

Health Care and Waste Treatment

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1 Introduction

Collecting, transporting, processing and disposing waste material is known as waste management. The aim is to clean up the surrounding environment and see that the waste does not have a detrimental effect on our health. Nowadays waste management has gone a step further and not only plans proper disposal but also attempts to see whether we can reuse and recycle certain materials from waste matter. Waste management differs from country to country and in urban and rural areas. How waste is managed in a commercial industrial area will be very different from how it is handled in a residential area. In residential areas it is usually the responsibility of local government bodies while in industrial areas it is the industry responsible for creating the waste. The most commonly followed waste management systems involve collection and disposal of waste, the commonest way of disposal being landfills and incinerators. Landfills are the most common practice in many countries as it is a relatively inexpensive method of disposing of waste materials. These were often created in disused quarries or mining voids. The disposed waste is usually compacted and covered to prevent vermin and wind-blown litter. Landfills usually have a system to extract the gas that the decomposing waste matter generates. Opposition from adjacent landowners especially in urban areas have made it difficult to establish new landfills and the authorities have to transport it further away for disposal making disposal more expensive. Incineration destroys waste material by burning it. Regarded as a practical method of disposing of hazardous waste materials, it has of late, become controversial for many reasons such as the fact that it creates toxic gas and

ash, which can harm local populations and pollute groundwater [1]

2 Health Care Waste Management

Health care waste management (HCWM) is a process to help ensure proper hospital hygiene and safety of health care workers and communities. It includes planning and procurement, construction, staff training and behavior, proper use of tools, machines and pharmaceuticals, proper disposal methods inside and outside the hospital, and evaluation. Its many dimensions require a broader focus than the traditional health specialist or engineering point of view [2]. The need for proper HCWM has been gaining recognition slowly. It can:

- help control nosocomial diseases (hospital acquired infections), complementing the protective effect of proper hand washing;
- reduce community exposure to multi-drug resistant bacteria;
- dramatically reduce HIV/AIDS, sepsis, and Hepatitis transmission from dirty needles and other improperly cleaned/disposed medical items;
- control zoonoses (diseases passed to humans through insects, birds, rats and other animals);
- cut cycles of infection;
- easily and cost-effectively address health care worker safety issues, including reducing risk of needle sticks;

- prevent illegal repackaging and resale of contaminated needles;
- avoid negative long-term health effects; eg, cancer, from the environmental release of toxic substances such as dioxin, mercury and others [2].

HCW can be subdivided into various categories (Table 1). Segregation of different waste categories is critically important to enable proper disposal. Approximately 80% of all HCW can be disposed of through regular municipal waste methods. The other 20% can create serious health threats to health workers and communities if not disposed of properly [2].

Waste category	Description & examples
infectious waste	waste suspected to contain pathogens, eg laboratory cultures, waste from isolation wards, tissues (swabs), materials or equipment that have been in contact with infected patients, excreta
pathological waste	human tissues or fluids, eg body parts, blood and other body fluids, fetuses
sharps	sharp waste, eg needles, infusion sets, scalpels, knives, blades, broken glass
pharmaceutical waste	waste containing pharmaceuticals, eg pharmaceuticals that are expired or no longer needed, items contaminated by or containing pharmaceuticals (bottles, boxes)
genotoxic waste	waste containing substances that are capable of causing damage to DNA, eg waste containing cytostatic drugs (often used in cancer therapy), genotoxic chemicals
chemical waste	waste containing chemical substances, eg laboratory reagents, film developer, disinfectants that are expired or no longer needed, solvents
wastes with high content of heavy metals	Batteries, broken thermometers, blood-pressure gauges, etc.
pressurized containers	gas cylinders, gas cartridges, aerosol cans
radioactive waste	waste containing radioactive substances, eg unused liquids from radiotherapy or laboratory research, contaminated glassware, packages or absorbent paper, urine and excreta from patients treated or tested with unsealed radionuclides, sealed sources

Table 1: WHO categories of health care waste

Disposal methods vary according to type of waste, local environment, available technology, costs and financing, and social acceptance (due to religion, customs, etc). Each facility or health authority must assess local conditions and decide on appropriate HCW solutions; there is no single best method or method mix [2].

3 Waste Treatment in Slovenia

In 2005 Slovenia recovered 58% of waste generated by production and service activities. The rest of waste was disposed (30%), delivered to abroad (9%) or temporary stored. In 2005, 5,585,080 tons of waste was generated by production and service activities. Compared to 2004, the amount of waste decreased by 5.2%. The greatest share in the total amount of waste was generated by manufacturing (38%), followed by electricity, gas and water supply (27%) and construction (18%). The rest of waste was generated by other activities (17%). In 2005, 54% of waste was internally recovered or internally disposed; the remaining 46% of waste was delivered to the others for recovery or disposal.

In 2005 the amount of hazardous waste increased by 16%. So, 122,161 tons of hazardous waste were generated. A slightly higher share of hazardous waste (54%) was delivered to the others for recovery or disposal, while the rest of hazardous waste (46%) was recovered or disposed individually by the business entities.

In 2005 total recovery of waste decreased by 9.6% compared to 2004, but it was still 18% higher than in 2003. In 2005 the disposal of waste increased by 2.8%. At the same time the waste export increased by as much as 51.3% over the previous year [3]. Table 2 presents amount of waste from manufacturing and services and waste handling, Slovenia, 2002-2005.

	Amount of waste generated	Amount of waste generated and waste store	Internal treatment of waste	Amount of waste delivered to the other
	T			
2002	4.067.315	4.089.604	2.786.969	1.302.635
2003	4.570.267	4.686.134	3.163.418	1.522.715
2004	5.893.306	5.981.378	3.658.143	2.323.235
2005	5.585.080	5.669.138	3.034.056	2.635.082

Table 2: amount of waste from manufacturing and services and waste handling, Slovenia, 2002-2005 [3].

