbles from the inside walls of the syringes by keeping the needle inserted in the vial and gently tapping the barrel of the syringe using "flicking" motion with thumb and index finger.
16. Determine the final medication volume and remove the needle from the rubber stopper of the vial. The vial is left with a slightly negative pressure to prevent "spitting" of solution from around the puncture site as the needle is withdrawn.
17. Remove the needle and syringe from the rubber stopper with a quick straight pull. This can be done with the vial inverted, but slightly tilted; making sure that the rubber stopper is not being bathed with the solution or rest the vial right side up on the work surface and withdraw.
18. The syringe is turned upward after withdrawal to prevent leakage out of the needle.
19. If the syringe volume needs to be adjusted after the needle has been withdrawn from the vial, pull back a short distance on the plunger before pushing the plunger forward to clear the needle and hub of fluid and minimize release of medication onto the work surface area.
20. Remove the needle and place a sterile Luer Lok™ cap at the end of the syringe for transportation to the resident's room or place of medication administration.

# MEDICATION ADMINISTRATION

## WITHDRAWAL AND TRANSFER OF FLUID FROM AN AMPULE

### Policy

Staff will be knowledgeable regarding proper withdrawal and transfer of medication from an ampule.

### General Guidelines

1. Ampules with noted or suspected contaminants or abnormal properties will be discarded.
2. Single dose ampules will be discarded after opening and not stored for any time period.

### Equipment and Supplies

1. Medication ampule
2. Alcohol wipes
3. 5-micron filter straw
4. Syringe of appropriate size
5. Needle of appropriate gauge
6. Sterile Luer Lok™ cap if applicable

### Procedure

1. Assemble equipment and supplies needed.
2. Disinfect the neck of the ampule completely with an alcohol wipe.
3. Ensure no liquid remains in the neck of the top of the ampule. Hold the ampule upright and tap or "flick" the top of the ampule to remove any liquid trapped in the area in order to minimize the formation of aerosols upon opening.
4. Wrap an alcohol wipe around the neck of the ampule and grasp the ampule on each side with the thumb and index finger of each hand.
5. Attach a 5-micron filter straw to an appropriate size syringe, leaving the plastic protective covering in place.
6. Press the plunger down towards the tip of the barrel to expel air and loosen plunger.
7. Remove the protective covering from the filter straw.
8. With one hand, tilt the ampule slightly and insert the filter straw through the opening of the ampule.
9. Withdraw the required volume by pulling the plunger away from the barrel of the syringe using the thumb and index finger of the hand in which the syringe is being held. Do not touch the plunger around the mid-portion when withdrawing the fluid.
10. The tip of the filter straw should be below the fluid surface but not touching the bottom of the ampule to avoid areas of glass concentration. This will avoid aspirating any glass particles floating on the surface or laying on the bottom of the ampule.
11. After obtaining the desired volume from the ampule, remove the filter straw from the ampule.
12. Tap the barrel of the syringe and remove any excess air bubbles.
13. Return the protective covering onto the filter straw and remove from the hub of the syringe.
14. Place a sterile Luer Lok™ cap at the end of the syringe for transportation to the resident's room or place of medication administration.

# MEDICATION ADMINISTRATION

## RECONSTITUTION OF A MEDICATION FROM A VIAL

### Policy

Staff will be knowledgeable regarding guidelines for the reconstitution of a medication provided in a vial (bottle).

### General Guidelines

1. Injectable medication vials are containers with a rubber stopper secured to its top by an aluminum band. A cap or aluminum cover usually protects the rubber stopper. Most protective caps do not ensure sterility of the rubber closure.
2. Vials with noted or suspected contaminants or abnormal properties will be discarded.
3. Reconstitution will be done in accordance with manufacturers' recommendations.
4. After initial opening, the beyond-use date of multiple-dose medication vials is 28 days unless otherwise specified by the manufacturer.
5. Single-dose vials may be used for up to one hour after initial puncture.
6. Vials labeled as "single dose" or "single use" will not be used on multiple residents. Such vials will be used only for one resident in a single procedure.
7. Refer to the *Withdrawal and Transfer of Fluid from a Vial* Policy for general guidelines on medication withdrawal from a vial.

### Equipment and Supplies

1. Powdered medication in vial;
2. Diluent;
3. Alcohol wipes;
4. Syringe of appropriate size;
5. Needle of appropriate gauge; and
6. Filter, if necessary.

### Procedure

1. Assemble equipment and supplies needed.
2. Inspect the vial's protective cap and rubber stopper for physical integrity. Remove the vial's protective cap.
3. Disinfect by wiping the rubber stopper(s) with alcohol wipe, leaving no excess on top of the closure(s).
4. Determine the correct volume of a suitable diluent to reconstitute the powdered medication by referring to the manufacturer's guideline (or package insert).
5. Using a needle and syringe, remove the diluent from its container, eliminating all air bubbles inside the syringe.
6. Inject the diluent into the vial containing the powdered medication. As the diluent is added, an equal volume of air must be removed in order to prevent a positive pressure from developing inside the vial. To do this, let air in the vial flow back into the syringe before removing the needle from the vial.
7. Remove the needle and swirl or shake (if permissible) the vial until the entire medication is dissolved.

8. Reinsert the needle, inverting both the vial and syringe. If no air is in the syringe, pull back on the plunger to withdraw the proper volume of medication solution. If air is in the syringe barrel, gradually inject air into the vial a little at a time, pulling back on the plunger after each injection. Avoid injecting all the air at once in order to avoid foaming and excessive build up of pressure within the vial.
9. To remove air bubbles from the syringe, keep the needle inserted in the vial and tap the barrel of the syringe to allow air bubbles to surface. Push the plunger forward to expel air into the vial.
10. To prevent leakage, remove the needle and syringe from the stopper with a quick, straight pull, turning the syringe up.
11. If it becomes necessary to adjust the volume in the syringe after the needle has been withdrawn from the vial, pull back a short distance on the plunger before pushing the plunger forward. This clears the needle and hub of fluid and minimizes the release of medication into the work space.
12. If the solution is to remain in the syringe for administration, remove excess air and cap with a sterile syringe cap.

## USP <797> Compliance

1. Medications that are reconstituted and/or added to an infusion solution at the bedside or in the nursing station without sterile conditions or engineering controls are considered to be at high risk for microbial contamination.
2. These preparations are classified as "immediate-use category" in the *United States Pharmacopeia* Chapter 797 (USP<797>) pharmacy compounding risk level assessment.
3. Immediate-use preparations are exempt from USP chapter <797> requirements for *Compounding Sterile Preparations* as long as the following criteria are met:
    a. The CSP must be for emergent use, or for situations where a delay associated with lower-risk compounding would add risk for the resident.
    b. The preparation involves the simple transfer of not more than three commercially manufactured packages of sterile, non-hazardous drugs or diagnostic radiopharmaceuticals in their original containers.
    c. The transfer of substances does not involve more than two entries into any one container or package of sterile infusion solution or administration container (e.g., bag or vial).
    d. Process must utilize aseptic technique.
    e. The compounding process must lass less than one continuous hour.
    f. The CSP must be administered less than one hour after preparation begins, or it must be properly discarded.
    g. The CSP must be administered immediately and completely (or the administration witnessed) by the person who prepared it, OR the CSP must be labeled with:
        1. the resident/patient identification information;
        2. the names and amount of all ingredients;
        3. the name or initials of the person who prepared the CSP; and
        4. the exact 1-hour beyond-use date (BUD) and time.
    h. The CSP not be compounded in batches or stored.

# MEDICATION ADMINISTRATION

## ELECTRONIC INFUSION DEVICES/PUMPS

### Policy

Electronic infusion devices or pumps will be selected to best meet the needs of the resident with regard to pharmaceutical considerations and effectiveness of medication administration.

Devices supplied by the pharmacy will be cared for and maintained by facility staff.

### General Guidelines

1. Intravenous therapies shall be administered via the system that best meets the resident needs, based on factors including but not limited to:
    a. age;
    b. disease process;
    c. ambulatory status;
    d. cognitive and physical abilities;
    e. medication and diluent ordered;
    f. education and training required for staff;
    g. safety issues related to use in facility; and
    h. payor source.
2. A wide range of pumps are available from several manufacturers. The products offer various programmable features. Factors that play an important role in the decision to use a particular type of pump as the delivery system of choice include, but are not limited to:
    a. Syringe pumps:
        (1) Volume of medication is less than 50 mL.
        (2) Dosing is one (1) to four (4) times a day.
        (3) Resident is mobile or active.
        (4) Refrigerator space is limited.
    b. Ambulatory pumps for small volume infusions:
        (1) Pain management (bolus, continuous or both).
        (2) Chemotherapy.
        (3) Anticoagulant therapy.
        (4) Inotropic therapy.
        (5) Antibiotic therapy, if stable, every four (4) hours or every six (6) hours.
        (6) Resident has impaired cognitive or learning abilities.
        (7) Ambulatory residents on parenteral nutrition during the day.
        (8) Parenteral nutrition.
        (9) Continuous hydration.
    c. Pole-mounted or stationary pumps:
        (1) Hydration, especially those with higher concentrations of potassium.
        (2) Parenteral nutrition.
        (3) Antibiotics in fluids over 250 mL volume.
        (4) Steroid therapy.
        (5) Intravenous Immunoglobulin therapy (IVIG).

