

# Literature Review

*Guidelines for Disposal of Bio-Medical Waste (Management & Handling) Rules, 1998*  
*Bio-medical Waste Generated during UIP*

for

## Models & Practices on Bio-Medical Waste Management

with focus on

### Primary Health Care

*Aide-Memoire for a National Strategy for  
Safe Health Care Waste Management*

*Training Module  
Health Care Waste Management*

*Safe Management of Wastes from Health Care Activities*  
*Tamil Nadu Health Care Waste  
Management System*

Assigned by –

**German Technical Assistance for Health Sector Support  
GTZ - HSS**

*Hospital Waste - Time to Act*  
*Health Care Waste Management Guidance Note*

*IMEP for Reproductive & Child Health  
Phase-II*

*Managing Hospital Waste  
A Guide for Health Care Facilities*

Conducted by –

**Society for Direct Initiative for Social & Health Action**

*Teacher's Guide*

**DISHA**

*Management of Waste from Health-care Activities*

*Understanding and Simplifying  
Bio-Medical Waste Management*

**Dec'05 – Jan'06**

**Society for Direct Initiative for Social & Health Action  
DISHA**

20/4, Sil Lane Kolkata 700 015  
India

Phone & FAX 91 33 23283989  
e-mail: [fordisha@cal2.vsnl.net.in](mailto:fordisha@cal2.vsnl.net.in)

## *Contents*

<b>Item</b>	<b>Page</b>
Introduction	2
Acknowledgement	3
Review methodology	4
Documents Reviewed	5
Overview	7
Brief Description of Documents with Comments	12

## ***INTRODUCTION***

### **Background**

The necessity of managing health care waste in a scientific manner has been receiving increasing attention in India over the past few years due to the serious threat to public health, pollution of air, water and land resources arising out of its improper management.

The Ministry of Environment and Forests, Government of India has issued a Notification on Bio-Medical Waste (Management and Handling) Rules, 1998 (BMW Rules) under the Environment Protection Act, 1986 to bring bio-medical waste management under legal ambit and provide directives and guidelines.

To address the issue and to comply with the BMW Rules Government of West Bengal (GoWB) has prepared an Action Plan on Health Care Waste Management (HCWM) through the West Bengal Health Systems Development Project (WBHSDP).

The health care waste management initiative under the Health Systems Development Project II, supported health care waste management in Government Health Care Units (HCUs) in West Bengal up to the level of Rural Hospitals. Thus leaving a large number of Govt. HCUs below that level [Block Primary Health Centers (BPHCs), Primary Health Centers (PHCs), Sub-Centers and Outreach Centers] outside its purview.

GTZ support to Health Sector Programme in India, referred to as Indo German Health Programme, specifically aims to develop a strategy for health care waste management at the primary level for West Bengal, based on an assessment of the situation that exists (waste audit, facility infrastructure, manpower, administrative systems related to HCWM) taking into account and addressing the changes in the systems that are slated to take place in the next 5 - 10 years. A review of available literature on health care waste management stressing on primary level HCUs and of existing rules, regulations, orders, directives and guidelines is an important component of this strategy development.

### **The Task for Literature Review**

In view of the above Society for Direct Initiative for Social and Health Action (DISHA) has been assigned with the task of Developing a Strategy for Health-Care Waste Management for Primary Level Health Care in West Bengal. Literature review of models and practices for health-care waste management at both national and international levels with special focus on primary health care alongwith review of Government orders, regulations, rules and models developed and promoted by Government of India and the states with regard to health care waste management is an essential component of the strategy development. The present study endeavours to accomplish the same.

### ***ACKNOWLEDGEMENT***

Developing a strategy for primary level health-care waste management involving health-care waste (hospital waste and immunisation waste) generated from widespread network of hundreds of Block Primry Health Centers (BPHCs) and Primary Health Centers (PHCs) and thousands of Sub-centers (SCs) and Outreach Centers (ORCs) is a very complex and important component of health-care waste management in the state. It throws up new challenges and possibilities. We are thankful to the German Technical Assistance for Health Sector Support (GTZ - HSS) for entrusting this assignment to Society for Direct Initiative for Social and Health Action (DISHA).

Dr. J.N.Pandit, Sr. Programme Officer, GTZ-TAT has been very helpful in providing us with some literatures and valuable discussions. Ms. Bulbul Bakshi, Sr. Programme Officer, GTZ-TAT suggested some important inclusions.

We are especially thankful to Dr. A. K. Ghosh, Assistant Director, H&FWD, GoWB for enriching our effort through his kind opinions and suggestions.

Pradip Chatterjee  
Chief Coordinator  
DISHA  
Kolkata, 20.02.2006

## ***METHODOLOGY***

In all 30 documents belonging to 6 broad categories have been reviewed. The categories are *General Guidelines, Country Experiences, Legal & Administrative Directives, State Experiences, Hospital Experiences, Training Modules and Accreditation.*

Under these categories the review has been prepared in two ways -

- A. An overview of documents relevant to the various strategic points of health-care waste management with special focus on primary health care, and
- B. Brief description of each of the documents with comments.

## ***DOCUMENTS REVIEWED***

	<b>Title of Document</b>	<b>Publication</b>	<b>Review at Page</b>
	<b><i>A. General Guidelines</i></b>		
<b>1</b>	Safe management of wastes from health care activities	World Health Organisation Geneva 1999	12
<b>2</b>	Management of solid health-care waste at primary health-care centres - A Decision-Making guide	World Health Organization Geneva 2004	14
<b>3</b>	Preparation of National Health-Care Waste Management Plans in Sub-Saharan Countries - Guidance Manual	UNEP & WHO	15
<b>4</b>	Health Care Waste Management Guidance Note	World Bank's Human Development Network May 2000	16
<b>5</b>	Management of wastes from immunisation campaign activities: Practical guidelines for planners and managers.	World Health Organization Geneva 2004	17
<b>6</b>	Safe Management of Bio-medical Sharp Waste in India	World Health Organisation South-East Asia 2005	18
<b>7</b>	Aide-Memoire for a national strategy for safe health-care waste management	World Health Organization Geneva 2003	19
<b>8</b>	Environmentally Responsible Management of Health Care Waste With a Focus on Immunization Waste	Health Care Without Harm October 2002 Working Draft	20
<b>9</b>	Managing Hospital Waste - A Guide for Health Care Facilities	SRISHTI September, 2000	21
<b>10</b>	Hospital Waste - Time to Act	SRISHTI June, 2002	22
<b>11</b>	Designing Safe Syringe Disposal Systems for Immunization Services	PATH October 2003	23
	<b><i>B. Country Experiences</i></b>		
<b>12</b>	Implementation Plan for Health Care Waste Management 2004-2006	Central Board of Health, Lusaka, Zambia September 2003	24
<b>13</b>	Disposal of Mass Immunization Waste Without Incineration: Philippine Follow-Up Measles Campaign 2004	Phillipine Deptt. Of Health & HCWH 2004	25
<b>14</b>	Health-care waste management in Lao PDR: a case study	Department of Health Policy & Planning, School of International Health, University of Tokyo, Tokyo, Japan 2005	26
<b>15</b>	Emergency Waste Management-Healthcare Waste Improvements Made In Kosovo	Sarah Gayton 2003	27

