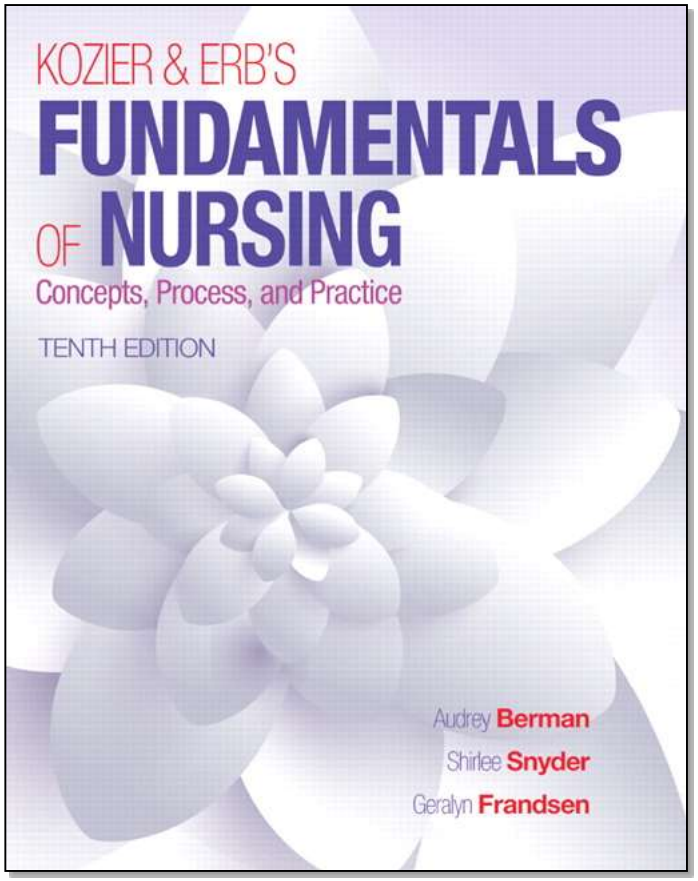
Kozier & Erb's Fundamentals of Nursing

Concepts, Process, and Practice

TENTH EDITION



CHAPTER 35

Medications

TABLE 35–7 Approximate Volume Equivalents: Metric, Apothecaries', and Household Systems

Metric		Apothecaries'		Household
1 mL	=	15 minims (min or m)	=	15 drops (gtt)
4–5 mL	=	1 fluid dram	=	1 teaspoon
15 mL	=	4 fluid drams	=	1 tablespoon (Tbsp)
30 mL	=	1 fluid ounce	=	same
500 mL	=	1 pint (pt)	=	same
1,000 mL	=	1 quart (qt)	=	same
4,000 mL	=	1 gallon (gal)	=	same

Figure 35–11 The medication cart is kept locked when not in use. The nurse is using a key to access client medications.

Figure 35–13A A sample bar code.

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Figure 35–13B The nurse scans the bar code on the medication package.

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Figure 35–13C The nurse scans the the bar code on the client's wristband before administering the medication.

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Oral Medications

- NPO “nothing by mouth” or Latin “nil per os”
- Oral most common route
- Preferred unless digestive problem (*e.g.*, nausea and vomiting)

Administering Oral Medications

SKILL 35-1

PURPOSE

- To provide a medication that has systemic effects or local effects on the GI tract or both (see specific drug action)

ASSESSMENT

Assess

- Allergies to medication(s)
- Client's ability to swallow the medication
- Presence of vomiting or diarrhea that would interfere with the ability to absorb the medication
- Specific drug action, side effects, interactions, and adverse reactions
- Client's knowledge of and learning needs about the medication

Perform appropriate assessments (e.g., vital signs, laboratory results) specific to the medication.

Determine if the assessment data influence administration of the medication (i.e., is it appropriate to administer the medication or does the medication need to be held and the prescriber notified?).

PLANNING

DELEGATION

In acute care settings, administration of oral/enteral medications is performed by the nurse and is not delegated to unlicensed assistive personnel (UAP). The nurse can inform the UAP of the intended therapeutic effects and/or specific side effects of the medication and request the UAP to report specific client observations to the nurse for follow-up. In some long-term care settings, trained UAP may administer certain medications to stable clients. It is important, however, for the nurse to remember that the medication knowledge of the UAP is limited and *assessment and evaluation of the effectiveness of the medication remain the responsibility of the nurse.*

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Administering Oral Medications—*continued*

SKILL 35–1

Equipment

- Client's MAR or computer printout
- Dispensing system
- Disposable medication cups: small paper or plastic cups for tablets and capsules, waxed or plastic calibrated medication cups for liquids
- Pill crusher/cutter
- Straws to administer medications that may discolor the teeth or to facilitate the ingestion of liquid medication for certain clients
- Drinking glass and water or juice
- Soft foods such as applesauce or pudding to use for crushed medications for clients who may choke on liquids

IMPLEMENTATION

Preparation

1. Know the reason why the client is receiving the medication, the drug classification, contraindications, usual dosage range, side effects, and nursing considerations for administering and evaluating the intended outcomes for the medication.
2. Check the MAR.
   - Check for the drug name, dosage, frequency, route of administration, and expiration date for administering the medication, if appropriate. **Rationale:** *Orders for certain medications (e.g., narcotics, antibiotics) expire after a specified time frame and they need to be reordered by the primary care provider.*
   - If the MAR is unclear or pertinent information is missing, compare the MAR with the prescriber's most recent written order.
   - Report any discrepancies to the charge nurse or the primary care provider, as agency policy dictates.

❶ Compare the medication label to the MAR.

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Administering Oral Medications—*continued*

3. Verify the client's ability to take medication orally.
   - Determine whether the client can swallow, is NPO, is nauseated or vomiting, has gastric suction, or has diminished or absent bowel sounds.
4. Organize the supplies.
   - Gather the MAR(s) for each client together so that medications can be prepared for one client at a time. **Rationale:** *Organization of supplies saves time and reduces the chance of error.*

Performance

1. Perform hand hygiene and observe other appropriate infection prevention procedures.
2. Unlock the dispensing system.
3. Obtain the appropriate medication.
   - Read the MAR and take the appropriate medication from the shelf, drawer, or refrigerator. The medication may be dispensed in a bottle, box, or unit-dose package.
   - Compare the label of the medication container or unit-dose package against the order on the MAR or computer print-out. **Rationale:** *This is a safety check to ensure that the right medication is given.* If these are not identical, recheck the prescriber's written order in the client's chart. If there is still a discrepancy, check with the nurse in charge or the pharmacist. ❶
   - Check the expiration date of the medication. Return expired medications to the pharmacy. **Rationale:** *Outdated medications are not safe to administer.*
   - Use only medications that have clear, legible labels. **Rationale:** *This ensures accuracy.*
4. Prepare the medication.
   - Calculate the medication dosage accurately.
   - Prepare the correct amount of medication for the required dose, without contaminating the medication. **Rationale:** *Aseptic technique maintains drug cleanliness.*
   - While preparing the medication, recheck each prepared drug and container with the MAR again. **Rationale:** *This second safety check reduces the chance of error.*

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Administering Oral Medications—*continued*

Tablets or Capsules

- Place packaged unit-dose capsules or tablets directly into the medicine cup. Do not remove the medication from the package until at the bedside. **Rationale:** *The wrapper keeps the medication clean. Not removing the medication facilitates identification of the medication in the event the client refuses the drug or assessment data indicate to hold the medication. Unopened unit-dose packages can usually be returned to the medication cart.*
- If using a stock container, pour the required number into the bottle cap, and then transfer the medication to the disposable cup without touching the tablets.
- Keep narcotics and medications that require specific assessments, such as pulse measurements, respiratory rate or depth, or blood pressure, separate from the others. **Rationale:** *This reminds the nurse to complete the needed assessment(s) in order to decide whether to give the medication or to withhold the medication if indicated.*
- Break only scored tablets if necessary to obtain the correct dosage. Use a cutting or splitting device if needed. Check the agency policy as to how unused portions of a medication are to be discarded. ❷
- If the client has difficulty swallowing, check if the medication can be crushed. Some drug handbooks have an appendix that lists the "Do Not Crush" medications. The Institute for Safe Medication Practices (2013c) website provides an updated list of medications that should not be crushed. Some medications that should not be crushed include time-released and enteric-coated medications. An example of tablets that should not be crushed is oxycodone (OxyContin), a long-acting narcotic that normally lasts 12 hours after administration. If the tablet is crushed, the client gets a surge of action in the first 2 hours, and may then start having severe pain again in 4 to 6 hours, because the narcotic effect wears off too soon. The crushing of these tablets causes an uneven effect, and the long or sustained action of the medication is lost.

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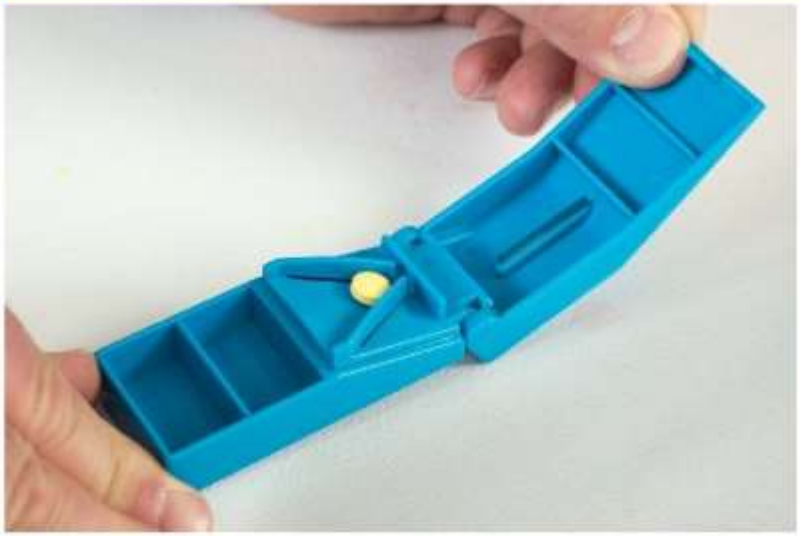


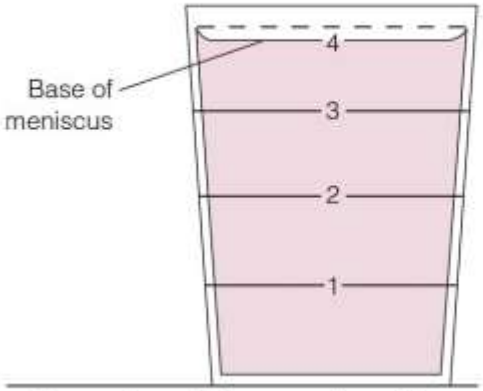
❷ A cutting device can be used to divide tablets.

❸ Pouring a liquid medication from a bottle.

- If it is acceptable, crush the tablets to a fine powder with a pill crusher or between two medication cups. Then, mix the powder with a small amount of soft food (e.g., custard, applesauce).

CLINICAL ALERT!

Check with the pharmacy before crushing tablets. Sustained-action, enteric-coated, buccal, or sublingual tablets should not be crushed.



❹ The *bottom* of the meniscus is the measuring guide.

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Administering Oral Medications—*continued*

Liquid Medication

- Thoroughly mix the medication before pouring. Discard any medication that has changed color or turned cloudy.
- Remove the cap and place it upside down on the countertop. **Rationale:** *This avoids contaminating the inside of the cap.*
- Hold the bottle so the label is next to your palm and pour the medication away from the label. **Rationale:** *This prevents the label from becoming soiled and illegible as a result of spilled liquids.* ❸
- Place the medication cup on a flat surface at eye level and fill it to the desired level, using the *bottom* of the **meniscus** (crescent-shaped upper surface of a column of liquid) to align with the container scale. ❹ **Rationale:** *This method ensures accuracy of measurement.*
- Before capping the bottle, wipe the lip with a paper towel. **Rationale:** *This prevents the cap from sticking.*
- When giving small amounts of liquids (e.g., less than 5 mL), prepare the medication in a sterile syringe without the needle or in a specially designed oral syringe ❺. Label the syringe with the name of the medication and the route (PO). **Rationale:** *Any oral solution removed from the original container and placed into a syringe should be labeled to avoid medications being given by the wrong route (e.g., IV). This practice facilitates client safety and avoids tragic errors.*
- Keep unit-dose liquids in their package and open them at the bedside.

Oral Narcotics

- If an agency uses a manual recording system for controlled substances, check the narcotic record for the previous drug count and compare it with the supply available. Some medications, including narcotics, are kept in plastic containers that are sectioned and numbered.
- Remove the next available tablet and drop it in the medicine cup.
- After removing a tablet, record the necessary information on the appropriate narcotic control record and sign it.
- *Note:* Computer-controlled dispensing systems allow access only to the selected drug and automatically record its use.

❺ Oral syringe.

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SKILL 35–1

SAFETY ALERT!

SAFETY

2014 The Joint Commission National Patient Safety Goals (2013a)

GOAL 3: IMPROVE THE SAFETY OF USING MEDICATIONS

- Label all medications, medication containers, and other solutions on and off the sterile field in perioperative and other procedural settings.
- Medication containers include syringes, medicine cups, and basins.
  Rationale: *Medications or other solutions in unlabeled containers are unidentifiable. Errors, sometimes tragic, have resulted from medications and other solutions being removed from their original containers and placed into unlabeled containers. This unsafe practice neglects basic principles of safe medication management, yet it is routine in many organizations. The labeling of all medications, medication containers, and other solutions is a risk-reduction activity consistent with safe medication management. This practice addresses a recognized risk point in the administration of medications in perioperative and other procedural settings.*

All Medications

- Place the prepared medication and MAR together on the medication cart.
- Recheck the label on the container before returning the bottle, box, or envelope to its storage place. **Rationale:** *This third check further reduces the risk of error.*
- Avoid leaving prepared medications unattended. **Rationale:** *This precaution prevents potential mishandling errors.*
- Lock the medication cart before entering the client's room. **Rationale:** *This is a safety measure because medication carts are not to be left open when unattended.*
- Check the room number against the MAR if agency policy does not allow the MAR to be removed from the medication cart. **Rationale:** *This is another safety measure to ensure that the nurse is entering the correct client room.*

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Administering Oral Medications—*continued*

5. Provide for client privacy.
6. Prepare the client.
   - Introduce self and verify the client's identity using agency protocol. **Rationale:** *This ensures that the right client receives the medication.*
   - Assist the client to a sitting position or, if not possible, to a side-lying position. **Rationale:** *These positions facilitate swallowing and prevent aspiration.*
   - If not previously assessed, take the required assessment measures, such as pulse and respiratory rates or blood pressure. Take the apical pulse rate before administering digitalis preparations. Take blood pressure before giving antihypertensive drugs. Take the respiratory rate prior to administering narcotics. **Rationale:** *Narcotics depress the respiratory center.* If any of the findings are above or below the predetermined parameters, consult the primary care provider before administering the medication.
7. Explain the purpose of the medication and how it will help, using language that the client can understand. Include relevant information about effects; for example, tell the client receiving a diuretic to expect an increase in urine output. **Rationale:** *Information can facilitate acceptance of and compliance with the therapy.*
8. Administer the medication at the correct time.
   - Take the medication to the client within the guidelines of the agency
   - Give the client sufficient water or preferred juice to swallow the medication. Before using juice, check for any food and medication incompatibilities. **Rationale:** *Fluids ease swallowing and facilitate absorption from the GI tract. Grapefruit juice may not be safe for clients who take certain medications.* Liquid medications other than antacids or cough preparations may be diluted with 15 mL (1/2 oz) of water to facilitate absorption.
   - If the client is unable to hold the pill cup, use the pill cup to introduce the medication into the client's mouth, and give only one tablet or capsule at a time. **Rationale:** *Putting the cup to the client's mouth maintains the cleanliness of the nurse's hands. Giving one medication at a time eases swallowing.*
   - If an older child or adult has difficulty swallowing, ask the client to place the medication on the back of the tongue before taking the water. **Rationale:** *Stimulation of the back of the tongue produces the swallowing reflex.*

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Administering Oral Medications—*continued*

- If the medication has an objectionable taste, ask the client to suck a few ice chips beforehand, or give the medication with juice, applesauce, or pudding if there are no contraindications. **Rationale:** *The cold of the ice chips will desensitize the taste buds, and juices, applesauce, or pudding may mask the taste of the medication.*
- If the client says that the medication you are about to give is different from what the client has been receiving, do not give the medication without first checking the original order. **Rationale:** *Most clients are familiar with the appearance of medications taken previously. Unfamiliar medications may signal a possible error.*
- Stay with the client until all medications have been swallowed. **Rationale:** *The nurse must see the client swallow the medication before the drug administration can be recorded.* The nurse may need to check the client's mouth to ensure that the medication was swallowed and not hidden inside the cheek. A primary care provider's order or agency policy is required for medications left at the bedside.

9. Document each medication given.
   - Record the medication given, dosage, time, any complaints or assessments of the client, and your signature.
   - If medication was refused or omitted, record this fact on the appropriate record; document the reason, when possible, and the nurse's actions according to agency policy.
10. Dispose of all supplies appropriately.
    - Replenish stock (e.g., medication cups) and return the cart to the appropriate place.
    - Discard used disposable supplies.

Evaluation

- Return to the client when the medication is expected to take effect (usually 30 minutes) to evaluate the effects of the medication on the client.
- Observe for desired effect (e.g., relief of pain or decrease in body temperature).
- Note any adverse effects or side effects (e.g., nausea, vomiting, skin rash, or change in vital signs).
- Relate to previous findings, if available.
- Report significant deviations from normal to the primary care provider.

Parenteral Medications

- Parenteral administration is a common nursing procedure.
- Absorbed more quickly than oral route
  - Careful and accurate administration
- Aseptic technique

Figure 35–14 The three parts of a syringe.

