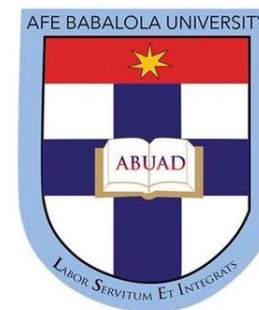




The Journal of Sustainable Development Law and Policy



ISSN: 2467-8406 (Print) 2467-8392 (Online) Journal homepage: <https://www.ajol.info/index.php/jsdlp>

Healthcare Waste Management Policy in a Lower-Middle-Income Country: A Case for the Adoption of the RADICAL Framework

Leroy C. Edozien

To cite this article: Leroy C. Edozien (2024). Healthcare Waste Management Policy in a Lower-Middle-Income Country: A Case for the Adoption of the RADICAL Framework. *The Journal of Sustainable Development, Law and Policy*. Vol. 15:1. 81-105, [DOI:10.4314/jsdlp.v15i1.3](https://doi.org/10.4314/jsdlp.v15i1.3)

To link this article: DOI: [10.4314/jsdlp.v15i1.3](https://doi.org/10.4314/jsdlp.v15i1.3)



Received: 6 September, 2023;

Final Version Received: 20 November, 2023;

Published online: 30 January, 2024

Full Terms & Conditions of access and use can be found at <https://www.ajol.info/index.php/jsdlp>

HEALTHCARE WASTE MANAGEMENT POLICY IN A LOWER-MIDDLE-INCOME COUNTRY: A CASE FOR THE ADOPTION OF THE RADICAL FRAMEWORK

Leroy C. Edozien*

ABSTRACT

The COVID-19 pandemic raised the salience of Healthcare Waste Management (HCWM). Various studies have shown that the level of HCWM in lower-middle-income countries falls below international standards and global best practice, indicating that the national policy on HCWM is either non-existent or has not been embedded in practice. The renewed salience affords an opportunity to revisit, update and embed the national policy on HCWM. In seizing this opportunity, the elemental thinking must change from a linear model to the complex adaptive model that takes account of the inter-relationships and contextual factors that could impede or facilitate implementation of the policy. These complexities account for the ‘policy-implementation gap’ associated with policy failure. This paper presents a framework that could be applied in developing, implementing, and monitoring the national HCWM policy in a lower-middle-income country. The integrative framework, identified by the acronym RADICAL, comprises the following domains in an integrated grid: **R**aise awareness; **A**pply formal quality improvement methods; **D**esign for quality and safety; **I**nvolve stakeholders; **C**ollect and **A**nalyse pertinent data; **L**earn from shared experience. The pertinence of each domain to HCWM is described.

Keywords: Healthcare Waste Management (HCWM), Nigeria, RADICAL Framework.

1. INTRODUCTION

Healthcare waste is all the waste generated within healthcare facilities, research centres, laboratories, and homes during medical procedures. Alongside other effects, the COVID-19 pandemic renewed attention to Healthcare Waste Management (HCWM).¹ When the spotlight is shone on HCWM in low-middle-income countries, glaring deficiencies abound. Various studies² published before and during the pandemic show that

* LLB MBBS PhD FRCOG FWACS. Affiliation: Professor & Director, Institute of Advanced Clinical Studies, University of Medical Sciences, Ondo City, Nigeria. Email: ledozien@unimed.edu.ng Address: Institute of Advanced Clinical Studies, University of Medical Sciences, Laje Road, Ondo City, Ondo State, Nigeria. ORCID details: <https://orcid.org/0000-0002-1815-730>

¹ Mmemek-Abasi Etim, David O. Omole & Oyindamola V. Araoye, 'Impact of COVID-19 on medical waste management and disposal practices in Nigeria' (2022) 9 *Cogent Engineering* 1 doi: 10.1080/23311916.2022.2038345