	<b><i>C. Legal &amp; Administrative Directives</i></b>		
<b>16</b>	Bio- Medical Waste (Management & Handling) Rules, 1998	Ministry of Environment & Forests, GOI	28
<b>17</b>	Guidelines for Common Bio-medical Waste Treatment Facility & Incineration	Central Pollution Control Board, India	29
<b>18</b>	Guidelines for Disposal of Bio-medical Waste Generated during Universal Immunisation Programme	CPCB, India 2004	30
<b>19</b>	Infection Management & Environment Plan (IMEP) for Reproductive & Child Health Programme, Phase-II	Govt. of India, Ministry of H&FW, Deptt. of Family Welfare September, 2004	32
	<b><i>D. State Experiences</i></b>		
<b>20</b>	Action Plan on Health Care Waste Management	WBHSDP, Deptt. of H&FW, GOWB December 2003	34
<b>21</b>	Tamil Nadu Health Care Waste Management System	HSDP Govt. of Tamilnadu	35
<b>22</b>	Draft Vision Document on Bio-Medical Waste Management	Kerala SPCB 2003	36
<b>23</b>	Bio- Medical Waste Management	Govt. of Delhi, Directorate of Health Services 2003	36
<b>24</b>	Healthcare Establishment Waste Management and Education Programme (HEWMEP), Gulbarga, Karnataka	Centre for Environment Education (CEE) [A presentation by Dr. Shyamala Mani]	37
	<b><i>E. Hospital Experiences</i></b>		
<b>25</b>	Managing Hospital Waste At CHC Daulatpur : Basic Health Project Himachal Pradesh	Indo-German Cooperation 2004	38
	<b><i>F. Training Modules</i></b>		
<b>26</b>	TEACHER'S GUIDE Management of wastes from health-care activities	World Health Organisation Geneva 1998	39
<b>27</b>	Training Module on Health Care Waste Management	WBHSDP Deptt. of H&FW, GoWB December 2003	40
<b>28</b>	Understanding and Simplifying Bio-Medical Waste Management	Toxics Link January 2005	41
<b>29</b>	Training Health Workers in the Management of Sharps Waste	PATH October 2005	42
	<b><i>G. Accreditation</i></b>		
<b>30</b>	Standards for Hospital National Accreditation Board for Hospitals and Healthcare Providers	Quality Council of India 2005	43

## ***OVERVIEW***

Health-care waste management is a multifaceted exercise involving wide range of issues and stakeholders. Review of literature on this subject serves both as a reckoner of the diverse areas and as a method of developing possible options from the myriad of principles, policies and practices already laid down and experienced.

Being an evolving subject literatures dealing with it are also evolving in nature, i.e., the observations, analyses and inferences contained in these literatures should not be taken as immutable. They are subject to revision with time and experience.

The literatures reviewed have been classified in seven categories: General Guidelines, Country Experiences, Legal & Administrative Directives, State Experiences, Hospital Experiences, Training Modules and Accreditation.

### **General Guidelines**

Literatures containing General Guidelines generally deals with the following items related to health-care waste: Definitions and Characterization, Health and Environmental Impacts, Underlying Principles of health-care waste management, National Planning, Legal and Administrative Policy Directives, Management Options etc.

**Definitions and Characterization** of different categories of health-care waste includes general, bio-medical, infectious, pathological, sharp, anatomical, genotoxic, chemical, heavy metal containing waste and radioactive waste etc. These have been covered by almost all the documents containing the general guidelines<sup>1,3,4,9,10</sup>.\*

**Health and Environmental impacts** of health-care waste include specific types of hazards from different kinds of health-care waste, exposures, public health risks, entry and survival of waste conveyed pathogens in the environment etc<sup>1,2,3,4,6,8,9,10</sup>.

**The underlying principles**<sup>1,4,10,19</sup> of health-care waste management include:

‘Restriction on Transboundary Movement of Hazardous Waste that include Health-care Waste (Basel Convention);

‘Polluter Pays Principle’ – resting the onus of management on the producer of waste ;

‘Precautionary Principle’ – areas of unknown risk to be treated as those of significant risk;

‘Duty of Care Principle’ – persons attending health-care waste management to be ethically responsible to take utmost care;

‘Proximity Principle’ – treatment and disposal of health-care waste to be done closest possible to its source;

‘Avoid Multiple Handling’ – Collection and handling according to disposal options to avoid multiple handling;

‘Zero Waste Principle based on Reduce, Reuse and Recycle’ – waste minimization, composting the bio-degradable, recycling the recyclables;

‘Low Cost, Effective and incremental Approach’ – Not to go for unsustainable capital intensive procedures, prefer gradual up-gradation and efficacy monitoring.

---

\* superscript numbers refer to literatures enlisted at page 5&6 with corresponding numbers

**National Planning components**<sup>1,3,4,7</sup> include: Need Perception; International Recommendations; Purpose and Action Plan to develop the National Programme; Assessment of the current situation including waste audit, facilities available and present practices; Regional and local management plans including health-care unit wise management as well as management of waste generated from scattered sources; Enactment/Compliance of national legislations; fixing of Authorities; Assignment of responsibilities, Implementation Programme; Funding Resources; Capacity building/training; Monitoring system etc. Associated procedures include national surveys and workshops, setting up national institutional framework and laying down a time frame for implementation.

**Legal and Administrative Policy Directives**<sup>1,3,4,7</sup> are constituted of international agreements of obligatory nature; need and development of legal provisions; management policy and technical guidelines.

**Management options**<sup>1-10,19</sup> are made of a host of diverse issues like procedures for waste minimization, recycle and reuse; process of responsibility discharge; choice of appropriate waste collection, storage, transport, treatment and disposal methods; choice of appropriate technology; cost assessment and resource allocation; personal protection and hygiene of waste handlers; hospital hygiene and infection control; emergency response and training.

**Management Planning**<sup>1-11,19</sup> being the all important issue in health-care waste management the assignment of responsibilities at each level with required coordination and correlation calls for much attention. From regulatory authorities at the national/regional/state levels to the waste management committees at health-care units along with the specific roles to be played by each and every staff involved in health-care waste generation, collection, treatment and disposal.

Some of the literatures cater a rich glossary with and comparative efficacy and cost assessment of **treatment and disposal options** like burial, incineration, autoclaving, microwaving, chemical disinfection etc<sup>1,3,4,8,9,10</sup>. It appears that no single method is appropriate for all kinds of waste and use of a combination of suitable treatment options coupled with a feasible incremental approach is the best option.

Regarding the **waste generated in primary health-care (BPHCs & PHCs)** including the **immunisation waste** the general WHO guidelines<sup>2</sup> suggest segregation of waste in three categories – Sharps, Infectious non-sharp and General. Suggested treatment and disposal options vary according to the scenarios considered (facilities available). Hauling of all sharp waste (syringe with attached needle) collected in safety boxes and used vials collected in bags from the outreaches (out reach centers and sub-centers) to PHCs has also been suggested. These deserve serious examination. Mixing of all non-sharp infectious waste not only render recycling difficult and/or impossible if treated, but also makes the process unsustainable if buried. Hauling of waste from outreach centers/sub-centers to PHCs also raise serious questions regarding its feasibility. Very useful tools for practical waste management like record keeping and waste tracking have been given<sup>5</sup>.

It appears that management of sharp waste generated by the Universal Immunisation Programme has not been taken up by the WHO publication on management of sharp waste in India<sup>6</sup>. But it provides valuable insights on the treatment, disposal and recycling possibilities of sharps.

Very useful instructions for planning syringe disposal systems at the district level has been provided by PATH<sup>11</sup>.

Environmental concerns regarding exercise of waste treatment options have been well documented<sup>1,4,8,9,10</sup>. Incineration and some very toxic chemical disinfectants are suggested against.

### **Country Experiences**

Literatures on this section offer important insights and experiences on a range of areas like health-care waste management for a country – Zambia<sup>12</sup>, for countrywide mass immunisation campaign – Philippines<sup>13</sup>, for an emergency situation in the aftermath of armed conflict – Kosovo<sup>15</sup> and health-care waste management situation in a south-east Asian country – Lao PDR<sup>14</sup>.

