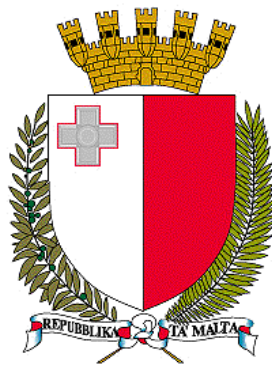

Clinical Waste Management Plan



Health Division

Malta

**CLINICAL WASTE MANAGEMENT PLAN
FOR HOSPITALS
AND HEALTHCARE FACILITIES
OF THE HEALTH DIVISION**

December 2001

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FOREWORD

Clinical waste has often made the headlines; this is understandable. Hospitals have long held an aura of apprehension amongst the general public. It is therefore understandable that any issue that deals with waste from hospitals will be an emotional one. It is however important that we go about the matter in a sensible way, aiming to assess the situation in a scientific manner and devising clear policies and interventions based on the latest available scientific advice.

For this reason, the Health Division has produced this comprehensive waste management plan to encompass clinical waste from production to disposal. This document provides a risk-assessment approach to hospital waste, bypassing irrational fears or conjectures and concentrating instead on evidence-based literature and expert advice on the subject.

It should serve as a template for clinical waste operational policy-making in all the hospitals of the Health Division as well as a guidance document for private entities.

*The Hon. Dr. L. Deguara
Minister for Health*

Introduction

The inadequate handling and disposal of healthcare waste may lead to transmission of infectious diseases. The groups most at risk are healthcare workers, waste management operators, and scavengers. The management of hospital wastes requires diligence and care from a chain of people, starting with healthcare staff, continuing through collection workers, and finishing with disposal operators. If any of these lack knowledge or are careless in their work, or allow scavengers or children access to the waste, the chain would be broken and dangers of infection would follow.

It is the responsibility of the Health Department to ensure that the premises for which it is responsible meet the necessary requirements. Additionally, compliance with an effective policy on clinical waste, from its generation to its disposal, is essential. The strategy needs to be endorsed by senior managers and backed through clear lines of accountability.

This plan outlines:

- Waste categorisation criteria;
- Policies on waste handling and transfer, setting out the arrangements — with sufficient investment in suitable equipment;
- Appropriate arrangements for storage, transportation and disposal of clinical waste which are both cost effective and flexible enough to adjust, so far as possible, to future changes in regulations and demand.
- Satisfactory methods by which clinical waste can be rendered safe in a manner consistent with environmental protection.

Clinical directors, nurse managers and other managers of staff who produce waste must support the strategy and ensure that all staff observe the rules about segregation and recycling. They must endorse reviews of waste collection points in their areas, making sufficient space available for its safe storage. They must recognise that staff will need to be trained to put the right waste in the right container. Only with the support of senior managers can staff of all grades be held properly accountable for any breaches in the rules.

Identification of categories of hospital waste

Hospital waste is to be categorised as follows for management purposes:

Clinical or healthcare waste

- Clinical waste — this includes ward and sanitary dressings, human tissue, specimens, operating theatre waste, disposable theatre garments, infectious materials (includes items in contact with infectious patients, blood-soiled linen), etc;
- Sharps including needles, syringes, razor blades, etc;
- Pharmaceutical products and cytotoxic waste;
- Radioactive waste;

Conventional domestic waste

- Organic domestic waste — this includes food wastage and garden waste;
- Non-organic domestic waste — this includes plastics, non aluminium cans, cardboard packaging; and
- Domestic recyclable waste — this includes bottles, newspapers, aluminium cans, etc.

Definitions of clinical waste

Clinical/healthcare waste can be grouped under five categories for the purposes of risk assessment, in accordance with World Health Organisation established criteria