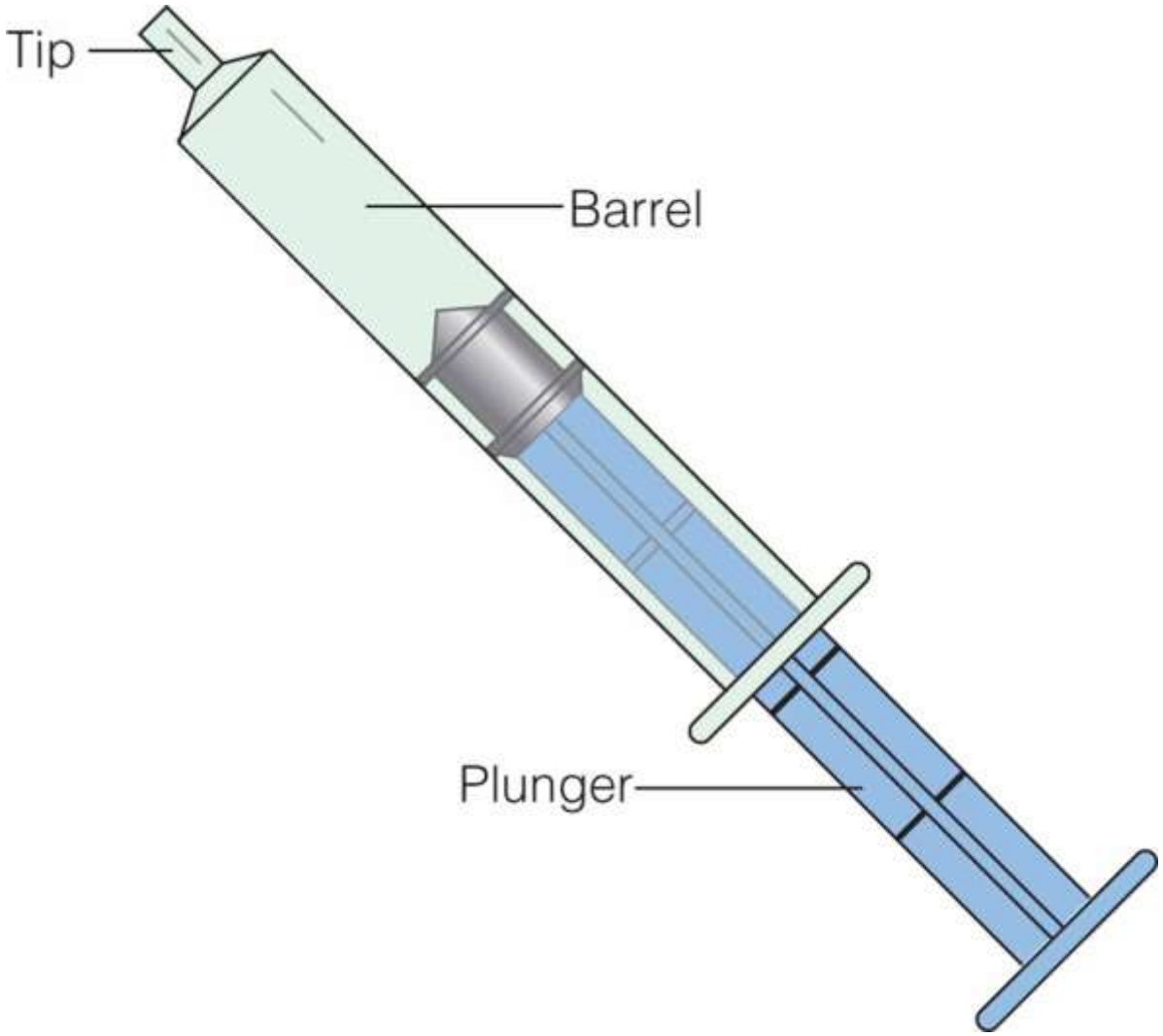
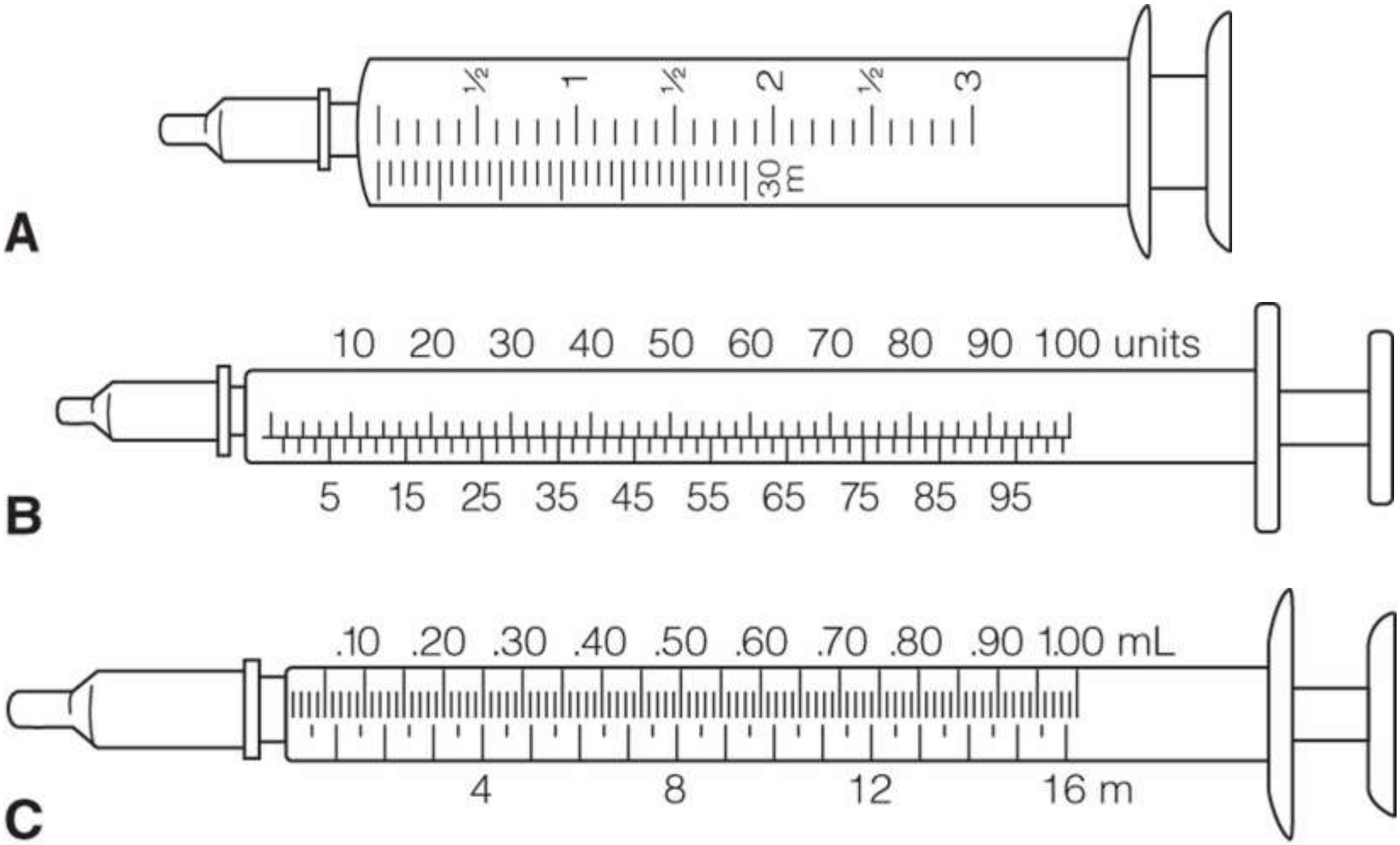


Figure 35–15 Three kinds of syringes: A, 3-mL syringe marked in tenths (0.1) of milliliters and in minims; B, insulin syringe marked in 100 units; C, tuberculin syringe marked in tenths and hundredths (0.01) of 1 milliliter (mL) and in minims.



Equipment

- Syringes
  - Insulin
    - Common problems with insulin pen
      - Needlestick injuries
      - Errors in technique
      - Using the pen like a vial
      - Using the pen for more than one client
  - Tuberculin
    - Narrow

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Figure 35–18 Tips of syringes: *A*, Luer-Lok syringe (note threaded tip); *B*, non–Luer-Lok syringe (note the smooth graduated tip).

A

B

Figure 35–19 A 60-mL non–Luer-Lok syringe, which can be used for irrigation of tubes or wounds.

Figure 35–22 The parts of a needle.

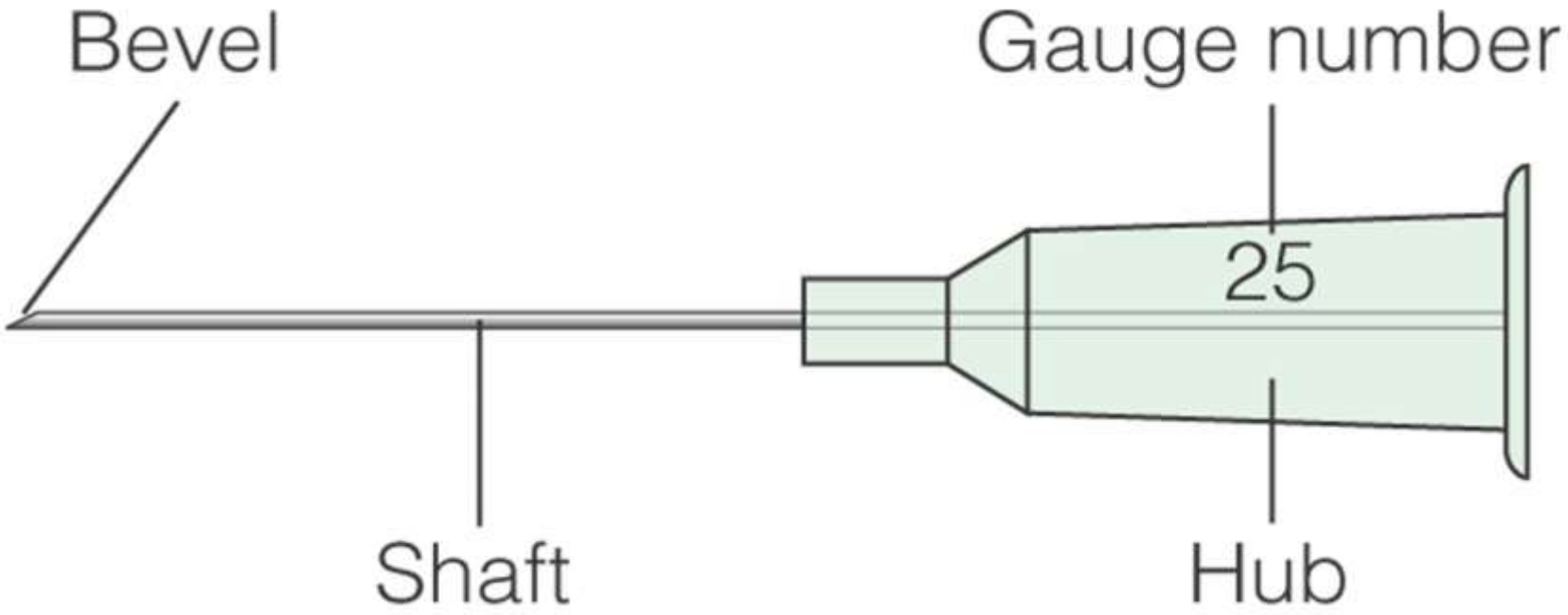

Figure 35–26 Passive safety device. The needle retracts immediately into the barrel after injection.

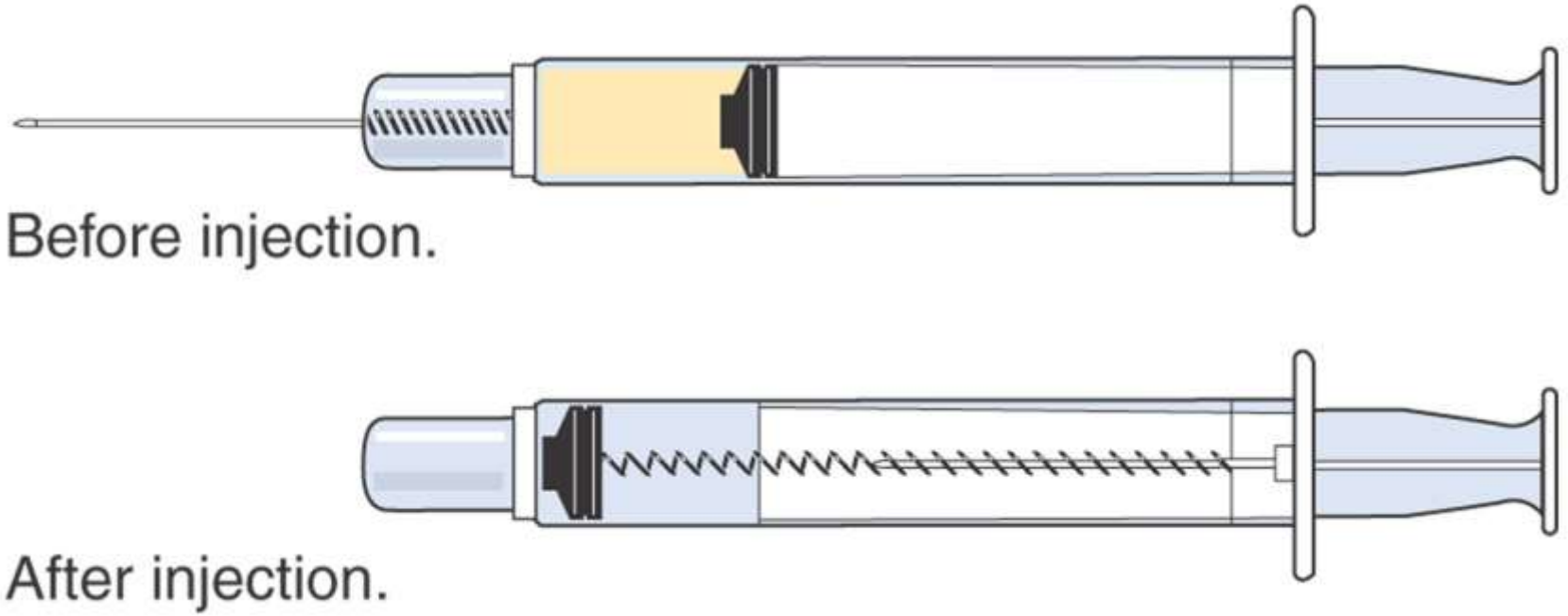

Figure 35–27 Active safety device. The nurse manually pulls the sheath or guard over the needle after injection.

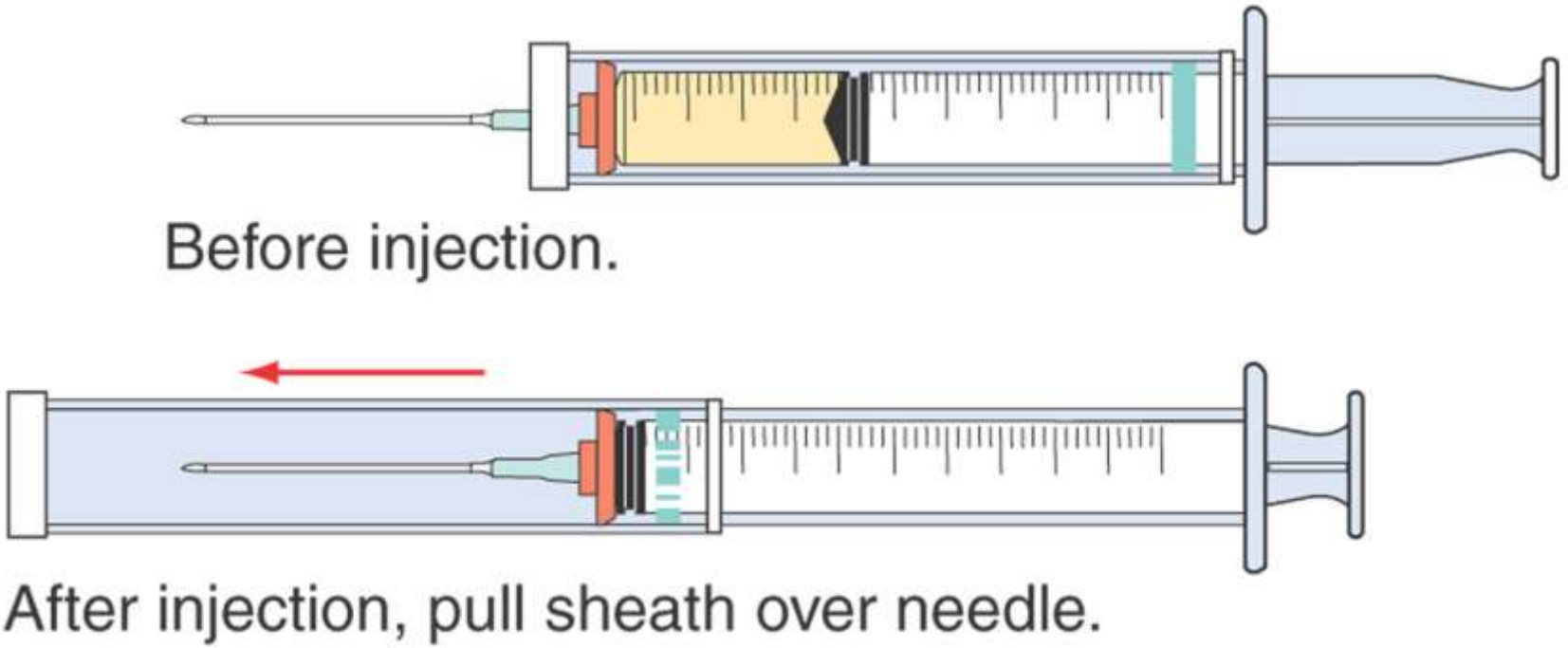

Figure 35–28 A needleless system can extract medication from a vial.

BOX 35–8 Avoiding Puncture Injuries

Figure 35–23 ■ Dispose of used syringe and needle in a sharps container.

Figure 35–24 ■ A safety mechanical device that holds the needle cap in place until the nurse is ready to recap.

- Use appropriate puncture-proof disposal containers to dispose of uncapped needles and sharps (Figure 35–23 ■). These are provided in all client areas. Never throw sharps in wastebaskets. Sharps include any items that can cut or puncture skin such as:
  - Needles
  - Surgical blades
  - Lancets
  - Razors
  - Broken glass
  - Broken capillary pipettes
  - Exposed dental wires
  - Reusable items (e.g., large-bore needles, hooks, rasps, drill points)
  - ANY SHARP INSTRUMENT!

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BOX 35–8 Avoiding Puncture Injuries

- Never bend or break needles before disposal.
- Never recap *used* needles (i.e., ones that have been inserted into clients) except under specified circumstances (e.g., when transporting a syringe to the laboratory for an arterial blood gas or blood culture).
- When recapping a needle (i.e., drawing up a medication into a syringe *prior* to administration):
- Use a safety mechanical device that firmly grips the needle cap and holds it in place until it is ready to recap (Figure 35–24 ■).
- Use a one-handed "scoop" method. This is performed by (a) placing the needle cap and syringe with needle horizontally on a flat surface, (b) inserting the needle into the cap, using one hand (Figure 35–25 ■), and then (c) using your other hand to pick up the cap and tighten it to the needle hub. Be careful not to contaminate the needle. If the needle becomes contaminated, replace the needle with a new one.

Figure 35–25 ■ Recapping a needle using the one-handed scoop method.

Preparing Injectable Medications

- Ampules and vials
  - Ampule
    - Glass container designed to hold a single dose of a drug
    - Must be broken at constricted neck to access medication
  - Vial
    - Small glass bottle with sealed rubber cap

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Preparing Medications from Ampules

SKILL 35–2

ASSESSMENT

Assess

- Client allergies to medication
- Specific drug action, side effects, interactions, and adverse reactions
- Client's knowledge of and learning needs about the medication
- Intended route of parenteral medication to determine appropriate size of syringe and needle for the client
- Ordered medication for clarity and expiration date

Perform appropriate assessments (e.g., vital signs, laboratory results) specific to the medication.

Determine if the assessment data influence administration of the medication (i.e., is it appropriate to administer the medication or does the medication need to be held and/or the primary care provider notified?).

PLANNING

DELEGATION

Preparing medications from ampules involves knowledge and use of sterile skills. Therefore, these techniques are not delegated to UAP.

Equipment

- Client's MAR or computer printout
- Ampule of sterile medication
- File (if ampule is not scored) and small gauze square or plastic ampule opener
- Antiseptic swabs
- Syringe
- Needle for administering the medication
- Filter needle or straw for withdrawing medication from the ampule

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Preparing Medications from Ampules

IMPLEMENTATION

Preparation

1. Check the MAR.
   - Check the label on the ampule carefully against the MAR to make sure that the correct medication is being prepared.
   - Follow the three checks for administering medications. Read the label on the medication (1) when it is taken from the medication cart, (2) before withdrawing the medication, and (3) after withdrawing the medication.
2. Organize the equipment.

