

Guidelines for Disposal of Bio-medical Waste Generated during Universal Immunisation Programme (UIP)

(November 2004)

CENTRAL POLLUTION CONTROL BOARD
DELHI – 110 032

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Guidelines for Disposal of Bio-medical Waste Generated during Universal Immunisation Programme

1. Introduction

Universal Immunisation Programme (UIP) in India is one of the largest health programmes in the world for giving vaccinations (such as DPT, BCG, TT, OPV etc.) to children and women. All vaccines except OPV are given by injection. The programme includes administration of about 200 million injections each year covering about 5.5 lakhs sites in the various urban as well as rural parts including remote/outreach locations of India. The vaccination practice of the UIP so far involved use of either glass or disposable syringes so far. The Govt. of India has now decided to introduce Auto Disable (AD) syringes instead of glass or disposable syringe to minimize the risk of reuse of syringes that might transmit infections. Although the introduction of AD syringes would check the possibility of reuse, it would also generate relatively large quantity of bio-medical waste during the immunization programme. Such waste generated in urban areas may conveniently be imparted necessary treatment using existing infrastructure for treatment of bio-medical waste but imparting necessary treatment/disposal to these waste generated at outreach points is a matter of concern. The Central Pollution Control Board (CPCB) has, therefore, prepared guidelines for disposal of bio-medical wastes expected to be generated under UIP. The development of guidelines involved two case studies conducted in the district of Bulandshahar (Uttar Pradesh) and Alwar (Rajasthan) for a broad understanding of the immunisation system under the UIP and a review of treatment requirements for the bio-medical waste involved in the UIP vis-à-vis the permitted treatment/ disposal options at the various location and the outreach points.

2. The immunization System - Case Studies

Two districts i.e. Bulandshahar (Uttar Pradesh) and Alwar (Rajasthan) were visited by CPCB team in September, 2004 for an overall understanding of the immunization system under UIP in the Districts including their rural areas. Detailed discussions were held with persons involved in immunization programmes in these districts. The team also made field visits to some of the immunization sites.

The immunization system existing in these districts was observed to be almost the same with the following hierarchy:

- A. District level Healthcare Facilities
 - District Hospital
 - Female District Hospital

- B. Sub-division or Tehsil/Block level Healthcare Facilities
 - Community Health Centre (CHC)
 - Block Primary Health Centre (BPHC)
- C. Below Block level Healthcare Facilities
 - Primary Health Centre (PHC)
 - Additional PHC

- D. Outreach Points
 - Sub-Centre Village Point
It is a one or two room's establishment where vaccination is carried out
 - Outreach Villages
Aangan Bari Centre (a place where educational/social activities are conducted mainly for women and children under the Govt. aid) or any other known common places such as *chaupals* (a place where villagers discuss local issues)

Each District Hospital/CHC/PHC etc. has one or two Auxiliary Nurse Midwives (ANM)/Health Visitors (HV) for carrying out immunisation. The ANM/HV give vaccination not only at the concerned District Hospitals/CHCs/PHCs etc. but also at the Outreach Points within the jurisdiction of their respective areas. The ANMs/HV are therefore the key persons involved in UIP.

The vaccinations and other healthcare activities at Outreach Points are carried out once or twice a week. On each such day, the ANM/HV take vaccine carrier and other items such as family planning materials (condoms, pills etc.), iron tablets, anti-malarial tablets, vitamin solution, gauge, bandages, service register etc to the Outreach Points.

The ANM or HV administers 5 to 40 injections a day depending upon the population of the jurisdiction area. The vaccines are stored in deep freezer or Ice lined refrigerator (ILR) at District Hospitals/CHCs/PHCs etc. and are collected by ANM/HV in the morning. After administering vaccines, ANM/HV return back to District Hospitals/CHCs/PHCs etc. to store remaining unused vaccines in deep freezer/ILR and also to complete some documentation work.

At Outreach Points, current practice is to sterilize the glass syringes by boiling or mutilate the needle of disposable syringes manually and dispose the same at the site. However, reuse of needles and syringes without sterilization in case of glass syringes and reuse of same needles and

syringes in case of disposable syringes can not be ruled out under the current practice.

None of the CHCs and PHCs was having any treatment facilities and thus no treatment is imparted to bio-medical waste.

