

*THE UNITED REPUBLIC OF TANZANIA*



*MINISTRY OF HEALTH AND SOCIAL WELFARE*

*Tanzania National Health-Care Waste Management Plan*

*Updated version of 2003 five year plan*

*April 2007*

## *Acronyms*

---

AIDS	:	Acquired Immune Deficiency Syndrome
ALAT	:	Association of Local Authorities in Tanzania
APHTA	:	Association of Private Hospitals in Tanzania
CEDHA	:	Centre for Educational Development in Health
CSSC	:	Christian Social Service Councils
DED	:	Deutscher Entwicklungsdienst
DHMT	:	District Health Management Teams
EHSS	:	Environmental Health and Sanitation Services
EPI	:	Expanded Programmes of Immunization
GNP	:	Growth National Product
GOT	:	Government of Tanzania
HCF	:	Health – Care Facility
HCW	:	Health – Care Waste
HCWM	:	Health – Care Waste Management
HCWMO	:	Health – Care Management Officer
HDPE	:	High Density Polyethylene
HIV	:	Human Immune Deficiency Virus
HO	:	Health Officer
HSDP	:	Health Sector Development Project
IDA	:	International Development Association
MAP	:	Multi – Country HIV/AIDS Programme
MAT	:	Medical Association of Tanzania
MCH	:	Maternal and Child Health
MOC	:	Medical Officer in Charge
MOF	:	Ministry of Finance
MOH	:	Ministry of Health
MSD	:	Medical Store Department
MSF	:	Medecins Sans Frontieres
MUCHS	:	Muhimbili University College of Health Science
NAP	:	National Action Plan
NEMC	:	National Environmental Management Council
NGO	:	Non Governmental Organisation
NMC	:	Nurses and Midwives Council
RHO	:	Regional Health Officer
TACAIDS	:	Tanzania Commission for AIDS
TARENA	:	Tanzania Registered Nurse Association
TUGHE	:	Tanzania Union of Government and Health Employees
UNEP	:	United Nation Environmental Programme
UNICEF	:	United Nation Children’s Fund
WHO	:	World Health Organization
PC	:	Programme Co – Ordinator
NSHCWM	:	National Steering Committee on Health – Care Waste Management

NCHHC : National Committee for Hospital Hygiene and Infection  
WGRL : Working Group on Regulations and Laws  
WGP : Working Goup on Health – Care Waste Management

## *Executive Summary*

---

Although several isolated attempts have been made to improve the situation in some of the medical institutions, the management of health – care waste in Tanzania remains below minimum international standards, resulting in significant risks to health – care workers. The hygiene conditions linked to the handling and disposal of HCW cannot guarantee a satisfactory control on the transmission of nosocomial infections within the HCFs.

The backstopping and monitoring capacities of the Central, Regional and District Authorities to support the medical institutions remain limited. Furthermore the legal framework is not sufficiently developed. Direct and indirect costs resulting from this situation are difficult to estimate but are certainly significant.

A standardised health- care waste management system must be developed for the country. The health – care facilities must be provided with appropriate equipment to implement safer procedures. The differentiation of the health – care waste streams within the medical institutions of Tanzania must be progressively upgraded taking into consideration the Tanzania content.

The GOT must formulate a clear *National Policy* for the management of health – care waste and more broadly to control infections and improve hygiene in the hospitals. It is of the utmost importance that this policy be completed with *National Guidelines* to support the Health Authorities in implementing adequate standards for the management of health – care waste.

Developing an integrated strategy for infection control that would include the safe management of health – care waste is strongly recommended to ensure a coherent and sustainable implementation of the system. The mission also recommends to set up Committees for Hospital Hygiene and infection Control at all relevant levels of the Health Services.

### **The following priority objectives should be pursued:**

1. The consolidation of the legal framework and the reinforcement of the existing rules and regulatory documents. As a minimum:
  - A Decree should be issued, containing the general and specific provisions to determine the enforcement of authorities, the obligations of health-care waste Producers and Operators, the authorized management, treatment and disposal procedures, the range of penalties to be applied.

- Guidelines for the medical staff to ensure hygiene and control nosocomial infections should be consigned in a comprehensive Code of Hygiene.
2. The standardization of the current health-care waste management practices with the application of on-going management and monitoring procedures. The minimum recommendations comprise:
- The establishment of annual health-care waste management plans to progressively lead the medical institutions and the administrative authorities to consider health-care waste management a routine issue and reinforce progressively their organizational capacities;
  - The designation of a Health-Care Waste Management Officer in large health facilities who should be given the responsibility to operate and monitor the health-care waste management system on a daily basis;
  - Standardised segregation procedures should be set-up in all Tanzania HCFs by implementing a three bins systems that should be systematically associated with a colour coding and labeling procedure;
  - The application of a strict procedure for the most hazardous waste generated in medical institutions such as chemical pre-treatment of the highly infectious waste in a solution of sodium hypochlorite in concentrated form and a centralized disposal of the Cytotoxic and Hazardous Pharmaceutical Waste supervised by the Medical Store Department.
  - The development of specific treatment/disposal methods according to the type and the location of the health-care facility where the waste is generated. This includes:
    1. The use of “waste burning pits” in Dispensaries and Health Centres located in rural areas;
    2. The on-site burning of sharps and the safe burying of the ash in Health-Centres and Dispensaries located in urban areas and the use of its, specifically designed, for pathological waste as a first step. Off-site disposal may be planned when the collection services are sufficiently developed;
    3. The incineration of clinical waste in District and Regional Hospitals, as well as some Referral Hospitals located in small municipalities in appropriate low-cost incinerators and the use of placenta pits for some categories of pathological waste that cannot be incinerated in such incinerators;
    4. In the absence of sanitary landfills, which would be the cheapest option for urban settlements, incinerated of health-care waste, without any treatment of the stack emissions, remains the disposal option that is proposed for the Hospitals located in large municipalities. The other alternatives would be either too complicated to implement (autoclaving and shredding, chemical disinfection) or too expensive (treatment using microwaves).

3. The development of on-going awareness and training programmes as well as the review of the curricula of medical and paramedical staff.

A National Action Plan should be implemented over a five-year period to progressively upgrade the current health-care waste management practices and target objectives at all levels of the Health Services for an approximate initial cost of 9.1 billion TSH (9.1 million USD). The Government of Tanzania should also establish a National Steering Committee on Health Care Waste Management to ensure the co-ordination and the supervision of the Health-Care Waste Management Plan at country level. This plan is a five year plan to be implemented from 2009 - 2015

## INTRODUCTION

In October 2002, The World Bank mandated Emergence to complete initial surveys<sup>1 2</sup> and to support the Ministry of Health and Social Welfare (MOHSW) to develop an integrated Health Care Waste Management (HCWM) system for Tanzania. This overall consultancy ultimately aimed at upgrading the HCWM system in the medical institutions of the country.

Since the independence, the GOT has recognized the importance of health and given it a high priority. In the 1970s and 1980s, the Government adopted a Primary Health Care Approach, and expanded rapidly the number of Health Care Facilities (HFCs) and staff under an extensive referral pyramid. Universal and free access to public health facilities had been maintained until the early 190s when financial pressures, expanded demand for services, and declining service quality obliged the government to change towards a cost-sharing policy.

Social indicators are somewhat better than the average for Sub-Saharan Africa with an infant mortality rate of 86 per 1'000 live births (average is 91) and a child mortality rate of 144 per 1'000 live births (average is 147). The average life expectancy is estimated at 52 years only.

In addition, Tanzania has been severely hit by the AIDS epidemic since the first cases were recorded in the country in 1983. UNAIDS estimates that some 10% of the adult population is infected with HIV/AIDS and that about 1.1 million orphans are due to this epidemic, 700'000 of whom are estimated to be alive today. HIV has become the first cause of mortality in urban centres for adults aged between 15 and 49 has a direct impact on the occurrence of opportunistic diseases such as tuberculosis, which is having a significant resurgence with an unusual emergence of multi-drug resistance strains. **Child** Mortality due to unsafe and unhygienic delivery account for high mortality of the infant indicated as 68 per 1000 live births. These affect **Maternal** Health following HIV/AIDS, Malaria, TB and other diseases. Safe management of HCW is a key factor towards maintaining the living environment.

Thus Healthcare waste management has a significant contribution in achieving the millennium development goals and specifically on;

The GOT and the World Bank estimate that some aspects of the project's implementation could lead to an increase in the environmental and health risks. Inappropriate handling of HIV/AIDS infected materials does not only constitute a risk for HCF staff but also for municipal workers involved in waste handling as well as for families and street children who scavenge on dump sites.

Consequently, the programme must include a component focusing on the improvement of the existing HCWM procedures within the medical institutions as well as finding appropriate treatment/disposal technologies through the development of an integrated National HCWM plan, appropriately budgeted with clear institutional arrangements for its execution. The development of the National HCWM plan should also be compatible with the Health Sector Development Project (HSDP), Millenium Development Goals which is currently supported by the World Bank, and includes modules that aim at reinforcing the capacity of the MOH in its central support role and strengthening the District Health Services.

## 2. Objectives

The programme intends to:

- Setting-up and implement a National HCWM Plan: to improve the current management and disposal practices;
- Find an adequate strategy for the implementation of the plan at country level in the coming years;
- Develop National policy Guidelines and Standards (already in place) that should attempt to set-up standardized procedures, which are protective for both the human health and the environment, taking into consideration the financial possibilities of each institution.

## 3. Methodology

Preparing and implementing a HCWM plan requires developing sequential steps that are presented in figure 1. The satisfactory execution of each of these steps is strongly dependent on the completion of the other ones; none can be omitted but they can be tackled in varying sequences. A special attention in this report has been paid to the analysis of the situation and the formulation of adequate recommendations as well as to the elaboration of the implementation strategy.

To carry out the national sector assessment, the rapid assessment tool jointly developed by the WHO<sup>7</sup>, UNEP and Emergence has been used. The assessment phase, limited to a three-weeks time, consisted in:

- Discussions with officials of the health and environmental sectors, representatives of private industries as well as Public Agencies or Bilateral and Multilateral Agencies, International NGOs working in the Tanzanian health sector;
- Review of the existing documents provided by the MOH and the World Bank Office in Dar es Salaam before and during the mission as well as existing policy documents already developed in other countries of the region;
- Visits paid in randomly selected hospitals in and outside Dar es Salaam with systematic discussions initiated with the medical and administrative staff members.

