LEGAL ASSESSMENT OF ENVIRONMENTAL HAZARD FROM INAPPROPRIATE DISPOSAL OF MEDICAL WASTE IN NIGERIA*

Abstract

The generation of medical waste is an unavoidable consequence of administering patient treatment globally. Crucially, when medical waste is not properly disposed of, its inherent toxicity renders it capable of significantly altering ecological balance to the detriment of human health and the environment. The systemic and often careless method of disposing of medical waste in Nigeria currently constitutes a significant and escalating environmental hazard, placing immense pressure on fragile ecosystems and posing severe risks to public health. Against this backdrop, this article conducts a legal assessment of the regulatory framework for environmental hazard resulting from the inappropriate disposal of medical waste in Nigeria. Categorically, the paper commences by dissecting the unhealthy methods of disposing of medical waste and their detrimental environmental effects, before proceeding to consider the relevant legal framework controlling medical waste disposal in Nigeria. Employing a doctrinal research methodology, it finds, among other issues, that the difficulty in controlling medical waste stems primarily from inadequate enforcement capacity coupled with institutional overlap among key regulatory bodies. The paper concludes that while the legal framework for controlling medical waste in Nigeria is robust, its practical efficacy is demonstrably insufficient. Accordingly, it recommends, among other measures, that enforcement capacity be strategically decentralised by mandating and adequately funding relevant agencies to conduct regular, unannounced compliance checks on all healthcare facilities, laboratories, and other generating points.

Keywords: Environmental Effect, Healthworkers, Law, Medical Waste, Nigeria, Public Health.

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1. Introduction

The management of medical waste is increasingly recognised as a global critical public health and environmental challenge.[1] This issue, characterised by improper disposal practices, poses an overwhelming threat to public health and negatively impacts the social and economic well-being of the population.[2] Quantifying this significant hazard, the World Health Organisation (WHO) estimates that approximately 20% of all medical waste generated is classified as hazardous, creating substantial and immediate risks of infection, chemical exposure, and environmental contamination.[3] The sheer magnitude of this problem is evident worldwide. For instance, in developed nations like the United States, medical waste is considered a major source of overall waste, and its unsanitary disposal has demonstrably put millions of lives at risk.[4] Crucially, the detrimental effects of poor handling are not confined to the point of generation in many nations including Nigeria.

The associated hazards extend directly to care staff, employees responsible for handling and transporting the waste, patients, visitors, and the wider environment, including neighbouring communities in proximity to healthcare facilities.[5] Furthermore, when medical wastes are not properly handled or disposed of, the resulting contamination can lead to severe environmental degradation, spreading widely through the air, water, and land.[6] It is fundamental to recognise that while modern medicine is essential for preserving human health and quality of life, the healthcare sector will inevitably produce hazardous by-products and these materials pose an enduring risk to both public health and the integrity of the wider environment[7]

1 Ugboma Ogochukwu Akabike, Kachikwulu O., Melo, Isotilia C., Junior Paulo N. Alves, 'An Assessment of Medical Waste Logistics in Selected Healthcare Facilities (HCF) in Lagos State' (2025) 2(1) *Lagos State University Postgraduate School Journal* 304.

2 Samuel Osaretin Olikiabo & Norris Igbinosa Erhabor, 'Medical Waste Management in Public and Private Health Care Facilities in Nigeria' (2025) 10(1) *NIU Journal of Humanities* 347.

3 World Health Organisation, 'Health-Care Waste' (2024) <https://www.who.int/ news-room/fact-sheets/detail/health-care-waste> accessed 5 November, 2025.

4 Olikiabo & Erhabor (n2) 348.

5 Nwosu, I. D., 'Analysis of Legal Framework in Addressing Medical-Waste Menace in Nigeria' (2024) 1 *AEFUIJ* 32.

6 ibid.

7 Samuel Osaretin Olikiabo & Norris Igbinosa Erhabor, 'Importance of Proper Waste Management Programme in Edo State, Nigeria' (2025) 11(1) *NIU Journal of Social Sciences* 374.

In many developing countries, including Nigeria, numerous health concerns are simultaneously competing for severely limited governmental resources, meaning that the crucial task of medical waste management has not historically received the necessary attention or priority it deserves.[8] It is imperative to point out that medical wastes in Nigeria emanate from an extensive range of sources. These include Government and Private Hospitals, Medical Colleges and Research Centres, Veterinary Colleges and Animal Research Centres, Blood Banks, Mortuaries and Autopsy Centres, and Medical Laboratories.[9] Other sources of generation encompass smaller entities such as Physician and Dentist Clinics, Blood Donation and Vaccination Centres, Acupuncturist and Psychiatric Clinics, Cosmetic Piercing Centres, Institutions for Disabled Persons, Old People's Homes, and even informal settings like home treatment administered by nurses from pharmaceutical centres.[10]

In Nigeria, medical wastes are regrettably still often handled and disposed of together with domestic wastes, frequently deposited in the same collecting bins at roadsides and disposed of in an identical manner.[11] The critical problem associated with such careless forms of waste disposal is that these potentially infectious medical wastes are routinely exposed to unlicensed and informal waste collectors, who are commonly referred to as 'waste pickers.'[12] These collectors not only carry the contaminated medical wastes from one location to another, thereby spreading disease, but they also go as far as cleaning up some of the disposable medical materials and selling them for re-use to unsuspecting buyers, compounding the public health crisis.[13]

It is worthy of note that Nigeria is a signatory to a range of international instruments aimed at controlling toxic and hazardous wastes, including those generated by the health sector. These instruments include the Basel Convention on the Control of Transboundary Movements of Hazardous

8 ibid.

9 Mathur, P., 'Need of Biomedical Waste Management System in Hospitals-An Emerging Issue-A Review' (2012) 7(1) *Current World Environment Journal* 17.

10 ibid.

11 ibid.

12 Nwosu (n5) 32-33.

13 ibid.