- Group A: All *human tissues*, including all *blood and blood products*
Surgical dressings, swabs and other waste from the treatment of patients, that are significantly soiled with blood, pus or serous fluids.
Animals naturally or experimentally infected with zoonotic etiological agents.
Waste materials, which after expert assessment, are deemed to pose a risk to staff handling them or of dissemination of infection in the healthcare setting (e.g. from isolated infectious disease cases).
- Group B: Discarded used *syringe needles*, cartridges, broken glass and other contaminated disposable sharp instruments or items.
- Group C: *Microbiological cultures* and waste from *pathology departments* (clinical laboratories and post-mortem rooms) which may harbour infectious agents or serve as the reservoir for the transmission of infectious agents.
- Group D: Expired or unutilised *pharmaceuticals* (other than intravenous infusion preparations, such as saline, which non-environmentally polluting).
All *cytotoxic* wastes even when in diluted form.
- Group E: Items used to dispose of *urine*, *faeces* and other bodily secretions or excretions assessed as not falling within Group A. This includes used disposable bed pans or bed pan liners, incontinence pads, stoma bags and urine containers. It will be apparent that Group E contains items, which usually present low level of risk, and are also produced in greater number in community and home settings. For this reason, Group E wastes shall be regarded as clinical waste only if they are originating from patients infected with Risk Group 3 or 4 etiologic agents. In such cases, they will be treated in the same way as Group A wastes.

Hospital waste minimisation

Healthcare waste is designated a priority waste stream by the European Union (EU) which has defined a hierarchy of options for waste management in which the options at the top of the hierarchy are preferred to those at the bottom:

- Reduction — minimising the generation of waste at source;
- Re-use — treatment of waste for its recycling and re-use;
- Recovery — recovery of raw materials by recycling, composting;
- Combustion with energy recovery — production of energy from certain waste; and
- Disposal — landfilling as last resort.

The following strategy has been adopted for healthcare waste in respect of waste minimisation:

- Waste prevention and waste minimisation are to be encouraged although they must not “present a barrier to high standards of healthcare”;
- Re-use of non-healthcare risk waste is to be encouraged, although guidance is required on those products suitable for re-use, and re-use must not compromise healthcare standards;
- Recycling of healthcare waste is to be encouraged, if a market exists and if it does not compromise healthcare standards;

- The selection of medical products should be based on performance in clinical setting with consideration given to the environmental effect of the waste produced.

Healthcare waste reduction strategies

In the drive to reduce or contain the costs of waste management, the most effective strategy is to reduce the amount of waste produced. This can be done by waste minimisation or waste avoidance. Waste minimisation is the recovery of materials through recycling or secondary use. Waste avoidance is the minimisation of waste at as many points as possible in the production, use and disposal of any goods. This can be achieved not simply through good management, but also by the environmental design of products, plant and processes. Good environmental design can result in the use of less materials during the manufacture of a product, and the production of less waste from raw material extraction through to end-use.

Environmental design of medical products must reflect the demands of clinical practice. It may be possible to alter clinical procedures in a way that will eliminate or reduce clinical waste, without compromising or having an adverse effect on clinical outcome. Alterations in procedure may also require alterations to the specifications for a product and/or its packing.

Managerial responsibilities

Managers in charge of health care institutions are responsible for putting in place the infrastructure necessary to support the waste management strategy. This will include:

- The equipment required for collecting waste and storing it. There should be sufficient local collection points for both household and clinical waste, latched wheeled bins for holding tied and labelled clinical waste containers under secure conditions, and suitable facilities for holding waste at a central point before disposal.
- Regular collection of waste containers — single handling of waste containers should be aimed for in order to reduce the risk of spillage and accidents;
- Appropriate equipment for transferring waste through the hospital and protective clothing for those handling it;
- Sound arrangements for disposing of waste, including arrangements for the recycling of household waste where possible.

Managers must encourage a clear and agreed waste management strategy, identify responsibilities and clarify accountability. To reduce the impact of waste on the environment and to reduce disposal costs, the hospital management shall:

- Establish a segregation policy;
- Audit waste collection points throughout the hospital;
- Obtain support for the segregation policy from staff;
- Translate the policy into protocols for staff who operate it;
- Publicise the arrangements;
- Collect data to determine how any new scheme performs;
- Review use of supplies to reduce usage and packaging; and
- Review recycling opportunities.
- Track all aspects of waste management preferably by a computerised database system.

Segregation

Careful segregation of clinical waste from non-clinical waste is essential. The colour-coding for waste containers shall be as follows:

Yellow bags: Clinical waste for decontamination only and clearly marked for that purpose.

Black bags: Normal domestic waste (not to be treated as clinical waste).

Bags for autoclaving laboratory waste shall be transparent and carry autoclave tape or another indicator to show they have been autoclaved sufficiently.