## 4. Definitions

- **Health-Care Waste (HCW)** includes all the waste, hazardous or not, generated during medical activities. It embraces activities of diagnosis as well as preventive, curative and palliative treatments in the field of human and veterinary medicine. In other words, are considered as health-care waste all the waste produced by a medical institution (public or private), a medical research facility or a laboratory;



- **Non risk Health care Waste** comprises all the waste that has not been infected. They are similar to normal household or municipal waste and can be managed by the municipal waste services. They represent the biggest part of the HCW generated by a medical institution (between 75% and 90%). It includes paper, cardboard, non-contaminated plastic or metal, cans or glass, left over food, etc... can also be included in this category of waste all items (such as gloves, gauze, dressings, swabs...) that have been used for medical care but are visually not contaminated with blood or body fluids of the patient this only being applicable if the patient is not confined in an isolation ward. Sanitary napkins from maternity wards even if contaminated with blood, can be included in this category of waste as they are normally;
- **Pathological Waste** groups all organs (including placentas), tissues as well as blood and body fluids. Following the precautionary principle stipulated by WHO<sup>9</sup>, this category of waste should be disposed of consequently;
- **Anatomical waste** comprises recognizable body parts. It is primarily for ethical reasons that special requirement must be placed on the management of human body parts. They can be considered as a subcategory of Pathological Waste.
- **Infectious waste** comprises all biomedical and health care waste known or clinically assessed by a medical practitioner to have the potential of transmitting infectious agents to man or animals. Waste of this kind is typically generated in the following places: isolation wards of hospitals; dialysis wards or centres caring for patients infected with hepatitis viruses (yellow dialysis); pathology departments, operating theatres and laboratories. Infectiousness is one of the hazard characteristic listed in annex II of the Basel Convention and defined under class H6.2:
- **Highly infectious waste** includes all viable biological and pathological agents artificially cultivated in significant elevated numbers. Cultures and stocks, dishes and devices used to transfer, inoculate and mix cultures of infectious agents belong to this category of waste. They are generated mainly in hospital medical laboratories;
- **Sharps** are all objects and materials that pose a potential risk of injury and infection due to their puncture or cutting properties (e.g. syringes with needles, blades, broken glass ...). For this reason, sharps are considered as one of the most hazardous category of waste generated during medical activities and must be managed with the utmost care;
- **Pharmaceutical Waste** embraces a multitude of active ingredients and types of preparations. The spectrum ranges from teas through heavy metal containing disinfectants to highly specific medicines. This category of waste comprises expired pharmaceuticals or pharmaceuticals that are unusable for other reasons (e.g. call back campaign). Not all the pharmaceutical wastes are hazardous. They can thus be classified into two categories: Non-Hazardous Pharmaceutical Waste and Hazardous Pharmaceutical Waste;
- **Cytotoxic Pharmaceutical Waste** may be considered as a sub-group of Hazardous Pharmaceutical Waste, but this category of waste must be managed and disposed of specifically due to its high degree of toxicity. The potential health risks for people who handle cytotoxic pharmaceuticals result above all from the mutagenic, carcinogenic and teratogenic properties of these substances, which can be split into six main groups: alkylated substances, antimetabolites, antibiotics, plant alkaloids, hormones and others. Cytotoxic waste are still generated in a limited number of medical institutions in Tanzania.

- **Radioactive Waste** includes liquids, gas and solids contaminated with radionuclides whose ionizing radiations have genotoxic effects. The ionizing radiations of interest in medicine include X-rays as well as alpha- and beta- particles. An important difference between these types of radiations is that X-ray tubes only when generating equipment is switched on whereas gamma-rays, alpha- and beta- particles emit radiations continuously. The type of radioactive material used in HCFs results in low level radioactive waste and concerns mainly therapeutic and imaging investigation activities where Cobalt <sup>60</sup>Co, Technetium <sup>99m</sup>Tc, iodine <sup>131</sup>I and iridium <sup>192</sup>Ir are most commonly used;
- **Special Hazardous Waste** includes gaseous, liquid and solid chemicals, waste with a high contents of heavy metals such as batteries, pressurized containers, out of order thermometers, blood-pressure gauges, photographic fixing and developing solutions in X-ray departments, halogenated or non-halogenated solvents... This category of waste is not exclusive to the health-care sector. They can have toxic, corrosive, flammable, reactive, explosive, shock sensitive, cyto- or genotoxic properties;
- **Effluents** and more particularly, effluents from isolation wards and medical analysis laboratories should be considered as hazardous liquid waste that should receive specific treatment before being discharged into the sewerage / drainage system, if such a system exists.

### **3. PART TWO; ANALYSIS OF THE SITUATION**

#### ***Section 1. Organisation of Health Services***

---

Although Tanzania is experiencing one of the highest rates of urbanisation among the Sub – Saharan countries with an urban population growth rate between 8 and 10% , more than 70% of the Tanzania population still lives in rural communities where the Village Health Posts continue to play an important role providing preventive health through education. Hence, the Health Services and the distribution of the HCFs throughout the country still have a strong rural emphasis.

#### **1. *The Public Health Services***

Tanzania has created an extensive network of Health –Care Facilities that provides 90% of the population with at least one HCF in a radius of 10km NGOs and private institutions play a major role in the sustainability of the Tanzania Health Sector.

##### *a) District – level: Primary Health Services*

At District level, basic clinical and public health services are provided through three layers of HCFs: the Dispensaries, the Health Centres and the District Hospitals:

- The Dispensary is the smallest curative unit. Usually located at the ward level, it serves 3 to 5 villages and provides health services for 6'000 to 10'000 inhabitants. It has an outpatient Department, a Mother and Child health Unit (MCH) and a maternity room with at least two beds, latrines and rooms for the medical staff. It provides health education, treatment of diseases, MCH and delivery services, treatment and immunization. It can be located in urban or rural areas:
- The Health Centre is expected to cater for between 50'000 and 80'000 people, which is approximately the population of one administrative division. The services provided in Health Centres are similar to the ones provided in Dispensaries but short hospitalisations are possible and basic medical analysis can be carried out.
- The District Hospital is the referent health unit at District level. It normally has between 60 and 150 beds and provides OPD and MCH , a store for drugs and equipment, laboratory and blood banks, X-ray, OT, kitchen, laundry, technical carpenter and tailoring workshop, mortuary and dispensing room. The staff includes graduate and Assistant Medical Officers, Nurses of different qualifications, Pharmacists, Laboratory Technicians, Radiologists and a Health Officer. The GOT attempts to get one District Hospital per District.

### b) *Regional Level: Secondary Health Services*

The Regional Hospital is the secondary referral facility to the districts and serves a population of about 1 million people. There are currently 17 Regional Hospitals in the mainland of Tanzania each one having between 200 and 400 beds. The services are similar to the ones provided in the District Hospitals but in addition, various special medical services are provided such as surgery gynaecology/obstetrics and paediatrics. The pharmacy and laboratory services are more developed than in a District Hospital.

### c) *National – Level: Tertiary Health Services*

Only four Referral or Consultant Hospitals (the tertiary referral hospitals) and two specialized in psychiatry and tuberculosis exist throughout the country. With more than 400 beds per hospitals, they provide highly specialised services. The four Hospitals are considered as Teaching Hospitals<sup>10</sup>.

## **2. *The Voluntary and Private Health Services***

The voluntary organisations are increasingly involved in the rural Health Sector, while the role of the private providers remains limited but has been growing rapidly, particularly in urban areas, since the re-legalization of private practices in 1991.

### a) *The Voluntary Health - Services*

Voluntary organisations, NGOs and religious organisations are important auxiliaries of the Public Health Services in Tanzania. They own as many hospitals as the Government and serve especially the rural population. The quality of the services provided by these organizations attracted many patients, even if more expensive. Special agreements have been developed between the GOT and the missionary organisations. For instance, in the Districts where there are no Government hospitals, the Government negotiates with religious organizations to designate voluntary hospitals as District Hospitals and provides staff and essential supplies such as pharmaceuticals. Parastatal Organisations are supposed to offer services free of charge or in accordance with the cost sharing policy of the GOT.

### b) *The Private Health Services*

Since the Private Hospitals Act was amended in 1991, the number of private HCFs in Tanzania has been constantly increasing, mostly in urban areas. Despite its importance, the private sectors hasn't really been involved in the National Health Policy formulation

and there has been little co – operation or co – ordination of planning regarding the delivery of health services between public and private actors.

Inspection mechanisms exist for private practitioners to measure/ensure the quality of services. However a few inspections seem to have taken place since 1991, which could become problematic. The GOT should therefore put in place a number of regulatory mechanisms so as to ensure this important actor develops in a sound manner and integrates well with the public services in a complementary way.

## ***Section 2. Legal and Regulatory Frameworks***

---

The legislative provisions constitute the backbone for improving the management of HCW in any country since it enables to establish legal control and define clearly the duties and responsibilities of each actor involved in the management of HCW. This section rapidly reviews the current legal provisions for HCW M in Tanzania as well as the current rules that are applied within the medical institutions.

### ***1. Review of the Existing Legislation***

The different legal documents that have been made available to the mission by the Ministry of Health and other partners have been analysed<sup>12</sup>. Are presented the most important outcomes that should be taken into consideration to implement the National HCWM Plan.

#### ***a) Legal Provisions for Environmental Protection and Solid Waste Management***

##### ***At National Level***

The environmental management has predominantly been sectoral, a situation which has facilitated the growth of disparate regulatory institutions which has let the environmental legislation to be contained in many Acts and Policies, most of which are sector specific and outdated. As a response to this fragmented approach to legislation and policy National Environmental Management Council (NEMC) was established in 1983. However, the NEMC only has an advisory function and lacks regulatory powers, meaning that presently pollution produced by industry or by human settlements is virtually not controlled.

The National Environmental Action Plan addresses Urban Environmental Pollution and solid waste management by setting – up standards and defining permitting requirements as well as promoting environmentally sound waste – collection, transportation and disposal systems for urban and protected areas or by establishing emergency sites for solid waste disposal, until permanent ones can be found..

Despite these efforts, the current legislation on solid waste management remains incomplete, and above all impossible to be applied as such for enforcement.

Recently, the Vice President's Office drafted air emission standards and the MOH prepared Waste Management Guidelines. There are clear attempts to provide comprehensive management guiding principles in these two documents but they remain a compilation of various guidelines and finally fail to be specifically adapted for the Tanzania context. Furthermore, the provisions contained for the management of

hazardous waste, including HCW, are incomplete and not directly applicable for the municipal authorities and the HCFs.

At international level, Tanzania has ratified the Basel Convention on the Control of Transboundary Movement of Hazardous Waste and Their Disposal (1992)<sup>13</sup>. It is not party to the Stockholm Convention on the Persistent Organic Pollutants (2002)<sup>14</sup>. Despite this, these two conventions have not yet had a major impact on the Tanzania legislation.

---

12 They include : the National Health Policy, Feb 1990: The Policy for the development of human resources for health, June 1995: The nurse and midwives registration Act, 1997: The Public Health Act, 2009: The Health Sector Reform, Programme of work, July, 1999 – Junr 2002; The drafted Management Guidelines, September 2002: The proposed Environmental Standards.

13 Infectiousness is one of the hazard characteristics listed in annex III of the Basel Convention and defined under class H 6.2.

14 Persistent Organic Pollutants (POP)s such as dioxins or furans are produced during incineration of waste. At international level there is a strong debate at present between environmentalists and public health specialists on the pertinence to operate low – cost incinerators and releasing the fumes without prior treatment.

