

# JoVE: Science Education

## Preparing and Administering Subcutaneous Medications

--Manuscript Draft--

<b>Manuscript Number:</b>	10234
<b>Full Title:</b>	Preparing and Administering Subcutaneous Medications
<b>Article Type:</b>	Manuscript
<b>Section/Category:</b>	Manuscript Submission
<b>Corresponding Author:</b>	Madeline Lassche UNITED STATES
<b>Corresponding Author Secondary Information:</b>	
<b>Corresponding Author's Institution:</b>	
<b>Corresponding Author's Secondary Institution:</b>	
<b>First Author:</b>	Madeline Lassche
<b>First Author Secondary Information:</b>	
<b>Order of Authors:</b>	Madeline Lassche Katie Baraki
<b>Order of Authors Secondary Information:</b>	

## Author Name:

Madeline Lassche, MSNEd RN; Katie Baraki, MS RN

## Nursing Education Title:

Preparing and Administering Subcutaneous Medications

## Overview:

Preparing and administering subcutaneous medications requires the nurse to be knowledgeable about the medication purpose, adverse effects, and the patient's preferences. Adherence to the "five rights" and "three checks" of safe medication administration is imperative to prevent the patient's injury and harm. ~~This demonstration will present how to prepare and administer subcutaneous injection medications after the medication has been obtained from the medication dispensing device. This demonstration will also present the steps in performing the five rights during the third checkpoint of safe (patient bedside) medication administration. The first and second medication safety check using the associated five rights will be provided in the video titled "Safety Checks for Acquiring Medications from a Medication Dispensing Device".~~ Prior to acquiring medications for the subcutaneous injections from a medication-dispensing system (MDS), the nurse must consider if the medication is appropriate given the patient's medical conditions, allergies, current clinical status, and the timing of the prior administration of the same medication. Subcutaneous injection preparations are commonly provided in vials or ampules for withdrawal to a syringe. The nurse should determine the appropriate medication dose ~~according to the~~ based on the medication concentration in the provided on the container.

~~This demonstration will present how to prepare and administer subcutaneous medications in including the five rights and medication documentation in the electronic Medication Administration Record (MAR). This demonstration will present how to~~ following video will demonstrate how to prepare and administer subcutaneous injection medications after the medication has been obtained from the medication dispensing device. This demonstration will also present the steps and the importance of and how to adhere to the "in performing the five rights" during at the third safety checkpoint of safe medication administration of safe, which is (at the patient's bedside) of safe medication administration. The first and second medication safety check using the associated five rights will be provided in the video titled "Safety Checks for Acquiring Medications from a Medication Dispensing Device".

## Procedure:~~and representative findings~~

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

**Commented [AS1]:** These steps are performed before any med administration: the nurse washes their hands, reviews the medication record, patient's condition, and discusses with the patient how the medication will be administered. AS

1.1 Upon first entering the patient's room, wash hands with soap and warm water, and vigorous friction for at least 20 seconds. Hand sanitizers may be used if the hands are not visibly soiled, but vigorous friction should also be used.

**Commented [DN2]:** Will this be inside the room?

1.2 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.

1.3 At the bedside computer, pull up the Medication Administration Record (MAR).

1.3.1 Review the medications that are ~~supposed~~ due to be administered, and clarify with the patient if they have a ~~their~~ preference for a subcutaneous injection site and the administration process.

**Commented [DN3]:** The preference for injection site is self explanatory, but I'm not sure what is meant by "preference for administration process"

1.4 Leave the patient's room, wash hands with soap and warm water, and vigorous friction for at least 20 seconds. Hand sanitizers may be used if the hands are not visibly soiled, but vigorous friction should also be used.

2. Go to the Medication Preparation area (this area may be in a secured room or in a secured portion of the nurses' station), acquire the medication from a Medication Dispensing Device ~~and~~ complete the first safety check using ~~adhering to~~ the "five5" rights of medication administration. To review these steps in detail r- (Refer to the video titled "Safety Checks for Acquiring Medications from a Medication Dispensing Device")

3. In the medication preparation area, prepare the subcutaneous injection according to best practice and procedures.

3.1 Open the medication box and pull out the medication vial, then "pop off" the plastic cap on the top of the vial.

3.2 ~~Take an alcohol wipe package, open the package,~~ remove the ~~alcohol~~ alcohol wipe from the package and ~~with friction and intent~~ scrub the top of the medication vial for 20 seconds 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.

3.1 ~~Select the appropriate size syringe. Open~~ from the syringe drawer in the medication room, ~~that contains the syringes, and select~~ obtain the smallest syringe that will accommodate the available in comparison to the volume of fluid ~~dto be that you have to aspirated withdraw~~ from the medication vial. ~~(Action item: comparing various sized syringes for the volume of fluid needed to withdraw from the vial).~~

**Commented [AS4]:** From the authors: . (Action item: comparing various sized syringes for the volume of fluid needed to withdraw from the vial).

3.2 Obtain a blunt tip needle from the needle drawer in the medication room.

3.3- Open the syringe package using a sterile technique. ~~peel the sides of the wrapper apart to expose the rear end of the syringe barrel~~. Hold the syringe in your dominant hand, taking special care not to contaminate the syringe tip.

