**Waste Minimization and Recycling Of Infectious Waste** – **Guidance**

**Document Number: 501**

*Note: This guidance document is provided as a template and must be customized to accommodate facility specific procedures and terminology.*

1. **Purpose**

This document is intended to provide hospitals, laboratories and other health facilities with information about how to reduce or minimize the amount of infectious waste they produce and how to recycle it, if possible.

1. **Scope**

Waste is an unavoidable by-product of health care activities. About 10-25% of health care waste is categorized as potentially infectious to humans and must be properly managed. A health care facility should have a comprehensive waste management plan and implementation program for all waste that incorporates the following four key activities:

(1) Prevent unnecessary waste generation

(2) Reduce amount and toxicity of waste generated

(3) Reuse noninfectious waste that has been generated (infectious waste that has been treated should not be reused)

(4) Recycle waste

Among these four activities, the first (prevent unnecessary waste generation) and second (reduce waste generated) are components of the minimization program. The third and fourth (reuse waste that has been generated, and recycle waste) are usually considered part of the waste recycling program.

In practice, waste minimization and recycling strategies work together. Waste minimization and recycling has been shown to have positive effects in that they can provide economic returns from reducing costs in raw materials, waste treatment and/or disposal and generating revenue from recycled items. Elimination of waste streams reduces liabilities. Organizations that reduce their waste streams also improve their public image in the community by reducing their environmental impact. Waste minimization and recycling makes sense in today’s “green” competitive marketplace.

1. **Definitions**

**Infectious waste** ‒ any waste suspected to contain pathogenic organisms, i.e., bacteria, viruses, parasites or fungi in sufficient concentration to cause disease in susceptible hosts. Infectious waste includes waste contaminated with blood and other body fluids, laboratory cultures and microbiological stocks, waste from isolation wards, tissues (swabs), materials, or equipment that have been in contact with infected patients. This category can overlap with the categories of sharps, pathological and anatomical waste, all of which can be infectious.

**Recycling** ‒ the reuse or reclamation of waste, through a process or activity separate from the production of the primary product or the provision of the primary service. Recycling is a broad term that encompasses the reuse of materials in original or changed forms rather than discarding them as wastes. Recycling can also be thought of as the collection and reprocessing of a resource so it can be used again, though not necessarily for its original purpose. Recycling helps conserve raw materials and energy that manufacturers would otherwise use in producing new products. Recycling also reduces the amount of material going into landfills. Recycling helps lessen the pollution that may result from waste disposal.

**Sharps** ‒ items that could cause cuts or puncture wounds, including needles, scalpels and other blades, knives, infusion sets, saws, broken glass and nails. Irrespective of the associated infection risk potential, such items are usually considered to be highly hazardous health care waste.

**Waste management** ‒ the collection, transport, processing or disposal of waste materials, usually ones produced by human activity, in an effort to reduce their effect on human health or local environment. A sub-focus in recent decades has been to reduce waste materials' effect on the environment and to recover resources from them.

**Waste minimization** ‒ the reduction, to the extent feasible, of waste that is generated or subsequently treated, stored, or disposed of. It includes any source reduction or recycling activity undertaken by a generator or facility operator that results in either (1) the reduction of total volume or quantity of waste, or (2) the reduction of toxicity or other characteristics of hazardous waste, or both, so long as the reduction is consistent with the goal of minimizing present and future threats to human health and the environment.

**Waste segregation** ‒ the process of sorting waste into the relevant waste categories so that it can be appropriately disposed of. Segregation of infectious waste at the point of generation is critical for effective and efficient waste management. It not only helps to control the risk of transmission and reduce waste management costs, but also ensures that the correct pathways are adopted for storage, transport and ultimate disposal.

**Waste storage** ‒ to hold the waste for a period of time after collection and before final disposal.

1. **Responsibilities**
	1. Senior management and the waste management oversight committee within the health care facility should design and formally approve the program, and they should assign responsibility for its management and implementation.
	2. Procurement department should:
		1. Take the lead in drafting, implementing and updating a green procurement policy for the facility
		2. Take the lead in identifying the products and services that produce the smallest amount of waste and the least toxic waste
		3. Take the lead in identifying products that can be safely reused rather than those that need to be disposed of after one use
		4. Take the lead in identifying and procuring recycled and recyclable products for nonmedical purposes, e.g. recycled office paper
		5. Negotiate/assist in the negotiations for samples and, where necessary, training, to allow the facility staff to try new products and services
		6. Negotiate take-back agreements with suppliers as part of the procurement contracts; items for which take-back agreements are recommended include, but are not limited to:
	* Expired and unused pharmaceuticals
	* Hazardous chemicals and their containers
	* Lead-acid batteries used as backup in case of power failure
	* Electrical and electronic equipment
	* Sealed radioactive sources
		1. Identify recyclers and negotiate contracts for sale of recyclable materials generated by the facility
		2. Identify other health care facilities with whom advantageous partnerships can be made, e.g., in bulk purchasing of sustainable materials to obtain lower prices
		3. Report progress regularly to the Waste Management Oversight Committee
		4. Support requests from facility staff/the Waste Management Oversight Committee to procure particular environmentally friendly products and services
2. **Materials and Equipment**

