MINISTRY OF WATER AND ENVIRONMENT

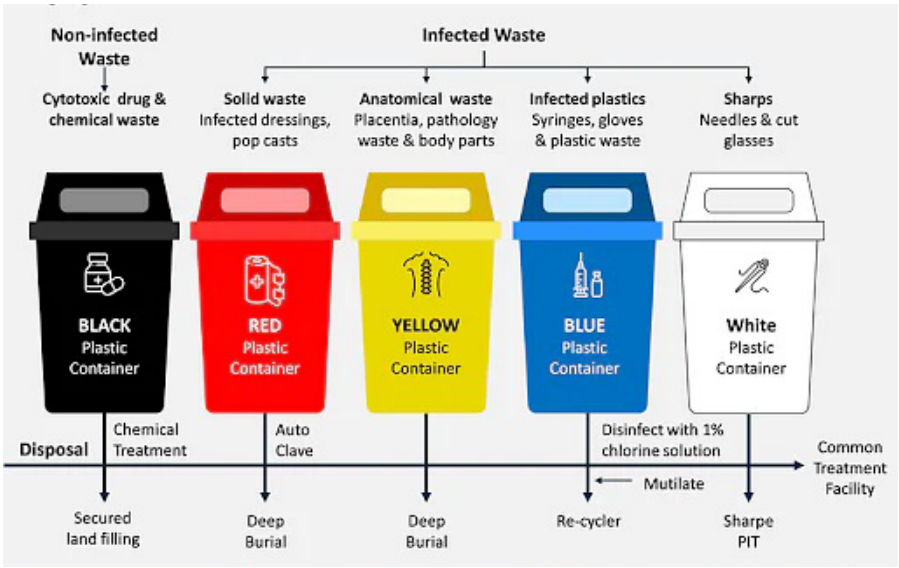
SORTING HEALTHCARE WASTE MANAGEMENT

Evidence shows Healthcare Settings are Sources of Infections and Drug-Resistance through the Environment

SUMMARY

Guided by international frameworks, Government of Uganda has put in place with a robust set of laws, regulations, policies and guidelines for management of hazardous waste – hazardous healthcare waste inclusive. However, people and animals continue to be exposed to anti-microbial resistant infections that tend to develop in health facilities with poor sanitation systems and spill into the environment, where they are picked by humans and animals.

This brief urges health facilities, pharmacies, laboratories, farms and other actors to strictly follow the existing regulations, guidelines and protocols for management of hazardous healthcare waste in order to safeguard water sources, the environment, and animal and human health.



Source: https://prepp.in/news/e-492-hospital-wastes-environment-notes

INTRODUCTION

The National Environment (Waste Management) Regulations, 2020 define waste as any substance or object which is dumped, abandoned, discarded or disposed of or intended or required by law to be disposed of. The Regulations describe waste management as "the activities relating to the collection, transportation, storage, treatment and disposal of waste, including the management of waste at source and during decommissioning of waste management facilities".

Hazardous wastes have been defined as wastes that, owing to their toxic, infectious, radioactive or flammable properties, pose a substantial, actual or potential danger to the health of humans and other living organisms, and to the environment.[1] Health care wastes are considered the second most hazardous wastes globally, after radiation waste[2], and on average, 15-25% of waste generated within healthcare facilities is classified as hazardous.[3]

Hazardous healthcare waste includes sharps, human body parts, blood, chemical wastes, pharmaceutical wastes, and medical devices[4], generated from hospitals and primary care facilities, laboratories, mortuaries, autopsy centers, laboratories, blood banks, and nursing homes, among others[5].

1 Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, United Nations, New York, 1997

2 Arab M, Baghbani RA, Tajvar M, Pourreza A, Omrani G, Mahmoudi M. The assessment of hospital waste management: a case study in Tehran. Waste Manag Res. 2008;26(3):304–8. Vol. 26, Issue 3, https://doi.org/10.1177/0734242X08093598

3 WHO 2014. Safe management of wastes from healthcare activities. 2nd edition.

4 Rodriguez-Morales AJ. Current topics in public health. *InTech*; 2013. https://www.intechopen.com/books/3432

5 Pépin J, Abou Chakra CN, Pépin E, Nault V, Valiquette L (2014). Evolution of the

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Mismanagement of healthcare waste can result into hospital-acquired infections, occupational health hazards and food contamination.[6]

STATUS OF HEALTHCARE WASTE MANAGEMENT AND ITS IMPACT ON THE ENVIRONMENT

Healthcare waste management in Uganda is well below minimum standards.[7] Studies[8] that have assessed healthcare waste management practices at 50 health facilities in eastern Ugandan (Bugiri, Iganga, Mbale districts) found that only 13 (26%) of them provided a full complement of personal protective equipment (PPE).[9] Less than 5% of 239 service delivery areas (clinics, operating rooms, laboratories, and specialty services) observed in the study had both color-coded bins and their accompanying liners.

