King Saud University
College of Medicine

Intravenous Interventions and Injections Skills Checklists

Department of Medical Education
Clinical Skills and Simulation Center
Riyadh, September 2013

King Saud University College of Medicine
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Contents

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Intravenous (IV) Injection

OBJECTIVE: To administer an intravenous (IV) drug to an appropriately selected vein.
MATERIALS: IV drug, syringe, clean gloves, alcohol swab, sterile gauze, adhesive tape, tourniquet.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

	STEP/TASK	D	PD	ND
	Preparation			
1.	Introduce yourself to the patient.			
2.	Confirm patient's ID.			
3.	Explain the procedure and reassure the patient.			
4.	Get patient's consent.			
5.	Wash hands.			
6.	Prepare the necessary materials. *(Medication should be drawn up into the syringe beforehand and expiration dates checked.)*			
7.	Check the doctor's order with the drug to be administrated to ensure correct drug and dosage			
8.	Put on a pair of clean gloves.			
9.	Position the patient in a lying or sitting position and uncover the arm completely.			
	The procedure			
10.	Apply tourniquet 10 cm above injection site. *(Make sure it is not too loose or too tight. When necessary, check if pulse is still present.)*			
11.	Select the site and appropriate vein for injection.			
12.	Visualize and palpate the vein using the pads of the fingertips. *(If veins are not visible ask patient i) to close and open the hand ii) apply gentle taps iii) apply warm/hot pad to selected site to help dilate the veins.)*			
13.	Clean the site with an alcohol swab using an expanding circular motion or a single wiping from distal to proximal. Do this 3 times with separate swabs. Let it air dry.			
14.	Take the syringe and open its cap.			
15.	Stabilize the vein and apply counter tension to the skin.			
16.	Insert the needle through the skin at an angle of 30-45 degrees and ensure the bevel is up.			
17.	Reduce the angle of the needle and advance approximately 3-5 mm further into the vein.			
18.	Aspirate and make sure venous blood appears in the syringe. *(If not, re-adjust position of the needle and aspirate again.)*			
19.	Release the tourniquet.			
20.	Inject the drug very slowly. *(Check for pain, swelling, hematoma. If present; withdraw the needle and repeat the procedure at another site with a new needle.)*			
21.	Withdraw the needle swiftly. Apply pressure with sterile gauze on the opening, secure it with an adhesive tape and have patient maintain the pressure.			
	After the procedure			
22.	Dispose of sharps and waste material according to infection control standards.			
23.	Ensure that the patient is comfortable.			
24.	Remove the gloves and wash hands.			
25.	Document the procedure.			

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Venepuncture

(Intravenous Blood Drawing)

OBJECTIVE: To draw venous blood sample from an appropriately selected vein.

MATERIALS: Syringe, clean gloves, alcohol swab, sterile gauze, adhesive tape, tourniquet.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

	STEP/TASK	D	PD	ND
	Preparation			
1.	Introduce yourself to the patient.			
2.	Confirm patient's ID.			
3.	Explain the procedure and reassure the patient.			
4.	Get patient's consent.			
5.	Wash hands.			
6.	Prepare the necessary materials (see above).			
7.	Put on a pair of clean gloves.			
8.	Position the patient in a lying or sitting position and uncover arm completely.			
	The procedure			
9.	Select the site and appropriate vein for venepuncture.			
10.	Apply tourniquet 10 cm above injection site. *(Make sure it is not too loose or too tight. When necessary, check if pulse is still present.)*			
11.	Visualize and palpate the vein using the pads of the fingertips. *(If veins are not visible ask patient i) to close and open the hand ii) apply gentle taps iii) apply warm/hot pad to selected site to help dilate the veins.)*			
12.	Clean the site with an alcohol swab using an expanding circular motion or a single wiping from distal to proximal. Do it for 3 times with different swabs. Let it air dry.			
13.	Attach the needle to the syringe and remove the cap			
14.	Stabilize the vein and apply counter tension to the skin.			
15.	Insert the needle through the skin at an angle of 30-45 degrees and make sure the bevel is up.			
16.	Reduce the angle of the needle and advance approximately 3-5 mm further into the vein.			
17.	Aspirate appropriate amount of venous blood. *(If aspiration fails, re-adjust position of the needle and aspirate again.)*			
18.	Release the tourniquet.			
19.	Withdraw the needle swiftly. Apply pressure with sterile gauze on the opening, secure it with an adhesive tape and have patient maintain the pressure.			
	After the procedure			
20.	Dispose of sharps and waste materials according to infection control standards.			
21.	Ensure that the patient is comfortable.			
22.	Remove gloves and wash hands.			
23.	Label the blood sample: *(Patient's name, date of birth and hospital number; date and time of drawing blood).*			
24.	Fill in the form: *(Patient's name, date of birth and hospital number; date of blood drawing; tests required).*			

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Intravenous Blood Sampling

OBJECTIVE: To draw venous blood sample from an appropriately selected vein.