Wastes on the Ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa. Similarly, Nigeria has developed a robust framework of domestic laws to combat the issue of medical waste, providing the legal basis for control and enforcement. Key among these are the Constitution of the Federal Republic of Nigeria, 1999 (as amended), which provides the constitutional foundation for environmental protection; the Harmful Wastes (Special Criminal Provisions, etc.) Act, 1988, which criminalises the illegal dumping of harmful substances; and the Environmental Impact Assessment (EIA) Act[14] which mandates assessment for relevant projects. Furthermore, the National Environmental Standards and Regulations Enforcement Agency (NESREA) (Establishment) Act 2007 serves as the principal legislation establishing the body mandated to enforce environmental standards and ensure nationwide compliance.

Despite the existence of these comprehensive domestic and international laws aimed at curtailing the incidence of indiscriminate disposal of medical wastes which often leads to severe infections caused by pathogens such as bacteria, viruses, parasites, and fungi, there remain major and persistent challenges arising from the indiscriminate disposal of these medical wastes.[15] Against this backdrop, this paper carries out legal assessment of the regulatory framework for environmental hazard resulting from the inappropriate disposal of medical waste in Nigeria. The article commences with a discussion on the common methods of inappropriate disposal and their detriment in the environment, before moving on to dissect the legal framework and key statutes designed to control medical waste disposal in Nigeria. Crucially, it then discusses the challenges of controlling inappropriate medical waste disposal in Nigeria, and concludes by making appropriate, actionable recommendations.

2. Methods of Inappropriate Disposal of Medical Waste in Nigeria And Their Detriment In The Environment

Inappropriate disposal practices of medical wastes often lead to significant ecological degradation. These methods are enumerated as follows:

14 Cap E12 Laws of the Federation of Nigeria, 2004.
15 Mathur (n9) 20.

2.1 *Co-mingling with Municipal Solid Waste (MSW) and Open Dumping*

One of the most widespread and concerning inappropriate disposal methods involves the co-mingling of hazardous medical waste with general Municipal Solid Waste (MSW), followed by disposal in open dumpsites or unsanitary landfills.[16] This practice of non-segregation is distressingly pervasive across the Nigerian healthcare landscape, representing a systemic failure at the initial stage of waste handling.[17]

The environmental effect lies in the Soil and Groundwater Contamination. When this combined waste is dumped, the hazardous components, including pathogens, heavy metals (e.g., from broken thermometers or batteries), and toxic chemicals, leach into the soil and subsequently contaminate groundwater reserves.[18] This process, known as leaching, introduces contaminants that can render land unusable for agriculture and poison vital water sources, impacting both human and animal health.[19] Furthermore, open dumpsites become breeding grounds for disease vectors such as rodents, insects, and worms, which can then spread pathogens from the infectious medical waste into surrounding communities, contributing to the transmission of diseases like cholera and typhoid fever.[20]

2.2 *Uncontrolled Open Burning*

Open burning is a common, cheap, and easy disposal method, particularly prevalent in areas lacking proper incineration facilities or where healthcare

16 Onyenekenwa Cyprian Eneh, 'Municipal Solid Waste Recycling, Resource Recovery and Public Health Challenges: A Regional Case Study of Enugu, Nigeria' (2025) <https://doi.org/10.1186/s12982-025-00688-2> accessed 9 November 2025.

17 Mathur, (n9) 17.

18 Tomquin Abiye & Morufu Olalekan Raimi, 'Unlocking the Secrets Beneath: Utilizing the Water Quality Index (WQI) to Assess Groundwater Contamination Near Dumpsites-A Case Study of Port Harcourt' (2025) < https://preprints.jmir.org/preprint/73643> accessed 9 November 2025.

19 Godwin A. Usoh, Enobong O. Umoh, Emmanuel O. Sam & Edidiong S. Akpanudo, 'Assessment on Effect of Hospital Wastes on Soil Quality in Uyo Metropolis' (2025) 11(6) *International Journal of Geography & Environmental Management* 39.

20 Gospel Chimenma Dimkpa, Priscilia Nyekpunwo Ogbonda , Amaka Azubuike Ogba, Darlington N. Kilay, Elechi, Sabinus Ordu, Omodu, & Happy Pere-Ela, 'Unregulated Dumpsites, Mosquito Proliferation, Environmental and Public Health Risks in Urban Settlements' (2025) 9(8) *International Journal of Scientific Engineering and Science* 69.

institutions seek an immediate reduction in waste volume.[21] This involves setting fire to medical waste, often mixed with general refuse, in open pits or dumps.[22]

The environmental effect is based on air pollution and emission of toxic fumes. Burning medical waste-which frequently contains plastics, pharmaceuticals, and chemicals—releases toxic air pollutants such as dioxins and furans into the atmosphere.[23] Dioxins are highly toxic, persistent organic pollutants that are carcinogenic and can accumulate in the food chain,[24] Furthermore, the burning of items containing heavy metals, such as mercury from medical devices, releases these metals as fine particulates, contributing to widespread air contamination.[25]Another environmental effect of uncontrolled open burning is greenhouse gas contribution. The combustion process also releases gases like carbon monoxide and particulate matter, contributing to poor air quality, respiratory illnesses, and, indirectly, to the greenhouse effect and climate change.[26]

2.3 *Disposal of Untreated Sharps*

The inappropriate disposal of sharps-such as needles, syringes, scalpels, and broken glass-is a critical challenge in medical waste management.[27] Rather than being encapsulated in puncture-proof containers and safely treated, these

21 Fatima Zahra Abubakar-Otaru, Yusuf Yahaya Miya & Nabil Riskuwa Bello, 'Waste Management and Public Health: Examining the Healthrisks of Poor Disposal Practices in Nigeria' (2025) 2(3) *Kashf Journal of Multidisciplinary Research* 66.

22 ibid.

23 Unwana Joe Udobia, Imoh Imoh-Ita & Unwana-Abasi Udoh, 'The Impact of Compost and Burning of Waste on Public Health:A Case Study of Akpan Andem Market and Mechanic Village Communities in Uyo, Akwa Ibom State' (2025) 8(1) *International Journal of Advancement in Education, Management, Science and Technology* 54.

24 ibid.

