

# UNIT-5

## Safe injections and Waste Disposal

## Learning objectives

- *Describe the importance of safe injections and ways to improve injection safety*
- *List steps to achieve safe injections and safe disposal of immunization waste according to existing GoI guidelines.*

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# Safe injections and waste disposal

## 5

### Safe injections

A safe injection is one that:

- does not harm the recipient
- does not expose the HWs to any avoidable risks
- does not result in waste, which is dangerous for the community.

The most common, serious infections transmitted by unsafe injections are Hep B, Hep C, and HIV. Poorly administered injections can also cause injuries or drug toxicity when the wrong injection site, vaccine, diluent, or dose is used. It is important to prevent the risks of accidental needle-stick injury, and it is also necessary to dispose of used syringes and needles safely to prevent risks to the community at large.

Impacts of unsafe injections are illustrated in Fig. 5.1.

**Fig. 5.1. Impacts of unsafe injections**



The provision of AD syringes by the GoI and the implementation of the Central Pollution Control Board (CPCB) waste management guidelines improves injection safety in the immunization programme.

## Simple ways to improve injection safety

### Keep hands clean before giving injections

- o Wash or disinfect hands prior to preparing injection material.
- o Cover any small cuts on the service provider's skin.
- o Avoid giving injections if the skin at the site of injection is compromised by any local infection such as a skin lesion, cut, or weeping dermatitis.



### Use sterile injection equipment, every time

- o Always use AD syringes for each injection and a new disposable syringe to reconstitute each vial of BCG, measles/MR and JE.



### Prevent the contamination of vaccine and injection equipment

- o Prepare each injection in a designated clean area where contamination from blood or body fluid is unlikely.
- o If the injection site is dirty, clean it with clean swab.
- o Always pierce the rubber cap (septum) of the vial with a sterile needle.
- o Do not touch the needle or rubber cap (septum) of a vial with your finger.
- o Follow product-specific recommendations for use, storage and handling of a vaccine.
- o Discard any needle that has touched any non-sterile surface.



### Assume all used equipment is contaminated

- o Cut the used syringe with the hub cutter immediately after use.

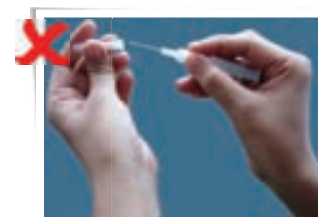
### Practice safe disposal of all medical sharps waste

- o Used sharps (needles) must be collected in a hub cutter and then carried to the PHC for safe disposal.






### Prevent needle-stick injuries


- o Do not re-cap or bend needles.
- o Anticipate sudden movement of the child.
- o Collect sharps in a puncture-proof container (hub cutter).



## Correct use of AD syringes (Fig 5.2)

Fig. 5.2. Correct use of AD syringes

|  |   |
|--|---|
|   | <ol style="list-style-type: none"> <li>1. Select the correct syringe for the vaccine to be administered – 0.1ml for BCG, fIPV and 0.5ml for all others.</li> <li>2. Check the packaging. Don't use if the package is damaged, opened, or expired.</li> <li>3. Peel open or tear the package from the plunger side and remove the syringe by holding the barrel. Discard the packaging into a <b>black</b> plastic bag.</li> </ol>   |
|   | <ol style="list-style-type: none"> <li>4. Remove the needle cover/cap and discard it into the black plastic bag.</li> <li>5. Do not move the plunger until you are ready to fill the syringe with the vaccine and do not inject air into the vial as this will lock the syringe.</li> </ol>   |
|  | <ol style="list-style-type: none"> <li>6. Take the appropriate vaccine vial, invert the vial, and insert the needle into the vial through the septum. Insert the needle such that the tip is within the level of the vaccine. If inserted beyond that, you may draw an air bubble which is very difficult to expel.</li> <li>7. <b>Do not touch the needle or the rubber cap (septum) of the vial.</b></li> <li>8. Pull the plunger back slowly to fill the syringe. The plunger will automatically stop when the necessary dose of the vaccine has been drawn (0.1 ml or 0.5 ml).</li> <li>9. <b>Do not draw air into the syringe.</b> In case air accidentally enters the syringe, remove the needle from the vial. Holding the syringe upright, tap the barrel to bring the bubbles towards the tip of syringe. Then carefully push the plunger to the dose mark (0.5 or 0.1 ml) thus expelling the air bubble.</li> <li>10. Clean the injection site (if dirty) with a clean swab.</li> </ol> |