² SA Omoleke, N Usman, KK Kanmodi, MM Ashiru, 'Medical waste management at the primary healthcare centres in a northwestern Nigerian State: Findings from a low-resource setting' (2021) 2 *Public Health in Practice* 100092; I Ezirim, F Agbo, Role of National Policy in Improving Health Care Waste Management in Nigeria (2018) 8 *Journal of Health & Pollution* 180913; AO Adeoye, EA Akande, A Lateef, Impacts of hospital waste management on the health and environment of Ogbomoso area, Oyo State (2018) 2 *Hospice & Palliative Medicine International Journal* 386-389. doi: 10.15406/hpmij.2018.02.00130; O Awodele, AA Adewoye, AC Oparah, Assessment of medical waste management in seven hospitals in Lagos, Nigeria (2016) 16 *BMC Public Health* 269; AO Sowande, KE Amaefule, J Pearson, I Iyortim, Healthcare waste management in low resource countries: Nigeria experience (2014) 10 *International Journal of Infection Control [Internet]* 1–4; JO Babatola, A study of hospital waste generation and management practice in Akure, Nigeria. (2008) 2 *African Research Review [Internet]* 292–305; Y Chartier, J Emmanuel, U Pieper, et al, (eds) *Safe management of wastes from health-care activities* (2nd ed. Geneva, Switzerland: World Health Organization; 2014), 329. A Oli, CC Ekejiindu, D Adje, I Ezeobi, O Ejiofor, C Ibeh, CF Ubajaka, Healthcare waste management in selected government and private hospitals in Southeast Nigeria (2016) 6.1 *Asian Pacific Journal of Tropical Biomedicine* 84-89 DOI:10.1016/J.APJTb.2015.09.019

the level of HCWM falls below international standards and global best practice. A review by Ezeudu and colleagues³ found that there are no available nationally documented data on healthcare waste characterization in Nigeria and that waste segregation, in facilities where it was practised, did not comply with WHO guidelines.

There is a pressing need to implement sustainable HCWM in low-middle-income countries, to prevent harm to patients, health care workers and the community at large. This paper focuses on the Nigerian context, but its precepts are generalizable to all low-middle-income countries.

‘Sustainable waste management’ promotes reusing, recycling, or recovering materials as many times as possible before they reach the end of their useful life.⁴ It also ensures that any waste generated is kept to a minimum and is disposed of in a manner that minimizes environmental harm. The starting point in creating a sustainable healthcare waste management system for any country is the national HCWM policy.⁵ Nigeria has had a national policy on HCWM since 2013. The policy, developed in collaboration with the United States Agency for International Development (USAID), is accompanied by a Guideline and an Implementation Plan but these documents are not widely available.⁶ Nevertheless, a survey found that 44.8%

³ OB Ezeudu, TS Ezeudu, UC Ugochukwu, IT Tenebe, AP Ajogu, UV Nwadi, CC Ajaero, ‘Healthcare Waste Management in Nigeria: A Review’. 2022, 7(6) Recycling 87

⁴ The Global Fund, Technical Brief: Sustainable Health Care Waste Management. (The Global Fund, Geneva. February 2020) 6

⁵ United Nations Environment Programme. Basel Convention. Basel declaration of environmentally sound management of waste (Basel, Switzerland. Secretariat of the Basel Convention; 1999).

⁶ World Health Organisation, Preparation of National Healthcare Waste Management Plans in sub-Saharan countries. Guidance manual (Secretariat of the Basel convention and World Health Organization 2005)<<https://iris.who.int/>

of 1921 health facilities across Nigeria had healthcare waste management work plans adapted from the 2013 national policy.⁷

Prior to 2021, there were laws and regulations on waste management generally but no legislation specifically dealing with HCWM in Nigeria. In April 2021, the National Environmental (Healthcare Waste Control) Regulations, 2021 were published by the Federal Ministry of Environment.⁸ The document covered the handling and treatment of healthcare waste, and had provisions regarding enforcement, offences, and penalties. It is limited in scope to the storage and transportation of healthcare waste, does not address, reduction, reuse, and recycling (see definition of ‘sustainable waste management’ above), and contains no provisions relating to education and training. Regulations are different from policies; the former are prescriptive while the latter are more about embedding good practice and less about punishment. Ideally, policy should be articulated first, to be followed by primary or secondary legislation.