Table 3 presents hazardous waste and waste handling, Slovenia, 2001-2005

	Amount of hazardous waste generated	Amount of hazardous waste generated and waste store	Internal treatment of hazardous waste	Amount of hazardous waste delivered to the other
	t			
2001	67.517	67.520	33.826	33.694
2002	63.206	66.780	33.364	33.416
2003	64.180	67.137	28.933	38.203
2004	104.073	108.882	53.062	55.820
2005	122.161	126.848	57.997	68.851

Table 3: hazardous waste and waste handling, Slovenia, 2001-2005 [3].

Figure 1 presents waste recovery and waste disposal in Slovenia, 2002-2005.

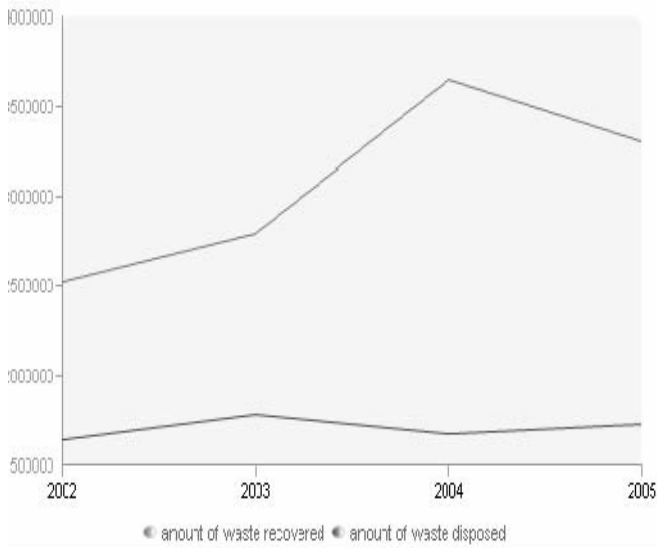


Figure 1: Waste recovery and waste disposal in Slovenia, 2002-2005 [3].

Health services have an exceptional role in the spheres of preventive medicine and public health promotion, in the sense of keeping a favorable balance between costs

and benefits. Health service organizations should define all their processes. These processes, which are typically multidisciplinary, include administrative and other support services, include such examples as:

- the organizational development, including quality, environmental, safety and health management system,
- the development and delivery of training to educate,
- the process,
- the preventive and corrective maintenance program for equipment and facilities,
- the continued care of patient/client in any setting,
- the counseling of a patient/client and family [4].

One point of view of all their process is waste treatment. The stages in HCWM are: production of waste within a hospital ward, segregation of waste, ward storage, onsite transportation and treatment (if any), onsite central storage, offsite transportation, treatment, and final disposal. Dealing with such a comprehensive subject which impacts the construction and functionality of health facilities, can be daunting. Several agencies (WHO, the World Bank) and NGOs (Health Care Without Harm) have developed useful guidelines [2].

4 Handling and Disposal

Management should consider actions such as:

- Identifying the product realization processes that provide added value to the organization,
- Identifying the support processes that influence the effectiveness and efficiency of the realization processes,
- Creating an environment that encourages the involvement and development of people, and
- Provision of the structure and resources that are necessary to support the organization's strategic plans [12].

Optimizing processes in private and public Health services is essential for process costs control and in for contributing to a rational medicinal products/services supply of the population. Privatisation of a public health service may be one possible step in combination with a thorough consideration of all benefits and deficiencies [6]. An organization should allow adequate time for the environmental management to be effective. Constant growth in business operation

means also care of environmental and environmental management system.. handling and disposal. The success of the organization depends on the understanding and satisfying the current and future needs and expectations of present and potential customers and end-users, as well as understanding and considering those of other interested parties. Because of these, management shall ensure that appropriate communication channels are established within the organization and that communication takes place regarding the effectiveness of the management system. An efficient and successful system of providing quality and environmental service pertaining to medicinal products/services supply - a system satisfying the needs, wishes and expectations of everybody concerned through an overall activity control, is one of the most suitable mechanisms enabling us to have global supervision and to act globally on the local market – with global characteristics. Simultaneously, such a system offers a possibility of constant growth in business operation [5]. ISO 14001:2004 dealing with environment system requirements [7]. Important part of EMS is handling care waste management. HCWM is most effective when proper methods are employed at each step, from planning and procurement through disposal. The first step should be determining realistic options for HCWM given the budget, technology, and local community preferences. Different aspects of health care waste must be considered when choosing the appropriate treatment technology (such as volume, temperature, whether the waste is liquid or solid, hazardous or infectious) [2]. To ensure worker safety, it is normally necessary to procure plastic bags, trash bins, ‘sharps’ containers, and sometimes even special trucks. It is sometimes advisable to ensure access to disposable gloves and other protective equipment for staff (eg boots, aprons, thick rubber gloves), needles and syringes, laboratory equipment, cleansing agents, and tubes/hoses/other items associated with diagnostic and intensive care machines. Disposable items increase the amount of HCW each hospital or health care facility produces, and have cost implications [2].

5 Conclusion

Health service design, delivery, management and/or administration should focus ultimately on the patient/client [9]. The interest of customers, users, developers and others in the environmental aspects and impacts of products is increasing [10]. With the environmental management system and information

support of the business operation we can achieve the following basic goals:

- Assure and permanently improve the level of health service quality,
- assure constant growth of general population’s satisfaction with health service supply,
- optimize the economic aspect of business operation [5].

Poor management of HCW exposes healthcare workers, waste handlers and the community to infections, toxic effects and injuries. This has to be taken into consideration when choosing a treatment or a disposal method by carrying out a rapid environmental impact assessment .

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