UNIT 8  DRUGS DISPENSING AND INJECTIONS

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8.0  INTRODUCTION

In the previous units you have learnt about the practical skills on Sample collection, common blood tests, screening and management of dental conditions and suturing of Superficial Wounds. In Block 6 of Theory Course 2 (BNS-042), you have also learnt about essential drugs.

With this background you are ready to move a step further and get acquainted with the common procedures of ‘Drugs Dispensing and Injections’. Many of you might already be actively involved in this activity. The unit will mainly deal with the prescribing/ dispensing and administering designated drugs / medication and explaining side effects to the patients or their care providers. In this unit you will be learning how to Insert intravenous cannula, administer intramuscular injection and provide intravenous medication/ fluids in emergency.
8.1 OBJECTIVES

After the completion of this unit, you will be able to:

- describe the principles of prescribing/dispensing and administering drugs;
- list the various routes of drug administration;
- administer intramuscular, intradermal and subcutaneous injections;
- insert intravenous cannula; and
- provide intravenous medication/fluids in emergency.

8.2 DRUG PRESCRIPTION

What is meant by prescribing, dispensing and administering of drugs?

Prescribing: When the doctor or another designated person writes a prescription for a medication for the patient.

Dispensing: When the pharmacist sometimes a nurse fills the doctor’s prescription and hands the medication to the customer.

Administering: When the patient ingests the actual medicine or is injected the medicine (or a nurse gives the medicine to the patient).

8.2.1 What is a Prescription?

A prescription is a written, verbal, or electronic order from a practitioner or designated agent to a pharmacist or nurse for a particular medication for a specific patient. Although you will not prescribe medications, but get acquainted to the principles of drug prescription as follows.

8.2.2 Writing Prescriptions and its Content

You should be aware with the content while writing any prescription so that, you cross check that right medication is ordered to right patient. Hence, check for the following:

Who can write a Rx?

- Practitioners: Physicians, veterinarians, dentists, podiatrists
- Mid-level practitioners: nurse practitioners, physician assistants, optometrists, pharmacists
8.2.3 Principles for Drug Prescription

- Select the drug, considering:
  - Medication Allergies
  - Suitability
  - Safety
  - Availability
  - Cost
- Determine if controlled drug or non-controlled drug
- Determine preference for brand or generic product
- Name of the drug:
  - Use with caution- look alike or sound alike drugs
  - Avoid abbreviations
- Must give clear information, instructions and warnings
- Multiple drugs per prescription can add to confusion
- KEEP IT SIMPLE

Give Information, Instructions and Warnings

The six points listed below summarise the minimum information that should be given to the patient.

1) Effects of the drug
   - Which symptoms will disappear; and when; how important is it to take the drug; what happens if it is not taken;

2) Side effects
   - Which side effects may occur; how to recognise them; how long will they remain; how serious they are; what to do if they occur;
3) Instructions
   When to take; how to take; how to store; how long to continue the treatment; what to do in case of problems;

4) Warnings
   What not to do (driving, machinery); maximum dose (toxic drugs); need to continue treatment (antibiotics);

5) Future consultations
   When to come back (or not); when to come earlier; what to do with left-over drugs; what information will be needed;

6) Everything clear?
   Everything understood; repeat the information; any more questions.

8.3 DRUG DISPENSING

In the settings where a pharmacist is not available, nurses have authority to dispense certain medications. Nurses are accountable for providing safe, competent and ethical care to their clients.

8.3.1 What is Drug Dispensing?

Dispensing includes the preparation, packaging, labelling, record keeping, and transfer of a prescription drug to a patient or an intermediary, who is responsible for administration of the drug.

Dispensing occurs when the nurse gives medication to a client or their delegate for administration at a later time e.g. when the client is leaving the health centre and needs medication while away/ at home.

Nurses may dispense with or without the involvement of a pharmacist.

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<tr>
<td>If you dispense the medication without the involvement of a pharmacist, you must</td>
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<td>• Ensure the pharmaceutical and therapeutic suitability of the medication for the client, as well as its proper use.</td>
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<td>• Have policies or standing instructions from your employers regarding dispensing by nurses.</td>
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8.3.2 Principles of Drug Dispensing

In order to dispense medications, you should meet the following expectations:

1) Dispense medications when it is in the best interest of the client.
2) Dispense medications only to clients under your care.
3) Take steps to ensure pharmaceutical and therapeutic suitability,
   • Review the order for completeness and appropriateness (e.g., drug, dosage, route and frequency of administration)
• Review the client’s medication history and other personal health information

• Consider potential drug interactions, contraindications, allergies, therapeutic duplications and any other potential problems (e.g., adverse side effects)

• Use current, evidence-based resources to support your decision-making (e.g., online clinical databases, decision support tools)

• Consider the client’s ability to follow the medication regimen.

