

Science Education Collection

# Preparing and Administering Subcutaneous Medications

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## Overview

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Subcutaneous medication administration is a parenteral approach to administer small amounts of medication (less than 2 mL) into the layer of tissue just below the skin. Common medications administered via the subcutaneous route include anticoagulant medications, such as heparin or enoxaparin; epinephrine administered for allergic reactions; insulin; and some immunizations.

Subcutaneous injection preparations are commonly provided in vials or ampules for withdrawal into a subcutaneous syringe. Subcutaneous needles have a shorter length and smaller diameter than syringes used for intramuscular injections, are typically less than 5/8<sup>th</sup> of an inch, and are 26 gauge or smaller. Medication absorption and onset is slower than for intravenous routes, with some absorption rates lasting 24 h or longer. This approach is selected for many medications that may be denatured or deactivated if given via the oral route, given the acidity of the gastrointestinal tract.

Subcutaneous injection preparations are commonly provided in vials or ampules for withdrawal into a subcutaneous syringe. The nurse should determine the appropriate medication dose according to the concentration provided on the container. This demonstration will present how to prepare and administer subcutaneous medications after the medication has been obtained from the medication dispensing device. The discussion also includes the five "rights" and the medication documentation in the electronic Medication Administration Record (MAR).

## Procedure

### 1. General medication administration considerations (review in the room, with the patient)

1. Upon first entering the patient's room, wash hands with soap and warm water. Apply vigorous friction for at least 20 s. Hand sanitizers applied with vigorous friction may be used if the hands are not visibly soiled.
2. At the bedside computer, log into the patient's electronic health record and review the patient's medical history and previous administration times. Verify with the patient any medication allergies and discuss their physical allergic responses and reactions.
3. At the bedside computer, pull up the MAR.
  1. Review the medications that are due to be administered, and clarify with the patient whether he/she has a preference for a subcutaneous injection site and an administration process (*i.e.*, whether the patient prefers the skinfold to be pinched up or pulled taught over the injection site, depending upon the level of adipose tissue available for injection).
  2. If administering insulin, discuss with the patient when he/she is planning on eating his/her next meal. If the patient is to receive short-acting insulin, he/she should have a meal within 20-30 min due to the insulin onset time; this will prevent hypoglycemia.
4. Leave the patient's room and perform hand hygiene, as described above (step 1.1)
5. The nurse must now maintain a distraction/disruption-free environment while dispensing and administering medications to prevent medication errors.

### 2. Go to the medication preparation area (this area may be in a secured room or in a secured portion of the nurses' station) and complete the first safety check using the five "rights" of medication administration. Refer to the video on "Safety Checks."

### 3. Next, prepare the subcutaneous injection according to the MAR, pharmacy instructions, nurse drug guide, best practices, and institutional policies/procedures.

1. Review the patient's assigned medication bin in the medication refrigerator to determine if an unexpired multi-dose vial is available for administration. The expiration date will be written on a preprinted sticker or in indelible ink directly on the vial. Insulin vials expire 30 days after their initial opening. If an unexpired multi-dose vial is unavailable, retrieve a new box of medication from the medication dispensing device. Refer to the video "Safety Checks for Acquiring Medications from a Medication Dispensing Device."
2. Open the medication box for each type of subcutaneous medication vial and "pop off" the plastic caps on the tops of the vials.
  1. Gently roll each vial of insulin back and forth between your hands. This will warm and mix the insulin. For intermediate-acting insulin, make sure to roll the vial back and forth until the cloudiness disappears. Take care not to shake the vial; shaking can cause the proteins in the insulin to precipitate and cluster.
3. Remove the alcohol wipe from the package and scrub the top of the vial for 20 s with friction and intent. This should be done while looking at a clock to verify that you have scrubbed for the appropriate amount of time.
4. From the syringe drawer in the medication room, obtain the smallest syringe that will accommodate the volume of fluid to be aspirated from the medication vial.

#### Insulin variation

1. If delivering mixed insulins, you must obtain the smallest insulin syringe that will accommodate the combined total volume of insulin to be delivered.
  2. Insulin MUST be drawn up in an insulin syringe, because it is calibrated according to units instead of milliliters. Using a non-insulin syringe to administer insulin will result in administering an incorrect dose, leading to hypoglycemia, insulin shock, and potentially death.
  3. Insulin syringes are provided with an insulin needle. Review the needle length as indicated on the package to determine if it is the appropriate length for your patient. Patients with small amounts of adipose tissue (very thin) may prefer a needle length of 4 or 5 mm. Patients with adequate to large amounts of adipose tissue may prefer a length of 8 mm. However, research supports using the smallest-length needle for administration.
5. For any other subcutaneous medication, if the selected syringe is needleless, obtain a blunt-tip needle for withdrawing medication from the medication vial and follow the procedure for preparing an injection, described in the "Intramuscular Injection" video.