The Zambian health-care waste management plan has worth noting points like division of responsibilities among ministries and department, choosing of different treatment and disposal options for different levels of health-care units, a three years' implementation plan etc. Classifications of health-care waste and treatment/disposal options suggested require to be examined.

The Philippine experience in managing huge amount of immunisation waste generated through a countrywide immunisation campaign offers valuable experiences. But it is to be noted that the one time mass immunisation programme was different from the universal immunisation programme we have here. The planned hauling of waste over widely spread out diverse terrain may not be possible on regular basis.

The study of emergency health-care waste management in Kosovo is instructive for developing a management system with very little infrastructure. Its dependence on low quality incineration is not acceptable.

The study on Lao PDR offers insights on poor management of health care waste.

### **Legal & Administrative Directives**

The literatures reviewed in this section give out the legal and administrative framework for health-care waste management in India. The Bio-medical Waste (Management & Handling) Rules, 1998<sup>16</sup> lays down the authorities, responsibilities, procedures and standards for health-care waste management. The Central Pollution Control Board Guidelines on Common Bio-medical Waste Treatment Facilities and Incineration<sup>17</sup> add to the directives contained in the former.

The BMW Rules direct that no bio-medical waste is to be stored for more than 48 hours in untreated condition – this may be of particular importance in view of the BMW

generated in immunisation centers spread out in the rural areas from where hauling to BPHCs or PHCs might take considerable time and effort.

Incineration, as prescribed in the rules may not be a viable option at the BPHC/PHC level given the waste permissible for incineration<sup>17</sup> (category-1) is of very small quantity.

Also, the standards of treatment options laid down in the rules may be very difficult to follow in rural setting with little infrastructure and resources. Thus, it may not be easy to go for waste autoclaves with computerized recording system at the BPHC/PHC level.

The Central Pollution Control Board Guidelines for Disposal of Bio-medical Waste Generated during Universal Immunisation Programme (UIP)<sup>18</sup> have made definite developments over the instructions contained in the BMW Rules. First, it helps to reduce the quantity of sharp waste generated through immunisation programmes by advising cutting of the needles with hubs from the syringes. Second, it advises boiling of the waste sharps and used syringes and vials as a procedure for decontamination where autoclave is not available. Third, it prescribes sharp pits to dispose the waste sharps.

The Government of India publication “Infection Management & Environment Plan (IMEP) for Reproductive & Child Health Programme – Phase-II”<sup>19</sup> provides, among other matters, an Institutional Framework for management and environment as well as a time frame for the implementation of the action plan. These may contribute in a good way towards development of a plan for primary/immunisation health-care waste management in the state. One important suggestion is chemical disinfection of used needles and syringes. Waste management equipment and consumable requirements of the immunisation centers with cost estimates have also been appended.

Both the CPCB guidelines and the IMEP document suggests regular hauling of BMW from the outreach/sub immunisation centers to PHCs/BPHCs for treatment and disposal, this may be very difficult to implement.

### **State Experiences**

The WBHSDP Action Plan on Health Care Waste Management<sup>20</sup> is by far the most resourceful and important document in this section as it is the blueprint of the health-care waste management system at work in the secondary level health-care units in West Bengal and covers almost all the relevant issues including the administrative arrangements and legal obligations. Any strategy for management of primary level health-care waste in the state must take into account the procedures already in place and develop necessary linkages with the same. One very important area dealt in is the incremental approach and scope for multiple options in choosing the appropriate waste management model. The collection, treatment and disposal systems suggested in the Action Plan need to be assessed in the light of new directives and possibilities.

The literatures on BMW management in Tamilnadu<sup>21</sup>, Kerala<sup>22</sup> and Delhi<sup>23</sup> apart from providing elaborate plans on general BMW management issues pertaining to the respective states do not offer much insight regarding primary level or immunisation health-care waste management.

The “Healthcare Establishment Waste Management and Education Programme (HEWMEP), Gulbarga, Karnataka”<sup>24</sup> provides planning a composite common facility with multiple treatment and disposal options for bio-medical waste.

### **Hospital Experiences**

The only hospital experience reviewed in this section is that of CHC Daulatpur<sup>25</sup>. The document offers well laid out plan for bio-medical waste management in the hospital with monitoring/reporting formats.

### **Training Modules**

WHO published Teacher’s Guide<sup>26</sup> covers the subjects dealt in the basic WHO source book on health-care waste management – “Safe management of wastes from health care activities” in training course format. As such it is a basic source book on health-care waste management training meant for management staff. This may serve as a guidebook for developing a training manual for primary level health-care waste management.

The Training Module<sup>27</sup> on health-care waste management of WBHSDP has been developed through experiences gathered during implementation of waste management programme in secondary level hospitals in the state. This document needs to be updated and adapted to the requirements of primary level health care waste management in the state.

The training manual “Understanding and Simplifying Bio-Medical Waste Management”<sup>28</sup> prepared by Toxics Link presents the issues in the form of slides. This may be a useful form for delivering necessary trainings.

A very useful step-by-step training manual for management of sharps waste with user instructions has been provided in “Training Health Workers in the Management of Sharps Waste”<sup>29</sup> published by PATH.

### **Accreditation**

Accreditation of hospitals and inclusion of health-care waste management as one of its components are new to our society. Accreditation system, if properly maintained, goes a long way in ascertaining and keeping up standards of materials and services by imparting information about those to the society in a codified manner.

It appears from the publication “Standards for Hospital”<sup>30</sup> that the system in this case is still in a very primary stage and deserves to be made more sensitive towards the difference in levels and characters of health care units operating in our society.

\* \* \*

*It is observed that none of the literatures reviewed offer any experience of state or district wise implementation of health care waste management at primary level health care including immunisation programme undertaken on regular basis. As such the present GTZ-DISHA endeavour to develop a strategy for health care waste management for primary level health care in West Bengal appears to be a new pursuit.*

## **1. Safe management of wastes from health care activities**

World Health Organisation  
Geneva 1999

### ***SUMMARY:***

Considered as the most comprehensive guidebook for health care waste management this publication covers almost all the aspects of the subject.

1. Definition and characterization of health-care waste
2. Health impacts of health-care waste
3. Legislative, regulatory and policy aspects
4. Health care waste management planning
5. Waste minimization, recycling and reuse
6. Handling, storage and transportation of health-care waste
7. Treatment and disposal technologies for health-care waste
8. Application of treatment and disposal methods to health-care waste categories
9. Collection and disposal of wastewater
10. Costs related to health-care waste management
11. Health and safety practices for health-care personnel and waste workers
12. Emergency response
13. Hospital hygiene and infection control
14. Training
15. Minimal programmes for health-care waste management

Particularly important to develop a management strategy for basic health-care waste are chapters on “Health care waste management planning”, “Handling, storage and transportation of health-care waste”, “Application of treatment and disposal methods to health-care waste categories” and “Minimal programmes for health-care waste management”.

The section “Health care waste management planning” relates facility level planning with international recommendations and national plans indicating their respective importance. It covers both development and implementation of the plan. It lays down the basic principles for managing health care waste from scattered small sources.

The section on “Handling, storage and transportation of health-care waste” takes up collection methods of individual items, storage norms, and criteria for both on-site and off-site transportation with labeling, record keeping and routing.

“Application of treatment and disposal methods to health-care waste categories” suggests treatment and disposal options for different categories of health-care waste. Emphasis has been given on pharmaceuticals, heavy metals, cytotoxic drugs and radioactive waste.

“Minimal programmes for health-care waste management” lays down the basic elements of minimal programmes of health-care waste management for a health-care unit including assessment, assignment, training, safety, collection, treatment and disposal with options to reuse and recycle.

