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BASIC STEPS IN THE PREPARATION OF HEALTH CARE WASTE MANAGEMENT PLANS FOR HEALTH CARE ESTABLISHMENTS



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1. INTRODUCTION

The lack of policies, strategies and enforcement of legislation for the handling and disposing of health care waste (HCW) in many developing countries in the Eastern Mediterranean Region of the World Health Organization has resulted in poor management of such waste. As a result many health care establishments in the Region are increasingly exposing patients and medical and support staff in health care establishments to avoidable health risks. Moreover, improper management of HCW could have serious implications for public health and the general environment.

The impact of HCW may be reduced by introducing a process of health care waste management (HCWM) planning within health care establishments. HCWM planning covers not only the technical aspects related to waste management, such as waste handling, storage, transportation¹, treatment and disposal, but also human resources development, financial aspects, staff responsibilities and roles, surveillance and control, all of which are essential components in sustaining the operation of HCWM systems.

Field experience demonstrates that the inclusion of HCWM planning within health care institutions is a first step towards encouraging the development of better hygiene practices and optimizing the operation of existing HCWM systems. It can also become the catalyst for encouraging the development of national HCWM plans in due course.

The development of an HCWM plan at a health care institution not only reduces the potential for occupational accidents, but also gives staff and managers the opportunity to address improvements in waste management activities. In addition, HCWM planning encourages cost-effective use of resources and materials associated with the safe handling, treatment and disposal of HCW, and strengthens the relationship between health care institutions and national authorities and agencies, which constitute the

¹ See also *Starting health care waste management in medical institutions. A practical approach*. Health Care Waste Management Practical Information Series No. 1, Copenhagen, WHO Regional Office for Europe, 2000. Also available at www.who.dk/document/e72035.pdf.

major components of a national HCWM system.

This document provides practical steps for the development of HCWM plans for small, medium and large health care establishments. The approach in this document is the result of continuous collaboration in the area of HCWM with the WHO Regional Office for Europe through the WHO European Centre for Environment and Health (ECEH), Rome, Italy. This document can also be downloaded free of charge from the WHO web site at: <http://www.emro.who.int/ceha>.

In view of the lack of information with respect to the financial aspects of HCWM, a separate booklet in this series on the economics of HCWM within health care establishments will be published when sufficient information has been gathered.

2. STARTING HEALTH CARE WASTE MANAGEMENT PLANNING IN HEALTH CARE ESTABLISHMENTS

Experience in the Eastern Mediterranean Region shows that many health care establishments confuse HCWM guidelines with HCWM plans. In fact, planning of HCWM is not limited to the preparation of internal guidelines/instructions for the management of health care waste. Rather, it is a process to sustain and optimize the operation of HCWM systems in health care establishments. Therefore, improving or initiating new HCWM systems in health care establishments is unlikely to be sustainable in the medium or longer term unless the process of planning is introduced.

The preparation of an HCWM plan must begin with commitments from the head of the health care institution and senior directors. Once a decision is made, the head of the health care establishment should designate a waste management officer (WMO) with overall

responsibility for the development of the HCWM plan and the day-to-day operation of the HCWM system. Involvement of senior nurses in the preparation of HCWM plans should be encouraged. Once the WMO is designated, the head of the health care establishment should form a waste management team (WMT) to be in charge of the approval and periodic review of the HCWM plan.

It should be noted that in many health care institutions in the Region, HCWM is a responsibility of the hospital infection control committee which, in most cases, includes an infection control officer/nurse. Where this is the case, the infection control officer should draft the HCWM plan. This is acceptable and feasible since waste management is part of hospital hygiene and infection control. Once approved by the WMT/infection control committee, the implementation of the HCWM plan should be monitored by the WMO/infection control officer to make sure the procedures and ideas in the plan are put into practice by the staff.

This document provides basic steps and a simple and practical approach for the preparation of an HCWM plan. It is hoped this will assist managers of health care establishments in developing plans to optimize and sustain the operation of HCWM systems in their health care institutions. The diagrams, photographs and charts in the document are real life examples from Al Basheer Hospital, one of the largest hospitals in Jordan. This hospital has 16 medical departments, 852 beds with a high occupancy rate and is situated on an area of about 11 hectares. Health care waste in the medical departments is handled by the nursing staff. Outside the medical departments, HCWM (e.g. collection and transportation of bagged waste) is undertaken by a private company.

