

TEACHER'S GUIDE

Management of wastes from health-care activities

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This *Teacher's Guide* accompanies the WHO publication *Management of wastes from health-care activities* (Geneva, 1999). It provides teaching materials and recommendations for a three day training course, designed mainly for managers of health-care establishments, public health professionals and policy makers.

Note to the user: A selection of photographs is available from the Web site of the World Health Organization (after October 1998, <http://www.who.ch/>)

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Preface

This *Teacher's Guide* compiles educational materials that can be used in training courses for health-care waste management. It is a compendium to the WHO publication *Management of wastes from health-care activities* (WHO, Geneva, 1999), which is a more comprehensive handbook. Both publications form a "set", which can be useful to handle this important public health issue in a practical manner. These are the first WHO publications providing global advice and guidance on the management of health-care waste. They build on the knowledge and experience gained in different WHO regions over the past years.

Management of health-care waste is an important public health issue since it involves major risks for the health of the people and the environment. WHO is, therefore, issuing this set of materials to provide operational tools for health care workers, environmental professionals, public health authorities, manufacturers of health care products as well as policy makers. This training guide compiles basic information on health-care waste, management principles, and provides tools for training using appropriate educational materials such as overhead transparencies, handouts, tables and figures.

The Health-care waste management set (Handbook + Teacher's Guide) aims to raise awareness on public health and environment, to provide information on sound management practices of health-care waste, to identify safe, efficient, sustainable, economic and culturally acceptable waste management practices and to enable managers of health-care establishments to develop their waste management plans.

This *Teacher's Guide* has been prepared as a practical response to the need for improved health-care waste management at local level and improved legislation, management and guidance at national and regional level. WHO will be pleased to see that this guide is used widely. Continuing efforts will be made to improve its content and structure. It would be appreciated if the users of this guide would provide feedback from its use and their own experiences. Please send us your comments and suggestions on the WHO *Teacher's Guide* on health-care waste management direct to the Division of Operational Support in Environmental Health, World Health Organization, Geneva, Switzerland (Fax: +41 22-791 4127, e-mail: pruess@who.ch).

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The World Health Organization thanks all individuals who have contributed to the preparation of the handbook *Management of wastes from health-care activities* (WHO, Geneva, 1999) that served as a basis for the production of this *Teacher's Guide*. Contributors and reviewers are listed in the 'Acknowledgements' section of the handbook.

1. Introduction

1.1 Purpose of the *Teacher's Guide*

The *Teacher's Guide* complements the WHO publication *Management of wastes from health-care activities* (Geneva, 1999). It can be used to assist in the preparation and delivery of a three day course, adapted to provide a one day introductory course, or expanded to five days to include technical visits. There is sufficient resource material to initiate, organize, deliver and evaluate courses of different lengths. The course material includes overhead transparencies, handouts showing definitions, tables and figures and the material necessary for workshops.

The *Teacher's Guide* has been prepared to allow the course to be given without further development on background information on health-care waste, management principles, training etc. In order to increase the benefit for the course participants, it is strongly advised to include local issues in the programme. The course coordinator should plan the collection of material on the local situation (practices, legal framework, disposal possibilities, cultural issues, practical examples), preferably illustrated by photographs, figures and objects. The coordinator may also invite guests or course participants to prepare certain topics which they may present during the course (e.g. officers in national authorities may present legal framework or current policy; hospital managers may present practices in their establishment etc.). In this case, presenters should be contacted well in advance and agree to their presentation.

1.2 How to use the *Teacher's Guide*

The *Guide* provides material for a tutor to arrange a course and includes information to assist in organizing workshops.

The *Guide* should be read by the course tutor well before the beginning of the course and the tutor should allow sufficient time for the preparation of local examples to illustrate points discussed.

Extensive use is made of overhead projection as a visual aid, however, if a projector is not available the content of the slides can be copied onto flip charts or blackboards.

1.3 Target groups for the course on HCW

The course designed in this *Teacher's Guide* is targeted at managers, regulators and policy makers which are involved in health-care waste management. The main professional categories are the following:

- Officials from national or regional authorities involved with developing policies in health-care waste management;
- Environmental or health and safety regulators;

Environmental health professionals;
Hospital managers and other administrators of health-care establishments;
Representatives of local authorities;
Waste collection, treatment and disposal managers;
Manufacturers of medical devices, chemicals and pharmaceuticals.