Performance

1. Perform hand hygiene and observe other appropriate infection prevention procedures.
2. Prepare the medication ampule for drug withdrawal.
   - Flick the upper stem of the ampule several times with a fingernail. **Rationale:** *This will bring all medication down to the main portion of the ampule.*
   - Use an ampule opener or place a piece of sterile gauze or alcohol wipe between your thumb and the ampule neck or around the ampule neck, and break off the top by *bending* it toward you to ensure the ampule is broken away from yourself and away from others. **Rationale:** *The sterile gauze protects the fingers from the broken glass, and any glass fragments will spray away from the nurse.* ❶

   or

   - Place the antiseptic wipe packet over the top of the ampule before breaking off the top. **Rationale:** *This method ensures that all glass fragments fall into the packet and reduces the risk of cuts.*
   - Dispose of the top of the ampule in the sharps container.
3. Withdraw the medication.
   - Place the ampule on a flat surface.
   - Attach the filter needle/straw to the syringe. **Rationale:** *The filter needle/straw prevents glass particles from being withdrawn with the medication.*
   - Remove the cap from the filter needle and insert the needle into the center of the ampule. Do not touch the rim of the ampule with the needle tip or shaft. **Rationale:** *This will keep the needle sterile.* Withdraw the amount of drug required for the dosage.
   - With a single-dose ampule, hold the ampule slightly on its side, if necessary, to obtain more than the ordered amount of medication. ❷

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Preparing Medications from Ampules—*continued*

SKILL 35–2

A

B

❶ *A,* Breaking the neck of an ampule using a gauze pad; *B,* breaking the neck of an ampule using an ampule opener.

- Dispose of the filter needle by placing in a sharps container.
- If giving an injection replace the filter needle with a regular needle, tighten the cap at the hub of the needle, and push solution into the needle, to the prescribed amount.

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Preparing Medications from Ampules—*continued*

A

B

❷ Withdrawing a medication *A*, from an ampule on a flat surface; and *B*, from an inverted ampule.

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SKILL 35–3

Preparing Medications from Vials

PLANNING

DELEGATION

Preparing medications from vials involves knowledge and use of sterile technique. Therefore, these techniques are not delegated to UAP.

Equipment

- Client's MAR or computer printout
- Vial of sterile medication
- Antiseptic swabs
- Safety needle and syringe
- Filter needle (check agency policy)
- Sterile water or normal saline, if drug is in powdered form

IMPLEMENTATION

Preparation

- Follow the same preparation as described in Skill 35–2.

Performance

1. Perform hand hygiene and observe other appropriate infection prevention procedures.
2. Prepare the medication vial for drug withdrawal.
   - Mix the solution, if necessary, by rotating the vial between the palms of the hands, not by shaking. **Rationale:** *Some vials contain aqueous suspensions, which settle when*

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Preparing Medications from Vials—*continued*

they stand. In some instances, shaking is contraindicated because it may cause the mixture to foam.

- Remove the protective cap, or clean the rubber cap of a previously opened vial with an antiseptic wipe by rubbing in a circular motion. **Rationale:** *The antiseptic cleans the cap and reduces the number of microorganisms.*

3. Withdraw the medication.
   - Attach a filter needle, as agency practice dictates, to draw up premixed liquid medications from multidose vials. **Rationale:** *Using the filter needle prevents any solid particles from being drawn up through the needle.*
   - Ensure that the needle is firmly attached to the syringe.
   - Remove the cap from the needle, then draw up into the syringe the amount of air equal to the volume of the medication to be withdrawn.
   - Carefully insert the needle into the upright vial through the center of the rubber cap, maintaining the sterility of the needle.

1 Injecting air into a vial.

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Preparing Medications from Vials—*continued*

- Inject the air into the vial, keeping the bevel of the needle above the surface of the medication. ❶ **Rationale:** *The air will allow the medication to be drawn out easily because negative pressure will not be created inside the vial. The bevel is kept above the medication to avoid creating bubbles in the medication.*
- Withdraw the prescribed amount of medication using either of the following methods:
  a. Hold the vial down (i.e., with the base lower than the top), move the needle tip so that it is below the fluid level, and withdraw the medication. Avoid drawing up the last drops of the vial. ❷ **Rationale:** *Proponents of this method say that keeping the vial in the upright position while withdrawing the medication allows particulate matter to precipitate out of the solution. Leaving the last few drops reduces the chance of withdrawing foreign particles.*

or

  b. Invert the vial, ensure the needle tip is *below* the fluid level, and gradually withdraw the medication. ❸ **Rationale:** *Keeping the tip of the needle below the fluid level prevents air from being drawn into the syringe.*

❷ Withdrawing a medication from a vial that is held with the base down.

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Preparing Medications from Vials—*continued*

- Hold the syringe and vial at eye level to determine that the correct dosage of drug is drawn into the syringe. Eject air remaining at the top of the syringe into the vial.
- When the correct volume of medication plus a little more (e.g., 0.25 mL) is obtained, withdraw the needle from the vial, and replace the cap over the needle using the scoop method, thus maintaining its sterility.
- If necessary, tap the syringe barrel to dislodge any air bubbles present in the syringe. **Rationale:** *The tapping motion will cause the air bubbles to rise to the top of the syringe where they can be ejected out of the syringe.*
- If giving an injection, replace the filter needle, if used, with a regular or safety needle of the correct gauge and length. Eject air from the new needle and verify correct medication volume before injecting the client.

Variation: Preparing and Using Multidose Vials

- Read the manufacturer's directions.
- Withdraw an equivalent amount of air from the vial before adding the diluent, unless otherwise indicated by the directions.
- Add the amount of sterile water or saline indicated in the directions.
- If a multidose vial is reconstituted, label the vial with the date and time it was prepared, the amount of drug contained in each milliliter of solution, and your initials. **Rationale:** *Time is an important factor to consider in the expiration of these medications.*

❸ Withdrawing a medication from an inverted vial.

- Once the medication is reconstituted, store it in a refrigerator or as recommended by the manufacturer.
- Discard vial if sterility is compromised or questionable.
- Remember to use a sterile syringe and needle/cannula for each access to the multidose vial.

SKILL 35–4

Mixing Medications Using One Syringe

ASSESSMENT

Assess

- Client allergies to medications
- Specific drug action, side effects, interactions, and adverse reactions
- Client's knowledge of and learning needs about the medications
- Intended route of parenteral medication to determine appropriate size of syringe and needle for the client
- Ordered medications for clarity and expiration date

Determine that the two medications are compatible.

PLANNING

DELEGATION

Mixing medications in one syringe involves knowledge and use of aseptic technique. Therefore, this procedure is not delegated to UAP.

Equipment

- Client's MAR or computer printout
- Two vials of medication; one vial and one ampule; two ampules; or one vial or ampule and one cartridge
- Antiseptic swabs
- Sterile syringe and safety needle or insulin syringe and needle (If insulin is being given, use a small-gauge hypodermic needle, e.g., #26 gauge.)
- Additional sterile subcutaneous or intramuscular safety needle (optional)

continued on next slide

Mixing Medications Using One Syringe

IMPLEMENTATION

Preparation

1. Check the MAR.
   - Check the label on the medications carefully against the MAR to make sure that the correct medication is being prepared.
   - Follow the three checks for administering medications. Read the label on the medication (1) when it is taken from the medication cart, (2) before withdrawing the medication, and (3) after withdrawing the medication.
   - Before preparing and combining the medications, ensure that the total volume of the injection is appropriate for the injection site.
2. Organize the equipment.

Performance

1. Perform hand hygiene and observe other appropriate infection prevention procedures.
2. Prepare the medication ampule or vial for drug withdrawal.
   - See Skill 35–2, *Performance* section, step 2, for an ampule.
   - Inspect the appearance of the medication for clarity. Note, however, that some medications are always cloudy. **Rationale:** *Preparations that have changed in appearance should be discarded.*
   - If using insulin, thoroughly mix the solution in each vial prior to administration. Rotate the vials between the palms of the hands. **Rationale:** *Mixing ensures an adequate concentration and thus an accurate dose. Shaking insulin vials can make the medication frothy, making precise measurement difficult.*
   - Clean the tops of the vials with antiseptic swabs.
3. Withdraw the medications.

Mixing Medications from Two Vials

- Take the syringe and draw up a volume of air equal to the volume of medications to be withdrawn from both vials A and B.
- Inject a volume of air equal to the volume of medication to be withdrawn into vial A. Make sure the needle does not touch the solution. **Rationale:** *This prevents cross contamination of the medications.*
- Withdraw the needle from vial A and inject the remaining air into vial B.
- Withdraw the required amount of medication from vial B. **Rationale:** *The same needle is used to inject air into and withdraw medication from the second vial. It must not be contaminated with the medication in vial A.*
- Using a newly attached sterile needle, withdraw the required amount of medication from vial A. Avoid pushing the plunger because that will introduce medication B into vial A. If using a syringe with a fused needle, withdraw the medication from vial A. The syringe now contains a mixture of medications from vials A and B. **Rationale:** *With this method, neither vial is contaminated by microorganisms or by medication from the other vial.* Be careful to withdraw only the ordered amount and to not create air bubbles. **Rationale:** *The syringe now contains two medications and an excess amount cannot be returned to the vial.*

See also the *Variation* later in this skill.

Mixing Medications from One Vial and One Ampule

- First prepare and withdraw the medication from the vial. **Rationale:** *Ampules do not require the addition of air prior to withdrawal of the drug.*

continued on next slide

Mixing Medications Using One Syringe—*continued*

SKILL 35–4

- Then withdraw the required amount of medication from the ampule.

Mixing Medications from One Cartridge and One Vial or Ampule

- First ensure that the correct dose of the medication is in the cartridge. Discard any excess medication and air.
- Draw up the required medication from a vial or ampule into the cartridge. Note that when withdrawing medication from a vial, an equal amount of air must first be injected into the vial.
- If the total volume to be injected exceeds the capacity of the cartridge, use a syringe with sufficient capacity to withdraw the desired amount of medication from the vial or ampule, and transfer the required amount from the cartridge to the syringe.

Variation: Mixing Insulins

The following is an example of mixing 10 units of regular insulin and 30 units of neutral protamine Hagedorn (NPH) insulin, which contains protamine.

- Inject 30 units of air into the NPH vial and withdraw the needle. (There should be no insulin in the needle.) The needle should not touch the insulin. ❶
- Inject 10 units of air into the regular insulin vial and immediately withdraw 10 units of regular insulin. ❷ and ❸ Always withdraw the regular insulin first. **Rationale:** *This minimizes the possibility of the regular insulin becoming contaminated with the additional protein in the NPH.*
- Reinsert the needle into the NPH insulin vial and withdraw 30 units of NPH insulin. ❹ (The air was previously injected into the vial.) Be careful to withdraw only the ordered amount and to not create air bubbles. If excess medication has been drawn up, discard the syringe and begin the procedure over again. **Rationale:** *The syringe now contains two medications, and an excess amount cannot be returned to the vial because the syringe contains regular insulin, which, if returned to the NPH vial, would dilute the NPH with regular insulin. The NPH vial would not provide accurate future dosages of NPH insulin.*

By using this method, you avoid adding NPH insulin to the regular insulin.

CLINICAL ALERT!

One way to determine which insulin to *withdraw* first is to remember the saying "Clear before cloudy." (Regular insulin is clear and NPH is cloudy due to the proteins in the insulin.)

SAFETY ALERT!

SAFETY

The ISMP (2012) considers insulin a high-alert medication, meaning that it can cause significant client harm if used in error. Check the health agency's policy regarding administration because some agencies may require insulin doses to be checked by two nurses.

continued on next slide

Mixing Medications Using One Syringe—*continued*

1

2

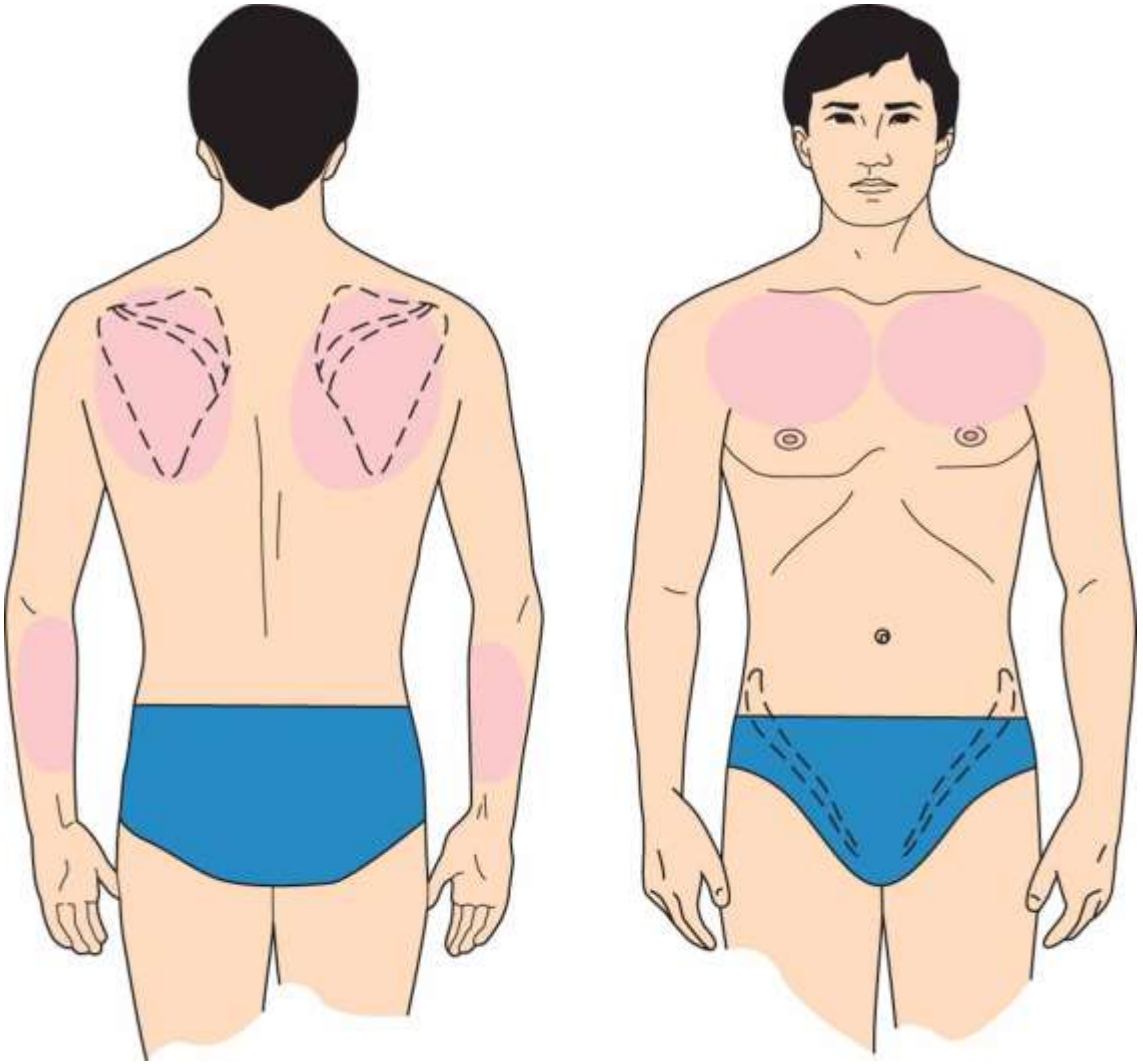

3


4

Intradermal Injections

- Very small amounts administered just below epidermis
- Allergy testing
- Tuberculosis

Figure 35–32 Body sites commonly used for intradermal injections.



Administering an Intradermal Injection for Skin Tests

SKILL 35–5

PURPOSE

- To provide a medication that the client requires for allergy testing and TB screening

ASSESSMENT

Assess

- Appearance of injection site
- Specific drug action and expected response
- Client's knowledge of drug action and response

Check agency protocol about sites to use for skin tests.

PLANNING

DELEGATION

The administration of intradermal injections is an invasive technique that involves the application of nursing knowledge, problem solving, and sterile technique. This technique is not delegated to UAP. The nurse, however, can inform the UAP about symptoms of allergic reactions and the necessity of reporting those observations immediately to the nurse.

Equipment

- Client's MAR or computer printout
- Vial or ampule of the correct medication
- Sterile 1-mL syringe calibrated into hundredths of a milliliter (i.e., tuberculin syringe) and a #25- to #27-gauge safety needle that is 1/4 to 5/8 inch long
- Alcohol swabs
- 2×2 sterile gauze square (optional)
- Clean gloves (according to agency protocol)
- Bandage (optional)
- Epinephrine on hand in case of allergic anaphylactic reaction

continued on next slide

Administering an Intradermal Injection for Skin Tests

IMPLEMENTATION

Preparation

1. Check the MAR.
   - Check the label on the medication carefully against the MAR to make sure that the correct medication is being prepared.
   - Follow the three checks for administering medications. Read the label on the medication (1) when it is taken from the medication cart, (2) before withdrawing the medication, and (3) after withdrawing the medication.
2. Organize the equipment.

PERFORMANCE

1. Perform hand hygiene and observe other appropriate infection prevention procedures.
2. Prepare the medication from the vial or ampule for drug withdrawal.
   - See Skills 35–2 and 35–3.
3. Prepare the client
   - Prior to performing the procedure, introduce self and verify the client's identity using agency protocol. **Rationale:** *This ensures that the right client receives the medication.*
4. Explain to the client that the medication will produce a small wheal, sometimes called a bleb. A wheal is a small raised area, like a blister. The client will feel a slight prick as the needle enters the skin. Some medications are absorbed slowly through the capillaries into the general circulation, and the bleb gradually disappears. Other drugs remain in the area and interact with the body tissues to produce redness and induration (hardening), which will need to be interpreted at a particular time (e.g., in 24 or 48 hours). This reaction will also gradually disappear. **Rationale:** *Information can facilitate acceptance of and compliance with the therapy.*
5. Provide for client privacy.
6. Select and clean the site.
   - Select a site (e.g., the forearm about a hand's width above the wrist and three or four finger widths below the antecubital space).
   - Avoid using sites that are tender, inflamed, or swollen and those that have lesions.
   - Apply gloves as indicated by agency policy.
   - Cleanse the skin at the site using a firm circular motion starting at the center and widening the circle outward. Allow the area to dry thoroughly.
7. Prepare the syringe for the injection.
   - Remove the needle cap while waiting for the antiseptic to dry.
   - Expel any air bubbles from the syringe. Small bubbles that adhere to the plunger are of no consequence. **Rationale:** *A small amount of air will not harm the tissues.*
   - Grasp the syringe in your dominant hand, close to the hub, holding it between thumb and forefinger. Hold the needle almost parallel to the skin surface, with the bevel of the needle up. **Rationale:** *The possibility of the medication entering the subcutaneous tissue increases when using an angle greater than 15°.*

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Administering an Intradermal Injection for Skin Tests

8. Inject the fluid.

- With the nondominant hand, pull the skin at the site until it is taut. For example, if using the ventral forearm, grasp the client's dorsal forearm and gently pull it to tighten the ventral skin. **Rationale:** *Taut skin allows for easier entry of the needle and less discomfort for the client.*
- Insert the tip of the needle far enough to place the bevel through the epidermis into the dermis. The outline of the bevel should be visible under the skin surface.
- Stabilize the syringe and needle. Inject the medication carefully and slowly so that it produces a small wheal on the skin. **Rationale:** *This verifies that the medication entered the dermis.* 1
- Withdraw the needle quickly at the same angle at which it was inserted. Activate the needle safety device. Apply a bandage if indicated.
- Do not massage the area. **Rationale:** *Massage can disperse the medication into the tissue or out through the needle insertion site.*
- Dispose of the syringe and needle into the sharps container. **Rationale:** *Do not recap the needle in order to prevent needlestick injuries.*
- Remove and discard gloves.
- Perform hand hygiene.
- Circle the injection site with ink to observe for redness or induration (hardening), per agency policy.

9. Document all relevant information.

- Record the testing material given, the time, dosage, route, site, and nursing assessments.

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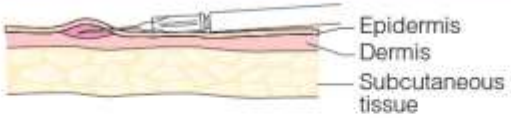
Administering an Intradermal Injection for Skin Tests—*continued*

SKILL 35–5

❶ A



❶ B

❶ C

❶ For an intradermal injection: *A*, the needle enters the skin at a 5° to 15° angle; *B, C,* the medication forms a bleb or wheal under the epidermis.