### *At District and Municipal Level*

The Municipal and District Authorities are responsible for the collection and Transportation of the solid waste generated in their area of jurisdiction<sup>15</sup>. With the current decentralisation process, this responsibility is constantly increasing. The Local Government (District and Urban Authorities) Act of 1982, details the Responsibilities of district and urban councils, including solid waste management. However, this Act does not contain any particular provision for the management of specific categories of waste such as HCW. Furthermore, enforcement of the existing legislation pertaining to waste management remains ineffective and the refuse collection capacity of the Collection Services in the municipalities is clearly insufficient to cope with the amount of waste generated in the urban centres. Due to the weaknesses of the public sector, formal and informal waste collection services are flourishing, but without any regulation, coordination, monitoring by the Public authorities.

## **2. *Appraisal of the Hospital Regulations***

The proper management of HCW depends to a large extent on good administration and organisation but also requires that adequate instructions be consigned in a formal document (e.g a HCWM plan) and that the medical and paramedical staff be fully aware of their duties and responsibilities.

### a) Rules in Hospitals

In all the medical institutions visited, HCWM is organised according to specific schemes but there are no explicit rules consigned in a single document providing adequate instructions regarding the management of the HCW within the establishments. Nobody is formally nominated to supervise the whole HCWM system or co-ordinate the efforts between all actors within the hospitals. This engenders an obvious lack of efficiency and harmonisation in the HCWM procedures.

- 
- 15 The Health and Social Welfare Department, the Urban Planning Departments and the Works Departments co-ordinate to ensure the collection services.
- 16 Section 55 G stipulates that the Local Government is responsible for the removal of “refuse and filth from any public or private place”.
- 17 The HCFs must indicate if: 1) the “surroundings are clear or dirty” ;2) they have “waste basket / dustbin”, 3) they use “a dumping site or not “ and 4) they have an “

#### b) *Duties and Responsibilities of the Medical Staff*

Well-defined duties and responsibilities are essential to operate an integrated HCWM system. The responsibility of the different components of the HCWM system is shared between.

- The director, who is with the administrative officer directly in charge of the overall implementation of a safe HCWM system inside the hospital:
- The medical doctors and nurses in charge of the segregation under the supervision of the head nurses and the matron of the hospital:
- The ancillary staff (ward attendants) in charge of the packaging, waste collection and on-site disposal under the direct supervision of the nurses;
- The Health Officers who have an important role to monitor the hygiene conditions in the hospitals;

#### ***Conclusion***

There is currently a significant gap in the Tanzania legislation regarding the regulation of HCWM issues as well as for an efficient control of nosocomial infections in HCFs.



### ***Section 3. Characterisation of the HCW Production***

---

The MOH should be fully aware of the current levels of waste production. This information is essential for the development of the future HCWM plan. A comprehensive survey is thus essential for planning an effective HCWM programme. Recently, the MOH and other actors involved in the management of HCW tried to characterise the HCW production in Tanzania <sup>20</sup>. However, providing reliable estimations is a difficult task essentially due to the fact that important data are missing in the National Health Statistic Abstracts <sup>21</sup> such as the bed occupancy rates for each HCF. Another problem is linked to the absence of standardised definitions, which leads to results that can differ significantly from one survey to another.

#### ***1. Type of HCW Generated***

Among all the categories for HCW produced in the medical institutions, the large hospitals (Referral, Regional and District), in which almost all the ranges of medical activities are practised, produce the following categories of HCW:

- Non – risk HCW or domestic waste made of all waste that are not contaminated with infectious or pathogen agents (food residues, paper, cardboard and plastic wrapping );
- Pathological waste, infectious waste as well as items that have been used for medical care and also not necessarily contaminated <sup>22</sup> that have been collected together. Some interlocutors call these categories of waste “soft waste” or clinical waste “ <sup>23</sup>.
- Anatomical waste and placenta that are managed separately from the clinical waste;
- Sharps, mainly, but not exclusively, auto-disable or disposal syringes with needles that are collected in general in separate cardboard boxes;
- Pharmaceutical waste that consists in outdated drugs. They are specifically managed by the Medical Stores Department (MSD);
- Specific hazardous HCW (radioactive, cytotoxic) that are produced in a limited number of specialised medical institutions.

The production of HCW in the Health Centres and in the Dispensaries remains limited to non- risk HCW, clinical waste, placentas and sharps, generally in small quantities. This is due to their specific level of services (no major surgery, preventive health – care).

- 
- 20 Study Report on Assessment of Health – Care Waste Management in Tanzania, August 2001. Environmental Health Section. The United Republic of Tanzania, Ministry of Health and WHO, August, 2001. A report for the Health Care Waste Management Plan Development of the Ministry of Health (MOH) – Tanzania Government. Gabriel Mealuko, 2002. Proposal for the containment, removal and disposal of “ hazardous medical waste from medical institutions, city of Dar es Salaam. Disposed Africa LTD.
21. See the Health Statistics Abstract 2002. Vol 1 Burden of Diseases and Health facility Utilization. Statistics. Ministry of Health. The United Republic of Tanzania June 2002 and the Health Statistics Abstract 2002. Vol. 2 Inventory Statistics Ministry of Health. The United Republic of Tanzania June,2002.
- 22 See definitions provided in the introduction of this document.
- 23 This terminology will be used in the continuation of this report to define the Pathological waste, infectious waste and other items considered as contaminated and hazardous by the Tanzania interlocutors.

## 2 *Estimation of the Quantities Generated*

### a) *Estimation Methodology*

The production of hazardous HCW was calculated in each medical institution by estimating the number of containers (bags, rubbish bins) used for medical waste collection during a defined period of time. The discussions with the medical and paramedical staff (nurses, nursing – assistants and technical services) enabled to adjust the total volume of waste collected by using a filling rate for each category of container. Finally, a volumetric mass ratio was applied (0,30 kg/l) according to the type of waste thrown into the container in order to estimate the total weight of clinical waste generated. The figure obtained is then divided by the total number of beds and the occupancy rate to estimate the quantity of medical waste generated per occupied bed per day in each hospital category. In Health Centres and Dispensaries the estimation of the clinical waste production is based on the daily number of patients

### b) *Results*

#### *At Health – Care Facility Level*

Annexe 4 presents the detailed calculations of the quantities of HCW produced in large health – care facilities, as well as an example of how the information was collected in each HCF. Since the level of care and services provided in one type of facility cannot be distinguished from those provided in a facility at a lower level (cf. Section 6)), no differentiation has been made between Referral, Regional and District Hospitals to estimate the daily production of clinical waste in these establishments. Around 9.14 kg/occupied bed/day of clinical waste are generated in these Tanzania Health Institutions<sup>24</sup>. In Health –Care Centres and Dispensaries, around 0.03 kg/patient/day of clinical waste are generated<sup>25</sup>.

#### *At National Level*

Annexe 5 presents the detailed calculations of the quantities of HCW produced at National Level. The overall production of clinical waste is estimated between 12 and 14 tons per day<sup>26</sup>. About 50% of the HCW is generated in the regions of Dar –ES-Salaam, Kagera, Iringa, Kilimanjaro, Arusha, Pwani and Mwanza. These regions should therefore be considered in priority for the application of the HCWM plan. The other regions and districts produce comparable quantities of HCW.

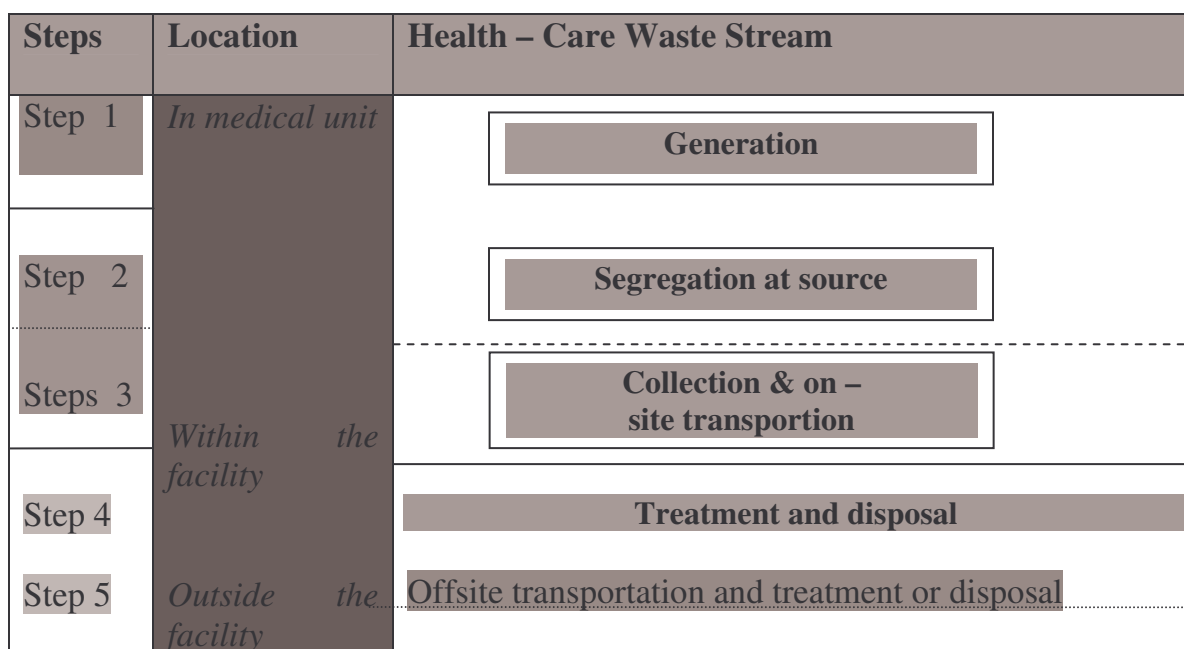
## *Production of Sharps*

In 2002, MSD supplied all the auto – disable syringes (about 2,8millions) used in the BCG vaccinations programme in the country as well as all the disposal syringes for the public health facilities and a substantial part of the private hospitals (about 12,7) millions). Assuming that the average weight of a syringe plus needle is 10 g, this means that approximately 400 to 450 kg of syringes and needles are used and must be disposed of every day in Tanzania. The quantities produced remains thus marginal in comparison with the total amount of HCW to be disposed of (3 to 4%)<sup>27</sup>.

- 
- 24 For detailed estimations see Annexe 4. This result is in accordance with the studies carried out in similar countries by the Commission of the European Union in 1994 and the International Health – Care Network in 1995.
25. This result is similar to the one obtained by I. Christen in 1996. Dar Es Salaam Urban Health Project. Health – Care Waste Management in District Health Facilities. Situational Analysis and System Development SKAT.
- 26 Dispositif Africa LTD estimated the total production at 11 tons a day (cf. Proposal for the containment, removal and disposal of hazardous medical waste from medical institution, City of Dar es Salaam Dispositif Africa (LTD).
27. This means for instance that an incinerator of an average capacity of 200 kg per hour would be able to treat all the needles and syringes used in Tanzania each day in 2 to 3 hours.

## ***Section 4. Characterisation of the HCWM Practices***

The HCW that are generated within a HCF should always follow an appropriate and well – identified stream from their point of generation until their final disposal. This stream is composed of several steps that include generation, segregation collection and on – site transportation, on – site storage, off – site transportation (if needed) and finally on or off – site treatment and disposal (see figure 2). All these steps require a vigorous organisation that should be translated into HCWM plans at *health – care facility level*.