MATERIALS: Vacutainer tube/s, vacutainer holder, blood collection needle, clean gloves, alcohol swab, sterile gauze, adhesive tape, tourniquet.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

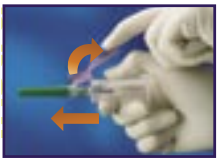
	STEP/TASK	D	PD	ND
	Preparation			
1.	Introduce yourself to the patient.			
2.	Confirm patient's ID.			
3.	Explain the procedure and reassure the patient.			
4.	Get patient's consent.			
5.	Wash hands.			
6.	Prepare the necessary materials (see above).			
7.	Put on a pair of clean gloves.			
8.	Position the patient in a lying or sitting position and uncover arm completely.			
	The procedure			
9.	Select the site and appropriate vein for venepuncture.			
10.	Apply tourniquet 10 cm above injection site. *(Make sure it is not too loose or too tight. When necessary, check if pulse is still present.)*			
11.	Visualize and palpate the vein using the pads of the fingertips. *(If veins are not visible ask patient i) to close and open the hand ii) apply gentle taps iii) apply warm/hot pad to selected site to help dilate the veins.)*			
12.	Clean the site with an alcohol swab using an expanding circular motion or a single wiping from distal to proximal. Do it for 3 times with different swabs. Let it air dry.			
13.	Attach the blood collection needle* to the vacutainer holder and remove the cap. *(*butterfly needle can be used instead if necessary).*			
14.	Stabilize the vein and apply counter tension to the skin.			
15.	Insert the needle through the skin at an angle of 30-45 degrees and make sure the bevel is up.			
16.	Reduce the angle of the needle and advance approximately 3-5 mm further into the vein.			
17.	Place the Vacutainer tube to the holder and draw appropriate amount of venous blood. *(If blood draw fails, re-adjust position of the needle).*			
18.	Release the tourniquet.			
19.	Withdraw the needle swiftly. Apply pressure with sterile gauze on the opening, secure it with an adhesive tape and have patient maintain the pressure.			
	After the procedure			
20.	Dispose of sharps and waste materials according to infection control standards.			
21.	Ensure that the patient is comfortable.			
22.	Remove gloves and wash hands.			
23.	Label the blood sample: *(Patient's name, date of birth and hospital number; date and time of drawing blood).*			
24.	Fill in the form: *(Patient's name, date of birth and hospital number; date of blood drawing; tests required).*			

INSTRUCTIONS FOR USE VACUTAINER*

BD Vacutainer®
Eclipse™ Blood Collection Needle

1. Holding both pink shield and green cap, twist and remove white cap.

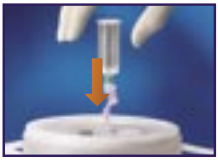
2. While holding the needle firmly, screw holder onto needle until it fits securely.



3. (a) Rotate pink safety shield back toward the holder.
   (b) Twist and pull green needle cap straight off.

4. Perform venipuncture according to your facility's established procedures.

5. Immediately after removing needle from vein, cover needle by pushing pink safety shield forward with thumb. An audible click may be heard. Lock into place and inspect. DO NOT attempt to engage shield by pressing against hard surface.



6. DO NOT remove needle from holder. Dispose of the needle and holder as one unit into nearest sharps container. DO NOT REUSE.

* Becton, Dickinson and Company official web site, BD Vacutainer® One Use Holder & Pre-Attached Venous Access Products, (available at http://www.bd.com/vacutainer/pdfs/VS7189_BD_Vacutainer_One_Use_Holder.pdf)

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Intravenous (IV) Cannulation

OBJECTIVE: To apply an intravenous (IV) cannulation to an appropriately selected vein

MATERIALS: IV solution or drug, IV set, IV catheter or cannula, clean gloves, alcohol swab, transparent dressing or tape, tourniquet.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

	STEP/TASK	D	PD	ND
	Preparation			
1.	Introduce yourself to the patient.			
2.	Confirm patient's ID.			
3.	Explain the procedure and reassure the patient.			
4.	Get patient's consent.			
5.	Wash hands.			
6.	Prepare the necessary materials.			
7.	Check the doctor's order and the reason for cannulation.			
8.	Put on a pair of clean gloves.			
9.	Position the patient in a lying or sitting position and uncover arm completely.			
	The procedure			
10.	Apply tourniquet 10 cm above injection site. *(Make sure it is not too loose or too tight. When necessary, check if pulse is still present.)*			
11.	Select the site and appropriate vein for injection.			
12.	Visualize and palpate the vein using the pads of the fingertips. *(If veins are not visible ask patient i) to close and open the hand ii) apply gentle taps iii) apply warm/hot pad to selected site to help dilate the veins.)*			
13.	Clean the site with an alcohol swab using an expanding circular motion or a single wiping from distal to proximal. Do it for 3 times with different swabs. Let it air dry.			
14.	Prepare and inspect the catheter. Slightly pull the needle from the cannula, turn, and inspect for any defects.			
15.	Stabilize the vein and apply counter tension to the skin.			
16.	Insert the stylet through the skin at an angle of 30-45 degrees and make sure the bevel is up.			
17.	Observe for "flash back" of blood in the chamber of the stylet to confirm a successful entry.			
18.	Reduce the angle of the needle and advance approximately 1 cm further into the vein.			
19.	Slowly advance the catheter over the needle and into the vein while keeping tension on the vein and skin.			
20.	Release the tourniquet and quickly remove the needle over the catheter while pressing at least 0.5 cm above the insertion site to prevent backflow of blood. Connect the intravenous tubing immediately and open the regulator.			
	After the procedure			
21.	Anchor the catheter firmly in place by the use of transparent dressing or tape. *DO NOT interrupt the flow rate.*			
22.	Regulate the rate of flow according to the doctor's order.			
23.	Ensure that the patient is comfortable.			
24.	Dispose of sharps and waste material according to infection control standards.			
25.	Remove the gloves and wash hands.			
26.	Document the procedure.			