Adequate supplies of appropriate containers shall be provided where clinical waste arises. All secondary waste containers shall be capable of containing the waste without spillage or puncture, especially during transport and handling. A rigorous, effective and properly monitored segregation procedure is necessary to ensure that no waste requiring decontamination enters any other waste stream.

The origin of the clinical bags shall be identified for the purpose of accountability. This can be achieved sealed by means of plastic clips, pre-printed adhesive tape or labels and ensures that, in the event of an injury arising from an incorrectly filled bag, the source can be traced. Tagging of bags will also allow for auditing of segregation effectiveness. In addition, a workable documentation system shall be devised to guarantee an audit trail throughout the system.

Management of specific clinical waste streams

Group A wastes

These shall be placed in suitable yellow waste storage sacks within sack holders, rigid yellow containers or rigid, yellow, lidded, lockable, wheeled polyethylene bins. They shall be impervious to moisture and of a strength sufficient to resist ripping, tearing or bursting under normal conditions of use and labelled "Clinical Waste Only". When $\frac{3}{4}$ full, or prior to collection, the bags shall be sealed, marked with the ward or section of origin. All Group A waste shall be decontaminated by a process that provides a six-log reduction in the concentration of vegetative organisms and a four-log reduction in the concentration of *Bacillus subtilis* spores.

Group B wastes

Sharps shall be put in containers that conform to accepted standards. Sharp containers shall be closed, sealed and labelled as to their origin after 5 days' use or when $\frac{3}{4}$ full, whichever occurs first. Damaged containers shall be placed in a larger container, which shall be properly labelled. All sharps shall be decontaminated as per Group A wastes and at the same time destroyed sufficiently to remove their potential to cause physical harm.

Group C wastes

Microbiological cultures and potentially infectious waste from clinical laboratories and post-mortem rooms shall be autoclaved on site at 121°C for 15 minutes prior to disposal. Waste destined for autoclaving shall be labelled and bagged in autoclave bags. The treated material shall be over-packed and labelled into yellow sacks or containers for decontamination in accordance with guidance for Group A wastes.

Group D wastes

Unused or expired pharmaceutical and cytotoxic wastes which represent less than 1% of the clinical waste stream shall be collected by a responsible person possibly at the hospital pharmacy. They will be catalogued and stored under lock and key in approved and audited locations. The key should be under the responsibility of a designated pharmacist.

Once accumulated volumes reach feasible proportion, arrangements should be undertaken with the Waste Manager for these wastes to be transported to a suitable facility possessing an incinerator or plasma thermal system capable of attaining above 1000°C, which is the approved manner for their final disposal. If such facilities are not be available for the hazardous waste generated in Malta, any overseas export of these wastes should be undertaken in full compliance of the provisions of the Basel Convention.

Group E wastes

Stoma wastes incorporating urine, faeces and other bodily secretions or excretions (including used disposable bed pans or bed pan liners, incontinence pads, stoma bags and urine containers) shall be treated in accordance with guidance for Group A wastes only if they are originating from patients infected with Risk Group 3 or 4 etiologic agents. Group E wastes from other ward locations should be regarded as low level risk and can be placed in black bags and sent as municipal waste. In no circumstances shall plain yellow sacks or containers be used for Group E wastes destined for landfill, nor shall they be over-packed into black bags. Such misuse can give rise to considerable concern when bags arrive at the landfill, even if their contents are innocuous.

Radioactive clinical waste

This will fall into two categories:

Medium volume low level waste (e.g. inpatients receiving radioactive iodine, contaminated bed linen, etc);

Small volume high level waste (e.g. vials containing radioactive pharmaceuticals).

Radioactive waste shall be stored in an appropriate storage room for determined periods (usually approximately 6 months) after which all radioactivity will have decayed naturally. After this period the waste can be disposed of as normal waste. Some specific radioactive waste (from research etc, such as sources with high activity or containing long-lived radionuclides) shall be returned to the supplier according to special procedures.

Removal of waste & central storage

Trained portering staff will transport a clean empty wheeled bin to the ward, replacing the filled bin in the refuse room (or sluice or corridor depending on the logistics present within the individual wards). These will then regular be transported to the decontamination facility.

