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## Revised National Tuberculosis Control Programme

# Environmental & Bio-medical Waste Management plan for RNTCP- II

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## Introduction

The Revised National Programme is being implemented in the country since 1997. The basic unit of the programme is the Designated Microscopy Centre (DMC) which is a sputum microscopy lab set up for a population of about 100,000 population in normal areas and for 50,000 population in tribal and hilly areas. Most of the waste generated under RNTCP is at these laboratories. At treatment centres there is minimal amount of waste generated as empty blister packs and as used syringes (which are generated only in Category II cases, at the rate of 24 syringes per cat II patient treated). It has been estimated by an Environment Assessment study conducted for the RNTCP that the average quantum of waste generated in RNTCP centres is approximately 2.5 to 3.8 kg per day which is relatively small.

Most of the technical guidelines and training modules were prepared in the early years of programme onset, and at that time the Bio-Medical waste management rules 2000 had not come into act. However, at present the programme has technical instructions for waste disposal in the DMCs (laboratories), which constitute the major chunk of waste generated under RNTCP at health centres. Under RNTCP-II, the programme will take measures to update the waste management guidelines to various categories of staff.

## Legal and institutional framework

The Environment Protection Act (EPA) of 1986 laid down the framework for all subsequent legislations pertaining to Environment, in the country. India together with Denmark were among the first countries in the world to have such legislation in place.

Government of India (GoI) under its EPA (1986), passed the Biomedical Waste (Management and Handling) Rules in 1998 and subsequent amendment followed in 2000. The rules form the legal framework for the collection segregation, transportation, treatment & disposal of Biomedical waste, throughout the country. The SPCBs (State Pollution Control Boards) and PCCs (Pollution Control Committees) are empowered to validate & modify the Bio -Medical Rules based on the local conditions within the broad framework of the legislation. The SPCBs (in states) and pollution control committees (PCCs) (in Union Territories) are monitoring the compliance of the rules in the respective states. The capacity of the SPCBs and PCCs for effective monitoring is slowly building up.

MOH&FW, GOI has laid down the National Guidelines on Hospital Waste Management in March 2002, which apart from covering the aspects included in the Bio-Medical Rules, also lay down recommendations for safety measures, training, management & administrative functions. In the states where State Health System Development Projects (SHSDP) have been implemented, the implementation of the Health Care Waste Management(HCWM) up to the CHC (Community Health Center) /FRU (First Referral Unit) level health care facilities and above already exists.

Under RNTCP guidelines have already been developed for disposal off the waste generated under RNTCP. Presently to a great extent the waste is being disposed off as per guidelines within the over all hospital waste management system existing in the health facility where RNTCP services are provided. However, it needs up-gradation and strengthening

**Types of wastes generated by the RNTCP**

- Human/ Biological Waste (Sputum);
- Sharp Waste (needles, glass slides etc.);
- Used blister packs, drug packaging material;
- Plastic waste (waste generated from disposable syringes, cups and glasses),
- Laboratory & General Waste- Liquid waste, broomsticks, paper waste
- Construction waste (waste generated from civil work activities)

**Waste Management under RNTCP-- Current Practices**

The RNTCP is not a vertical programme, but it is well integrated into the general health system of the states. Waste management is a component of overall facility management of the respective state health system institutions where RNTCP centres are located. Accordingly, **the waste generated by RNTCP should not be viewed in isolation, but is to be integrated in the broad framework of the peripheral institutions' waste management practices**. The waste generated under RNTCP is at present being disposed of with other hospital waste as per the recommended procedures.

The sputum containers used for sputum collection would contain sputum which is potentially infectious and are disposed of by the following methods:

A. After the sputum smears are examined, all sputum cups and broom sticks used are kept in a bucket containing 5% Hypochlorite or 10% bleach solution or 5% Phenol solution. The bin/bucket should have a lid which is foot operated. Caps of the sputum cups are removed and cups, caps and broom sticks are completely submerged in the solution in a secure place for at least 18 hours. After this these are discarded with other hospital waste as per the method followed by the Health facility.(i).By incineration, wherever incinerators are available.(ii).By burying in a special landfill site at a safe distance away from inhabited areas.
B. Autoclaving in an autoclave wherever it is available or in a pressure cooker of 7 liters capacity with adequate amount of water to submerge the contents and boiled for at least 20 minutes. This is done at the end of each days laboratory work. After cooling this material then is discarded as general waste with other hospital waste as per the methods followed.

