UNIT 6 IMMUNISATION AND SAFE INJECTION PRACTICES

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6.0 INTRODUCTION

In the previous units you have learnt about the practical skills on resuscitation and assessment of Newborns, key aspects of Kangaroo Mother Care, Infant and Young Child Feeding and counselling and promoting and monitoring growth and development. With this background you are ready to move a step further and get acquainted with a common procedure that both sick and healthy children experience such as injection/ immunisations. It has been seen that there is unsafe use of injections and unsafe disposal of injection related waste materials. These unsafe injections increase the risk of infection/ abscess formation/ local reaction to the recipients and also pose a threat to the health care workers, community and environment. In order to address this major public health problem, it is important to improve injection practices and promote safe injection techniques, safe disposal of injection related waste, rational prescription of injections and generating awareness in the community regarding safe and rational use of injections

In this unit you will learn about the immunisation and injection safety issues need for injection safety, Safe practices and techniques of injections and immunisation. At the end focus will be on safe disposal of injection related waste as well as the safety of health care providers.
6.1 OBJECTIVES

After completing this unit, you should be able to:

- follow injection safety and safe injection practices;
- conduct an immunisation session using the correct administration techniques for each vaccine;
- recognise and correct unsafe injection and immunisation practices;
- take steps for the safety of the health care providers; and
- demonstrate safe disposal of injection/immunisation waste.

6.2 INJECTION SAFETY

Injection safety is a set of measures taken to perform injections in an optimally safe manner for patients, healthcare workers, bio medical waste handlers, professionals involved in handling waste outside the health facilities, rag pickers and general community to prevent transmission of infectious diseases and needle stick injuries.

6.2.1 Safe and Best Injection Practices

Injections are considered safe for patient, health worker and waste handlers in following situations:

- the patient/child, when health workers use sterile needles and syringes and appropriate injection techniques;
- the health worker, when he or she avoids needle-stick injuries; and
- Waste handlers and the community, when used injection equipment is disposed of properly and does not cause injuries or pollution.

Key components of safe injection practices: These include safe injection devices and medications and safe injection techniques including hand hygiene and aseptic technique. We shall discuss each one as given below:

Injection Devices and Medications

The types of devices/equipment used to administer injections/vaccines is given in Table 6.1 below.

Table 6.1: Types of equipment used to administer injections/ injectable vaccines

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto-disable (AD) syringes</td>
<td>equipment of choice</td>
</tr>
<tr>
<td>Prefilled AD injection devices only</td>
<td>available for some antigens</td>
</tr>
<tr>
<td>Reusable syringes and needles</td>
<td>not recommended</td>
</tr>
<tr>
<td>Hypodermic syringes with reuse prevention feature (RUP) and needles</td>
<td>for mixing purposes only</td>
</tr>
</tbody>
</table>
Health-care settings should ensure an adequate supply of single-use injection devices, to allow providers to use a new device for each procedure. It is also important to ensure availability of hub cutters and waste segregation bags.

Safe Injections Techniques

Steps in giving safe injection:
- Preparing to give injection
- Drawing up the medication
- Locating the injection site
- Preparing the skin
- Giving the injection
- Safe disposal of the syringe and needles (Refer Section 6.6)

Let us elaborate on each of above steps as given below:

Preparing to give injection
- Assemble the necessary equipment like syringe and needle, spirit/alcohol/boiled swab, medication/vaccine vial/ampoule, diluent, hub cutter and the bin to dispose the syringe.
- Wash hands it involves Preparation, washing, and rinsing and drying. Always use a running water source for hand washing. Refer Unit 4 of Block 2 Course (BNS-043) for technique of Hand washing.
- Wear gloves where ever possible/ available.

Drawing up the medication

Use safe technique in
- Cutting open a glass ampoule
- Drawing medication/vaccine with AD syringe
- Drawing medication from a vial with regular plastic syringe

Note: The Ministry of Health and Family Welfare, Government of India has already introduced Auto Disabled (AD)/ plastic syringes for the universal immunisation programme throughout the country in 2005.

Locating the injection site

- Locate the route through which injection/vaccine is to be given such as the intra-dermal (ID), intra-muscular (IM), subcutaneous (SC) routes. Intravenous route may be used for IV injections, IV infusion or drawing blood samples.

Remember:
Prevent accidental injury to adjoining structures like nerves and blood vessels. Access the site safely where the injection needs to be given (muscle, subcutaneous tissue or dermis).
Irrespective of the route of injection it is important to examine the local skin for any signs of any inflammation, swelling, infection or other skin lesions and avoiding such sites where these may be present.