4) To ensure proper use, you should

• Label the medication legibly with: Client’s name; Medication name, dosage, route, and (where appropriate) strength; Directions for use; Quantity dispensed; Date dispensed; Initials of the nurse dispensing the medication and the name, address, and telephone number of the agency from which the medication is dispensed; and any other information that is appropriate/specific to the medication.

• Package the medication in a way that is most appropriate for client needs. Hand the medication directly to the client or their delegate.

• Provide education based on an assessment of the client’s abilities and level of understanding regarding the medication, including: Purpose of medication; Dosage regime, expected benefits, potential side effects, storage requirements and instructions required to achieve a therapeutic response; and Written information about the medication.

5) Record dispensing information on an individual medication profile and/or client record each time a medication is dispensed.

Client profile/record includes

• Client name, address, phone number, date of birth, gender and, when available, allergies and adverse reactions

• Date dispensed

• Name, strength, dosage of medication and quantity dispensed

• Duration of therapy

• Directions to client

• Signature and title of the person dispensing the medication.

8.4 ADMINISTRATION OF MEDICATIONS

The administration stage (administering the prescription) includes administering the right medication to the right patient, in the right manner and administering the medication only when indicated.

8.4.1 Basic Principles of Administering Medication

Before administration

• Check that you are taking the correct medication chart for the correct patient

• Interpret the order carefully before preparing drug for administration
• Check that the pharmacist/you has/have reviewed a new drug order before administering
• Check for any drug allergy or ambiguous order
• Do not hesitate to contact the prescriber, if not you, for any illegible or ambiguous order
• Accept verbal order only in emergency by writing down and repeating back the order, spelling the drug name and doses
• Check that you are preparing the correct drug for the correct patient
• Always get a double-check for correct drug, dose, route and time of administration before administering the drug
• Make sure to counter-check the drug prepared against the order before administering
• Label all infusion sets and lines
• Be familiar with all the different administration sets and devices available in the inventory

**During administration**
• Check that you are administering the correct drug to the correct patient
• Advise patients on the possible adverse drug reactions
• Encourage patient to express any discomfort or problems experienced during drug administration

**After administration**
• Document promptly on the medication chart the time that the drug is administered

**Rights of Medication Administration:** Rights of drug administration are not rights, as in privileges, but things that must be correct.

1) **Right patient**
   Check the name on the order and the patient; use 2 identifiers; ask patient to identify himself/herself; when available, use technology (for example, barcode system).

2) **Right medication**
   Check the medication label; check the order.

3) **Right dose**
   Check the order; confirm appropriateness of the dose using a current drug reference. If necessary, calculate the dose and have another nurse calculate the dose as well.

4) **Right route**
   Again, check the order and appropriateness of the route ordered. Confirm that the patient can take or receive the medication by the ordered route.

5) **Right time**
   Check the frequency of the ordered medication; double-check that you are
6) Right documentation

Document administration AFTER giving the ordered medication. Chart the time, route, and any other specific information as necessary.

7) Right reason

Confirm the rationale for the ordered medication. What is the patient’s history? Why is he/she taking this medication? Revisit the reasons for long-term medication use.

8) Right response

Make sure that the drug led to the desired effect. If an antihypertensive was given, has his/her blood pressure improved? Be sure to document your monitoring of the patient and any other nursing interventions that are applicable.

8.4.2 Basic Principles of Monitoring Medication Use

- Be familiar with the drug use protocols
- Be familiar with the possible adverse drug reactions following drug administration
- Be vigilant when monitoring patient by adhering strictly to established protocols
- Alert prescriber promptly should patient develop unexpected signs and symptoms or is not responding as expected
- Document patient’s response on the medication chart in a timely manner
- Do not use dangerous abbreviations when documenting administration details
- Keep up-to-date references easily accessible for quick checks

8.5 ORAL DRUG ADMINISTRATION

You have learnt in your basic nursing training about the various routes of drug administration such as: oral, parenteral (Injections), rectal, inhalations, local applications etc. In the next section we shall review drug administration via oral and parenteral (Injections) routes.