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Intramuscular (IM) Injection

OBJECTIVE: To administer an intramuscular (IM) drug to dorsogluteal region.
MATERIALS: Intramuscular drug, syringe, clean gloves, alcohol swab, sterile gauze, adhesive tape.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

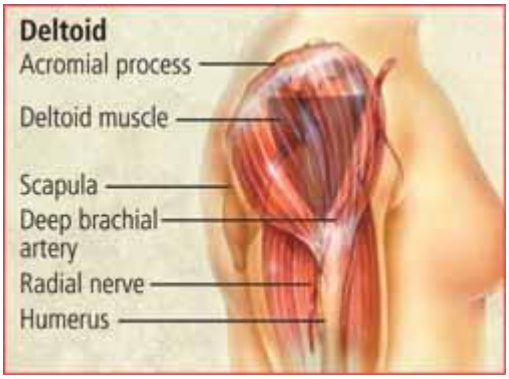
	STEP/TASK	D	PD	ND
	Preparation			
1.	Introduce yourself to the patient.			
2.	Confirm patient's ID.			
3.	Explain the procedure and reassure the patient.			
4.	Get patient's consent.			
5.	Wash hands.			
6.	Prepare the necessary materials. *(Medication should be drawn up into the syringe beforehand and expiration dates checked).*			
7.	Check the doctor's order with the drug to be administrated to ensure correct drug and dosage			
8.	Put on a pair of clean gloves.			
9.	Position the patient in a prone position and expose the gluteal (*buttock*) region. *(Maintain the patient's privacy and dignity).*			
	The procedure			
10.	Identify the injection site* *(Select a site free of skin lesions, swelling, tenderness and one that has not been used frequently).*			
11.	Clean the site with an alcohol swab using an expanding circular motion or a single wiping from distal to proximal. Do this 3 times with separate swabs. Let it air dry.			
12.	Take the syringe and open its cap.			
13.	Hold the syringe (*from its barrel*) like a pencil or dart with your dominant hand and place a sterile gauze between 4^{th} and 5^{th} finger.			
14.	With your non-dominant hand, taut the gluteal muscle at the site of injection.			
15.	Insert the needle at a 90 degree angle to the patient's skin in a quick, firm motion.			
16.	With your non-dominant hand, pull on the syringe's plunger to ensure that you have not entered a blood vessel. *(If you aspirate blood, withdraw the needle and repeat the procedure at another site with a new needle.)*			
17.	Inject the drug very slowly.			
18.	With your non-dominant hand, take the cotton wool and quickly remove the needle while applying pressure with the sterile gauze, maintain gentle pressure for a minute.			
19.	Observe your patient at least 15 min. for any possible adverse effects of the injected drug.			
	After the procedure			
20.	Dispose of sharps and waste material according to infection control standards.			
21.	Ensure that the patient is comfortable.			
22.	Remove the gloves and wash hands.			
23.	Document the procedure.			

Identifying Intramuscular (IM) injection sites*

Drug injection sites vary with the administration route. The instructions below describe proper identification of injection sites for Intramuscular (IM) drugs.
You can administer an IM injection into the muscles shown below. In these illustrations, specific injection sites are shaded.

Deltoid site

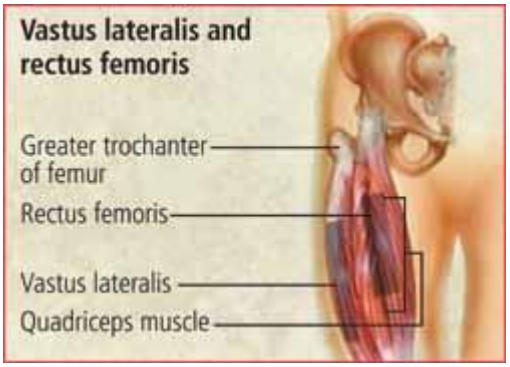
- Locate the lower edge of the acromial process.
- Insert the needle 1" to 2" below the acromial process at a 90-degree angle.



Vastus lateralis and rectus femoris sites

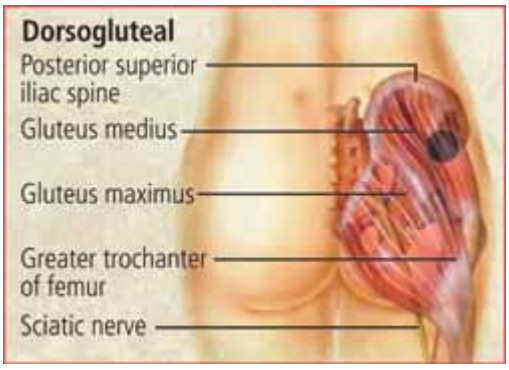
- Find the lateral quadriceps muscle for the vastus lateralis, or the anterior thigh for the rectus femoris.

Insert the needle at a 90-degree angle into the middle third of the muscle, parallel to the skin surface.



Dorsogluteal site

- Draw an imaginary line from the posterior superior iliac spine to the greater trochanter.
- Insert the needle at a 90-degree angle above and outside the drawn line.