Preparing the skin

- Before giving the injection, clean the site with spirit/alcohol/boiled swab, in a circular motion starting from the centre of the site towards its periphery.
- Allow 30 seconds for the spirit to dry for effective action.

Remember:
Spirit swabs should not be used for vaccines

Giving the injection

Proper techniques should be followed for delivery of injections as given below.

<table>
<thead>
<tr>
<th>Follow Seven Rights for Safe Injection delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Right medication</td>
</tr>
<tr>
<td>• Right dose</td>
</tr>
<tr>
<td>• Right patient/client and site</td>
</tr>
<tr>
<td>• Right time</td>
</tr>
<tr>
<td>• Right route of administration</td>
</tr>
<tr>
<td>• Right documentation</td>
</tr>
<tr>
<td>• Right disposal</td>
</tr>
</tbody>
</table>

Always use Aseptic Technique for injections: It refers to the manner of handling, preparing, and storing of medications and injection equipment/supplies (e.g., syringes, needles and IV tubing) so as to prevent microbial contamination.

Now let us turn our attention to best injection Practices.

**Best Injection Practices:**

The best practices for safe injections include following:

- Use sterile injection equipment preferably auto destructible one time use.
- Prevent contamination of injection equipment and medication.
- Prevent Needle Stick Injuries (NSIs) to the provider.
- Prevent access to used syringes and needles — Intentional and Downstream reuse Common errors in injection practice is shown in Fig. 6.1.
Other practice issues include:

- Use of Safety Engineered Medical Devices (SEMDs) — Reuse Prevention (RUP) syringes, safety syringes and safety needles Fig. 6.2.
- Maintaining Hand Hygiene all the times
- Ensuring skin integrity of the provider
- Using gloves, if indicated
- Swabbing vial tops or ampoules
- Adequate site preparation of patient
- Handle syringe and needle safely
- Assume all used equipment is contaminated: Cut the used syringe at the hub immediately after use.
- Practice safe disposal of all medical sharps waste: Used sharps (needles) must be collected in a hub cutter and then carried to the PHC for safe disposal.

Fig. 6.2: Parts of a syringe and needle
6.2.2 Safe Immunisation Practices

In this section focus will be on safe injection practices as given below.

Giving the right vaccine safely:

- Maintain the *cold chain* for all vaccines (You are advised to refer the Unit on Universal Immunisation Programme for recommended vaccine specific temperatures)
- Before administering a vaccine to an infant/ child, it is important to check which vaccines are due:
  - Verify the infant’s/ child’s age
  - Verify which vaccines the infant has received

*Remember:*
If any of these parts are touched, discard the needle and syringe and get new sterile ones.
- Verify all vaccines the infant needs at this session to allow efficient preparation.
- Use appropriate techniques for reconstitution and administration of the vaccines.
- DO NOT use a vaccine that has expired.
- Position the children receiving immunisation in a secure position before administering the injection to prevent needle stick injury to the child or the vaccinator.
- Remove all empty/discharged vials, all used lancets/swabs/gauze pieces/syringes and needles from the immunisation site before leaving. These items are potentially infectious and can cause physical injury to members of the community.
- Reconstitute the vaccine only with the diluent provided with the vaccine.
- Utilise a disposable needle and a syringe of the size recommended for each type of vaccine and for each vaccination.
- Discard used vaccine at the time recommended.
- Plan the disposal of the injectable material so that it is risk-free.
- DO NOT store drugs and other substances in the UIP refrigerator; it is to be used exclusively for vaccines.
- Specify the contraindications to the administration of the vaccine and the precautions that should be taken by the personnel in charge immunisation session.
- Train and supervise workers appropriately so that they observe safe injection/immunisation practices.

**Remember:**
Always keep an Emergency kit ready for use at the injection/immunisation centre for use in case of emergency (like anaphylaxis) following injection. The kit should be checked AT LEAST once a month for availability and expiry of medicines.

### 6.2.3 Routes of Safe Administration of Vaccines

- **Intra-dermal injection (BCG)**
  - An Intra-dermal injection is given directly into the dermis (skin) layer. Carry out the following steps when giving an intra-dermal injection:
  - Position the baby, and load the reconstituted BCG vaccine 0.05 ml for infants under one month and 0.1ml for infants older than one month.
  - Position your left hand under the child’s left arm and gently pull the skin under the arm to stretch the skin at the injection site.
  - Hold the syringe in your right hand with the bevelled edge of the needle pointing up.
  - Insert the tip of the needle into skin—just the bevel and a little bit more at 150 angle.
  - Do not push too far, and do not point downward (**This way, the needle will go under the skin and will make the injection subcutaneous, instead of Intradermal**)
- Put your left thumb over the needle-end of the syringe (not on the needle itself) to hold it in position.
- Hold the plunger end of the syringe between the index and middle fingers of your right hand and press the plunger in with your right thumb. When an intradermal injection is given correctly the plunger is hard to push.