#### Insulin Variation

1. Hold the syringe upright in your dominant hand, with the needle pointing towards the ceiling. Draw back the plunger using your non-dominant hand, pulling the amount of air needed for the intermediate-acting insulin dose administration, into the syringe. This step is important to avoid a vacuum, which will make it more difficult to withdraw fluid from the vial.
  2. Obtain the intermediate-acting insulin vial and hold it securely with your non-dominant hand. With your dominant hand, insert the needle into the soft, rubber portion of the vial.
  3. Holding the vial with your non-dominant hand and the syringe and needle between your middle finger and the thumb of your dominant hand, push the needle into the vial. Using the forefinger of your dominant hand, push the plunger to inject the air into the vial. Take special care to grasp the vial and the needle in a manner that does not contaminate either the syringe tip or the needle.
  4. Remove the needle from the vial.
  5. Again, hold the syringe upright in your dominant hand, with the needle pointed towards the ceiling. Pull back the amount of air needed for the immediate-acting insulin dose, as indicated in step 3.5.1.
  6. Insert the air into the immediate-acting insulin vial, as indicated in step 3.5.3.
  7. Holding the vial of immediate-acting insulin with your non-dominant hand and the syringe and needle with your dominant hand, invert the needle and vial. Hold them at eye-level and make sure that the syringe tip is below the level of the liquid in the vial.
  8. Withdraw the appropriate amount of fluid from the vial by drawing back slowly on the syringe plunger until the "right" number of units of immediate-acting insulin are obtained. Remove the needle from the vial and place the vial on the counter.
  9. When withdrawing medication, ensure that the needle tip is below the fluid level at all times.
  10. Obtain the intermediate-acting insulin and hold it with your non-dominant hand. Holding the syringe between your middle finger and the thumb of your dominant hand, push the needle into the vial.
  11. Holding the same vial of immediate-acting insulin with your non-dominant hand and the syringe and needle with your dominant hand, invert the needle and vial. Hold them at eye-level and make sure that the syringe tip is below the level of the liquid in the vial.
  12. Withdraw the appropriate amount of fluid from the vial by drawing back slowly on the syringe plunger until the "right" number of units of immediate-acting insulin are obtained. This is calculated by adding the number of units of immediate-acting insulin needed to the number of intermediate-acting units of insulin needed.
  13. Withdraw the needle from the vial, taking care not to contaminate the needle tip, and set the vial down on the counter with your non-dominant hand (while continuing to hold the needle and syringe upright, in the air, with your dominant hand).
6. Engage the needle safety device using the thumb of your dominant hand.
1. If a safety device is not available, leave the needle cap on the counter. Carefully place the tip of the needle in the opening of the needle cap with your dominant hand while keeping your non-dominant hand away from the needle cap and tip. Slowly scoop the needle cap onto the tip of the needle and then secure the needle cap to the syringe with your non-dominant hand.
7. Set the syringe with the needle and the medication down on the counter. Variation: if a needleless syringe with a blunt-tipped needle was used to withdraw the medication, open the drawer or cabinet containing syringe needles and select an appropriately sized needle for subcutaneous injection (*i.e.*, 25 or 27 gauge, ½ inch in length or less), depending upon the amount of adipose tissue on your patient's chosen injection site.
8. Open the subcutaneous injection needle using aseptic technique by peeling the paper packaging at the needle hub end until you are able to grasp the outer cap. Take special care not to contaminate the needle hub by touching it to any surface or fingers. Drop the needle packaging on the counter.
9. Holding the syringe in your dominant hand, grasp the safety-capped needle (or capped blunt-tipped needle) with your non-dominant hand's middle and ring fingers and gently twist the syringe with your dominant hand to remove the needle from the syringe tip.
10. Attach the syringe tip to the subcutaneous injection needle using your non-dominant hand's thumb and index finger, taking care not to contaminate the syringe tip or the needle syringe connection.
11. Dispose of the used medication withdrawal needle in the sharps container.
12. Using tape or a pre-printed medication label (if available), write the medication name and dosage amount on the label and place it on the syringe. Some institutions may require more information, depending upon their medication labeling policy.
13. Dispose of all packaging materials in a trash receptacle.

**4. In the medication preparation area, complete the second safety check using the five "rights" of medication administration. Refer to the "Safety Checks" video.**

**5. Gather the necessary supplies, including an alcohol prep wipe, non-sterile gloves, adhesive bandage or a cotton ball and silk/paper tape, and the subcutaneous medications. Take the supplies to the patient's room.**

#### Administration

**6. Upon first entering the patient's room, set the medications down on the counter and wash your hands with soap and warm water, applying vigorous friction for at least 20 s. Hand sanitizers may be used if the hands are not visibly soiled, but vigorous friction should also be applied.**

**7. In the patient's room, complete the third and final medication safety check, adhering to the five "rights" of medication administration. Refer to the "Safety Checks" video.**