(6) Amphotericin.
(7) All additives, solutions or medications that have narrow therapeutic index levels.

3. Procedures for preparation of intravenous solutions to be administered via pumps shall be conducted in the clean room with appropriate supplies following hand hygiene and protective personal attire procedures.
4. Each pump has specific instructions for use procedures per manufacturer's recommendations.

## Procedure

1. The Pharmacist and the Nurse performing the resident assessment upon new orders for IV therapy determine the most appropriate infusion device. Recommended uses for pumps include, but are not limited to:
    a. cytotoxic infusions over two (2) hours;
    b. heparin;
    c. inotropic therapy;
    d. pain management therapy;
    e. potassium chloride (KCl) infusions over 20mEq/L; and
    f. total Parenteral Nutrition (TPN).
2. Nurses shall be provided with verbal and written instructions regarding pump operation and care upon initial pump dispensing.
3. Whenever possible, pumps will be plugged into an electrical wall outlet.
4. Pumps are dispensed per resident. Once intravenous therapy is complete, pumps will be returned to the pharmacy for cleaning and inspection between resident uses.
5. Equipment will be secured during transport to prevent damage.
6. Clean and dirty pumps will be stored separately during transport.
7. Administration sets/tubing, medication cassettes or other attachments should be removed and disposed of properly before returning to the pharmacy.
8. Dirty pumps shall be handled with gloves on, placed in plastic bags, and labeled as dirty.
9. While in use in the facility, pumps will be periodically monitored for:
    a. visual structure (loose or broken parts, cracks, irregularities or other damage);
    b. alarm functioning;
    c. power cord and plug functioning;
    d. battery functioning; and
    e. volumetric accuracy or flow rate (calibration).
10. When a pump is determined to be faulty, the pharmacy is to be notified and the malfunctioning pump will be returned to the pharmacy for inspection and repair.
11. The malfunctioning pump will be replaced immediately. Facilities geographically distant from the pharmacy may require a backup pump to be available in the facility in the event of pump failure.
12. All pumps will undergo servicing (arranged by the pharmacy) at least once annually, or at the manufacturer's recommendation.
13. Preventative maintenance stickers will be on all pumps.
14. Facilities shall be informed of the pharmacy's 24 hour emergency services for pump problems or replacement.
15. The Pharmacy Manager shall notify the pharmacy and nursing staffs of equipment hazards, defects and recalls as alerted.

# MEDICATION ADMINISTRATION

## Documentation

1. Documentation of staff training in the proper procedures regarding pump dispensing, care, and maintenance shall be completed and kept in the staff's file. This documentation should indicate that the staff has been trained on the proper use and care procedures for equipment.

# MEDICATION ADMINISTRATION

## ELASTOMERIC INFUSION DEVICES

### Policy

Staff will be knowledgeable regarding the use of elastomeric infusion devices.

### General Guidelines

1. An elastomeric infusion device is a non-electric disposable pump consisting of an elastomeric reservoir (balloon containing the medication) with a filling port that is housed within an outer protective shell, and a flow restrictor system within the administration set.
2. The device administers a set volume of fluid over a given time period. The flow rate is determined by the pressure in the filled reservoir, flow control (narrow bore) tubing and the flow restrictor.
3. A wide range of elastomeric infusion devices is available from a number of manufacturers. The products offer various flow rates and infusion times, with differing physical features. Devices can infuse at flow rates of 0.5-500 mL/hour, with running times from 30 minutes to 12 days.
4. Reservoir volume usually ranges from 60 to 500 mL.
5. Examples of elastomeric infusion devices include: Eclipse® [1], Homepump® [2], Infusor® [3], Intermate® [4], ReadyMED® [5], and Sidekick® [6].
6. Factors that play an important role in the decision to use elastomeric infusion devices as the delivery system of choice include:
    a. medication dosed once or twice a day;
    b. resident's physical or cognitive abilities allow understanding of device use;
    c. resident is ambulatory or mobile;
    d. central or midline venous access preferred, however reliable peripheral access is acceptable; and
    e. payor status allows use.
7. Elastomeric infusion devices may be utilized to deliver medications for:
    a. antibiotic treatment;
    b. chemotherapy;
    c. pain management; and
    d. chelation therapy.
8. Elastomeric infusion units are disposable and should be discarded after a single use. The devices shall not be refilled or re-sterilized

[1] Eclipse® is a trademark (or registered trademark) of I-Flow Corporation (www.iflo.com).
[2] Homepump® is a trademark (or registered trademark) of I-Flow Corporation (www.iflo.com).
[3] Infusor® is a trademark (or registered trademark) of Baxter International Inc. (www.baxter.com).
[4] Intermate® is a trademark (or registered trademark) of Baxter International Inc. (www.baxter.com).
[5] ReadyMED® is a trademark (or registered trademark) of Alaris Medical Systems (www.alarismed.com).
[6] Sidekick® is a trademark (or registered trademark) of I-Flow Corporation (www.iflo.com).

# MEDICATION ADMINISTRATION

## ADMINISTERING MEDICATIONS THROUGH A SECONDARY TUBING

### Policy

Staff will be knowledgeable regarding the safe and aseptic administration of medications intravenously through a secondary ("piggy back") line.

### General Guidelines

1. The Nurse responsible for administering IV medications shall be knowledgeable of:
    a. indications for use;
    b. appropriate routes of administration, doses and diluents;
    c. side effects;
    d. toxicities;
    e. incompatibilities;
    f. stability;
    g. storage requirements;
    h. potential complications; and
    i. allergies.
2. Administer the first dose of IV medication in a situation in which close observation of the resident and the ability to intervene in the case of complications is possible.
3. Consult manufacturer's recommendations regarding recommended monitoring and potential side effects of medication.
4. Obtain an order for anaphylaxis protocol, or note if there is a standing protocol for intervention.
5. Observe the resident during infusion and for a minimum of one hour after completion of the infusion.
6. Primary and secondary continuous sets are changed no more frequently than every 96 hours or upon suspected contamination. [1]
7. Primary intermittent sets are changed every 24 hours.
8. If a secondary administration set is disconnected from a primary administration set, the secondary administration set is considered intermittent and is then changed every 24 hours. [2]

### Equipment and Supplies

1. Prescribed medication in IV bag, normal saline[3] flush bag, or prescribed hydration fluid bag;
    a. Medication may need to be reconstituted or mixed first. When diluting or reconstituting medications, follow USP <797> guidelines for compounding sterile preparations.
2. Primary and secondary tubing;
3. Needleless connection device;
4. Gloves;
5. Alcohol wipes; and
6. Tape (optional).

[1] INS 2011 Standard 43, Practice Criteria IIA
[2] INS 2011 Standard 43, Practice Criteria IIC
[3] Preservative-free 0.9% sodium chloride

# MEDICATION ADMINISTRATION

## Assessment

1. Inspect insertion site and catheter for any signs or symptoms of IV-related complications before hanging solution. This should be done at least once a shift and during infusion procedure.
    a. If any complications are noted, intervene as appropriate according to facility protocol.
2. Prior to administering IV solutions, assess the following:
    a. General assessment of resident health status, and cardiac and respiratory status;
    b. Allergies;
    c. Baseline vital signs, weight, height (for pharmacy dosing needs);
    d. The Physician's rationale for ordering treatment, laboratory results, and appropriateness of treatment;
    e. Review physician's order, confirm the "5 Rights" of medication administration (right resident, medication name, dose, route, rate). If no rate is ordered, calculate rate according to dose, volume and time ordered;
    f. Check medication bag for leaks, sterility, precipitate, and expiration date;
    g. Ensure compatibility of secondary solution and primary solution; and
    h. If multiple medications are being placed on secondary tubing, check with pharmacy to determine if separate tubing is needed for each medication.