8.5.1 Oral Administration of Medicines

Let us go through oral medications procedure as given below:

Giving medicines in the form of tablets, capsule or syrup by mouth

**Purposes**

To prevent diseases e.g. OPV, Vitamin supplements
To diagnose disease condition
To treat disease condition
Articles required

A clean tray containing

1) Medicine container (tab, syrup etc.)
2) Bowl of water for rinsing spoon
3) Hand towel-1
4) Medication card
5) Minim glass/ounce glass
6) Glass of water, feeding cup/spoon/dropper etc.
7) Grinding mortar and pistle
8) Small towel to clean the mouth of the bottle, kidney tray and paper bag

Procedure

1) Check medication card with the treatment book/prescription record and counter checked by another person
2) Wash hands
3) Recall safety measures, record, locate the drug, read the label on exact bottle/container and see that it is the right medicine, shake the bottle (If liquid), read label the second time
4) Collect medicine into the container with minimal handling of the drug
5) Measure liquid accurately with a minim glass and read the lower level of the meniscus
6) Pour liquid from the side opposite to the label, wipe the mouth of the bottle, recap the bottle and read the label before replacing
7) If the drug is a tablet or capsule form, take it in a spoon or medicine cup
8) Keep medication card at hand
9) Identify the patient by his/her name, explain the procedure and place the patient’s towel under the chin if needed
10) Position the patient comfortably in an upright sitting position
11) Administer each drug separately followed by water
12) Remain with the patient till the medicine is swallowed
13) Record the drug given: details of the dose, route, date, time, signature and omissions etc.
14) Clean and replace the articles, dispose waste safely, and wash hands

Note:

- If patient is unable to swallow, powder the tablet by crushing it in the mortar with pistle.
- Give water before and after putting the powder in patient’s mouth or dissolving it in water.
- Syrup, cough mixtures and sedative lozenges should be given without water and not followed by food or water.
• Tonic to stimulate appetite is given before meals
• Laxatives are given at night e.g. Paraffin, Dulcolax
• Drugs that irritate the lining of the stomach may be given by diluting with water / or after food and with plenty of water e.g. iron, aspirin
• The nurse must know the pharmacological action, uses, dosage and the effect of each drug given
• Never use content of the unlabelled container, the label must be clear and legible
• If in doubt about anything regarding medication orders like the dosage or patient, consult a senior person before giving the medication
• Any error in administration of medication must be reported to the higher authority immediately
• All medication should be recorded only after administration.

8.6 INJECTIONS: 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 (Refer Section 8.7).

Withdrawal/Preparation of injections

Checklist 1: Aspirating from ampoules (glass, plastic)

Materials needed
Syringe of appropriate size, needle of required size, ampoule with required drug or solution, gauze.
Technique

1) Wash your hands.
2) Put the needle on the syringe.
3) Remove the liquid from the neck of the ampoule by flicking it or swinging it fast in a downward spiralling movement.
4) File around the neck of the ampoule.
5) Protect your fingers with gauze if ampoule is made of glass.
6) Carefully break off the top of the ampoule (for a plastic ampoule twist the top).
7) Aspirate the fluid from the ampoule.
8) Remove any air from the syringe.
9) Clean up; dispose of working needle safely; wash your hands.

Checklist 2: Aspirating from a vial

Materials needed
Vial with required drug or solution, syringe of the appropriate size, needle of right size (im, sc, or iv) on syringe, disinfectant, gauze.

Technique

1) Wash your hands.
2) Disinfect the top of the vial.
3) Use a syringe with a volume of twice the required amount of drug or solution and add the needle.
4) Suck up as much air as the amount of solution needed to aspirate.
5) Insert needle into (top of) vial and turn upside-down.
6) Pump air into vial (creating pressure).
7) Aspirate the required amount of solution and 0.1 ml extra. Make sure the tip of the needle is below the fluid surface.
8) Pull the needle out of the vial.
9) Remove possible air from the syringe.
10) Clean up; dispose of waste safely; wash your hands.

Checklist 3: Dissolving dry medicine

Materials needed
Vial with dry medicine to be dissolved, syringe with the right amount of solvent, needle of right size (iv, sc or iv) on syringe, disinfectant, injection needle, gauze.

Technique

1) Wash hands.
2) Disinfect the rubber cap (top) of the vial containing the dry medicine.
3) Insert the needle into the vial, hold the whole upright.
4) Suck up as much air as the amount of solvent already in the syringe.
5) Inject only the fluid into the vial, not the air!
6) Shake.
7) Turn the vial upside-down.
8) Inject the air into the vial (creating pressure).
9) Aspirate the total amount of solution (no air).
10) Remove any air from the syringe.
11) Clean up; dispose of waste safely; wash hands.

**Drug Dose Calculations**

\[
\frac{\text{Desired Dose} \times \text{Volume in Hand}}{\text{Concentration}} = \text{ml to be given}
\]

**Common routes and methods of giving Injections**

You have learnt in your basic nursing training that injections can be delivered through different methods or routes. Though injections can be given through a wide variety of routes, the most common are intradermal (ID), subcutaneous (SC), intramuscular (IM) and intravenous (IV). The injection sites vary according to the type of injection.