**Figure 1: Synopsis of the HCW stream**

In Addition, management of HCW should always be considered as an integral part of hospital hygiene and infection control. Infectious HCW contributes to nosocomial infections, putting the health of medical staff and patients at risk. Proper HCWM practices should therefore be strictly followed as part of a comprehensive and systematic approach to hospital hygiene and infection control. A set of protective measures should also be developed in relation with the handling and the treatment/disposal of HCW.

Implementing adequate procedures to minimise the overall risks associated with HCWM should remain one of the priority objectives of the MOH. Waste management and treatment options should first protect the health – care workers and the patients and minimise indirect impacts from environmental exposures to HCW. A special emphasis has therefore been put by the mission on the level of risk associated with the management of HCW in the Tanzania HCFs. Due to the current lack of clear protocols for the

management of HCW, a wide variety of inadequate practices are found in the medical institutions. The practices which should be urgently improved are underlined below.

For practical reasons, in the following section, the Referral, Regional and District Hospitals where HCWM practices do not differ significantly are regrouped into *Large Health – Care Facilities* while Dispensaries and Health Centres are gathered as *Small Health – Care Facilities*.

## **1. *Segregation, Packaging and Labelling***

Segregation is one of the most important steps to successfully manage HCW. Given the fact that only about 10 – 25% of the HCW is hazardous, treatment and disposal costs could be greatly reduced if a proper segregation were performed. Segregating hazardous from non – hazardous waste reduced also significantly the risks of infection workers handling HCW. Actually, the part of the HCW that is hazardous and requires special treatment should be reduced to some 2 – 5 % if the hazardous part were immediately separated from the other waste.

The segregation consists the separation of the different waste streams based on the hazardous properties of the waste, the type of treatment and disposal methods that are applied. A recommended way of identifying HCW categories is by sorting the waste into colour – coded, well packed and labelled containers,. Segregation must always be applied *at source*.

## **2. *Collection, On – Site Transportation and Storage***

In order to avoid an accumulation of the waste, it must be collected on a regular basis and transported to a central storage area within the HCF before being treated or removed. The collection must follow specific routes through the HCF to reduce the passage of loaded carts through wards and other clean areas. The carts should be 1) easy to load and unload, 2) have no sharp edges that could damage waste bags or containers and 3) easy to clean.

Great care should be taken when handling HCW. The most important risks are linked with the injuries that sharps can produce. When handling HCW, sanitary staff and cleaners should always wear protective clothing including, as a minimum, overalls or industrial aprons, boots and heavy duty gloves.

### **a) Collection and On – Site Transportation**

The organisation of collection and on – site transportation depends on the type of HCF and the human resources available. Two collections per day are normally scheduled ( one in the morning and one in the afternoon). In some Hospital, sanitary labourers do not

come directly from the one – site disposal facility / location to collect the HCW in the wards/ departments by themselves, which is a positive aspect to minimize potential spread of infections. In these cases, it is usually the nursing – assistants who transport and drop off the waste directly to the storage or disposal points.

*b) Storage in the Large Health – Care Facilities*

In large health – care facilities<sup>30</sup>, the clinical waste can be stored in specific locations or directly inside the burning chamber of the “incinerators” while non – risk HCW can be stored in separate dumps

### **3. Treatment and Disposal**

Hazardous / infectious HCW can be treated on – site (i.e in the HCF itself) or off – site (i.e in an other HCF or in a dedicated treatment plant). On – site treatment is often the only one possible in rural HCFs but on – site treatment can be also carried out for HCW generated in large HCFs . On – site treatment systems are particularly appropriate in areas where hospitals are situated far from each other and the road system is poor. The advantages of providing each health- care establishment with an on – site treatment facility includes convenience and minimization of risks to public health and the environment by confinement of hazardous / infectious HCW to the health – care premises. However, extra technical staff may be required to operate and maintain the systems and it may be difficult for the relevant authorities to monitor the performance of many small facilities. This may result in poor compliance with operating standards, depending on the type of systems, and increased environmental pollution.

The HCW generated in a HCF can also be treated off – site, when centralized facilities exist, in urban areas for instance. Greater cost – effectiveness may be achieved for larger units, through economies of scale<sup>32</sup>, unless the running costs for waste collection and transportation remain too expensive.

Incineration is the only disposal technology known in the Tanzania medical institutions. The GOT must be aware that alternative technologies exist to treat hazardous / infectious HCW and reach a level of hazard / infectiousness that is considered as acceptable, enabling the disposal of such categories of waste with the General solid waste. Detailed information on the advantages and disadvantages of each treatment / disposal technology are provided in annexe 7.

---

30 Storage facilities are not useful in small HCFs where the amounts of HCW generated remain limited .

31 But not locked!

### a) *In Large Health – Care Facilities*

Different ways of disposing of HCW have been observed by the mission, but none of them are fully satisfactory. The current disposal of HCW in the absence of adequate financial means and specific budget lines is problematic and will certainly remain so in the coming years. In addition, the lack of specific and affordable transportation services in municipalities and towns as well as the low monitoring capacities of the Municipal Authorities reduces drastically the waste treatment and disposal options, which could be envisaged.

Due to the lack of protocols, there are disparities between the institutions visited in the way HCW is disposed of. The following practices have been observed:

- In some hospitals, clinical wastes and sharps are burnt in masonry single – chamber “ incinerators” built by local private manufacturers (photo 6). The burning is carried out on a periodic basis ( from daily to weekly depending on the resources of the HCF ). The combustion is initiated by adding fuel, usually kerosene or charcoal. The air inflow is based on natural ventilation. Most of these “ incinerators” are in bad shape and temperatures of only 300<sup>0</sup>C to 400<sup>0</sup>C are reached in these “ incinerators”. In many HCF s more than one incinerator has been built, but they are usually all in a dismal state (photo 7). The Conclusion is that these rudimentary single – chamber “ incinerators” are not able to sustain combustion of waste in a reliable manner and do not demonstrate any significant advantage/ improvement compared to open burning;
- General medical and domestic wastes, although they have been segregated at source can also be collected by the municipal services and disposed of together in dumpsites. In this kind of situation, sharps are burnt separately or dropped into pits without any specific precautions. However, it has been observed that they may also be collected by mistake together with the municipal waste. In this kind of situation, the segregation benefited failed to be maintained all along the waste stream;
- Anatomical wastes generated in Operation Theatres are disposed of separately. When a “satisfactory” incinerator exists in the medical institution (such as Muhimbili Hospital), body parts are incinerated. Otherwise, anatomical wastes are buried inside the hospital compound. Placentas and major human tissues are either



burnt in a single – chamber incinerator or dropped inside a “ placenta – pit” with concrete lining (photo 9).

- Finally, general medical waste but also sharps (photo 8) are dumped, without any segregation, into an open pit. The pit can be lined or not and sometimes delimited by a fence ( photo 10). The waste is then periodically burnt or covered with earth when it is full; a new pit is then built next to it
- Effluents <sup>33</sup> of medical institutions are treated in general through separate septic tanks.

WHO ( at central level, photo 11) and DFID (in Mbeya Region, photo 12) have supported the installation of low – cost, high – temperature incinerators that have been specifically developed and designed for the treatment of HCW in low - income countries by the De Montfort University <sup>34</sup>. Mark II and III models of the De Montfort incinerator have been already installed in various Tanzania HCFs and they are “ recommended for district hospitals, health centres, dispensaries and regional and consultancy hospitals respectively : <sup>35</sup>, If properly operated, a De Montfort incinerator has the following advantages:

33 It has not been possible to address this point in a comprehensive way during the mission. Only some highlights are provided in the report showing that the current situation may be considered as unsatisfactory. The review of the current systems of discharge of effluents from hospitals should be addressed in a second phase after having first successfully implemented a solid waste management system.

34 The Mark III is designed for hospitals up to 1'000 beds, and burns, at about 4 times the rate of the Mark I and II (50 kg/h approx). The Mark V incinerator is thermodynamically the same as the Mark III, but modified to carry the weight of a much higher chimney for use where a high chimney is a legal requirement or where the proximity of other buildings makes a high chimney necessary to disperse smoke and fumes

- 
- It reaches temperatures above 900<sup>0</sup>C<sup>36</sup>
  - The operating costs of the De Montfort incinerator remain extremely low (less than 5 USD /ton) as well as the capital cost ( about 1'000 USD for a Mark II and 2'000 USD for a Mark III);
  - Operation and maintenance are simple ( coconut shells can be used for instance to initiate the combustion instead of kerosene);

Products of Incomplete Combustion (PCI) are obviously generated during the whole process. Nevertheless in areas that are not densely populated, incineration can reduce the immediate hazards linked to medical waste and sharps. With respect to the financial resources available in the hospitals, this type of incinerator, if upgraded (*for instance Mark V incinerators can be used* ), can constitute an acceptable intermediate solution to dispose of clinical wastes and sharps. The remaining ashes must be buried. In densely

populated areas, incineration should not be seen as a long term satisfactory solution but the reality of the current situation prevailing in Tanzania must be taken in consideration when alternative solutions are proposed.

In any case, Operation and Maintenance of these incinerators must be well planned to ensure their sustainability and they should be replaced or repaired every 3 to 5 years when they are continuously operated. In that respect, the MOH should propose adequate financial, management and institutional mechanisms.

#### b) *In Small Health Facilities*

There is no significant difference in the way that clinical waste and sharps are disposed of. In the absence of adequate infrastructures and equipment, they are dropped into a pit without segregation, and burnt periodically. Placentas are dropped directly in latrines or pits after delivery. DED and MSF have developed two different programmes to improve the situation in the Health Centres and in the Dispensaries located in remote rural areas<sup>37</sup>.

Following pilot projects that have been conducted in Tanzania by international and bilateral agencies (cf section 6), the MOH has developed and is implementing a plan to install 63 Mark II De Montfort incinerators in District Hospitals, Health Centres and Dispensaries. Low – cost De Montfort incinerators should actually become a standard disposal facility for the Dispensaries and the Rural Health Centres. The Mission believes that it will be probably hard to implement such a policy for at least two reasons:

- Sustainable maintenance and adequate operation of such facilities cannot be guaranteed in rural HCFs due to their limited institutional capacities (cf. Section 5);
- The implementation of such a solution remains relatively expensive<sup>38</sup>;

---

35 Source: Waste Management Guidelines, draft document Ministry of Health September 2002

36 Results of a campaign of measures carried out at De Montfort University Personal communication of Professor D. J. Picken.

37 See section 6.

38 Considering the price of a Mark II De Montfort (1'000 USD), the number of Dispensaries (4'380), and the number of Health Centres (402) the total cost would approximately be 5'000'000 USD.

c) *Specific cases*

The Municipality of Dar Es Salaam

Disposal of HCW in the Municipalities of Dar Es Salaam <sup>39</sup> or Mwanza remains problematic for the following reasons:

- The number of HCFs scattered in this municipality is important and the amount of HCW produced in such a densely populated area is significant. The utilisation of De Montfort incinerators, although some are already in use <sup>40</sup>, cannot be seen as a sustainable long – term solution. On the other hand the use of one – site pyrolytic incinerators would be too expensive and would not significantly reduce the air pollution form that of a De Montfort;
- Although the introduction of alternative technologies such as autoclaving or hydroclaving<sup>R41</sup> could be seen as valuable on – site treatment technologies, the success of their implementation is uncertain as long a pilot projects won't have been carried out and evaluated';
- The implementation of a centralised solution (off – site treatment), lathough interesting poses another set of problems relating amongst others to the verification of the transport of HCW. Currently the Municipal Council does not have the capacity to perform such controls. In addition, the public hospitals would have difficulties to pay for such a serice and the public secur is, for the time bing, not sufficiently developed to ensure that both transportation and treatment will be performed in the most cost effective, environmentally firendly way;
- There is no proper sanitary landfill where the general medical HCW would be safely buried.