Further information on more detailed aspects of HCWM can be found in references [1–6].

3. SIX STEPS FOR THE DEVELOPMENT OF A HEALTH CARE WASTE MANAGEMENT PLAN

1. Designate a responsible person.
2. Conduct an HCWM survey and invite suggestions.
3. Recommend HCWM improvements and prepare a set of arrangements for their implementation.
4. Draft the HCWM plan.
5. Approve the HCWM plan and start implementation.
6. Review the HCWM plan.

Step 1. Designate a responsible person

When the decision has been made to prepare an HCWM plan, the head of the health care institution should designate a WMO. This person should know how the medical and support staff work in the institution. The WMO is also responsible for the operation and monitoring of the current waste management system and acts as a focal point with regulatory authorities/agencies concerning enforcement and compliance issues. The WMO should be neither too senior, since he/she may not be able to devote enough time to waste management, nor too junior, since he/she may not have sufficient experience and influence to make any changes. The knowledge, attitude and motivation of the WMO are very important if waste practices, hygiene and infection control are to be improved.

The head of the health care institution should designate a WMT

before the initiation of any process of planning. The WMT should comprise the following:

- head of hospital (as chairperson) or a senior director
- heads of hospital departments
- infection control officer^o
- chief pharmacist
- radiation officer
- matron (or senior nursing officer)
- hospital manager
- senior engineer
- financial controller
- WMO if different from the infection control officer
- head of housekeeping or cleaning services.

In many health care establishments in the Region, the infection control committee (Example 1) is in charge of the HCWM planning. As such, the follow-up of HCWM instructions/recommendations issued by the infection control committee is usually carried out by the infection control officer.

Example 1. Creation of infection control committees

Based on the recommendations of the Jordanian National Committee on Infection Control, the Ministry of Health, in 2000, issued a circular to all health care establishments in Jordan instructing them to appoint an infection control committee which should meet monthly and comprise the following:

- a doctor specialist in medicine
- an infection control nurse
- hospital technical director
- chief of the hospital laboratory
- chief of the hospital nursing unit
- chief of the surgery department
- chief of the maternity department
- chief of the paediatric department
- pharmacist
- person responsible for general services, i.e. maintenance, house keeping and food preparation

The task of the infection control committee was to control all routes of acquired hospital infections including routes of transmission of diseases caused by HCW. The circular was followed by the issuance of instructions for the safe management of hazardous health care waste, to be applied by all health care establishments in Jordan.

In compliance with the above circular, the Director-General of Al Basheer Hospital, Jordan, selected the following to form the infection control committee:

- technical assistant of the Director General
- chief of the general surgery department
- chief of the maternity department
- specialist paediatrician
- internal medicine specialist
- senior specialist from the hospital central laboratory
- chief of hospital nursing unit/matron
- infection control nurse
- pharmacist
- chief of the public health unit

Step 2. Conduct an HCWM survey and invite suggestions

A survey should be conducted on the current situation of HCWM within the health care establishment in order to identify whether improvements are necessary and what they might be. The WMO is responsible for coordinating the survey and analysing the results. The WMO should review and assess the existing waste management situation in close cooperation with head nurses from the medical departments.

The assessment phase includes the following tasks:

- Compile general information: types of waste generated in the health care establishment, number of beds, occupancy rates, number of medical departments etc. [2, 3].
- Conduct a waste generation survey, i.e. waste composition, waste quantity, sources of generation and number of beds in use. The survey results should be presented in the form of average daily quantity (kg) of waste generation in each health care waste category from each department (Example 2). Special care should be taken to assess the potential for peak loading, when extraordinary quantities of waste may be produced. It is of help if details are also available on quiet periods or unusual circumstances which may cause significant cyclical variations in waste quantities. Estimates should also take to account past experience of epidemics and other emergencies that affect the quantities of waste generated. The waste generation survey is the basis for identifying opportunities for improving waste collection, handling and disposal, as well as setting targets for waste minimization, recycling and cost reduction.