3. Waste Generation and its Treatment

The generation of waste as a result of the introduction of AD syringes in the UIP is as follow:

- (i) AD Syringes
- (ii) Broken or discarded Vials containing some leftover vaccines, and
- (iii) Packaging materials

The packaging material wastes, if segregated, are not bio-medical waste and can be considered as municipal solid waste. The schedule I of the Bio-medical Waste (Management and Handling) Rules, 1998, categorises the bio-medical waste and stipulates respective treatment and disposal method. The bio-medical wastes generated during immunization programme fit in the following categories of the Schedule I of the Rules:

Table-1: Bio-medical waste generation in UIP and its treatment/disposal

Waste Generated during Vaccination	Schedule I of the Bio-medical Waste (Management & Handling) Rules		
	Waste Category No.	Waste Category Type	Treatment and Disposal
Leftover Vaccine	Category No. 3	Microbiology and biotechnology wastes (Wastes from laboratory cultures, <u>stocks or specimens of micro-organisms live or attenuated vaccines</u> , human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures)	Local autoclaving/microwaving/incineration
AD Syringes	Category No. 4	Waste Sharps (Needles, syringes, scalpels, blades, glass etc. that may cause puncture and cuts. This includes both used and unused)	Disinfection (Chemical treatment ^{@@})/autoclaving/microwaving and mutilation/shredding

^{@@} Chemical treatment shall be done using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.

It can be seen from the treatment and disposal requirements given in Table-1 that all bio-medical wastes generated during the UIP can be treated through autoclaving/microwaving. However, imparting such treatment to the bio-medical waste at the site of its generation may not be possible in view of the fact that vaccination sites are also located at Outreach Points. Thus all generated bio-medical waste will be required to be carried to District Hospitals/PHCs/CHCs etc. for imparting autoclaving/microwaving treatment through the available facilities within such healthcare facilities.

Autoclaving is to be given preference over microwaving as the later may not be effective in treating metal syringes (specially in bulk quantities) due to the possibilities of reflection of microwaves by metals.

The packaging materials, if not allowed to get mixed with bio-medical wastes, are non-infectious and may be disposed in landfill.

4. Guidelines for disposal of bio-medical waste generated during immunisation under UIP

4.1 The CMO concerned or the officer made responsible for implementation of the UIP in the respective area as decided by the MoH&FW shall obtain authorization from the “Prescribed Authority” as notified under the Bio-medical Waste (Management & Handling) Rules (i.e. State Pollution Control Board/Pollution Control Committee) for generating, collecting, receiving, storing, transporting, treating, disposing, and/or handling bio-medical waste in any other manner.

4.2 No untreated bio-medical waste shall be kept stored beyond a period of 48 hours.

4.3 Disposal of bio-medical waste generated within District Hospitals/CHCs/PHCs etc.

Step 1 Remove needles from AD syringe immediately after administering injection at the site using a suitable syringe cutter that cuts plastic hub of syringe and not the metal part of needle.

Step 2 Segregate and store detached needles and broken vials, if any, separately in a sturdy and puncture proof white translucent container.

Step 3 Segregate and store syringes and unbroken (but discarded) vials in red bag or container. If a bag is used, its strength should be such that it can withstand the load of waste inside.

Step 4 Label both the containers with biohazard symbol as stipulated in the Schedule III of the BMW Rules.

- Step 5 Send both the containers to the Common Bio-medical Waste Treatment Facilities (CBWTF). In case, CBWTF does not exist, go to step 6.
- Step 6 Treat both white translucent container and red container/bag in autoclave. The autoclave shall comply with the standards stipulated in the Rules. Under certain circumstances, if it is unable to impart autoclaving, boiling such waste in water for at least 10 minutes/chemical treatment may be imparted. It shall be ensured that these treatments ensure disinfection. However, such District Hospital/CHC/PHC etc. shall ultimately make necessary arrangements to impart autoclaving treatment on regular basis.
- Step 7 Dispose the autoclaved waste as follow:
- (i) Dispose the needles and broken vials in a pit/tank made as per the design described in Appendix I.
 - (ii) Send the syringes and unbroken vials for recycling or landfill.
- Step 8 Wash properly both the autoclaved containers for reuse (the material of the containers shall be so selected that it withstands the pressure and temperature during autoclaving).
- Step 9 Make a proper record of generation, treatment and disposal of waste to enable preparation of annual reports to be submitted to the "Prescribed Authority" by 31st January of every year.
- 4.4 Disposal of bio-medical waste generated at Outreach Points/outside District Hospitals/CHCs/PHCs etc.
- Step 1 Remove needles from AD syringe immediately after administering injection at the site using a suitable syringe cutter that cuts plastic hub of syringe and not the metal part of needle. The removed needle having the detached plastic hub of the syringe shall be made to fall in an attached white translucent sturdy and puncture proof container having a capacity to store at least 45 needles and designed to ensure no spillage of stored needles while handling the syringe cutter or carrying the same while traveling.
- Step 2 Store broken vials in a separate white translucent sturdy and puncture proof container or in the container mentioned at Step 1 in case its capacity is able to accommodate broken vials also or.
- Step 3 Segregate and store the detached syringe and the discarded unbroken vials in the red container.
- Step 4 Label the red and white translucent containers with Biohazard symbol.
- Step 5 Carry and handover these containers to the District Hospitals/CHC/PHC etc. while unused remaining vaccines are