25 Unyeawaji Brownson Ntesat, David Ojadi, Chinwendu Emeka, & Reuben Nwomandah Okparanma, 'Ambient Air Quality and Human Health Risk Assessment of Heavy Metals in a Potentially Toxic Silver-Polluted Environment' (2025) 5 *Research Journal of Ecology and Environmental Sciences* 14.

26 Gideon Seun Olanrewaju, Temilade Salami, Olajide Charles Falajiki, Wonderful Akanbi, Lawson Omoniyi, & Praise Adebisi, 'Technology-Led Greenhouse Gas Emissions (THGE) in Nigeria: A Narrative Review of Environmental Impacts and Digital Sustainability Strategies' (2025) <10.20944/preprints202503.1065.v1> accessed 9 November 2025.

27 Abdikarim Abdi Adam, Felix Emeka Anyiam, Mukhtar Abdi Shube, Hassan Dahir Mohamed, Hassan Abdi Ahmed & Nor Haji Osman, 'Assessment of Medical Waste Segregation, Disposal Practices for Infectious and Sharps Waste in Healthcare Facilities in Somalia: Implications for Infection Prevention and Control' (2025) < https://www.tandfonline.com/doi/pdf/10.2147/IDR.S525134> accessed 9 November 2025.

items are often discarded directly into general waste bins, open dumps, or sometimes left exposed at disposal sites.[28]

While the direct environmental effect of a single sharp is minimal, its ability to transmit infection is profound.[29] Sharps contaminated with blood or body fluids are reservoirs of blood-borne pathogens (e.g., HIV and Hepatitis B and C viruses).[30] When improperly discarded, they pose an extreme hazard, particularly to waste handlers, scavengers, and children who may sustain accidental injuries (needle-pricks).[31] This exposure facilitates the introduction of infectious agents into the wider environment and population.

2.4 *Flushing or Pouring Liquid Waste and Pharmaceuticals into Drains*

Medical facilities, laboratories, and even home-care settings generate liquid clinical waste, including bodily fluids, laboratory reagents, and expired or unused pharmaceuticals.[32] In many instances, these substances are improperly disposed of by flushing them down sinks, toilets, or open drains/sewage systems without prior treatment.[33]

The environmental effect relates to water contamination and antimicrobial resistance. Discharging untreated liquid waste and spent pharmaceuticals, including antibiotics, directly into water bodies or sewage systems pollutes surface and ground water.[34] The presence of active pharmaceutical compounds in the aquatic environment can negatively affect non-target

28 Ndifreke, E. I., Imoh, I. E., & Eyo, S. A., 'Assessment of Medical Waste Disposal and Environmental Implications in Uyo City Metropolis' (2024) 8(3) *FUPRE Journal* 296.

29 Adam, Anyiam, Shube, Mohamed, Ahmed & Osman (n27).

30 Edith C Okechukwu, Azuka C Oparah, Sunday O Aguora, & Jeffrey S Soni, 'Evaluation of Health Risks of Improper Biomedical Waste Management among Health Workers in Selected Hospitals in Abuja, Nigeria' (2024) < 10.21522/TIJPH.2013.09.03.Art005> accessed 10 November 2025.

31 PubMed Central, 'Healthcare Waste-A Serious Problem for Global Health' (2023) < https://pmc.ncbi.nlm.nih.gov/articles/PMC9858835/> accessed 10 November 2025.

32 Addisu Shewaye & Gudina Terefe, 'The Challenges and Impacts of Pharmaceutical Waste Management in Low-Income Countries: A Systematic Review' (2025) 11(1) *International Journal of Management and Fuzzy Systems* 25.

33 ibid.

34 Godspower Oke Omokaro, Vivian Idama, Edmond Osemwengie Airueghian & Ikioukenigha Michael, 'Water Resources, Pollution, Integrated Management and Practices in Nigeria – An Overview' (2024) 3(1) American *Journal of Environmental Economics* 10.

organisms.[35] Furthermore, the introduction of antibiotics into the environment facilitates the development and spread of antimicrobial resistance (AMR) in waterborne bacteria, creating a significant public health threat.[36] Similarly, chemical reagents and disinfectants found in liquid waste can be acutely toxic to aquatic life, disrupting the natural balance of rivers and streams, and potentially causing mass die-offs of sensitive species.[37]

2.5 *Burying Untreated Waste*

A seemingly controlled method, the practice of burying untreated or improperly contained medical waste on hospital grounds or in makeshift pits is often employed, particularly by smaller facilities lacking access to municipal disposal systems.[38] This method attempts to contain the waste but fails to neutralise its inherent dangers.[39]

The effect is on localised soil and water contamination. Similar to open dumping, burying untreated waste, especially if pits are unlined, permits the slow, continuous leaching of toxic and infectious materials into the immediate soil.[40] Over time, this localised contamination compromises the integrity of the soil structure and chemistry, making it hazardous for any future use.[41] Additionally, buried infectious material, including pathological waste (e.g., tissues, body parts), can survive for extended periods.[42] If inadvertently

35 Hourui He, Sijia Ma, Xincai Hao, Xianmin Hu & Jun Wang, 'Knowledge, Attitudes, and Practice of Fish Farmers Towards Eco-Pharmacovigilance for Aquaculture Discharge of Pharmaceutical Contaminants from a One-Health Perspective: A Cross-Sectional Study in Wuhan Area of China' (2025) <https://doi.org/10.1080/09603123.2025.2526526> accessed 10 November 2025.

36 Zuraifah Asrah Mohamad, Norashirene Mohamad Jamil & Sophia Karen Bakon, ' From Rivers to Tap: The Spread of Antimicrobial Resistance in Drinking Water Systems' (2025) <10.5772/interchopen.1009585> accessed 10 November 2025.

37 Saidu, A., Zaky, S. K., Sani, S. S., Mato, I. B., Ishaq, S., Irigo, O. S., Henry, D., Umar, B. H., Abdulhamid, H. & Bature, E., 'An Examination of the Ocean Pollution Risks in Nigeria: A Review' (2025) 3(1) *Sahel Journal of Life Sciences FUDMA* 164.