***COMMENTS:***

1. Health-care waste management practice is an evolving subject and this 1999 publication deserve to be updated. However, other subsequent WHO publications contain updated information.
2. Problems specific to primary health-care waste management in health care units spread over rural areas and management of immunisation waste have not been discussed.
3. The concept of disposal specific collection and handling systems has not been mentioned while discussing options.

**2. Management of Solid Health-Care Waste At Primary Health-Care Centres**  
**A Decision-Making guide**  
World Health Organization  
Geneva 2004

***SUMMARY:***

Aimed at providing guidance for selection of the most appropriate options for safe health care waste management at Primary Health Care Centres (PHCs) in developing countries this guide caters detailed information on the following:

- i. Basic risks associated with poor management of health care waste.
- ii. Basic elements for safe health-care waste management (HCWM)
- iii. Parameters to assess before selecting HCWM options
- iv. Technical annexes describing HCWM options
- v. Estimation of costs of the various options
- vi. Decision-trees, assisting the selection of HCWM options

In view of wide situational variations the document considers 5 scenarios –

- i. Urban area with access to legally approved modern waste treatment facility
- ii. Urban area without access to legally approved modern waste treatment facility
- iii. Peri-urban area
- iv. Rural area with access to legally approved modern waste treatment within reasonable distance
- v. Remote area without access to legally approved modern waste treatment or disposal facility

And in consideration of wide ranging immunization activities attaches special importance to –

- i. Immunization activities at PHC, and
- ii. Outreach immunization activities

It provides useful insights on the range of treatment options available and their respective usefulness and limitations.

Suggested waste management flow charts for different scenarios have been appended.

It also provides a costing methodology for health care waste management.

***COMMENTS:***

1. Sharp pits for needles – contains the most dangerous infectious waste.
2. Syringes (cut from the needle hubs) and vials etc. for chemical disinfection / autoclaving. Consequent recycling.
3. Other BMW to be autoclaved and recycled or put into burial pit.

4. All Immunisation waste to be hauled to PHCs/BPHCs may not be a viable option in our situation under given constraints.

It is a rich document that discusses not only various options but also how to choose between them, leaves scope for improvisation and adoption according to exigency and scope.

**3.Preparation of National Health-Care Waste Management Plans in  
Sub-Saharan Countries - Guidance Manual**  
UNEP & WHO  
2005

***SUMMARY:***

This manual is the result of experience gathered over several years (2000-2004) in conducting technical assistance projects in a number of countries in the Sub-Saharan region. It aims at identifying appropriate practices for health care waste management by providing assessment and planning tools applicable in most sub-Saharan countries of Africa. The document is divided into four sections.

The *first section* contains fundamental regarding definitions, characterisation and classification of health care waste, associated risks and basic protective measures for employees, minimum observance that any health care facilities should comply with, key management principles, sound treatment and disposal technologies applicable to each category of waste.

The *second section* describes the first steps necessary to assess the current situation before developing a national health care waste management plan.

The *third section* provides guidance for the establishment of a national health care waste management plan. It describes how to incorporate both specific objectives and a holistic approach to address efficiently all the specific aspects of such a plan.

The *fourth section* provides guidance to develop a strategy to implement a health care waste management plan through reinforcement of the collaboration between the central, regional and municipal/local authorities to improve the health care waste management practices and to find out pragmatic solutions.

Further, the document contains important briefs on the following issues –

- 1: Fundamentals regarding the management of syringes and needles
- 2: Health care waste treatment and disposal technologies
- 3: HCWM procedures to be applied in medical laboratories
- 4: HCWM procedures to be applied in health-care facilities
- 5: Methodology to estimate the quantities of hazardous HCW produced at national level

***COMMENTS:***

1. Though primarily aimed at providing guidance to development and implementation of national plan for HCWM, information catered and issues discussed are of much

relevance to development of health care waste management strategy for primary level health care.

2. Management issues for immunisation waste have not been covered other than needle syringe management.

#### **4. Health Care Waste Management Guidance Note**

World Bank's Human Development Network

May 2000

##### ***SUMMARY:***

This guidance note is an internal World Bank working document that attempts to synthesize the available knowledge and information in the field of healthcare waste management. It has been developed on the basis of WHO guidelines for healthcare facilities and waste management projects contained in "Safe Management of Wastes From Health-care Activities, WHO, 1999".

This guidance note covers areas like small and large health care units; municipal, metropolitan, regional and national health care waste projects. Each sector has been dealt with specific guidelines on assessment and planning. Checklists are provided for convenient recapitulation.

A rich annexure of notes on the following items are provided –  
Management Issues;

National and International Healthcare Waste Regulations;

Technology Considerations for Special HCW Treatment and Disposal;

Cost Considerations for Waste Treatment and Disposal;

Conducting Environmental Assessments;

Packaging Options;

Feasibility Study for Regional HCW Management.

##### ***COMMENTS:***

1. Assessment and planning checklists provided in the document are useful tools for planning HCWM at facility level as well as local, regional or national levels.
2. Technology options have also been very aptly assessed. Problems of waste incineration mentioned.
3. Management issues for immunisation campaign waste have not been covered.

## **5. Management of Wastes from Immunisation Campaign Activities: Practical Guidelines for Planners and Managers.**

World Health Organization  
Geneva 2004

### ***SUMMARY:***

This document aims at providing practical guidelines for planners, managers of health-care facilities or mobile vaccine team leaders to improve planning and coordination at the *central level* as well as waste management practices at the *local level* where immunisation activities are conducted. It is divided into four parts:

- I. *Elements of strategy* presented are:
  - \_ careful planning at the central and local levels;
  - \_ clear assignment of responsibilities;
  - \_ adequate briefing and training of staff;
  - \_ daily monitoring to enable immediate corrective actions if necessary;
  - \_ final evaluation and recommendations for future activities.
- II. A *chronological management plan* structured in checklist format to recapitulate basic actions that have to be taken in order to cope with waste created during immunisation activities at both central and local levels;
- III. Specific *recommendations for practical waste management procedures* as well as a set of *toolboxes* to assist users in the planning, follow up and monitoring of the management of wastes during the campaigns;
- IV. A *glossary* to summarize the main terms used in the document.

### ***COMMENTS:***

1. Very useful management strategy points and guidelines for strategy implementation at both central and local levels are provided.
2. The suggested practical waste management procedures deserve to be examined and upgraded.

## **6. Safe Management of Bio-medical Sharp Waste in India**

World Health Organisation

South-East Asia 2005

### ***SUMMARY:***

The study documents successful sharp management systems in urban areas and evaluates non-burn treatment and disposal technologies. In view of the nation wide introduction of Auto Disable (AD) syringes for immunisation programme the study analyses the implications linked to their use and the possibilities of material recovery of these syringes.

Thirteen case studies have been conducted on bio-medical waste management and disposal covering health care and waste treatment facilities in different parts of the country. Areas under focus are: waste management within the health care facility, sharps collection and transportation, treatment of sharps waste, evaluation of waste treatment technologies including costs and options for final disposal.

Cost comparison of treatment options has been provided.

Sharps waste management flow charts for all the 13 facilities have been provided.

The study took up material (metal & plastic) recovery from waste syringes and needles with special reference to AD syringes. Views of the recycling industry have been noted.

The findings of the study indicate recycling possibilities at all the sites. Autoclaves have been recommended as most affordable effective treatment option. Wide practice of chemical disinfection of sharps has been noted. Designs of disposal facilities and standards of treatment facilities have also been appended.

### ***COMMENTS:***

1. The study does not cover Immunisation campaign waste generated throughout the length and breadth of the country.
2. The study has not taken into account the CPCB “Guidelines for Disposal of Bio-medical Waste Generated during Universal Immunisation Programme (UIP)” while discussing the regulatory provisions.
3. Evaluation of treatment options and findings on material recovery from sharps are very useful.