![Image](Fig. 6.4: Intra-dermal injection) ![Image](Fig. 6.5: Intra-dermal needle position)

- Inject vaccine (0.05/0.1 ml as required) and withdraw the needle.
- Cut the hub of syringe with the hub cutter and put plastic portion of the syringe into the red bag.
- If you have injected BCG correctly, a flat-topped swelling appears on the skin. The swelling may look pale with very small pits (like an orange peel).
- After 2–3 weeks of a correct injection, a papule develops which increases slowly in size up to 5 weeks (4–8 mm). It then subsides and breaks into a shallow ulcer. Healing occurs spontaneously within 6–12 weeks, leaving a permanent tiny round scar, 4–8 mm in diameter.
- This is a normal reaction. When the technique is incorrect (the vaccine will go in easily and no swelling will be visible).
  - If the whole dose has been delivered under the skin, consider the child vaccinated.
  - Do not repeat the injection.
  - If the whole dose has not been administered, reposition the needle and give the remaining dose.
  - Follow-up for side effects such as abscess and enlargement of the glands.

**Intra-muscular injection (DPT, TT and Hepatitis B) Fig. 6.6 and Fig. 6.7**

- Carry out the following steps when giving an intra-muscular injection:
  - Check the VVM on the vaccine vial.
  - Position the child on the mother’s lap.
  - Load the vaccine into a 0.5 ml AD syringe.
- Throw the AD syringe wrapper and plastic cap in the black bag.
  - If necessary, expel excess air from the syringe by tapping the syringe.
  - Make sure you have exactly 0.5 ml of vaccine in the syringe (no more, no less).
Put the finger and thumb of your left hand on either side of the injection site.

Stretch the skin flat between finger and thumb.

Hold the syringe like a pen in the right hand and push the needle straight down at 90° (as it will traumatisé fewer muscle fibres) through the skin between finger and thumb. Penetrate deep into the muscle, but not all the way to the bone.

- Do not massage the injection site after vaccination
  - Press the top of the plunger with the thumb to inject the vaccine.
  - Withdraw the needle and press the site of injection with a dry cotton swab.
  - Cut the hub of syringe with the hub cutter and put the plastic part of the syringe into the red bag.

**Caution:** Infants should never be given injections in the buttock as evidence indicates that there is risk of damaging the nerves in the area. The vaccine will also be less effective if injected deep into fatty tissues.

**Subcutaneous injection (Measles and JE)**

- A subcutaneous injection is one that is given into the thin layer of tissue between the dermis (skin) and the muscle Fig. 6.10. The injection should be given in the right arm on the deltoid site of the skin.
- Carry out the following steps when giving a subcutaneous injection:
  - Make sure the reconstituted vaccine has not expired. (To be used with in four hours of reconstitution)
  - Position the child on the mother’s lap.
  - Load the vaccine into a 0.5 ml AD syringe (put the AD syringe wrapper and plastic cap in the black bag)
  - If necessary, expel excess air from the syringe by tapping the syringe.
  - Make sure you have exactly 0.5 ml vaccine in the syringe (no more, no less).
  - Pinch the skin of the right upper arm through the left index finger and thumb.
  - Push the needle in a slanting position at 45° angle into the pinched-up skin. Do not push the needle too far. Fig. 6.8
Fig. 6.8: Sub-cutaneous injection, Sub-cutaneous needle position

- Press the plunger with your thumb to inject the vaccine.
- Withdraw the needle and press the site of injection with a dry cotton swab.
- Cut the hub of syringe with the Hub cutter and put the plastic part of the syringe into the red bag.
- Oral administration (OPV)
- The Oral Polio Vaccine (OPV) comes in a glass/plastic vial with a sterile dropper. The vaccine is given orally; two drops in the child’s mouth as shown in Fig. 6.9.
- Check VVM on the vial before use.
- Remove the metal or rubber cap on the vaccine vial.
- Fit the dropper on the vial.
- Put two drops directly in the mouth of the child. Take care that the dropper does not touch the mouth.
- Make sure the child swallows the vaccine. If it is spit out, give another dose.

Fig. 6.9: OPV Administration

Remember:

Contraindications to immunisation

1) Anaphylaxis or a severe allergic reaction is an absolute contraindication to subsequent doses of a vaccine. Persons with a known allergy to a vaccine component should not be vaccinated.