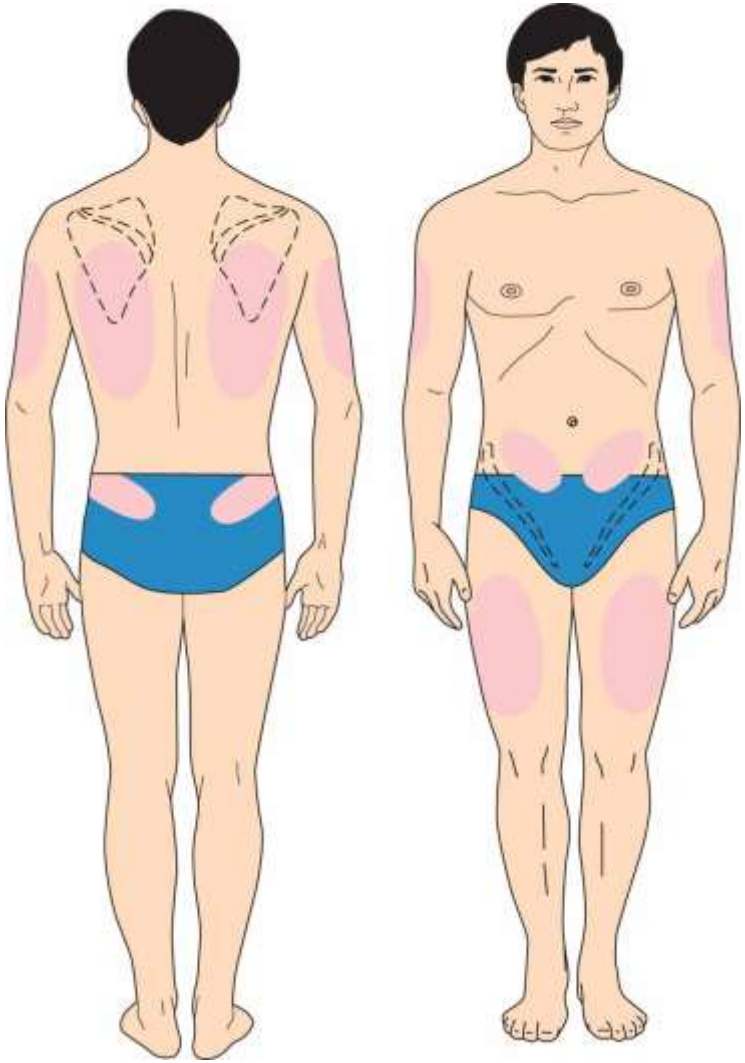
EVALUATION

- Evaluate the client's response to the testing substance. **Rationale:** *Some medications used in testing may cause allergic reactions.* Epinephrine may need to be used.
- Evaluate the condition of the site in 24 or 48 hours, depending on the test. Measure the area of redness and induration in millimeters at the largest diameter and document findings.

Subcutaneous Injections

- Injected just beneath skin
- Vaccines, insulin, heparin
- Syringe depends on medication given, thickness of skin fold
- Sites need to be rotated in an orderly fashion to minimize tissue damage, aid absorption
- Aspiration no longer recommended

Figure 35–33 Body sites commonly used for subcutaneous injections.



SKILL 35–6

Administering a Subcutaneous Injection

PURPOSES

- To provide a medication the client requires (see specific drug action)
- To allow slower absorption of a medication compared with either the intramuscular or intravenous route

ASSESSMENT

Assess

- Allergies to medication
- Specific drug action, side effects, and adverse reactions
- Client's knowledge and learning needs about the medication
- Status and appearance of subcutaneous site for lesions, erythema, swelling, ecchymosis, inflammation, and tissue damage from previous injections
- Ability of client to cooperate during the injection
- Previous injection sites used

PLANNING

DELEGATION

The administration of subcutaneous injections is an invasive technique that involves the application of nursing knowledge, problem solving, and sterile technique. Therefore, this skill is not delegated to UAP. The nurse, however, can inform the UAP of the intended therapeutic effects and/or specific side effects of the medication and direct the UAP to report specific client observations to the nurse for follow-up.

Equipment

- Client's MAR or computer printout
- Vial or ampule of the correct sterile medication
- Syringe and needle (e.g., 3-mL syringe, #25-gauge needle or smaller, 3/8 or 5/8 in. long)
- Antiseptic swabs
- Dry sterile gauze for opening an ampule (optional)
- Clean gloves

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Administering a Subcutaneous Injection—*continued*

IMPLEMENTATION

Preparation

1. Check the MAR.
   - Check the label on the medication carefully against the MAR to make sure that the correct medication is being prepared.
   - Follow the three checks for administering medications. Read the label on the medication (1) when it is taken from the medication cart, (2) before withdrawing the medication, and (3) after withdrawing the medication.
2. Organize the equipment.

Performance

1. Perform hand hygiene and observe other appropriate infection prevention procedures (e.g., clean gloves).
2. Prepare the medication from the ampule or vial for drug withdrawal.
   - See Skill 35–2 (ampule) or 35–3 (vial).
   - If the medication is insulin or heparin, the dosage needs to be verified by another nurse. **Rationale:** *Double checking the dosage avoids medication errors.*

CLINICAL ALERT!

When asking another nurse to verify the dosage of insulin or heparin, leave the needle and syringe in the vial and ask "What dosage do I have in the syringe?" The nurse needs to then check the vial medication name and concentration as well as calculate the dosage. This is a safer and more accurate method of double checking than saying to another nurse "I have 10 units of insulin," which "presets" the other nurse's checking of the medication dosage and can lead to an error.

this technique keeps the swab readily accessible when the needle is withdrawn.

7. Prepare the syringe for injection.
   - Remove the needle cap while waiting for the antiseptic to dry. Pull the cap straight off to avoid contaminating the needle by the outside edge of the cap. **Rationale:** *The needle will become contaminated if it touches anything but the inside of the cap, which is sterile.*
   - Dispose of the needle cap.
8. Inject the medication.
   - Grasp the syringe in your dominant hand by holding it between your thumb and fingers. With palm facing to the side or upward for a 45° angle insertion, or with the palm downward for a 90° angle insertion, prepare to inject. ❶
   - Using the nondominant hand, pinch or spread the skin at the site, and insert the needle using the dominant hand and a firm steady push. Recommendations vary about whether to pinch or spread the skin and at what angle to administer subcutaneous injections. The most important consideration is the depth of the subcutaneous tissue in the area to be injected. If the client has more than 1/2 inch of adipose tissue in the injection site, it would be safe to administer the injection at a 90° angle with the skin spread. If the client is thin or lean and lacks adipose tissue, the subcutaneous injection should be given with the skin pinched and at a 45° to 60° angle. One way to check that the pinch of skin is subcutaneous tissue is to ask the client to flex and extend the elbow. If any muscle is being held in the pinch, you will feel it contract and relax. If so, release the pinch and try again. ❷

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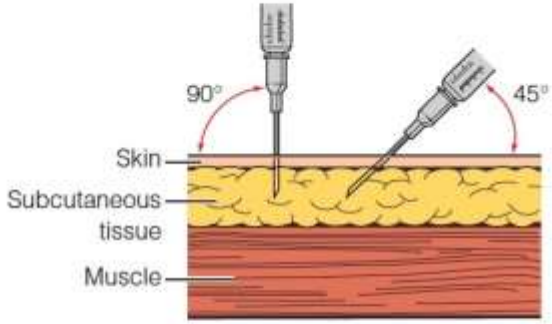
Administering a Subcutaneous Injection—*continued*

3. Provide for client privacy.
4. Prepare the client.
   - Prior to performing the procedure, introduce self and verify the client's identity using agency protocol. **Rationale:** *This ensures that the right client receives the right medication.*
   - Assist the client to a position in which the arm, leg, or abdomen can be relaxed, depending on the site to be used. **Rationale:** *A relaxed position of the site minimizes discomfort.*
   - Obtain assistance in holding an uncooperative client. **Rationale:** *This prevents injury due to sudden movement after needle insertion.*
5. Explain the purpose of the medication and how it will help, using language that the client can understand. Include relevant information about effects of the medication. **Rationale:** *Information can facilitate acceptance of and compliance with the therapy.*



❶ Inserting a needle into the subcutaneous tissue using 90° and 45° angles.

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Administering a Subcutaneous Injection—*continued*

6. Select and clean the site.

- Select a site free of tenderness, hardness, swelling, scarring, itching, burning, or localized inflammation. Select a site that has not been used frequently. **Rationale:** *These conditions could hinder the absorption of the medication and may also increase the likelihood of injury and discomfort at the injection site.*
- Apply clean gloves.
- As agency protocol indicates, clean the site with an antiseptic swab. Start at the center of the site and clean in a widening circle to about 5 cm (2 in.). Allow the area to dry thoroughly. **Rationale:** *The mechanical action of swabbing removes skin secretions, which contain microorganisms.*
- Place and hold the swab between the third and fourth fingers of the nondominant hand, or position the swab on the client's skin above the intended site. **Rationale:** *Using*

❷ Administering a subcutaneous injection into pinched tissue.

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Administering a Subcutaneous Injection—*continued*

SKILL 35–6

- When the needle is inserted, move your nondominant hand to the end of the plunger. Some nurses find it easier to move the nondominant hand to the barrel of the syringe and the dominant hand to the end of the plunger.
- Inject the medication by holding the syringe steady and depressing the plunger with a slow, even pressure.
  Rationale: *Holding the syringe steady and injecting the medication at an even pressure minimizes discomfort for the client.*
- It is recommended that with many subcutaneous injections, especially insulin, the needle should be embedded within the skin for 5 seconds after complete depression of the plunger to ensure complete delivery of the dose.

9. Remove the needle.

- Remove the needle smoothly, pulling along the line of insertion while depressing the skin with your nondominant hand.
  Rationale: *Depressing the skin places countertraction on it and minimizes the client's discomfort when the needle is withdrawn.*
- If bleeding occurs, apply pressure to the site with dry sterile gauze until it stops. *Bleeding rarely occurs after subcutaneous injection.*

VARIATION: ADMINISTERING A HEPARIN INJECTION

The subcutaneous administration of heparin requires special precautions because of the drug's anticoagulant properties.

- Select a site on the abdomen at least 2 inches *away* from the umbilicus and above the level of the iliac crests. Some agencies support the practice of subcutaneous injection of heparin in the thighs or arms as alternate sites to the abdomen. Avoid injecting into bruises, scars, masses, or areas of tenderness.
- Use a 3/8-inch, #25- or #26-gauge needle or smaller, and insert it at a 90° angle. If a client is very lean or wasted, use a needle longer than 3/8 inch and insert it at a 45° angle. The arms or thighs may be used as alternate sites.
- Do *not* aspirate when giving heparin by subcutaneous injection.
  Rationale: *Aspiration can possibly damage the surrounding tissue and cause bleeding as well as ecchymoses (bruises).*
- Do not massage the site after the injection. **Rationale:** *Massaging could cause bleeding and ecchymoses and hasten drug absorption.*
- Alternate the sites of subsequent injections.

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Administering a Subcutaneous Injection—*continued*

10. Dispose of supplies appropriately.
- Activate the needle safety device or discard the uncapped needle and attached syringe into designated receptacles. **Rationale:** *Proper disposal protects the nurse and others from injury and contamination. The CDC recommends not capping the needle before disposal to reduce the risk of needlestick injuries.*
- Remove and discard gloves.
- Perform hand hygiene.

11. Document all relevant information.
- Document the medication given, dosage, time, route, and any assessments.
- Many agencies prefer that medication administration be recorded on the medication record. The nurse's notes are used when prn medications are given or when there is a special problem.

12. Assess the effectiveness of the medication at the time it is expected to act and document it.

VARIATION: ADMINISTERING ENOXAPARIN (LOVENOX)

Lovenox is a low molecular weight heparin that is used to prevent deep venous thrombosis (DVT). Administration of Lovenox has special considerations also.

- Choose an area on the abdomen at least 2 inches from the umbilicus and above the level of the iliac crests.
- Lovenox syringes come prefilled. Check that the syringe is for the correct dosage. Every syringe comes with a small air bubble. Do *not* expel the air bubble unless you have to adjust the dose.
- Pinch an inch of the cleansed area on the abdomen to make a fold in the skin. Insert the full length of the needle at a 90° angle into the fold of the skin.
- Press the plunger with your thumb until the syringe is empty.
- Pull the needle straight out at the same angle that it was inserted and release the skinfold.
- Point the needle down and away from yourself and others and push down on the plunger to activate the safety shield (Sanofi-Aventis, 2012).

EVALUATION

- Conduct appropriate follow-up such as desired effect (e.g., relief of pain, sedation, lowered blood sugar, a prothrombin time within preestablished limits), any adverse effects (e.g., nausea, vomiting, skin rash), and clinical signs of side effects.
- Relate to previous findings if available.
- Report deviations from normal to the primary care provider.

Intramuscular Injections

- Absorbed more quickly than subcutaneous because muscle more vascular
  - Large volumes can be tolerated.

Intramuscular Injections

- Size of syringe varies.
  - Adult standard is 1.5 inches, 21 or 22 gauge.
- Factors determining size and length
  - Muscle
  - Type of solution
  - Adipose tissue
  - Age of client

Intramuscular Injections

- Ventrogluteal site
  - Preferred
    - No large nerves, vessels
    - Sealed off by bone
  - Side-lying position most accessible
- Vastus lateralis site
  - Best for infants, young children

Figure 35–35 Landmarks for the ventrogluteal site for an intramuscular injection.

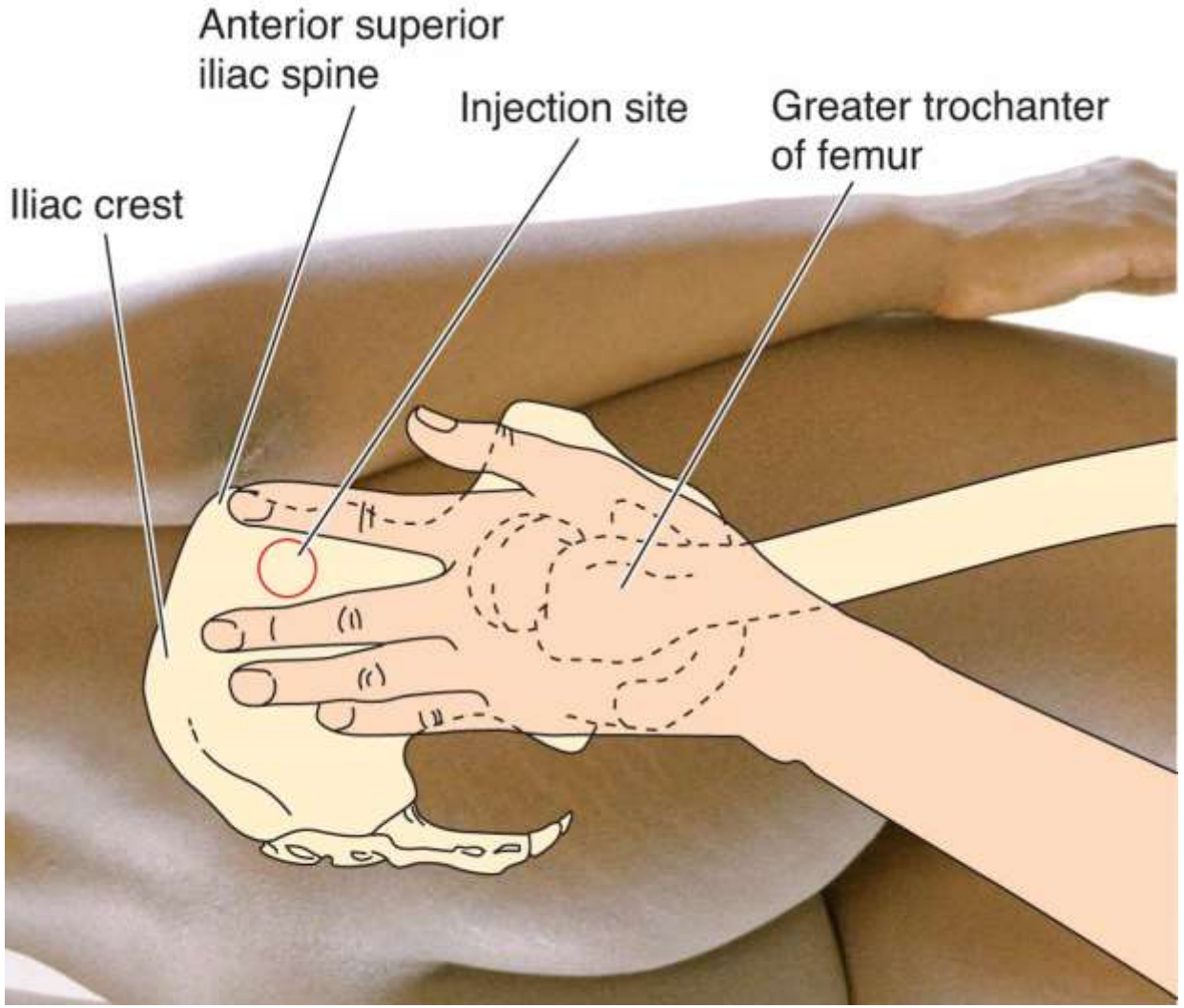


Figure 35-37 The vastus lateralis muscle of an infant's upper thigh, used for intramuscular injections.