## Procedure

1. Perform hand antisepsis and don non-sterile gloves.
2. Connect secondary administration set to piggy back medication solution bag.
3. Prime primary tubing with ordered solution or normal saline. Prime secondary tubing with ordered medication. All air bubbles must be removed from tubing before attaching to resident.
4. Hang both IV bags on the IV pole.
    a. If infusing via gravity: The secondary (smaller) bag is hung higher than the primary bag.
    b. If infusing via pump: Both bags can be hung at the same level.
5. Disinfect Y access port.
6. Attach secondary administration line to primary line at the Y port using needleless connection device.
7. Administer medication according to prescribed rate using pump or gravity flow control device.
    a. If infusing via gravity: Only the secondary solution should be infusing. The primary solution should start running after the secondary solution has been infused.
    b. If infusing via pump: The primary and secondary solutions should be individually set for rate and volume. This prevents the bag from either running dry or infusing too much fluid.
8. After the secondary infusion is completed, the secondary tubing should be clamped.
    a. If infusing via gravity: Primary bag needs to have the rate readjusted after secondary bag has been infused.
    b. If infusing via pump: Primary bag will automatically change back to set rates. Monitor pump actions.
9. Leave secondary administration set in place until next medication is scheduled to be administered. If medication is given every 24 hours, the secondary bag should be disconnected and discarded in appropriate receptacle.
10. Discard used supplies in appropriate receptacles.
11. Perform hand antisepsis.

# MEDICATION ADMINISTRATION

## Documentation

1. Document the following in the resident's medical record.
    a. Medication;
    b. Dose;
    c. Total amount infused;
    d. Total time infused;
    e. Condition of the catheter site; and
    f. Resident response to the procedure, including any results of the medication (adverse or desired).

## Reporting

1. Notify Physician (or Supervisor per facility policy) and oncoming shift if medication was not infused or refused by resident.
2. Any complications with insertion site and interventions that were done.

# MEDICATION ADMINISTRATION

## ADMINISTERING MEDICATIONS BY IV PUSH

### Policy

Staff will be knowledgeable regarding the safe and aseptic administration of a medication bolus directly into the venous system through a vascular access device.

### General Guidelines

1. The IV push route of administration directly boluses medications into the venous system through a vascular access device at a rate not to exceed 1 mL/minute.
2. Many medications may be utilized for the IV push type of administration. Examples include:
    a. antihistamines (such as diphenhydramine);
    b. diuretics (such as furosemide and torsemide);
    c. glucagon;
    d. narcotics (such as hydromorphone and morphine); and
    e. steroids (such as dexamethasone).
3. A physician's order is necessary to administer medication via this route.
4. The Nurse responsible for IV medications shall be knowledgeable of:
    a. indications for use;
    b. appropriate routes of administration, doses and diluents;
    c. side effects;
    d. toxicities;
    e. incompatibilities;
    f. stability;
    g. storage requirements;
    h. potential complications; and
    i. length of time needed to administer medication.
5. Verify with State Nurse Practice Act the scope of practice for RNs and LPNs regarding this procedure.
6. Administer the first dose of intravenous medication in a situation in which close observation of the resident and the ability to intervene in the case of complications is possible.
7. Obtain anaphylaxis protocols/orders.
8. Follow manufacturer recommendations and pharmacy/facility guidelines for approved routes of medication administration for particular medications. SOME MEDICATIONS CAN NOT BE ADMINISTERED VIA IV PUSH.

### Equipment and Supplies

1. Medication vial or ampule;
2. Medication labels for syringe;
3. Normal saline[1] or heparin for flush per facility protocol;
4. Needleless connection device/adapter, if needed;
5. Sterile syringe to withdraw medication;

[1] Preservative-free 0.9% sodium chloride

6. Filter straw if withdrawing medicine from glass ampule;
7. Non-sterile gloves;
8. Alcohol wipes, tape; and
9. Mini-bag of flush solution if needed.

## Assessment

1. Inspect intravenous catheter site for signs of complications at scheduled intervals, upon routine site care and during administration set changes.
2. Prior to administration of intravenous medications assess resident's:
    a. overall health status;
    b. cardiovascular status;
    c. history of allergies;
    d. baseline vital signs, height and weight; and
    e. laboratory/test results and appropriateness of therapy.
3. Review physician's order to confirm type of medication, amount, route, and rate of administration.
4. Verify the identity of the resident.
5. Inspect medication label and verify against the order.
6. Check vial for leaks, cracks, precipitate and expiration date.
7. Use a separate syringe for each medication. Give one medicine at a time, flushing with normal saline in between medications.

## Procedure

1. Perform hand antisepsis. Apply non-sterile gloves.
2. Withdraw medication from vial or glass ampule (use filter straw to withdraw medication from glass ampule).
    a. Vials labeled as "single dose" or "single use" will not be used on multiple residents. Such vials will be used only for one resident in a single procedure.
3. Dilute medication with appropriate diluent (follow manufacturer guidelines or consult pharmacy).
    a. When diluting or reconstituting medications, follow USP <797> guidelines for compounding sterile preparations.
4. To administer medication directly through an IV catheter:
    a. disinfect needleless connection device;
    b. attach normal saline-filled syringe and flush the catheter;
    c. disinfect needleless connection device again;
    d. attach medication-filled syringe and administer medication according to prescribed rate. If no rate is specified, administer over 1-2 minutes;

# MEDICATION ADMINISTRATION

**To calculate mL/minute:**

$\frac{\text{mL to be infused}}{\text{number of minutes}} = \text{mL/min}$

Example: Order is for 25 mg of medication "A" to be administered over 5 minutes. Vial contains 25 mg/mL and must be diluted in 5 mL of sterile water. Total amount to be infused is 6 mL (1 mL of medication + 5 mL diluent).

$\frac{6 \text{ mL}}{5 \text{ minutes}} = 1.2 \text{ mL/min}$

e. monitor time with second hand on watch. (It is important to push at a controlled rate to avoid too high of a concentration of medication in a short period of time);
f. disinfect catheter connection device;
g. flush catheter with appropriate flush (normal saline or dextrose) at the same rate that medication had been given to avoid giving a fast bolus dose;
h. observe to make sure that medication has cleared the catheter; and
i. finish flushing catheter with normal saline, and heparin (if required).

5. To administer through the side (Y) port of the administration set tubing:
    a. open IV clamp and allow primary solution to flow freely;
    b. disinfect the Y port;
    c. attach medication-filled syringe to Y port and administer medication per calculated rate. Stop intermittently to allow primary solution to flow;
    d. after medication is administered, allow the IV solution to flush the tubing and catheter; and
    e. return infusion to prescribed rate.
6. Discard used supplies in appropriate receptacle.
7. Perform hand antisepsis.

## Documentation

1. Document the following in the resident's medical record:
    a. Medication;
    b. Dose;
    c. Total amount infused;
    d. Total time infused;
    e. Condition of the catheter site; and
    f. Resident response to the procedure, including any results of the medication (adverse or desired).

## Reporting

1. Report to Physician, Supervisor and the oncoming shift any results, problems or complications (if any) that occurred during the medication administration.

# MEDICATION ADMINISTRATION

## ADMIXTURES (NEEDLE AND SYRINGE TRANSFER OF MEDICATIONS)

### Policy

1. Admixture of medications should only be done when the pharmacy is unable to do procedure in a timely manner for resident need.
2. All admixture medications will be prepared aseptically.

### General Guidelines

1. Verify with State Nurse Practice Act regarding RN/LPN scope of practice for this procedure.
2. IV admixtures are routinely prepared in the pharmacy.
3. Admixtures are prepared by Nurses in the following situations:
    a. Medication instability requires addition of medication to bag immediately prior to administration.
    b. Immediate administration of medication is required according to clinical situation.
    c. The medication is required after regular business hours and the supplies are available in the facility.
4. Most admixtures can be done using needleless system bags with attached medications. These are mixed just before administering the medication.
5. Use appropriate diluent when preparing medication.
6. Consult Pharmacist or pharmacy information books when unfamiliar with the medication or mixing the medication. This includes diluent and dosage of medication to be given to resident.
7. Label the admixture medication bag with:
    a. name, dose, route of medication;
    b. resident's name, room number;
    c. name of person who prepared medication; and
    d. date and time when medication was mixed.
8. Follow manufacturer recommendations for storage and expiration of admixture medications.

### Equipment and Supplies

1. Prescribed medication;
2. Syringe with 1 inch needle;
3. Label for bag;
4. Alcohol wipe;
5. Non-sterile gloves;
6. Clean work area; and
7. Filter needle/straw for glass vial medications.

### Procedure

1. Verify physician order for medication.
2. Work area should be a clean, draft free environment away from unit traffic.
3. Clean work area with soap and water, 70% alcohol or antibacterial cleaner. Allow to air dry.