Example 2. Results of a waste generation survey

In 2000, a waste generation survey was conducted at Al Basheer Hospital, Jordan. It showed the waste generation in the hospital to be 3 kg/bed/day, comprising 0.45 kg of hazardous waste/bed/day and 2.55 kg of general waste/bed/day. The general surgery and maternity departments were the largest producers of hazardous health care waste.

- Conduct a critical review of existing waste management practices, i.e. segregation, storage, collection, transport, treatment and disposal.
- Prepare an inventory of existing waste treatment and disposal facilities and an evaluation of their capacities and efficiencies.
- Quantify the number of trolleys, containers and other equipment used in waste handling, collection and transportation.
- Identify the costs related to waste management.
- Describe the responsibilities and roles of staff involved in hygiene control and waste management and their skills.
- Assess the existing practice/opportunities for waste minimization, reuse and recycling (if any).
- Assess existing a colour coding system for waste containers and trolleys.
- Assess existing safety (e.g. protective clothing) and security measures (e.g. in case of spills and chemicals accidents).
- Evaluate the emergency response capacity (e.g. special measures

for management of large quantities of HCW in case of outbreaks of diseases such as cholera and Ebola fever).

- Evaluate the contingency measures applied in case of a breakdown of HCW treatment units or during close down for planned maintenance (e.g. safe procedures for handling laboratory wastes in case of breakdown of the autoclave).
- Assess and/or devise a training and awareness-raising programme.
- Prepare drawings or sketches of the health care establishment showing:
 - the layouts of medical departments
 - central storage areas for hazardous and other types of waste
 - on-site treatment facilities (incinerators, etc.)
 - on-site disposal facilities (if any)
 - refrigeration facilities (for health care waste storage)
 - waste collection trolleys routes through the health care establishment (e.g. routes for transportation of general and hazardous waste outside medical department).
 - security equipment
 - areas for washing and disinfecting waste collection trolleys
 - main access road around the site and entrance point on to the public highway.
- Prepare drawings of each medical department, floor or building showing:
 - location of individual HCW collection points (at least for hazardous waste, sharps and general waste)
 - location of temporary storage areas/containers
 - routes for internal transport of waste in medical departments (at least for hazardous waste)

- location of equipment for disinfection and sterilization of reusable medical utensils
 - location of patient rooms (e.g. intensive care unit, patient rooms in surgery department).
- Prepare drawings and specifications of:
- plastic waste bags (thickness, width and length)
 - containers (for hazardous waste and sharps, etc.)
 - trolleys and wheeled containers for internal collection and transport
 - protective clothing to be used in the handling of each category of waste (e.g. gloves, masks, plastic aprons, overalls, boots, eye protectors [1]).

Step 3. Recommend improvements, allocate human and financial resources and arrange for implementation.

3.1 Making recommendations

Based on the results obtained from Steps 1 and 2, as well as from the WMT, the WMO or the infection control officer should prepare recommendations, following national and/or WHO guidelines, as appropriate [1,4], on how to improve HCWM in the health care establishment. These recommendations should include staff responsibilities and roles, training needs, staff and equipment resources.

Recommendations for setting up or improving an HCWM system in health care establishments are given in Table 1.

Table 1. Setting up and improving an HCWM system in health care establishments [5]

Setting up an HCWM system	Improving an HCWM system
<p>Facilities that generate health care waste should set up a comprehensive waste management system based on the most appropriate means of achieving the safe, environment-friendly management of waste. The system should start with basic measures and then gradually be improved. First steps should include the segregation and safe handling, treatment and disposal of sharps.</p> <p>Important activities include:</p> <ul style="list-style-type: none"> ■ assignment of responsibilities for waste management ■ allocation of sufficient human and financial resources ■ waste minimization, including purchasing policies and stock management practices ■ segregation of waste into hazardous and general HCW categories ■ implementation of safe handling, storage, transportation, treatment and disposal options ■ monitoring of waste production and waste destination 	<p>Waste management options should be efficient, safe and environmentally friendly to protect people from voluntary and accidental exposure to waste when collecting, handling, storing, transporting, treating or disposing of waste.</p> <p>Important activities include:</p> <ul style="list-style-type: none"> ■ identification of available centralized waste management and disposal resources ■ choice of sustainable management and disposal options according to: <ul style="list-style-type: none"> • affordability • environmental-friendliness • efficiency • worker safety • prevention of the re-use of disposable medical equipment (e.g. syringes) • social acceptability ■ monitoring and evaluation of safety and efficiency