1.4 The objectives of the course on HCW

The course tutor should set out the learning objectives in the opening lecture of the course. This statement will make clear what is to be achieved by the end of the course. It is likely that the backgrounds, functions and level of knowledge of the participants will vary. Accordingly, the objectives of the course should be adapted. The main objectives are the following:

To raise awareness on public health and environment hazards that may be associated with inappropriate segregation, storage, collection, transport, handling, treatment and disposal of health-care waste;

To provide information on hazards and sound management practices of health-care waste for the formulation of policies and the development or improvement of legislation and technical guidelines;

To identify waste management practices and technologies that are safe, efficient, sustainable, economic and culturally acceptable; to enable the participants to identify the systems suitable for their particular circumstances;

To enable managers of health-care establishments **to develop their waste management plans**;

To enable course participants to develop training programmes for the different categories of staff that handle, treat or dispose of health-care waste.

At the end of the course the participants should be able to demonstrate individually that they have achieved the course objectives and competence in health-care waste management.

2. Teaching and training in health-care waste management

2.1 Rationale for training in health-care waste management

Health-care waste is special in that it has a higher potential of infection and injury than any other type of waste. Therefore, it has to be handled with sound and safe methods wherever generated. Inadequate handling of health-care waste may have serious public health consequences and impact on the environment. Health-care waste management is, therefore, an important and necessary component of environmental health protection.

Hospitals and health-care establishments have responsibilities and a “duty of care” for the environment and public health, particularly in relation to the waste they produce. They also carry a responsibility to ensure that there are no adverse health and environmental consequences as a result of waste handling, treatment and disposal activities. Unfortunately, health-care waste management is, in many regions, not yet carried out with a satisfactory degree of safety. This course aims at transmitting the basic skills for the development and implementation of a health-care waste management policy, including the components outlined in this programme. In this way, health-care and research facilities can take steps towards securing a healthy and safe environment for their employees and communities.

2.2 The HCW course programme

The proposed programme for a three day course is shown in Table 1. Should the course be expanded or condensed, then the course programme should be adjusted to meet the objectives set out in 1.4. The programme should not be too ambitious or impracticable but be designed to make the objectives easily achieved. According to the participant’s interests and level of knowledge, certain parts of this course may be condensed and others expanded.

The last ten minutes of each lecture should always be dedicated to questions by the participants. Should the lecturer finish his presentation before, she/he may foster a discussion with the participants on how the presented aspects relate to their local situation.

Table 1: Proposed time-table for a three day course

| | <u>Day 1</u> | <u>Day 2</u> | <u>Day 3</u> |
|--------|--|---|--|
| 45 min | <u>Introduction</u> | <u>Minimization, recycling and segregation</u> <u>Lecture 5</u> | Wastewater management <u>Lecture 10</u> |
| 45 min | Definition of health-care waste; hazards and public health impacts of health-care waste <u>Lecture 1</u> | Handling, storage and transportation <u>Lecture 6</u> | Worker's health and safety and emergencies <u>Lecture 11</u> |
| | Break | | |
| 45 min | Introduction to legislation <u>Lecture 2</u> | Minimization, segregation and handling options <u>Workshop 3</u> | Waste management related costs <u>Lecture 12</u> |
| 45 min | Current national and local legislation <u>Workshop 1</u> | Treatment and disposal options (i) <u>Lecture 7</u> | Training <u>Lecture 13</u> |
| | Lunch break | | |
| 45 min | National programme for HCW management <u>Lecture 3</u> | Treatment and disposal options (II) <u>Lecture 8</u> | Options: (a) Regulatory package (b) Waste management plan - design <u>Workshop 5</u> |
| 45 min | HCW management programme for a health-care establishment <u>Lecture 4</u> | Application of treatment and disposal methods to health-care waste categories <u>Lecture 9</u> | |
| | Break | | |
| 90 min | HCW management plan a) Action plan for implementation of national HCW management b) How to improve HCW management plan of the health-care establishment <u>Workshop 2</u> | Treatment and disposal options policy considerations major urban hospitals smaller or remote establishments <u>Workshop 4</u> | Workshop 5 (continued) Results of the workshop Evaluation of the course Final discussions and closure |

2.3 Planning the HCW course

It is essential that there is one course coordinator, who takes on the responsibility for planning and delivering the course. Sufficient time should be given to these activities.