*Sharps*

The MOH, in agreement with UNICEF, has developed a new policy for disposable syringes and needles that is in accordance with WHO and UNICEF international recommendations: syringes and needles must be discarded of immediately following use. Needles shouldn't be recapped or removed from the syringe and the whole combination

must be inserted into the safety box directly after use. UNICEF provides safety boxes specially designed for safe collections and open – air burning. The boxes provided are used only for EPI programmes.

There are no provisions for the handling and disposal of syringes and needles used for curative care. In order to follow the new policy of the MOH, the medical and paramedical staff has to develop alternative solutions<sup>57</sup> and reuse recycled plastic bottles or cardboard boxes. In some health facilities, other practices exist, sometimes in parallel of the new MOH policy for EPI campaigns creating confusion among the medical and paramedical staff (cf section 6).

### ***Risks Associated with the Current Practices***

There is no standardized segregation procedure applied in the Tanzania medical institutions. Potential mistakes in segregation can easily occur and the risk of a person accidentally coming into contact with hazardous waste is important. .

The nurses or the nursing – assistants fail to apply the aseptic measures when they handle and transport the bins within the wards or outside. The waste containers are not lined with adequate bags or even not regularly disinfected. The lids are manipulated with no specific precaution: fundamental hygienic measures are not applied. This obviously results in an increase of the risk of transmitting nosocomial infections

The risk of spillage of medical waste and sharps during the transportation due to the use of inappropriate containers and the loss of syringes and needles from overfilled cardboard boxes.

The inappropriate off – site transportation ( at least for DES), the disposal of clinical waste with the domestic waste in dumpsites and the absence of control procedures increase the risk for scavengers to be contaminated. The use of incineration, whatever temperatures may be reached, release air pollutants (PCI, heavy metals, etc ...) the constitute an environmental health threat.

## ***Section 5. Appraisal of the Planning Capacities of the Health Services***

---

---

57 The Annexe 6 provides more information on alternative solutions for the disposal of sharps.

58 Waste Management Guidelines, draft document. Ministry of Health September, 2002

### ***1 Monitoring Capacities of the Health Authorities***

The capacities of the Health Authorities remain limited. There is no sufficient local or national expertise available in Tanzania for the management of HCW. Scientific knowledge on HCWM remains limited and the Health Authorities have difficulties to provide adequate backstopping for the medical institution under their jurisdiction

a) *At Central Level*

Despite the decentralisation management process that Tanzania has been experiencing since the mid 1980s, the MOH continues to play a major role in the day – to day management of the Public Health Services but progressively shifts its role from a direct provider to a facilitator in order to centre most efficiently its tasks towards: 1) the policy formulation through appropriate legislation and regulations; 2) the development of guidelines and standards to facilitate the implementation of the National Health Policy; 3) the monitoring and evaluation of the Health Service to improve their quality; 4) the training, the deployment and transfers of all cadres of health workers.

b) *At Local Level*

Authorities and budgets of the Public Health Services are more and more decentralised to the district level. However, Local Authorities have so far not been able to exercise sufficiently their authority in the management of these services due to lack of critical decision making power and inadequate resources availability. Despite the decentralisation process, the present staffing level of the CHMTs and their capacities are severely limited, as the ones of the Regional Health Authorities that are in charge of the interpretation of the national policies and the supervision of their implementation by the CHMTs. It is however expected that each of the 134 districts develop a Health Plan using guidelines<sup>61</sup> provided by the MOH. These District Health Plans could be used to initiate monitoring and control procedures of the production of HCW in the medical institutions.

---

59 This is particularly the case for the Environmental Health and Sanitation Services (EHSS), which will be in charge of co-ordinating the National HCWM Plan.

60 See for instance the dispersed and non co-ordinated approaches of the different co-operation agencies that have developed projects on HCWM throughout the country (section 6).

61 See for instance the National District Health Planning Guidelines. Part I District Health Planning, Plan Preparation. Part II: Techniques and other Information for Planning. Version 1.0 Second Edition and Printing. Ministry of Health. The United Republic of Tanzania. April 1998. See also the Format of a prototype comprehensive council health plan issued by the Health Sector Reform secretariat of the MOH in March 2001

In this context, the safe management of the HCW is not –and cannot be– seen as a priority by the executive and managerial teams.

b) *Financial Resources and Planning*

Tanzania allocates a relatively high proportion of its budget to the Health Sector compared to the neighbouring countries<sup>62</sup>. However, shortages of funds and weak management have meant that many public HCFs lack essential drugs and supplies and has also led to deteriorating infrastructures<sup>63</sup>.

Therefore the HCWM plan will have to balance optimally but costantly and unaffordable solutions with realistic but not always fully satisfactorfy technical options for the disposal of HCW. In order to cope with this constraint, a clear difference between short term and long term solutions will have to be provided in the plan.

---

62 Approximately 1.5% of the GDP.\

63 Tanzania Copuntry Assistance Strategy. The World Bank Group FY 2001 - 2003

64 The Situation is worsened by the weak execution of the budget. In 1996/97 for instance, only 60% of the MOH's non salary recurrent budget was release as opposed to over 100% of personnel emolument (World Bank Repoort)

65 Approximately less than 4% of the budget of medical facilities is dedicated to the supply of goods necessary for cleaning and disinfectin

### c) *Monitoring and Control*

In practice, there is a lack of monitoring fo monitoring of the management of HCW due to: 1) scarce knowledge on HCWM in the country ; 2) limited financial resources; 3) incomplete legal and regulatory provisions and 4) the understaffed Health Authorities<sup>66</sup>. The finite resources of the Government strongly limit its possibiities to set – up a monitoring system to control HCW streas inside the public and private HCFs of the the country.

### b) *Training and Awareness of Staff*

#### *Awareness*

The level of awareness is a key element to change and improvement. To compare the needs identified by the mission with those expressed by the aministrative and medical staff of the hospitals, a number of qualitative questions were systematically asked during the filed visits<sup>68</sup>. This information is essential in helping to select the kost appropriate strategy for the implementation of the new policy.

---

66 For instance, the Health Officer (HO) plays a central role in the monitoring and control of the application of environmental health standards at HCF, district, regional and central level but his/her professional responsibilities include: 1) the control of communicable

disease, 2) health education, 3) sanitary inspections, 4) food quality control, 5) enactment, revision and enforcement of the relevant laws, 6) control of waste collection, transport and disposal, 7) improvement of housing conditions, 8) improvement of school health, 9) improvement of occupational health, 10) vector and vermin control, 11) continuing education, 12) immunization, 13) port health control. The multiplicity of the tasks to be performed by the Hos is such that it is obviously impossible to ensure that a proper monitoring is applied in all these fields of activities.

67 Source. Tanzania – Multi- Sectoral AIDS Project, World Bank Report N0PID10683 Africa Regional Office 2002

68 Analysis of the needs identified by the mission vs. The demand expressed by the interlocutors

## ***Section 6. External Support Capacities***

---

### ***1. Review of the HCWM Projects Carried out in Tanzania***

Among the international co-operation agencies involved in the Tanzania Health Sector, WHO, UNICEF, SDC, DFID, DED and MSF have developed HCWM projects in relation with their specific programmes unfortunately without coordination. Each agency has therefore proposed several solutions for the management and the disposal of HCW, not all of them having the same standards, which are sometimes hardly compatible with each other. In addition, the management practices fail to be improved in a sustainable way since these projects have not been integrated in a global and national strategy. For instance:

- DFID, through its Tanzania Family health Project 1994 – 2001 installed several De Montfort incinerators in the region of Mbeya and produced a little brochure providing indication for the management of HCW that does not fully comply with the international recommendations of the WHO;
- Based on DFID experience, WHO has recently financed the installation of 12 De Montfort incinerators in large hospitals and the training of the nurses for the management of the HCW bases on the recommendation developed in Geneva headquarters;
- DED (German cooperation) is currently working in Mtwara Region. For Health Centres and Dispensaries located in rural areas, DED has built “waste burning pits” (photo 15) and recommends throwing all the waste produced in the HCFs without segregation and burning them. In the same region, MSF has developed its own specific guidelines for HCWM. The organisation recommends the segregation of the waste into three categories, the use of sharp pits (photo 16) as presented in annexe 6 and, “waste burning pits” but with a different design (photo 17). UNICEF recommends the use of safety boxes (in which the entire combinationa



syring plus neele are dropped) and then burying these containers. The medical and paramedical staff may be confused with so many varying approaches.

## **2 Mobilisation of the Civil Society**

National NGOs and religious institutions play a major role in the provision of health – care services in Tanzania by managing half of the HCFs in the country. Their mobilisation capacity and the possibility to train medical and paramedical staff through their institutions are important. They should be part of the national workshop that the MOH intends to organise.

### ***Section 7. Synthesis of the Findings***

---

In the absence of disposal or treatment facilities within the hospitals, clinical and domestic wastes are disposed of together. All the effort currently carried out in the wards/departments to segregate the wastes are consequently ruined. When clinical wastes are disposed of separately, most often they are burnt in single – chamber incinerators or dumped into open – air pits. In general, treatment and disposal of clinical and highly infectious waste remains an urgent problem to be addressed. There is also an urgent need to develop an integrated and homogenous HCWM system for the country as well as to provide the hospitals with adequate equipment and to implement proper managerial procedures (colour coding system, collection procedures, etc...)

Although the medical and paramedical staff has a relatively good perception of the degree of hazard associated with HCW, the current practices in the hospitals visited by the mission result in significant risks to public health. The hygiene conditions linked to HCW handling and disposal cannot guarantee a satisfactory control on the transmission of nosocomial infection throughout the HCFs. Although direct and indirect costs of this situation are difficult to establish, they remain certainly significantly high.

<sup>69</sup> To avoid this kind of problem, these NGOs should not be left aside and should be invited at the national workshop to be fully part of the decisional process.

The backstopping and monitoring capacities of the Central, Regional and District Authorities to support the medical institutions remain limited. Furthermore the legal framework is not sufficiently developed. Additional decrees, code of hygiene and internal rules for hospitals will have to be established and put at the disposition of the local authorities as well as the hospital administrations so as to clarify roles, duties and responsibilities of all the actors involved. Finally, the implementation of an efficient monitoring framework and the involvement of the executives remain key issues to improve the situation within the hospitals.



The administrations of the medical facilities have difficulties to estimate the costs related to management of HCW. The structure of their accounting system does not enable them to differentiate the expenses associated with the management of the HCW from the one linked to other activities. Consequently it is extremely difficult for the medical institutions to estimate the financial costs for the development of an integrated HCWM plan.