4. Wash hands, wear non-sterile gloves.
5. Inspect medication and diluent for any signs of problems. If any irregularities are noted, do not use the medication and contact the pharmacy.
6. Cleanse the top and neck of medication bottle with alcohol wipe for at least 15 seconds. Allow to air dry before placing needle in bottle. Also clean end of diluent bag where medication needle will be placed.
7. If using a glass vial, clean around neck of vial with alcohol wipe before breaking vial. Use a filter straw on sterile syringe to withdraw medication, then remove filter straw and place sterile needle on medicine syringe.
8. For powdered medication that requires reconstitution:
    a. Draw up the appropriate amount of diluent into the syringe using needle or needleless system.
    b. Transfer diluent into medication container.
    c. Gently rotate medication vial to thoroughly mix additive (check medication insert for specific instructions).
    d. Repeat this procedure until the required number of vials is reconstituted. Discard unused medication.
    e. Withdraw reconstituted medication into syringe with needle or filter straw (if medicine is drawn from glass ampule).
    f. Transfer medication to IV solution container or administer by ordered route.
    g. Inspect solution for any interactions or problems. Do not use if there are any problems.
    h. Label bag.
9. For reconstituted or premixed medications:
    a. Calculate the amount of medication that should be withdrawn from bottle. Verify with Pharmacist if necessary.
    b. Place sterile needle on sterile syringe to withdraw medication. Use filter straw if drawing from a glass vial, then replace filter straw with needle on syringe.
    c. Withdraw ordered dosage of medication, transfer medication into mini-bag.
    d. Rotate bag back and forth – DO NOT SHAKE, until medication is mixed. If multiple bottles of medication are to be used to achieve the ordered dosage, repeat steps as described above.
    e. Observe for any interactions or problems with solution.
    f. Label solution.
    g. Discard any unused portion of medication.
    h. Dispose of sharps in sharps container, other supplies as appropriate.

## USP <797> Compliance

1. Medications that are reconstituted and/or added to an infusion solution at the bedside or in the nursing station without sterile conditions or engineering controls are considered to be at high risk for microbial contamination.
2. These preparations are classified as “immediate-use category” in the *United States Pharmacopeia* Chapter 797 (USP<797>) pharmacy compounding risk level assessment.
3. Immediate-use preparations are exempt from USP chapter <797> requirements for *Compounding Sterile Preparations* as long as the following criteria are met:
    a. The CSP must be for emergent use, or for situations where a delay associated with lower-risk compounding would add risk for the resident.

b. The preparation involves the simple transfer of not more than three commercially manufactured packages of sterile, non-hazardous drugs or diagnostic radiopharmaceuticals in their original containers.
c. The transfer of substances does not involve more than two entries into any one container or package of sterile infusion solution or administration container (e.g., bag or vial).
d. Process must utilize aseptic technique.
e. The compounding process must lass less than one continuous hour.
f. The CSP must be administered less than one hour after preparation begins, or it must be properly discarded.
g. The CSP must be administered immediately and completely (or the administration witnessed) by the person who prepared it, OR the CSP must be labeled with:
    1. the resident/patient identification information;
    2. the names and amount of all ingredients;
    3. the name or initials of the person who prepared the CSP; and
    4. the exact 1-hour beyond-use date (BUD) and time.
h. The CSP not be compounded in batches or stored.

## Documentation

The following information should be recorded in the resident's medical record.

1. Time medication was given and by whom.
2. Medication, diluent, dosage, route, and who prepared solution.
3. Assessments of resident tolerance or problem with medication treatment.
4. Any complications with catheter or infusion process.
5. Any communication with pharmacy or Physician.

## Reporting

Report any problems with infusion to Physician and Supervisor. Report to oncoming shift Nurses as to specifics of procedure, and that orders were faxed to pharmacy for future doses (if needed).

# MEDICATION ADMINISTRATION

## MEDICATION OR SOLUTION COMPATIBILITY/INCOMPATIBILITY

### Definitions

**COMPATIBILITY** indicates that when two or more medications or solutions are mixed together there are no negative effects on the physical, chemical or therapeutic properties of the medication(s) or solution(s).

1. Compatibility means that medications and/or solutions can be mixed in the same infusion bag or given through the same tubing and catheter.
2. When administering medications through an IV catheter, flush with normal saline[1] between each medication to avoid interaction potential.

**INCOMPATIBILITY** results when two or more substances react or interact which alters the expected activity of one or more components. Medication or solution incompatibility can result in a loss of therapeutic effect or harm to resident. Types of incompatibility include:

1. Physical: occurs when combining a medication or solution causes physical changes to the mixture that are often visible. Signs can include any of the following: precipitate (floating particles), gas bubbles, cloudiness/haze, or color changes.
2. Chemical: occurs when there is a reaction between medications or solutions which results in an alteration of the integrity or potency of the active ingredient. Example: a reaction between acidic and alkaline medications/solutions resulting in a change of pH which makes environment unstable for the medication.
3. Therapeutic: occurs when the concomitant administration of medications or solutions leads to an altered or reduced therapeutic effect of the medication.

### General Guidelines

1. Follow manufacturer's instructions and warnings regarding appropriate volume and type of diluent and compatible solutions.
2. Flush catheters between medication administration per facility protocol or physician order.
3. Consult current pharmacy guidelines for medication incompatibilities prior to mixing multiple medications in a single syringe for IV push.
4. Be knowledgeable of medications that are known to be incompatible with other medications (e.g., phenytoin, heparin, furosemide, diazepam, etc.).
5. Observe for changes in the appearance of IV solutions in the bag or tubing after adding any medication.
6. Do not piggy back any medications into a parenteral line unless the Pharmacist has verified the compatibility of the mixtures.
7. If there are any signs of incompatibility DO NOT ADMINISTER THE MEDICATION OR SOLUTION. Notify the Physician and pharmacy.

[1] Preservative-free 0.9% sodium chloride

# MEDICATION ADMINISTRATION

## MEDICATION BEYOND-USE DATING

### Policy

All medications will have a beyond-use (expiration) date on the medication container or on a label if the medication is premixed.

### General Guidelines

1. A beyond-use date (BUD) is defined as the date or time after which a medication shall not be stored, transported or administered.
2. The date is determined by the pharmacy for compounded sterile preparations, or by the manufacturer for packaged ready-to-dispense medications.
3. Medications will not be used beyond the expiration date. If the medication was dispensed after the beyond-use date, contact the pharmacy. Otherwise, discard the medication.
4. The person who is administering the medication/solution is responsible for checking the expiration date prior to administering.

# MEDICATION ADMINISTRATION

## INTRAVENOUS ADMINISTRATION OF FLUIDS AND ELECTROLYTES

### Policy

Staff will be knowledgeable regarding the safe and aseptic administration of intravenous fluids and electrolytes for hydration.

### General Guidelines

1. A physician's order is necessary to give intravenous fluids and electrolytes.
2. Assess resident's lung and heart status and vital signs before and during therapy to assess for fluid overload.
3. The Nurse responsible for administering the fluids and electrolytes shall be knowledgeable of:
    a. indications for use;
    b. side effects;
    c. toxicities;
    d. incompatibilities;
    e. stability;
    f. storage requirements;
    g. potential complications; and
    h. appropriate rates, doses and routes of administration.
4. Administer the first dose of IV medication in a situation in which close observation of the resident and the ability to intervene in the case of complications is possible.
5. Obtain order for anaphylaxis protocol, or note if there is a standing protocol for intervention.
6. Resident should be monitored frequently when continuous fluids are infusing. Monitor for signs and symptoms of fluid overload, catheter and insertion site complications, and the resident's tolerance of procedure. Fluids may be stopped by a Nurse if signs of a problem are present.
7. When infusing continuous fluids, the tubing should not be changed more frequently than every 96 hours but at least every 7 days (per INS standard) or per facility policy.[1]

### Equipment and Supplies

1. Infusion solution
2. Administration set
3. Normal saline[2] or heparin for flush, if appropriate
4. Needleless connection device
5. Electronic infusion pump or flow control device
6. Gloves
7. Alcohol wipes
8. Tape

[1] INS 2011 Standard 43, Practice Criteria IIA
[2] Preservative-free 0.9% sodium chloride

# MEDICATION ADMINISTRATION

## Assessment

1. Inspect intravenous catheter and insertion site for signs and symptoms of complications at scheduled intervals (per facility policy), during routine site care and when changing administration sets.
2. Prior to administration of intravenous fluids and electrolytes assess resident's:
    a. overall health status;
    b. cardiovascular and respiratory status;
    c. history of allergies;
    d. baseline vital signs, height and weight; and
    e. laboratory results and appropriateness of therapy.
3. Review physician's order. Confirm type, volume of solution, route, and rate of administration.
4. Verify the identity of the resident.
5. Inspect solution for leaks, cracks, precipitate, and expiration date.