The other waste generated under RNTCP are presently supposed to be discarded as under:

-The used blister packs are discarded as a general waste with other hospital waste. Outdated and unused drugs, if at all, will be destroyed by breaking and then buried.

-Used glass slides with positive smears are discarded by disposal in special landfill sites after treating with 5% hypochlorite solution. Negative glass slides may be reused for malaria diagnosis, else they are disposed off in a manner similar to positive slides.

**Challenges for RNTCP II:**

- Preventing burning of plastics, especially those treated with chlorine producing chemicals
- Destruction of Needles and syringes
- Disposal of sharps in separate pit for sharps
- Ensuring deep burial of used cups and slides
- Encouraging all health care workers involved in RNTCP to adopt Standard Precautions in handling the samples i.e. during collection and transportation, avoiding spillage etc.

**Waste Management Plan during 2nd phase of RNTCP**

Waste generated under RNTCP will be discarded with the overall waste of the health facility in which services under RNTCP are provided. The staff involved in RNTCP services will be trained as per the guidelines to be followed which will be incorporated in the training manuals for different category of staff. The plan will include effort of organized waste collection, information dissemination and monitoring of disposal of the waste.

**Disposal of the General Waste:**

The empty blister packs, packaging material, disposable syringes office and kitchen waste should be considered as general waste. It does not require any treatment and will be disposed off as general waste by segregating such material in black bag. The empty vials after washing with water may be reused if required or disposed off with general waste of the hospital.

**Disposal of Biomedical waste generated in RNTCP laboratory:**

Sputum Cups and broom sticks: Cups made from bio-degradable poly-propylene will be encouraged to be used in the programme wherever such cups are available in the districts. RNTCP is including the specification as "made of polypropylene", for the sputum containers. The used cups and broom sticks will be disinfected first and will then be disposed of with other hospital waste by deep burial as per the existing facility within the overall waste management system in the health facility. Disinfection with chemicals or

autoclaving/ pressure cooking prior to disposal will be stressed upon. The left over fluid after chemical disinfection will be drained off in the hospital drainage.

Used slides: For discarding the used slides, the slides will be disinfected by submerging in 5% hypochlorite solution for a minimum of 30 minutes and disposing in the pit for sharps with other hospital waste sharps. Breaking of the slides is not recommended. The used chemical solution will be drained away in the hospital drain.

Used Syringes and Needles: The needles will be destroyed after use by using the available needle destroyer/ cutter. After disinfecting the needles and broken vials, dispose in a pit/ tank made for sharps within the overall waste management system in the heath facility providing RNTCP services.

Storage: No untreated biomedical waste will be kept stored beyond a period of 48 hours.

Maintenance of Records: The officer in charge of the health facility is responsible for maintaining a proper record of treatment and disposal of waste in the health facility. RNTCP will advise the states to submit yearly waste management reports.

**Bio-Medical Waste Management for RNTCP-II**

**Action Plan:**

The RNTCP is implemented through the state health system and is just one of the many national programmes being implemented in any given health centre. The RNTCP forms a very small component of a multi-pronged infrastructure, and exists at most centres in the form of a laboratory only. The management of waste generated under RNTCP is to be seen as an integral component in the broad framework of the peripheral institutions' waste management activities. RNTCP would provide the required guidance, know-how and materials required. RNTCP would attempt to bring about the necessary 'attitude changes' in the staff handling bio-medical wastes through training and repeated reminders for compliance with BMW guidelines during supervisory activities. Similarly activities of waste reporting would be the responsibility of the peripheral institutions providing RNTCP services. RNTCP would assess gaps identified, or lack of compliance with the guidelines and advise states to correct wrong practices, if any.