2) Any serious AEFI reported during previous vaccination to the child with the same vaccine is also a contraindication. e.g. convulsion and encephalitis with a previous dose of DPT.

3) High fever.
6.2.4 Unsafe Injection/ Practices and Outcome

Unsafe injection is any such practice which cause harm to patients, providers or the community The unsafe injection Practices are given in Table 6.2 and incorrect Injection practices and possible adverse events is given in Table 6.3.

**Table 6.2: Unsafe Injection practices.**

<table>
<thead>
<tr>
<th>Reuse:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Using the same syringe or needle to administer medication to more than one patient</td>
</tr>
<tr>
<td>2. Using cannula’s with a needle that has already been used for a patient</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unhygienic practices:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Not washing hands, not wearing gloves by provider</td>
</tr>
<tr>
<td>2. Not cleaning the injection sites</td>
</tr>
<tr>
<td>3. Touching the needles with hands or with any objects before and after injections</td>
</tr>
<tr>
<td>4. Flushing the syringes or needles before injections</td>
</tr>
<tr>
<td>5. Administering injections over clothes</td>
</tr>
<tr>
<td>6. Leaving the needles in a multi dose vial</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wrong techniques:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Wrong selection of injection sites</td>
</tr>
<tr>
<td>2. Using medications without checking labels or expiry dates</td>
</tr>
<tr>
<td>3. Using medicines packed as single-dose or single-use for more than once</td>
</tr>
<tr>
<td>4. Recapping the syringes after injections</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Waste management mechanism:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Not segregating the injection related waste at source</td>
</tr>
<tr>
<td>2. Not cutting hub (needles and plungers) after every injections</td>
</tr>
<tr>
<td>3. No sharp containers for needle storage</td>
</tr>
<tr>
<td>4. No adequate storage sites</td>
</tr>
<tr>
<td>5. No terminal disposal mechanism</td>
</tr>
</tbody>
</table>

Now let us look at incorrect injection practices as given in following Table 6.3.

**Table 6.3: Some incorrect immunisation practices and adverse events**

<table>
<thead>
<tr>
<th>Incorrect Practices</th>
<th>Possible Adverse Events Following Immunisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-sterile injection due to:</td>
<td>Infections such as local abscess at injection site, sepsis, toxic shock syndrome, or death</td>
</tr>
<tr>
<td>• reuse of disposable syringe or needle</td>
<td>Transmission of blood borne infections such as hepatitis or HIV</td>
</tr>
<tr>
<td>• improperly sterilised syringe or needle</td>
<td></td>
</tr>
<tr>
<td>contaminated vaccine or diluent</td>
<td></td>
</tr>
<tr>
<td>Incorrect Practices</td>
<td>Possible Adverse Events Following Immunisation</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Reconstitution error due to:</td>
<td>Local abscess at injection site</td>
</tr>
<tr>
<td>• inadequate mixing of vaccine</td>
<td>Vaccine ineffective</td>
</tr>
<tr>
<td>• reconstitution with incorrect diluent</td>
<td>Negative effect of drug (for example, insulin, oxytocin, muscle relaxants)</td>
</tr>
<tr>
<td>• drug substituted for vaccine or diluent</td>
<td>Death</td>
</tr>
<tr>
<td>• inappropriate reuse of reconstituted vaccine at subsequent session</td>
<td></td>
</tr>
<tr>
<td>Injection at incorrect site such as:</td>
<td>Local reaction or abscess</td>
</tr>
<tr>
<td>• BCG given subcutaneously</td>
<td>Sciatic nerve damage</td>
</tr>
<tr>
<td>• DPT/DT/TT too superficial injection into buttocks</td>
<td></td>
</tr>
<tr>
<td>Vaccine transportation/storage incorrect such as:</td>
<td>Local reaction</td>
</tr>
<tr>
<td>• VVM(Vaccine Vial Monitor) changed colour</td>
<td>Vaccine ineffective</td>
</tr>
<tr>
<td>• clumping of adsorbed vaccine</td>
<td></td>
</tr>
<tr>
<td>Contraindications ignored</td>
<td>Avoidable severe reaction</td>
</tr>
</tbody>
</table>

*Strictly speaking, ineffective vaccine is considered to be an effect, not an adverse event

**Outcome of Unsafe Injection/Immunisation Practices?**

Outcomes of unsafe injections could be grouped as:

- **Short term** - Abscess formation, skin rashes, irritation, pain, disabilities
- **Long term** - HBV, HCV and HIV infections.