The course coordinator's role is crucial in ensuring the course has the right pace and that all of the activities are kept to the time allocated. The coordinator must ensure that the lecturing and teaching staff are properly briefed and the necessary resources are available on site and on time.

2.4 The problem solving approach to learning

The hazards relating to health-care waste, the regulatory issues and the operational practices will be presented through formal teaching and illustrated by visual aids. If the students apply health-care waste management principles to their own tasks and guidance, and supervision ensures that this is done correctly, the learning will be detailed and long lasting.

The problems that the students deal with in a course setting should be of increasing complexity and they should be encouraged to use appropriate resource materials. A first step in problem solving is to encourage students to answer questions based upon local problems during the lectures. Secondly, during the workshop settings, a scenario should be developed which will be based directly on material that has already been presented formally, structured questions will then be asked, which will lead to a particular solution. Thirdly they should be required to tackle real issues, preferably local in origin where the students develop the questions to be asked, seek the information required and find a solution themselves. This is the most complex situation and the students will require assistance from the tutors.

2.5 Formal presentations

Through giving lectures or presentations, one person can inform a large number of course participants of the content of the course and the principles of the subject. This enables new ideas to be introduced, particularly information on the national and local situation which is not readily available in text books or other published material. Although the audience will have a limited attention span, by proper planning the effects of this can be minimized.

Lectures are an important way of disseminating information. A well prepared lecture can be an extremely satisfying experience and a very efficient means of teaching. Thorough preparation is essential and the lecturer must be confident and have a thorough knowledge in the subject, particularly when the opportunity is given for a question and answer session at the end of the lecture. However, instant answers are not always possible. Should the lecturer be unable to answer, every effort should be made to find the answer as soon as possible or advise where the answer may be found.

At the end of each lecture, an interactive discussion between presenter and participants to address questions or applicability to the participant's situation is recommended.

During the workshop sessions, small group discussions led by the lecturer or an assistant can be an effective method of learning. It widens the knowledge base and reinforces the information given in lectures.

Recommendations for effective communication of the lecture content to the participants are given below:

Useful hints for effective presentations

Face participants at all times

Maintain eye contact

Speak clearly and at a moderate speed

Pause for a few seconds at the end of making a point

Leave each overhead slide on the screen for sufficient time to allow the participants to make notes (distribute reduced overheads before the presentation)

Engage in interactive question and answer style

2.6 Audiovisual and other teaching aids

This Guide proposes to use visual aids to accompany the lectures and workshops. The overheads shown in this Guide may be copied directly onto transparent plastic sheets and used with overhead projectors. Overhead transparencies can be produced with many photocopying machines. The use of a bright projector that does not require a darkened room is best. Overhead projectors are readily portable and not as expensive as slide projectors.

The overheads could also be produced as 35mm slides. Slide projectors however may be less reliable than overhead projectors and require a darkened room. They can be helpful to illustrate practical situations with photographs of plants, equipment and personnel.

Technology is now available for making presentations with a portable computer using a special projector. This equipment is expensive and may not be readily available in some countries, but is a convenient and may be considered. However, careful planning is required for its use.

In some situations, videotaped material may also prove to be a good means of presenting information and encouraging discussion. Again the necessary equipment is expensive and requires professional maintenance. Producing video material is time-consuming, difficult and if carried out professionally it is expensive.

All presentations should be prepared well in advance of the course to avoid loss of time or distraction from the objectives of the presentation.

This guide does not contain photographs. A selection of photographs on diverse aspects and applications of health-care waste management should be available on the Web site of the World Health Organization's Programme of Environmental Health (after October 1998, <http://www.who.ch/>). From there they could be printed directly onto transparent sheets and projected with an overhead projector. They would provide valuable illustrations of management practices and show practical examples.