**7. Aide-Memoire For A National Strategy For  
Safe Health-Care Waste Management**  
World Health Organization  
Geneva 2003

***SUMMARY:***

This brief document emphasizes the basic underlying principles for national health care waste management strategy, “(1) the assignment of the legal and financial responsibility for safe management to the waste producer; and (2) the responsibility of duty of care”. Precaution should be applied when risks are uncertain. Policies and plans for safe management of healthcare waste should address three elements:

1. A comprehensive system, from generation of health-care waste to disposal – to be implemented gradually
2. Training of all those involved and increase awareness
3. Selection of safe and environment-friendly management options.

It provides a checklist for action at National and Local levels that includes the following:

**National policy for safe health-care waste management**

- Designation of responsible authority  Regulatory framework and guidelines
- Initial assessment  Three element approach (as outlined in this aide-mémoire)
- Monitoring and evaluation  Integration into overall waste management plan

**Comprehensive system**

- Assigned waste management responsibilities to personnel  Allocation of resources
- Waste minimization  Waste segregation  Safe collection, handling and storage
- Safe treatment and disposal

**Awareness & training**

- Waste management in health curricula of health-care personnel  National training package
- Train the trainers programme  Education on health risks  Education on safe practices

**Selection of management options**

- Review available options  Check safety and environment friendliness
- Ensure workers’ safety  Evaluate Sustainability  Assess acceptability
- Monitor safety and efficiency

***COMMENTS***

A ready-reckoner of the steps associated with bio-medical waste management. A very useful tool in strategy planning and implementation.

**8. Environmentally Responsible Management of Health Care Waste  
With a Focus on Immunization Waste**  
Health Care Without Harm  
October 2002

***SUMMARY:***

This publication by Health Care Without Harm - an international collective working for safe management of health care waste is designed to guide the reader toward safer approaches to managing health care wastes with an emphasis on wastes from immunization programmes. Five topics are covered:

1. Health care wastes and the threat to public health
2. Combustion technology and its impact on the environment, health workers, and surrounding communities
3. The De Montfort incinerator – research and results
4. Low-cost alternatives for waste treatment and disposal
5. Recommended processes for good waste management

The document emphasizes use of alternatives to waste incineration and suggests steps to evolve a sound and comprehensive waste management system.

It indicates that in a systems approach to waste management—even in temporary programs or small facilities—the key structure is segregation, proper containerization of wastes, a secure system of storage and transportation, and appropriate and safe treatment and disposal sites that are adequately operated. This key structure depends on training, education, and management. The quality of the workforce determines the ultimate success of a program.

The publication also provides both On-Site and Off-Site Treatment and Disposal Options Decision Trees to show the wide range of possibilities available to meet different needs.

***COMMENTS:***

1. The publication caters strong arguments against waste incineration.
2. It describes the essential steps required to evolve a waste management system.

3. It does not specifically take up issues related to management of immunisation waste generated through immunisation centers operating over a widespread rural area.

## **9. Managing Hospital Waste - A Guide for Health Care Facilities**

SRISHTI

September, 2000

### ***SUMMARY:***

This is a very useful handbook by SRISHTI, who are the pioneering NGO in bio-medical waste management in India, for managing waste in a health care unit. It addresses the following areas:

- i. Planning the Programme
- ii. Getting to know the waste (classification, survey)
- iii. Dealing with the waste (segregation, handling and treating)
- iv. Focusing on specific locations (in patient locations, OT, OPD, Laboratory)
- v. Involving Personnel ( training modules, awareness)
- vi. Sustaining the scheme
- vii. Disposal Technology efficacies
- viii. Ragpickers' Role, Municipality interface
- ix. Case Studies

### ***COMMENTS:***

1. A very useful guide for establishing a system of waste management in a particular HCU.
2. Management problems typical to primary level health care waste and immunisation programme waste have not been addressed.

## **10. Hospital Waste - Time to Act**

SRISHTI  
June, 2002

### ***SUMMARY:***

The publication contains a collection of factsheets on very important topics related to bio-medical waste management. The topics covered are:

1. Sharps disposal
2. Economy of hospital waste management
3. Plastics in healthcare
4. Incineration
5. Mercury handling
6. Glutareldehyde
7. Training for medical staff
8. Universal Precautions
9. Disinfectants against the microbes
10. Exploring mercury and its alternatives
11. Radioactive waste
12. Treatment technologies
13. Safety of healthcare workers
14. Cytotoxic drugs

### ***COMMENTS:***

1. This publication is relevant to address a number of problems encountered in primary health care and immunisation waste management like management of waste sharps, plastics, disinfectants, precautionary measures and training.

## **11. Designing Safe Syringe Disposal Systems for Immunization Services**

PATH  
October 2003

### ***SUMMARY:***

Construed as a guide for programme managers engaged in planning safe management of syringes this publication of PATH (Programme for Appropriate Technology in health) caters the following in a step-by-step manner –

1. Review of Options :  
Options for collection, disposal and monitoring along with locations for disposal
2. Collection of relevant data and map of the district:  
Data on generation of waste syringes; health facilities and treatment and incinerators available; constraints of transport etc.  
A disposal system map showing the various disposal requirements of each health center and outreach site and their proximity to existing or planned incinerators.
3. Identifying facilities with access to incineration  
Marking all health facilities that can be served by existing incinerators on the map.
4. Identifying strategic locations for new incinerators  
Locating new incinerators to get full coverage.
5. Determining the best disposal systems for the remaining health facilities  
Deciding the best destruction option for each unserved facility.
6. Calculating needs and cost of the plan and implementation  
Preparation of planning chart and budget, then going for implementation.

### ***COMMENTS:***

Minus its almost singular dependence on incineration as the final disposal option for waste syringes the guidebook is a useful document. It presents the elements of bio-medical waste management planning at the district level.

Advantages and disadvantages of the options for collection, disposal and monitoring; collection of data on waste generation, number and category of health facilities, waste

treatment and disposal facilities, transport etc. together with mapping are important factors in planning the system.

Finally, identifying the need and locations for new treatment facilities, preparation of planning chart and budgeting have also been dealt with.

## **12. Implementation Plan for Health Care Waste Management 2004-2006**

Central Board of Health,  
Lusaka, Zambia  
September 2003

### ***SUMMARY:***

This plan endeavors to tackle issues of health-care waste management arising from operations, at various levels of health care delivery system in Zambia.

The document contains:

- i. Different levels of govt. health care facilities operating in the country.
- ii. Different categories of waste generated from health care facilities.
- iii. Technologies for health-care waste treatment and final disposal have also been enlisted with their respective advantages and disadvantages.
- iv. Recommendation of approved technologies for each level of health care units.
- v. Cost approximations.
- vi. Development and utilization of regional/centralized disposal facilities..
- vii. Capacity building of health care workers and waste managers.
- viii. Legal framework and policy
- ix. Recommendation for a colour coded collection system.
- x. Responsibilities of government ministries and departments.
- xi. A format for schedule of three years' implementation plan for HCWM with budget.

### ***COMMENTS:***

1. It is a well-attempted document to develop a comprehensive BMW management plan for the country.
2. Absence of a detailed legal instrument is a big gap affecting the plan.
3. Classification of health care waste presented in the document may not be in conformity with standardized management procedures and options.
4. Treatment options recommended include incineration of wastes other than anatomical even at lower levels.

5. Chemical treatment agents recommended include very toxic chemicals like glutaredehyde.

**13. Disposal of Mass Immunization Waste Without Incineration:  
Philippine Follow-Up Measles Campaign 2004**  
Phillipine Deptt. Of Health & HCWH  
2004

***SUMMARY:***

The document states “The Philippine Follow-Up Measles Elimination Campaign (PMEC) targeted an estimated 18 million children during the month of February 2004. In a little over a month, the PMEC generated an estimated 19.5 million syringes collected in 162,000 safety boxes, amounting to about 810,000 liters or 130,000 kg of sharps waste. Also produced were an additional 740,000 liters or 72,000 kg of non-hazardous waste (empty vaccine vials and ampoules, syringe wrappers, empty vitamin capsules, cotton swabs, syringe caps, and packaging). The measles campaign presented an opportunity to demonstrate and document waste management and disposal without incineration or open burning during a mass immunization campaign”.