Any HCWM improvements recommended should ensure that an acceptable level of hazard protection is achieved. This may require meeting national or locally determined requirements. Recommendations should not include practices/procedures below the minimum requirements of safety as laid down in the WHO minimal programme for safe management of health care waste [1].

The following are basic actions for achieving the goals of the WHO minimal programme:

- assessment of waste production (waste generation and composition)
- assessment of the local handling, treatment and disposal options
- segregation of health care waste into hazardous and general (or municipal) waste
- establishment of internal rules for waste handling (e.g. storage, colour coding or signs, bag/container filling, closing and labelling)
- ensuring workers' training and safety at work (e.g. training on the safe use of chemicals for waste disinfection)
- assignment of responsibilities within the health care establishment
- choice of suitable or better treatment and disposal options.

3.2 *Setting priorities for HCWM improvements*

Medical departments in some middle and lower-income developing countries should first focus on the safe practices/procedures for health care waste segregation, internal collection and storage. These measures have the greatest impact in reducing poor hygiene practices.

Improvements with respect to waste segregation, internal storage and collection in medical departments should consist, at least, of the following:

a) Segregation

- separation of health care waste into three categories (general waste, hazardous health care waste and sharps);
- colour coding of bags/containers or (if not feasible) clear labelling of bags and containers to differentiate between waste categories;
- use of posters and checklists to help segregate the waste;
- use of labels for closed yellow-bagged waste;
- use of holders to contain highly infectious waste bags/containers;
- existence of safety measures (protective clothing etc.) and emergency response (in case of stick injuries, etc.);
- awareness-raising and hands-on training.



The three bins system: yellow bag for hazardous waste, black bag for general waste, and leak and puncture proof container for sharps with statements "Do not fill above the line" and "Sharps waste"



Bag closing and labelling by a nurse in a medical department

b) Internal storage

- separate temporary storage areas and containers for hazardous and general wastes.
- temporary storage areas/containers located away from patient areas
- fixed collection schedule for temporary stored bagged waste
- periodic cleaning and disinfection of temporary storage areas and containers.



Temporary storage container



Collection of bags from temporary storage containers

c) Internal transport

- fixed collection schedule for each waste category (three-bin system)

- dedicated trolleys and wheeled containers (leakproof with cover) for collection and transport of hazardous waste
- colour coding system or (if not feasible) coloured signs for trolleys and wheeled containers to differentiate between trolleys for general and hazardous waste
- periodic disinfection and cleaning of trolleys and wheeled containers
- existence of safety measures (e.g. protective clothing) and emergency response (e.g. in case of spills, occupational injuries)
- awareness-raising and hands-on training.

For additional information see references [1] and [4].



Colour coding system for wheeled containers (yellow for hazardous and black for general HCW)



Internal transportation of yellow bagged waste by yellow wheeled containers.

3.3 *Costs associated with HCWM improvements*

The cost of HCWM improvements depends upon the nature of the improvements; e.g. the total cost of introducing segregation of waste includes the cost of purchasing plastic bags and containers, of trolleys and wheeled containers and their maintenance, and of separate transportation, expressed as labour, etc. As a general guideline, the final cost of HCWM improvements may consist of the following:

- capital investment cost (e.g. purchase of trolleys and wheeled containers)
- operating costs: labour, consumables (e.g. purchase of plastic bags)
- cost of maintaining equipment or improving buildings (e.g. creation in medical departments of separate temporary storage areas for yellow- and black-bagged waste)
- costs of contracted HCWM services (e.g. collection of segregated waste by contractual services)
- treatment and disposal costs (by private or public sector)
- miscellaneous.