Some suggestions to improve the management of HCW within the medical institutions of Tanzania are proposed and their economical implications roughly analysed in the following part of this report. A strategy to upgrade the current HCWM practices is also developed taking into consideration that the improvement of the prevailing situation requires a long-term involvement from the MOH to monitor and implement adequate managerial procedures. A potential “*National Action Plan*” with measures that could be carried out by the MOH within the next five years to implement the recommendations is contained in the third part of this report.

## **PART TWO; RECOMMENDATIONS**

### **Section 1. Consolidating the Legal and Regulatory Frameworks**

#### **1. National Legislation and Regulations**

A number of legal documents should be reviewed or edited by the MOH to reinforce the duties and responsibilities of key staff/institutions. Any policy should outline the rationale for HCWM in Tanzania, the short-term and long-term objectives to improve HCWM and the key steps essential to achieve these objectives.

##### **a) The Legislation**

The decree should contain general and specific provisions to determine the authorities of enforcement, the obligations of HCW Producers and Operators, the authorized management, Treatment and Disposal procures as well as the range of penalties to be applied. Some details are provided in table 2

##### **b) The Regulations**

In addition to the legislation, it is recommended that the MOHSW urgently prepare for publication a paper presenting the National Policy on HCWM. It should be completed with practical, informative and incentive National Guidelines-jointly drafted with this report – to precise the national regulations for Tanzania

It could be worthwhile that the GOT elaborate a specific Policy on injections safety – the current poster available at the MOH cannot be considered as National Guidelines. The MOH should also consider the development of an integrated Policy on Hospital Hygiene and Infection Control as a priority.

#### **2. Code of Hygiene and Rules in Medical Institutions**

##### **a) Code of Hygiene**

The Management of HCW must be considered as an integral part of hygiene and infection control in HCFs. The legal framework must therefore be reinforced with the application of strict internal rules that should be regularly monitored. Guidelines for the medical staff to ensure hygiene and control of nosocomial infections should be consigned in a comprehensive Code of Hygiene providing:

##### **b) Assignment of responsibilities**

- Personal responsibility is a key issue to ensure that the medical paramedical staff actively participate in the general HCWM effort. The Medical Officers in Charge should formally appoint each category of staff, in writing, informing them of their duties and responsibilities concerning the management of HCW. A Health-Care Waste Management Officer (HCWMO) in major health-care facilities should be designated and left with the responsibility for the day to day operation and monitoring of the HCWM system (cf. section4). Nurses and attendant job descriptions should be

reviewed so as to reinforce the duties and responsibilities of this category of staff in the daily management of HCW.

The objectives are that every producer and operator HCW comply with the management, treatment and disposal procedures stipulated in the Decree and abide by the registration and tracking provisions contained in the Decree;

As a minimum a glossary with the following information should be provided in the Decree: definitions and a classification of HCW generation, handling, segregation, collection, transportation, treatment and final disposal, HCW producers and operators

#### Authorities of Enforcement

The Decree should: specify which institution is responsible for the enforcement and the coordination of the policy on HCWM: 2) explain what should be the different competencies of the Central; Regional and District /Municipal Authorities regarding HCWM;3) describe the enforcement power of each of these authorities.

#### Provisions related to HCW Producers and Operators

The training courses on the risks and the safely measures that should be taken during the handling, transportation and treatment of HCW; medical check-up be carried out in case of an accident; compulsory immunization vaccines that stall being contact with HCW should receive; equipment that the staff dealing with HCW should have; the security instructions and guidance manual that should be available for the staff in any establishment generating HCW.

#### Provisions Related to Management, Treatment and Disposal Procedures

The mission recommends to include the following provisions:

List all the management procedures that the producers should comply with: segregation, handling, on-site transportation, storage, of-site transportation, on/off-site treatment and final disposal;

Describe the standard treatment and disposal norms that should be respected by HCW producers and operators to get an operating certificate issued by the Ministries to allow them to run their activities;

#### **Penalties**

The major mismanagements that would lead the enforcement authority to withdraw the certificate and to apply penalties should be inventorised.

### **Section 2; Standardising HCWM Practices**

The recommendations that are presented hereafter should be implemented in all the medical institutions of the country. The financial constraints that the medical institutions face are taken into consideration to propose pragmatic and affordable HCWM plans and disposal

technologies. A step – by –step strategy has to be implemented to progressively improve the HCWM practices.

<b>1. Minimize the production of HCW</b>
<ul style="list-style-type: none"> <li>▪ Improve purchasing practices</li> <li>▪ Rationalise stock management</li> </ul>
<b>2. Ensure adequate segregation, packaging and labeling</b>
Set-up a three-bins system and a colour coding system for <ul style="list-style-type: none"> <li>▪ Non-Risk HCW</li> <li>▪ Clinical Waste</li> <li>▪ Sharps</li> </ul>
Consider Special categories of waste
<ul style="list-style-type: none"> <li>▪ Highly infectious Waste</li> <li>▪ Cytotoxic and Hazardous Pharmaceutical Waste</li> <li>▪ Placentas and other pathological waste</li> </ul>

Figure 2: the first steps for rationalizing HCWM

### 1. Segregation, Packaging and Labeling

The recommendation provided in this chapter are mainly valid for major health-care facilities (i.e district, Regional, Referral Hospitals) and in Health-Centres located in urban areas.

#### a) Segregation

The segregation of HCW is of the utmost importance for three different reasons: 1) proper segmentation is the basis for safe manipulation and appropriate disposal of medical waste; 2) the treatment and disposal procedures can be optimized for each category of waste; 3) it is the best way to reduce the costs linked to the treatment and the disposal of HCW.

The following categories of HCW should be considered:

- Non –Risk HCW or domestic waste;
- Clinical Waste (hazardous HCW) that includes all the pathological and infectious wastes as described in the introduction of this report as well as some particular waste generated in isolation wards;
- Sharp that include all items that can cause cuts or puncture wounds. They should always be collected in rigid safety boxes. In particular, all disposable syringes and needles should be discarded immediately after being used without recapping the needle or removing it from the syringe; the whole combination should be inserted into the safety box.

In addition to this three bins system, in the different services where they are generated:

- Anatomical Waste, generated in Operation Theatres and Placentas should be collected separately to be specifically disposed of;
- Highly Infectious Wastes generated in Medical Laboratories have to be pre-treated before being disposed of with clinical waste (cf. draft National guidelines and annexe 8):
- Pharmaceutical Waste generated in Pharmacies should be separated into two categories. Non-Hazardous Pharmaceutical Waste could be disposed of with Non-risk HCW while Hazardous Pharmaceutical Waste and Cytotoxic Waste should be specifically packed to be sent back to MSD (cf. chapter 4). The MOH, in co-ordination with MSD should thus establish a comprehensive list with adequate instructions of Hazardous Pharmaceutical Waste and Cytotoxic Waste and ensure a proper distribution within the country.

### **b)Packaging**

Packaging is a problem in Tanzania. The mission proposes to take into consideration the reality of the country by implementing different solutions for packaging;

- In all the HCFs outside cities, where on –site treatment is planned, 60 litre plastic bins can continue to be used if they are regularly disinfected. To enable the monitoring process, the use of other sizes should never be allowed by the MOH.
- In the major HCFs located in cities, when off-site treatment is planned, bins for medical waste should be replaced with bag-holders using 30 litre yellow PE bags (200-300um gauge). Black plastic bins could continue to be used for non-risk HCW.
- In all HCFs, cardboard safety boxes, similar to the one used for EPI programme should be used for sharp.

### **c) Colour Coding**

A standardized colour coding system aims at ensuring an immediate and non-equivocal identification of the hazards associate with the type of HCW that is handled or treated. In that respect, the colour coding system should remain simple and be applied uniformly throughout the country. The internationally recognized colours that should be applied in the medical institutions of Tanzania should be:

### **d)Labelling**

In the major HCFs located in cities, when off-site treatment is planned, the mission would recommend to set-up an adequate tracking system of clinical waste and sharps. The labeling should be written in Swahili and English and mention: 1) the type of waste in the container with the formulation “Domestic waste” or “Danger !Hazardous biomedical waste”;2) the name of the hospital;3) the date of collection.

Clinical Waste	Sharp	Non-risk waste
<p>Gloves, gowns, masks gauze, dressing, swabs spatulas that are visually contaminated with blood or body fluids</p> <p>Urine, blood bags, sump tubes, suction canisters, disposable bowls and containers used for medial purposes, Haemodialysis tubing, Intravenous (IV) lines, bags Foley catheters</p> <p>Pre-treated highly infectious waste form medical laboratories, isolation wards</p> <p>Are considered as potentially infectious waste but are managed separately for technical reasons; Human tissue placentas, body parts</p>	<p>Needles , Needle and Syringe assemblies, Lancets, scalpels, blades, Scissors</p> <p>Broken glass, ampoules</p> <p>Intravenous catheter</p> <p>Glass slides, cover slips</p>	<p>Gloves, gowns, masks, gauze, dressings, swabs, spatulas that are contaminated neither with blood nor body fluids</p> <p>Sanitary napkins, Incontinence pads (except in isolation wards)</p> <p>Packages, boxes, Wrappings Newspapers, Magazines Disposable plates, cups, food utensils, left over food and packaging, canisters</p> <p>Tissues, paper towels, intravenous bottles, packs</p>

Table 3: Practical segregation examples

### 3. Collection, On-Site Transportation and Storage

The recommendations provided in this chapter are mainly valid for major HCFs, i.e. District, Regional and Referral Hospitals. For their formulation, the mission assumed that a medium-term objective that the MOH should target is the safe off-site transportation and disposal of the clinical waste generated by the major institutions located in the cities (i.e. Mwanza and Dar Es Salaam)

#### a) Collection and On-site Transportation

The mission would recommend;

- Store temporarily filled up yellow bins or waste bags and black bins in separate locations so as to avoid mistakes, away from patient areas, preferably close the nurses room;
- In the major HCFs located in cities, two –wheeled 240 litre bins (with a lid) should be used, for temporary storage of clinical wastes and sharps inside the HCFs and off-site transportation. Once again, to enable to monitoring process, the use of other sizes should never be allowed by the MOH.

- Precise the schedule for the collection of waste and containers from each Medical Department in order to ensure the regular removal of waste from each location and to avoid misunderstandings between medical and non medical staff;
- Remove the waste from the different units within the HCFs at least once a day;
- Set-up separate schedules and separate collection times for black bins and yellow bags/bins;
- Ensure that the cleaners and waste collectors wear protective clothes when they handle waste, at least, heavy duty gloves, industrial boots and an overall.

#### b)Central Storage

The mission would recommend to improve the central storage point(s) in hospitals for the two types of waste. They should be geographically separate within the hospital ground in order to: 1) avoid contamination of Non-Risk HCW waste from Clinical Waste; 2) facilitate the collection of both wastes that will go to different treatment/disposal facilities. The wastes should be stored in away that they are protected from the effects of the weather and from the scavenging of animals and insects. All wastes should be disposed of within a maximum of the 48 hours.