## Procedure

1. Perform hand antisepsis and apply non-sterile gloves.
2. Prime tubing of administration set.
3. Disinfect needleless connection device with alcohol wipe.
4. Flush catheter using normal saline per facility protocol.
5. Connect primed administration set to needleless connection device.
6. Open roller clamp.
7. Establish prescribed rate of flow:

    **If infusing via gravity:**
    a. Check orders for amount to be infused and duration.
    b. Calculate drops per minute.
    c. Adjust clamp to achieve desired flow rate.

    **If infusing via pump:**
    a. Check orders for amount to be infused and duration.
    b. Follow manufacturer's directions to program pump.
    c. Program to achieve desired flow rate.

8. When infusion is complete:

    **For intermittent therapy:**
    a. Clamp tubing and disconnect from catheter.
    b. If tubing will be reused, replace sterile cap.
    c. Flush catheter per protocol.

    **For continuous therapy:**
    a. Mark solution container with label that states when bag was started and approximate time of completion.
    b. Use a time tape on bag to mark time intervals.
    c. Never write directly on the bag with ink or marker; always use a label or tape.

9. Document procedure in the resident's medical record and on the intake/output record.

# MEDICATION ADMINISTRATION

## Documentation

The following information should be recorded in the resident's medical record:

1. The date and time the infusion was administered.
2. The type of solution administered.
3. The amount of solution administered.
4. The route of administration.
5. The rate of administration.
6. The condition of the IV site before and after administration.
7. Notification of the Physician if there are any complications.
8. Quote from resident stating how they tolerated the procedure.
9. The signature and title of the person recording the data.

## Reporting

1. Notify Physician, Supervisor, and oncoming shift of complications or resident refusal of treatment.
2. Report other information in accordance with facility policy and professional standards of practice.

# MEDICATION ADMINISTRATION

## INTRAVENOUS PAIN MANAGEMENT

### Policy

Staff will be knowledgeable regarding the safe and aseptic administration of intravenous (IV) pain medication.

### General Guidelines

1. Verify with State Nurse Practice Act the scope of practice for RNs and LPNs regarding this procedure.
2. A physician's order is necessary for this procedure.
3. The Nurse responsible for administering IV pain therapy shall be knowledgeable of:
    a. indications for use;
    b. appropriate doses and diluents;
    c. side effects;
    d. contraindications;
    e. toxicities;
    f. incompatibilities;
    g. stability;
    h. storage requirements;
    i. potential complications; and
    j. conventional and alternative methods of pain control.
4. Common indications for use of narcotics for pain management infusions include, but are not limited to:
    a. Residents with advanced stages of disease experiencing chronic, severe pain due to tumor recurrence or metastatic disease and unrelieved by conventional means of pain control due to one or more of the following reasons:
        (1) Emesis or difficulty swallowing negates oral analgesia.
        (2) Suppositories are contraindicated or ineffective.
        (3) Refuses other routes of administration.
        (4) Chronic pain makes intramuscular dosing impractical.
    b. Residents with other types of pain (such as chronic back pain) requiring individual assessment to determine appropriateness.
5. Verify anaphylaxis and naloxone medication protocols/orders/medications prior to the administration of IV pain medication.
6. Do not leave narcotic bags or cassettes in an unsecured area when not in use for resident infusion.
7. Administer the first dose of intravenous medication in a situation in which close observation of resident and the ability to intervene in the case of complications is possible.
8. Frequently observe and monitor the resident when IV pain medication is being administered. Monitor for pain control, change in vital signs, mental status, breathing status, nausea/vomiting, rash, or intolerance of medication.
9. Use a separate administration set for each medication.
10. When administering pain medication, use electronic infusion device to monitor rate of infusion.

# MEDICATION ADMINISTRATION

## Equipment and Supplies

1. Prescribed medication
2. Administration set
3. Normal saline[1] or heparin for flush, as appropriate
4. Needleless connection device
5. Electronic infusion pump
6. Gloves
7. Alcohol wipes
8. Tape

## Assessment

1. Inspect intravenous catheter site for signs of complications at scheduled intervals and upon routine site care and administration set changes.
2. Prior to administration of pain medications assess resident's:
    a. level of pain using appropriate pain scale;
    b. level of consciousness;
    c. history of allergies; and
    d. baseline vital signs, height and weight.
3. Prior to administration of intravenous pain medication, asses the resident for risk factors for respiratory depression and other adverse events, including:
    a. Age;
    b. Morbid obesity;
    c. Obstructive sleep apnea;
    d. COPD;
    e. Renal insufficiency.
4. Monitor resident during administration of pain medication for signs of:
    a. respiratory depression;
    b. level of consciousness/confusion;
    c. unsteady gait, risk of falling;
    d. nausea and vomiting;
    e. pruritus;
    f. constipation;
    g. urinary retention; and/or
    h. hypotension or hypertension.
5. Review physician's order. Confirm type and amount of medication, route, and rate of administration.
6. Verify the identity of the resident.
7. Check medication label and verify against the order.
8. Inspect medication for any leaks, cracks, precipitate and expiration date.

[1] Preservative-free 0.9% sodium chloride

# MEDICATION ADMINISTRATION

## Procedure

1. Perform hand antisepsis and don non-sterile gloves.
2. Prime tubing of administration set.
3. Disinfect needleless connection device.
4. Flush catheter.
5. Connect primed administration set to needleless connection device.
6. Open clamp on tubing.
7. Establish prescribed rate of flow using an electronic infusion pump.
    a. Follow orders for amount to be infused and duration.
    b. Follow manufacturer's directions to program pump.
    c. Program to achieve desired flow rate.
8. Begin infusion.
9. Instruct resident on expected outcomes and potential side effects.
10. Use pulse oximeter to monitor for respiratory depression. Monitor resident closely. Assess and re-assess the resident for:
    a. current level of pain;
    b. side effects of pain medications; and
    c. adverse reactions to pain medication.
11. When infusion is complete, clamp tubing and disconnect from catheter.
12. If tubing will be reused, replace sterile end cap on tubing.
13. Flush catheter per protocol.
14. Document procedure in the resident's medical record.

## Documentation

1. The following should be documented in the resident's medical record, and/or narcotic control record.
    a. Results of the initial and/or follow-up pain assessments.
    b. Any complications, side effects, problems with infusion, change in dose, refusal of medication.
    c. Any communication with Physician, Supervisor, or oncoming shift.
    d. Any waste of narcotic when treatment is finished.
    e. Effectiveness of pain treatment, per resident statement or use of scale.
    f. Any changes in orders.
    g. Condition of catheter and any complications/interventions.
2. Document narcotic administration in appropriate controlled medication record.

## Reporting

The following should be reported to Physician, Supervisor, and oncoming shift as per facility policy.

1. Resident refusal of treatment.
2. New onset or worsening of assessed or resident-reported pain level.
3. Effectiveness of treatment.
4. Any side effects or complications from treatment/interventions.
5. Resident statement regarding tolerance of treatment.

# MEDICATION ADMINISTRATION

## HYPODERMOCLYSIS – SUBCUTANEOUS HYDRATION

### Policy

Staff will be knowledgeable regarding administration of subcutaneous hydration to the resident.

### General Guidelines

1. Verify with State Nurse Practice Act the scope of practice for RNs and LPNs regarding this procedure.
2. Hypodermoclysis is a method of hydration that does not require an intravenous catheter for delivery.
3. Hypodermoclysis involves using small needles to deliver isotonic fluids (normal saline[1], lactated ringers) slowly into the subcutaneous tissue.
4. This system is designed for short-term, preventative hydration or for mild dehydration. Treatment usually lasts for no more than 7 days.
5. Hypodermoclysis is NOT for antibiotics, narcotics, or fluids with electrolytes (KCL, magnesium, etc.).
6. Sites for needle placement are the abdomen, stomach, and front or side of thighs.
7. The fluid is infused into the subcutaneous tissue where it is absorbed slowly. While the fluid is absorbed, a fluid wheal will form. This is normal and is not an infiltration of fluids.
8. Hypodermoclysis reduces the chance of the following complications associated with intravenous therapy:
    a. Fluid overload, CHF.
    b. Phlebitis.
    c. Infections.
9. Physician order should include:
    a. type and quantity of isotonic fluid;
    b. rate (determined by type of delivery set); and
    c. length of treatment.