|   |  |
|---|--|
|  | <p><b>11. Administer the vaccine, as follows:</b></p> <ul style="list-style-type: none"> <li>• <b>BCG:</b> upper arm <b>LEFT</b></li> <li>• <b>DPT and Hep B:</b> Anterolateral aspect (outer side) of mid-thigh <b>LEFT</b></li> <li>• <b>Pentavalent:</b> Anterolateral aspect of mid-thigh <b>LEFT</b></li> <li>• <b>fractional IPV:</b> Upper arm <b>RIGHT</b></li> <li>• <b>PCV:</b> Anterolateral aspect of mid-thigh <b>RIGHT</b></li> <li>• <b>MR:</b> Upper arm <b>RIGHT</b></li> <li>• <b>TT:</b> Upper arm <b>RIGHT</b></li> <li>• <b>JE:</b> upper arm <b>LEFT.</b></li> </ul> |
|   | <p>12. Push the plunger completely to deliver the dose. <b>Do not rub the injection site after vaccine is given.</b></p>   |
|   | <p>13. <b>Do not re-cap the needle.</b> Cut the hub of the syringe immediately after use with hubcutter that collects the sharps in its puncture proof container.</p>  |
|   | <p>14. Then collect the plastic portion of the cut syringes in a red plastic bag.</p>  |
|   | <p>Follow the guidelines for waste disposal as given in next section.</p>  |

### Steps to ensure safe disposal of immunization waste

The CPCB outlines guidelines for disposal of biomedical waste generated during immunization under the UIP. The concerned CMO/DHO or the officer responsible for implementation of UIP in the respective area, as decided by the MoHFW, will obtain authorization from the “Prescribed authority” notified under the Biomedical Waste (Management & Handling) Rules for generating, collecting, receiving, storing, transporting, treating, disposing and/or handling biomedical waste in any other manner.

Biohazard and cytotoxic symbols are given in Fig. 5.3.

**Fig. 5.3. Biohazard and cytotoxic symbols**



## Disposal of biomedical waste generated at outreach points/PHCs/CHCs/district hospitals, etc. (refer Fig. 5.6)

**Step 1:** At the session site, ANMs to cut the needle of the AD syringe immediately after administering the injection using the hub cutter that cuts the plastic hub of the syringe and not the metal part of needle. The cut needles will get collected in the puncture-proof container of the hubcutter (Fig. 5.4).

**Step 2:** Store the broken vials in a separate white sturdy and puncture proof container or in the same hubcutter, in case its capacity is also able to accommodate broken vials.

**Step 3:** Segregate and store the plastic portion of the cut syringes and unbroken (but discarded) vials in the red bag or container. Both the containers should bear the biohazard symbol as stipulated in Schedule III of the Bio-Medical Waste (BMW) Rules (Fig. 5.3).

**Step 4:** Send the red, black bag and the hub cutter to PHC for disinfection (see fig. 5.5) and disposal by the designated person at the PHC. Dispose of the black bag as general waste. PHC may send the collected materials to the Common Biomedical Waste Treatment Facility (CBWTF). If the CBWTF doesn't exist, go to Step 5.

**Step 5:** Treat the collected material in an autoclave. If unable to impart autoclaving, boil the waste in water for at least 10 minutes or provide chemical treatment using sodium hypochlorite for 30 minutes to ensure that this results in disinfection. However, the district hospital/CHC/PHC will ultimately make the necessary arrangements to autoclave on a regular basis.

**Step 6:** Dispose the autoclaved (or boiled/chemically disinfected) waste as follows:

- Dispose the needles and broken vials in a safety pit/tank
- Send the syringes and unbroken vials for recycling or to a landfill.

**Step 7:** Wash the hub cutters properly with sodium hypochlorite before reuse.

**Step 8:** Maintain a proper record of generation, treatment and disposal of waste at the district hospital/CHC/PHC in order to assess that waste (needles/syringes/vials) reported back matches with the stock issued to HWs at the beginning of the session day. Match by weighing rather than counting to avoid occupational and safety hazards. This helps to prepare annual reports, submitted to the prescribed authority by 31 January of every year.

Fig. 5.4. Using the hub cutter correctly





Fig. 5.5. Pictorial flow chart – disinfection and disposal sharps waste from RI session



Fig. 5.6. Pictorial guide – segregation and safe disposal methods for immunization waste