As observed by one commentator, however, the ‘extant laws (both at the national and state levels) are not deficient or short of policies and regulations on waste management. Our problem is lack of (effective) enforcement of the extant laws and policies’.⁹ Enforcement of extant laws and policies falls under

[bitstream/handle/10665/43118/924154662X.pdf?sequence=1](https://www.federalregister.gov/documents/2021/04/22/2021-08104-national-environmental-healthcare-waste-control-regulations) accessed 1 November 2023.

⁷ I Ezirim, F Agbo, ‘Role of National Policy in Improving Health Care Waste Management in Nigeria’ (2018) 8 *Journal of Health & Pollution* 180913

⁸ Federal Republic of Nigeria, National Environmental (Healthcare Waste Control) Regulations, (2021) 108 70 *Official Gazette*

⁹ Bolaji Ramos, ‘Waste Management in Nigeria through Effective Policy: Strengthening the Legal Framework. Paper presented by Bolaji Ramos at the Lagos Climathon 2018 on 26th October, 2018 at LASEPA Hall, LASEPA, Alausa Secretariat, Ikeja, Lagos. Available at <Waste Management in Nigeria through

Phase 3 of the implementation process as characterised by Ilott et al¹⁰: Phase 1: Rising Salience: The issue gains the attention of policymakers. Phase 2: Building Blocks: The policies, institutions, and targets are established. Phase 3: Embedding: The policy is mainstreamed but political attention to it wanes, except in the few cases of long-term success. The authors state that ‘this third phase is where poorly designed long-term strategies are often exposed’.¹¹

Public policy failure is attributable to a wide range of inter-related factors, such as deficiencies in methods of implementation, leadership, stakeholder engagement, training, and accountability. Fundamentally, to tackle the ‘policy-implementation gap’ there should be a shift from the traditional linear model of thinking to the complex adaptive model. Hudson and colleagues define the ‘rational-linear model of decision making’ as one ‘in which unambiguous objectives are established, action upon them flows in predictable and unidirectional ways through established implementation structures, and outcomes are monitored against them’.¹² The Health Foundation defines complex adaptive systems as ‘a way of thinking about and analysing things by recognising

Effective Policy: Strengthening the Legal Framework – Bolaji Ramos - DNL Legal and Style accessed 1 November 2023.

¹⁰ O Ilott, J Randall, A Bleasdale, E Norris, Making Policy Stick: Tackling Long-Term Challenges in Government. (London: Institute for Government, 2016, 6-7). Available at <2016-IfG-Making_Policy_Stick.pdf (civilservant.org.uk)> accessed 1 November 2023

¹¹ Ilott, 13

¹² B Hudson, DJ Hunter, S Peckham, ‘Policy failure and the policy-implementation gap: can policy support programs help? (2019) Policy Design and Practice’ 1-14 < Policy failure and the policy-implementation gap: can policy support programs help? (tandfonline.com)> Accessed 1 November 2023

complexity, patterns and interrelationships rather than focusing on cause and effect'.¹³

This paper presents a framework that could be applied for national HCWM policy at all levels, from the shelves of government offices to the shopfloor of health care facilities. The framework is integrative rather than linear (Figure 1) and draws from complex adaptive thinking. It is posited that adoption of this framework could facilitate Phase 3 (embedding) of the HCWM policy implementation and encourage a holistic approach to healthcare waste management.

2. THE RADICAL FRAMEWORK

The framework, identified by the acronym RADICAL, comprises the following domains in an integrated grid: **R**aise awareness; **A**pply formal quality improvement methods; **D**esign for quality and safety; **I**nvolve stakeholders; **C**ollect and **A**nalyse pertinent data; **L**earn from shared experience. It was originally conceived as a means of facilitating an integrative approach to the implementation, monitoring, and reporting of risk management in healthcare settings,¹⁴ and was described as 'a substantial contribution to safer clinical practice and organisational learning'¹⁵. RADICAL emphasises the links between domains; these links are as important as the domains

¹³ The Health Foundation, Evidence Scan: Complex Adaptive Systems. (Health Foundation; London. 2010, 6)

¹⁴ LC Edozien, 'The RADICAL framework for implementing and monitoring healthcare risk management (2013) 18 Clinical Governance: An International Journal 165-175 <https://doi.org/10.1108/14777271311317945> accessed 1 November 2023. LC Edozien, 'Mapping the patient safety footprint: The RADICAL framework' (2013) 27 Best Pract Res Clin Obstet Gynaecol 481-8. doi: 10.1016/j.bpobgyn.2013.05.001.