**Commented [DN5]:** Can we briefly describe the sterile technique?

**Commented [DN6]:** Is it to expose just the rear end of the barrel? Or the whole syringe?

**Commented [DN7]:** How would one contaminate any area during this process – by touching?

3.4. Holding the needle package with your non-dominant hand, open the needle package using by peeling the wrapper to expose the needle hub, sterile technique, taking special care not to contaminate the syringe connection area on the needle.

**Commented [DN8]:** Will this action be formed using the non-dominant hand?

**Commented [DN9]:** Isn't this the hub?

3.5. Using the a sterile technique, insert the connect the needle to the syringe tip into the needle hub, taking special care not to contaminate either the connection point. Note: if any of the connection points are contaminated, you must obtain new supplies and start over.

3.6 Take the cap off the needle, taking care not to contaminate the point of the needle, and hold it in your dominant hand.

Question- Where would one dispose of the wrappers and the cap during this whole process?

**Commented [DN10]:** What does it refer to over here? Syringe? If yes, then I don't think its necessary to mention as it has been in the dominant hand since start.

3.7. Secure the medication vial with your non-dominant hand, and insert the needle into the soft, rubber portion of the vial cap.

**Commented [DN11]:** I believe more detail is warranted here. Is this done by keeping the vial on the counter and inserting the needle perpendicularly? Also, doesn't the usual practice indicate to inject equal amount of air in the vial before withdrawing the medication?

3.8 Holding the vial with your non-dominant hand, and the syringe and needle with your dominant hand, invert the needle and vial. Hold holding them at the eye level and make sure the syringe tip is below the level of the liquid in the vial. ~~Note: take special care to grasp the vial and needle in a manner that does not contaminate either the syringe tip or the needle.~~

3.9 Withdraw the appropriate amount of fluid from the vial, by slowly drawing-pulling back slowly on the syringe plunger until you get to the right correct medication volume is obtained amount. ~~Note: The amount of fluid to be withdrawn is based on medication calculation calculated based on that considers the medication dosage with and the medication medication-concentration provided in the vial. Also, ensure the needle tip is below the fluid level at all points when withdrawing the fluid.~~

3.9.1 When withdrawing medication ensure that the needle tip is below the fluid level at all times.

3.10 Assess the syringe for air bubbles and appropriate amount of volume. If air bubbles are present, gently tap the syringe with your finger or a pen to release the air bubbles, ~~and~~ eject the air, and then adjust needle tip to below level of fluid and withdraw more fluid until the desired volume is obtained.reached.

3.10 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).~~

3.11 Engage the needle safety device using the thumb of your dominant hand.

**Commented [AS12]:** Needle safety devices are made from plastic and can be activated to protect from accidental needle stick and for asepsis. Here's an example of one, the design depends on the manufacturer but the principle is the same:  
[https://www.bd.com/hypodermic/pdf/BD\\_Eclipse\\_Brochure.pdf](https://www.bd.com/hypodermic/pdf/BD_Eclipse_Brochure.pdf)

3.11.1 Variation: - If the a safety device is not available, your dominant hand. Using your dominant hand that has the needle, carefully place the tip of the needle in the opening of the syringe cap with your dominant hand, while keeping your non-dominant hand away from the needle cap and tip. Slowly scoop the needle cap on the tip of the needle and secure the needle cap to the syringe with your non-dominant hand. ~~Using your non-dominant hand to secure the~~

**Commented [DN13]:** Is needle cap same as syringe cap?

3.12 Set the syringe ~~and with the~~ needle and the medication down on the counter. ~~Open the~~ or cabinet containing syringe needles, and select an appropriate sized needle for the subcutaneous injection. ~~(Note: For subcutaneous injections, use a 25 or 27 gauge, ½ inch in length or less depending on the amount of adipose tissue on your patient on your patient's subcutaneous adipose tissue thickness.)~~

**Commented [DN14]:** How would one have this information?

3.13 Open the subcutaneous injection needle package, taking care not to contaminate the syringe connection area and hold it between the pointer-finger and thumb of your non-dominant hand.

3.14 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.

3.15 Attach the syringe tip to the subcutaneous injection needle ~~that is held in using~~ your non-dominant hand's thumb and pointer finger, taking care not to contaminate the syringe tip or needle syringe connection.

3.16 Dispose of the used needle in the sharps container.

3.17 Using tape or a pre-printed medication label (if available), write the medication name and dosage amount on the label, and place on the syringe. Note: some institutions may require more information according to their medication labeling policy.

4. In the medication preparation area complete the second safety check using the 5 rights of medication administration. Refer to the video "Safety Checks for Acquiring Medications from a Medication Dispensing Device"

5. Gather ~~needed~~ supplies, including an al-

#### Administration

6. ~~1~~ Upon first entering the patient's room, set the medications down on the counter and wash hands with soap and warm water, and vigorous friction for at least 20 seconds. Hand sanitizers may be used if the hands are not visibly soiled, but vigorous friction should also be used.