In other hospitals, sealed bags will be wheeled out in purpose-designed closed waste trolleys to a holding area, which will be identified in the hospital premises. On a daily (or more frequent/infrequent) basis they will then be collected by designated personnel for transportation to the decontamination facility. If wheeled bins are used, they should be replaced with washed, clean ones for the next day. The washing of the bins will most likely be undertaken at the decontamination site preferably using proprietary units that not only wash but also disinfect them by steam.

The frequency of waste collection from wards and departments shall be agreed by service managers. Clinical and domestic waste shall be segregated when collected from disposal rooms for subsequent transportation to the central disposal area. Separate storage facilities shall be provided centrally for clinical and domestic waste awaiting uplift for transport off-site for disposal. The transportation of waste from wards/departments to the central storage/collection point shall be undertaken in suitable closed containers. The route from origin to central storage should minimise crossing with patient or visitor traffic.

Storage areas for clinical waste should have prominent signage indicating the space is used for storage of medical waste, be designed or equipped to prevent unauthorised access, to protect waste from the elements and prevent access by vermin. They should be appropriately ventilated and hold the waste at temperatures which prevent its rapid decomposition and the resultant generation of odours. Whenever waste other than clinical waste is stored in the same room or area, space shall be sufficient to allow for clear separation of clinical waste from other waste.

Temperature-controlled or refrigerated storage facilities may be considered in instances where clinical waste containing pathological waste, such as placentae, is to be centrally stored for more than 24 in summer and 48 hours in winter. The production of odour from clinical waste, however, is normally the result of the presence of a non-clinical organic element such as food; effective segregation at source will therefore be more effective in reducing odours than refrigeration.

Off-site transportation

Arrangements for the off-site collection and transport of clinical waste should comply with standards of good practice and be undertaken only by licensed waste contractors.

Infectious clinical waste, which is being transported by road, should be contained in UN type approved packaging and transported in designated vehicles that permit the easy loading, securing and unloading of waste, contain any leakage from damaged containers, avoid entrapment of particles of waste and harbourage of insects or vermin, allow ready disinfection or steam cleaning and permit the use of secondary containment of the waste. Refrigerated vehicles are not normally necessary, especially where transit time is not expected to exceed 8 hours.

Transportation via public roads and thoroughfares should, in all cases, comply with all the legislative procedures and documentation required by the Environmental Protection Agency for the transportation of hazardous wastes.

Waste decontamination

At the decontamination facility, the skips should be unloaded, unlocked and mechanically tipped into the decontamination unit, which would process and render the waste safe for final disposal in a landfill site. The constitution of the final waste should be unrecognisable as clinical waste as even needles and syringes are shredded. Additionally, the volume of the waste should be reduced by as much as 80%. The final quantity disposed in the landfill should therefore be considerably small and insignificant compared to the non-recyclable domestic waste generated.

Any thermal waste processing system should generate no harmful air emissions at all. If shredding of waste occurs prior to disinfection within the system, air from the in-feed hopper should be first treated through a pre and HEPA filter before being discharged.

The operators should not handle the contaminated waste bags directly. They should load the containers into the unit where they are automatically emptied into the hopper. Empty containers shall be thoroughly washed and decontaminated each time they are emptied unless their surfaces have been completely protected from contact with waste by disposable liners, bags or other devices removable with the waste

Administrative arrangements

The Hospital Waste Manager or similarly designated individual has overall responsibility for waste management throughout the hospital. He/she has a particular responsibility to train staff through induction programmes and to retrain them from time to time to ensure that best practices are followed. He/she will review waste collection points and ensure that waste is collected at the right time and in the right manner.

Training of users at ward levels will be undertaken by the Infection Control Nurses as will the recording and monitoring needle-stick injuries, particularly in hospital staff who would normally have no contact with sharp objects.

Training

All employees who are required to handle and move clinical waste shall be adequately trained by the Waste Manager in safe procedures and in dealing with spillages or other incidents for their area of work. Retraining will be required as policies and procedures are reviewed and revised. A record of such training shall be kept. Written local procedures shall be available in all areas where clinical waste is generated or handled.

The Infection Control Nurses co-ordinate the training of hospital staff including medical, dental, nursing, auxiliaries, domestics, ambulance, porters, laboratory & post-mortem technicians, transport drivers, security personnel and operators of the decontamination system.