**Check Your Progress 1**

List any two incorrect immunisation practices and their possible adverse events.

<table>
<thead>
<tr>
<th>Incorrect Practice</th>
<th>Possible Adverse Event</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**6.3 IMMUNISATION SESSION**

Before beginning your immunisation session, and before giving each vaccine, you should take the following steps to ensure that every dose that you are going to give is safe and effective.

**Check label:** Make sure the label on the vaccine vial is attached and clear enough to read. If the label is not clear enough to read or has come off, discard the vial.
**Check vaccine and diluent:** Check that the vaccine and diluent being given are the correct one.

**Check expiry:** Look for the expiry date on the vial. If the expiry date has passed, do not use the vial; **Discard it.**

**Check the vaccine vial monitor (VVM)** on vaccine vials to make sure that the vaccine is in the usable stage.

**Shake the T-series and HepB vials** to rule-out freezing or floccules.

**Note down the batch number** of each vaccine vial and diluent.

**Mild fever, diarrhoea, and cough are not contraindications for immunisation.**

**Steps in conducting the immunisation session**

You should follow the steps given below while conducting an immunisation session:

- Welcome the beneficiaries.
- Verify beneficiaries’ record and age and check that the beneficiary is due for vaccination today.
- Screen for contraindications.
- Explain what vaccine(s) will be given and the disease it prevents.
- Check the vial label for VVM.
- Check vial expiry date on the label.
- **Wash hands** before reconstituting vaccine and conducting the session.
- For T series vaccines lightly shake the vials before withdrawing the dose.
- Use only the diluent supplied with the vaccine as it is specifically designed by the manufacturer for the needs of that vaccine, with respect to volume, PH level and chemical properties.
- Write the time of reconstitution on the vial (BCG, Measles).
- **Check the label of the vial for VVM and the expiry date before drawing the dose**
- Maintain aseptic technique throughout.
- Position the child correctly. (Fig. 6.10)

![Fig. 6.10: Correct positioning of child](image-url)
- The correct positioning of a child for immunisation is to ask the mother (or caregiver) to sit with the baby on her lap with one arm around the back of the baby, holding the baby’s hand and leg steady. The baby’s other arm should wrap around the mother’s side.

- Clean the injection site if dirty with clean water swab.

- Inject the vaccine at the correct site and follow the correct route of administration of the vaccine e.g. Intradermal; subcutaneous; intramuscular. (Fig. 6.11).

![Diagram of injection sites](image)

**Fig. 6.11 : Various Needle Positions**

Always give vaccines through the correct route and at the correct site.

**Inject the vaccine using steady pressure.**

- Withdraw the needle at the angle of insertion.

- *Do not massage the injection site after giving the injection.*

- Cut the hub of the syringe with the hub cutter. Collect cut needles in the hub cutter and place the cut syringes in the red bag.

- Explain potential minor side-effects/problems that may occur due to the vaccine and how to deal with them.

- Remind parents about the next visit and ask them to bring the card on next visit.

- Ask beneficiaries to wait for half an hour after vaccination to observe for any AEFI.
• Fully document each immunisation in the immunisation card, counterfoil, tally sheet and immunisation register.

• Retain the counter foil in the tracking bag.

• Ensure disinfection of the needles and syringes followed by their disposal as per guidelines.

• Leave the list of children vaccinated in a session with the AWW/ASHA and request them to be alert and report AEFIs. Share contact details of self and PHC.

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**Reconstituting vaccines**

BCG and measles vaccines are freeze-dried (dry powder) and must be reconstituted with diluents before use. Keep the diluents in the ILR for atleast 24 hours before use to ensure that vaccines and diluents are at the same temperature (+20 to + 80°C) at the time of reconstitution. Otherwise it can lead to thermal shock i.e. the death of some or all the essential live organisms in the vaccine. Keep diluents with vaccines in plastic zipper bag in the vaccine carrier during transportation.

Diluents for BCG are normal saline. Diluents for measles are pyrogen-free, double-distilled water. Diluents for JE are phosphate buffer solution.

When reconstituting vaccines, carry out following steps carefully:

• Double check that you have chosen the correct diluent, which has been supplied by the manufacturer for the specific freeze-dried vaccine, you are going to mix.

• Check expiry date on the label and VVM on the cap of vaccine vial. This VVM indicates whether the dry vaccine is usable or not. **Once reconstituted, VVM is of no use as the vaccine has to be used with in 4 hours (2 hrs for JE).**

• Reconstitute the vaccine even when only one eligible child is present.

• Use a new 5 ml disposable syringe for each reconstitution. Do not use it for injecting.