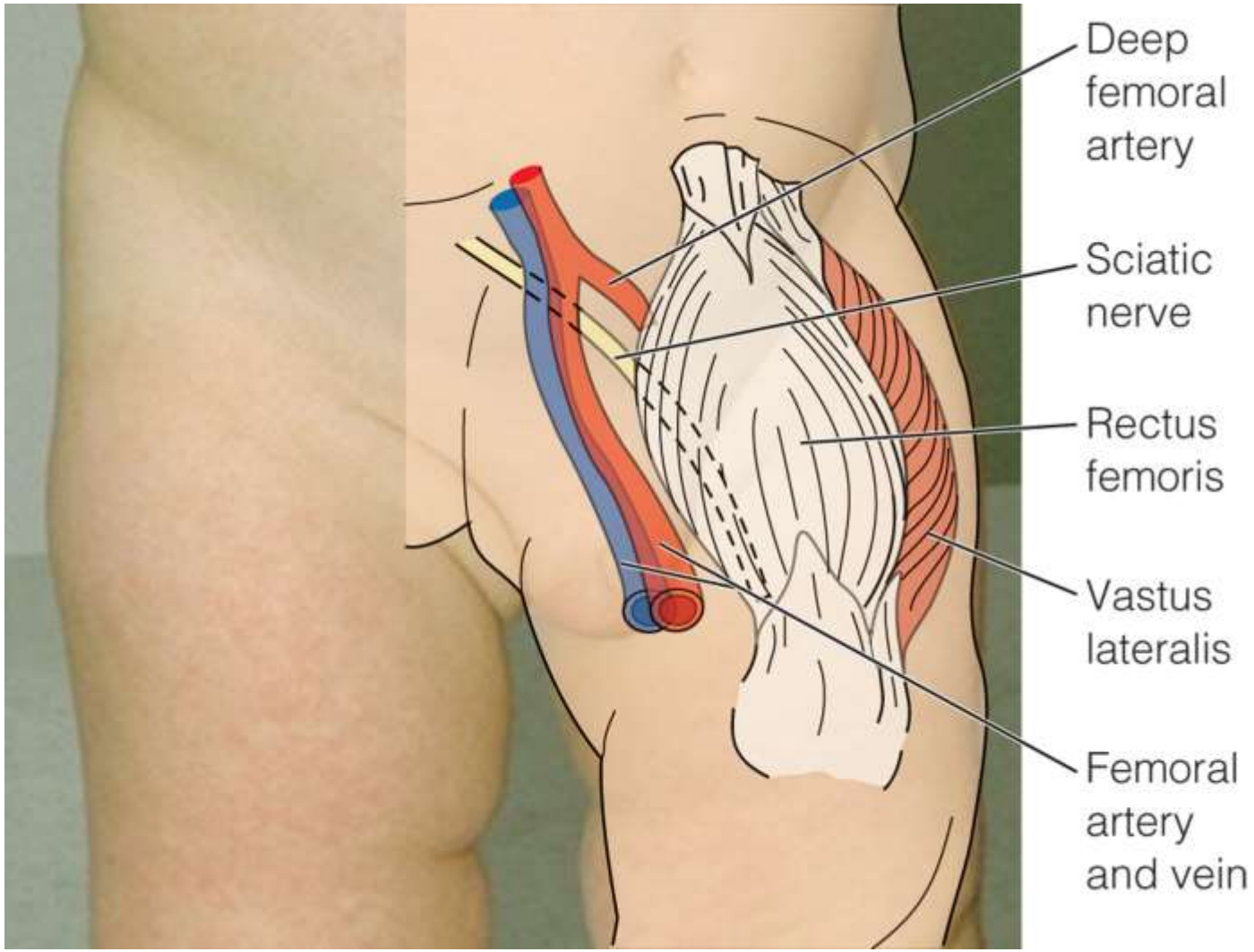
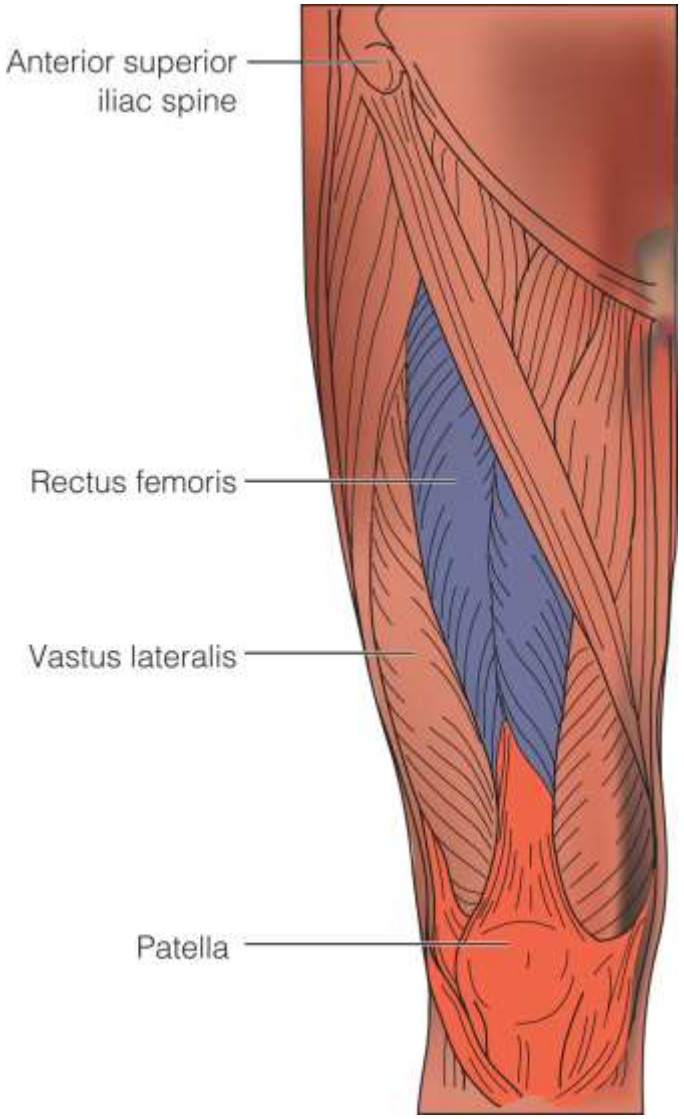


Figure 35–40 Landmarks for the rectus femoris muscle of the upper right thigh, used for intramuscular injections.



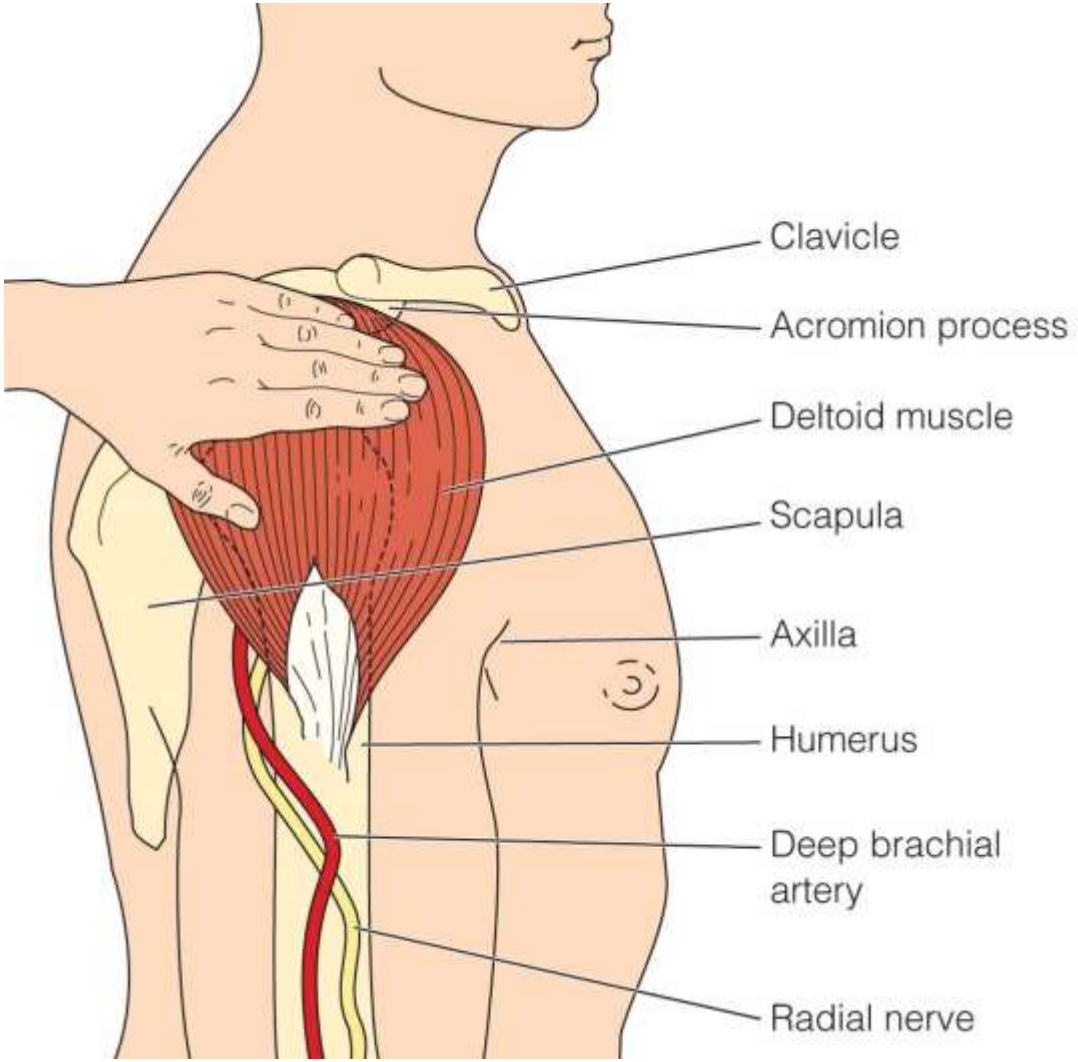
Intramuscular Injections

- Dorsogluteal site
  - Not preferred, should be avoided
  - Close to sciatic nerve and superior gluteal nerve
    - Complications have occurred.
      - Numbness
      - Pain
      - Paralysis
  - Subcutaneous tissue

Intramuscular Injections

- Rectus femoris site
  - Easily accessible to clients who administer their own injection
  - May cause discomfort for some people
- Deltoid site
  - Close to radial nerve, artery
  - No more than 1 mL of solution can be administered
  - Hepatitis B vaccine

Figure 35–41 A method of establishing the deltoid muscle site for an intramuscular injection.



Intramuscular Injection Technique

- Also called Z-track
- Less painful
- Decreases leakage of irritant medication into subcutaneous tissue
- Traps medication in muscle layer

Administering an Intramuscular Injection

SKILL 35–7

PURPOSE

- To provide a medication the client requires (see specific drug action)

ASSESSMENT

Assess

- Client allergies to medication(s)
- Specific drug action, side effects, and adverse reactions
- Client's knowledge of and learning needs about the medication
- Tissue integrity of the selected site
- Client's age and weight to determine site and needle size
- Client's ability or willingness to participate

Determine whether the size of the muscle is appropriate to the amount of medication to be injected. An average adult's deltoid muscle can usually absorb 0.5 mL of medication, although some authorities believe 1 mL can be absorbed by a well-developed deltoid muscle. The gluteus medius muscle can often absorb 1 to 4 mL, although 4 mL may be very painful and may be contraindicated by agency protocol.

PLANNING

DELEGATION

The administration of IM injections is an invasive technique that involves the application of nursing knowledge, problem solving, and sterile technique. Delegation to UAP would be inappropriate. The nurse, however, can inform the UAP of the intended therapeutic effects and/or specific side effects of the medication and direct the UAP to report specific client observations to the nurse for follow-up.

Equipment

- Client's MAR or computer printout
- Sterile medication (usually provided in an ampule or vial or prefilled syringe)
- Syringe and needle of a size appropriate for the amount and type of solution to be administered
- Antiseptic swabs
- Clean gloves

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Administering an Intramuscular Injection

IMPLEMENTATION

Preparation

1. Check the MAR.
   - Check the label on the medication carefully against the MAR to make sure that the correct medication is being prepared.
   - Follow the three checks for administering the medication and dose. Read the label on the medication (1) when it is taken from the medication cart, (2) before withdrawing the medication, and (3) after withdrawing the medication.
   - Confirm that the dose is correct.
2. Organize the equipment.

Performance

1. Perform hand hygiene and observe other appropriate infection prevention procedures.
2. Prepare the medication from the ampule or vial for drug withdrawal.
   - See Skill 35–2 (ampule) or 35–3 (vial).
   - Whenever feasible, change the needle on the syringe before the injection. **Rationale:** *Because the outside of a new needle is free of medication, it does not irritate subcutaneous tissues as it passes into the muscle.*
   - Invert the syringe needle uppermost and expel all excess air.
3. Provide for client privacy.
4. Prepare the client.
   - Prior to performing the procedure, introduce self and verify the client's identity using agency protocol. **Rationale:** *This ensures that the right client receives the medication.*
   - Assist the client to a supine, lateral, prone, or sitting position, depending on the chosen site. If the target muscle is the gluteus medius (ventrogluteal site), have the client in the supine position flex the knee(s); in the lateral position, flex the upper leg; and in the prone position, toe in. **Rationale:** *Appropriate positioning promotes relaxation of the target muscle.*
   - Obtain assistance in holding an uncooperative client. **Rationale:** *This prevents injury due to sudden movement after needle insertion.*
5. Explain the purpose of the medication and how it will help, using language that the client can understand. Include relevant information about effects of the medication. **Rationale:** *Information can facilitate acceptance of and compliance with the therapy.*

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Administering an Intramuscular Injection

6. Select, locate, and clean the site.

- Select a site free of skin lesions, tenderness, swelling, hardness, or localized inflammation and one that has not been used frequently.
- If injections are to be frequent, alternate sites. Avoid using the same site twice in a row. **Rationale:** *This is to reduce the discomfort of intramuscular injections.* If necessary, discuss with the prescribing primary care provider an alternative method of providing the medication.
- Locate the exact site for the injection. See the discussion of sites earlier in this chapter.
- Apply clean gloves.
- Clean the site with an antiseptic swab. Using a circular motion, start at the center and move outward about 5 cm (2 in.).
- Transfer and hold the swab between the third and fourth fingers of your nondominant hand in readiness for needle withdrawal, or position the swab on the client's skin above the intended site. Allow skin to dry prior to injecting medication. **Rationale:** *This will help reduce the discomfort of the injection.*

7. Prepare the syringe for injection.

- Remove the needle cover and discard without contaminating the needle.
- If using a prefilled unit-dose medication, take caution to avoid dripping medication on the needle prior to injection. If this does occur, wipe the medication off the needle with a sterile gauze. Some sources recommend changing the needle if possible. **Rationale:** *Medication left on the needle can cause pain when it is tracked through the subcutaneous tissue (Nicoll & Hesby, 2002).*

8. Inject the medication using the Z-track technique.

- Use the ulnar side of the nondominant hand to pull the skin approximately 2.5 cm (1 in.) to the side. Under some circumstances, such as for an emaciated client or an infant, the muscle may be pinched. **Rationale:** *Pulling the skin and subcutaneous tissue or pinching the muscle makes it firmer and facilitates needle insertion.* ❶
- Holding the syringe between the thumb and forefinger (as if holding a pen), pierce the skin quickly and smoothly at a 90° angle (see Figure 35–39), and insert the needle into the muscle. ❷ **Rationale:** *Using a quick motion lessens the client's discomfort.*
- Hold the barrel of the syringe steady with your nondominant hand and aspirate by pulling back on the plunger with your dominant hand. ❸ Aspirate for 5 to 10 seconds. **Rationale:** *If the needle is in a small blood vessel, it takes time for the blood to appear.* If blood appears in the syringe, withdraw the needle, discard the syringe, and prepare a new

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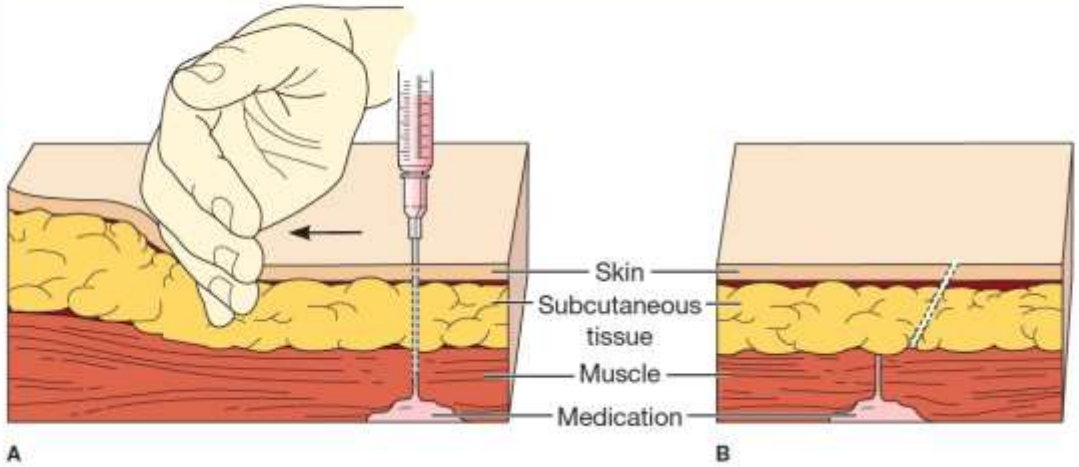
Administering an Intramuscular Injection—*continued*

SKILL 35–7



❶ Inserting an intramuscular needle at a 90° angle using the Z-track method: *A,* skin pulled to the side; *B,* skin released. *Note:* When the skin returns to its normal position after the needle is withdrawn, a seal is formed over the intramuscular site. This prevents seepage of the medication into the subcutaneous tissues and subsequent discomfort.

continued on next slide

Administering an Intramuscular Injection—*continued*

injection. **Rationale:** *This step determines whether the needle has been inserted into a blood vessel.* Note, however, that as stated previously, the practice of aspiration immediately before the administration of an IM vaccine injection is not necessary. Aspiration should be used with the dorsogluteal site (last resort) because needle insertion is close to the gluteal artery. Currently there is no clear evidence with other sites. Thus, it is recommended that nursing students consult the policy manual at the institution where they are practicing to determine the recommended guidelines for IM injection technique.

- If blood does not appear, inject the medication steadily and slowly (approximately 10 seconds per milliliter) while holding the syringe steady if using the ventrogluteal site. **Rationale:** *Injecting medication slowly promotes comfort and allows time for tissue to expand and begin absorption of the medication* (Malkin, 2008; Zimmerman, 2010). *Holding the syringe steady minimizes discomfort.* One study found that rapidly injecting vaccines without aspiration caused less pain (Hensel & Springmyer, 2011).
- After injection, wait 10 seconds if using the ventrogluteal site. **Rationale:** *Waiting permits the medication to disperse into the muscle tissue, thus decreasing the client's discomfort.*

❷ Holding the syringe between the thumb and forefinger. Note that the nurse is using the Z-track technique.

continued on next slide

Administering an Intramuscular Injection—*continued*

9. Withdraw the needle.
   - Withdraw the needle smoothly at the same angle of insertion. **Rationale:** *This minimizes tissue injury.* Release the skin.
   - Apply gentle pressure at the site with a dry sponge. **Rationale:** *Use of an alcohol swab may cause pain or a burning sensation.*
   - It is not necessary to massage the area at the site of injection. **Rationale:** *Massaging the site may cause the leakage of medication from the site and result in irritation.*
   - If bleeding occurs, apply pressure with a dry sterile gauze until it stops.
10. Activate the needle safety device or discard the uncapped needle and attached syringe into the proper receptacle.
11. Remove and discard gloves.
    - Perform hand hygiene.
12. Document all relevant information.
    - Include the time of administration, drug name, dose, route, and the client's reactions.
13. Assess the effectiveness of the medication at the time it is expected to act.

❸ In addition to pulling the skin to the side, the nondominant hand is holding the barrel of the syringe to prevent it from moving while the dominant hand aspirates by pulling back on the plunger.