None

1. **Hazards and Safety Concerns**

New products (for example, digital thermometers if phasing out thermometers containing mercury) must be introduced carefully and with proper training and handling.

1. **Procedures**
	1. Waste minimization strategy

Management should develop a waste minimization strategy. The strategy should recognize the various waste streams within the facility and outline strategies to ensure that staff are trained to aggressively prevent unnecessary waste, minimize the generation of waste, and ensure that the waste streams do not become unnecessarily combined. The waste minimization strategy should explicitly identify the goals of the program and define new policies for purchasing and for handling and discarding infectious and noninfectious waste.

Important elements of the waste minimization strategy include:

* A clear waste minimization policy including targets for continual improvement
* Plans for staff training and follow-up monitoring
* A monthly tracking mechanism for waste minimization
* Recognition or awards for achieving milestones in implementing the strategy
* Formation of a team or council to oversee and coordinate the medical waste minimization strategy; this team would report to the waste management oversight committee
* Tangible reports, graphs and feedback to show results
	1. Waste minimization practices

Reduce efforts in subsequent handling, treatment and disposal operations by identifying ways to prevent unnecessary waste and reduce the amount of waste generated. For example:

* + 1. Source reduction through purchasing policies:
* Choose supplies that are less wasteful or are less hazardous but still effective (for example, replacing mercury-containing thermometers with digital thermometers).
* Buy in quantities that are sufficient for the task but not excessive, e.g., do you need 3-ply tissue or will 2-ply tissue be sufficient? Do you need 2-m-long bandages or will 1-m-long bandages be sufficient?
* Select the right type of chemicals for the task, buying the least toxic chemical that is still effective. This is particularly important when choosing disinfectants.
* Purchase products that can be reused safely in preference to disposables.
* Avoid or limit the purchase of nonbiodegradable solid material or materials that are less able to be reused or recycled.
* Purchase products without excessive packaging.
* Collaborate with manufactures to reduce excess packaging.
* Request that manufactures shift to recyclable packaging.
* Purchase supplies in bulk to further reduce packaging and handling costs.
* Centralize the purchasing of hazardous chemicals so that departments can benefit from bulk procurement.
* Purchase from companies that claim to have green manufacturing practices; investigate and verify any such claims as far as possible.
	+ 1. Management and control measures at facility level
* Use physical instead of chemical cleaning methods (e.g., steam disinfection instead of chemical disinfection).
* Monitor chemical use within the facility from receipt as raw materials to disposal as hazardous waste and determine if there are ways to reduce the volume of use.
* Routinely assess the production of waste to identify places and ways to reduce unnecessary waste generation.
* Train staff in waste minimization and recycling methods.
	+ 1. Stock management of chemical and pharmaceutical products
* Only order what you expect to need so that you do not have excess that needs to be destroyed.
* Hazardous materials should be stored separately from nonhazardous materials to prevent the creation of larger amounts of hazardous waste if a spill takes place in the storage area.
* Use first in, first out procedures so that products are used before they expire.
* The full contents of each box or bottle are used.
* Upon delivery, check expiration date of all products.
	1. Reuse practices

The reuse of equipment in rich countries has almost disappeared due to the marketing of single use items and the need to prevent the spread of nosocomial diseases. This is particularly the case for medical items. Some items, such as syringes and needles, should never be reused, but others, such as surgical instruments can be cleaned and disinfected many times.

There are also many opportunities for recycling or reuse of objects that are not directly used for health care (glass, rubber, paper, cardboard, metal containers, plastic wrapping, etc.). Promoting reuse entails the selection of reusable rather than disposable items.

Health facilities that adopt reuse as a waste reduction strategy need to have careful procedures and safety standards to ensure that reused products are not hazardous. Some technical approaches (below) can be applied in a reuse program at the health care facility level:

* IVF bottles are reused as drainage bottles and as urine collectors.
* In laboratories, glassware and vials are cleaned, sterilized, and reused as specimen collection bottles for laboratory examination.
* Unused medical supplies or those with expired sterilization are resterilized and repacked for future use.
	1. Recycling practices

There are a number of different methods by which resources may be extracted from waste. The process of extr[acting](http://people.theiapolis.com/) resources or value from waste is variously referred to as secondary resource recovery, [recycling](http://www.spiritus-temporis.com/recycling/), and other terms.