The main modality of implementation of the BMWM action plan would be by imposing compliance with the technical guidelines for disposal of bio-medial wastes as per revised RNTCP guidelines. Specifically the guidelines would encourage use of bio-degradable plastic like polypropylene, discourage incineration of plastic waste, discourage open dumping of slides and sharps, adoption of Universal precautions and encourage waste reporting of centres to their prescribed authority.

1. **Upgradation of existing training modules:**

The existing training modules will be upgraded so that different categories of staff involved in RNTCP are made aware of different waste management procedures. The Environmental assessment carried out by the appointed consultants for Central TB Division has been completed and they have clearly delineated the portions to be incorporated for each category of staff (Annexure-1).

The modules/ manuals which need upgradation are:

a. The Medical Officers are trained on "Medical Officer's module 1-9". These have recently been updated. The portions pertaining to BMWM will be incorporated soon, probably as addenda.
b. The laboratory personnel, namely the technicians are trained on the "Laboratory technician's manual". The lab supervisors (STLS) are trained on "STLS module" and "Lab technician's manual".
c. The BMWM issues would be incorporated in the "STS module" in a brief manner, as these staff are not directly concerned with lab function, but deal with treatment activities. But since they visit all the health centres on treatment supervision, they will assist in reporting discrepancies, if any.
d. The MPW manual is used to train all categories of peripheral staff, mostly the ANMs, MPWs and also community volunteers like AWW. The portions pertaining to BMWM will be incorporated in them so as to improve knowledge of these staff on BMWM.

Universal Precautions:
The health care workers involved in RNTCP will be encouraged to adopt Universal Bio-safety Precautions in handling the samples i.e. during collection and transportation, avoiding spillage etc (Annexure-2). The Universal Bio-safety Precautions will be included in the training modules.

*This upgradation of training material is proposed to be completed by March 2006.*

## 2. Training:

In future training of the new staff involved in RNTCP will be done using the updated modules. The staff already trained under RNTCP will be updated/ sensitized by using revised training modules.
Categories of staff to be trained:
The Laboratory technicians are the major staff category who are responsible for waste generation and waste management in any given RNTCP service providing centre. But besides them, there are a number of other staff which are involved in bio-medical waste management under RNTCP, including the Medical officers who are in charge of the peripheral centres, the STLS who supervise these labs and the Class IV employees who are responsible for cleaning and waste disposal. It is estimated that RNTCP has close to 10,000 functioning Lab technicians at any given point in time, about 630 DTOs, more than 2000 each MO-TCs, STS and STLS; and about 10,000 to 12,000 medical officers who are responsible for the peripheral centres delivering

RNTCP and an equal number of Class IV employees. However, these figures are an approximation based on the numbers of districts, TUs and DMCs.
Modality of implementing the training:
It is planned that RNTCP will hold an update training on bio-medical waste management for all state staff (STO/ medical officer of state TB cell, microbiologist of STDC, medical officer of STDC) at NTI Bangalore in a few batches. Thereafter the STOs will hold similar update training for the DTOs. The DTOs will return to the districts and train their staff in a few batches, so as to cover all medical officers in charge of DMCs, MO-TCs, all STLS, all STS, all LTs and some identified class IV staff from all RNTCP centres.

*The training on BMWM issues is planned to be completed by December 2006.*

**3. Procurement arrangements:**

Consumables and equipment:
RNTCP is in the process of incorporating changes into the list of lab consumables so as to facilitate implementation of the HCWM plan. The technical specifications of sputum cups are being specified as "made of polypropylene, wherever available locally". Bio-medical waste disposal bags with the required specifications and Bio-medical waste insignia would be procured (Annexure-3). Existing needle cutters will be used wherever necessary. In exceptional situations, DTCSs may decide to purchase limited numbers of these out of "Miscellaneous" head if not available from state health sources or from other national programmes like RCH, UIP, NACP, etc.