38 Abubakar-Otaru, Miya & Bello (n21) 67.

39 ibid.

40 Pinelopi Petropoulou, 'Hazardous Waste Management and One Health Approach' (2025) <10.3389/fpubh.2025.1684269> accessed 10 November 2025.

41 ibid.

42 Andrew C. D'Lugos, Jeremy B. Ducharme, Chandler S. Callaway, Jose G. Trevino, Carl Atkinson, Sarah M. Judge & Andrew R. Judge, 'Complement Pathway Activation Mediates Pancreatic Cancer–Induced Muscle Wasting and Pathological Remodeling' (2025) 135(12) *The Journal of Clinical Investigation* 2.

excavated or exposed in the future, it presents a long-term health risk to construction workers, agriculturalists, or the general public.[43]

3. Legal Framework for Controlling Medical Waste Disposal

The legal framework for controlling medical waste disposal in Nigeria is a layered structure, anchored by the Constitution and enforced through specific sectoral laws and regulations. In order to facilitate a comprehensive understanding of the governing mechanisms, this section provides appraisal of the pertinent Nigerian legislation.

3.1 *The Constitution of the Federal Republic of Nigeria, 1999 (as amended)*

While not a direct regulatory instrument, the Constitution provides the supreme legal foundation for environmental protection, thereby legitimising all subsidiary environmental laws, including those targeting medical waste. The Constitution located in Chapter II (Fundamental Objectives and Directive Principles of State Policy), explicitly mandates that 'the State shall protect and improve the environment and safeguard the water, air and land, forest and wildlife of Nigeria.'[44] This place a fundamental, albeit non-justiciable, duty on the government at all levels to prioritise environmental quality, making the control of polluting activities like improper medical waste disposal a constitutional objective.[45]

It is, however, worthy of note that the enforceability of environmental protection has been significantly advanced through judicial interpretation. Nigerian courts have increasingly interpreted the right to life[46] and the right to dignity of human person (found in the justiciable Chapter IV) to include the right to a clean, poison-free, and healthy environment.[47] This judicial stance transforms environmental protection from a mere directive principle into a guaranteed human right. Specifically, in the crucial case of *Centre for Oil*

43 ibid.

44 Constitution of the Federal Republic of Nigeria, 1999 (as amended), s.20.

45 Ibrahim Shehu Aliyu & Sadiq Usman Abubakar, 'Legal Frameworks and Challenges for Environmental Protection in Nigeria: An Appraisal of Enforcement Mechanisms' (2025) 4(3) *International Journal of Multidisciplinary Research in Academic Studies and Field Practices* 3.

46 Constitution of the Federal Republic of Nigeria, 1999 (as amended), s.33.

47 ibid at s 34; *Mobil Producing (Nig.) Unlimited v Ajanaku & Anor.* (2021) LPELR-52566 (CA).

Pollution Watch v. Nigerian National Petroleum Corporation[48] the Supreme Court of Nigeria held that Section 20 (the environmental objective), though initially classified as a directive principle, becomes justiciable when read in conjunction with Section 4(2), which grants the National Assembly the power to enact laws to give effect to such principles. This confirms that the laws enforcing medical waste control are constitutionally sound. Furthermore, it follows that the right to a clean and healthy environment is considered implicit in the fundamental right to life guaranteed under Section 33 of the Constitution.[49]

Similarly, African Charter on Human and Peoples' Rights, guarrantees the right of all peoples to a general satisfactory environment favourable to their development.[50] In the case of *Social and Economic Rights Action Center (SERAC) v. Nigeria*,[51] the African Commission on Human and Peoples' Rights found Nigeria in violation of the Charter due to environmental degradation caused by oil extraction activities in the Niger Delta.[52] This paper posits that this judgment confirmed the binding nature of the environmental right. This consistent judicial activism, both domestically and regionally, makes the failure to adequately regulate hazardous medical waste, which severely threatens public health, a potential violation of fundamental human rights.[53] This provides citizens and civil society organisations with a powerful tool for judicial enforcement, compelling the government to adhere to its constitutional and legal duties. Consequently, judicial activism and Nigeria's international obligations have paved the way for the robust enforcement of these environmental rights. The evolving jurisprudence reflects a growing recognition of the importance of a healthy environment as a fundamental human right.[54]

48 (2019) 5 NWLR (Pt.1666) 518 (SC); *Gbemre v Shell Petroleum Development Company Nigeria Ltd* (2005) AHRLR 151 (NGHC 2005).

49 Anamoji, G. S., 'Appraisal of Rights to Healthful Environment under the Nigerian Constitution 1999 as Amended' (2025) 11(5) *Journal of Political Science and Leadership Research* 101.

50 African Commission on Human and Peoples' Rights, art 24.

51 (2001) AHRLR 60.

52 Anamoji (n49) 109.

53 Aliyu & Abubakar (n45) 3.

54 Ekponyong, E. J. & Ekpo, E. F. 'Access to Justice in Environmental Law in Nigeria: Challenges and the Way Forward' (2023) 6(2) *African Journal* 60.

3.2 *Environmental Impact Assessment (EIA) Act, Cap E12 LFN 2004*

The EIA three cardinal objectives are:[55]

(a) Before any person or authority takes a decision to undertake or authorize the undertaking of any activity that may likely or significantly affect the environment, prior consideration of its environmental effects should first be taken;
(b) To promote the implementation of appropriate procedures to realize the above goal; and
(c) To seek the encouragement of the development of reciprocal procedures for notification, information exchange and consultation in activities likely to have significant trans-state (boundary) environmental effects.