1. Verify that the patient is wearing the correct name band by asking him/her to state their name and birthdate. Compare this information with what is provided on the name band.
2. At the bedside computer, log into the electronic health record, open the patient's chart, and open the patient's MAR.
3. Confirm that you have the correct patient by comparing the patient's name and medical record number on the wrist identification band with the patient's name and medical record number on the electronic MAR on the computer screen. At this point, the "Right Patient" step has been completed for the third safety check.
4. Hold the labeled syringe next to the computer screen. Compare the medication name on the label of the syringe to the medication name provided on the MAR in the electronic health record (on the computer screen). At this point the "Right Medication" step has been completed for the third safety check.
5. Hold the labeled syringe next to the computer screen. Compare the medication dose listed on the syringe label with the dose listed on the electronic MAR. At this point, the "Right Dose" step of the third safety check is complete.
6. Review the electronic MAR to confirm that the medication administration route listed on the electronic MAR is listed as "subcutaneous injection." At this point, the "Right Route" step of the third safety check is complete.
7. Review the time listed for the subcutaneous medication injections in the MAR to confirm that it is the right time for administration of the subcutaneous medication. Compare the administration time in the MAR with the clock in the patient's room. At this point, the "Right Time" step is complete for the third safety check.

**8. Prepare the patient and administer the subcutaneous medication.**

1. Select an appropriate subcutaneous injection location, which is based on the type of medication, patient preference, and injection site rotations for patients receiving multiple doses of subcutaneous injections over time. The injection sites for subcutaneous injections are on the back of the arm, abdomen, thighs, and the adipose portion of the hips. The most appropriate site is dependent upon where the last injection was given, the amount of adipose tissue, and patient preference.
2. Access the injection site by removing bed linens and/or patient clothing/gown from the identified subcutaneous medication administration injection site.
3. Put on clean gloves. Ensure that the patient does not have a latex allergy and/or that the clean gloves are non-latex.
4. If the injection area is visibly dirty, clean the area with an alcohol prep pad and allow the alcohol to dry. According to the Center for Disease Control and Prevention (CDC), it is not necessary to clean the skin with an alcohol prep pad if the skin is not visibly soiled.
5. Hold the syringe in your dominant hand, and with your non-dominant hand, remove the needle cap.
6. Using the non-dominant hand, pinch or pull taut the skin at the injection site.
7. Hold the syringe between the thumb and index finger of the dominant hand, as with a pencil or dart, and insert the needle using a quick, purposeful motion and at the appropriate angle into the skinfold (if the skinfold exceeds 2 inches, insert the needle into the skin at a 90° angle; if the skin fold is less than 1 inch, insert the needle into the skin at a 45° angle). If the patient is obese, you may need to spread the skin taut between the thumb and forefinger of the non-dominant hand.
8. Using the thumb or index finger of the dominant hand, press the plunger slowly to inject the medication. You may stabilize the syringe position in the skin using the fingers of the non-dominant hand. Using the dominant hand, push down the plunger with the index finger or thumb.
9. Smoothly remove the needle along the line of insertion and immediately place the needle and syringe directly into a "sharps" container, without recapping the needle. If the needle has a safety device, once the needle is removed from the skin, use the thumb of the dominant hand to engage the safety device and then place the needle and syringe directly into the "sharps" container.
10. If blood is present at the injection site, apply the adhesive bandage or cotton ball and silk/paper tape. Adhesive bandage may also be applied if the patient prefers coverage after injection.
11. Cover the injection site with the patient's clothing/gown and replace the bed linens as needed and according to patient preference.
12. Remove the gloves and dispose of them in the proper receptacle. Wash hands with soap and warm water, applying vigorous friction for at least 20 s.

## 9. Document the medication administration in the electronic MAR.

1. In the patient's MAR, record the date, time, and location/site of the subcutaneous medication administration.

## 10. Prior to leaving the room, remind the patient about any side effects/adverse effects or considerations for which they should notify the nurse.

## 11. Leave the patient room. Upon exiting the room, again perform hand hygiene, as described previously.

### Applications and Summary

This video demonstrates the administration of subcutaneous medications and discusses considerations in administration approach due to variations in patient adipose tissue. It is important to ensure that subcutaneous injection sites are rotated to decrease tissue damage and to prevent complications to adipose tissue, such as localized lipodystrophy. Common errors in subcutaneous medication administration include: contaminating the injection site by blowing or wiping the area after cleaning with an alcohol wipe; using a needle with an inappropriate gauge or length for subcutaneous injections, resulting in inadvertent administration into muscular or dermal tissues; and removing the needle too quickly following administration, which can result in medication loss and the administration of a sub-therapeutic dose of medication. Contamination to the patient or to the administering nurse is also a risk when hesitating with the injection, resulting in the needle tip bouncing on the skin before breaking the surface. Recapping a used needle can potentially result in a nurse "needle stick" injury.

### References

1. Institute of Medicine. *To Err is Human: Building a Safer Healthcare System*. Academic Press. Washington, DC. (2000).
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3. Potter, P. A., Perry, A. G., Stockert, P. A., Hall A. *Essentials for Nursing Practice*, Eighth Edition. Elsevier. St. Louis, MO. (2015).