The level of training will clearly be dependent on the staff involvement with clinical waste. Specific staff will require greater depths of training, for example operators of the decontamination plant, drivers, community and laboratory staff. Posters or notices detailing the identification system shall be displayed at appropriate locations to assist the information, instruction and training process.

Handling practices shall also comply with the relevant health and safety regulations at work and where appropriate be agreed with the health and safety officer, the infection control officer and the infection control committee.

Monitoring and quality assurance

Evaluation procedures are necessary to support the continuing practice of segregation and enable any contravention of segregation policy to be managed effectively.

Contraventions of segregation fall into three main categories:

- Non-clinical waste entering the clinical or special waste stream (financial implications);
- Clinical or special waste entering the non-clinical waste stream (legal implications);
- Special waste entering the clinical waste stream (legal implications).

The working definitions of the various waste streams shall be used as framework to formulate what constitutes an infringement of segregation. It is advisable that different categories of infringement of clinical waste the non-clinical waste stream be recognised, which reflect the degree of risk or offence associated with them.

Monitoring

It is important to monitor the effects of any change in the management of healthcare wastes in order to assess whether objectives are being met, targets are being achieved, and to ensure that the implementation of change by staff falls within the policy which governs that change. Monitoring the effectiveness of the change will involve monitoring the clinical waste stream to ensure that significant weights of non-clinical waste are not entering that stream. The Waste Manager will normally co-ordinate such interventions but each ward manager involved is given an opportunity to identify infringements specific to individual clinical areas.

The non-clinical waste stream will also need to be monitored to ensure that clinical or special waste is not entering that stream in contravention of segregation policy. If any form of recycling is undertaken, it is important to ensure that inappropriate materials, or those that cannot be recycled, do not enter a particular recycling stream.

In view of the legal liabilities associated with breaches of the duty of care, it is essential to monitor the contents of the non-clinical waste stream for infringements of segregation.

To comply with the legislation and reduce the risk of prosecution, it is important to ensure that certain healthcare wastes do not enter inappropriate waste streams, for example that clinical waste does not enter the non-clinical waste stream, and special waste does not enter the non-clinical waste stream.

Both informal and formal mechanisms of monitoring shall be established and implemented:

Informal mechanisms: all qualified staff shall be encouraged to monitor the non-clinical waste stream informally by noticing and preventing an error about to be made by another member of staff, and noting an infringement in the sack/receptacle when depositing other waste. This is an effective adjunct to any formal system and helps strengthen staff responsibilities towards proper management.

Screening by dedicated waste collection team: in this system, a dedicated waste collection team is responsible for removing, sealing, labelling and transporting the waste from waste points in clinical areas throughout the hospital. This team is also responsible for undertaking a visual audit of the contents of the waste sacks/containers before sealing them.

Sampling: non-clinical waste sacks may be removed at random from any one of the points in the collection, storage and transportation of waste (for example a waste point in a ward/clinical area, a ward/clinical area storage point, or en route to the compactor). The contents of the sack shall be only be examined by a competent and trained individual to identify any infringements of segregation. The effectiveness of the system will be dependent on the frequency of sampling.

Any member of staff who has to perform quality assurance on the clinical or the non-clinical waste stream shall receive specific training, use special equipment to minimise contact with the waste, use protective clothing (e.g. gloves, apron and, if necessary, sleeve protectors, etc) and have had a full course of hepatitis A & B vaccination and primary tetanus immunisation.

Quality assurance (QA)

Monitoring is the cornerstone of any QA system. It provides the baseline data/information from which any quality standards can be derived and targets can be set. It enables an assessment to be made of performance against those quality standards and towards those targets.

Quality standards shall be set based on data collected at local hospitals. It is advisable to use a common framework that can accommodate any "local" variations in standard for specific wards/clinical areas, i.e. develop an individual or "tailored" standard for each ward/clinical area. In this way, staff are reassured that any problems with specific components of the "local" waste streams have been taken into account and the standard as set is directly related to performance on each individual ward/clinical area.

Once a standard has been set, it is possible to audit the clinical and the non-clinical waste stream. From the results of that audit it is possible to assess segregation performance in relation to the standard, which is a numerical comparison, and then to evaluate segregation competency in relation to the nature of the infringements. The system of evaluation used shall be quick and easy for the assessor to use, and comprehensible to the staff whom are assessed.