In the same study, waste segregation took place at 73% of service points; safety boxes for sharps wastes were used at 82% of service points; and loose biological waste was observed at 24% of the sites.[10] In interviews, staff explained that these problems were due to lack of color-coded bins or liners, knowledge gaps, staff turnover, and negligence, among other reasons.[11]

The studies further found that just over half of facilities treated infectious laboratory waste before final disposal; just over half used unsafe practices for disposal of effluent waste; and the most common method of final disposal was transportation offsite.[12]

Facilities performed better with sharps and infectious waste, with 90% or more of facilities performing safe disposal; and all facilities that generated anatomical waste disposed of it safely.[13]

Photo credit: World Health Organization

A national cross-sectional survey of injection safety practices in health facilities found that Ugandans were over-prescribed injections, contributing to high volumes of sharps wastes and antibiotic resistance. The survey showed that over 70% of the respondents received more than three injections per year, putting Uganda among the group of countries in the sub-Saharan region with the highest use of injections.[14]

The current levels of antimicrobial resistance (AMR) are attributed largely to the overuse and abuse of antibiotics and other antimicrobials.[15] Antimicrobial resistance (AMR) – or drug resistance – occurs when a pathogen or disease-causing microorganism no longer responds to a drug (antimicrobial) that was previously effective against it.[16]

Given the high prescription and concentrated usage of antibiotics in healthcare settings, healthcare waste and effluent[17] are increasingly becoming a major channel of development, transmission and spread of AMR infections[18]. Poor waste management and sanitation in healthcare facilities is a major driver of AMR, with resistant bacteria developed in hospital effluent being transferred to the environmental distribution sites.[19]

Global Burden of Viral Infections from Unsafe Medical Injections, 2000–2010. *PLOS ONE* 9(6): e99677. https://doi.org/10.1371/journal.pone.0099677

6 Manyele, S. V., & Tanzania, V. (2004). Effects of improper hospital-waste management on occupational health and safety. *African newsletter on occupational health and safety*, 14(2), 30-33.

7 Ministry of Health: National Health Care Waste Management Plan 2009/10-2011/12

8 Masembe V, Pearson J, Kalungu M, Namisango E, Rogers-Bloch Q, and Amandua J. (2014). Assessment of Health Care Waste Management Practices in Three Districts in Uganda. AIDSTAR-One, Task Order One.

9 Ministry of Health recommends heavy gloves, masks, boots, goggles, and overalls as PPE for each waste handler.

10 Masembe V, et. al (2014)

11 Masembe V. et.al (2014)

12 Masembe Victoria, Jennifer Pearson, Kalungu Michael, Eve Namisango, Quail Rogers-Bloch, and Jacinto Amandua. 2014. Assessment of Health Care Waste Management Practices in Three Districts in Uganda. Arlington, VA: USAID's AIDS Support and Technical Assistance Resources, AIDSTAR-One, Task Order One.

13 Masembe Victoria, Jennifer Pearson, Kalungu Michael, Eve Namisango, Quail Rogers-Bloch, and Jacinto Amandua. 2014. Assessment of Health Care Waste Management Practices in Three Districts in Uganda. Arlington, VA: USAID's AIDS Support and Technical Assistance Resources, AIDSTAR-One, Task Order One.

14 National Policy on Injection Safety and Health Care Waste Management 2004

15 Alliance for Prudent Use of Antibiotics (2010). General background: About antibiotic resistance. https://bit.ly/3Fb4FYU

16 WHO (2014). Antimicrobial resistance: Global report on surveillance. Summary report. https://bit.ly/2Yf50c4

17 Berendonk TU et al. Tackling antibiotic resistance: the environmental framework. *Nature Rev Microbiol* 2015;13:310–7.