Civil works:
States will be encouraged to undertake proper selection of place for lab, sputum collection centres and disposal areas. The guidelines for civil works under RNTCP already takes care of these requirements. The states will be advised to follow these guidelines and wherever required (for upgradation of new DMCs), the up-gradation may be carried out. The waste disposal pit and pit for sharps of the peripheral institution providing RNTCP services will be used. Guidelines for waste and sharp disposal pits will be made available in RNTCP manuals.

*Procurement is a continuous activity* and the expenditure is reflected in the budget sheets.

**4. Monitoring of the waste disposal:**

Monitoring of the waste disposal generated under RNTCP, will be an on going activity. These will be included in checklists for lab evaluations. Non-compliance with regulations will be reported by the supervisors. Central TB Division will advise states to submit yearly waste management reports to their prescribed authority.

**Disposal of Sputum Container with specimen and wooden sticks**

Step 1: After the smears are examined, remove the lids from all the sputum cups.

Step 2: Put the sputum cups, left over specimen, lids & wooden sticks in foot operated plastic bucket/bin with 5% hypo chlorite solution. The cups + lids should be submerged in the solution.

Step 3: At the end of the day, drain off the hypochlorite solution in drain.

Step 4: Take out the sputum cup/lid/ wooden sticks and put into reusable metal or autoclave-able plastic container/red bag. The Red bag should have a biohazard symbol, and adequate strength so that it can withstand the load of waste & be made off non PVC plastic material.

Step 5: Put this container/bag in autoclave with other autoclavable BMW and the contents be autoclaved at $121^0$C at 15 psi pressure for 60 minutes. The autoclave shall comply with the standards stipulated in the rules. Under certain circumstances, if autoclaving is not possible, boil such waste in water for at least 20 minutes. However, the District hospital/ CHC/PHC etc. shall ultimately make necessary arrangements to impart autoclaving treatment on regular basis

Step 6: After adequate cooling the material can be safely transported to common waste treatment facility for mutilation/shredding/ disposal

If common waste treatment facility is not available in the area, the sputum cups/ lids/ wooden sticks after autoclaving can be deep buried in deep burial pit.

**Disposal of used Syringes/needles/broken vials** .

Step 1: Immediately after administering injection, cauterize needle on site using a suitable **needle destroyer/cutter**, followed by cutting of plastic hub of syringe without detaching the needle from the syringe.

Step 2: Put cauterized needles and broken vials, ampoules in a **sturdy puncture proof** white translucent plastic /card board container.

Step 3: Segregate and store cut plastic syringes in reusable metal or autoclave-able plastic container/ red bag. If a bag is used, its strength should be such that it can withstand the load of waste inside & be made off non PVC plastic material.

Step 4: Label both the container with biohazard symbol as stipulated in the Schedule III of the Biomedical Waste (Management & Handling ) Rules 1998.

Step 5: Put both the containers in prescribed bag & Transport through dedicated vehicle to the common waste Treatment Facility (CWTF) for autoclaving, mutilation/ shredding /disposal

Step 6 : If CWTF does not exist ,put both sharp container(needles) and metal/plastic container / red bag(syringes) in autoclave with other BMW and autoclave at $121^0$C at 15 psi pressure for 60 minutes. Under certain circumstances if autoclaving is not possible, boil such waste in water for at least 20 minutes.. However, the District hospital/ CHC/PHC etc. should ultimately make necessary arrangements to autoclave the waste on regular basis.

Step 7: Dispose the autoclaved waste as follows :

I Dispose the needles and broken vials in sharp pit.

II Send the syringes for shredding/mutilation or landfill in deep burial pit.

**<u>Disposal of used Slides</u>**.

Step 1: Whenever the used slides (positive or negative) are to be discarded, immerse the slides in 5% hypochlorite solution for minimum of 30 minutes.

Step 2: At the end of the day, Drain off the hypo- chlorite solution in drain.

Step 3: Take out the slides and put them into puncture proof container and red bag. The Red bag should have a biohazard symbol; it should be made off

non-PVC plastic material. This bag/ sharp container should be put in autoclave or pressure cooker for autoclaving/boiling.

