



## Evaluating Hospital Waste Segregation Practices at one of the Hospitals in Eastern Province, Zambia: An Observational Study

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DOI: <https://doi.org/10.55248/gengpi.5.0224.0511>

### ABSTRACT

Health Care Waste Management is a necessary component in the provision of health care services, for without it or a decline in adherence to its guidelines can be disastrous to the facility, Health Care Workers, patients and the community. Waste segregation means separating waste at the point of generation into infectious and non-infectious. This study, using an observational check list, conducted during the month of June, 2023 at one of the largest hospital in Chipata District, Zambia, found that waste segregation practices did not comply with standard waste management guidelines. Infectious waste were mixed with non-infectious waste, in some instances waste bins were left unemptied. This study recommends orientation of staff in IPC guidelines, strengthen supervision at ward and departmental level, procurement of IPC materials, regular inspections and introduction of reward system for best performing departments in IPC.

**Key Words:** Clinical Waste, Domestic Waste, Waste segregation, Infection Prevention, Sharps

### I. INTRODUCTION

Health-Care Waste is generated daily in Health Care facilities. Busier urban health facilities with larger bed capacities generate tens of tonnes of waste daily. The United States Environmental Protection Agency (USEPA) (2011) defined, healthcare waste as 'all waste generated by healthcare facilities (HCF), such as hospitals, clinics, physician's offices, dental practices, blood banks, and veterinary hospitals/clinics, as well as at medical research facilities and laboratories.' The World Health Organization Fact Sheet of (2018) classifies Health Care Waste broadly into hazardous waste and non-hazardous waste. Distinctively, health-care waste are sorted as- 'sharps, infectious waste (contaminated with blood or other body fluids, cultures and stocks, and waste from isolation wards), pathological waste, pharmaceutical (including cytotoxic) waste, hazardous chemical waste, radioactive waste and non-hazardous general waste' (World Health Organization 2014:19). Health-Care Waste Management requires adherence to strict procedures for safe handling, treatment and disposal. Unsafe handling, treatment and disposal of waste generated in health facilities poses a greater risk to the handler, patients, other Health Care Workers, the environment and the community at large.

Health Care Facilities have an entrusted mandate for consistent high quality health care environment and guaranteed safety of all patients, Health Care workers and surrounding communities. Therefore, process activities- from generation, segregation, transportation, storage, and treatment to safe disposal of all type of Health-Care Wastes (Sanitation Connection, 2002) should be done systematically. Segregation of waste in health facilities means separating the generated waste at the point of origin at earliest possible time (Khobragade, 2018). Waste segregation is done through the aid of colour-coded bin liners and labelled waste bins (Sadia, 2018).

'Containers and bags should be labelled with the type of waste, point of generation, date and where possible, weight' (Basel Convention Technical guidelines 2003: 2). Mixing up of medical waste and non-medical waste is prohibited as it poses health risks to health workers, patients, children and waste pickers through exposure to Hepatitis B, C, Syphilis and HIV infections as a result of needle-stick injuries or handling contaminated gloves, instruments, cotton wool and other sharp objects. In case of accidental mixing of hazardous and domestic waste, the World Health Organization (2014) guidelines' second edition, advises treating the mixed waste as hazardous material. Sharps containers and bags should be filled to no more than three quarters of their capacity and then sealed (Basel Convention Technical guidelines 2003: 2). Other indirect risks to humans through direct environmental effects by contaminating soil and ground waters also emerge following improper segregation of Health-Care Waste (Okoye & Origbakpor. 2023: 172). Scholars such as Odette et al., (2014) in their study in Madagascar and Leonard and colleagues (2022)'s study in Zambia, found that not all Health Care Facilities in low-resource countries comply with the standard waste management guidelines.

## II. Materials and Methods

**Study Design:** The study used explorative research design and qualitative research approach

**Study Location:** The study was conducted at one of the largest Health Care Facility

**Study Duration:** It was conducted between April and July, 2023

**Sample size** : 8 Hospital Wards, 2 Emergency Out Patient Departments and Dental Department

**Sample size calculation:** Sampled 10 patient treatment points.

### Inclusion criteria

1. Only staff in the selected areas available and willing participated in the study

### Exclusion criteria

1. Staff found busy attending to patients, were unwilling to participate or not available

## III. Procedure Methodology

This study was meant to gain insight into the existing practices surrounding Health-Care Waste segregation. The objective was to create awareness and draw up action points for improvement in our Health facility waste management process. The first step in the data collection process began with a meeting involving the Principal Investigator and other two Officers in-charge of Infection Prevention and Control. The meeting was designed to help Data Collectors get familiar with the Infection Prevention and Control Monitoring Tool. The part in the monitoring tool assessing Health-Care Waste segregation practices was printed and copies shared. Visit to the selected areas was done without disclosure so that accurate and reliable data can be sourced. Upon reaching the research site, the objective of the study was communicated to the in-charge. Furthermore, permission was sought prior to the onset of data collection. Qualitative research methods- naturalistic observation and a bit of interviews were the techniques employed for data collection. A total of 10 staff from the selected sites participated in the study. Analysis of data done was done quantitatively using evaluation rating contained in the tool.

### Theory

This study drew impeccable lessons from Deming's Theory of Quality Improvement Management. Dr Edwards Deming, an American scholar and management practitioner distilled quality Improvement using his 14 points. His theory sharply criticizes the traditional approach to leadership. His theory fosters culture of continuous improvement for the overall goal of achieving customer satisfaction in this case patients, Health Care Workers and communities in order that 'everybody gains, not one part of the system at the expense of any other' (Clements 2014). Health Care facilities have an obligation for quality service and safety for the satisfaction of patients and communities they serve. Using Deming's theory, Health Facilities just like other organizations, are urged to improve their services constantly through incremental changes' (Deming, 1986: 49).