### Red/black plastic bags

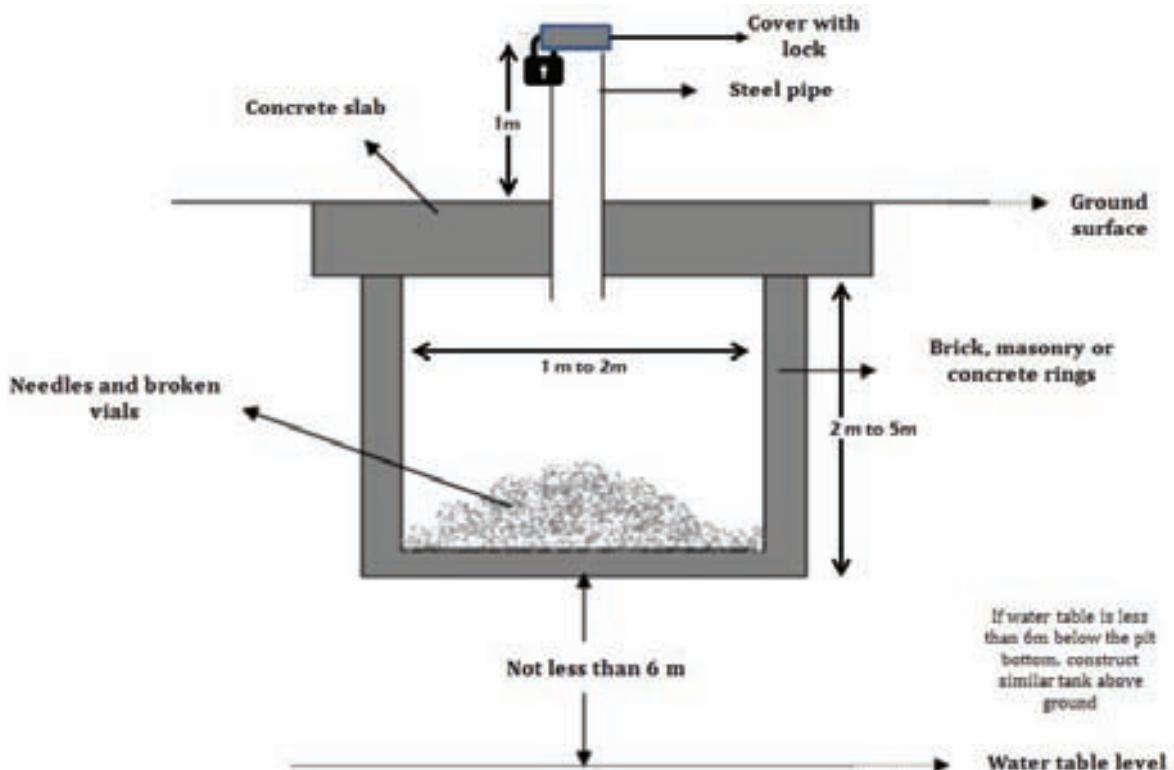
30 Liters (24" x 28") (biodegradable) HDPE/LLDPE/PP bags made with virgin, non-chlorinated polymer material with minimum thickness of 55 micron, with easy to hold collar tie/knot arrangement and preprinted as per requirements of Bio Medical Waste Management Rules are to be used.

### Final disposal at PHC/UHC/CHC of treated needles and broken vials (sharps)

Treated needles/broken vials should be disposed of in a circular or rectangular pit as shown in Fig. 5.7. Such a rectangular or circular pit can be dug and lined with brick, masonry or concrete rings. The pit should be covered with a heavy concrete slab, which is penetrated by a galvanized steel pipe projecting for about 1 m above the slab, with an internal diameter of up to 50 mm or 1.5 times the length of vials, whichever is more. The top opening of the steel pipe shall have a provision for locking after the treated waste sharps have been disposed.

When the pit is full, it can be sealed completely after another one has been prepared. For high water-table regions where the water table is less than 6 meters beneath the bottom of the pit, a tank with above mentioned arrangements shall be made above the ground.

**Fig. 5.7. Design of the pit/tank for disposal of treated needles and broken vials (sharps)**



**Your role in safe injections, safety of staff and waste management**

| Medical Officer's role   | Activity  | How   |
|--|---|---|
| Ensuring safe injections by health workers                               | <ol style="list-style-type: none"> <li>1. Ensuring availability and maintenance of logistics needed for safe injections</li> <li>2. Ensuring all ANMs both in the field and in health centre are aware and practice injection safety</li> </ol>   | Use the opportunity during field visits to RI session sites                                     |
| Further develop and guide safe practices                                 | <ol style="list-style-type: none"> <li>1. Review of waste segregation and management with all staff to identify issues</li> <li>2. Involvement of waste handlers</li> </ol>   | Discuss during meetings and involve all staff   |
| Ensure existing waste management is adequate and in line with guidelines | <ol style="list-style-type: none"> <li>1. Is at source segregation of waste being practiced at all levels?</li> <li>2. Ensuring availability of proper logistics</li> <li>3. Making sure the injection pit and waste storage areas are as per guidelines</li> </ol>                     | When on rounds of hospital or visiting any other department in your centre                      |
| Ensuring safe final disposal of waste                                    | <ol style="list-style-type: none"> <li>1. Ensure timely collection of segregated waste from your health centre. Report delays to district.</li> <li>2. Ensure safe storage of segregated waste before final disposal</li> <li>3. Review functioning of sharps pit / landfill</li> </ol> | Discuss issues during district level meetings or contact district immediately when issues arise |

**Global research in new vaccine delivery methods**

- **Intra dermal delivery** – Jet injectors, Micro needles,
- **Needle free vaccines delivery** – Needle free patch, inhaled vaccines
- **Transcutaneous route**

*Notes...*



*Notes...*