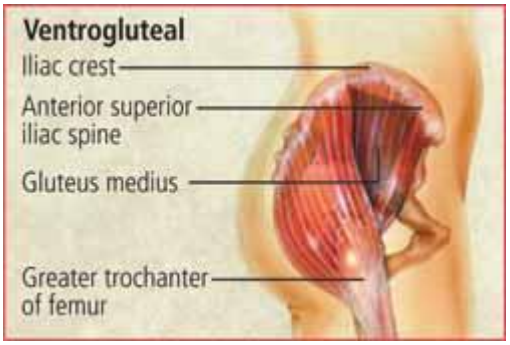


You can administer a Z-track injection through this site. After drawing up the drug, change the needle, displace the skin lateral to the injection site, withdraw the needle, and then release the skin.

Ventrogluteal site

- With the palm of your hand, locate the greater trochanter of the femur.
- Spread your index and middle fingers posteriorly from the anterior superior iliac spine to the furthest area possible. This is the correct injection site.

Remove your fingers and insert the needle at a 90-degree angle.



* http://books.mcgraw-hill.com/medical/NursesDrugHandbook/safe_drug_admin/identifying_injection_sites/IdentifyingInjectionSites.php

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Subcutaneous (SC) Injection

OBJECTIVE: To administer a subcutaneous (SC) drug to upper arm region.

MATERIALS: Subcutaneous drug, syringe, needle (26-30 G, 13-16 mm), clean gloves, alcohol swab, sterile gauze, adhesive tape.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

	STEP/TASK	D	PD	ND
	Preparation			
1.	Introduce yourself to the patient.			
2.	Confirm patient's ID.			
3.	Explain the procedure and reassure the patient.			
4.	Get patient's consent.			
5.	Wash hands.			
6.	Prepare the necessary materials. *(Medication should be drawn up into the syringe beforehand and expiration dates checked).*			
7.	Check the doctor's order with the drug to be administrated to ensure correct drug and dosage.			
8.	Put on a pair of clean gloves.			
9.	Position the patient in a sitting position and expose her/his upper arm. *(Maintain the patient's privacy and dignity).*			
	The procedure			
10.	Identify the injection site* *(Select a site free of skin lesions, swelling, tenderness and one that has not been used frequently).*			
11.	Clean the site with an alcohol swab using an expanding circular motion or a single wiping from distal to proximal. Do this 3 times with separate swabs. Let it air dry.			
12.	Take the syringe and open its cap.			
13.	Hold the syringe (*from its barrel*) like a pencil or dart with your dominant hand and place a sterile gauze between 4th and 5th finger.			
14.	Grasp the skin between the thumb and index finger with your non-dominant hand and pinch up*.			
15.	Insert the needle at a 45-90 degree angle to the patient's skin in a quick, firm motion. (*for thin or muscular people insert the needle at a 45 degree angle to avoid injecting into muscle).*			
16.	Release the skin that you are grasping. With your non-dominant hand, pull on the syringe's plunger to ensure that you have not entered a blood vessel. *(If you aspirate blood, withdraw the needle and repeat the procedure at another site with a new needle.)*			
17.	Inject the drug very slowly.			
18.	With your non-dominant hand, take the cotton wool and quickly remove the needle while applying pressure with the sterile gauze, maintain gentle pressure for a minute.			
19.	Observe your patient at least 15 min. for any possible adverse effects of the injected drug.			
	After the procedure			
20.	Dispose of sharps and waste material according to infection control standards.			
21.	Ensure that the patient is comfortable.			
22.	Remove the gloves and wash hands.			
23.	Document the procedure.			

Identifying subcutaneous (SC) injection sites*

Drug injection sites vary with the administration route. The instructions below describe proper identification of injection sites for subcutaneous (SC) drugs. Subcutaneous injections can be given in the arms, legs, or abdomen -shown below. In these illustrations, specific injection sites are shaded.

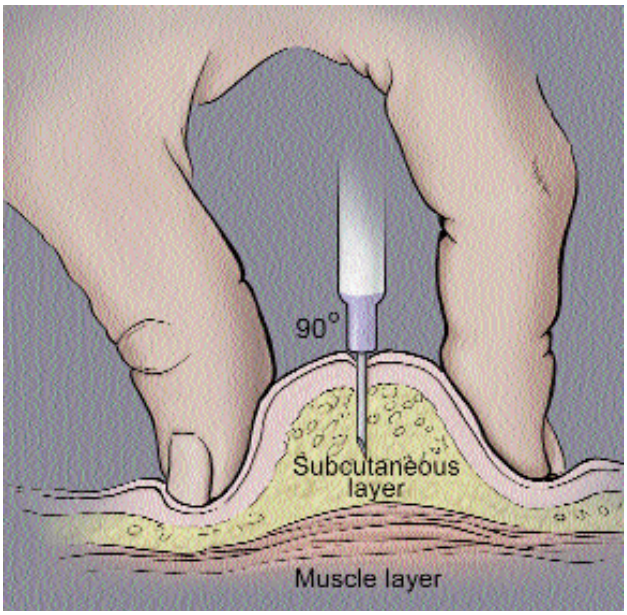
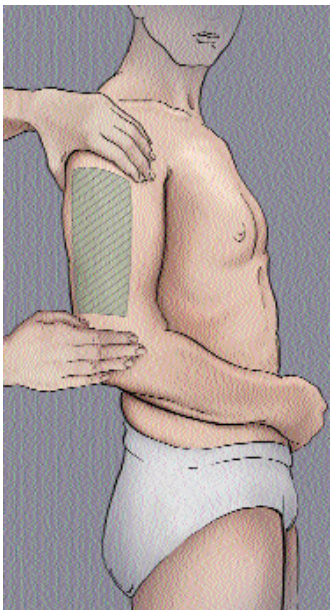


Fig.1*: A subcutaneous injection into the fatty layer of tissue (pinched up to give the injection) under the skin.