¹⁵ Harrop N, Alan Gillies A, 'Is clinical governance a black box?' (2013) 27 Clinical Governance: An International Journal 18 <https://doi.org/10.1108/cgij.2013.24818baa.001> accessed 1 November 2023

themselves. This emphasis on inter-relationships and inter-dependence is intrinsic to a complex adaptive system. The framework challenges service providers to not only address each domain but also show how each domain has informed, and been informed by, other domains. It has foundations in schema theory.¹⁶ A schema is a cognitive framework or concept that helps organise and interpret information, including information about relationships between objects, situations, events, and actions. Schemas facilitate comprehension and interpretation of data as well as recognition of inter-relationships between domains. The RADICAL framework has not previously been applied to the management of healthcare waste and, for the first time, the sections below describe this potential application. The framework is applicable in all three phases of the policy implementation process referred to above: Phase 1 – building salience; Phase 2 – articulating policy; Phase 3 – embedding policy in practice.

2.1 Raise awareness

Various studies show that the knowledge and practice of health professionals and health facility workers in Nigeria in respect of HCWM fall below expected standards, and there is an acute need to raise awareness in this regard.¹⁷ This applies across sectors (public and private health care facilities) and care levels

¹⁶ Themantic Education. Schema Theory: A Summary. <https://www.themantic-education.com/ibpsych/2017/11/29/schema-theory-a-summary> accessed 1 November 2023

¹⁷ JO Makanjuola, UI Ekowmenhenhen, LL Enone, et al, 'Mercury hygiene and biomedical waste management practices among dental health-care personnel in public hospitals in Lagos State, Nigeria' (2021) 21 *Afr Health Sci* 457-469. doi: 10.4314/ahs.v21i1.56; I Idowu, B Alo, W Atherton, R Al Khaddar, 'Profile of medical waste management in two healthcare facilities in Lagos, Nigeria: a case study' (2013) 31 *Waste Man Res* 494-501 doi: 10.1177/0734242X13479429

(primary, secondary, or tertiary). Omoleke and colleagues,¹⁸ assessing knowledge and practice at primary health centre level, found that most of their study participants did not understand the color-coding system in HCWM. A study conducted in 52 private healthcare facilities in Abuja (capital city of Nigeria) showed that about 83 % of waste handlers were not trained properly on how to manage healthcare waste and 60 % did not use any form of personal protective equipment.¹⁹ A cross-sectional survey conducted in 2016 of respondents representing 54 health care facilities from 13 Local Government Areas in Ebonyi state, showed that only 1 out of 54 respondents had ‘appropriate knowledge of HCWM, and only 22 (40%) had received some forms of HCWM training.’²⁰

At the Federal Teaching Hospital Abakaliki, a referral centre for the management of viral haemorrhagic fevers (Ebola, Lassa, etc), the proportion of cleaning staff with good knowledge of HCWM was found to be 41.5% and only 57.3% of the respondents had received HCWM training.²¹ Based on the finding of knowledge and practice deficits, the authors of a study of mercury hygiene and biomedical waste management

¹⁸ SA Omoleke, N Usman, KK Kanmodi, MM Ashiru, ‘Medical waste management at the primary healthcare centres in a northwestern Nigerian State: Findings from a low-resource setting’ (2021) 2 *Public Health in Practice* 100092 <https://doi.org/10.1016/j.puhip.2021.100092>

¹⁹ AA Oyelayo, J Anokwu, ‘Healthcare Waste Management Among Private Healthcare Facilities in Abuja Municipal Area Council, Nigeria’ (2020) 6 *Dutse Journal of Pure and Applied Sciences* 92-102. Available at [https://fud.edu.ng/journals/dujopas/2020_Vol6_3/16%20edited\(1\).pdf](https://fud.edu.ng/journals/dujopas/2020_Vol6_3/16%20edited(1).pdf) accessed 1 November 2023