Waste minimization, segregation and recycling can greatly assist in the cost reductions increasingly required by health care establishments, by reducing disposal costs. Cooperation between local health care establishments is also a way to minimize costs, e.g. by establishing a central treatment facility.

The alteration of purchasing policies may also lead to cost reductions.

For instance, participation in group purchasing may empower health care establishments since purchasing decisions not only reduce costs (e.g. through discounted prices for bulk purchase) but can also drive suppliers to offer products that are safe and environmentally friendly. For further information on cost reduction see reference [1].

3.4 *Implementing the proposed HCWM improvements*

Arrangements for the implementation of HCWM improvements should be stated in the HCWM plan. A work plan or protocol comprising practical approaches/steps for safe implementation of waste management improvements in each medical department should be developed by the WMO/infection control officer in close cooperation with the head nurses of medical departments and in consultation with the WMT members. Experience shows that head nurses in medical departments and the matron can be of great assistance to the WMO/infection control officer in preparing practical steps for implementing the proposed HCWM improvements (Example 3).

Example 3. Preparation of protocols for HCWM

During 2000–2001, Al Basheer Hospital, Jordan developed protocols for the segregation of health care waste, the handling of cytotoxic drugs, sharps and highly infectious and pathological waste. Protocols for the management of health care waste in each medical department are currently under preparation. These HCWM protocols are being prepared jointly by the hospital infection control nurse, the clinical instructors from the nursing development unit and the hospital public health unit, in consultation with the matron and the head nurses of medical departments.

The work plan for implementation of HCWM improvements in each medical department may include the following:

- Methods and timetable for implementing HCWM improvements (e.g. segregation, handling and collection, transport, treatment by autoclave or disinfection) and definition of responsibilities and roles (Example 4).

Example 4. Implementation of HCWM improvements

At the Al Basheer Hospital, Jordan, health care waste is segregated at source using a colour coding system for three categories of waste: yellow for hazardous health care waste, black for general waste, and empty plastic detergent containers for used sharps. Plastic bags and sharps containers are replaced when they are two-thirds full. Collection of yellow-bagged waste from the medical departments is carried out by a private company at the end of each of the three shifts. When there is a large amount of hazardous health care waste (e.g. emergency department at night) between the shifts, head nurses in medical departments may request the company representatives in the medical departments to collect stored waste bags. These measures and the fixed waste collection schedule are addressed by the HCWM protocols of each medical department.



Before: infectious-waste bags stored in the incinerator room (original situation)



After: newly constructed room for storage of yellow bags to be incinerated (after improvement)

- Checklists to assist nurses during the implementation process (steps for safe segregation of waste categories, methods to follow for the sterilization of reusable items, etc.).
- Training and awareness-raising activities to introduce procedures for implementation of planned activities, e.g. training courses, training guides, field visits, training and visits abroad, production of posters, brochures, etc. (Example 5.) The following subjects may be considered for training and awareness-raising activities:
 - proper procedures and precautions for segregation, handling, storage and disposal of hazardous health care waste
 - proper emergency procedures during a hazardous health care-waste spill or exposure.

Example 5. Training and awareness-raising of nurses and workers

During 2000, the nursing development unit of Al Basheer Hospital, Jordan, initiated training for nurses on infection prevention and safe handling and treatment (i.e. autoclaving, chemical sterilization) of hazardous health care waste within medical departments. The employees of the private company in charge of the management of health care waste outside medical departments (collection of bags from medical departments, transport etc.) also attended special training on the safe handling and transportation of hazardous health care waste. Training of nurses was conducted separately from that of the company's employees. Twelve clinical instructors with experience in nursing and infection control were also appointed from the nursing development unit to each medical department for a 3-month period to provide hands-on/on-site training of nurses.