• Open the vaccine vial and open an ampoule of diluent.

• Draw the entire quantity of the diluent into the mixing syringe.

• Insert the reconstitution needle into the vaccine vial, inject the diluent from the syringe into the vial and remove the needle.

• Cut the mixing syringe at the hub with the hub cutter.

• To mix the vaccine and diluent, shake the vial gently by holding at the neck.

• Write the time of reconstitution on the vial label.

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**Use the reconstituted vaccine, within four hours of reconstitution. At the end of four hours, discard the vaccine and reconstitute a new one if required.**
6.4 SAFETY FOR HEALTH CARE PROVIDERS

Effective measures to prevent infections from occupational exposure of healthcare workers to blood includes following:

- **Rational use of injections**: Substitute injections by administering, medications through another route such as tablet, inhaler etc. where ever possible.

- **Immunisation against HBV**: for every health care worker (even for contractual workers and staff engaged in any type of health care plan).

- **Implementing Universal Precautions**: Bio safety measures for medical waste disposal should be strictly followed at the point of waste generation. Use of Post Exposure Prophylaxis (PEP) by healthcare worker should be encouraged, following the NACO guidelines.

- Eliminating needle recapping:
  - Disposing of the sharp into a sharps container immediately after use
  - Use of safer devices such as needles i.e. safety needles and cannulas
  - Provision and use of personal protective equipment, and
  - Training of workers regarding the risks and prevention of transmission of infections.

**What to do if there is exposure to blood and body fluid during injection procedure?**

First Aid management of the Exposure to Blood and Body Fluid during Injection Procedure (Post Exposure Prophylaxis, PEP):

<table>
<thead>
<tr>
<th>Injury or Exposure</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needle-stick or other sharps injury</td>
<td>Immediately wash the affected area with soap and water</td>
</tr>
<tr>
<td></td>
<td>Allow injury to bleed freely and report immediately to higher authority.</td>
</tr>
<tr>
<td></td>
<td>Report to the higher authority where PEP is available DO NOT suck blood</td>
</tr>
<tr>
<td></td>
<td>from the site</td>
</tr>
<tr>
<td>Splash of blood and/or body fluids on non-intact</td>
<td>Splash of blood and/or body fluids on non-intact skin</td>
</tr>
<tr>
<td>skin</td>
<td>DO NOT use disinfectant on skin</td>
</tr>
<tr>
<td></td>
<td>DO NOT scrub or rub the area</td>
</tr>
<tr>
<td></td>
<td>DO NOT squeeze or press the area</td>
</tr>
<tr>
<td>Splash of blood or body fluids to eyes</td>
<td>Flush the area gently but thoroughly with running water or saline for</td>
</tr>
<tr>
<td></td>
<td>atleast 15 minutes while the eyes are open. Keep eyelid gently inverted</td>
</tr>
<tr>
<td>Splash of blood skin</td>
<td>Immediately wash the affected area with soap and water DO NOT rub the</td>
</tr>
<tr>
<td></td>
<td>area</td>
</tr>
</tbody>
</table>
6.5 HANDLING AND DISPOSAL OF INJECTION RELATED WASTE

You have learnt in detail about collection, segregation, transportation and management of Bio-Medical waste in Unit 6 of Theory Courses (BNS-041) i.e. Foundations of Community Health and also in Unit 1 of Block 2 under Practical Course III. (BNS-043) (Public Health and Primary Health Care Skills).

Here focus will be on handling and disposal of injection related waste.

6.5.1 Types of Sharp Waste and Its Segregation

As per the BMW Rules, sharp wastes are classified in category 4 and include needles, syringes, scalpel blades, glass etc. that may cause puncture and cuts. This includes both used and unused sharps. Disposal of immunisation waste is strictly as per Central Pollution Control Board (CPCB) guidelines for biomedical waste disposal.

6.6.2 Guidelines for Waste Disposal

Steps of waste disposal are given below.

**Step 1** Cut the AD syringe at the hub immediately after administering the injection at the session site using the Hub cutter that cuts plastic hub of syringe and not the metal part of needle. (Fig 6.12)

**Step 2** The cut needles will get collected in the puncture proof translucent container of the hub cutter.

**Step 3** Store broken ampoules / vials in a separate white translucent sturdy and puncture proof container or in the same hub cutter in case its capacity is able to accommodate broken vials also.

**Step 4** Segregate and store the plastic portion of the cut syringes and unbroken (but discarded) vials in the red bag or container.

**Step 5** Send the red bag and the hub cutter to PHC for disinfection and disposal by designated person at the PHC. Dispose off the black bag as general waste.