²⁰ OB Anozie, LO Lawani, JN Eze, et al, ‘Knowledge, Attitude and Practice of Healthcare Managers to Medical Waste Management and Occupational Safety Practices: Findings from Southeast Nigeria.’ (2017) 11 *J Clin Diagn Res. IC01-IC04*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5427335/pdf/jcdr-11-IC01.pdf> accessed 1 November 2023

²¹ RC Onoh, AS Adeke, CD Umeokonkwo, et al, ‘Knowledge and practices of health-care waste management among health workers in Lassa fever treatment facility in Southeast Nigeria’ (2019) 60 *Nigerian Med J* 257-61

practices among dental health-care personnel in public hospitals in Lagos State, Nigeria, proposed that universities should compulsorily integrate HCWM as part of undergraduate curriculum for dental students, dental nurses and therapists; they also recommended the organisation of continuing medical education and extensive training programmes for all health care staff to update existing knowledge about HCWM.²² There is evidence from Tunisia²³ and Pakistan²⁴, lower-middle-income countries, that training programmes for health care staff results in improved knowledge, attitudes and practice.

In a nutshell, there are knowledge deficits and unmet training needs in respect of HCWM in Nigeria and other lower-middle-income countries. National and local HCWM policies should recognise and address these. Elaboration of a model training curriculum for HCWM is beyond the scope of this paper. There are established training manuals and resources. These include the World Health Organisation (WHO) manual,²⁵ the

²² JO Makanjuola, UI Ekowmenhenhen, LL Enone, et al, 'Mercury hygiene and biomedical waste management practices among dental health-care personnel in public hospitals in Lagos State, Nigeria' (2021) 21 *Afr Health Sci.* 457-469 doi: 10.4314/ahs.v21i1.56

²³ MB Jmaa, HB Ayed, MB Hmida, et al, 'Effectiveness of a Training Intervention about Healthcare Waste Management on the Knowledge and Practical Skills of Healthcare Professionals in a Teaching Hospital of Southern Tunisia' (2021) *Hospital Topics* 1-10. doi: 10.1080/00185868.2021.1969307

²⁴ R Kumar, R Somrongthong, BT Shaikh, 'Effectiveness of intensive healthcare waste management training model among health professionals at teaching hospitals of Pakistan: a quasi-experimental study' (2015) 15 *BMC Health Serv Res* 81 doi: 10.1186/s12913-015-0758-7.

²⁵ World Health Organisation. Training modules in health-care waste management. (World Health Organisation, undated). Available at: [https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health-\(wash\)/health-care-facilities/health-care-waste/training-modules](https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health-(wash)/health-care-facilities/health-care-waste/training-modules) Accessed 1 November 2023

manual published by the Kenya Ministry of Health,²⁶ and the manual prepared for the United Nations Industrial Development Organisation (UNIDO) in respect of a HCWM project in India.²⁷

Apart from raising awareness through the training of health practitioners, national policy should also address the need to raise awareness among the lay public. By raising awareness, application of the RADICAL framework could help maintain the salience of HCWM – in other words, promote Phase I of the process outlined by Ilott et al.²⁸ There is interconnectedness between this domain (Raising awareness) and other domains in the RADICAL framework, particularly ‘Design for quality and safety’ and ‘Involve stakeholders’ described below.

2.2 Apply formal quality improvement methods

The embedding of national policy on HCWM will require sustained change in individual and organisational behaviour. Such change does not just happen by chance; it must be proactively secured, and appropriate methods must be employed in order to achieve the desired outcomes. This was recognised decades ago in the manufacturing industry but only recently in the healthcare sector. Poorly planned initiatives often turn out to be mere tick box exercises, but well-designed

²⁶ Ministry of Health, Government of Kenya. Guide for Training Health Workers in Health Care Waste Management. (Ministry of Health, Government of Kenya, April 2015) Available at: <Guide for Training Health Workers in Health Care Waste Management (path.org)> accessed 1 November 2023