### 8.6.1 Intramuscular Injection

An intramuscular (IM) injection is a shot of medicine given into a muscle. Injections given using intramuscular route include Diclofenac, DPT, TT.

The following are safe areas to give an IM injection:

![Injection Sites](attachment:image.png)

**Fig. 8.1 : Injection Sites**

Vastus Lateralis and Rectus Femoris Muscle (Thigh): Anterolateral aspect of middle one third or the mid thigh. This is the preferred site in children.

Ventrogluteal Muscle (Hip): Fig. 8.1 (c) Have the person getting the injection lie on his or her side. The hip is a good place for an injection for adults and children older than 7 months.

**Deltoid Muscle (Upper arm muscle):** Completely expose the upper arm. You will give the injection in the center of an upside down triangle, 1 to 2 inches below the acromion process. This site should not be used if the person is very thin or the muscle is very small. Shown in Fig. 8.1 (a).
**Dorso gluteal Muscle (buttocks):** Shown in Fig. 8.1 (c) Expose one side of the buttocks. (outer upper quadrant of the gluteus maximus muscle). Do not use this site for infants or children younger than 3 years old. Even in adult patients, this site is best avoided as the extra layer of fat tissue reduces the absorption of the medication.

**Materials needed**

Syringe with the drug to be administered (without air), needle (gauge 22, long and medium thickness; on syringe), liquid disinfectant (alcohol/spirit), cotton wool/swab.

**Technique**

1) Assemble equipment.

2) Reassure the patient and explain the procedure.

3) Wash hands and use disposable gloves.

4) If necessary, withdraw medication from the ampoule or vial.

5) Use an alcohol swab to clean the skin where you will give the shot.

6) Hold the muscle firmly and insert the needle into the muscle with a quick firm motion.

7) After you insert the needle swiftly at an angle of 90 degrees, release the muscle grasp.

8) Gently pull back on the plunger of the syringe to check for blood. (If blood appears when you pull back on the plunger, withdraw the needle and syringe and gently press the alcohol swab on the injection site. Start over with a fresh needle.)

9) If no blood appears, inject all the solution by gently and steadily pushing down the plunger.

10) Withdraw the needle and syringe and press an alcohol swab gently on the spot where the shot was given.

11) Check the patient’s reaction and give additional reassurance, if necessary.

12) Clean up; dispose of waste safely; wash your hands.

**8.6.2 Intradermal Injection**

A shallow injection given between the layers of the skin, creating a “wheal” on the skin.
Materials needed

Syringe (tuberculin or 1ml suringe) with the drug to be administered (without air), needle (Gauge 26–27, short and thin; on syringe), liquid disinfectant (alcohol/spirit), cotton wool/swab.

Technique

1) Follow steps 1 to 5 as given for intramuscular injection

2) Select an area on the inner aspect of the forearm that is not heavily pigmented or covered with hair, shown in Fig. 8.2. The upper chest or upper back beneath the scapulae are also sites for intradermal injections.

3) Cleanse the area with an alcohol swab by wiping with a firm circular motion and moving outward from the injection site. Allow skin to dry.

4) Use your non-dominant hand to pull skin taut over the injection site.

5) Remove needle cap with non-dominant hand by pulling it straight off.

6) Place the needle almost flat against the patient’s skin, bevel side up (at an angle of 10–15°)

7) Insert the needle so that the point of the needle can be seen through the skin—only about 1/8 of an inch.

8) Slowly inject the desired dose of medication while watching for a small wheal or blister to appear. If none appears, withdraw the needle slightly.

9) Withdraw the needle at the same angle it was inserted.

10) Do not massage the area or apply spirit swab after removing the needle.

11) Assist the patient into a position of comfort.

12) Clean up; dispose of waste safely; wash your hands.

13) Chart the administration of medication, as well as the site of the administration. Some agencies recommend circling the injection site with ink.

14) Observe the area for signs of reaction at frequent intervals.

8.6.3 Subcutaneous Injection

A subcutaneous (SC) injection is a shot of medicine given into the fatty tissue beneath the skin. Since there is little blood flow to the fatty tissue, this route is used for a slow, sustained absorption of medicine.

In addition to all the sites mentioned for IM injections SC injections are also given frequently over abdomen. (about 5 cm around the navel).