carried to the District Hospitals/CHC/PHC etc for cold storage and to do other documentation work. To dispose these wastes at the District Hospitals/CHC/PHC etc., follow the step 5 onwards under para 4.3.

- Step 6 Maintain a proper record at the District Hospitals/CHC/PHC etc. in order to assess that waste (needles/syringes/vials) reported back to District Hospital/CHC/PHC matches with the stock issued to ANM/HV in the morning. Such matching is to be done by weighing but not by counting in order to avoid occupational and safety hazards.

Design of the Pit/tank for disposal of treated needles and broken vials

The treated needles/broken vials should be disposed in a circular or rectangular pit as shown in figure 1. Such 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 about 1.5 meters above the slab, with an internal diameter of up to 50 millimeters or 1.5 times the length of vials, whichever is more. The top opening of the steel pipe shall have a provision of locking after the treated waste sharps has been disposed in. When the pit is full it can be sealed completely, after another has been prepared.

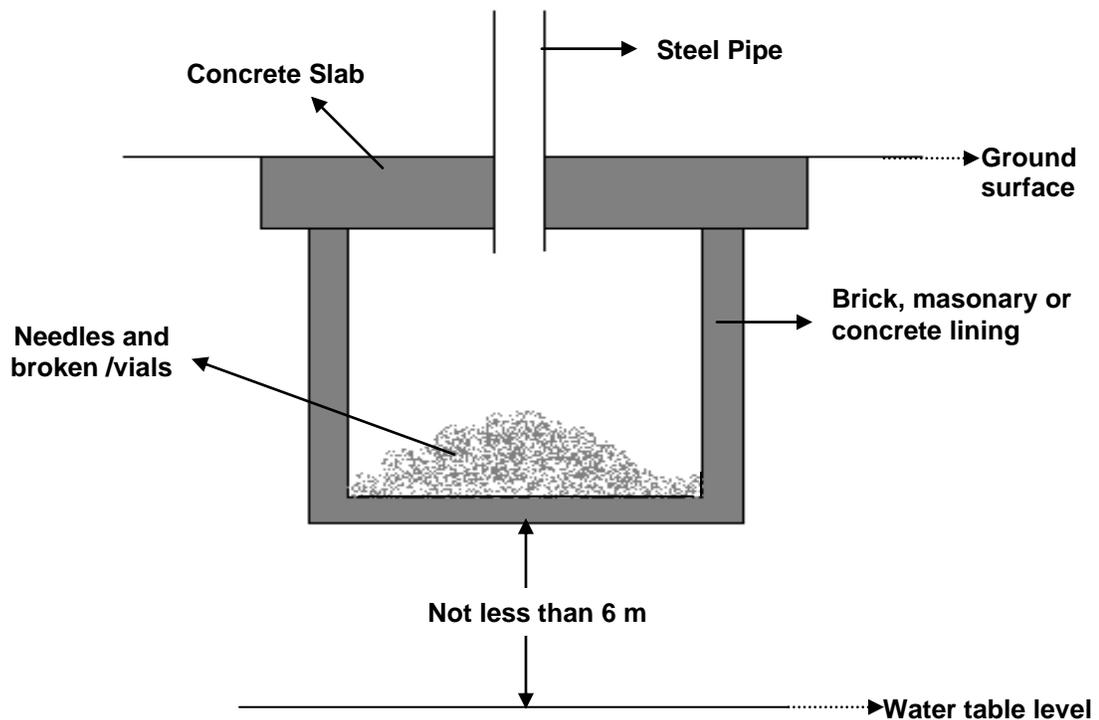


Figure 1

For high water table regions where water table is less than 6 metres beneath bottom of the pit, a tank with above mentioned arrangements shall be made above the ground.