The used auto-disable syringes were collected in 5-liter safety boxes, and treated and disposed using one of the following methods after temporary storage and subsequent transportation:

- Treatment in an autoclave facility
- Treatment in a microwave facility
- Encasement in a concrete septic vault
- Burial in a waste pit.

A cost estimation of various treatment and disposal options has also been given.

***COMMENTS:***

1. It is a great feat to plan and manage wastes from such a huge mass immunisation campaign. The organisation, coordination, training, treatment and disposal facilities opted for provide valuable lessons.
2. Empty vaccine vials and ampoules, cotton swabs generated during immunisation are to be treated as hazardous waste.
3. The long hauling measures undertaken during the particular campaign may not be advisable for routine immunisation activities.
4. Treatment and disposal options are also to be assessed accordingly.

## **14. Health-care waste management in Lao PDR: A Case Study**

Department of Health Policy & Planning,  
School of International Health, University of Tokyo,  
Tokyo, Japan 2005

### ***SUMMARY:***

This study investigated the health-care waste (HCW) management at each health-care facility level at two selected sites in the Lao People's Democratic Republic (Lao PDR): Vientiane Municipality; and Bolikhamxay province. It focused on the amount of HCW, its segregation and the factors influencing HCW management, particularly segregation procedures. It also attempted to prepare an outline status report on HCWM in Lao PDR. The study revealed lack of proper segregation, treatment and disposal with very low level of awareness among health workers and waste managers.

### ***COMMENTS:***

1. The Country Situation Assessment indicates the problems of poor management and needs for improvement.
2. As an outline status report it may be of little use for developing primary health care waste management plan.

## **15. Emergency Waste Management Healthcare Waste Improvements Made In Kosovo**

Sarah Gayton  
2003

### ***SUMMARY:***

This paper details the improvements in health care waste management, which have been made in the Province in the post conflict phase, following the ending of the NATO interventions in August 1999.

The challenge was to provide focused technical and financial assistance to allow low cost interventions, which could be quickly implemented to improve the situation. These included:

- a) The introduction of waste segregation of general and potentially infectious waste into colour coded bags or containers
- b) Collection of sharps into rigid containers
- c) Provision of a separate facility for treating potentially infectious and used sharps waste

The document enlists the problems faced by the health institutions like, very limited or no waste collection and disposal service, no treatment facilities, accumulation of waste during the NATO interventions, no waste segregation, lack of awareness of risks of waste management with personnel, no regular electricity or water supply, difficult procurement procedures, lack of fund.

The immediate intervention activities included:

- i. The introduction of the WHO three-container system for waste segregation.
- ii. Construction of brick built single chamber De Montfort incinerators along with four double chamber incinerators.
- iii. Procurement of waste management consumables
- iv. Development and catering of Training Materials and Training

### ***COMMENTS:***

1. Use of WHO recommended three colour container system is a useful method.

2. Use of incinerators to treat all infectious waste and use of the contents of the healthcare waste as fuel is unacceptable for public health concerns.
3. Deserves incremental approach with introduction of low cost but effective treatment and disposal options.

## **16. Bio-Medical Waste (Management and Handling) Rules, 1998**

Ministry of Environment and Forests

New Delhi – 1998

### ***SUMMARY:***

These rules provide for the legal and binding instrument for management and handling of biomedical waste in Indian territory.

They :

- Bring BMW Management within Legal Ambit
- Indicate Authorities, Responsibilities, Procedures & Standards
- Fix Datelines for Implementation

They apply to all persons who – Generate, Collect, Receive, Store, Transport, Treat, Dispose, Handle bio-medical waste in any form.

### ***COMMENTS:***

1. According to these rules all the BPHCs and PHCs in the primary/basic health sector will have to apply for authorization from the state pollution control board and abide by the related obligations and formalities.
2. The treatment and disposal options as well as their standards prescribed in the rules deserve to be examined with reference to the requirements and capacities of primary health care system.
3. 48 hours time limit for storing untreated BMW imposes a definite constraint on management of waste generated in widely spread out and remote immunisation centers.

**17. Guidelines for  
Common Bio-Medical Waste Treatment Facility & Incineration**  
Central Pollution Control Board  
New Delhi

***SUMMARY:***

Central Pollution Control Board laid down these guidelines to meet regulatory needs thrown up by new situations involving establishment of Common Treatment Facilities and Incinerators.

For Common Bio-Medical Waste Treatment Facility (CBWTF) the guidelines have been provided regarding:

Location, Land Requirement, Coverage Area, Treatment Equipment, Infrastructure, Record Keeping, Collection and Transportation, Disposal of Treated BMW, Cost to be Charged from the HCUs, Setting Up and Operation Checklist.

For Incinerator guidelines have been provided regarding:

General Applicability & Installation, Design, Air Pollution Control Device, Incinerator & Waste Storage Rooms, Operator of Incinerator.

***COMMENTS:***

Relevant developments made in the guidelines over the BMW Rules are –

1. Only Waste Category 1 & 2 shall be incinerated (Exceptionally Category 5).
2. All other waste shall be imparted non-incineration treatment.
3. Incinerator shall be allowed only at Common Bio- Medical Waste Treatment Facility.

## **18. Guidelines for Disposal of Bio-medical Waste Generated during Universal Immunisation Programme**

CPCB, India

2004

### ***SUMMARY:***

The Central Pollution Control Board (CPCB) has, prepared guidelines for disposal of bio-medical wastes expected to be generated under Universal Immunisation Programme. 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. 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. CPCB has developed the guidelines on the basis of case studies conducted in two districts, one each from Uttar Pradesh and Rajasthan.

The guidelines describes the nature of the wastes generated during UIP and the process of their generation.

The guidelines prescribe for District Hospitals/CHCs/PHCs

- i. Removal of needles from the syringes cutting from the hub.
- ii. Collection of cut needles and broken vials in white translucent puncture-proof containers and collection of syringes (cut from the hub) and unbroken discarded vials in red bags/ containers.
- iii. Labeling of the containers.
- iv. Sending both the containers to CBWTF for treatment if available.
- v. If not, autoclaving.
- vi. Boiling in water where autoclaving is not available.
- vii. Disposal of needles and broken vials in pits/tanks.
- viii. Sending the syringes and unbroken vials for recycling.
- ix. Washing of autoclaved containers for reuse
- x. Record keeping and reporting.

For outreach points out side the District Hospitals/CHCs/PHCs the guidelines prescribe

- i. Carrying and handing over of the waste containers (as instructed earlier) to the District Hospitals/CHCs/PHCs while returning the unused vaccines and reporting.
- ii. Following similar subsequent steps as instructed earlier.
- iii. Keeping of records and checking the matching of waste generated with the stock issued.

The document provides a design for sharp pit as well.

***COMMENTS:***

1. These all-important guidelines from the prescribed authority have provided very useful improvements/adjustments over the BMW Rules to suit the UIP.
2. Detaching of needles cut from the syringe hubs and disposing those in sharp pits with broken vials contains the most hazardous waste.
3. Boiling, as a treatment procedure, is a useful compromise over the BMW rules. Its parameters have to be examined.
4. Regular hauling of waste from the outreach and sub centers to PHCs/BPHCs for treatment and disposal is a difficulty.