Training of nurses in the nursing development unit by clinical instructors



Training of waste collection workers by clinical instructors in the nursing development unit

- health hazards associated with mishandling hazardous health care waste
- organizational process for reporting hazardous materials and waste spills or exposures.
- Detailed information on safety practices and emergency response in case of incidents or accidents associated with HCWM (e.g. occupational injuries, spillage of hazardous waste, exposure to cytotoxics) and in case of disease outbreaks (e.g. cholera). For further information see reference [1].
- Health surveillance and control (e.g. immunization against HBV and tetanus) and provision of information on rapid access to post-exposure prophylaxis.
- Measures to control and monitor the implementation of waste management improvements (Example 6).

Example 6. Supervision of HCWM within a health care establishment

Head nurses of medical departments and infection control nurses at Al Basheer Hospital, Jordan, supervise the handling of hazardous health care waste within medical departments. The collection and transportation of waste bags outside medical departments are carried out by a private company, which is supervised by the hospital's public health unit. Problems and incidents regarding yellow-bagged waste outside medical departments (e.g. cuts in plastic bags from sharp items, spillage from plastic bags, etc.) are reported to the infection control nurse and the matron by the public health unit. The liaison paths between the personnel involved and management responsibilities are shown in Figure 1.

- Performance standards and performance indicators to assess the effectiveness of HCWM improvements. By reviewing performance data every few months modifications can be made to the waste management system. An example of performance standards in a laboratory department is given in Table 2.
- Contingency measures, including instructions on storage or evacuation of health care waste in case of breakdown of treatment units or during close down for planned maintenance (e.g. safe procedures for handling laboratory wastes in case of breakdown of the autoclave).

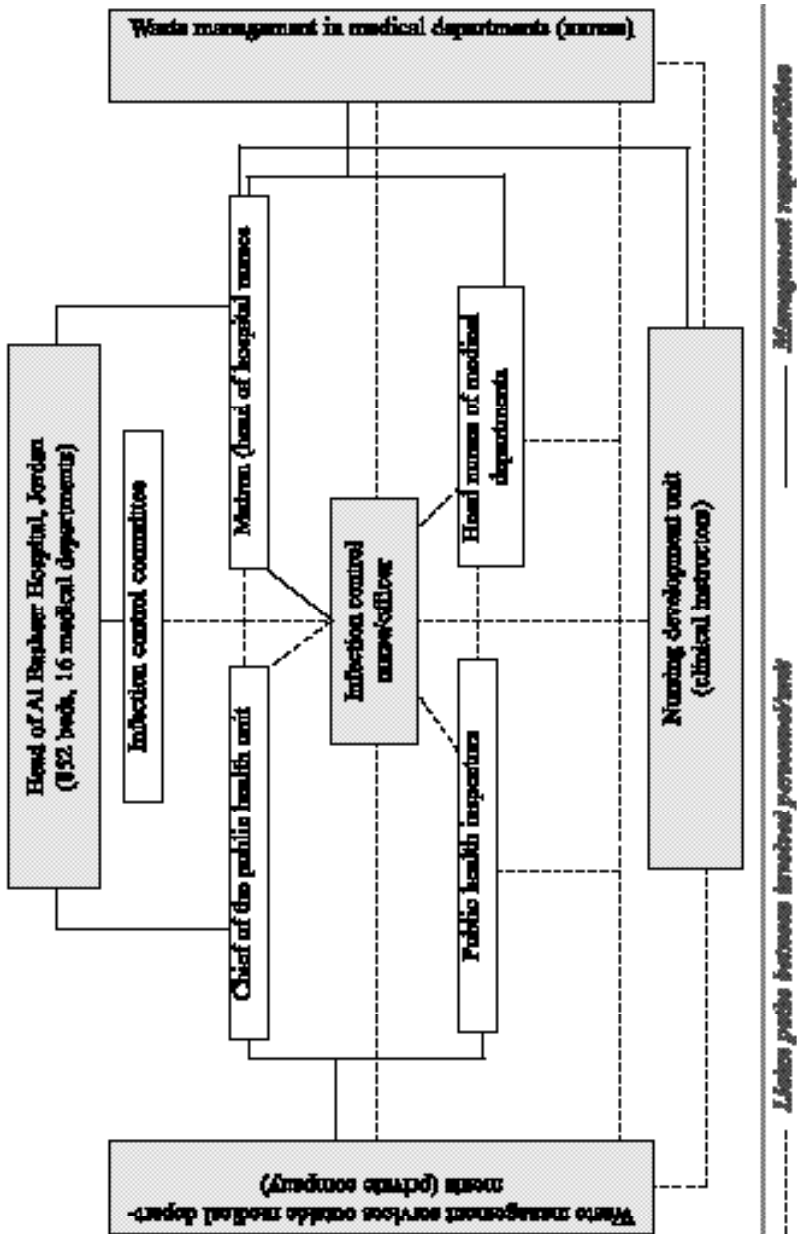
Table 2. Sample performance standards for laboratories [6]