Arm

To locate injection sites on the arms, fold one arm across the chest. Place your hand on the shoulder and draw an imaginary line below your hand. Place another hand on the elbow. Draw an imaginary line down the outer side of the arm and down the center front of the arm, starting at the elbow. The area inside these imaginary lines is where injections are given.

(*If you are injecting imagine the hand placement.*)



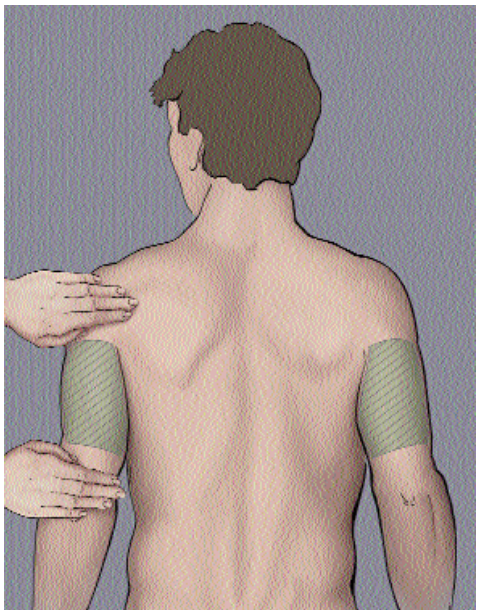


Fig.2*: Injection sites on the side and on the back of the arm

Thigh

To locate injection sites on the thighs, sit down, place your hand above the knee, and draw an imaginary line above it. Place your hand at the uppermost part of the thigh and draw an imaginary line below your hand. Draw an imaginary line down the outer side of the leg and down the center front of the leg. The area within these imaginary lines is where injections may be given.

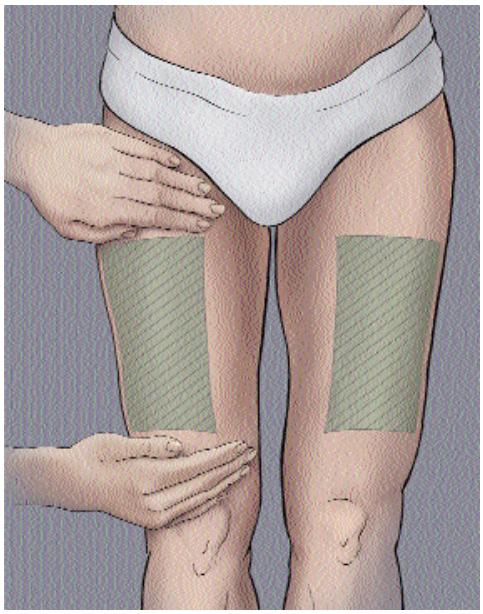


Fig.3*: Injection sites on the front of the thigh.

Abdomen

To locate injection sites on the abdomen, place your hands on the lower ribs and draw an imaginary line them. Use this area below your hands for injections, as far around as you can pinch up fatty tissue. use a 1inch (2,5 cm) area around the navel.

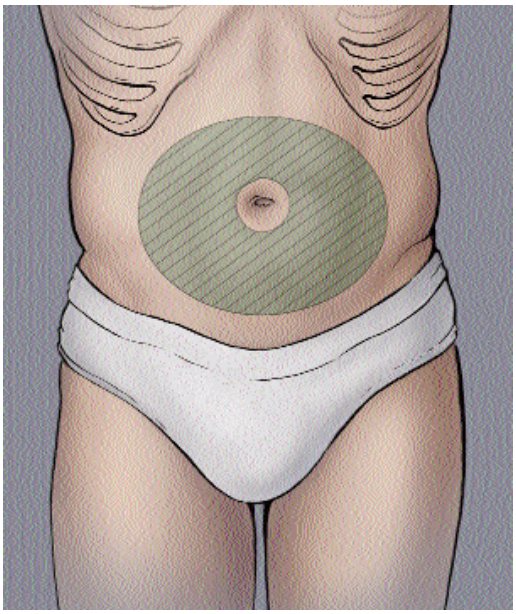


Fig.4*: Injection sites on the abdomen.

* www.cc.nih.gov/ccc/patient_education/pepubs/subq.pdf

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Aspirating from ampoules (glass, plastic)

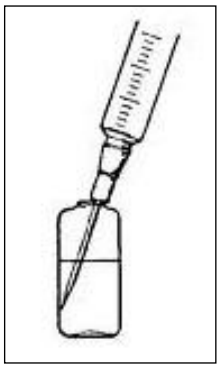
OBJECTIVE: To aspirate drug or solution from ampoules (glass, plastic).

MATERIALS: Required drug or solution (ampoule), syringe, needle (G21-G23), alcohol swab, sterile gauze.