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**Check Your Progress 2**

i) List the measures needed for the safety of the health care providers.

ii) What will you do if there is needle-stick injury?
Step 6 Treat the collected material in an autoclave. If autoclaving is not possible, boil the waste in water for atleast 10 minutes or provide chemical treatment (using atleast 1% solution of freshly prepared sodium hypochlorite for 30 minutes). Ensure that these treatments result in disinfection. However, District Hospital/CHC/PHC etc. will ultimately make the necessary arrangements to autoclave on a regular basis.

Step 7 Dispose the autoclaved / disinfected waste as follows:
- Dispose the needles and broken vials in a safety pit/tank
- Send the syringes for recycling and unbroken vials for landfill.

Step 8 Wash the hub cutters properly for re-use.

Step 9 Make a proper record of generation, treatment and disposal of waste at the PHC.

Fig. 6.12 : Disposal of needle

6.5.3 Steps to Prevent Needle Stick Injury
- Do Not recap needles using both hands
- Do Not bend/ break the needles
- Do Not manually remove needle from the syringe

6.6 DO’S AND DON’TS IN INJECTION

Let us look at Do’s and Don’ts in following box

<table>
<thead>
<tr>
<th>Do’s</th>
<th>Don’ts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintain hand hygiene (use Soap and water or alcohol rub)</td>
<td>Don’t forget to clean your hands.</td>
</tr>
<tr>
<td>Use alcohol swab to clean the site for injection and plain sterile</td>
<td>Don’t pre soak cotton wool in a container.</td>
</tr>
<tr>
<td>swab for vaccinations</td>
<td>Don’t re use a syringe, needle or lancet for more than one patient.</td>
</tr>
<tr>
<td>Use a single-use device for blood sampling and drawing</td>
<td>Don’t use a single loaded syringe to administer medication to several</td>
</tr>
<tr>
<td>Do disinfect the skin at the vein puncture site</td>
<td>patients.</td>
</tr>
<tr>
<td>After giving injection, if using Re use prevention syringe, break</td>
<td>Don’t touch the puncture site after disinfecting it.</td>
</tr>
<tr>
<td>the plunger of syringe and needle through hub cutter</td>
<td>Don’t change the needle in order to reuse the syringe.</td>
</tr>
<tr>
<td></td>
<td>Don’t use the same mixing syringe to reconstitute several vials.</td>
</tr>
<tr>
<td><strong>Do’s</strong></td>
<td><strong>Don’ts</strong></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Where recapping of a needle is unavoidable, DO use the one-hand scoop technique</td>
<td>Don’t recap a needle using both hands.</td>
</tr>
<tr>
<td>Seal the sharps container with a tamper-proof lid</td>
<td>Don’t leave an unprotected needle lying outside anywhere.</td>
</tr>
<tr>
<td>Ensure One needle, One syringe and One patient</td>
<td>Don’t overfill or decant a sharps container.</td>
</tr>
<tr>
<td>Take post exposure prophylaxis, in case of needle stick Injuries and Blood &amp; Body Fluid splash</td>
<td>Don’t delay PEP for HIV beyond 72 hours, then PEP for HIV is NOT effective.</td>
</tr>
<tr>
<td>Do report to higher authority as per PEP</td>
<td>Don’t suck blood from the site of needle prick and don’t squeeze out the blood.</td>
</tr>
</tbody>
</table>

### Check Your Progress 3

List the steps required to prevent needle stick injury.

-----------------------------------------------------------------------------------
|                                                                                   |
-----------------------------------------------------------------------------------

### ABREVIATION

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD</td>
<td>Auto Disposable</td>
</tr>
<tr>
<td>BMW</td>
<td>Bio Medical Waste</td>
</tr>
<tr>
<td>CVC</td>
<td>Central Venous Catheter</td>
</tr>
<tr>
<td>DPT</td>
<td>Diphtheria Pertussis Tetanus vaccine</td>
</tr>
<tr>
<td>HBV</td>
<td>Hepatitis B Virus</td>
</tr>
<tr>
<td>HCV</td>
<td>Hepatitis C Virus</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>ID</td>
<td>Intradermal</td>
</tr>
<tr>
<td>IM</td>
<td>Intramuscular</td>
</tr>
<tr>
<td>IV</td>
<td>Intravenous</td>
</tr>
<tr>
<td>NACO</td>
<td>National Aids Control Organization</td>
</tr>
<tr>
<td>NSI</td>
<td>Needle Stick Injuries</td>
</tr>
<tr>
<td>OPD</td>
<td>Out Patient Department</td>
</tr>
<tr>
<td>PEP</td>
<td>Post Exposure Prophylaxis</td>
</tr>
<tr>
<td>RUP</td>
<td>Reuse Prevention</td>
</tr>
<tr>
<td>SC</td>
<td>Subcutaneous</td>
</tr>
<tr>
<td>SEMD</td>
<td>Safety Engineered Medical Devices</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
6.7 LET US SUM UP