2.7 Evaluation

Evaluation aims at assessing the extent to which the course objectives have been attained and at determining the quality of the teaching. The evaluation results will allow the course to be improved or adapted as necessary for future use. An evaluation of the course can be made by carrying out a short initial assessment of the level of knowledge of the participants right at the beginning of the course and by comparing it to the knowledge assessed at the end of the course. A questionnaire for the initial assessment is proposed in Chapter 3.1, Introduction - resources. The same questionnaire may be completed by the participants at the end of the course and the initial and final results compared. Also, the participants should be consulted on the content, visual aids and teaching methods at the end of the course. This can be carried out by asking them to complete an anonymous written questionnaire. An example is shown in Table 2. The results could then be analysed by the organisers.

The teachers may also wish to carry out an assessment using *Self assessment for teachers of Health* by A. Rotem and F. Abatt (World Health Organization, Geneva, 1982, WHO Offset Publication No. 68), which is a good source of advice. It illustrates the teaching skills that can be developed and indicates ways of improving those skills.

Evaluation of the course and the teachers by the participants is as important as assessing the competence of the participants at the end of the course.

Table 2: Course evaluation form for participants

It is through your comments that we can improve this course and maintain a high standard in the future. We would greatly value your help by completing this questionnaire. This evaluation is anonymous, only mark your name if you wish **Thank you.**

Please underline your answer

1. Did this course help to improve your knowledge on the subject and fulfil your expectations? Yes/No
Comments

2. Were any topics omitted from the programme that you felt should have been included?
If so state what they are:

3. Did you feel that the course level was appropriate for you? Too high/adequate/too low

4. Was the course too theoretical? yes/no

5. Was the ratio lecture/workshops & discussions adequate? yes/no
Comments

6. Do you feel that another related course should be held (yes/no)? If yes who do think should attend?

7. Did this course provide you with the necessary elements and confidence to contribute to improvement of health-care waste management practices in your country/ region/ establishment? yes/no
Comments

8. Please indicate your ratings for the following:

| | |
|---|--------------------------|
| Method of presentation (Use of audio visual equipment) | Very Good/Good/Fair/Poor |
| Documentation | Very Good/Good/Fair/Poor |
| Location and facilities | Very Good/Good/Fair/Poor |

Table 2 (continued)

Please evaluate the Lectures and Workshops using the following scale

5 = Excellent 4 = Good 3 = Average 2 = Fair 1 = Poor

| Activity | Presentation | Content |
|---|---------------------|----------------|
| Lecture 1 - Definitions, hazards, risks. | | |
| Lecture 2 - Legislation | | |
| Workshop 1 - Current national and local laws | | |
| Lecture 3 - National programme | | |
| Lecture 4 - Health-care establishment programme | | |
| Workshop 2 - Waste management plan | | |
| Lecture 5 - Minimization, recycling, segregation | | |
| Lecture 6 - Handling, storage and transport | | |
| Workshop 3 - Minimization, recycling, segregation | | |
| Lecture 7 - Treatment and disposal (I) | | |
| Lecture 8 - Treatment and disposal (II) | | |
| Lecture 9 - Application to waste categories | | |
| Workshop 4 - Treatment and Disposal Options | | |
| Lecture 10 - Wastewater management | | |
| Lecture 11 - Worker's health and safety | | |
| Lecture 12 - Related costs | | |
| Lecture 13 - Training | | |
| Workshop 5 - Regulatory package/ Management plan | | |
| The course overall | | |

Comments

3. Course resources

This section of the *Teacher's Guide* contains a variety of resource materials which the teachers may use for their presentations. It includes:

- Overheads (to be copied onto transparent sheets)
- Teacher's notes referring to the overheads
- Reduced overheads as handouts
- Handouts containing background information
- Handouts with tasks/questions for the workshops

The teacher may complete certain lectures with additional overheads, handouts or other material, in particular to add information of local relevance, practical examples and case studies. The course coordinator may also contact certain participants before the course and ask them to prepare a case study on their own situation, to present during the course.

The overheads are generally for the teachers and the handouts for the participants. They may, however, be converted into handouts/overheads as appropriate. The overhead content may also be copied onto a blackboard.

The references of the material presented in this *Teacher's Guide* are stated in the publication *Management of wastes from health-care activities* (WHO, Geneva, 1999).