## IV. Results

This study used sampled 10 service areas. Waste segregation audit was done using the Health Facility Infection Prevention and Control Monitoring Tool. Care points in the hospital were assessed on whether waste was segregated according to the type of waste (e.g. indicated by colour code or labelling): Infectious, non-infectious (from source, during collection, to disposal and/or treatment. For sharps -disposed in the designated sharp box). The score each complete parameter was 2, 1 for partially- if one element is missing and 0 if standard not met.

**Table 1. Illustrates waste segregation findings in the sampled care points of the hospital**

LABOUR WARD	SCORE		Comment
	YES	NO	
Available, sealed, covered and labelled waste bins	1		Waste bins not covered
Sharp containers available at all points of use	2		Standard met
Waste is segregated according to type	2		Standard met
<b>POST NATAL WARD</b>			
Available, sealed, covered and labelled waste bins	1		Waste bins not covered, full, not emptied
Sharp containers available at all points of use	1		Sharp boxes full
Waste is segregated according to type		0	Mixed waste
<b>GYAEN WARD</b>			

Available, sealed, covered and labelled waste bins	1		Waste bins not covered, not emptied
Sharp containers available at all points of use	1		Sharp box very full, not emptied
Waste is segregated according to type		0	Mixed waste
<b>MALE MEDICAL WARD</b>			
Available, sealed, covered and labelled waste bins	2		Standard met
Sharp containers available at all points of use	1		Sharp box full, syringes juggling out
Waste is segregated according to type		0	Mixed waste
<b>FEMALE MEDICAL WARD</b>			
Available, sealed, covered and labelled waste bins	1		Waste bins not labelled
Sharp containers available at all points of use	2		Standard met
Waste is segregated according to type		0	Mixed waste, needles found in waste
<b>MALE SURGICAL WARD</b>			
Available, sealed, covered and labelled waste bins	1		Waste bins not covered
Sharp containers available at all points of use	1		Very full sharp box
Waste is segregated according to type		0	Mixed waste
<b>FEMALE SURGICAL WARD</b>			
Available, sealed, covered and labelled waste bins	1		Waste bins not covered
Sharp containers available at all points of use	1		Very full sharp box
Waste is segregated according to type		0	Mixed waste
<b>EMERGENCY MEDICAL OPD</b>			
Available, sealed, covered and labelled waste bins	1		Waste bins not covered
Sharp containers available at all points of use	1		Sharp box full
Waste is segregated according to type		0	Waste mixed
<b>EMERGENCY TRAUMA OPD</b>			
Available, sealed, covered and labelled waste bins	1		Waste bins not covered
Sharp containers available at all points of use	2		Sharp box full
Waste is segregated according to type	2		Std met
<b>DENTAL CLINIC</b>			
Available, sealed, covered and labelled waste bins	1		Waste bins not covered
Sharp containers available at all points of use	1		Sharp box full with syringes juggling out
Waste is segregated according to type	2		Standard met

This study used an observational checklist from the Health Facility Infection Prevention and Control Monitoring Tool. As observed from **Table 1**. The hospital's Infection Prevention and Control Program had plenty of gaps. The first pervasive deficit noted as the team conducted an inspection was non-adherence to waste segregation procedures. Seven service points mixed clinical and domestic waste. In some departments, solid mixed waste had needles, a clear indication that sharps were disposed in the waste bin and not in the sharp box as required. The second observation from the table was that waste bins were not labelled or were left uncovered. The final observation from the table is that sharp boxes were found full and in some departments, needles and syringes were visibly seen juggling out.

## V. Discussion

The World Health Organization (2014) identifies waste segregation as the first step in implementing a facility-wide waste management plan which should be 'carried out as close as possible to the place of generation' (.Basel Convention Technical guidelines 2003:2) Adherence to ideal waste segregation practices guarantees safety, protection and sets the best tone for facility waste management. However, this study found decaying standards in the way health care facility waste management was being conducted at one of the high volume hospitals in Chipata District, Zambia. For example, infectious

waste and domestic waste were disposed in one waste bin. In extreme cases, sharps such as needles and scalpels were mixed with the general waste. Findings of this study are supported by a multi-site study conducted in 5 provinces of Zambia by Leonard and colleagues (2022). In their study, Leonard et al. (2022) found that while over 98% of Health Care Facilities surveyed had waste bins, albeit, these were not always covered and in some instances waste bins did not have bin liners. Scholars have found that covering of waste bins and consistent use of bin liners limit exposure of infectious waste to health workers and patients (WHO, 2014). In another study, Odette et al. (2014) found that 54.3% of Health Care Facilities in Madagascar had poor waste-mixing-practice during waste segregation.

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## VI. Conclusion

Health Care Waste Management is a necessary component in the provision of health care services, for without it or a decline in adherence to its guidelines can be disastrous to the facility, Health Care Workers, patients and the community. Waste segregation means separating waste at the point of generation into infectious and non-infectious. This study, conducted during the month of June, 2023 at one of the largest hospital in Chipata District, Zambia, found that waste segregation practices did not comply with standard waste management guidelines. Infectious waste were mixed with non-infectious waste, in some instances waste bins were left unemptied. This study recommends orientation of staff in IPC guidelines, strengthen supervision at ward and departmental level, procurement of IPC materials, regular inspections and introduction of reward system for best performing departments in IPC.

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## VII. Recommendations

This study recommends orientation of staff in IPC guidelines, strengthen supervision at ward and departmental level, procurement of IPC materials, regular inspections in all points of care and introduction of reward system for best performing departments/wards in IPC.

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