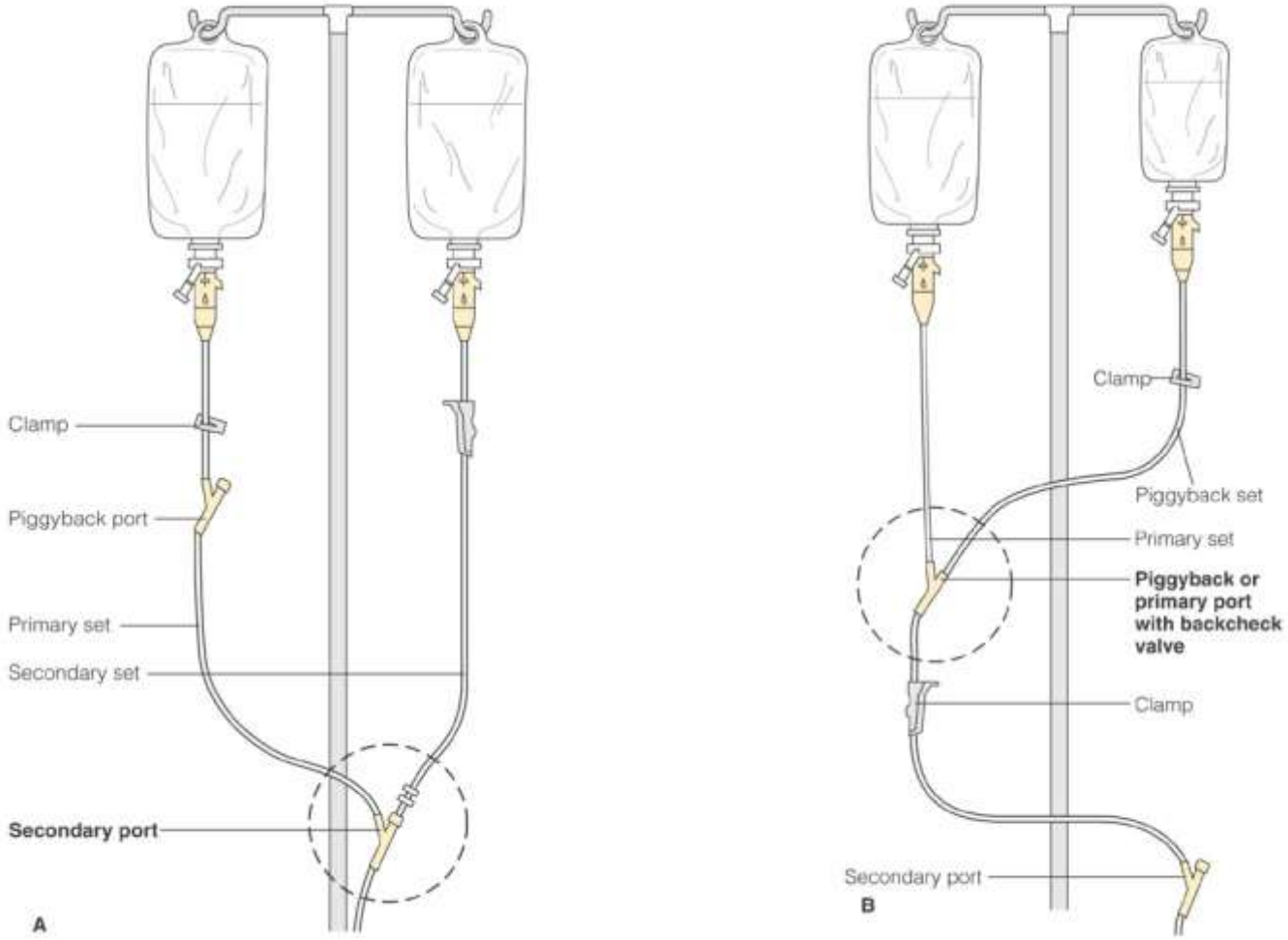
Evaluation

- Conduct appropriate follow-up, such as
  - Desired effect (e.g., relief of pain or vomiting)
  - Any adverse reactions or side effects
  - Local skin or tissue reactions at injection site (e.g., redness, swelling, pain, or other evidence of tissue damage).
- Relate to previous findings, if available.
- Report significant deviation from normal to the primary care provider.

Intravenous Medications

- Route appropriate for rapid effect (direct to bloodstream) or for medication that irritates tissue
- Large-volume infusions
  - Safest, easiest
  - Main danger is hypervolemia
- Intermittent intravenous infusions
  - Tandem
  - Piggyback

Figure 35-45 Secondary intravenous lines: A, a tandem intravenous alignment; B, an intravenous piggyback (IVPB) alignment.



Adding Medications to Intravenous Fluid Containers

SKILL 35–8

PURPOSES

- To provide and maintain a constant level of a medication in the blood
- To administer well-diluted medications at a continuous and slow rate

ASSESSMENT

- Inspect and palpate the IV insertion site for signs of infection, infiltration, or a dislocated catheter.
- Inspect the surrounding skin for redness, pallor, or swelling.
- Palpate the surrounding tissues for coldness and the presence of edema, which could indicate leakage of the IV fluid into the tissues.
- Take vital signs for baseline data for medication that is particularly potent.
- Determine if the client has allergies to the medication(s).
- Check the compatibility of the medication(s) and IV fluid.

continued on next slide

Adding Medications to Intravenous Fluid Containers—*continued*

SKILL 35–8

PLANNING

DELEGATION

Adding medications to IV fluid containers involves the application of nursing knowledge and critical thinking. The nurse does not delegate this procedure to UAP. However, the nurse can inform the UAP of the intended therapeutic effects and/or specific side effects of the medication(s) in the IV and direct the UAP to report specific client observations to the nurse for follow-up.

Equipment

- Client's MAR or computer printout
- Correct sterile medication
- Diluent for medication in powdered form (see manufacturer's instructions)
- Correct solution container, if a new one is to be attached
- Antiseptic swabs
- Sterile syringe of appropriate size (e.g., 5 or 10 mL) and a 1- to 1 1/2-inch, #20- or #21-gauge sterile safety needle if not using a needleless system
- IV additive label

IMPLEMENTATION

Preparation

1. Check the MAR.
   - Check the label on the medication carefully against the MAR to make sure that the correct medication is being prepared.
   - Follow the three checks for administering medications. Read the label on the medication (1) when it is taken from the medication cart, (2) before withdrawing the medication, and (3) after withdrawing the medication.
   - Confirm that the dosage and route is correct.
   - Verify which infusion solution is to be used with the medication.
   - Consult a pharmacist, if required, to confirm compatibility of the drugs and solutions being mixed.
2. Organize the equipment.

Performance

1. Perform hand hygiene and observe other appropriate infection prevention procedures.
2. Prepare the medication ampule or vial for drug withdrawal.
   - See Skill 35–2 (ampule) or 35–3 (vial).
   - Check the agency's practice for using a filter needle to withdraw premixed liquid medications from multidose vials or ampules.

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Adding Medications to Intravenous Fluid Containers—*continued*

3. Add the medication.

To New IV Container

- Locate the injection port. Clean the port with the antiseptic or alcohol swab. ❶ **Rationale:** *This reduces the risk of introducing microorganisms into the container when the needle is inserted.*
- Remove the needle cap from the syringe, insert the needle through the center of the injection port, and inject the medication into the bag. Activate the needle safety device. ❷
- Mix the medication and solution by gently rotating the bag or bottle. **Rationale:** *This should disperse the medication throughout the solution.* ❸

❶ Cleanse the injection port with an alcohol swab.

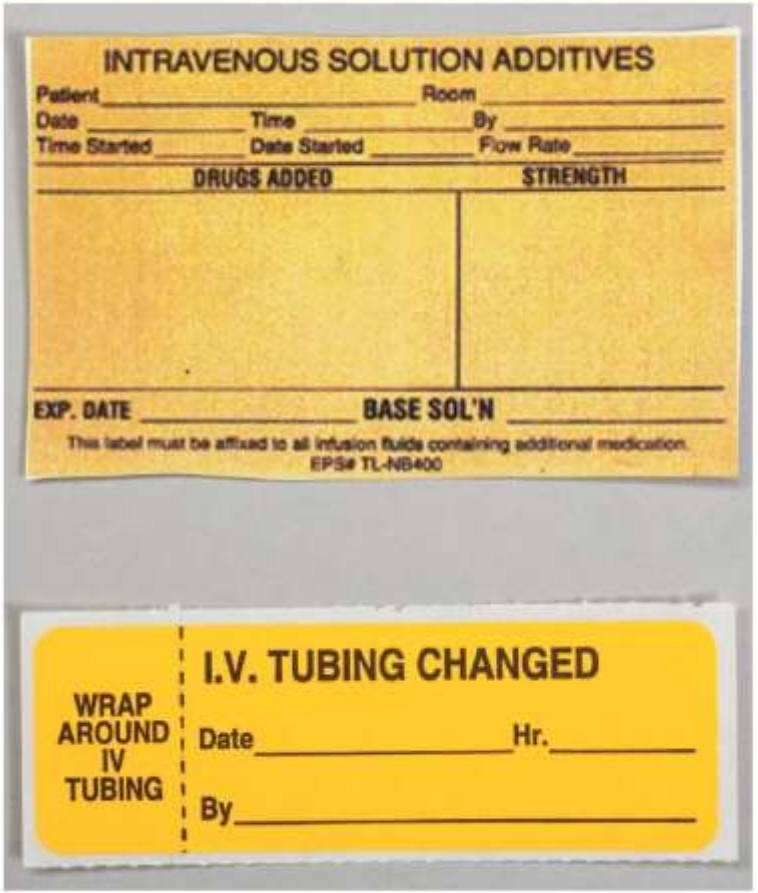
❷ Inserting a medication through the injection port of an infusing container.

continued on next slide

Adding Medications to Intravenous Fluid Containers—*continued*

3 Rotating an IV bag to distribute a medication.

- Complete the IV additive label with name and dose of medication, date, time, and nurse's initials. Attach it on the bag or bottle. **Rationale:** *This documents that medication has been added to the solution. The label should be easy to read when the bag is hanging.* 4
- Clamp the IV tubing. Spike the bag or bottle with IV tubing and hang the IV. **Rationale:** *Clamping prevents rapid infusion of the solution.*
- Regulate infusion rate as ordered. Often a controller device such as an IV pump is used to ensure accurate rate of infusion.



4 *Top,* label indicating a medication added to an IV infusion; *bottom,* label for indicating when the IV tubing was changed.

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Adding Medications to Intravenous Fluid Containers—*continued*

To an Existing Infusion

- Determine that the IV solution in the container is sufficient for adding the medication. **Rationale:** *Sufficient volume is necessary to dilute the medication adequately.*
- Confirm the desired dilution of the medication, that is, the amount of medication per milliliter of solution.
- Close the infusion clamp. **Rationale:** *This prevents the medication from infusing directly into the client as it is injected into the bag or bottle.*
- Wipe the medication port with the alcohol or disinfectant swab. **Rationale:** *This reduces the risk of introducing microorganisms into the container when the needle is inserted.* Remove the needle cover from the medication syringe.
- While supporting and stabilizing the bag with your thumb and forefinger, carefully insert the syringe needle through the port and inject the medication. **Rationale:** *The bag is supported during the injection of the medication to avoid punctures.* If the bag is too high to reach easily, lower it from the IV pole. Activate the needle safety device.
- Remove the bag from the pole and gently rotate the bag. **Rationale:** *This will mix the medication and solution.*
- Rehang the container and regulate the flow rate. **Rationale:** *This establishes the correct flow rate.*
- Complete the medication label and apply to the IV container.

4. Dispose of the equipment and supplies according to agency practice. **Rationale:** *This prevents inadvertent injury to others and the spread of microorganisms.*
5. Document the medication(s) on the appropriate form in the client's record.

EVALUATION

- Conduct appropriate follow-up such as desired effect of medication, any adverse reactions or side effects, or change in vital signs.
- Reassess the status of IV site and patency of IV infusion.
- Relate to previous findings, if available.
- Report significant deviations from normal to the primary care provider.

Intravenous Medications

- Volume-controlled infusions
  - Set such as Buretrol, Soluset, Volutrol, and Pediatrol
  - Often used with children, older clients when volume administered is critical and must be carefully monitored

Intravenous Medications

- Intravenous push
  - Or bolus
  - Undiluted and used in emergency
  - Errors may not be corrected and drug may irritate lining of blood vessels
- Intermittent infusion devices
  - For clients receiving long-term therapy
  - SASH flushing procedure

Administering Intravenous Medications Using IV Push

SKILL 35–9

PURPOSE

- To achieve immediate and maximum effects of a medication

ASSESSMENT

- Inspect and palpate the IV insertion site for signs of infection, infiltration, or a dislocated catheter.
- Inspect the surrounding skin for redness, pallor, or swelling.
- Palpate the surrounding tissues for coldness and the presence of edema, which could indicate leakage of the IV fluid into the tissues.
- Take vital signs for baseline data if the medication being administered is particularly potent.
- Determine if the client has allergies to the medication(s).
- Check the compatibility of the medication(s) and IV fluid.
- Determine specific drug action, side effects, normal dosage, recommended administration time, and peak action time.
- Check patency of IV.

continued on next slide

Administering Intravenous Medications Using IV Push—*continued*

SKILL 35-9

PLANNING

DELEGATION

The administration of intravenous medication via IV push involves the application of nursing knowledge and critical thinking. This procedure is not delegated to UAP. The nurse, however, can inform the UAP of the intended therapeutic effects and/or specific side effects of the medication and direct the UAP to report specific client observations to the nurse for follow-up. *Note:* Administration of IV push medications varies by state nurse practice acts. For example, some states may allow the RN to delegate certain medications to be given by an LPN/LVN, whereas other states may allow only the RN to administer IV push medications. The nurse needs to know his or her scope of practice according to the state's nurse practice act and agency policies.

Equipment

IV Push for an Existing Line

- Client's MAR
- Medication in a vial or ampule
- Sterile syringe (3 to 5 mL) (to prepare the medication)
- Sterile needles, #21 to #25 gauge, 2.5 cm (1 in.) (needle not needed if using a needleless system)
- Antiseptic swabs
- Watch with a digital readout or second hand
- Clean gloves

IV Push for an IV Lock

- Client's MAR
- Medication in a vial or ampule
- Sterile syringe (3 to 5 mL) (to prepare medication)
- Sterile syringe (3 mL) (for the saline or heparin flush)
- Vial of normal saline to flush the IV catheter or vial of heparin flush solution or both depending on agency practice. **Rationale:** *These maintain the patency of the IV lock. Saline is commonly used for peripheral locks.*
- Antiseptic swabs
- Watch with a digital readout or second hand
- Clean gloves. **Rationale:** *OSHA recommends gloves be worn when performing vascular access procedures.*

continued on next slide

Administering Intravenous Medications Using IV Push—*continued*

IMPLEMENTATION

Preparation

1. Check the MAR.
   - Check the label on the medication carefully against the MAR to make sure that the correct medication is being prepared.
   - Follow the three checks for correct medication and dose. Read the label on the medication (1) when it is taken from the medication cart, (2) before withdrawing the medication, and (3) after withdrawing the medication.
   - Calculate medication dosage accurately.
   - Confirm that the route is correct.
2. Organize the equipment.

Performance

1. Perform hand hygiene and observe other appropriate infection prevention procedures.
2. Prepare the medication.

   Existing Line
   - Prepare the medication according to the manufacturer's direction. **Rationale:** *It is important to have the correct dose and the correct dilution.*

   IV Lock

   a. Flushing with saline:
      - Prepare two syringes, each with 1 mL of sterile normal saline.

   b. Flushing with heparin (if indicated by agency policy) and saline:
      - Prepare one syringe with 1 mL of heparin flush solution (if indicated by agency policy).
      - Prepare two syringes with 1 mL each of sterile, normal saline.
      - Draw up the medication into a syringe.
3. Put a small-gauge needle on the syringe if using a needle system.
4. Perform hand hygiene and apply clean gloves. **Rationale:** *This reduces the transmission of microorganisms and reduces the likelihood of the nurse's hands contacting the client's blood.*
5. Provide for client privacy.
6. Prepare the client.
   - Prior to performing the procedure, introduce self and verify the client's identity using agency protocol. **Rationale:** *This ensures that the right client receives the right medication.*
   - If not previously assessed, take the appropriate assessment measures necessary for the medication. If any of the findings are above or below the predetermined parameters, consult the primary care provider before administering the medication.

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Administering Intravenous Medications Using IV Push—*continued*

7. Explain the purpose of the medication and how it will help, using language that the client can understand. Include relevant information about the effects of the medication. **Rationale:** *Information can facilitate acceptance of and compliance with the therapy.*
8. Administer the medication by IV push.

IV Lock with Needle

- Clean the injection port with the antiseptic swab. **Rationale:** *This prevents microorganisms from entering the circulatory system during the needle insertion.*
- Insert the needle of the syringe containing normal saline through the injection port of an IV lock and aspirate for blood. **Rationale:** *The presence of blood confirms that the catheter or needle is in the vein. In some situations, blood will not return even though the lock is patent.* ❶
- Flush the lock by injecting 1 mL of saline slowly. **Rationale:** *This removes blood and heparin (if present) from the needle and the lock.*
- Observe the area above the IV catheter for puffiness or swelling. This indicates infiltration into tissue, which would require removal of the IV catheter.

❶ Inserting a needle through the injection port of an IV lock.

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Administering Intravenous Medications Using IV Push—*continued*

SKILL 35–9

❷ Using a watch to time the rate of a medication injection.

❸ A blunt plastic cannula replaces the sharp steel needle.
Courtesy of Covidien.

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Administering Intravenous Medications Using IV Push—*continued*

4 Stopping the IV flow by pinching the tubing above the injection port.

5 Injecting a medication by IV push to an existing IV using a needleless system.

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Administering Intravenous Medications Using IV Push—*continued*

- Remove the needle and syringe. Activate the needle safety device.
- Clean the lock's diaphragm with an antiseptic swab. **Rationale:** *This prevents the transfer of microorganisms.*
- Insert the needle of the syringe containing the prepared medication through the center of the injection port.
- Inject the medication slowly at the recommended rate of infusion. Use a watch or digital readout to time the injection. ❷ **Rationale:** *Injecting the drug too rapidly can have a serious untoward reaction.*
- Observe the client closely for adverse reactions. Remove the needle and syringe when all medication is administered.
- Activate the needle safety device.
- Clean the injection port of the lock.
- Attach the second saline syringe, and inject 1 mL of saline. **Rationale:** *The saline injection flushes the medication through the catheter and prepares the lock for heparin if this medication is used. Heparin is incompatible with many medications.*
- If heparin is to be used, insert the heparin syringe and inject the heparin slowly into the lock.

IV Lock with Needleless System

- Clean the injection port of the lock.
- Insert syringe containing normal saline into the injection port.
- Flush the lock with 1 mL of sterile saline. **Rationale:** *This clears the lock of blood.*
- Remove the syringe.
- Insert the syringe containing the medication into the port. ❸
- Inject the medication following the precautions described previously.
- Withdraw the syringe.
- Repeat injection of 1 mL of saline.

Existing Line

- Identify the injection port closest to the client. Some ports have a circle indicating the site for the needle insertion. **Rationale:** *An injection port must be used because it is self-sealing. Any puncture to the plastic tubing will leak.*
- Clean the port with an antiseptic swab.
- Stop the IV flow by closing the clamp or pinching the tubing above the injection port. ❹
- Connect the syringe to the IV system.
  a. Needle system:
    - Hold the port steady.
    - Insert the needle of the syringe that contains the medication through the center of the port. **Rationale:** *This prevents damage to the IV line and to the diaphragm of the port.*

  b. Needleless system:
    - Remove the cap from the needleless injection port. Connect the tip of the syringe directly to the port. ❺
    - Inject the medication at the ordered rate. Use the watch or digital readout to time the medication administration. **Rationale:** *This ensures safe drug administration because a too rapid injection could be dangerous.*
    - Release the clamp or tubing.

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Administering Intravenous Medications Using IV Push—*continued*

SKILL 35–9

- After injecting the medication, withdraw the needle and activate the needle safety device. For a needleless system, detach the syringe and attach a new sterile cap to the port.

9. Dispose of equipment according to agency practice.
   Rationale: *This reduces needlestick injuries and spread of microorganisms.*
10. Remove and discard gloves.
    - Perform hand hygiene.
11. Observe the client closely for adverse reactions.
12. Determine agency practice about recommended times for changing the IV lock. Some agencies advocate a change every 48 to 72 hours for peripheral IV devices.
13. Document all relevant information.
    - Record the date, time, drug, dose, and route; client response; and assessments of infusion or heparin lock site if appropriate.

EVALUATION

- Conduct appropriate follow-up such as desired effect of medication, any adverse reactions or side effects, or change in vital signs.
- Reassess status of IV lock site and patency of IV infusion, if running.
- Relate to previous findings, if available.
- Report significant deviations from normal to the primary care provider.
- Inspect appearance of medication and check expiration date.

Topical Medications

- Percutaneous
- Transdermal patch
- Skin applications
  - Clean skin before applying
  - Wear gloves
  - Use surgical asepsis in presence of open wound

Topical Medications

- Ophthalmic medications
  - Liquid or ointment medication into eye
    - Irrigation
    - Instillation

Administering Ophthalmic Instillations

SKILL 35–10

PURPOSE

- To provide an eye medication the client requires (e.g., an antibiotic) to treat an infection or for other reasons (see specific drug action)

ASSESSMENT

In addition to the assessment performed by the nurse related to the administration of any medication, prior to applying ophthalmic medications, assess:

- Appearance of eye and surrounding structures for lesions, exudate, erythema, or swelling
- The location and nature of any discharge, lacrimation, and swelling of the eyelids or of the lacrimal gland
- Client complaints (e.g., itching, burning pain, blurred vision, and photophobia)
- Client behavior (e.g., squinting, blinking excessively, frowning, or rubbing the eyes).