The EIA Act serves as a preventative planning tool to integrate environmental considerations into project development. This paper opines that its relevance to medical waste control is primarily indirect but crucial for new or expanding healthcare facilities and waste treatment infrastructure. The Act mandates that any public or private project likely to have a 'significant extent (of impact on) the environment' must undergo an Environmental Impact Assessment.[56]

Major healthcare waste treatment facilities, such as the construction of new incinerators or secure landfills for final disposal of medical waste residues, fall under the 'Mandatory Study List' or 'Category I' projects and must obtain an EIA Certificate before commencing operation.[57] This ensures that new disposal methods are environmentally sound and includes measures to mitigate the environmental effects of the waste before the project is approved, thus controlling future disposal practices.[58]

3.3 *The National Environmental Standards and Regulations Enforcement Agency (NESREA) (Establishment) Act, 2007.*

This enabling Act established the National Environmental Standards and Regulations Enforcement Agency (NESREA), the principal governmental

55 Environmental Impact Assessment Act, s. 1.
56 ibid at s 2.
57 Ibrahim Aliyu, Andrew Clark & Michael Hardman, 'A Systematic Quality Evaluation of Public Participation in Environmental Impact Statements (EIS): Reflecting on Practice in Nigeria' (2025) 43(3) *Impact Assessment and Project Appraisal* 231.
58 ibid.

body for the enforcement of all environmental laws and regulations in the country.[59]

NESREA's functions are to:[60]

(a) enforce compliance with laws, guidelines, policies and standards on environmental matters;

(b) coordinate and liaise with stakeholder, within and outside Nigeria, on matters of environmental standards, regulations and enforcement;

(c) enforce compliance with the provisions of international agreements, protocols, conventions and treaties on the environment, including climate changes, biodiversity, conservation, desertification, forestry, oil and gas, chemicals, hazardous wastes, ozone depletion, marine and wide life, pollution, sanitation and such other environmental agreements as may from time to time come into force;

(d) enforce compliance with policies, standards, legislation and guidelines on water quality, environmental health and sanitation, including pollution abatement;

(e) enforce compliance with guidelines and legislation on sustainable management of the ecosystem, biodiversity conservation and the development of Nigeria's natural resources;

(f) enforce compliance with any legislation on sound chemical management, safe use of pesticides and disposal of spent packages thereof;

(g) enforce compliance with regulations on the importations, exportation, production, distribution, storage, sale, use, handling and disposal of hazardous chemicals and waste other than in the oil and gas sector;

(h) enforce through compliance monitoring, the environmental regulations and standards on noise, air, land, seas, oceans and other water bodies other than in the oil and gas sector

59 NESREA, 'The Establishment of the National Environmental Standards and Regulations Enforcement Agency (NESREA)' <http://www.nesrea.org/about.pht> accessed 21 November 2025.

60 The National Environmental Standards and Regulations Enforcement Agency (NESREA) (Establishment) Act, 2007 s 7.

(i) ensure that environmental projects founded by donor organizations and external support agencies adhered to regulations in environmental safety and protection;

(j) enforce environmental control measures through registrations, licensing and permitting systems other than in the oil and gas sector;

(k) conduct environmental audit and establish data bank on regulatory and enforcement mechanisms of environmental standards other than in the oil and gas sector;

(l) create public awareness and provide environmental education on sustainable environmental management, promote private sector compliance with environmental regulations other than in the oil and gas sector and publish general scientific or other data resulting from the performance of its functions;

(m) carry out such activities as are necessary or expedient for the performance of its functions.

The Act grants NESREA the authority to monitor and enforce compliance with environmental standards, issue permits, conduct environmental audits, and take legal action against violators of the medical waste regulations.[61] This makes it the legal backbone for ensuring that the procedures mandated by the 2021 Regulations are actually implemented. Furthermore, the National Environmental (Healthcare Waste Control) Regulations, 2021 enacted by NESREA mandates detailed, practical steps for controlling waste disposal at the source. The Regulation mandates the segregation of healthcare waste at the source using standardised colour-coded containers, directly controlling the issue of co-mingling.[62] and explicitly prohibits the open burning of healthcare waste.[63] Moreover, the Regulation requires that healthcare waste generators shall treat or cause to be treated hazardous waste using appropriate technology prior to final disposal, thereby preventing the disposal of untreated infectious materials.[64]

61 Akintububo Olaleye Steve, 'A Critical Analysis of the Legal Frameworks for Sustainable Solid Waste Management Practices in Nigeria' (2025) 7(1) *Chukwuemeka Odumegwu Ojukwu University Journal of Private and Public Law* 91.

62 National Environmental (Healthcare Waste Control) Regulations, 2021, reg 12.

63 ibid at reg 16(1)(d).

64 ibid at reg 28.

3.4 *The Harmful Wastes (Special Criminal Provisions) Act, 1988*

This Act provides a stringent criminal deterrent against the most egregious instances of improper disposal.[65] It was primarily enacted to curb the dumping of imported toxic waste and its scope is broad enough to cover certain hazardous components of medical waste.[66] The Act criminalises the carrying, depositing, dumping, or being in possession for the purpose of dumping any harmful waste on Nigerian land or territorial waters.[67] This law targets the most reckless and intentional forms of improper medical waste disposal, such as the indiscriminate burying or dumping of pathological or chemical waste.[68] The Act criminalises the act of carrying, depositing, or dumping any harmful waste into the land or territorial waters of Nigeria.[69] Furthermore, it prescribes heavy penalties, including life imprisonment, for anyone found guilty of illegally dumping harmful waste, underscoring the severity of the offence.[70]

3.5 *The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*

Nigeria ratified Basel Convention on May 24, 2004,[71] and it has the force of law under the country's legal system, primarily by controlling the movement of hazardous wastes.[72] The Convention ensures that hazardous medical wastes, such as pharmaceutical and cytotoxic waste, are not illegally imported into or exported from Nigeria.[73] It enforces the principle of Environmentally Sound Management (ESM), which must be applied to all regulated hazardous wastes, compelling the use of safe disposal technologies domestically. In otherword, the Convention imposes a general obligation on Nigeria to ensure that the generation of hazardous wastes is reduced to a minimum and that they

65 Enakireru Eric Omo & Ekott U. D., 'Interrogating the Legal Regimes on Transboundary Hazardous Waste Dumping in Nigeria' (2024) 1 *Novena University Environmental Law Review* 12.

66 ibid.

67 The Harmful Wastes (Special Criminal Provisions) Act, 1988, s 1.

68 Enakireru & Ekott (n65) 13.

69 The Harmful Wastes (Special Criminal Provisions) Act, 1988, s 1(1).

70 ibid at s 6(2).