### Equipment and Supplies

1. Hypodermoclysis set with needle strip or subcutaneous needle
2. Isotonic solution bag
3. Antiseptic skin cleaning solution
4. Non-sterile gloves
5. Transparent dressing
6. IV pole

### Procedure

1. Review physician order.
2. Explain procedure to resident.
3. Assemble fluid and kit.
4. Wash hands. Don non-sterile gloves.

[1] Preservative-free 0.9% sodium chloride

5. Prime tubing including attached needle set until all air is removed.
6. Do sterile site preparation and allow to air dry.
7. Pinch up skin or flatten skin. Insert needle strip flat into skin.
8. Secure needle strip to skin using transparent dressing. Tape tubing to skin.
9. Date dressing and tubing.
10. Start fluid and adjust flow rate. Make sure that resident is comfortable.
11. Monitor for fluid wheal formation. This is affected by metabolism rate of resident.
12. If necessary, the site may be lightly massaged to help fluid absorption.
13. Observe for any signs of peripheral edema (not the fluid wheal), leakage or fluid overload. Monitor for line disconnection from skin.
14. If the site needs to be changed, change the whole set, including needles. Contact pharmacy for new set. No new order is needed.
15. The tubing and needle are changed every 3 days; the IV bag every 24 hours.

## Documentation

1. Document the following in the resident's medical record upon insertion:
    a. Procedure.
    b. Type of fluids.
    c. Dressing and tubing.
2. Document the change date on the medication administration record.
3. Document the following in the resident's medical record every shift:
    a. The type of fluid being infused, location of needle placement.
    b. Intake and output totals.
    c. Time fluid bag was started and discontinued.
    d. Condition of skin where needles are inserted, any leakage, peripheral edema (not fluid wheal), statement from resident regarding how they are tolerating the treatment.
    e. Date and time of tubing and needle strip site change and reason for changing site (leakage, skin irritation, 72 hour site change).
    f. Any communication with Physician about problems, laboratory values.

## Reporting

1. Report to Physician or Supervisor any information about treatment.
2. Report to oncoming shift Nurses the type of treatment, needle insertion site, any complications, and any objective information concerning treatment.

# MEDICATION ADMINISTRATION

## DEXTROSE 50 PERCENT INJECTION/INFUSION

### Policy

Dextrose 50% will only be administered by a Nurse.

### General Guidelines

1. Verify with State Nurse Practice Act the scope of practice for RNs and LPNs regarding this procedure.
2. 50% dextrose injection is a sterile, non-pyrogenic, hypertonic solution of dextrose in water for intravenous injection.
3. It can be used to provide a rapid source of carbohydrate calories and to restore blood glucose levels in severe hypoglycemia.
4. Each mL of fluid contains 0.5 gram dextrose (osmolarity of 2.53, pH of 4.2) and provides 3.4 kcal per gram of dextrose.
5. The standard dosage is 25 to 50 grams dextrose (IV push) or 250 to 500 mL of D10W combined with 10 units of regular insulin administered over 30 to 60 minutes (infusion).
6. Hypertonic solutions (greater than 10% dextrose) may cause thrombosis if given through peripheral veins. USE A CENTRAL VENOUS CATHETER for infusion except in the emergency treatment of severe hypoglycemia.
7. If administered via catheter into a peripheral vein for emergency use:
    a. administer slowly (3 mL/min);
    b. administer through a small gauge catheter into a large vein; and
    c. monitor for extravasation and phlebitis; stop infusion if this occurs.
8. Never inject through subcutaneous or intramuscular routes.
9. For central venous catheter infusions:
    a. Infuse at a maximum rate of 200 mg/kg over 1 minute.
    b. Continuous infusion rates range from 4.5 to 15 mg/kg/minute.
10. Monitor glucose levels after administration: treatment can cause hyperglycemia/rebound hypoglycemia
11. Dextrose 50% is CONTRAINDICATED in the presence of intracranial or intraspinal hemorrhage or in residents with delirium related to dehydration.
12. Store at room temperature, discard unused portion after treatment.

### Procedure

1. Review physician order.
2. Place small gauge catheter in large vein or use central venous catheter if in place.
3. Obtain dextrose 50% syringe from Emergency Box.
4. Inject solution slowly into catheter.
5. Monitor resident's response: glucose monitoring during and post treatment; vital signs pre/post treatment.
6. Keep catheter in place for further potential needs.

# MEDICATION ADMINISTRATION

## Documentation

The following information should be documented in the resident's medical record.

1. Objective assessment of signs/symptoms before treatment (vital signs, glucometer readings, mental status, physical symptoms).
2. Date, time of assessment, orders received.
3. Assessment of resident during treatment (objective information for response of dextrose 50% injection such as vital signs, glucometer readings, mental status, physical symptoms).
4. Length of time that injection lasted, amount of dextrose 50% given.
5. Condition of peripheral vein if used for injection, any complications, interventions.
6. Final objective results of treatment (vital signs, glucometer readings, mental status, physical assessment).
7. Contact Physician, Supervisor with final results for resident.
8. Received orders to adjust dietary, fluid intake, glucometer testing, or activity levels.

## Reporting

Report final results to Physician, Supervisor and oncoming shift.

# MEDICATION ADMINISTRATION

## PARENTERAL NUTRITION

### Policy

All nursing staff who will be caring for a resident receiving parenteral nutrition (PN) will receive training and demonstrate competency regarding parenteral nutrition to ensure proper assessment and monitoring of resident for complications.

### Definitions

**Definition** – Parenteral Nutrition is a sterile pharmacy-prepared form of nutrition that is delivered through an intravenous route. It can be in the form of partial (PPN) or total (TPN) nutrition. It may or may not include lipids.

**Partial Parenteral Nutrition (PPN)** – may be referred to as peripheral parenteral nutrition. Final dextrose concentration less than 10%, protein less than 5%, pH greater than 5 or less than 9, and osmolality less than 500m Osm/liter.

1. May be administered through large gauge peripheral over the needle catheter (20 gauge or larger) or midline. Central lines are preferred.
2. Short term treatment (usually 7 to 10 days).
3. Must be regulated by an electronic pump.

**Total Parenteral Nutrition (TPN)** – Final dextrose concentration greater than 10% to 70%, and protein greater than 5%.

1. Must be given through a central line.
2. Must be regulated by an electronic pump.
3. Treatment for short or long term therapy.

### General Guidelines

**Preparation:**

1. A physician's order is necessary for this treatment. The PN order should include the formula or a list of all individual ingredients/nutrients in the base solution, total volume and rate of administration as well as orders for monitoring laboratory results on a routine basis.
2. Verify with State Nurse Practice Act the role of the Nurse and requirements for RN coverage on the unit while PN is infusing.
3. Parenteral nutrition should be started in a hospital setting due to a high risk of complications.
4. Residents will have had stable glucose levels and no complications for at least 48 hours in the hospital before being transferred to long term care.
5. The long term care facility is responsible for having the proper staffing (per State Nurse Practice Act) before resident arrives in facility.
6. The assessment and management of PN residents is a multidisciplinary function involving the Dietitian, Physician, Nursing and Pharmacist.

7. The Physician may write orders for the Pharmacist to monitor and change the PN solution orders, in accordance with state practice laws.

**Handling and Storage:**

1. PN bags will not be accepted from any other facility due to the uncertainty of how it may have been handled and/or whether refrigeration has been maintained.
2. PN bags are to stay refrigerated until approximately ONE HOUR before use.
3. PN must be allowed to come up to room temperature naturally. It cannot be placed in a microwave, under hot water, in a sunny window, on a heat register, or heating pad. Rapid warming will destroy the contents of PN.