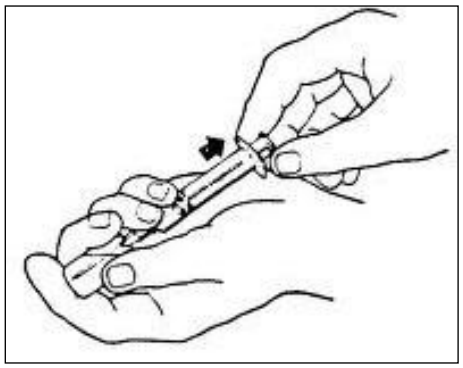
***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

	STEP/TASK	D	PD	ND
	Preparation			
1.	Wash hands.			
2.	Prepare the materials needed *(check the label, expiration date, integrity).*			
3.	Check if the stem of the ampoule is cleared of any trapped medication *(If ever gently tapping the top with the finger or swinging it fast in a downward spiralling movement).*			
4.	Place or wrap the ampoule on small sterile gauze square. *(A medicine file is drawn across the constricted portion to make a cut).*			
5.	Hold the lower portion of the ampoule with gauze, while the stem is snapped away with the other hand and carefully break off the top of the ampoule. *(The gauze protects the finger from injury, for a plastic ampoule twist the top).*			
6.	Check the syringe for air before aspirating the solution from the ampoule.			
7.	Carefully insert the needle into the opening without touching the outside of the ampoule			
8.	Aspirate the desired amount of solution *(make sure the tip of the needle kept submerged in the solution to avoid drawing air into the syringe).*			
9.	Once the syringe filled with the desired amount of medication pull the needle out of the ampoule.			
10.	Hold the syringe with the needle directed upward -to check accuracy of measurement.			
11.	Remove possible air from the syringe.			
12.	Change the aspirating needle with a new one (G21-G23).			
13.	Dispose of sharps and waste material according to infection control standards.			
14.	Wash hands.			

Step 5: Breaking off the top of the ampoule.



Step 7



Step 8

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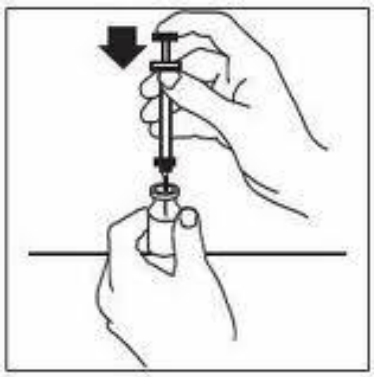
Aspirating from a vial

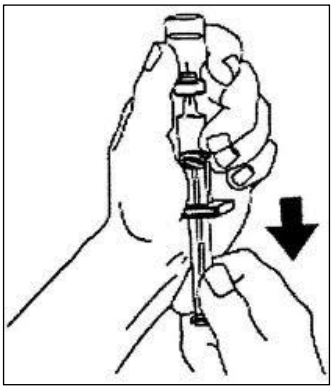
OBJECTIVE: To aspirate drug or solution from a vial.
MATERIALS: Required drug or solution (vial), syringe, needle (G21-G23), alcohol swab.

***D**: Appropriately done **PD**: Partially done **ND**: Not done/Incorrectly done*

	STEP/TASK	D	PD	ND
	Preparation			
1.	Wash hands.			
2.	Prepare the materials needed *(check the label, expiration date, integrity)*			
3.	Remove the plastic cover (or the center of the metal cover) of the vial.			
4.	Disinfect the rubber top of the vial with alcohol swab.			
5.	Fill the syringe with an equal amount of air to the amount of solution to be withdrawn.			
6.	Hold the vial and insert the needle into (top of) vial and turn upside –down.			
7.	Pump air into vial *(creating pressure)*.			
8.	Aspirate the desired amount of solution *(make sure the tip of the needle kept submerged in the solution to avoid drawing air into the syringe).*			
9.	Pull the needle out of the vial.			
10.	Hold the syringe with the needle directed upward -to check accuracy of measurement.			
11.	Remove possible air from the syringe.			
12.	Change the aspirating needle with a new one (G21-G23).			
13.	Dispose of sharps and waste material according to infection control standards.			
14.	Wash hands.			



Step 6 & 7



Step 8

The use of injections

There are two main reasons to prescribe an injection. The first is because a fast effect is needed, and the second is because the injection is the only dosage form available that has the required effect. A prescriber should know how to give injections, not only for emergency and other situations where it might be necessary, but also because it will sometimes be necessary to instruct other health workers (e.g. a nurse) or the patients themselves. Many injections are prescribed which are unnecessarily dangerous and inconvenient. Nearly always they are much more expensive than tablets, capsules and other dosage forms. For every injection the prescriber should strike a balance between the medical need on the one hand and the risk of side effects, inconvenience and cost on the other.

When a drug is injected certain effects are expected, and also some side effects. The person giving the injection must know what these effects are, and must also know how to react if something goes wrong. This means that if you do not give the injection yourself you must make sure that it is done by someone who is qualified.

A prescriber is also responsible for how waste is disposed of after the injection. The needle and sometimes the syringe are contaminated waste and special measures are needed for their disposal. A patient who injects at home must also be aware of this problem[1].

General practical aspects of injecting

Apart from the specific technique of injecting, there are a few general rules that you should keep in mind.

1. Expiry dates

Check the expiry dates of each item including the drug. If you make housecalls, check the drugs in your medical bag regularly to make sure that they have not passed the expiry date.

2. Drug

Make sure that the vial or ampoule contains the right drug in the right strength.

3. Sterility

During the whole preparation procedure, material should be kept sterile. Wash your hands before starting to prepare the injection. Disinfect the skin over the injection site.

4. No bubbles

Make sure that there are no air bubbles left in the syringe. This is more important in intravenous injections.