7.0 In the patient's room, complete ~~your the~~ third, and final, medication safety check.

7.1 At the bedside computer, log into the electronic health record, open the patient's chart, and open the patient's medication administration record (MAR).

7.2 Confirm that you have the correct patient through comparing the patient's name and medical record number on their wrist identification band with the patient's name and medical record number on the electronic Medication Administration Record (MAR) on the computer screen. At this point the "Right Patient" step has been completed for the ~~second third~~ safety check.

**Commented [DN15]:** Since we are going beyond our length limit (i.e., 3 pages of protocol), let's abbreviate this third safety check for this project. Let's explain it in detail for the oral tablet administration protocol where, I believe, the preparation or the administration section would not be as involved as this manuscript. And here we can say "Perform the third and final safety check adhering to the 'five rights', which has been demonstrated in detail in the oral tablet administration video." This will allow us to explain the other steps in detail and not exceed our targeted time limit, which is 10 min.

**Commented [DN16]:** We don't have to mention the full form at every instance the term appears. Just once at the start of the manuscript is sufficient.

7.3 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” has been completed for ~~the your-third second~~ safety check.

7.4 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 ~~second-third~~ safety check is complete.

7.5 Review the electronic MAR to confirm the medication administration route listed on the electronic MAR is listed as “subcutaneous injection”. At this point the “Right Route” step of the ~~second-third~~ safety check is complete.

7.6 Review the time listed for the subcutaneous medication injection 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.

8.0 Prepare the patient and administer the subcutaneous medication.

8.1 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. ~~Most appropriate~~The injection sites for subcutaneous injections are on the back of the arm, abdomen, thighs, and adipose portion of the hips. The most appropriate site is dependent upon where the last injection was given, amount of adipose tissue and patient preference (Figure 1)

8.2. Access the injection site by removing bed linens and/or patient clothing/gown from the identified subcutaneous medication administration injection site.

8.3. Put on clean gloves. Note: Ensure that the patient does not have a latex allergy and/or that the clean gloves are non-latex.

8.4. Variation: If the injection area “skin” 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.

8.5. Hold the syringe in your dominant hand, and with your non-dominant hand, remove the needle cap.

8.6. Using the non-dominant hand, pinch or pull taut the skin at the injection site. ~~Note: If the~~

8.7. Hold the syringe between thumb and index finger of the dominant hand like a pencil or dart, and insert the needle using a quick, purposeful motion and at the appropriate angle into the skin fold (if the skin fold 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). ~~Variation: If the~~

patient is obese, spread skin taut between the thumb and forefinger of the non-dominant hand.

8.9 Using the thumb or index finger of the dominant hand, press the plunger slowly to inject the medication. ~~You may~~ **Variation:** S stabilize the syringe into the skin with the fingers of the non-dominant hand, and using the dominant hand push down the plunger with the index finger or thumb ~~of the dominant hand.~~

8.10 Remove the needle smoothly ~~along the line of insertion,~~ and immediately place the needle and syringe directly into a “sharps” container, without recapping the needle. **Variation:** If the needle has a safety device, ~~remove the needle smoothly along the line of insertion.~~ ~~Once the needle is removed from the skin, use the thumb of the dominant hand to engage the safety needle device and e-~~ ~~t~~ Then place the needle and syringe directly into the “sharps” container.

8.11 If blood is present at the injection site, apply the adhesive bandage or cotton ball and silk/paper tape.

**Commented [DN17]:** Is this done only if bleeding occurs?

8.12 Cover ~~the~~ injection site with patient clothing/gown and replace bed linens as needed and according to patient preference.

8.13 Remove gloves ~~and~~ dispose ~~them~~ in proper receptacle ~~and~~ wash hands with soap and warm water, and vigorous friction for at least 20 seconds.

9.0 Document medication administration in the electronic Medication Administration Record.

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

10. Leave the patient room. Upon exiting the room, wash hands with soap and warm water, and vigorous friction for at least 20 seconds. Hand sanitizers may be used if the hands are not visibly soiled, but vigorous friction should also be used.

### Summary:

This video demonstrates the verification and administration of subcutaneous medications. Because dosage variations in the institutional pharmacy may be limited, it is important for the nurse to verify if the correct medication dose is withdrawn from the medication vial and prepared according to the dose indicated in the patient’s medication administration record. Common errors in subcutaneous medication administration include: withdrawing the incorrect amount of fluid given the medication concentration, contaminating the injection site by blowing or wiping an area after cleaning with an alcohol wipe, using a needle with an inappropriate gauge or length for subcutaneous injections, failure to create a taut surface and hesitating with the injection resulting in needle tip contamination, and recapping a used needle potentially resulting in a nurse “needle stick” injury.

### Figures & Legends

**Figure 1:** Subcutaneous Injection Sites

Diagram showing placement of subcutaneous injection needle (a) and appropriate injection sites for subcutaneous medication administration (b).

~~Appropriate Injection Sites for Subcutaneous Medication Administration~~

**References**

Institute of Medicine. (1999). *To err is human*. Washington, DC: Academic Press.

**Commented [AS18]:** To be re-drawn if needed.