3.1 Introduction - resources

In the Introduction, the following issues should be addressed:

- rationale for this course;
- context of the course (e.g. if part of a more comprehensive programme);
- course objectives (Overhead 1.1);
- invitation of participants to shortly introduce themselves and their professional activity;
- brief assessment of the level of knowledge on health-care waste (HCW) management of the participants (example of assessment sheet in Table 1.1, to be completed in about 10 minutes);
- short background on health-care waste management (see Teacher's notes - Introduction);
- local situation of health-care waste management (see Teacher's notes - Introduction).

Overheads

| | |
|--------------|--|
| Overhead 0.1 | Learning objectives |
| Overhead 0.2 | Actors in health-care waste management |

Teacher's notes

Handouts

- Initial Assessment
- Reduced overheads

Course Objectives

- Raise awareness on hazards related to HCW management
- Provide information on good HCW management practices
- Foster the development of policy and legal framework
- Identify suitable HCW management practices for local situations
- Enable development of local waste management plans
- Enable development of training courses



Actors in HCWM

- Managers of health-care establishments
 - Medical staff
 - Nursing staff
 - Auxiliary staff
 - Cleaners
 - Laboratory staff
 - Technical Staff
 - Policy makers
 - Health Ministry
 - Environment Ministry
 - Local authorities
 - Waste managers
 - Waste collectors
 - Waste treatment and disposal staff
 - Scavengers
- etc.



Teacher's notes - Introduction

Brief introduction to the problematique of health-care waste management

Health-care waste is special in that it has a higher potential for infection and injury than other types of waste;

Inadequate handling of health-care waste may have serious public health consequences and impact on the environment;

Health-care waste management is therefore a necessary component of environmental health protection;

Requirements for improved health-care waste management

Improved health-care waste management requires awareness raising; a legal framework and a policy, which have to be implemented locally; waste management plans for health-care establishments; staff training;

Actors in health-care waste management

See Overhead 0.2.

Local circumstances

The teacher should describe the local circumstances of health-care waste management of the regions or countries by which the participants are concerned; participants can be solicited to describe their situation;

Overhead 0.1

Course objectives may differ according to background, professional activities and demands of the participants. All objectives listed on the slide may not be applicable to all participants.

The participants should be given sufficient information to develop or improve their own policy/ legal framework/ waste management plan etc. The course should provide a basis for further actions to be taken at national/ local authority or health-care establishment level to improve management practices.

(Course objectives may be discussed with the participants).

Overhead 0.2

The actors involved in HCW management are numerous and are situated at different levels (authorities, waste producers, waste handlers);

Health-care and maintenance personnel of health-care establishments;

Patients in health-care establishments;

Visitors in health-care establishments;

Workers in support services to health-care establishments, such as laundries, waste handling and transportation;

Workers in waste disposal and treatment facilities, including scavengers;

Individual generators outside establishments (drug abusers, patients under home care (including home dialysis);
Officials of national or local authorities involved in forming policy, preparing legislation and law enforcement.

Initial Assessment

Please briefly answer the following questions:


1. What are the wastes produced in health-care? (make a short list with explanations)
2. What are the risks to human health if health-care wastes are not managed properly?
3. Which are the main points of health-care waste management that could be improved in your country/ health-care establishment?
4. Make suggestions on how improved health-care waste management could be achieved in your circumstances?
5. Do you know what laws and regulations apply to waste and health-care waste in your country? If so, please make a list and describe their content.

Reduced overheads - Introduction

Overhead 0.1

Course Objectives

- Raise awareness on hazards related to HCW management
- Provide information on good HCW management practices
- Foster the development of policy and legal framework
- Identify suitable HCW management practices for local situations
- Enable development of local waste management plans
- Enable development of training courses


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Overhead 0.2

Actors in HCWM

- Managers of health-care establishments
- Medical staff
- Nursing staff
- Auxiliary staff
- Cleaners
- Laboratory staff
- Technical Staff
- Policy makers
- Health Ministry
- Environment Ministry
- Local authorities
- Waste managers
- Waste collectors
- Waste treatment and disposal staff
- Scavengers

•etc.

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