**Safety Precautions:**

1. Parenteral nutrition orders will include an order for dextrose 10% IV to run at the same rate as PN, in case the PN has to be stopped or discontinued suddenly.
2. The orders for PN and the PN bag labels must match. Otherwise, contact the pharmacy.
3. TPN CANNOT BE STOPPED SUDDENLY. The rate must be tapered slowly to avoid drops in glucose levels that could cause hypoglycemia.
4. If replacement PN bag has not been received from pharmacy, infuse dextrose 10% at same rate that PN was running to avoid hypoglycemia.
5. Parenteral nutrition (PPN or TPN) must be administered via an electronic pump. The solution must be filtered.
6. The size of the filter on the end of the IV tubing is determined by the type of solution:
    a. 0.2 micron filter is used if solution does not contain intravenous fat emulsion (lipids).
    b. 1.2 micron filters are used if lipids are in solution.
7. The type of catheter that is used is determined by final concentration of dextrose (peripheral or midline for dextrose less than or equal to 10%; central line catheter for greater than 10% dextrose).
8. Strict aseptic technique is used when handling PN.
9. For multi-lumen catheters, specify/label one lumen for PN use only. Do not use this lumen for other infusions or blood sampling.
10. Avoid using single-lumen catheters for blood sampling. If blood sampling is necessary, venipuncture is preferred for residents with a single-lumen catheter dedicated to PN. If this is not possible, flush with at least 10mL of normal saline[1] before and after drawing blood. (Refer to *Obtaining Blood Specimens from a Central Venous Catheter*.)
11. Administration sets used to administer lipid-based infusates such as intravenous fat emulsions ( IVFE ), total nutrient admixture ( TNA ), or total parenteral nutrition (TPN) should be free of diethylhexyl-phthalate (DEHP). DEHP is considered a toxin especially in neonates, pediatrics, and long term care patients.[2]

**Infusions:**

1. Parenteral nutrition may be infused as a continuous or intermittent solution.
2. Parenteral nutrition bags must be changed at least every 24 hours.[3]

[1] Preservative-free 0.9% sodium chloride
[2] INS 2011 Standard 43 Practice Criteria VD
[3] INS 2011 Standard 65.4

3. Fat emulsions (lipids) alone will be changed at least every 12 hours.[4]
4. Parenteral nutrition solutions should be infused or discarded within 24 hours of attaching the administration set.
5. Medications cannot be "piggybacked" or administered via IV push through the PN tubing/lumen. The tubing cannot be disconnected to administer another medication. The system must stay intact to maintain sterile system.
6. Additives will be mixed with PN and administered per facility/pharmacy protocol. (Refer to *Parenteral Nutrition – Placement of Additives*.)
7. IV tubing administration set, filter, and needleless connection device must be changed with every new bag that is administered (at least every 24 hours).

**Monitoring:**

1. Residents receiving TPN/PPN should be routinely monitored per facility protocol for the following signs and symptoms of complications (Refer to *Complications Associated with Parenteral Nutrition*):
    a. Hypo/hyperglycemia.
    b. Fluid/electrolyte imbalance.
    c. Infection.
    d. Malnutrition.
    e. Catheter complication.
    f. Change of mental status.
    g. Other potential complications associated with PN therapy.
2. Clinical monitoring at regular intervals (per physician or pharmacy order) should include:
    a. vital signs;
    b. intake/output;
    c. glucose levels;
    d. urinalysis;
    e. electrolytes; and
    f. laboratory values (CBC, chemistry) or other labs per orders.

## Equipment and Supplies

1. Parenteral nutrition solution*
2. Fat emulsion (lipid) solution*
3. Administration sets with in-line (or add-on) filtration systems
4. Normal saline or heparin for flush, as appropriate
5. Needleless connection device
6. Electronic infusion pump
7. Gloves
8. Alcohol wipes
9. Tape

*These may be in a 3 in 1 mixture.

[4] Ibid

# MEDICATION ADMINISTRATION

## Procedure

1. Remove PN bag from refrigerator – AT LEAST ONE HOUR - before infusing.
2. Verify orders. Compare orders to bag label. Verify with second Nurse if required by facility protocol.
3. Assess IV catheter to make sure it is without complications.
4. Check resident chart for any allergies or special considerations.
5. Check lab results for appropriate use of therapy.
6. Do physical assessment, especially heart, lungs, and extremities, to determine if resident can tolerate large amounts of continuous fluids.
7. Check vital signs for any signs of complications.
8. Verify if there are any additives to be put in bag. If so, add before starting PN. (See *Parenteral Nutrition – Placement of Additives*.)
9. Verify identity of resident.
10. Inspect bag and equipment sterility, precipitate, expiration date, any separation of PN and lipids (if present). Call pharmacy if any problems are noted.
11. Perform hand antisepsis. Don non-sterile gloves.
12. Clean end of needleless connection device on catheter with alcohol wipe.
13. Flush catheter with normal saline.
14. Attach tubing with filter to PN bag. Prime tubing and filter by opening roller clamp. Prime, then clamp tubing. Place sterile end cap on tubing.
15. Set pump with prescribed rate and volume (continuous or intermittent).
16. Connect end of filter (or tubing if filter is attached to catheter) into needleless connection device.
17. Check connections. Secure tubing to resident with tape.
18. Start infusion and monitor for proper flow and any complications.
19. Educate resident that her or she should notify the Nurse if any problems develop such as shortness of breath, heart palpitations, catheter-related pain, or signs/symptoms of hypoglycemia/hyperglycemia.
20. Monitor resident, insertion site, and flow at regular intervals (at least every 2 hours).
21. Dispose of flush syringes and equipment packaging properly.
22. Document procedure in resident's medical record.

## Documentation

The following should be documented in the resident's medical record:

1. Date and time of administration.
2. Signature and title of Nurse(s) checking and hanging PN bag and person monitoring infusion.
3. Rate and volume infused.
4. Additives. Document in the medicine administration record.
5. Infusion rate, and changing of PN bag, tubing, needleless connection device, filter, and flushes.
6. Any complications, interventions, the condition of insertion site/dressing/catheter, any changes in PN formula, lab results, and the resident's response to procedure.

## Reporting

1. Report any complications with PN infusion to Physician, Supervisor, and oncoming shift.
2. Report any changes in PN formula and lab results.

# MEDICATION ADMINISTRATION

## PARENTERAL NUTRITION (PN) – CONTINUOUS VS. CYCLED

### Policy

Guidelines have been established for tapering the rate of infusion when starting or stopping parenteral nutrition infusions.

### Definitions

1. **Continuous Parenteral Nutrition** – The PN is infused at the same rate for 24 hours a day. The solution bag and equipment are changed at approximately the same time each day. The system stays intact without interruption.
2. **Cycled Parenteral Nutrition** – The PN is infused for a shorter interval lasting less than 24 hours. The PN infuses for a time interval according to physician order. Many times this is done to accommodate resident schedules and allows for more freedom in lifestyle.

### General Guidelines

1. The Nurse must have received training and demonstrated competency related to the handling of PN prior to performing this procedure.
2. Use aseptic technique at all times when administering PN.
3. Administer parenteral nutrition by midline or central line, according to the concentration of dextrose. (Refer to *Parenteral Nutrition*)
4. Guidelines for tapering cycled parenteral nutrition are as follows:
    a. The rate **tapers upward for 1-2 hours** when starting the infusion.
    b. Then the PN runs at a set rate for a determined time.
    c. The rate **tapers downward for 1-2 hours** before the infusion is stopped or discontinued.
    d. The time intervals and tapering rates will be determined by the Physician or the Pharmacist.
    e. The bag is then disconnected from the catheter and discarded.
    f. The catheter is flushed with normal saline[1]/heparin per protocol.
5. Never stop or discontinue parenteral nutrition suddenly.
    a. The PN rate must be tapered upward and downward over several hours to allow the pancreas to adjust to the decrease in glucose intake (and the subsequent decreased need for insulin). This will help prevent hypoglycemia.
    b. Total parenteral nutrition (TPN) (greater than 10% dextrose) orders should include dextrose 10% IV fluid to be used if for some reason the TPN has to be stopped suddenly or is not available.
    c. The Dextrose 10% should be run at the same rate that the TPN was running. The Dextrose 10% can be run on an IV flow control device until TPN and pump are available.

[1] Preservative-free 0.9% sodium chloride

# MEDICATION ADMINISTRATION

## PARENTERAL NUTRITION – PLACEMENT OF ADDITIVES

### Policy

Nursing staff will follow established guidelines for placing additives in the parenteral nutrition (PN) mixture.

### Preparation

1. Verify with State Nurse Practice Act the role of the Nurse and requirements for RN coverage on the unit while PN is infusing.
2. The Nurse placing the additives into the PN bag will receive training and demonstrate competency related to the handling of PN prior to performing this procedure.
3. Maintain aseptic technique when working with PN. The room where the additives are placed in PN bag must be clean and away from general traffic.
4. Check expiration dates on additive bottles/vials and inspect the PN solution for deterioration or breakdown before placing additives.
5. Check additives for compatibility before adding to the PN solution.

### General Guidelines

1. Additives are medications or supplements that are added to the PN solution just before infusing the PN. Examples of additives include multi-vitamins, vitamin K, $H_2$ blockers and insulin.
2. Medications added to PN are stable for less than or equal to 24 hours. Parenteral nutrition solutions may be delivered from the pharmacy in quantities that last 3 to 4 days. Therefore, medications are added to the PN at the facility rather than at the pharmacy.
3. Place additives in PN bag before the bag is connected to the resident. Never add medications while PN is infusing; this could result in a bolus dose of medication.
4. Place additives in the PN mixture immediately before administering the PN to the resident.
5. Add medications to the PN bag one at a time using a new syringe for each medication.
6. When additive is placed in bag, rotate bag back and forth. DO NOT SHAKE BAG.