Determine if assessment data influence administration of the medication (i.e., is it appropriate to administer the medication or does the medication need to be held and the primary care provider notified?).

PLANNING

DELEGATION

Due to the need for assessment, interpretation of client status, and use of sterile technique, ophthalmic medication administration is not delegated to UAP.

Equipment

- Client's MAR or computer printout
- Clean gloves
- Sterile absorbent sponges soaked in sterile normal saline
- Medication
- Sterile eye dressing (pad) as needed and paper tape to secure it

For irrigation, add:

- Irrigating solution (e.g., normal saline) and irrigating syringe or tubing
- Dry sterile absorbent sponges
- Moisture-resistant towel
- Basin (e.g., emesis basin)

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Administering Ophthalmic Instillations

IMPLEMENTATION

Preparation

1. Check the MAR.
   - Check the MAR for the drug name, dose, and strength. Also confirm the prescribed frequency of the instillation and which eye is to be treated.
   - Check client allergy status.
   - If the MAR is unclear or pertinent information is missing, compare it with the most recent primary care provider's written order.
   - Report any discrepancies to the charge nurse or primary care provider, as agency policy dictates.
2. Know the reason why the client is receiving the medication, the drug classification, contraindications, usual dose range, side effects, and nursing considerations for administering and evaluating the intended outcomes of the medication.

Performance

1. Compare the label on the medication tube or bottle with the medication record and check the expiration date.
2. If necessary, calculate the medication dosage.
3. Introduce self and explain to the client what you are going to do, why it is necessary, and how he or she can participate. The administration of an ophthalmic medication is not usually painful. Ointments are often soothing to the eye, but some liquid preparations may sting initially. Discuss how the results will be used in planning further care or treatments.
4. Perform hand hygiene and observe other appropriate infection prevention procedures.
5. Provide for client privacy.
6. Prepare the client.
   - Prior to performing the procedure, verify the client's identity using agency protocol. **Rationale:** *This ensures that the right client receives the right medication.*
   - Assist the client to a comfortable position, usually lying.
7. Clean the eyelid and the eyelashes.
   - Apply clean gloves.
   - Use sterile cotton balls moistened with sterile irrigating solution or sterile normal saline, and wipe from the inner canthus to the outer canthus. **Rationale:** *If not removed, material on the eyelid and lashes can be washed into the eye. Cleaning toward the outer canthus prevents contamination of the other eye and the lacrimal duct.*
8. Administer the eye medication.
   - Check the ophthalmic preparation for the name, strength, and number of drops if a liquid is used. **Rationale:** *Checking medication data is essential to prevent a medication error.*

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Administering Ophthalmic Instillations—*continued*

SKILL 35–10

Draw the correct number of drops into the shaft of the dropper if a dropper is used. If ointment is used, discard the first bead. **Rationale:** *The first bead of ointment from a tube is considered to be contaminated.*

- Instruct the client to look up to the ceiling. Give the client a dry sterile absorbent sponge. **Rationale:** *The person is less likely to blink if looking up. While the client looks up, the cornea is partially protected by the upper eyelid. A sponge is needed to press on the nasolacrimal duct after a liquid instillation to prevent systemic absorption or to wipe excess ointment from the eyelashes after an ointment is instilled.*
- Expose the lower conjunctival sac by placing the thumb or fingers of your nondominant hand on the client's cheekbone just below the eye and gently drawing down the skin on the cheek. If the tissues are edematous, handle the tissues carefully to avoid damaging them. **Rationale:** *Placing the fingers on the cheekbone minimizes the possibility of touching the cornea, avoids putting any pressure on the eyeball, and prevents the person from blinking or squinting.*
- Holding the medication in the dominant hand, place hand on client's forehead to stabilize hand. Approach the eye from the side and instill the correct number of drops onto the outer third of the lower conjunctival sac. Hold the dropper 1 to 2 cm (0.4 to 0.8 in.) above the sac. ❶ **Rationale:** *The client is less likely to blink if a side approach is used. When instilled into the conjunctival sac, drops will not harm the cornea as they might if dropped directly on it. The dropper must not touch the sac or the cornea.*

or

❶ Instilling an eyedrop into the lower conjunctival sac.

continued on next slide

Administering Ophthalmic Instillations—*continued*

- Holding the tube above the lower conjunctival sac, squeeze 2 cm (0.8 in.) of ointment from the tube into the lower conjunctival sac from the inner canthus outward. ❷
- Instruct the client to close the eyelids but not to squeeze them shut. **Rationale:** *Closing the eye spreads the medication over the eyeball. Squeezing can injure the eye and push out the medication.*
- For liquid medications, press firmly or have the client press firmly on the nasolacrimal duct for at least 30 seconds. **Rationale:** *Pressing on the nasolacrimal duct prevents the medication from running out of the eye and down the duct, preventing systemic absorption.* ❸

❷ Instilling an eye ointment into the lower conjunctival sac.

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Administering Ophthalmic Instillations—*continued*

Variation: Irrigation

- Place absorbent pads under the head, neck, and shoulders. Place an emesis basin next to the eye to catch drainage. Some eye medications cause systemic reactions such as confusion or a decrease in heart rate and blood pressure if the eyedrops go down the nasolacrimal duct and get into the systemic circulation.
- Expose the lower conjunctival sac. Or, to irrigate in stages, first hold the lower lid down, then hold the upper lid up. Exert pressure on the bony prominences of the cheek-bone and beneath the eyebrow when holding the eyelids. **Rationale:** *Separating the lids prevents reflex blinking. Exerting pressure on the bony prominences minimizes the possibility of pressing the eyeball and causing discomfort.*
- Fill and hold the eye irrigator about 2.5 cm (1 in.) above the eye. **Rationale:** *At this height the pressure of the solution will not damage the eye tissue, and the irrigator will not touch the eye.*
- Irrigate the eye, directing the solution onto the lower conjunctival sac and from the inner canthus to the outer canthus. **Rationale:** *Directing the solution in this way prevents possible injury to the cornea and prevents fluid and*

❸ Pressing on the nasolacrimal duct.

continued on next slide

Administering Ophthalmic Instillations—*continued*

SKILL 35–10

contaminants from flowing down the nasolacrimal duct.
- Irrigate until the solution leaving the eye is clear (no discharge is present) or until all the solution has been used.
- Instruct the client to close and move the eye periodically. **Rationale:** *Eye closure and movement help to move secretions from the upper to the lower conjunctival sac.*

9. Clean and dry the eyelids as needed. Wipe the eyelids gently from the inner to the outer canthus to collect excess medication.

10. Remove and discard gloves.
- Perform hand hygiene.

11. Apply an eye pad if needed, and secure it with paper eye tape.

12. Assess the client's response immediately after the instillation or irrigation and again after the medication should have acted.

13. Document all relevant assessments and interventions. Include the name of the drug or irrigating solution, the strength, the number of drops if a liquid medication, the time, and the response of the client.

EVALUATION

- Perform follow-up based on findings of the effectiveness of the administration or outcomes that deviated from expected or normal for the client. Relate findings to previous data if available.
- Report significant deviations from normal to the primary care provider.

Topical Medications

- Otic medications
  - Administer medication to external auditory canal
    - Irrigation
    - Instillation
  - Position of canal varies with age.

Administering Otic Instillations

SKILL 35–11

PURPOSE

- To soften earwax so that it can be readily removed at a later time
- To provide local therapy to reduce inflammation, destroy infective organisms in the external ear canal, or both
- To relieve pain

ASSESSMENT

In addition to the assessment performed by the nurse related to the administration of any medications, prior to applying otic medications, assess:

- Appearance of the pinna of the ear and meatus for signs of redness and abrasions
- Type and amount of any discharge.

Determine if assessment data influence administration of the medication (i.e., is it appropriate to administer the medication or does the medication need to be held and the primary care provider notified?).

PLANNING

DELEGATION

Due to the need for assessment, interpretation of client status, and use of sterile technique, otic medication administration is not delegated to UAP.

Equipment

- Client's MAR or computer printout
- Clean gloves
- Cotton-tipped applicator
- Correct medication bottle with a dropper
- Flexible rubber tip (optional) for the end of the dropper, which prevents injury from sudden motion, for example, by a disoriented client
- Cotton fluff

For irrigation, add:

- Moisture-resistant towel
- Basin (e.g., emesis basin)
- Irrigating solution at the appropriate temperature, about 500 mL (16 oz) or as ordered
- Container for the irrigating solution
- Syringe (rubber bulb or Asepto syringe is frequently used)

continued on next slide

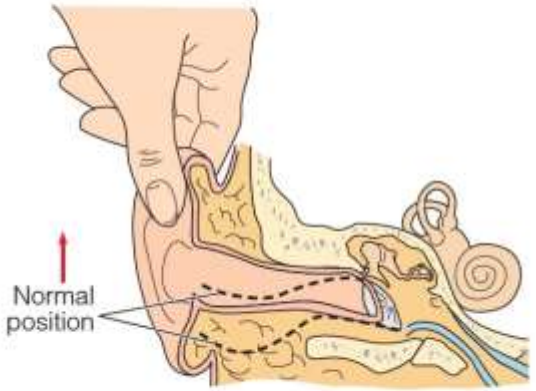
Administering Otic Instillations—*continued*

SKILL 35–11

IMPLEMENTATION

Preparation

1. Check the MAR.
   - Check the MAR for the drug name, strength, number of drops, and prescribed frequency.
   - Check client allergy status.
   - If the MAR is unclear or pertinent information is missing, compare it with the most recent primary care provider's written order.
   - Report any discrepancies to the charge nurse or primary care provider, as agency policy dictates.
2. Know the reason why the client is receiving the medication, the drug classification, contraindications, usual dose range, side effects, and nursing considerations for administering and evaluating the intended outcomes of the medication.



❶ Straightening the adult ear canal by pulling the pinna upward and backward.

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Administering Otic Instillations—*continued*

Performance

1. Compare the label on the medication container with the medication record and check the expiration date.
2. If necessary, calculate the medication dosage.
3. Explain to the client what you are going to do, why it is necessary, and how he or she can participate. The administration of an otic medication is not usually painful. Discuss how the results will be used in planning further care or treatments.
4. Perform hand hygiene and observe other appropriate infection prevention procedures.
5. Provide for client privacy.
6. Prepare the client.
   - Prior to performing the procedure, introduce self and verify the client's identity using agency protocol. **Rationale:** *This ensures that the right client receives the right medication.*
   - Assist the client to a comfortable position for eardrop administration, lying with the ear being treated uppermost.

❷ Instilling eardrops.

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Administering Otic Instillations—*continued*

7. Clean the pinna of the ear and the meatus of the ear canal.
- Apply gloves if infection is suspected.
- Use cotton-tipped applicators and solution to wipe the pinna and auditory meatus. **Rationale:** *This removes any discharge present before the instillation so that it will not be washed into the ear canal.* Ensure that applicator does not go into the ear canal. **Rationale:** *This avoids damage to tympanic membrane or wax becoming impacted within the canal.*

8. Administer the ear medication.
- Warm the medication container in your hand, or place it in warm water for a short time. **Rationale:** *This promotes client comfort and prevents nerve stimulation and pain.*
- Partially fill the ear dropper with medication.
- Straighten the auditory canal. Pull the pinna upward and backward for clients over 3 years of age. **Rationale:** *The auditory canal is straightened so that the solution can flow the entire length of the canal.* ❶
- Instill the correct number of drops along the side of the ear canal. ❷
- Press gently but firmly a few times on the tragus of the ear (the cartilaginous projection in front of the exterior meatus of the ear). **Rationale:** *Pressing on the tragus assists the flow of medication into the ear canal.*
- Ask the client to remain in the side-lying position for about 5 minutes. **Rationale:** *This prevents the drops from escaping and allows the medication to reach all sides of the canal cavity.*

❸ Ear irrigation.

- Insert a small piece of cotton fluff loosely at the meatus of the auditory canal for 15 to 20 minutes. Do not press it into the canal. **Rationale:** *The cotton helps retain the medication when the client is up. If pressed tightly into the canal, the cotton would interfere with the action of the drug and the outward movement of normal secretions.*

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Administering Otic Instillations—*continued*

Variation: Ear Irrigation

- Explain that the client may experience a feeling of fullness, warmth, and, occasionally, discomfort when the fluid comes in contact with the tympanic membrane.
- Assist the client to a sitting or lying position with head tilted toward the affected ear. **Rationale:** *The solution can then flow from the ear canal to a basin.* ❸
- Place the moisture-resistant towel around the client's shoulder under the ear to be irrigated, and place the basin under the ear to be irrigated.
- Fill the syringe with solution.

or

- Hang up the irrigating container, and run solution through the tubing and the nozzle. **Rationale:** *Solution is run through the tubing/nozzle to remove air from the tubing and nozzle.*
- Straighten the ear canal.
- Insert the tip of the syringe into the auditory meatus, and direct the solution gently upward against the top of the canal. **Rationale:** *The solution will flow around the entire canal and out at the bottom. The solution is instilled gently because strong pressure from the fluid can cause discomfort and damage the tympanic membrane.*
- Continue instilling the fluid until all the solution is used or until the canal is cleaned, depending on the purpose of the irrigation. Take care not to block the outward flow of the solution with the syringe.
- Assist the client to a side-lying position on the affected side. **Rationale:** *Lying with the affected side down helps drain the excess fluid by gravity.*
- Place a cotton fluff in the auditory meatus to absorb the excess fluid.

9. Remove and discard gloves.
   - Perform hand hygiene.
10. Assess the client's response and the character and amount of discharge, appearance of the canal, discomfort, and so on, immediately after the instillation and again when the medication is expected to act. Inspect the cotton ball for any drainage.
11. Document all nursing assessments and interventions relative to the procedure. Include the name of the drug or irrigating solution, the strength, the number of drops if a liquid medication, the time, and the response of the client.

EVALUATION

- Perform follow-up based on findings of the effectiveness of the administration or outcomes that deviated from expected or normal for the client. Relate findings to previous data if available.
- Report significant deviations from normal to the primary care provider.

Topical Medications

- Nasal medications
  - Shrink swollen mucus membranes
  - Loosen secretions and facilitate drainage
  - Treat infections of nasal cavity and sinuses

continued on next slide

Topical Medications

- Nasal medications
  - For self-administration:
    - Suggest that client should blow nose first
    - Client in seated position with head tilted back
    - Client holds tip of container just inside the nares
      - Inhales as spray enters the nasal passage

Figure 35–51 Position of the head to instill drops into the ethmoid and sphenoid sinuses.

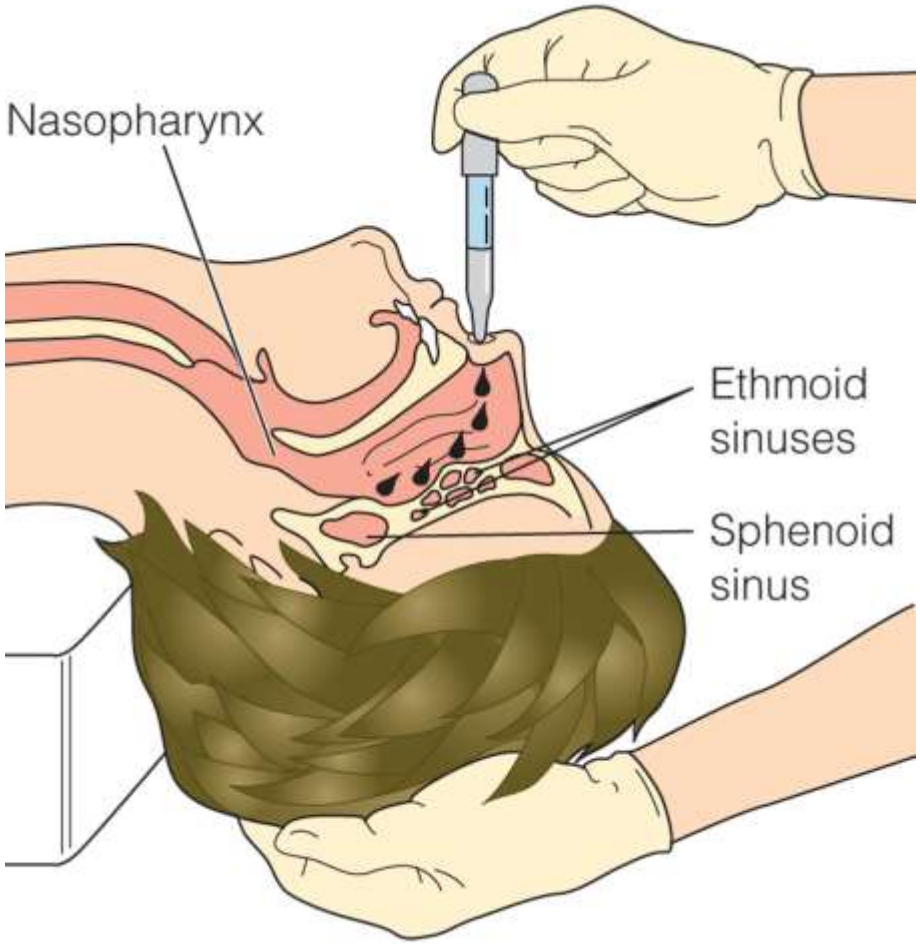
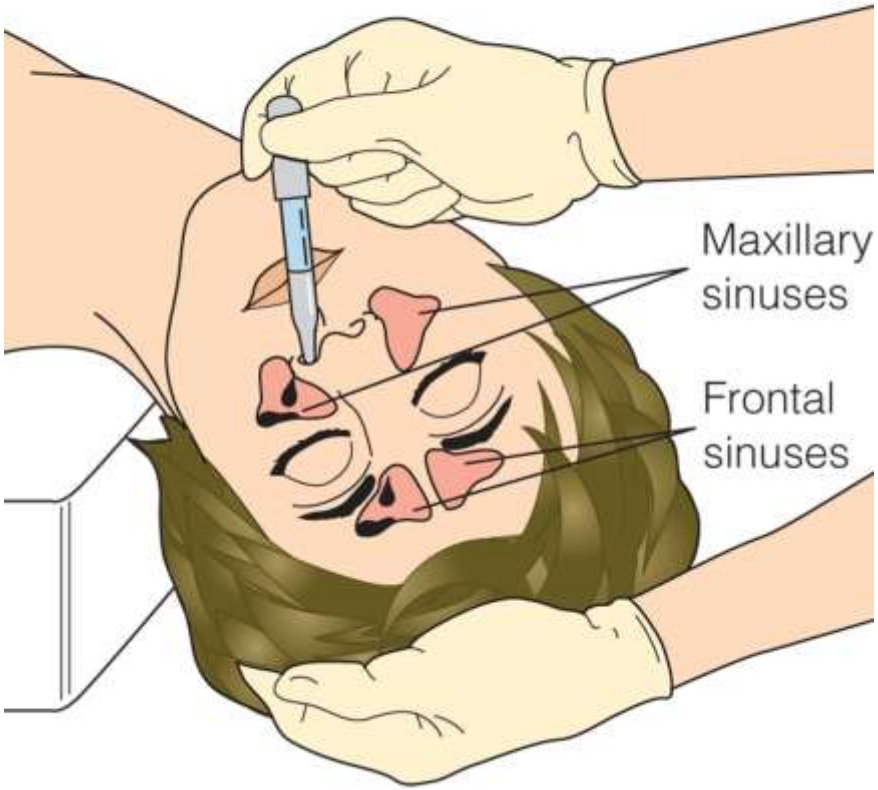


Figure 35–52 Position of the head to instill drops into the maxillary and frontal sinuses.