71 Emeka Aginam, 'Nigeria: E-Waste Concern Re-Echoes at Clean Environment Forum' (2010) <http://allafrica.com/stories/201008180100.html> accessed 12 November 2025.

72 The National Environmental Standards and Regulations Enforcement Agency (NESREA) (Establishment) Act, 2007, s 7(c).

73 Enakireru Eric Omo & Ekott U. D., 'Trans-Boundary Movement of Hazardous Waste in Africa: Interrogating the Basel and Bamako Convention' (2025) 2(3) *Fountain University Law Journal* 310-311.

are managed in an ESM.[74] Additionally, it regulates the international transfer of hazardous wastes, preventing Nigeria from being used as a dumping ground for clinical or pharmaceutical waste from other countries.[75]

4. The Challenges of Controlling Inappropriate Medical Waste Disposal in Nigeria

Controlling the inappropriate disposal of medical waste in Nigeria is hampered by a complex interplay of systemic, regulatory, and financial challenges, despite the existence of a detailed legal framework, the following elucidate the core reasons for this persistent difficulty.

4.1 *Inadequate Enforcement and Institutional Overlap*

The difficulty in controlling medical waste stems from inadequate enforcement capacity and institutional overlap among key regulatory bodies. While the NESREA Act grants the National Environmental Standards and Regulations Enforcement Agency (NESREA) the power to enforce regulations,[76] the lack of adequate funding, insufficient personnel for nationwide monitoring, and limited coordination with state-level environmental protection agencies (SEPAs) mean that illegal practices, such as open dumping and burning, often go unpunished.[77] This regulatory fragmentation weakens the intended deterrent effect of statutes like the Harmful Wastes (Special Criminal Provisions) Act (1988).[78]

4.2 *Financial Constraints and High Treatment Costs*

Financial constraints severely limit the adoption of environmentally sound disposal practices.[79] Compliance with the National Environmental (Healthcare Waste Control) Regulations, 2021, requires significant investment in appropriate treatment technologies (e.g., autoclaves, non-incineration systems,

74 The Basel Convention, art 4(2).
75 ibid at art 6.
76 Eze, A. O., 'Healthcare Waste Management in Nigeria: A Review' (2023) 7(6) *Ecology and the Environment* 11.
77 ibid.
78 Enakireru & Ekott (n65) 13.
79 Abaineh Kefale Gashaw, Sekhar Pitta & Leta Diro Jifera, 'Assessment of Medical Waste Generation, Disposal Practices and Health Implications at Bule Hora University Teaching Hospital, West Guji, Ethiopia' (2025) 4(91) *Discover Health Systems* 1.

or regulated incinerators) and specialized transportation.[80] However, many public and private healthcare facilities, particularly smaller clinics and those in rural areas (including those mentioned in the initial context like home treatment providers and acupuncturists), lack the necessary capital, often choosing cheaper, illegal methods like open burning or co-mingling with municipal solid waste to save costs.[81]

4.3 *Low Awareness and Behavioural Non-Compliance*

Significant barrier is the low level of awareness and poor attitude toward waste segregation among healthcare staff.[82] Despite the National Healthcare Waste Management Policy (2013) and the 2021 Regulations mandating segregation and training, some personnel-from doctors and nurses to cleaners-often consistently not separate sharps, infectious, and general waste at the point of generation.[83] This initial breakdown in the process contaminates the entire waste stream, rendering subsequent control efforts ineffective and making proper treatment virtually impossible.[84]

4.4 *Absence of Functional Centralised Treatment Infrastructure*

Absence of a functional, accessible, and centralised waste treatment infrastructure is a major systemic impediment.[85] For the vast number of small-to-medium generators-including laboratories, veterinary centres, and blood

80 Idorenyin Utip, Anne Krayer & Sion Williams, 'Waste Handlers' Health and Experiences of Healthcare Waste Management in a Lassa Fever Treatment Centre in Nigeria' (2025) 9 *Global Health Journal* 38.

81 ibid.

82 Innocent A. Nwosu, Joseph O. Ekpechu , Vivian C. Njemanze, Bukola Semidara, Emmanuel C. Eyisi, Ben Ohuruogu , Patricia E. Nwazonobi, Ubong N. Umanah, Willie C. Clement, Christian O. Aleke & Charles N. Okoli, 'Assessment of Awareness, Attitude, and Consequences of Healthcare Waste Among Health Workers at Health Facilities in Southeast Nigeria' (2024) <10.1177/21582440241229598> accessed 13 November 2025.

83 Olabosoye Peter Oladeji , Olowolafe Tubosun Alex, Olanrewaju John Adedayo, Makinde Mayowa, Amoo Olakunle & Awogbade Henry Adetayo. 'Assessing the knowledge and Practices of Healthcare Workers at Osun State University Teaching Hospital (OSUTH) Regarding Healthcare Waste Management' (2025) 5(6) *Journal of Applied Health Sciences and Medicine* 25.

84 Chikwendu Amaike, Oluwatolami Victoria Olomojobi, Inioluwa Olusona, Goodness Erinayo Omoworare, Ololade Olu-Osayomi & Somtochukwu Ononuju, 'Healthcare Waste Management in Southwest Nigeria: A Cross-Sectional Study Among Healthcare Workers in a Private Tertiary Hospital' (2025) <https://www.one-health.panafrican-med-journal.com/content/article/16/12/full> accessed 13 November 2025.