Fig. 8.3 : Subcutaneous Injection
Technique

1) Follow steps 1 to 5 as given for intramuscular injection.
2) Select an appropriate area and cleanse it with an alcohol swab by wiping with a firm circular motion and moving outward from the injection site. Allow skin to dry.
3) Take the cover off the needle.
4) Hold the syringe like a pencil in one hand.
5) With the other hand, pinch the skin between the thumb and index finger in order to separate it from the underlying muscle tissue.
6) Thrust the needle into the raised fold of skin at an angle of 90° if using a 26 G needle. However for small children and persons with thin skin, the needle should be inserted at an angle of 45° when using a larger needle. The aim is not to accidentally inject into the underlying muscle.
7) Release the skin fold after the needle is inserted completely.
8) Use the free hand to hold the syringe near its base to stabilise it.
9) Inject the medication slowly taking 5–10 seconds for injecting the entire amount.
10) Withdraw the needle, press the site with the spirit/boiled swab and press gently for about a minute.
11) Do Not RUB the injection site. Do Not recap the used needle.
12) Clean up; dispose off waste safely; wash hands
13) Chart the administration of medication, as well as the site of the administration.

8.6.4 Venepuncture for Giving Intravenous (IV) Injection

Intravenous injection is an injection given into a vein.

Venepuncture is a frequently done procedure for giving intravenous injection or drawing blood for various investigations. One should be extremely careful while performing a venepuncture since using an unsafe needle may transmit infections into the blood stream directly and this can have serious consequences. While the process for venepuncture remains essentially the same as that for an IM injection in terms of cleaning the skin, drawing the medication and handling of the syringe/needle the following points must be observed while performing a venepuncture:

Materials needed

Syringe with the drug to be administered (without air), needle (Gauge 20–24, long and medium thickness; on syringe), liquid disinfectant (alcohol/spirit), cotton wool/swab, tourniquet.

Technique

1) Select the right site and right vein: brachial vein and the veins in the back of the hand are commonly used.
2) Always wear a sterile glove before performing a venipuncture.
3) Apply the tourniquet 2–3 inches above the intended venipuncture site to increase pressure in the vein and make it more prominent. When tourniquet is in place, the patient should be asked to open and close his fist several times to encourage venous distension. The vein should be palpated gently to see if it feels soft and bouncy.

4) Cleaning the site: since the contamination of the blood stream poses a serious threat to the health of the patient, the skin should be cleaned meticulously over the site of the venipuncture (usually the brachial vein in the elbow region) using a spirit swab.

5) Hold the syringe at an angle of 10–15°.

6) Ensure that the bevel of the needle is facing up.

7) Push the needle gently but firmly into the vein as shown in Fig. 8.4.

8) Be careful not to push more than 1 cm inside the vein.

9) Draw the syringe plunger to see if the needle is inside the vein. If the blood flows easily into the syringe, it indicates that the needle is inside the vein. If it does not come, try again.

10) Release the tourniquet and then inject the medication into the vein.

11) Withdraw the syringe and needle gently.

12) Press the site of puncture firmly with a spirit swab.

13) Do Not Rub the site of puncture. Keep the swab pressed till the bleeding stops oozing out. This usually takes about 1 to 2 minutes.

14) Check the patient’s reactions and give additional reassurance, if necessary.

15) Clean up; dispose of waste safely; wash your hands.

**Fig. 8.4: Intravenous Injection**

**Remember:**

if the swelling occurs at the local site while injecting or blood does not flow freely while withdrawing, interrupt the procedure, withdraw the needle and restart the procedure at another site (use fresh syringe and needle...
8.6.5 Intravenous (IV) Cannulation

IV cannulation is an intravenous infusion (via a catheter placed in peripheral veins of upper limb) and is one of the commonest invasive procedures performed in acute care hospitals. The main indications of IV cannulation are:

- Fluid and/or electrolyte replacement
- Route for drug administration
- Nutritional support
- Transfusion of blood and blood products
- Venous access for diagnostic blood draws

**Material required**

- Tourniquet
- Gauze squares
- Adhesive tape
- Clear permeable dressing
- IV sets
- IV bottles
- IV catheters
- Sterile gloves
- Sterile drapes
- Surgical scissors
- Antiseptics
- Spirit swabs
- Site label (to record time of insertion)

**Technique**

- Wash hands
- Introduce yourself
- Confirm patient details – name / DOB
- Explain procedure and Check understanding & gain consent
- Select the right vein: consider
  - Patient medical history, age, body size, weight, general condition, and level of physical activity.
  - Condition of patient’s vein, type of IV fluid or medication, expected duration of IV therapy.