#### c)Off-site transportation

For large municipalities, the mission recommends to target at medium-term the treatment of clinical waste in central disposal facilities (cf. Chapter 4). It is thus necessary to consider off-site transportation. A question remains open: how effectively can off-site transportation for HCFs located in cities be monitored in Tanzania? Whilst the mission has currently no satisfactory solution, the following recommendation can be made;

### **Section 4; Treatment and Disposal**

Environmental-friendly, safe and affordable options may not be available for every situation in Tanzania. The health risks from environmental exposure should always be weighed against the risk of accidental infection due to an inadequate disposal system.

To date incineration has been the treatment technology chosen in Tanzania, even in urban areas. Other technologies internationally recognized and accepted for treating hazardous HCW exist (cf. annexe.7) currently, at international level; two major concepts for the treatment/disposal of HCW are applied:

- In most European countries (England, France, Germany, Switzerland..), where public health and environmental standards are quite strict, land expensive, etc – expensive modern incinerators are frequently used to dispose of the waste.
- In other countries (USA, Canada, Mexico, Argentina), where land is easily found for dump or where modern incineration cannot be afforded, alternative solutions are often proposed as autoclaving or controlled land-filling. These solutions remain anyway quite expensive.

a) Disposal of General Clinical Waste Generated in Health-Centres and Dispensaries

Unfortunately, such a solution cannot be envisaged currently for most cities of Tanzania since municipal waste collection services are not in a position to carry out the work in appropriate conditions and there are no sanitary landfills operated in the country. Aware of the reality of the country, the mission proposes to adopt a pragmatic step-by approach.

In Rural Area

Clinical waste, sharp boxes and domestic waste should be burnt daily together in “burning pits” as already recommended and implemented by DED. The MOH should adopt the design proposed by MSF, Placentas and other pathological waste that may not burn well should be buried (the use of pit latrines is possible).

In Urban Area

In health – centres and Dispensaries located in urban areas the first improvement would consist in ensuring the on-site burning of sharps and the safe burying of the ash; the safe burying of placentas in pits, specifically designed, as already done in several medical institutions. The other category of waste may be disposed of together with the municipal waste. In a second step, these HCFs may be included in a general HCW collection scheme, when the collection services are sufficiently developed.

### Section 3 Strengthening the Institutional Capacities for HCWM

In order to be able to manage efficiently the HCW produced during their activities, medical institutions must develop their own strategy. The elaboration of HCWM Plans at HCF level is a major issue. To facilitate their implementation, this requires that the MOH set-up.

- An adequate management information system to estimate the quantities of HCW generated in medical institutions;
- Strategies for the implementation of the HCWM plans;
- Monitoring systems to control the HCW streams within and outside the medical institutions.



## **PART THREE**

### **NATIONAL ACTION PLAN**

The GOT must develop a step-by-step strategy to improve the management of HCW in the HCFs of the country and reduce significantly the occupational risks associated with the current practices. The strategy should show clearly the medium and the long-term objectives to be achieved and reflect the integrated effort that is necessary to set-up safe and environmentally sound HCWM practices. Whenever possible, it should underline the institutional and individual responsibilities as well as define the monitoring and administrative procedures.

#### **Section 1. National Strategy for the Implementation of Plan**

It is of the utmost importance that the GOT implement new HCWM procedures in close co-operation with all the stakeholders of the country and induce them to develop their own HCWM plan. New standards should be applied first in the four Referral Hospitals. A three-step approach is proposed:

- Step 1: organize a National Workshop;
- Step 2: establish the institutional framework to initiate the HCWM plan;
- Step 3: launch a National Action Plan.

#### **1. First Step: Organise a National Workshop**

The national workshop should focus on amending and validating the National HCWM Plan as well as the National Guidelines 86. The implementation of the HCWM plan will require a regular commitment and monitoring. Thus participative decisions should be taken during the workshop to ensure a good co-operation between all the stakeholders for the future implementation of the plan. The following institutions should participate to the workshop:

- National and local institutions: MOH 87, Vice President Office, NEMC, MOF, MSD, CEDHA, Nurses and Midwives Council (NMC); Muhimbili University College of Health Science (MUCHS), representative of the District/Regional Health Management Teams;
- Civil Societies: CSSC, ALAT, APTHA, TARENA, MAT, TUGHE, environmental NGOs, representatives of the private sector;
- International Agencies: WHI, UNEP, MSF, DED, Representatives of the Bilateral Agencies;

The mission strongly recommends to set up a National Steering Committee for HCWM and designate the members of the Committee during the workshop. In addition, specific work groups should also be established.

#### **2. Second Step: Set-up the Institutional Framework to Implement the Plan**

The National Steering Committee for HCWM should supervise the overall implementation of the HCWM plan 88. The members should meet on a regular basis (every three months minimum).

Some key institutions should be involved in this committee in order to obtain a broad consensus. The tasks of the National Steering Committee should be the following:

- Nominate a project co-ordinator and compose the task groups;
- Establish the criteria for the evaluation of the HCWM plan during its implementation;
- Designate the administrative authorities in charge of the implementation of the HCWM plan at Regional and District levels;
- Select institutions and Regions to test the HCWM plan already established;
- Set-up intermediary and final evaluations of the implementation of the HCWM plan.

A program co-ordinator should be assigned a full time post during the overall duration of the implementation of the plan (i.e. five years minimum). He/she should have excellent organizing, managing and communication skills, dynamic, experienced in HCWM and his/her tasks are coordination, supervision, implementation, monitoring and evaluation. He/she should co-ordinate the work of specific work groups that will be established by the Steering Committee.

Four multidisciplinary work groups should be set-up to address the following objectives of the HCWM plan:

- Objective 1: develop the legal and regulatory frameworks for HCWM;
- Objective 2: standardize HCWM practices, improve management and monitoring procedures;
- Objective 3: equip the medical institutions;
- Objective 4: launch training and awareness measures.

86 Drafted separately.

87 And most particularly the following services: Policy and Planning Preventive Health Services, Curative Health services, Health Human Resources Development.

88 The institutional scheme proposed by the mission to implement the National HCWM Plan is shown in the figure 7.

The mission recommends to clearly identify at all levels – for the implementation of the specific actions – supervision and co-ordination bodies with well defined duties:

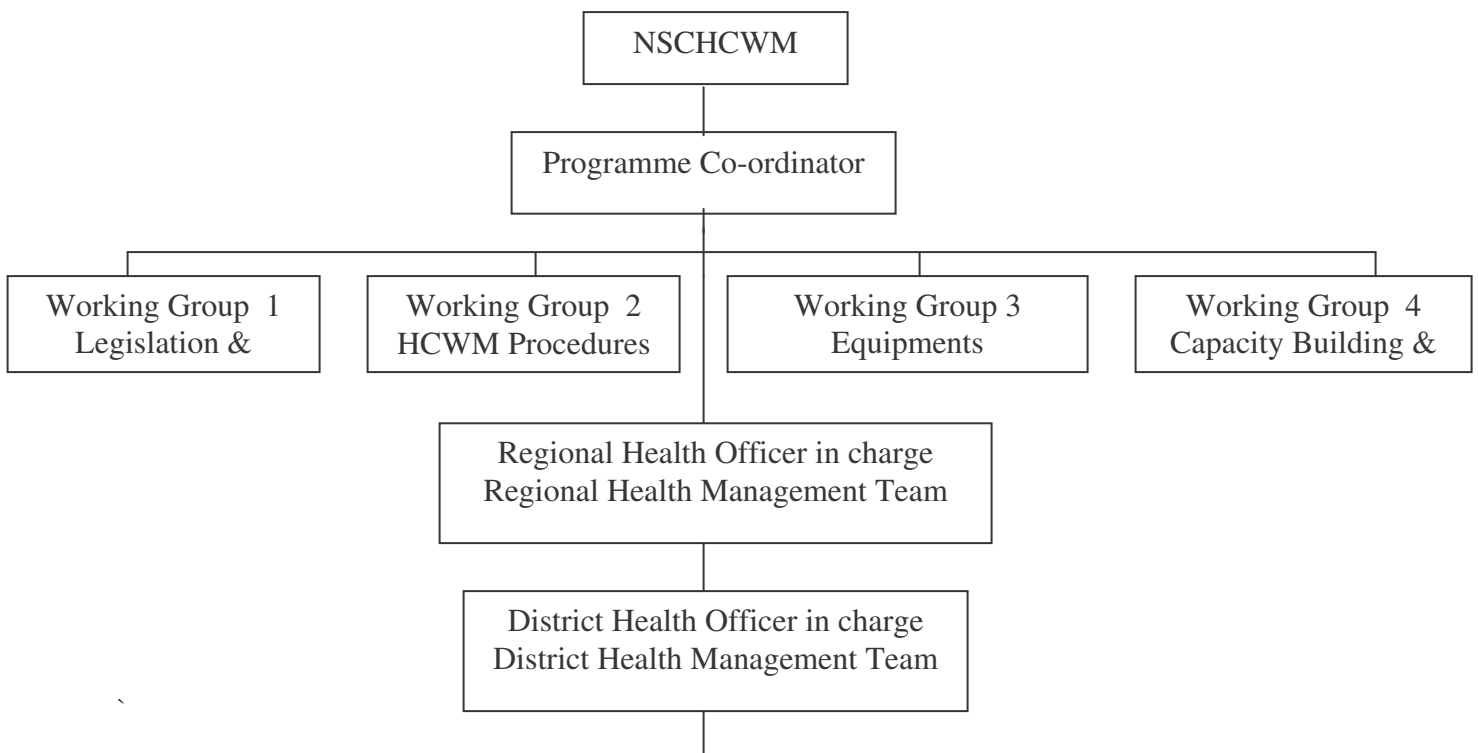
- At National level, a task force is responsible for the overall implementation of the HCWM plan. It includes the National Steering Committee in charge of the supervision of the HCWM plan, the project co-ordinator and the leaders of the work groups;
- At Regional and District levels, the Regional and the Council Health Management Teams are responsible to supervise HCWM practices within the Regions/Districts. The Regional and District Health Officers are in charge of the implementation of the plan;
- At Health facility level, each facility in charge is administratively responsible for the HCWM within his/her institution. He/She watches over the application of the rules and nominates the HCWMO and an Infection Control Committee as stipulated in the National infection prevention and control guideline.

### 3. Third Step: Launch the National action Plan

The implementation of the four objectives contained in the National HCWM Plan requires the development of the specific actions included in the National Action Plan (NAP) presented hereafter. The Plan should be periodically monitored and reviewed. As mentioned previously, a typical timeframe for a NAP is around five years. The NAP is structured as follows:

- For each objective, a table summarises the actions that must be taken to achieve this objective. The actions are classified by order of priority;
- For each action, the institutions responsible for its implementation and its co-ordination are designated. Indicators of achievement that should help in the regular monitoring of the plan are indicated. The initial and the annual costs in relation to this action are presented.