85 Farwa Nisar & Shaherbano Rizvi, 'A Systematic Review of Health Care Waste Management Practices and their Impact on Environmental Performance in Developing Countries' (2025) 8(2) *Review of Applied Management and Social Sciences* 797.

banks-it is uneconomical and impractical to own individual treatment equipment.[86] Where specialised facilities are absent or poorly managed, facilities have no option but to revert to inappropriate disposal,[87] directly undermining the goals of the EIA Act, which aims to ensure the environmental soundness of disposal infrastructure.[88]

4.5 *Weak Monitoring and Data Collection*

The control efforts are compromised by weak national monitoring systems and unreliable data collection.[89] There is a lack of accurate, up-to-date information on the actual volume, composition, and disposal pathways of medical waste generated across all States.[90] This data deficit makes it difficult for NESREA and State authorities to effectively plan treatment capacity, allocate enforcement resources, and measure compliance rates against the standards set by the NESREA Act rendering regulatory oversight largely reactive rather than preventative.[91]

4.6 *Logistical Challenges in Waste Transportation*

The logistical challenge of safe transportation contributes significantly to inappropriate disposal. The safe movement of hazardous infectious waste from diverse generating sources to distant treatment facilities is difficult due to poor road networks and the high risk of accidents or spillage if transport vehicles are not specialized or properly managed.[92] Where safe transport is unreliable or too costly, facilities are incentivised to dispose of waste locally and improperly,[93] directly violating the containment protocols intended by the National Environmental (Sanitation and Waste Control) Regulations, 2009.[94]

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86 Samuel Dare Oluwagbayide, Francis Olawale Abulude, Akinyinka Akinnusotu & Kikelomo Mabinuola Arifalo, 'The Relationship between Waste Management Practices and Human Health: New Perspective and Consequences' (2025) 4(1) *Indonesian Journal of Innovation and Applied Sciences* 29.

87 Abubakar-Otaru, Miya & Bello (n21) 66.

88 Aliyu, Clark & Hardman (n57) 323.

89 Izuchukwu Precious Obani, Zino Izu Obani, Frank Chudi Anaeto & Theresa Ojevwe Akroh, 'Public-Private Collaborations in Waste Management: Evaluating Policy Effectiveness and Governance Models in Nigeria' (2025) 3(2) *Journal of Integrity in Ecosystems and Environment* 26.

90 ibid.

91 NESREA (n59).

92 Nwosu (n5) 33.

93 ibid.

94 Cynthia Amaka Obiorah, Okeke Gerald Ndubuisi, Sony Emeka Ali, Ugah Theophilus Aku, Omatseyione Nesiama, Cletus Onyemhese Agbakhamen & Sulaiman Abubakar Gumi, 'The Role of Law in Environmental Conservation: Regulation, Enforcement, and Compliance' (2025) 13(2) *International Journal of Innovative Legal & Political Studies* 39.

4.7 *Jurisdictional Conflict and Constitutional Ambiguity*

There exists a degree of ambiguity and jurisdictional conflict in environmental health matters, severely complicating the control of medical waste, despite the existence of the Constitution of the Federal Republic of Nigeria, 1999 (as amended).[95] While the Federal Government, through the National Environmental Standards and Regulations Enforcement Agency (Establishment) Act, 2007, claims broad powers to set and enforce environmental standards nationwid,[96] the Constitution's assignment of environmental responsibilities is less clear, leading to overlapping and sometimes contradictory mandates. The Federal Government generally controls matters related to 'mines and minerals, including oil fields' and 'maritime shipping'.[97] This allows it to address transboundary waste issues (like the Basel Convention) and set national pollution standards (through NESREA).[98] Moreover, matters concerning 'public health', 'sanitation', and the day-to-day 'refuse disposal' and environmental health functions often fall under the Concurrent and Residual Legislative Lists, making them a joint responsibility or primarily the domain of State and Local Governments.[99]

While the Federal Government legislates and enforces high-level standards (e.g., the National Environmental (Healthcare Waste Control) Regulations, 2021), the licensing and daily management of the public health facilities (the waste generators) and the provision of local infrastructure (collection, transfer stations) often fall to state authorities.[100] This paper posits that this lack of clear, unambiguous demarcation of financial and operational responsibility for the entire waste management chain creates gaps. States may resist funding expensive treatment infrastructure, arguing that environmental standards are a Federal mandate, while Federal agencies lack the localised resources to monitor every healthcare facility. This systemic gap is readily exploited by

95 Nyekwue, P. E., 'A Legal Assessment of the Impact of the Improper Disposal of Medical Waste in Nigeria' (2021) 12(1) *Nnamdi Azikiwe University Journal of International Law and Jurisprudence* 31.

96 The National Environmental Standards and Regulations Enforcement Agency (NESREA) (Establishment) Act, 2007, s 7.

97 Constitution of the Federal Republic of Nigeria, 1999 (as amended), items 36 and 31 on the Exclusive Legislative List, Second Schedule.

98 Enakireru & Ekott (n73) 311.

99 Constitution of the Federal Republic of Nigeria, 1999 (as amended), Fourth Schedule.

100 Adekunle, A. A., 'Institutional and Legal Framework for Environmental Management in Nigeria' (2019) 3(1) *Nigerian Journal of Environmental Sciences and Technology* 11.

non-compliant generators who can escape rigorous regulation due to the resulting confusion and limited oversight.

5. Conclusion

This article commenced by establishing the gravity and complexity of the problem. The introduction of this paper affirmed that medical waste management constitutes a significant global public health challenge. It argued that Nigeria's crisis is driven by the widespread co-mingling of infectious and domestic waste streams. This perilous practice is compounded by the high diversity of generators from large hospitals to informal home-care providers and its direct consequence is the exposure of vulnerable waste pickers and the risk of contaminated materials re-entering the consumer market.

The subsequent discussion detailed the primary non-compliant practices, including open dumping, open burning which releases highly toxic dioxins and furans and the fundamental failure of segregation. The article confirmed that these practices directly result in pervasive environmental contamination across Nigeria's air, water, and land, contributing directly to the transmission of pathogenic agents such as bacteria, viruses, and fungi, thus severely impacting public health.

The paper then provided a detailed analysis of the legal framework on controlling medical waste disposal in Nigeria. This section demonstrated that the nation possesses a robust legal edifice, structurally anchored in the Constitution of the Federal Republic of Nigeria, 1999 (as amended). This constitutional foundation is given practical effect through key instruments such as the EIA Act which mandates assessment for relevant projects, NESREA Act, the Harmful Wastes (Special Criminal Provisions) Act (1988), and Basel Convention on the Control of Transboundary Movements of Hazardous Wastes on the Ban on the Import into Africa. Furthermore, it established that Nigeria's judicial activism, supported by obligations under the African Charter, renders the failure to control this hazard a potential violation of fundamental human rights.

