Management of Solid Health-Care Waste at Primary Health-Care Centres

A Decision-Making Guide

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ABBREVIATIONS

HCW Health-care waste
HCWM Health-care waste management
PHC Primary Health Care centres

1. Introduction

The objective of this document is to provide guidance for selecting the most appropriate for option safely managing solid waste generated at Primary Health-Care centres (PHCs) in developing countries.

The main tool of this guide consists of six decision-trees aimed at assisting the user in identifying appropriate waste management methods. The guide takes into consideration the most relevant local conditions, the safety of workers and of the general public as well as of environmental criteria.

This guide is composed of the following parts:

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

This guide may also be used to evaluate existing practices related to health-care waste management. More detailed sources of information on handling and storage practices, technical options for treatment and disposal of wastes, training and personal protection, and assessment of a country's situation, are presented in Annex A.

Audience

The audience for the guide includes the staff working in primary health-care centres and the technical staff working in the local, state or central administration.

Scope

The scope of the guide is to ensure a safer management of the solid wastes generated by PHCs in urban, peri-urban, and rural areas of developing countries. More specifically, the decision-making process helps selecting adequate options for the safe disposal of wastes at PHC level.

A PHC is a medical facility that delivers medical care to outpatients and, on occasion, may participate in large-scale immunization programmes. PHCs are generally relatively small and produce limited quantities of wastes.

The management of liquid wastes generated in PHCs is not addressed in this guide. Detailed information on handling, storage and transportation of waste, training and workers' protection can be found in WHO's publication *Safe management of wastes from health-care activities* (Ed. Prüss A et al, WHO, Geneva 1999) .

Scenarios used in this guide

This guide describes a total of six scenarios related to PHCs. They take into account the local characteristics of the PHC such as the population density and the proximity to legally approved modern waste treatment facilities. PHCs environments are characterized as **urban, peri-urban** or **rural**.

Definition of Health care waste

Health care waste (HCW) is defined as the total waste stream from a health care facility that includes both potential infectious waste and non-infectious waste materials.

Infectious wastes include infectious sharps and infectious non-sharp materials. Infectious *Sharps* consist of syringe or other needles, blades, infusion sets, broken glass or other items that can cause direct injury.

Infectious non-sharps include materials that have been in contact with human blood, or its derivatives, bandages, swabs or items soaked with blood, isolation wastes from highly infectious patients (including food residues), used and obsolete vaccine vials, bedding and other contaminated materials infected with human pathogens. Human excreta from patients are also included in this category.

Non-infectious wastes may include materials that have not been in contact with patients such as paper and plastic packaging, metal, glass or other wastes which are similar to household wastes.

Note: If no separation of wastes takes place, the whole mixed volume of health care waste needs to be considered as being infectious.

Table 1: Approximate percentage of waste type per total waste in PHC centres

Non-infectious waste	80%
Pathological waste and infectious waste	15%
Sharps waste	1%
Chemical or pharmaceutical waste	3%
Pressurises cylinders, broken thermometers...	less than 1%

2. Basic risks associated with the poor management of health-care waste

Poor management of health-care waste can cause serious disease to health-care personnel, to waste workers, patients and to the general public. The greatest risk posed by infectious waste are accidental needle stick injuries, which can cause hepatitis B and hepatitis C and HIV infection. There are however numerous other diseases which could be transmitted by contact with infectious health-care wastes.

Infectious sharps and Occupational Risk

During the handling of wastes, injuries occur when syringe-needles or other sharps have not been collected in rigid puncture proof containers. Inappropriate design and/or overflow of existing sharps container and moreover unprotected pits increase risk exposure of the health care workers, of waste handlers and of the community at large, to needle stick injuries.

Best practices in health care recommend the segregation of sharps at the point of use. In some countries, needle cutters are used to separate the needle from the syringe. Note that current WHO best infection control practices do not yet address the use of needle removal devices. While needle removals are a promising way to reduce the volume of sharps waste, evidence regarding the safety and effectiveness needs to be documented before they can be recommended.