Step 4 : Dispose the slides in sharp pit .

*Under no circumstances the slides should be broken.*

## Standard Precautions

In 1996, CDC developed a new system of standard precaution synthesizing the features of Universal precautions and body substance isolation. Standard precautions are used in the care of all patients and apply to blood, all body fluids, secretions and excretions except sweat regardless of whether thy contain visible blood.

Standard precautions include:

- Hand washing
- Barrier protection
- Safe handling of sharp items.
- Safe Handling of specimen (Blood etc)
- Safe handling of spillage of blood/ body fluid
- Use of disposable/ sterile items

### Hand washing

This is and ideal safety precaution and gloves should not be regarded as a substitute for hand washing

For General patient care (Hand decontamination )

- Wash hands thoroughly in running water with soap without missing any area. For effective hand washing first wash palms and fingers followed by back hands, knuckles, thumbs, fingertips and wrists. Rinse and dry hand thoroughly.
- Wash hands immediately after accidental contamination with fluid, before eating and drinking and after removing gowns/ coat
- Leave soap bars in dry container to prevent contamination

For Surgical care (Surgical Scrub)

- wash hands up to the elbows.
- Scrub hands for minimum of 2 minutes
- Prevent dripping down of water from unwashed area of arms to washed hands.
- Put on gowns and gloves after drying only.

### Barrier Protection

Gloves

- Wear while collecting/ handling blood specimens and blood soiled items.
- Wear while disposing waste

- Remove before handling door knobs, telephone, pen, performing office work
- Discard if cracked, discoloured or punctured.
- Discard if blood spills on them.
- Don't reuse disposable gloves.
- Wash hands when gloves are removed or changed.

Masks

- Wear masks and protective glasses if splashing or spraying of blood/ body fluids is expected.
- Masks of cotton wool, gauze, or paper mask are ineffective. Paper masks with synthetic material for filtration are an effective barrier against microorganisms.

Caps :
Cover hair completely in aseptic units, operating rooms or performing selected invasive procedure.

Gown and aprons :

- Wear clean clothes made up of a material easy to clean.
- Change after exposure to blood and body fluids.
- Wear Gown or apron of plastic water resistant paper when splashes of blood or other body fluids are likely to occur e.g. during surgery, obstetric procedures, invasive procedures, post mortem and embalming.

Occlusive bandage:

- Cover all skin defects e.g. cuts, scratches or other breaks with waterproof dressing before patient care.

**Safe Handling of sharps**

- Take extra care to avoid autoinoculation.
- Discard all chipped or cracked glassware in appropriate containers.
- Never use hands to pick up broken glass. Use a brush and pan.
- Don't manipulate disposable needles. Never bend, break, recap or remove needle from syringe.
- Dispose your own sharps. Don't pass used sharps directly from one person to another.
- Discarded needles in puncture proof rigid containers (Plastic or cardboard boxes) after disinfection in 5% sodium hypochlorite solution. Use needle shredder if available for needles or needles along with syringe nozzle.
- Send sharp disposal containers for disposal when three fourth full.

**Safe handling of specimen**

- Collect specimens, specially blood and body fluids in pre sterilized containers properly sealed to prevent leakage or spillage.
- Use autoclaved/ pre sterilized disposable syringes and needles for vein-puncture and lancets/ cutting needles for finger pricks.
- Cover cuts in hands properly with water proof adhesive bandages.
- Wear disposable gloves while collecting blood/ body fluids and maintain proper asepsis.
- Wash hands thoroughly with soap and water, particularly after handling specimens.

**Safe handling of blood/ body fluids spills**

- Cover spills of infected or potentially infected material on the flow with paper towel/ blotting paper/ newspaper.
- Pour 5% sodium hypochlorite solution on and around the spill area and cover with paper for at least 30 minutes.
- After 30 minutes, remove paper with gloved hands and discard in general waste.

**Use of Disposable Sterile Items**

- Ensure proper handling of disposable/ sterile item before/ during use.

There should be no re-circulation of disposable items.