However, the comprehensive analysis culminated in the findings on the difficulty of controlling inappropriate medical waste disposal in Nigeria. This section revealed that regulatory failure is rooted not in a lack of law, but in

systemic operational deficiencies. The core difficulties identified included insufficient resource allocation leading to weak enforcement, the critical lack of affordable, centralised treatment infrastructure, profound financial constraints on healthcare facilities, critical failures in staff awareness and source-level segregation, and persistent jurisdictional ambiguities between Federal and State authorities.

In response to these identified findings, the article presented seven actionable recommendations. These solutions focused on practical implementation strategies, including the decentralisation and self-financing of NESREA's enforcement capacity, the establishment of subsidised, regional centralised treatment facilities, the institutionalisation of continuous mandatory staff training, and the clarification of legislative responsibilities to close regulatory loopholes. The ultimate goal is to enforce a strict 'No-Segregation, No-Collection' policy and harness the criminal deterrent provided by the Harmful Wastes Act.

In summary, this assessment concludes that while the legal framework for controlling medical waste in Nigeria is robust, its efficacy is critically undermined by deep-seated institutional, financial, and infrastructural inadequacies. The persistent gap between legislative intent and practical compliance can only be bridged through concerted strategic investment in decentralised enforcement, affordable and accessible regional treatment infrastructure, mandatory professional training, and the complete resolution of inter-governmental jurisdictional conflict. Without the comprehensive and committed adoption of these operational and policy recommendations, the hazards posed by inappropriate medical waste disposal will continue to threaten the environmental integrity and public health of Nigeria.

6. Recommendations

Based on the findings regarding inappropriate disposal methods, the following recommendations are crucial for improving medical waste control and mitigating associated environmental and health hazards in Nigeria.

6.1 *Strengthen NESREA's Enforcement Capacity through Decentralisation and Funding*

The challenge of inadequate enforcement, identified as a major difficulty, necessitates a strategic boost to the National Environmental Standards and Regulations Enforcement Agency (NESREA). It is recommended that NESREA's enforcement capacity be decentralised by mandating and adequately funding State Environmental Protection Agencies (SEPAs) and Local Government authorities to conduct regular, unannounced compliance checks on all healthcare facilities, laboratories, and other generating points. Furthermore, a portion of the fines collected from non-compliant facilities should be reinvested directly into local enforcement and monitoring activities, thereby creating a financially self-sustaining regulatory loop. This will address the persistent issue of illegal practices like open dumping and open burning.

6.2 *Establish and Subsidise Regional Centralised Treatment Facilities*

To overcome the financial and logistical constraints faced by numerous small-to-medium generators, the government, in partnership with the private sector, must establish strategically located regional centralised medical waste treatment facilities. These facilities should employ environmentally sound technologies (non-incineration methods like autoclaving or microwaving) as mandated by the National Environmental (Healthcare Waste Control) Regulations, 2021. Critically, the government should offer subsidised collection and treatment rates for low-volume generators (e.g., small clinics, dentists, home treatment providers) to make legal disposal significantly cheaper and more convenient than illegal methods, eliminating the financial incentive for non-compliance.

6.3 *Institute Mandatory and Continuous Training for All Healthcare Personnel*

Addressing the finding on low awareness and behavioural non-compliance requires a mandatory, structured training programme. It is recommended that the Federal Ministry of Health, in collaboration with NESREA, institute continuous and compulsory training and certification for all healthcare staff, including administrative staff, nurses, laboratory technicians, and cleaners, focusing intensely on waste segregation at source (colour-coding, proper sharps containment). The renewal of facility operating licenses should be made conditional upon proof of such training and high compliance rates,

directly enforcing the mandate of the National Healthcare Waste Management Policy (2013).

6.4 *Resolve Constitutional and Jurisdictional Ambiguity*

To eliminate gaps exploited by non-compliant generators, the Federal and State Governments must urgently clarify and streamline the financial and operational responsibilities for medical waste management. It is recommended that an Inter-Ministerial/Inter-Governmental Task Force be established to clearly define the role of NESREA (setting standards and prosecuting major violations) and that of the State/Local Governments (day-to-day collection, site licensing, and local enforcement of sanitation standards). This action aligns with the constitutional objective of environmental protection by ensuring no facility can evade responsibility through jurisdictional confusion.

6.5 *Enforce the 'No-Segregation, No-Collection' Policy*

To directly tackle the widespread practice of co-mingling, a strict enforcement mechanism is necessary. It is recommended that all licensed waste transporters be legally required to adopt and strictly enforce a 'No-Segregation, No-Collection' policy. Under this rule, transporters must refuse to collect waste that is not properly segregated and contained. Repeat violations should result in escalating fines against the generating facility and, ultimately, the suspension of their operating license, thereby providing a powerful, immediate economic and operational incentive for compliance.

6.6 *Establish a Centralised National Healthcare Waste Data Registry*

To combat weak monitoring and data collection, it is recommended that a Centralised National Healthcare Waste Data Registry be established under the supervision of NESREA. This digital platform should mandate all healthcare facilities to report their weekly waste generation volumes, treatment methods, and final disposal pathways. This accurate data collection will enhance monitoring, allow authorities to proactively identify high-risk generators, and facilitate the planning of future infrastructure development required to meet the demands of the EIA Act (2004).

6.7 *Implement the Full Deterrent Force of the Harmful Wastes Act*

Given the severe nature of environmental contamination and infectious risks posed by improper disposal, it is recommended that the full punitive power of

the Harmful Wastes (Special Criminal Provisions) Act, 1988, be aggressively applied to egregious cases of deliberate dumping and illegal trafficking of infectious medical waste (e.g., selling contaminated sharps for reuse). Applying the severe sanctions prescribed by this Act will serve as a robust criminal deterrent, far beyond administrative fines, sending a clear message that endangering public health through medical waste crime will not be tolerated.