Performance standards	Justification for the selection of the standard	Performance indicator	Source of data
All laboratory waste shall be treated before reaching the yellow-bagged waste stream	Ensure that all laboratory wastes are treated	Percentage of waste bags treated	Daily records and monitoring reports
All staff shall be trained in safety and emergency procedures	Assessment of staff knowledge, skills and training	Percentage of staff trained	Training records
All spillage incidents causing occupational health injuries/hazards shall be reported and evaluated for compliance with established procedures	Assessment of emergency and incident reporting systems	Percentage of spillage incidents reported and evaluated	Spillage incident reports

a) Pilot scheme

The WMT may prefer to test the proposed HCWM improvements first in one or more departments. This may also be useful in resolving any problems that may arise. This approach also provides practical training for staff. Subsequently, the improvements can be extended to other parts of the health care institution.

Figure 1. Example of a scheme for coordinating hospital HCWM activities



b) Arrangements for coordinating activities of the WMO and the WMT

Efficient implementation of HCWM improvements depends on the level of cooperation and coordination between the WMO/infection control officer and each member of the WMT/infection control committee. Definition of responsibilities, roles and duties of each member of the WMT including the WMO should be stated in detail within the HCWM plan.

A framework/scheme for coordinating waste management activities stating the line management responsibilities and liaison paths between the key personnel involved in the handling of health care waste may also be developed to assist heads of health care institutions in the identification of needs and gaps in the process of coordination.

Figure 1 shows an example of a scheme for coordinating HCWM activities at Al Basheer Hospital, Jordan. The infection control committee is chaired by the head of the hospital. The infection control nurse liaises with all involved personnel and is supervised by the matron. The matron also supervises the head nurses of the medical departments and the nursing development unit (comprising clinical instructors only), which is headed, by a senior nurse. Both the clinical instructors from the nursing development unit (assigned for short terms in medical departments to provide hands-on training to nurses) and the head nurses of medical departments supervise the nurses and waste workers within medical departments.

Management of HCW (by private company) outside medical departments is supervised by the chief of the public health unit and a team of public health inspectors. The latter also liaises with the head nurses of the medical departments and nurses.

Step 4. Draft the HCWM plan

Based on the results of the situation assessment phase and its recommendations, the WMO/infection control officer should then draft the HCWM plan in consultation with each member of the WMT (Example 7). If necessary, the WMO should ask for advice and information from outside organizations.

The content of the draft of the HCWM plan can be as simple or as complex as desired by the management of the health care institution. However, all HCWM plans should address the following three aspects:

1. Clear and open examination of the current HCWM situation (Step 2).
2. Analysis of what resources are available for improving HCWM and the possible options for improvements (Step 3).
3. Preparation of a detailed set of arrangements to implement the proposed waste management improvements including:
 - arrangements for training staff
 - acquiring new waste storage
 - handling
 - treatment and disposal equipment
 - a timetable for implementation (Step 3).

An HCWM plan should show its linkage with other hospital management plans, if they exist (e.g. safety management plan, security management plan, emergency preparedness plan, equipment investment plan). Executive officers of these plans or officers in charge of the implementation of equivalent instructions/measures should be members of the WMT/infection control committee.

Weakness in the linkages with these management plans and lack of cooperation and coordination with related executive officers may affect the effectiveness of the HCWM improvements/plan.

Example 7. Compilation of protocols

As a first stage towards the preparation of an HCWM plan for the Al Basheer Hospital, Jordan, the HCWM protocols, currently under preparation, will be compiled into one document to be used as the hospital HCWM plan. The plan will also include the human resource development needs identified and a programme related to the ongoing training activities, which are conducted by the clinical instructors of the nursing development unit.