Topical Medications

- Vaginal medications
  - Creams, jellies, foams, or suppositories
  - Infections or discomfort

SKILL 35–12

Administering Vaginal Instillations

PURPOSES

- To treat or prevent infection
- To reduce inflammation
- To relieve vaginal discomfort

ASSESSMENT

In addition to the assessment performed by the nurse related to the administration of any medications, prior to applying vaginal medications, assess:

- The vaginal orifice for inflammation; amount, character, and odor of vaginal discharge
- For complaints of vaginal discomfort (e.g., burning or itching).

Determine if assessment data influence administration of the medication (i.e., is it appropriate to administer the medication or does the medication need to be held and the primary care provider notified?).

PLANNING

DELEGATION

Due to the need for assessments and interpretation of client status, vaginal medication administration is not delegated to UAP.

Equipment

- Client's MAR or computer printout
- Drape
- Correct vaginal suppository or cream
- Applicator for vaginal cream
- Clean gloves
- Lubricant for a suppository
- Disposable towel
- Clean perineal pad

For an irrigation, add:

- Moisture-proof pad
- Vaginal irrigation set (these are often disposable) containing a nozzle, tubing and a clamp, and a container for the solution
- Irrigating solution

IMPLEMENTATION

Preparation

1. Check the MAR.
   - Check the MAR for the drug name, strength, and prescribed frequency.
   - Check client allergy status.
   - If the MAR is unclear or pertinent information is missing, compare it with the most recent primary care provider's written order.
   - Report any discrepancies to the charge nurse or primary care provider, as agency policy dictates.

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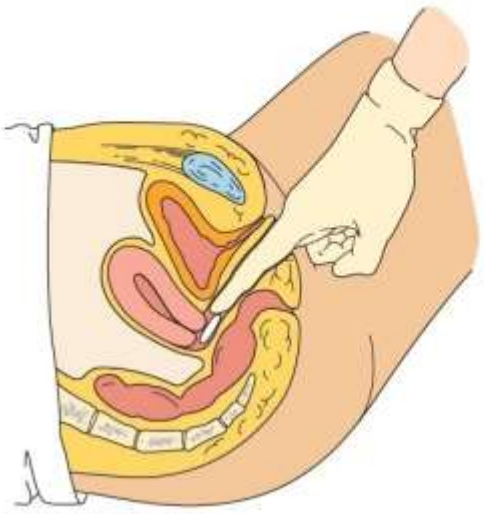
Administering Vaginal Instillations—*continued*

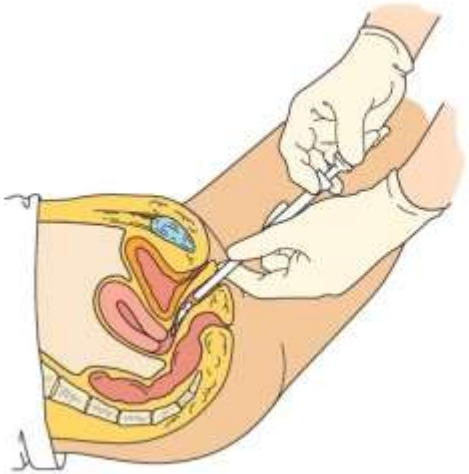
2. Know the reason why the client is receiving the medication, the drug classification, contraindications, usual dose range, side effects, and nursing considerations for administering and evaluating the intended outcomes of the medication.

Performance

1. Compare the label on the medication container with the medication record and check the expiration date.
2. If necessary, calculate the medication dosage.
3. Explain to the client what you are going to do, why it is necessary, and how she can participate. Explain to the client that a vaginal instillation is normally a painless procedure, and in fact may bring relief from itching and burning if an infection is present. Many people feel embarrassed about this procedure, and some may prefer to perform the procedure themselves if instruction is provided. Discuss how the results will be used in planning further care or treatments.
4. Perform hand hygiene and observe other appropriate infection prevention procedures.
5. Provide for client privacy.
6. Prepare the client.
   - Prior to performing the procedure, introduce self and verify the client's identity using agency protocol. **Rationale:** *This ensures that the right client receives the right medication.*
   - Ask the client to void. **Rationale:** *If the bladder is empty, the client will have less discomfort during the treatment, and the possibility of injuring the vaginal lining is decreased.*
   - Assist the client to a back-lying position with the knees flexed and the hips rotated laterally.
   - Drape the client appropriately so that only the perineal area is exposed.



❶ Instilling a vaginal suppository.



❷ Using an applicator to instill a vaginal cream.

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Administering Vaginal Instillations—*continued*

7. Prepare the equipment.
- Unwrap the suppository, and place it on the opened wrapper.

or

- Fill the applicator with the prescribed cream, jelly, or foam. Directions are provided with the manufacturer's applicator.

8. Assess and clean the perineal area.
- Apply gloves. **Rationale:** *Gloves prevent contamination of the nurse's hands from vaginal and perineal microorganisms.*
- Inspect the vaginal orifice, note any odor of discharge from the vagina, and ask about any vaginal discomfort.
- Provide perineal care to remove microorganisms. **Rationale:** *This decreases the chance of moving microorganisms into the vagina.*

9. Administer the vaginal suppository, cream, foam, jelly, or irrigation.

Suppository
- Lubricate the rounded (smooth) end of the suppository, which is inserted first. **Rationale:** *Lubrication facilitates insertion.*
- Lubricate your gloved index finger.
- Expose the vaginal orifice by separating the labia with your nondominant hand.
- Insert the suppository about 8 to 10 cm (3 to 4 in.) along the posterior wall of the vagina, or as far as it will go. **Rationale:** *The posterior wall of the vagina is about 2.5 cm (1 in.) longer than the anterior wall because the cervix protrudes into the uppermost portion of the anterior wall.* ❶
- Ask the client to remain lying in the supine position for 5 to 10 minutes following insertion. The hips may also be elevated on a pillow. **Rationale:** *This position allows the medication to flow into the posterior fornix after it has melted.*

Vaginal Cream, Jelly, or Foam
- Gently insert the applicator about 5 cm (2 in.).
- Slowly push the plunger until the applicator is empty. ❷
- Remove the applicator and place it on the towel. **Rationale:** *The applicator is placed on the towel to prevent the spread of microorganisms.*
- Discard the applicator if disposable or clean it according to the manufacturer's directions.
- Ask the client to remain lying in the supine position for 5 to 10 minutes following the insertion.

Irrigation
- Place the client on a bedpan.
- Clamp the tubing. Hold the irrigating container about 30 cm (12 in.) above the vagina. **Rationale:** *At this height, the pressure of the solution should not be great enough to injure the vaginal lining.*
- Run fluid through the tubing and nozzle into the bedpan. **Rationale:** *Fluid is run through the tubing/nozzle to remove air and to moisten the nozzle.*
- Insert the nozzle carefully into the vagina. Direct the nozzle toward the sacrum, following the direction of the vagina.
- Insert the nozzle about 7 to 10 cm (3 to 4 in.), start the flow, and rotate the nozzle several times. **Rationale:** *Rotating the nozzle irrigates all parts of the vagina.*
- Use all of the irrigating solution, permitting it to flow out freely into the bedpan.

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Administering Vaginal Instillations—*continued*

SKILL 35–12

- Remove the nozzle from the vagina.
- Assist the client to a sitting position on the bedpan.
  Rationale: *Sitting on the bedpan will help drain the remaining fluid by gravity.*

10. Ensure client comfort.
- Dry the perineum with tissues as required.
- Apply a clean perineal pad if there is excessive drainage.

11. Remove and discard gloves.
- Perform hand hygiene.

12. Document all nursing assessments and interventions relative to the skill. Include the name of the drug or irrigating solution, the strength, the time, and the response of the client.

EVALUATION

- Perform follow-up based on findings of the effectiveness of the administration or outcomes that deviated from expected or normal for the client. Relate findings to previous data if available.
- Report significant deviations from normal to the primary care provider.

Topical Medications

- Rectal medications
  - Inserting a rectal suppository
    - Assist client to left lateral or left Sims position
    - Upper leg flexed
    - Expose buttocks
    - Put glove on hand used to insert the suppository
    - Unwrap suppository

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Topical Medications

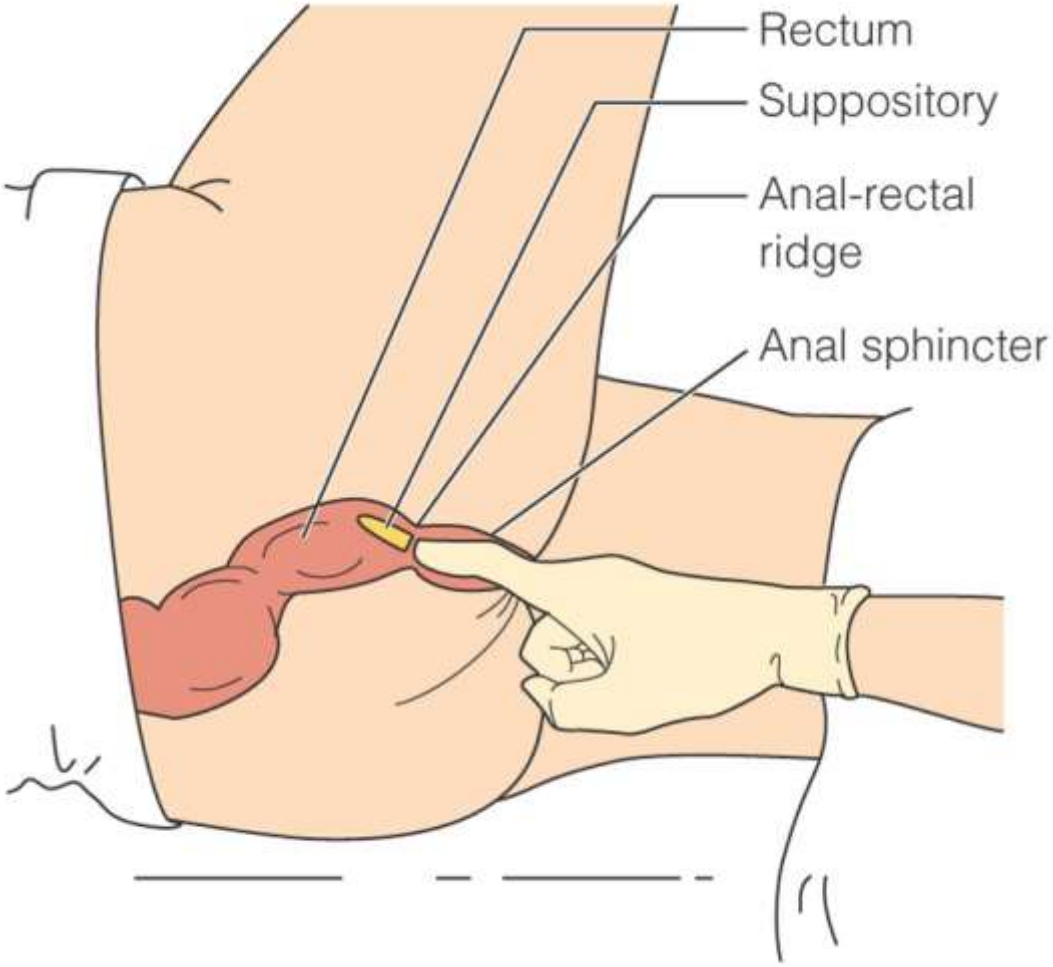
- Rectal medications
  - Inserting a rectal suppository
    - Lubricate smooth rounded end
    - Lubricate gloved index finger
    - Encourage client to relax by breathing through the mouth
    - Insert suppository gently into the anal canal

continued on next slide

Topical Medications

- Rectal medications
  - Inserting a rectal suppository
    - Avoid embedding in feces
    - Press buttocks together for a few minutes
    - Ask client to remain in left lateral or supine position for at least 5 minutes

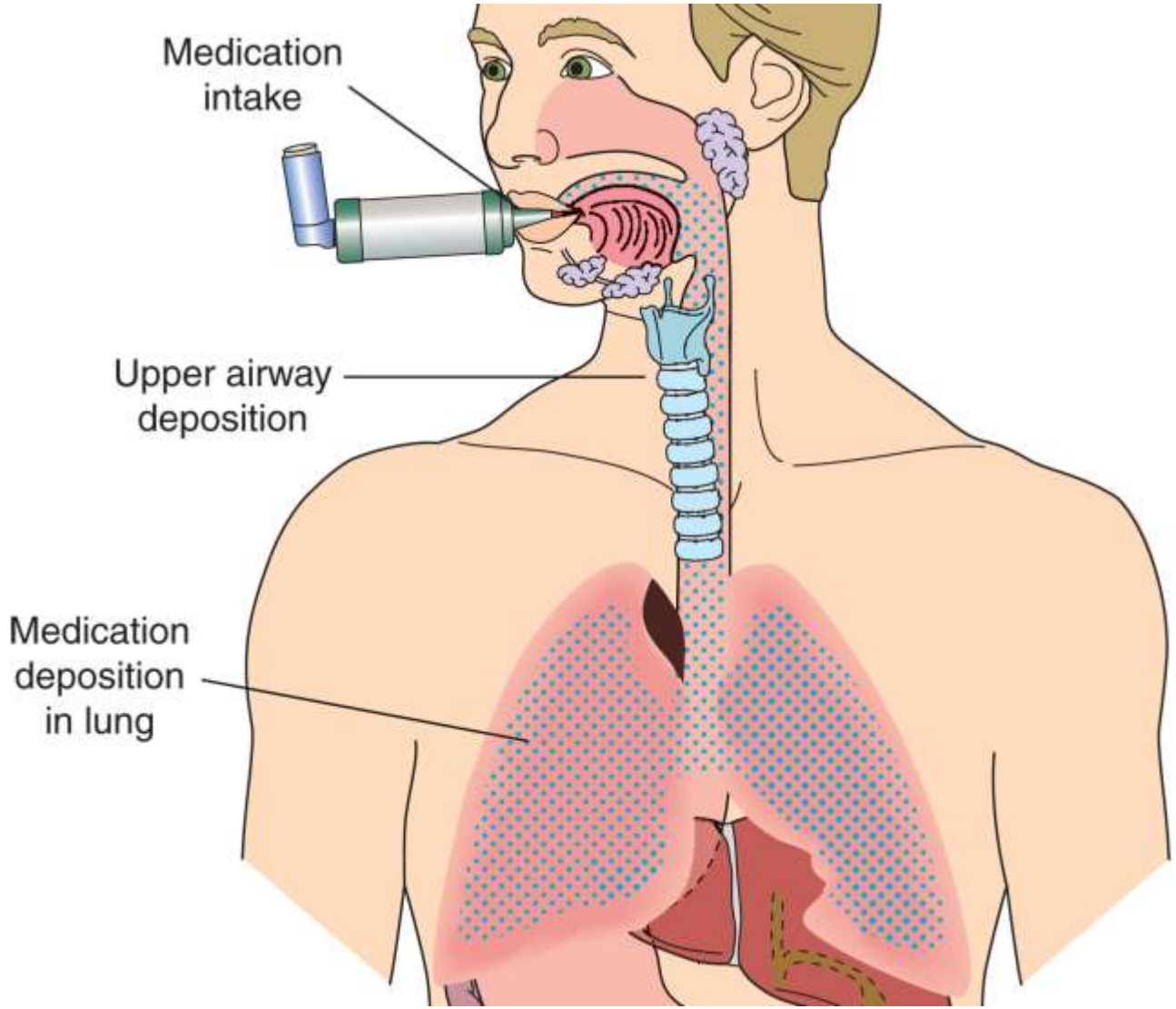
Figure 35–53 Inserting a rectal suppository beyond the internal sphincter and along the rectal wall.



Inhaled Medications

- Nebulizers
  - Fine spray (fog or mist)
- Metered-dose inhaler
  - Extender, extender spacer

Figure 35-55 Delivery of medication to the lungs using a metered-dose inhaler extender.



Inhaled Medications

- Metered-dose inhaler (MDI)
  - Client teaching
    - Remove mouthpiece cap
    - Exhale comfortably
    - Hold canister upside down
    - Press down once and inhale slowly and deeply through the mouth
    - Hold breath for 10 seconds or as long as one can

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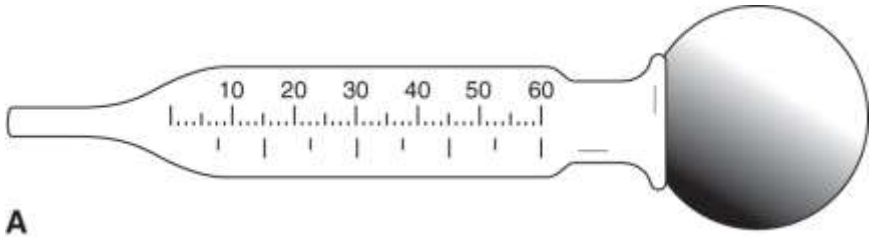
Inhaled Medications

- Metered-dose inhaler (MDI)
  - Client teaching
    - Remove inhaler away from mouth
    - Exhale slowly through pursed lips
    - Repeat inhalation if ordered
    - Rinse mouth with tap water
    - Clean MDI mouthpiece after each use

Irrigations

- Irrigation (lavage)
- Stream of water or other fluid
  - Clean body cavity
  - Remove foreign object, secretions
  - Apply heat/cold
  - Apply antiseptic
  - Reduce inflammation
  - Relieve discomfort

Figure 35–59 Four types of syringes used for irrigations: *A*, Asepto; *B*, rubber bulb; *C*, piston syringe; *D*, Pomeroy.



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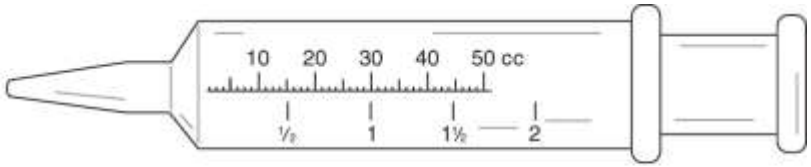

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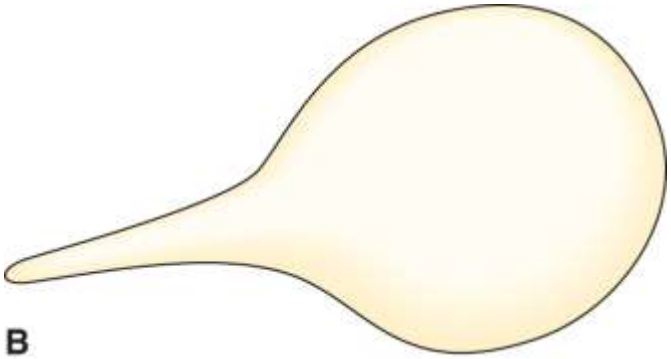

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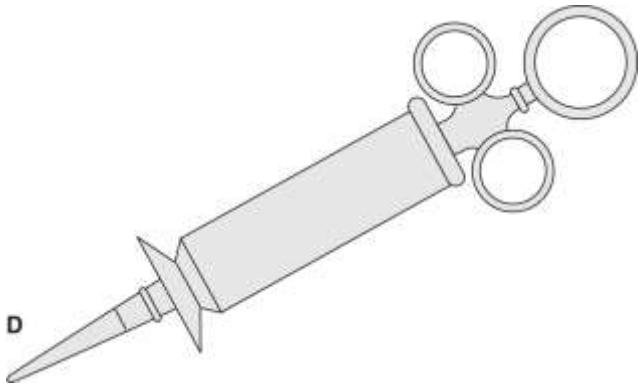

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