#### Programme Organogram



Health facility in charge



## The National Action Plan for HCWM (2009 – 2015)

### Budget Estimates

#### 1. Define a general Framework for the Implementation of the National Action Plan for HCWM

Actions		Time frame	Coordinati on	supervision	Indicator of achievement
0.1	Organisation of a national workshop to modify and validate the proposed NAP and set-up specific work groups.	Dec 2009	DPS	Chief. Med. Officer	<ul style="list-style-type: none"> <li>Updated NAP</li> <li>Minutes of work</li> <li>Specific work available</li> </ul>
0.2	Establish and hold the National Steering Committee on Health-Care Waste Management	By June 2009	DPS	Chief. Med. Officer	List of members Minutes of meeting
0.3	Designation of a consultant to facilitate the implementation of the NAP	Dec 2010	NSCHCWM	Chief Med. Officer	Presence of a consultant with clear description TOR
04	Appointment and running of Mult disciplinary working group	June 2009	DPS	PS	List of names of the working groups with TOR
05	Establishment of the criteria for the evaluation of the NAP during its implementation.	June 2010	PC	NSCHCWM	Criteria for evaluation available.
0.6	Designation of the administrative authorities in charge of the implementation of the NAP at Regional and District levels.	Dec 2010	DPS	PS.	Directive disseminated Regional and District authority. Regional and District charges in place
0.7	Set-up and conduct: 1) intermediary and 2) final evaluations of the implementation of the NAP		PC	NSCHCWM	Intermediary and evaluation reports

Actions			Time frame	Coordinati on	supervision	Indicator of achievement
	0.8	Facilitate office running cost for HCWMP(Staff allowances, fuel, stationeries, repair		PC	NSCHCWM	Availability of fu
SUB TOTAL						

**2. Develop the Legal and Regulatory Framework**

Actions	Time frame	Coordination	supervision	Indicator of achievement	Cost (USD)
---------	---------------	--------------	-------------	-----------------------------	---------------

Actions		Time frame	Coordination	supervision	Indicator of achievement	Cost (USD)	
Short – term 1-12 months	2.1	Prepare National Guidelines for HCWM	Dec 2006	WGLR & PC	NSCHCHM	HCWM Guidelines in place	0
	2.2	Dissemination HCWM Guidelines to all health facilities	June 2008	PC	NSCHCHM	Aavailability of Guidelines at all health service levels	300,000
	2.3	Prepare Natioalregulations for		PC	NSCHCHM		150,000
	2.4	1) Hospital Hygiene and Infection Control 2) Safe Management of the Health-Care Waste	Dec 2009	ADEHS	DPS	Two documents available	100,000
	2.5	Complete the Public Health Act and edit a specific Decree	June 2008	PC	DPS	Decree published in the Government Gazette	170,000
		Establish a Regulations on Code of Hygiene for Health facilities	Sept 2009			Regulation on Code of Hygiene available	
Long – term 2 – 3 year	2.6	Elaborate an Addendum to the Local Government Act.		MOHSW	GOT	Addendum available	30,000
	2.7	Complete the Professional Code of Ethics for Nurses and Midwives in Tanzania		NMC	MOHSW	Code of Ethics available and taught in the nursing schools	100,000
<b>SUB TOTAL</b>						<b>850,000</b>	

### Recommendations

- To implement these actions, the MOHSW should set-up a Working Group on Legislation and Regulations (WGLR). Should p Group Lawyers, Environmental an d Public Health Specialists from the MOH and MOEI.
- Ideally, the “National Guidelines”, the list of acceptable technologies and a catalogue of equipments should be the Decree. TH documents should clearly define roles, responsibilities, duties and penalties for the mismanagement of HCW (cf. part 2 of this
- On-going controls carried out in the field by the MOH and the PHS should be reinforced to ensure an adequate implementation plans. They should be accompanied with activities of advice and follow-up.
- The criteria for enforcement and inciting measures to ensure that the medical staff complies with the management procedures law/decree and described in the “National Guidelines” should be set up together with the Trade Unions.



### 3. Standardise the HCWM Practices and Improve Management and Monitoring Procedures

Actions		Time Frame	Coordination	Supervision	Indicators of achievement	
<b>Short – term 6 -12 months</b>	3.1	Set-up Health Care Waste Management Team at district level	By June 2009	DHO	RHO	- Member list is established, regular meetings scheduled
	3.2	Dissemination of acceptable procedure of HCWM and requirements for Health Care Waste disposal technologies	By June 2010	PC	NSCHCHM	- National standards and procedure disseminated - health care waste management team and other stakeholders - List of acceptable technologies
	3.3	Appoint : 1) HCWMO in Referral, Regional and District Hospitals; 2) Officers in charge in Health centre and Dispensaries	By June 2009	PC	PS/DPS	- Appointment letters in place and appointees available
	3.4	Develop a plan for management of HCW in Health institutions including recycling	Dec 2009	PC	NSCHCHM	- The plan is set-up
	3.5	HCWM should be added in the job description of all medical and paramedical jobs.	By June 2010	PC	NSCHCHM	- HCWM component in Job Description
	3.6	Conduct monitoring, supervision and research	By 2013	PC	NSCHCWM/WG	- Supervision and research reports

<b>Long – term 2-3 year</b>	3.6	Distribute official forms for the establishment of Regional, District and health facilities HCWM plans	By Jan. 2009	PC	NSCHCHM	Forms available in all health facilities and in use	20,000
	3.7	Elaborate a cost recovery system	By Dec. 2009	PC	DPS/DPP	HCWM included in the accountancy books	20,000
<b>SUB TOTAL</b>							<b>1,039,000</b>
<b>Recommendations</b>							
<ul style="list-style-type: none"> <li>• The action 2.4 should include: 1) the inventory by MSD of the materials susceptible to generate pollution when treated: 2) a feasibility study for the replacement of hazardous materials with less hazardous ones; 3) a feasibility study for the implementation of a national waste recycling programme; 4) the set-up of a waste minimization programme.</li> <li>• The forms for the HCWM plans should provide the necessary indications to estimate the quantities of HCW generated in their institution/ District, report incidents, inventory of the available equipment and materials and assess the on-going needs for HCMW. The regional and district HCMW plans should be gathered and analysed at central level to periodically adjust the “National Guidelines” and the “National Policy”.</li> </ul>							

**4. Equip the Health Institutions**

		Actions	Co-ordination	Supervision	Indicators of achievement	Cost (USD)
						Initial
In six months	3.1	Develop a National catalogue of equipment for segregation, packaging, collection and disposal of the HCM in the Health institutions materials (both solid and Liquids)	PC	WGE	A catalogue of Equipment available	100,000
	3.2	Write Technical Specifications and Bids by 2010	City councils, WGE & PC	NSCHCWM	Documents available	50,000
	3.3	Installation of centralized treatment by 2012	City councils, PC	WGE & NSCHCWM	Treatment plants available	700,000
	3.4.	Creation of Mutual benefit Groups in all cities	PC & City Council	NSCHCWM PC	The Group are constituted	20,000
	3.5	Negotiate with the private Sector for establishment of recommended disposal systems in all cities.	City CHMT	PC	Agreement and Memorandum of understanding signed	20,000
Within 1½ years	3.6	Launch international bids for City councils to Evaluate the Possibility to use sanitary landfills by 2011		NSCHCWM WGE, & PC	Documents available	600,000
	3.7	Equip all large HCFs with segregation, packaging, collection material (including protective clothes), transportation and disposal equipments by 2013	City CHMT CHMT	SCHCHM	Equipment available	800,000
	3.8	Equip all small health institutions with appropriate HCWM facilities by 2013	CHMT	WGE & PC	Delivery forms and equipment available.	700,000

#### 4. Launch Training and Awareness Measures

Actions		Co-ordination	Supervision	Indicators of achievement	Cost (USD)
					Initial
4.1	Conduct awareness campaign by December 2013 <ul style="list-style-type: none"> <li>• Policy makers</li> <li>• Health facility personnel/staff</li> <li>• General Community/population.</li> </ul>	WGT & PC	NSCHCWM	Posters displayed in Health facility. Documentation of trainings Number of trained personnel Documentation on mass education.	600,000
4.2	Create awareness on HCWM in Health Science institution and initiate teaching programmes to students by December 2012.	WGT & PC	MOHSW	Health care management topics incorporated in current	300,000
4.3.	Finalize training packages for HCWM in English by March 2008.	WGT & PC	NSCHCWM	Training package in English available.	60,000
4.4.	Translation of training package to Swahili language by June 2008	WGT & PC	NSCHCWM	Swahili Training package	40,000
4.5	Provide Technical training for the Health Officers of the MOHSW, National Institutions (CEDHA, MUCHS,) Regional and District Authorities (train ‘trainers of trainers’) by December 2008.	WGT & PC	NSCHCWM	Training packages available and sessions organized.	300,000

4.6	Set-up a Group of Trainers by January 2009 (train the trainers).	WGT & PC	NSCHCWM	Registration of the groups	50,000
4.7	Set-up-in-service Training Programmes in regional Centres for medical, paramedical and technical staff by April 2010.	WGT & PC	NSCHCWM	Reports of the different groups of trainers	900,000
4.8	Recruit new staff members at the MOHSW by December 2010.	MOH	GOT	Job descriptions and new positions at the MOH	-
4.9	Organize systematic initial briefing in Health institutions by December 2010.	WGT & PC	NSCHCWM	Briefing procedures available.	200,000
4.10	Review curricula in health institutions to incorporate HCWM by July 2010.	WGT & PC	NSCHCWM & all health institutions	HCWM incorporated in teaching curricula.	300,000
<b>Sub total</b>					<b>5,740,000</b>
<b>GRAND TOTAL</b>					<b>9,039,000</b>

## Conclusion

With the few exceptions, the current HCWM practices observed in Tanzania are not safe and have harmful environmental effects due to a lack of knowledge of management procedures and the disposal technologies available as well as the low financial resources of the health sector. Although they are difficult to estimate, the direct and indirect costs associated with this situation are certainly high.

The development of appropriate financial means for the regular implementation of the National health Care Waste Management Plan will remain a key issue for its application with regards to the relatively high costs associated with such plans. The Government of Tanzania may therefore develop a specific strategy aiming at improving the health-care waste management practices in the large medical institutions of the country first or implementing measures for specific categories of health-care waster, such as sharps.

The experiences carried out by several actors in the Tanzanian Health Sector have little chances to remain sustainable as long as a holistic approach is not developed. Actually, the sustainable implementation of safe procedures to manage health-care Waste requires a lasting commitment starting at the government level and prolonged all the way down to the hospital staff. The implementation of the four objectives targeted by the National Health care Waste Management Plan should contribute durably improve the situation if they are progressively implemented.

- The legislative and regulatory provisions will need to be completed so as to define both which practices and technical solutions are admissible or not as well as who is competent/responsible for what;
- The standardization of the health-care waste Management practices, though the establishment of clear protocols as well as managerial and monitoring measures will be key issues so as to secure the whole health-care waste stream. The procedures will have to be in accordance with the prescriptions contained in the national legislation and in the internal hospital rules.
- The equipment of the health-care facilities will provide to the administration and medical staff the necessary tools to apply the standardized procedures in their establishments and medical services:
- In-service training programme and adequate curricula will have to be set up followed by the ongoing training of all people involved so as to ensure that hospital staff knows the importance and the best practices linked to the management of health-care waste.