18 Musoke et. al (2021). The role of Environmental Health in preventing antimicrobial resistance in low and middle-income countries. Environ Health Prev Med (2021) 26:100. https://doi.org/10.1186/s12199-021-01023-2

19 Chowdhury AMMA, Uddin KN. Analysis of the Occurrence

resistance bacteria have increased substantially in various environments and are becoming a worldwide concern[20], and wastewater from hospitals is a major source of antibiotic resistance genes and antibiotic pollution in the environment.[21]

One study that analyzed direct hospital effluent as well as influent and effluent of a wastewater treatment plant for both hospital and urban wastewater found that hospitals represent one of the main sources of pollutants, in particular antibiotics, receptor antagonists and lipid regulators, with antibiotics being the most critical compounds in terms of contribution and potential environmental risk.[22]

In addition, public use of personal protective equipment (PPE) globally, especially masks, has increased significantly since the start of the COVID-19 pandemic. One estimate suggests that, based on country mask mandates and public mask use, in 2020, up to 3.4 billion single use masks were discarded each day, resulting in a sizable, additional volume of plastic waste.[23]

Most of the mask waste for disposal is plastic, and a sizeable proportion of this waste, especially in low- and middle-income countries with limited waste management systems, ends up polluting terrestrial and marine ecosystems.[24]

LEGAL FRAMEWORK FOR HEALTHCARE WASTE MANAGEMENT

The Constitution stipulates (Art. 17) that, "it is the duty of every citizen of Uganda to create and protect a clean environment." It further mandates (Art. 245) Parliament to make laws to provide for measures to protect and preserve the environment from abuse, pollution and degradation.

The National Environment Act (1995) established the National Environmental Management Authority (NEMA) as the statutory body responsible for protection of the environment.

of Antibiotic Resistant Bacteria in the Hospital's Effluent and its Receiving Environment. *Microbiology Insights*, 2022 Feb 14;15:11786361221078211. doi: 10.1177/11786361221078211.

20 Al-Bahry SN, Mahmoud IY, Al-Khaifi A, Elshafie AE, Al-Harthy A. Viability of multiple antibiotic resistant bacteria in distribution lines of treated sewage effluent used for irrigation. Water Sci Technol 2009; 60(11): 2939-48.

21 ReAct. Antibiotics in the environment. Understand – How did we end up here? https://www.reactgroup.org/toolbox/understand/how-did-we-end-up-here/antibiotics-in-the-environment/

22 P. Verlicchi, M. Al Aukidy, A. Galletti, M. Petrovic, and D. Barceló. Hospital effluent: Investigation of the concentrations and distribution of pharmaceuticals and environmental risk assessment. *Science of the Total Environment*, vol.430, 15 July 2012, Pages 109-118. https://www.sciencedirect.com/science/article/abs/pii/S0048969712005876

23 Benson NU, Bassey DE, Palanisami T. COVID pollution: impact of COVID-19 pandemic on global plastic waste footprint. Heliyon. 7(2):e06343.

24 Benson NU, Bassey DE, Palanisami T. COVID pollution: impact of COVID-19 pandemic on global plastic waste footprint. Heliyon. 7(2):e06343.

The National Environment (Waste Management) Regulations 2020 require a person who generates healthcare waste to categorize it into hazardous or non-hazardous waste (Sec. 49(1)). The Regulations (Sec. 49 (2)) require a person who generates hazardous healthcare waste to further segregate into six distinct categories: sharps waste; infectious waste; pathological waste; pharmaceutical waste; chemical waste; and radioactive waste.

At the global level, Uganda is party to the Stockholm Convention on Persistent Organic Pollutants (2001) which requires States Parties to take measures to restrict the production and release of persistent organic pollutants (POPs), with the goal of continued minimization and where feasible, ultimate elimination.

POLICY FRAMEWORK FOR MANAGEMENT OF HEALTHCARE WASTE

The World Health Organization (WHO) has published a global guidance document, *Safe management of wastes from health-care activities,* now in its second edition (2014), outlining six key elements of improving health-care waste management:

1) Promoting practices that reduce the volume of wastes generated;
2) Developing strong oversight and regulation to incrementally improve waste segregation;
3) Favoring environmentally sound treatment methods (autoclave, microwave, steam, and chemical treatment) over incineration;
4) Addressing responsibilities, resource allocation, waste handling and disposal;
5) Raising awareness of the risks related to health-care waste, and of safe practices; and
6) Selecting option that to protect people from hazards when collecting, handling, storing, transporting, treating or disposing of waste.