5. Prudence

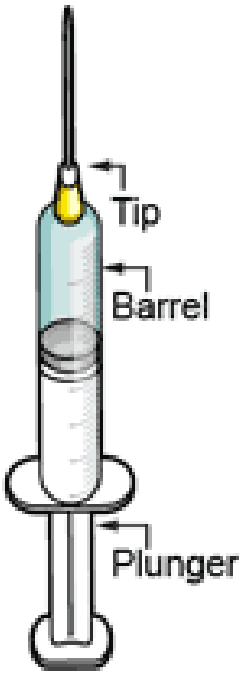
Once the protective cover of the needle is removed extra care is needed. Do not touch anything with the unprotected needle. Once the injection has been given take care not to prick yourself or somebody else.

6. Waste

Make sure that contaminated waste is disposed of safely[1].

Syringes and Needles

The basic parts of a syringe are the barrel, plunger, and tip. The barrel is a tube that is open at one end and tapers into a hollow tip at the other end. The plunger is a piston-type rod with a slightly cone-shaped top that passes inside the barrel of the syringe. The tip of the syringe provides the point of attachment for a needle. The volume of solution inside a syringe is indicated by graduation lines on the barrel. Graduation lines may be in milliliters or fractions of a milliliter, depending on the capacity of the syringe. The larger the capacity, the larger the interval between graduation lines.

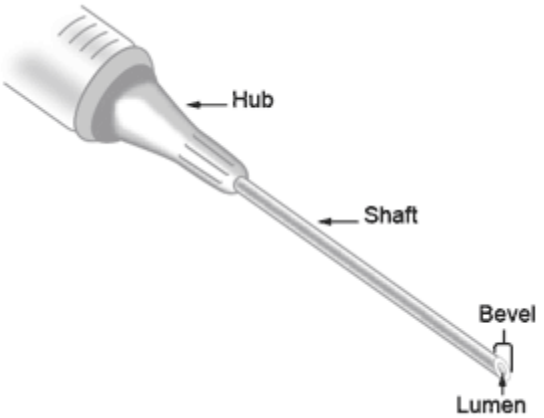


There are three common types of syringe tips: Slip-Tip®, Luer-Lok®, and eccentric. Slip-Tips® allow the needle to be held on the syringe by friction. The needle is reasonably secure, but it may come off if not properly attached or if considerable pressure is used. Luer-Lok® tips incorporate a collar with grooves that lock the needle in place. Eccentric tips, which are off-center, are used when the needle must be parallel to the plane of injection such as in an intradermal injection.

Syringes come is different sizes ranging from 1 to 60 ml. As a rule, select a syringe whose capacity is the next size larger than the volume to be measured. For example, a 3 ml syringe should be selected to measure 2.3 ml, or a 5 ml syringe to measure 3.8 ml. In this way, the graduation marks on the syringe will be in the smallest possible increments for the volume measured. Syringes should not be filled to capacity because the plunger can be easily dislodged.

The Cornwall syringe is used when many repetitions of filling a syringe to the same volume is needed. It is a manual device that has a two-way valve that attaches to both the syringe and the solution to be drawn into the syringe. Each time the grip is released, the syringe fills with solution. Each time the grip is compressed, the syringe volume is expelled. There are electronic versions of this basic design concept[2].

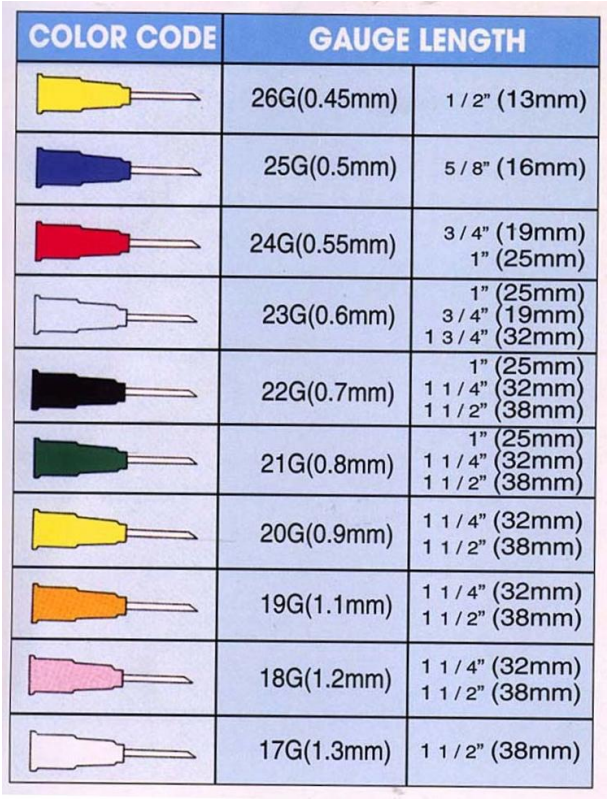
Needles and Needle Sizes



A needle has three parts, the hub, the shaft, and the bevel. The hub is at one end of the needle and is the part that attaches to the syringe. The shaft is the long slender stem of the needle that is beveled at one end to form a point. The hollow bore of the needle shaft is known as the lumen. Disposable needles should always be used when preparing admixtures as they are presterilized and individually wrapped to maintain sterility[2].