**Caution** - Avoid cannulation in an area of:

- Localised oedema, Dermatitis, Cellulitis,
- Arteriovenous Fistula,
- Wounds, Skin grafts, Fractures, Planned limb surgery, previous cannulation site

- Select the right site: from distal to proximal, Fig. 8.6
- Select the right size of IV catheter
• 26–24 gauge for infants and children
• 24–22 gauge for children and elderly patients
• 24–20 gauge for medical and post operative surgical patients
• 18 gauge for surgical patients and for rapid blood transfusion
• 16 gauge for trauma patients and those requiring large volumes of fluid rapidly transfusion

• Prepare the site, insert the catheter and use right technique for its fixation:
  If the site is excessively hairy, clip the hair (Do Not shave). Clean a visibly dirty skin with soap and water. Then use antimicrobial solution (chlorhexidinegluconate or 10% povidone iodine, or 2% tincture iodine or 70% isopropyl alcohol). Chlorhexidinegluconate takes 30 seconds while povidone iodine requires at least 2 minutes to kill all the micro-organisms. Do not use 70% isopropyl alcohol after povidone iodine because it may irritate the skin and interfere with its germicidal action. If patient is allergic to iodine, use Chlorhexidinegluconate or 70% isopropyl alcohol to prepare the site.

Steps of inserting the cannula/ catheter
• Apply a tourniquet 2–3 inches above the intended puncture site.
• Palpate a vein: Go for a vein you can feel – it's best if they feel “springy”
• It should ideally be straight
• Tapping the vein and asking the patient to pump their fist can make it easier to see and feel veins
• Avoid areas where two veins are joining (valves present)
• Wear gloves
• **Insert the cannula: before venipuncture, stretch and immobilise the vein:**
  • Grasp the cannula or cannula’s wings with right hand and proceed with venipuncture.
  • Insert the cannula at 10 to 30° angle depending on the vein depth.
  • Observe for the blood backflow in the cannula tubing or hub, it shows that the cannula is in the vein lumen.
  • If backflow present, lower the cannula almost parallel to the skin. Push the catheter off the stellite and advance completely into the lumen of the vein.
  • Remove the needle and dispose off into the sharps bin.
  • Release the tourniquet and apply digital pressure beyond the cannula tip and stabilise the hub.
  • Secure and dress the cannula: Place a 1–2 inch wide tape across the cannula hub: it should not cover the puncture site. Then place a 1–2 inch wide tape under the cannula hub, adhesive side facing up. Fold the tape around the hub. If catheter hub with wings being used, the tape strip is folded across the wings rather than the hub. Cover the venipuncture site and catheter hub with the dressing; the hub tubing junction is not covered. Place a gauge pad folded and covered with tape under the hub- tubing junction to prevent the skin breakdown.
• Flushing the IV cannula: Regular flushing with 5 ml of sodium chloride 0.9% is sufficient, 2 ml before and 3 ml after administering the drug as shown in Fig. 8.7. Alternatively safer solutions include prefilled single use saline flush syringes. Close the cannula port.

![Flushing of I/V Cannula](image)

Fig. 8.7: Flushing of I/V Cannula

• **Care of the catheter after insertion**

  Document in patient records: date and time of cannulation and reason for cannulation, type of cannula used, date the cannula should be removed, your name and designation.

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<th>Remember:</th>
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<tr>
<td>• Solution for flushing should go in smoothly with little resistance</td>
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<td>• Stop immediately if</td>
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<tr>
<td>• You see signs of swelling around the site (phlebitis)</td>
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<tr>
<td>• Patient complains of pain</td>
</tr>
<tr>
<td>• If you fail in first attempt, Don’t panic! <em>(this is relatively common)</em></td>
</tr>
<tr>
<td>• Try again (Get some new equipment, Try another vein)</td>
</tr>
<tr>
<td>• If you fail again, REFERR the patient immediately to PHC/CHC/DH</td>
</tr>
</tbody>
</table>

### 8.6.6 Administration of IV Fluids in Emergency

**Purposes**

1) To administer medicines for immediate action  
2) To substitute and supplement fluid and nutrition  
3) To help in maintaining blood volume

**General instructions**

1) Use strict aseptic technique  
2) Do not permit air entry into the vein maintain strict intake output record  
3) Have complete apparatus that should be in proper working order  
4) Ensure there is no cloudiness, sediments, discolouration or leakage of the medication or IV fluid

**Material required**

• IV stand  
• Mackintosh with cover
• Bottle/ bag of IV solution to be infused
• Sterile IV infusion set
• All other articles as required for IV cannulation (Refer section on IV Cannulation)

**Technique**

1) Wash hands
2) Collect all articles and take to patient side
3) Explain the procedure and reassure patient
4) Carefully remove the IV administration set from its packing to avoid contamination
5) Connect the set to the bottle/bag by inserting the piercer with a twisting movement
6) Hang the bottle/bag safely from the IV stand and prime the set by releasing the air vent and opening the flow clamp
7) Expel all air by running the fluid through
8) Protect the other end of the tube with the plastic cap
9) Position patient and place mackintosh to protect the bed clothes
10) Establish IV access (if not already done) using cannulation as described above (Refer section on IV Cannulation) apply splint to the limb if necessary and make the patient comfortable
11) Record time, type of solution used and rate of flow etc.
12) Clean and replace all articles
13) Observe the general condition of the patient, watch for any reaction, swelling, pain, leaking or inflammation
14) Maintain the desired rate of flow and ensure that the bottle/bag does not empty completely
15) As the level of the fluid in the bottle/bag reaches the piercer tip, clamp the tube, remove the piercer and needle carefully so as not to contaminate it and insert in the next bottle (if required) and restart.