### USP <797> Compliance

1. Medications that are reconstituted and/or added to an infusion solution at the bedside or in the nursing station without sterile conditions or engineering controls are considered to be at high risk for microbial contamination.
2. These preparations are classified as “immediate-use category” in the *United States Pharmacopeia* Chapter 797 (USP<797>) pharmacy compounding risk level assessment.
3. Immediate-use preparations are exempt from USP chapter <797> requirements for *Compounding Sterile Preparations* as long as the following criteria are met:
    a. The CSP must be for emergent use, or for situations where a delay associated with lower-risk compounding would add risk for the resident.

   b. The preparation involves the simple transfer of not more than three commercially manufactured packages of sterile, non-hazardous drugs or diagnostic radiopharmaceuticals in their original containers.
   c. The transfer of substances does not involve more than two entries into any one container or package of sterile infusion solution or administration container (e.g., bag or vial).
   d. Process must utilize aseptic technique.
   e. The compounding process must lass less than one continuous hour.
   f. The CSP must be administered less than one hour after preparation begins, or it must be properly discarded.
   g. The CSP must be administered immediately and completely (or the administration witnessed) by the person who prepared it, OR the CSP must be labeled with:
      1. the resident/patient identification information;
      2. the names and amount of all ingredients;
      3. the name or initials of the person who prepared the CSP; and
      4. the exact 1-hour beyond-use date (BUD) and time.
   h. The CSP not be compounded in batches or stored.
4. Single-dose containers (bags, bottles, vials, syringes) of sterile products and CSPs must be used within one hour of opening or needle-puncturing if opened in less than ISO Class 5 air quality (immediate-use CSPs).
5. Opened single-dose ampules will not be stored for any length of time.

## Equipment and Supplies

1. Parenteral nutrition solution;
2. Alcohol wipes;
3. Filter straw for glass medication ampules;
4. Sterile syringe for each additive;
5. Sterile injection needle(s) or needleless system to access medication containers and injection port of bag;
6. Sharps container;
7. Non-sterile gloves; and
8. Waterproof barrier for counter top.

## Procedure

1. Verify orders for PN. Check orders against PN bag label. If they do not match, call pharmacy and verify.
2. Verify orders for additives.
3. Check compatibility of medications.
4. Clean countertop with alcohol, soap and water, or antimicrobial solution. Allow to air dry.
5. Perform hand antisepsis. Don non-sterile gloves.
6. Assemble equipment and medication additives.
7. Clean injection port of PN bag with alcohol wipes.
8. Draw up additives one at a time in separate sterile syringes. Use filter straw to draw up medications from glass ampules.
9. Place additives into PN bag one at a time. Rotate bag back and forth gently in between medications to mix medicines. DO NOT SHAKE BAG.
10. Wipe needleless connection device with alcohol in between each additive.

11. Document medications added to the PN solution on a label affixed to the PN bag.
12. Prepare bag to be hung after the addition of additives.
13. Discard used equipment according to facility procedure.

## Documentation

The following should be documented in the resident's medical record:

1. Additives (document on label affixed to PN bag AND medication administration record).
2. If there was any visible deterioration in the PN solution and notification of the pharmacy.
3. Any communication with Physician, Supervisor, or oncoming shift (document in the nurses' notes).

## Reporting

1. Report any problems or complications with the PN solution or the additives to the pharmacy.
2. Report any complications with the procedure to the Director of Nursing Services or the Physician.
3. Report any changes in the resident's condition to the Physician.
4. Any changes in PN formula.

# MEDICATION ADMINISTRATION

## PARENTERAL LIPID ADMINISTRATION

### Policy

Staff will have training and demonstrated clinical competency prior to administering lipids through a venous access device.

### General Guidelines

1. Lipid administration requires a physician order. Lipid strength, volume, rate and frequency must be included in physician order.
2. Lipids are commonly ordered in conjunction with TPN/PPN or TNA solutions.
3. Lipids are used to provide calories and/or essential fatty acids to residents who are not able to get sufficient oral intake.
4. Lipids may be administered mixed with parenteral nutrition or separately.
5. An electronic infusion pump must be used with lipids and/or parenteral nutrition (PN).
6. When lipids are administered concurrently with TPN, the lipid solution may be connected to primary tubing via "piggyback" attached below the filter if possible. A 1.2 micron filter is attached to the primary administration set (tubing) when lipids are administered.
7. Administration sets used to administer lipid – based infusates such as intravenous fat emulsions ( IVFE ), total nutrient admixture ( TNA ), or total parenteral nutrition (TPN), should be free of diethylhexyl-phthalate (DEHP). DEHP is considered a toxin especially in neonates, pediatrics, and long term care patients.[1]
8. The pharmacy may mix a 3 in 1 solution of PN with lipids which is delivered and administered as one bag.
9. Lipids can be administered through peripheral or central catheters if separate from PN.
10. Aseptic technique should be used at all times when administering lipids.
11. Lipids that are not mixed with PN solutions expire 12 hours after being started.[2]
12. Lipids that are not mixed with PN solutions do not require refrigeration.
13. Lipids must be inspected for signs of instability and deterioration prior to administration. Signs of instability include discoloration (other than white color), separation, oily appearance, and/or inconsistent texture.
14. NEVER SHAKE LIPID CONTAINER or add anything to lipids; this could cause aggregation of fat globules.
15. No other medications or fluids are to be attached or added to the lipid solution.
16. Lipid administration is contraindicated in residents with:
    a. allergy to egg yolk;
    b. hepatic disease;
    c. hyperlipidemia; or
    d. blood coagulation defect caused by a depressed platelet count.

[1] INS 2011 Standard 43 Practice Criteria VD
[2] INS 2011 Standard 65.4

17. Monitor the resident receiving lipids for:
    a. signs/symptoms of adverse reactions such as fluid overload, chest pain, nausea, shortness of breath, abdominal pain, or wheezing;
    b. lab results for levels of triglycerides, cholesterol, and liver enzymes; and
    c. any signs/symptoms of catheter or resident infection.
18. Administration set (tubing), needleless connection device, and container must be changed every 24 hours. and with each new container.

## Equipment and Supplies

1. Lipid (or 3 in 1) solution;
2. Needleless connection device;
3. Electronic infusion pump;
4. Administration set (tubing);
5. Non-sterile gloves;
6. Alcohol wipes;
7. 1.2 micron filter; and
8. Normal saline[3] flushes (1-2).

## Procedure

1. Inspect lipid solution for discoloration or other signs of breakdown (separation, oily appearance, inconsistent texture). Do not administer if any signs of problems are observed.
2. Verify resident name, type of solution, rate, route and time.
3. Assemble solution, tubing, needleless connection device, normal saline flushes, and alcohol wipes.
4. Perform hand antisepsis. Don non-sterile gloves.
5. Place tubing in container and prime tubing.
6. Close clamp on tubing, replace needleless connection device, and flush catheter with normal saline (per protocol).
7. To run "piggyback" into primary PN tubing, place at most distal side port (Y site) after cleansing port with alcohol.
8. Place tubing into pump and set rate as ordered.
9. Start pump and observe flow.
10. Note resident response to procedure.

## Documentation

The following should be documented in the resident's medical record:

1. Date, time, amount, and flow rate of lipids administered.
2. Solution and equipment change. Document in the treatment administration record.
3. Any observation facts related to catheter insertion site, problems with solution, resident reactions. Any interventions that were done.
4. Intake and output if ordered.

[3] Preservative-free 0.9% sodium chloride

# MEDICATION ADMINISTRATION

## Reporting

1. Report any complications with treatment to Physician, Supervisor, and oncoming shift.
2. Report any problems with solution to pharmacy.
3. Report resident reaction to procedure.
4. Report other information in accordance with facility policy or professional standards of practice.

# MEDICATION ADMINISTRATION

## DOCUMENTATION OF MEDICATION ADMINISTRATION

### Policy

All medications administered to the resident will be documented in the resident's Medication Administration Record (MAR).

### General Guidelines

1. Nursing staff shall document all medications administered to each resident on the resident's Medication Administration Record (MAR).
2. Administration of medication must be documented immediately after (never before) it is given.
3. Documentation must include, as a minimum:
    a. name and strength of the medication;
    b. dosage;
    c. method of administration (e.g., oral, injection (and site), etc.);
    d. date and time of administration;
    e. reason(s) why a medication was withheld, not administered, or refused (as applicable);
    f. signature and title of the person administering the medication; and
    g. resident response to the medication, if applicable (e.g., PRN, pain medication, etc.).