## **19. Infection Management & Environment Plan (IMEP) for Reproductive & Child Health Programme, Phase-II**

Govt. of India, Ministry of H&FW,

Deptt. of Family Welfare

September, 2004

### ***SUMMARY:***

The main focus of the Infection Management and Environment Plan (IMEP) is to underpin the operations of RCH-II to deliver better health outcomes for the common people while ensuring the safety of the healthcare service providers. Thus it lays down a scheme for management of waste generated as part of the activities of RCH-II.

The plan provides among other things:

1. General instructions for managing BMW
  - i. Anatomical waste to be buried by ANMs at generation points (further instructions to be given) and in the pits at PHCs;
  - ii. At the PHC level, a simple system of two coloured bins, one for general waste and other for infectious waste is recommended. The disposal mechanism for the plastic waste at the PHC level would be analysed and suitable action plan would be drawn based on local conditions.
  - iii. At the CHC/FRU level, high-grade mechanical needle cutters would be provided. The remaining plastic part would be disinfected, autoclaved & shredded and used for recycling purposes . 3 coloured bins would be promoted as per the Bio-Medical rules, for collecting different types of wastes (Anatomical, Infectious Plastics and General Wastes)
  - iv. Use of Common Treatment Facilities (CTFs), wherever available, would be encouraged for the CHCs/FRUs located in the Urban/Peri-Urban areas.
  - v. Flow charts for managing sharp waste both at the outreach center / sub-center level and at the PHC/CHC/District Hospital/ Regional institute level. Hauling of sharp waste from outreach/sub centers to PHCs for chemical treatment and disposal has been proposed.
2. An institutional framework comprising of ANMs, Waste Management In-charge, Nursing Staff, Doctors, District Health Officers, State Nodal Officer-RCH-II, State Pollution Control Board ,Logistic Management Agency and MOHFW with clearly defined roles. State level plans would need to be

developed by the State Nodal Officers. An Institutional framework flow chart with monitoring & evaluation and reporting system has been appended.

3. A proposed country action plan implementation schedule with estimates of requirement of equipment and cost per center.

***COMMENTS:***

1. Waste management of RCH-II programme and govt. HCUs will have to be coordinated as they are concurrent where the latter exist. The institutional arrangements also call for coordinated approach.
2. Hauling of untreated waste from outreach/sub centers to PHCs for treatment and disposal may be difficult
4. The plan leaves out management of plastic waste, discarded vaccine vials, cotton swabs etc.

## **20. Action Plan on Health Care Waste Management**

WBHSDP Deptt.of H&FW, GoWB

December 2003

### ***SUMMARY:***

This action plan is the outcome of the rigorous exercise undertaken to manage health care waste in the secondary level govt. health care units under the West Bengal Health System Development Project.

This detailed action plan covers areas like :

- A. Legal Aspects and Responsibilities
- B. Institutional Arrangements for implementation along with formation of facility level task forces.
- C. Basic aspects of HCWM like categorization and composition of health care waste by quality and quantity
- D. Practical steps of HCWM like segregated collection in colour coded containers, internal transportation, on-site treatment, on-site storage, on-site disposal, off-site transportation and off-site disposal according to appropriate choice.
- E. Flow charts for BMWWM in three settings – HCUs with treatment facilities in municipal area, HCUs without treatment facilities in municipal area and HCUs in non-municipal areas have been provided.
- F. Aspects like waste tracking, record keeping and reporting, occupational safety measures, emergency response and waste minimization have also been given.
- G. Specification and Requirement of materials for HCWM, designs for campus pit, trench, burial pit and double chambered vat, formats for record keeping and reporting etc. are appended in the annexure.

### ***COMMENTS:***

1. This is a very instructive document for BMWWM in different categories of health care units in the state. May be of good use in planning primary level health care waste management.
2. Though waste sharps are collected separately – no separate disposal is prescribed.

3. No segregated collection of recyclable and biodegradable waste preclude recycling possibilities.
4. Burial of infectious solid (plastic) waste is not in conformity with the BMW Rules.
5. Where all the infectious waste goes for deep burial there three colour container approach might be simpler.
6. Plastic bags for collection and disposal of general waste hinder composting and generate unnecessary plastic waste.

## **21. Tamil Nadu Health Care Waste Management System**

HSDP Govt. of Tamil Nadu

### ***SUMMARY:***

As a part of Health Service Development Project, a comprehensive Health Care Waste management system is being planned by the Government of Tamil Nadu. Tamil Nadu has 1413 Primary Health Centres ( PHCs) and 8682 Health Sub Centres (HSCs) apart from more than 300 higher level hospitals.

This is a fairly elaborate plan that aspires to cover bio-medical waste management right from tertiary institutions to the PHCs dwelling on the following essential areas:

1. Segregated collection of waste with colour coding
2. Treatment options
3. Transportation
4. Disposal
5. Record Keeping
6. Personal protection
7. Administrative lay-out
8. Responsibilities of all personnel associated with waste generation and management
9. Locations of proposed Common Treatment Facilities
10. Implementation Schedule and
11. Budget

The plan rules out use of incinerator for treatment of bio-medical waste.

### ***COMMENTS:***

1. The document has a number of useful elements for state wise planning of HCWM like administrative lay out, fixing of responsibilities, implementation schedule and budget.
2. The treatment and disposal options indicated deserve to be re-examined and upgraded. Some of the prescribed options do not conform to the existing legal and / or scientifically accepted norms.
3. Treatment and disposal options given may not suit PHCs and SCs.

4. Problems of managing immunisation campaign waste do not figure in the document.

## **22. Draft Vision Document on Bio-Medical Waste Management** Kerala SPCB 2003

### ***SUMMARY:***

As per the 1991 census, Kerala is having the highest number of hospitals in India. 26% of total hospitals in India are located in Kerala. There has been tremendous increase in the number of hospitals thereafter.

This vision document lays out the bio-medical waste scenario in Karala and concentrates on installation of common biomedical waste treatment and disposal facilities (CBWTDFs) as the viable option for biomedical waste management in the state.

Initially it proposes three CBWTDFs at Kannur, Thrissur and Alappuzha and lays down the area and hospital coverage of the facilities. Then it goes on to indicate the requirements of these facilities in terms of treatment equipments, procedures for collection, treatment, disposal and record keeping along with the charges to be collected by the operators of these facilities. The document reiterates the CPCB guideline regarding common treatment facilities and mentions that no BMW other than category no.1 and category no.2 are to be incinerated. The vision document calls for private participation as a way out of the fund constraints.

### ***COMMENTS:***

1. The document exclusively deals issues concerning installation and running of large CBWTDFs and thus may not be relevant to the management of primary health care waste especially immunisation campaign waste.

## **23. Bio- Medical Waste Management** Govt. of Delhi, Directorate of Health Services 2003

### ***SUMMARY:***

With 25 government hospitals and 460 registered nursing homes Delhi produces around Delhi Government proposes installation of two more Common Treatment Facilities in addition to already operating two facilities.

**COMMENTS:**

1. The brief note exclusively deals issues concerning installation and running of large common treatment facilities in a large urban setting and thus may not be relevant to the management of primary health care waste especially immunisation campaign waste.

**24. Healthcare Establishment Waste Management and Education Programme (HEWMEP), Gulbarga, Karnataka**

Centre for Environment Education (CEE)

[A presentation by Dr. Shyamala Mani]

**SUMMARY:**

The HEWMEP was started with the objective to set up a completely operational common facility for Bio-medical Waste Collection, Transportation, Treatment and Disposal for Healthcare Establishments (HCEs) in Gulbarga. Common medical waste treatment facility at Gulbarga caters to all the 433 HCEs at Gulbarga (updated data Jan 2005).