*(Note: If indicated, refer the patient to the PHC/CHC/ DH with the IV fluid infusion on, IV site well immobilised using a splint.)*

**To discontinue the IV infusion:**

1) Close the flow control clamp, remove the splint
2) Place a spirit swab on the site and withdraw the cannula from the vein, maintaining pressure while doing so
3) Press the site till the bleeding stops
4) Clean up; dispose of waste i.e. IV set and cannula etc. safely; wash your hands.

**Fluids**

• Choice of resuscitation fluid depends on the cause of the deficit. At the level of Health and Wellness centre (HWC), isotonic crystalloid solutions (eg,
0.9% saline or Ringer’s lactate [RL]) are typically given for intravascular repletion during shock and hypovolemia (both haemorrhagic and non haemorrhagic)

- Colloid solutions are generally not used. Patients with dehydration and adequate circulatory volume typically have a free water deficit, and hypotonic solutions (e.g., 5% D/W 0.45% saline) are used.

**Route and Rate of Fluid Administration**

- Standard, large (e.g., 14 - to 16 - gauge) peripheral IV catheters are adequate for most fluid resuscitation. (An IV infusion pump can be used where available).

- Patients in shock typically require and tolerate infusion at the maximum rate. Adults are given 1 l of crystalloid (eg, 0.9% saline or Ringer’s lactate [RL]), (20 ml/kg in children) or, in haemorrhagic shock, 5 to 10 ml/kg of colloid or packed RBCs, and the patient is reassessed. An exception is a patient with cardiogenic shock who typically does not require large volume infusion.

- Patients with intravascular volume depletion without shock can receive infusion at a controlled rate, typically 500 ml/h.

**a) Fluid calculation formula for adults**

Calculating Flow Rate in Drops per Minute

\[
\text{drops/ min} = \frac{\text{volume (ml)} \times \text{drop factor (drops/ml)}}{\text{time (min)}}
\]

\[
\text{drops/ min} = \frac{\text{amount of solution to be used (ml)} \times \text{no. of drops/ml}}{\text{No. of hours over which to be given} \times 60}
\]

**b) Fluid calculation formula for children**

**Body Weight Method**

1) Daily maintenance fluid requirement formula:

<table>
<thead>
<tr>
<th>Weight Range</th>
<th>Daily Maintenance Fluid Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10 kg</td>
<td>100 ml/kg/day ((100 \times \text{kg}))</td>
</tr>
<tr>
<td>11-20 kg</td>
<td>1000 ml (for first 10 kg) + 50 mL/kg/day for each additional kg between 10- 20 kg</td>
</tr>
<tr>
<td>over 20 kg</td>
<td>1500 ml (for first 20 kg) + 20 ml/kg/day for each additional kg over 20 kg</td>
</tr>
</tbody>
</table>

**Basic Intravenous Medication Safety**

Nursing responsibilities for the safe and effective administration of intravenous (IV) medications begin with the standards of practice common to all routes:

- Know and perform the six rights of medication administration – right patient, right drug, right dose, right route, right time, and right documentation.

- Assess that the medication prescribed is the correct medication.

- Check the medication at least three times against the medication administration record (MAR) prior to administration – as you remove the
drug from the storage area, as you prepare the drug, and at the patient’s bedside just before you administer the drug.

- Only administer medications that have been labelled appropriately.
- Perform accurate dosage calculations; and know the volume of the medication to administer, the characteristics and viscosity of the medication, and the location of anatomical structures underlying injection sites.
- Administer medications correctly, and closely monitor their effects.
- Select an injection site in relation to anatomical landmarks.
- Maintain stability of the needle and syringe unit.
- Aspirate the syringe before injecting an IM medication, the medication may accidentally be injected directly into an artery or vein.
- Use strict aseptic technique.
- Don’t inject a large amount into a site that is not appropriate.
- Educate Patient and family about adverse effects.
- Apply the nursing process to medication administration.

Remember:
That, once you have administered an IV medication, it enters the bloodstream immediately and begins to affect target tissues and organs. Be careful to avoid errors in dosage calculations, preparation, and administration.