Of particular concern is the need to assess the trade-off between the following paradigms:

- Adding a step in the collection of sharps waste that could increase handling of infectious needles and thus the risk for needle-stick injuries among health care workers.

- Decreasing the volume of infectious sharps waste through (a) disposing of syringe alone with less precautions than regular infectious waste and (b) handling needles only as infectious sharps waste. This may result in fewer needle-stick injuries among waste handlers and the community.

WHO recommends to conduct studies on risk associated with this device before introducing needle remover/cutter in immunization settings.

Risk to the general public

The reuse of infectious syringes represents a major threat to public health. Based on previous estimates (Kane et al, 2000) and recent updates, WHO estimated that, in 2000, worldwide, injections undertaken with contaminated syringes caused about 23 million infections of Hepatitis B and Hepatitis C and HIV.

Such situations are very likely to happen when health-care waste is dumped on un-controlled sites where it can be easily accessed by the public: children are particularly at risk to come in contact with infectious wastes. The contact with toxic chemicals, such as disinfectants may cause accidents when they are accessible to the public. In 2002, the results of a WHO assessment conducted in 22 developing countries showed that the proportion of health care facilities that do not use proper waste disposal methods range from 18% to 64% .

Risk for the environment

In addition to health risks derived from direct contact, health-care waste can adversely impact human health by contaminating water bodies during waste treatment and by polluting the air through emissions of highly toxic gases during incineration.

When wastes are disposed of in a pit which is not lined or too close to water sources, the water bodies may become contaminated.

If health-care waste is burned openly or in an incinerator with no emission control (which is the case with the majority of incinerators in developing countries), dioxins and furans and other toxics air pollutants may be produced. This, would cause serious illness in people who inhale this air. When selecting a treatment and or disposal method for HCW, the environmental viability is thus a crucial criteria.

WHO has established Tolerable intake limits for dioxins and furans, but not for emissions. The latter must be set within the national context. A number of countries have defined emission limits. They range from 0.1 ng TEQ/m^3 (Toxicity Equivalence) in Europe to 0.1 ng to 5 ng TEQ/m^3 in Japan, according to incinerator capacity.

3. Relative risk approach

Waste management treatment options should protect health-care workers and the community and minimize adverse impacts on the environment. Environmentally-friendly, safe and affordable options correctly used in high income countries may not always be affordable in developing countries. Health risks from environmental exposures should be weighed against the risks posed by accidental infection from poorly managed infectious sharps

4. Important issues for the safe management of health-care wastes

A robust national legislation and its efficient implementation are the base for planning a system for the sound management of HCW. Technical as well as organizational issues must be considered when developing plans for managing wastes from PHC centres. Training of concerned personnel, clear attribution of responsibilities, allocation of human and financial resources, thoughtful development and implementation of best practices regarding handling, storage, treatment and disposal, all need to be addressed.

The final selection of waste management options may not always be scientifically evaluated, especially when it comes to a combination of methods, the main criteria should be that their implementation will offer a level of health protection which eliminates as many risks as possible. See annex D.

The HCWM systems can subsequently be upgraded to reach higher safety standards. Basic elements of safe management of health-care wastes are summarized in Table 2.

It is crucial to acknowledge that it is only well trained and motivated personal who will take the necessary simple steps to increase the safety of health care waste management.

Table 2: Basic elements for the safe management of health-care waste for PHC centres

1 - Selection of options	2 - Awareness and training	3 - Implementation
• Choice of off site options :Identification of close by centralized waste management and disposal facilities that meet national regulations and are legally recognized as such • Choice of sustainable management and disposal options, according to: – Context and needs – Availability – Affordability – Environment-friendliness – Efficiency – Worker's safety	• Awareness raising of all staff about risks related to sharps and other infectious wastes • Training of all health-care personnel regarding segregation practices • Training of waste workers regarding safe handling, storage and operation and maintenance of treatment technologies • Display of written instructions for personnel	• Assessment of the current HCW system in place • Joint development of a sound HCW system • Assignment of responsibilities for waste management • Allocation of sufficient resources • Waste minimization, including purchasing policies and stock management practices • Segregation of waste into sharps, non-sharps infectious waste and non-infectious waste (colour-coded system)