Most children receive injection/s at some time or the other. While some of these injections are justified and actually needed, on many occasions these are used irrationally and are avoidable. A safe injection does not harm the recipient, does not expose the provider to any avoidable risk and does not result in any waste that is dangerous for the community. Use of aseptic techniques in preparing, drawing and administering the medication/vaccines is critical in preventing related harmful effects including blood borne diseases. In this unit, you learnt that by using injections judiciously, following appropriate steps for giving injections, and by safe disposal of injection related waste, a large number of complications and deaths can be averted.

In the next unit you will be learning about the ‘Use of Equipment (Suction Machine, Oxygen Administration Device, Ambo-Bag, Radiant Warner, Phototherapy Unit etc)’.

6.8 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.

Downstream reuse : Picking up used needles and/or syringes at the point of disposal for repackaging and recirculation in the market.

Needle stick injury : A penetrating stab wound caused by a needle. It can cause the transmission of blood-borne pathogens.

Reuse : Using an object or material again either for its original purpose or for a similar purpose without significantly altering the physical form of the object or material

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.

6.9 MODEL ANSWERS

Check Your Progress 1

What is safe injection?

Injections are considered safe for:

- the patient/child, when health workers use sterile needles and syringes and appropriate injection techniques;
- the health worker, when he or she avoids needle-stick injuries; and
- waste handlers and the community, when used injection equipment is disposed of properly and does not cause injuries or pollution.

“Safe Injection practices should not be sacrificed in efforts to save time or money.”
Check Your Progress 2

A combination of factors makes injections unsafe, such as:
- Reuse of disposable injection devices (needle and syringe)
- Use of injection devices (needle and syringe) without adequate sterilisation
- In-appropriate, unhygienic practices and improper technique of giving injections
- Improper management of injection related waste like not segregating the waste at source

Check Your Progress 3

Following are the two examples of incorrect immunisation practices and their possible adverse events.

<table>
<thead>
<tr>
<th>Incorrect Practices</th>
<th>Possible Adverse Events Following Immunisation</th>
</tr>
</thead>
</table>
| 1. Non-sterile injection due to:  
  • reuse of disposable syringe or needle  
  • improperly sterilised syringe or needle contaminated vaccine or diluent |  
  • Infections such as local abscess at injection site, sepsis, toxic shock syndrome, or death  
  • Transmission of blood borne infections such as hepatitis or HIV |
| 2. Reconstitution error due to:  
  • inadequate mixing of vaccine  
  • reconstitution with incorrect diluent  
  • drug substituted for vaccine or diluent  
  • inappropriate reuse of reconstituted vaccine at subsequent session |  
  • Local abscess at injection site  
  • Vaccine ineffective  
  • Negative effect of drug (for example, insulin, oxytocin, muscle relaxants  
  • Death |

Other incorrect practices possible, such as Injection at incorrect site or incorrect storage/transportation of vaccines with consequent adverse events.

Check Your Progress 4

The measures needed for the safety of the health care providers are:
- Rational use of injections
- Immunisation against HBV
- Implementing Universal Precautions
- Eliminating needle recapping

Check Your Progress 5

In case of a needle-stick injury, I will
- Immediately wash the affected area with soap and water
- Allow injury to bleed freely and report immediately to higher authority. Report to the higher authority where PEP is available
- NOT suck blood from the site
Check Your Progress 6

The steps required to prevent needle stick injury:

- Do Not recap needles using both hands
- Do Not bend/ break the needles
- Do Not manually remove needle from the syringe

6.10 ACTIVITY

- Visit the OPD and perform immunisation safely
- Guidelines
  - Select safe and potent vaccines ............................................................
  - Consider contraindications to immunisation ........................................
  - Follow correct steps in conducting the immunisation session
    - Verify beneficiaary’s due vaccination/s ..............................................
    - Screen for contraindications ..............................................................
    - Check for vaccine safety: .................................................................
    - Reconstitute vaccine correctly: ...........................................................
    - Maintain aseptic technique .................................................................
    - Give the vaccine and document ...........................................................
    - Dispose immunisation related waste .................................................
    - Monitor .............................................................................................

6.11 REFERENCES


10. Universal Immunization Program (2013) http://www.mohfw.nic.in