8.7 HANDLING AND DISPOSAL OF INJECTION RELATED WASTE

(also refer Unit 1 of Block 2 on Universal Precautions and Bio-medical waste management)

Handling Injection Waste: Steps for handling injection waste after giving injection

1) Keep translucent puncture proof containers for collecting needle, syringe and broken glass ampoules within an arm’s reach at the place where injections are given. Keeping these containers out of reach leads to keeping infectious and dangerous sharps on places like the table where they are liable to cause injury.

2) Immediately after giving an injection, the syringe hub should be cut using the hub cutter. (Fig. 8.8) Avoid keeping the used syringe on the table/ tray. THE HUB SHOULD BE CUT AFTER EVERY SINGLE INJECTION.

3) The container attached to the hub cutter is to be emptied periodically (as explained later) into the white translucent puncture proof container.

4) Do not accumulate used syringes for hub cutting at one-go. Piled up used syringes with intact needles may be reused. This also exposes the health worker, clients and waste handlers to injury. Current guidelines recommend breaking the syringe hub Immediately after giving an injection at all locations (including in outreach immunisation sessions).
5) After cutting the hub, collect the syringe plungers in a blue or red plastic bag. The bag should not be filled more than 3/4th. Afterwards tie the bag and send for terminal disposal.

6) Likewise the translucent puncture proof container should not be filled more than 3/4th. It must be sealed and sent for terminal disposal.

7) As waste can’t be stored for more than 48 hours, even if the container/bag is not filled up to 3/4th, tie/seal/these and send for terminal disposal.

8) Used glass ampoules and broken multidose vials made of glass should be put in the sharps container.

9) The various categories of waste like paper, plastics, swabs and sharps should be put in separate color coded bags/containers as per BMW disposal guidelines of Central Pollution Control Board and Ministry of Health and Family Welfare.

![Fig. 8.8 : Hub Cutter](image)

### 8.8 LET US SUM UP

In unit you have studied about administering/prescribing designated drugs / medication and explaining side effects to the patients or their care providers; and how to Insert intravenous cannula, administer intramuscular injection and provide intravenous medication/fluids in emergency. The prescription/dispensing and administration of drugs is a specialised skill. The effectiveness of the prescribed drugs is influenced by your approach to the individual patient. It is important to follow the principles of drug prescription/dispensing and administration for avoiding errors and better outcome. It is equally important to listen to what the patient has to say and then also educate the patient.

This was the last unit of the block ‘General Skills and Laboratory Skills’. In the next block you will be learning about the ‘Skills for Management of Common Conditions and Emergencies’.

### 8.9 KEY WORDS

**Bio Medical Waste** : any waste which is generated during the diagnosis, treatment or immunisation of human beings or animals or in research activities pertaining thereto or in the production or testing of biological or any
solid waste or liquid, which may present a threat of infections to humans.

**Sharps**
- include needles, syringes, scalpel blades, glass etc. that may cause puncture and cuts. This includes both used and unused sharps, which should be treated.

**Venepuncture**
- the puncture of a vein as part of a medical procedure, typically to withdraw a blood sample or for an intravenous injection.

**BMW**: Bio Medical Waste
**CHC**: Community Health Centre
**DH**: District Hospital
**ID**: Intra Dermal
**IM**: Intra Muscular
**IV**: Intra Venous
**OPD**: Out Patient Department
**PHC**: Primary Health Centre
**SC**: Sub Cutaneous

### 8.10 ACTIVITY

1. On your visit to the health centre, a 30 year old male presents to you with severe dehydration, unable to tolerate oral fluids. He is conscious and having cold and clammy peripheries. You decide to refer this case to PHC after starting IV infusion. How will you proceed?

- **Guidelines**
  - Decide on the type and volume of IV fluid to be given.
    ........................................................................................................................................
    ........................................................................................................................................
  - Calculate the rate of flow of IV fluid.
    ........................................................................................................................................
    ........................................................................................................................................
  - Prepare the articles for IV Cannulation and IV infusion.
    ........................................................................................................................................
    ........................................................................................................................................
  - Perform IV cannulation and start the IV infusion.
    ........................................................................................................................................
- Dispose off the IV cannulation and IV infusion related waste safely.

- Refer the patient to the PHC

2) A case of pulmonary tuberculosis (Relapse) is due for Inj. Sterptomycin. Follow precautions before injecting dose to the patient.

- Ensure 7’ R
- Decide route of drug injection
- Prepare articles
- Plan health education pertaining to his condition
- Disposing Needle and Syringe after injection.
- Making patient comfortable before and after the procedure.

### 8.11 REFERENCES

1) https://www.crnbc.ca/Standards/PracticeStandards/Pages/dispensing.aspx

2) http://www.srmuniv.ac.in/sites/default/files/downloads/Prescription1.pdf