Step 5. Approve the HCWM plan and start implementation

The draft of the HCWM plan should be discussed by the WMT and submitted for approval by the institution's management. Once approved, the implementation of the HCWM plan should be the responsibility of the head of the health care establishment. The WMO/infection control officer, who is in charge of monitoring the operation of the HCWM system, may also be delegated by the head of health care establishment the responsibility for HCWM plan implementation.

Step 6. Review the HCWM plan

Operation of the HCWM system in health care establishments cannot be efficient nor optimized in the long run unless there is a periodic review of the HCWM plan. With respect to the process of review it is recommended that:

- Periodic review (e.g. every 2 years) of the HCWM plan is carried out by the WMT/infection control committee.
- The WMT/infection control committee meets periodically (e.g. monthly) to monitor the implementation of the HCWM plan and determine whether the approved HCWM improvements need review or adjustment.
- The head of the health care establishment invites local authority representatives (e.g. the environmental protection agency, the Ministry of Environment) to periodic meetings of the WMT to discuss and review the existing system for off-site transportation and disposal of hazardous and highly hazardous health care wastes (e.g. cytotoxic waste, large quantities of chemicals, waste with high levels of heavy metals).
- Where the WHO minimal programme [1,4] regarding the safe disposal in municipal landfills of small quantities of health care waste is applied, municipal authority representative(s) responsible for waste collection and disposal should be invited to discussions on and review of the HCWM plan. They could even be considered as permanent member(s) of the WMT in this case. Involvement of local authority representatives will strengthen coordination with the local authority and help to avoid a breakdown in the system that could lead to the collapse of HCWM procedures.

4. CONCLUSIONS

Many health care establishments in the Region have some sort of written internal instructions or procedures/practices for the management of health care waste. Experience shows that the existence of such instructions does not necessarily mean that the operation of their HCWM systems is effective and sustainable. In fact, it has been found that the majority of health care establishments have many gaps in their HCWM systems. Examples of this include:

- lack of proper segregation, handling, transport and disposal of waste
- no definition of responsibilities and roles
- lack of coordination between medical departments and those involved in the management of health care waste/infection control.

Further examples of gaps in the HCWM system are:

- lack of human resource development activities, which are essential for sustaining the operation of HCWM systems;
- lack of information about waste generation, which is essential for identifying opportunities for improving and optimizing the elements of the HCWM systems;
- lack of monitoring of the HCWM situation, which is essential for identifying the real needs to sustain the HCWM systems;
- lack of knowledge of the costs of waste management.

In addition, a minimum level of safety for the management of health care waste has often not been set or, if set, is often not adhered to.

The process of HCWM planning should address all these gaps and

identify cost-effective solutions for optimizing and sustaining HCWM systems. An HCWM plan should consist of a situation assessment and the identification of problems and needs. It should also include HCWM improvements, the allocation of human and financial resources, and arrangements for implementing the improvements to sustain the operation of the HCWM system. It is worth emphasizing that each health care establishment has to develop its own HCWM plan, depending on its size and type and nature of medical activities. Thus, an HCWM plan for a cancer treatment hospital will differ from the plan for a maternity hospital, for example.

In many lower and middle-income countries, shortage of funds discourages managers from preparing plans. When a bilateral or multilateral project is proposed, planning starts to get some attention. This is unfortunate, because planning should be a regular and continuing activity. Therefore, it is recommended that health care establishments at least initiate the preparation of a plan, however simple (e.g. based on the WHO minimal programme), for the short or medium term that is in line with the available resources and then gradually improve it. A simple plan will be better than no plan.

In addition to the benefits at managerial, organizational and environmental health levels, simple plans provide practical training for managers and senior staff of health care establishments.

Like any planning process, HCWM planning within health care establishments cannot be initiated without the decision and commitment of the heads of health care establishments. Such decisions will lead to the preparation of HCWM plans which may be a step towards encouraging the development of national plans for the management of health care waste, if they do not already exist.

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