The facility includes –

- Incinerator (1 in no.) of capacity 50 kgs /hr for treatment of waste under category 1,2.
- Modified Autoclaves (2 in no) each of capacity 100kg/hr for treatment of waste under category 3,4,6,7
- Metal Sharps Manager (1 in no) of capacity 10 kg/hr for treatment for metal sharps.
- Land filling for rejects, incinerator ash and hazardous chemicals (categories 5 and 9).
- Deep Burial as a stand by option in case of breakdown or maintenance of incinerator at the site.
- ETP for the liquid waste generated at the site.
- Compost pits for the organic waste at the site.

**COMMENTS:**

The common treatment facility at Gulbarga catering to 433 health care establishments is in itself worth studying. The composite nature of the facility with multiple treatment and disposal options is very instructive.

Metal Sharps Manager and Effluent Treatment Plant are very important components of the facility.

But the presentation raises the following questions as well –

The waste quantification data as presented do not indicate waste by category (as per the rules).

The incinerator with 50 kgs/hr capacity appears to run much under its capacity. Deep burial of sterilized soiled waste (cat.6) is not necessary and uses up precious burial space.

Besides, the economic (income-expenditure) picture has not been presented. Thus it is not possible to assess sustainability of the project.

This is a capital intensive, high capacity common facility in respect of basic health care waste management.

## **25. Managing Hospital Waste At CHC Daulatpur : Basic Health Project Himachal Pradesh**

Indo-German Cooperation 2004

### ***SUMMARY:***

A comprehensive plan for bio-medical waste (bmw) management has been developed. The plan has the following features:

- B. Segregated collection of different categories of BMW in coloured bins and bags according to disposal options exercised.
- C. Placements of Bins & Bags of appropriate size have been indicated.
- D. Bulk of the waste: Anatomical (cat 1), Microbiological Waste (cat 3) & Soiled Waste (6) to be collected in Yellow bag-bin to be disposed through deep burial.
- E. Solid (Plastic) Waste (cat 7) to be collected in Red bag-bin after mutilation and treated chemically.
- F. Sharp Waste (cat 4) to be collected in blue puncture proof container and treated chemically.
- G. Chemical disinfection prescribed for liquid waste.
- H. Recommendation for a bio-medical waste management committee with responsibilities.
- I. Material requirements and costs.

### ***COMMENTS:***

1. Very useful document for managing health-care waste in a given Health Care Unit.
2. Does not specially mention management of immunization waste, which is the major waste in primary health care sector.

**26. TEACHER'S GUIDE**  
**Management of wastes from health-care activities**  
World Health Organization  
Geneva, 1998

***SUMMARY:***

This *Teacher's Guide* accompanies the WHO publication *Management of wastes from health-care activities* (Geneva, 1999). Prepared with a view to raise awareness, provide information, identify suitable waste management practices and technologies, enable managers of health-care establishments to develop their waste management plans and course participants to develop training programmes, it caters teaching materials and recommendations for training course, designed mainly for managers of health-care establishments, public health professionals and policy makers. It has sufficient resource material to initiate, organize, deliver and evaluate courses of different lengths. The course material includes overhead transparencies, handouts showing definitions, tables and figures and the material necessary for workshops.

***COMMENTS:***

1. Deserve to be updated by incorporation of current information and instructions contained in subsequent WHO and other publications.
2. Problems specific to primary health-care waste management in health care units spread over rural areas and management of immunisation waste have not been taken up.
3. The concept of disposal specific collection and handling systems has not been mentioned while discussing options.

There is always a need to develop training course materials for non-managerial level health-care staff like doctors, nurses, cleaning staff etc. on the specific interventions called for from them.

## **27. Training Module on Health Care Waste Management**

WBHSDP Deptt.of H&FW, GoWB

December 2003

### ***SUMMARY:***

This training module was developed under the West Bengal Health Systems Development Project for successful implementation of the Action Plan prepared by the H&FWD on HCWM in various project hospitals.

The training module includes:

1. Definition and characterization of items related to hospital waste management.
2. Health impacts of health care waste.
3. Legislation and policies on health care waste management
4. Basic steps in health care waste management
5. Treatment and disposal technologies
6. Waste minimization, recycling and reuse
7. Health and safety practices
8. Basic aspects of HCWM
9. Annexure containing – Required materials for HCWM with specification; Record Keeping with labels and formats; Reporting formats; Institutional arrangements and responsibility allocation; Designs of storage vats and deep burial pits; sample IEC materials.

### ***COMMENTS:***

1. The module is very useful as training material.
2. Deserve to be updated by CPCB guidelines on CBWTF and Incinerator.
3. Management of BMW from smaller hospitals (BPHCs & PHCs) without treatment devices call for simpler practices like use of 2 coloured bins.
4. Management of immunisation waste generated at sub-centers and outreaches calls for incorporation of related issues and concerns.

5. Problems specifically related to primary health care waste including immunisation waste have to be incorporated.

## **28. Understanding and Simplifying Bio-Medical Waste Management**

Toxics Link  
January 2005

### ***SUMMARY:***

Toxics Link, a pioneering NGO in the field of bio-medical waste management in India has prepared this manual to provide a convenient, up-to-date training resource that will allow interested people and trainers to increase awareness on waste management and related issues at every level of their organisation. The manual has seven sections, each comprising of a number of slides on a particular topic related to BMWM. Users' guide has also been provided.

### ***COMMENTS:***

1. The form of presentation is useful for imparting training.
2. Problems specifically related to primary health care waste including immunisation waste have to be incorporated.

## **29. Training Health Workers in the Management of Sharps Waste**

PATH

*October 2005*

### ***SUMMARY:***

This publication of PATH (Programme for Appropriate Technology in health) is meant to provide Health Workers with necessary knowledge and expertise to choose and utilize options for sharps waste management. It presents:

- A. Key Steps in Sharps Waste Disposal
- B. Segregation
- C. Using Safety Boxes
- D. Using Needle Removers
- E. Segregation & Disposal of Medical Waste
- F. Incinerator Operation & Maintenance
- G. Building a Protected Sharps Pit
- H. Using a Protected Sharps Pit
- I. Building a Protected Sharps Barrel
- J. Using a Protected Sharps Barrel

### ***COMMENTS:***

A very useful step-by-step training manual for management of sharps waste. User instructions regarding Safety Boxes, Needle Removers, Sharps Pits and Sharps Barrels may be used in training manuals meant for the purpose.

Particularly important is the suggested design for simple sharp pits by using cement drain pipes. The simple and cheap sharps pit design may be very useful for resource crunched small units in rural setting.

Sharps Barrel is another useful concept for encapsulating waste sharps.

The design of incinerator does not appear to be proper with respect to the criteria laid down by WHO or the BMW Rules 1998.

**30. Standards for Hospital**  
**National Accreditation Board for Hospitals and Healthcare Providers**  
Quality Council of India 2005

***SUMMARY:***

Quality Council of India is an autonomous body, set up jointly by GOI and industry, to establish and operate accreditation structure in the area of conformity assessment covering bodies offering certification, inspection, testing, registration services etc. The present edition of standards has been drafted by Technical Committee of National Accreditation Board for Hospitals and Health Care Providers (NABH), a constituent board of QCI.

It has taken up the following areas relevant to hospital waste management for hospital accreditation purpose:

1. Hospital Infection Control that includes compliance of Statutory Provisions with regard to BMW management and infection control programme supported by the organisation's management inclusive of staff training and employees' health.
2. Facility management and safety that ensures safe and congenial environment for patients, visitors and employees.

***COMMENTS:***

1. Development of an accreditation system for hospitals incorporating health care waste management and infection control standards is in itself a big step forward towards ensuring proper BMW.
2. The statutory provisions referred to in the standards for waste management have to be clarified and with relation to different categories of health care units.
3. Services catered under the universal immunisation programme should also come under accreditation system with proper standardisation criteria.