²⁷ United Nations Industrial Development Organisation (UNIDO). Training Manual on Biomedical Waste Management for Doctors, Nurses, Nodal Officers and Waste Handlers. (United Nations Industrial Development Organisation (UNIDO), 2018). Available at: <4.-doctorss-manual.pdf (moef.gov.in)> accessed 1 November 2023

²⁸ Ilott, no.8 above

interventions have been shown to produce demonstrable benefits.²⁹

A range of quality improvement (QI) methods has been devised, researched, and refined.³⁰ The features common to the various methods include clear, specific definition of the desired improvement, stakeholder ownership, structured approach, the use of measurements and tracking of progress. QI methods could be applied to achieve any or all the 3Rs of HCWM: reduce, reuse, and recycle. For example, at the King Faisal Specialist Hospital and Research Centre, a Lean Six Sigma approach was employed in reducing biomedical waste.³¹ In the United States, a quality improvement project titled ‘Sharps and Bio-Medical Waste Disposal at Surgery Center of Fairfield County: Improving Environmental Impact and Cost’ resulted in a 43% reduction in sharps and biomedical waste, with concomitant cost savings, and the project was awarded the 2020 Bernard A. Kershner Innovations in Quality Improvement Award by the Accreditation Association for Ambulatory Health Care (AAAHC) Institute.³²

To bridge the policy-implementation gap, the national policy on HCWM should incorporate the use of formal QI methods

²⁹ KL Strom, ‘Quality improvement interventions: what works?’ (2001) 23 *J Healthc Qual* 4-14 doi: 10.1111/j.1945-1474.2001.tb00368.x.

³⁰ Healthcare Quality Improvement Partnership (HQIP). A guide to quality improvement methods. (HQIP 2015). Available at <Final-Quality-Improvement-QI-Tools-09-12-20.pdf (hqip.org.uk)> accessed 1 November 2023; Board on Global Health; Institute of Medicine; The National Academies of Sciences, Engineering, and Medicine. Six Widely Used Methods to Improve Quality. In: *Improving Quality of Care in Low- and Middle-Income Countries: Workshop Summary*. (Washington DC: National Academies Press [US] 2015)

³¹ L Almorsy, ‘M Khalifa, Lean Six Sigma in Health Care: Improving Utilization and Reducing Waste’ (2016) 226 *Studies in Health Technology and Informatics* 194-7

³² News report, Quality Improvement Project Reduces Sharps and Biomedical Waste, Saves Money. (Sameday Surgery, 2021) 45

for embedding the policy and achieving its set targets. The application of basic QI method is within the competence of all cadres of health professionals and should be part of training in HCWM.

2.3 Design for quality and safety

This domain is about putting in place systems that facilitate good quality HCWM, one that measures up to global best practice. Good quality HCWM secures the 3 Rs: reduce, reuse, and recycle. Safer HCWM minimises the risks to health facility workers, patients, and the community.

National policy should domesticate international standards pertaining to healthcare waste, general waste, and environmental protection. It should recommend means of reducing waste, provide guidance on reuse of devices, and make provisions for recycling. It should define roles and responsibilities of individuals and organisations charged with containing the risks posed by healthcare waste. It should address capacity-building and include an inventory of toolkits for health workers to use in quantifying and monitoring waste.

Quality and safety are boosted when shop-floor operatives have ready access to guidelines, preferably bite-size ones that relate to the local context. Unfortunately, most health care facilities in Nigeria do not have guidelines on HCWM. None of seven hospitals assessed in Lagos, Nigeria had policies or guidelines for waste management.³³ This deficiency needs to be addressed in the national policy on HCWM.

Guidelines and regulations facilitate standardisation, which is important in maintaining quality. An example of

³³ O Awodele, AA Adewoye, AC Oparah, Assessment of medical waste management in seven hospitals in Lagos, Nigeria (2016) 16 BMC Public Health 269

standardisation is the importance of colour coding in HCWM, but deficient/non-existent colour-coding and labelling has been identified as one of the major shortcomings in HCWM in Nigeria.³⁴

A key element in building robust systems for managing healthcare waste is the legal and regulatory framework. It should no longer be the case that in today's world that Nigeria has no laws specific to HCWM. In the post-pandemic era, legislative attention should be paid to this gap. As noted above, however, there is also a problem of enforcement and compliance with extant laws. This needs to be addressed as part of building a robust HCWM system. National policy should facilitate inter-agency working (for example, between health care facilities, local councils, and parastatals) and address the problem of lack of coordination of HCWM at different levels. These could be pursued through legislative and regulatory interventions.