Needle Sizes

Needle size is designated by length and gauge. The length of a needle is measured in inches from the juncture of the hub and the shaft to the tip of the point. Needle lengths range from 3/8 inch to 3 1/2 inches; some special use needles are even longer. The gauge of a needle, used to designate the size of the lumen, ranges from 27 (the finest) to 13 (the largest).



COLOR CODE	GAUGE	LENGTH
	26G(0.45mm)	1/2" (13mm)
	25G(0.5mm)	5/8" (16mm)
	24G(0.55mm)	3/4" (19mm) 1" (25mm)
	23G(0.6mm)	1" (25mm) 3/4" (19mm) 1 3/4" (32mm)
	22G(0.7mm)	1" (25mm) 1 1/4" (32mm) 1 1/2" (38mm)
	21G(0.8mm)	1" (25mm) 1 1/4" (32mm) 1 1/2" (38mm)
	20G(0.9mm)	1 1/4" (32mm) 1 1/2" (38mm)
	19G(1.1mm)	1 1/4" (32mm) 1 1/2" (38mm)
	18G(1.2mm)	1 1/4" (32mm) 1 1/2" (38mm)
	17G(1.3mm)	1 1/2" (38mm)

There are two considerations when choosing a needle size; the viscosity of the solution, and the nature of the rubber closure on the parenteral container. Needles with larger lumens should be used for viscous solutions. Smaller gauge needles are preferred if the rubber closure can be cored easily. Coring is when a needle punctures or tears a piece of the rubber closure and the piece then falls into the container and creates particulate material contamination[2].

Disassembly of needle from syringe or other devices

Safe methods of removing the needle from the syringe or other devices are necessary to protect health workers from injury.This procedure must be carried out close to a sharps container, and the needle must be discarded immediately.

NEVER disassemble an exposed, used needle with your bare hands.

If the needle has to be disassembled from the barrel or syringe, re-sheath using a one-hand scoop technique, then remove the needle using a removal device. Both of these procedures are explained below.

One-hand scoop technique

1. Leave the needle cap on the surface and guide the tip of the used needle tip into it using only one hand. Clean the surface with disinfectant afterward to avoid leaving blood.
2. Place the needle cap against a firm upright surface with its opening towards the phlebotomist, and place the used needle tip into it.
3. Lift the needle and syringe vertically and, once the tip is covered, use the other hand to fix the cap into place[3].

Use of a removal device

Needle pliers – Hold the needle with pliers or artery forceps. Dislodge the needle by unscrewing or pulling it off. Discard immediately into a sharps container.

Needle guard (mushroom) – Place the cap in the device. Using one hand, insert the needle tip into the cap vertically and turn firmly to fix the needle in the cap. Lift the syringe or barrel and removed the covered needle. Discard immediately[3].

Intravenous Cannula Selection

When considering the choice of cannula consideration should be given to the following: minimising discomfort to the patient, ensuring good flow rates, and easy insertion with no tissue reaction to the cannula. It should be of the smallest practical size to provide the required fluid regimen and take into account the size of vessel cannulated, the time scale of the proposed administration of infusion and the viscosity of the fluid to be infused[4].

Gauge	Colour	Length	Max flow/min	Common uses
14	Orange	45 mm	240	Rapid transfusions, blood
16	Grey	45 mm	180	Rapid transfusions, blood
18	Green	45 mm	80	IV maintenance fluids
20	Pink	32 mm	54	IV drugs/infusions
22	Blue	25 mm	31	Paediatrics/difficult veins.
24	Yellow	19 mm	13	Paediatrics/difficult veins.

Explaining the procedure to a patient

Introduction:

Hello, I am _____ I work at this health-care facility.

What is your name? (Health-care worker checks first and last name against order for tests and the patient's name band if present).

I am trained to take blood for laboratory tests (or medical reasons) and I have experience in taking blood.

I will introduce a small needle into your vein and gently draw some blood for _____ tests. (Tell the patient the specific tests to be drawn).

Then I will label them with your name and contact details and send them off for tests to the laboratory. The results will be returned to Dr _____ (mention the name of the clinician who ordered the tests).

Do you have any questions? Did you understand what I explained to you? Are you willing to be tested?

Please sit down and make yourself comfortable.

Now, I will ask you a few questions so that both of us feel comfortable about the procedure.

- Have you ever had blood taken before?
- (If yes) How did it feel? How long ago was that?
- Are you scared of needles?
- Are you allergic to anything? (Ask specifically about latex, povidone iodine, tape.)
- Have you ever fainted when your blood was drawn?
- Have you eaten or drunk anything in the past two hours?
- How are you feeling at the moment?

Shall we start? If you feel unwell or uncomfortable, please let me know at once[3].

References

1. Guide to Good Prescribing, World Health Organization, Geneva.
Available from: http://apps.who.int/medicinedocs/pdf/whozip23e/whozip23e.pdf.

2. Sterile Compounding, The Pharmaceutics and Compounding Laboratory of The University of North Carolina at Chapel Hill.
Available from: http://pharmlabs.unc.edu/labs/parenterals/syringes.htm.

3. WHO guidelines on drawing blood: best practices in phlebotomy, World Health Organization, 2010. Available from: http://whqlibdoc.who.int/publications/2010/9789241599221_eng.pdf.

4. Venepuncture and IV Cannulation Medical Student Practical Skill Session, University of Glasgow, University Section of Anaesthesia, Pain and Critical Care Medicine
Available from: http://www.gla.ac.uk/media/media_109800_en.pdf.