At the national level, the Uganda National Injection Safety and Health Care Waste Management Policy (2004) sets out strategies for ensuring that patients, health workers, communities and the environment are protected from risks associated with unnecessary and unsafe injections. The policy also addresses disposal of injection materials and other healthcare waste.

This policy aims at ensuring safe injection practices and proper management of healthcare waste. This is to be achieved through appropriate procurement, distribution and monitoring of equipment and supplies; improved injection practices, and sharps waste management.

To follow-up the policy, Ministry of Health issued the Uganda National Infection Prevention and Control Guidelines 2013, providing comprehensive guidelines for the prevention and control of infectious diseases at health facilities through safe practices, including the guidelines for proper final disposal methods for destruction of all healthcare waste generated during health care delivery, especially from sharps, laboratory, surgical and medical procedures.

The policy guidelines categorize hazardous healthcare waste into nine categories:

1) Infectious waste, consisting of waste that has living organisms in it which are capable of causing disease. These include blood and intems contaminated with blood and other body fluids, cultures and infectious agents from diagnostic and research laboratories; isolation wastes from highly infectious patients; discarded vaccines; and leftover food from highly infectious patients.
2) Anatomical waste, including human tissues, body parts, fetus, placenta, wastes from surgery, biopsies, autopsies; animal carcasses; and organs and tissues infected with human pathogens.
3) Sharps waste, consisting of o needles, scalpel blades, suture needles, razors, infusion sets, broken glass, specimen tubes and others.
4) Chemical waste (solid, liquid or gaseous) that has ability to undergo harmful reaction.
5) Pharmaceutical waste, consisting of expired medicines, residual medicines, pharmaceutical bottles.
6) Radioactive waste, consisting of any waste contaminated with radioactive isotopes of any kind.
7) Genotoxic waste, such as batteries, broken thermometers, broken blood pressure gauges, etc.
8) Pressurized containers, such as insecticide cans, perfumes, sprays, etc.
9) Heavy metals found in batteries, broken thermometers, broken blood pressure gauges, etc.

The guidelines provide for six steps in the management of healthcare waste: 1) Waste minimization; 2) Segregation; 3) Handling and storage; 4) Transportation; 5) Treatment and destruction; and 6) Disposal. Notably, the Guidelines require that healthcare waste be separated according to type of waste at the source of generation; that different types of waste are separated in different color coded containers; that waste is be separated by the person who generates it, immediately.

They further provide for different methods of disposal depending on the type of health care waste, including incineration for infectious clinical and laboratory waste, sharps, pharmaceutical wastes; burial for placentas, amputated limbs, and radioactive waste; burning in a medical pit for sharps; collected in leak-proof labeled containers for cytotoxic waste, consulting with Uganda Cancer Institute for proper disposal; encapsulation for wastes with heavy metals; collection in a designated area away from fire for pressurized containers; a closed sewerage system for liquid waste, where it is lacking, a deep covered hole.

According to the guidelines, healthcare waste should be stored for a maximum of three days during which it must be collected for treatment and/or disposal.

Ministry of Health further developed separate guidelines for management of circumcision waste. The *National Guidelines: Managing Healthcare Waste Generated from Safe Male Circumcision Procedures 2013* provide more detailed guidelines for management of waste at each individual service delivery point for voluntary medical male circumcision (VMMC). The Guidelines outline the range of steps that a VMMC client goes through during the circumcision process, and the nature of waste generated at each step.

These Guidelines provide that healthcare waste must be transported and treated by a licensed provider, who must be recognized and registered by NEMA, National Drug Authority (NDA), Uganda National Bureau of Standards (UNBS), and other regulatory bodies.

CONCLUSION

While the country boasts an impressive legal and policy framework for management of healthcare waste, evidence suggests that hazardous healthcare waste is still poorly managed through the different levels of the value chain. As a result, hazardous healthcare waste finds its way into the environment, causing pollution, contaminating water sources, facilitating the spread of AMR microorganisms, posing a danger to the ecosystems.

District health teams and NEMA should support health facilities to put in place and implement facility-level waste management plans that conform to the National Environment (Waste Management) Regulations 2020 and the Ministry of Health's National Infection Prevention and Control Guidelines 2013.

Ministry of Health, NEMA, District One Health Teams (where they exist), District Health Teams, and environmental civil society organizations (CSOs) should partner to build the capacities of health workers and waste handlers in infection prevention and control as well as in healthcare waste management; and to increase public awareness about the dangers of mismanaging healthcare waste.

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