To be effectively recycled, waste must be categorized into different groups including plastic, paper, glass, metal, etc. Medical waste is a heterogeneous mixture containing infective components mixed with plastics, textiles, and metals. Medical waste may include syringe needles, waste material of surgical and pathological-anatomical research, expired medicines and others. If waste is correctly segregated by hazard type and substance then, after sterilizing, waste of particular types can be sold to recycling companies. This generates revenue and reduces material wastage.

The steps below outline a recycling program at a health care facility:

* Find out what recycling programs or centers exist in your area, or what waste traders are interested in purchasing. It’s no use trying to recycle something if no market exists.
* Segregate recyclables at the source, e.g. aluminum cans, plastic drink bottles, and newspapers. The better segregated the waste the more likely you are to be able to command a good price for it.
* Train people to recycle by explaining what to put in what bin and the benefits of the program.
* Leave the collection bins in an appropriate collection area, or take the recyclables to a processing center once you have accumulated enough to make it worth the trip.
	+ It may be necessary to collect some waste streams for several months to obtain a saleable amount. Assign enough storage space for each waste stream.
	+ Consider partnering with other local health care facilities to have a joint contract for selling recyclables. The larger quantities that can be gathered this way may get a better price.
* Prevent unofficial sales of waste. It is very common for hospital staff to sell waste (e.g., plastic containers) or for rag-pickers to search hospital waste areas. This both diverts funds from the official recycling program and potentially allows the reuse of dangerous items like expired pharmaceuticals and used medical devices.
	+ Store waste in a secure area.
	+ Make sure that potentially harmful items like syringes are mutilated before disposal.
	+ Enlist facility security staff to make sure that only the official recycling and disposal contractors are able to take waste off the site.
	+ Use a gate pass or waste transportation manifest system to record all waste sales.
* Monitor the success of the program and particularly check that discarded items are going into the correct bin.

Commonly, hospitals burn their medical waste and the rest is sent to landfills. When PVC burns, carbon monoxide, dioxins and furans are released into the atmosphere. Recently, there are some environmentally friendly waste management techniques that can be used as an alternative. Some of these are:

* Composting and digestion: Infectious organic waste or food waste from health care facilities cannot be reused and makes up 25% of the total waste stream. These materials can be put through a composting or artificial digestion process to decompose the organic matter and kill pathogens. The organic material is then recycled as mulch or compost for agricultural or landscaping purposes. Refer to Doc 573: Technical Specifications: Biogas Digesters.
* For more examples of reuse of nonhazardous waste, refer to the References section.
1. **Reporting and Recordkeeping**

None

1. **References**
	1. Health Care Without Harm Asia. Best practices in health care waste management-examples from four Philippine hospitals. Manila: Health Care Without Harm; 2007. 69 pp.

<http://www.noharm.org/lib/downloads/waste/Best_Practices_Waste_Mgmt_Philippines.pdf>

* 1. Health Care Without Harm. Medical waste and human rights ‒ Submission to the UN Human Rights Council Special Rapporteur. 2011. 66 pp.

<http://www.gefmedwaste.org/downloads/HCWH%202011%20MedWaste%20Human%20Rights%20Report.pdf>

* 1. Emmanuel J and Stringer R. For proper disposal: a global inventory of alternative medical waste treatment technologies. Arlington, Va: Health Care Without Harm; 2007. 52 pp.

<http://www.noharm.org/lib/downloads/waste/For_Proper_Disposal.pdf>

* 1. Health Care Without Harm. Interim report of health care waste management system in Bir Hospital Kathmandu. Kathmandu: Health Care Without Harm; 2011. 27 pp.

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* 1. Royal College of Nursing. Safe management of health care waste. London: Royal College of Nursing; 2007. 20 p.

<http://www.rcn.org.uk/__data/assets/pdf_file/0013/111082/003205.pdf>

* 1. World Health Organization. Core principles for achieving safe and sustainable management of health-care waste. Geneva: WHO; 2007. 2 p.

<http://www.who.int/water_sanitation_health/medicalwaste/hcwprinciples.pdf>

1. **Related Documents**

Doc 502: On-site Handling of Health Care Waste ‒ Guidance

Doc 573: Technical Specifications: Biogas Digesters

Doc 202: Service Provider ‒ Guidance

1. **Attachments**

None