Quality and safety cannot be optimised without satisfactory budgetary provision. In designing or redesigning a HCWM system, consideration should be given to the availability of resources, funding, and the status of infrastructure. This includes not only infrastructure for disposal (e.g., incineration) but also infrastructure for the storage and transport of healthcare waste.

2.4 Involve Stakeholders

In the context of HCWM, a stakeholder is any person, group or organisation that is involved in, or may be affected by the

³⁴ World Bank. Health Care Waste Management Plan (HCWMP) for Nigerian Polio Eradication Support Project Additional Financing 3. Draft Report. March 2018, at p viii. Available at <https://ewdata.rightsindevelopment.org/files/documents/47/WB-P165247_ZgNI0lu.pdf> accessed 1 November 2023.

management of healthcare waste, or who may be a factor in the implementation of HCWM. Across the board in policy research, the importance of engaging stakeholders in policy formulation is widely acknowledged, but there is often not enough evidence to determine the best ways of transforming that acknowledgement into actual involvement of stakeholders in designing or evaluating policy. Also, while there has been much focus on stakeholder engagement in policy formulation, inadequate attention has been paid to stakeholder engagement in policy implementation.

The International Association of Public Participation (IAP2) articulates a spectrum of stakeholder participation as follows:³⁵ (i) inform (provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions), (ii) consult (obtain public feedback on analysis, alternatives and/or decisions), (iii) involve (work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered), (iv) collaborate (partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution), and (v) empower (place final decision making in the hands of the public). This spectrum could inform the engagement of stakeholders in updating and implementing the national policy on HCWM.

The potential stakeholders for the development and implementation of the national policy on HCWM include, but are not limited to, patients, health care providers (individuals and organisations), government ministries (particularly, health,

³⁵ International Association of Public Participation (IAP2), IAP2 Spectrum of Public Participation. Undated. Available at https://iap2.org.au/wp-content/uploads/2020/01/2018_IAP2_Spectrum.pdf accessed 1 November 2023

environment, science and technology), departments and agencies, waste management boards, civil society organisations, consumer protection organisations, professional associations, educational institutions, non-governmental or quasi-governmental bodies engaged in Public Health, donor agencies and international facilitators.

The national policy should outline strategies for informing, consulting, involving, collaborating with, and empowering stakeholders. It should enplace measures for assessing the effectiveness of stakeholder engagement.³⁶ It is worth emphasising that stakeholder engagement includes ensuring that stakeholders have ready access to the national policy, national plan and other HCWM documents that are currently locked in the Ministry of Health and other government agencies.

Stakeholder engagement should not be limited to an isolated one- or two-day stakeholder workshop held at national level. It should be seen as a process rather than an event, and the process should permeate all levels, from national down to institutional level.

2.5 Collect and Analyse Data

The purpose of this domain of the RADICAL framework is to monitor progress and to harvest information that could be used to inform other domains of the framework on various elements such as training needs, quantities of waste generated, deployment of resources, compliance issues, feedback to stakeholders, capacity building, impediments and facilitators of organisational learning, and so on.

³⁶ This inter-relates with the 'Collect and Analyse data' domain – see below.

As with other government policies, it is important that the national policy on HCWM be monitored to track its implementation, impact, and continuing salience. To do this, pertinent data must be collected. It must be stressed, however, that data on its own is akin to raw material. To be optimally useful, it must be processed and presented in a form that is meaningful and digestible to stakeholders. In other words, it is not enough to collect data, the data should also be appropriately analysed. For example, collecting data on the amount of waste generated in a facility should not be an end. Rather, the data should be analysed in relation to that of comparable facilities elsewhere, to determine whether the index facility is an outlier and analysed in relation to historical data to demonstrate improvement.

Brownson³⁷ and colleagues propose that evidence-based policy can be conceptualized as a continuum spanning 3 domains—process, content, and outcome. Based on this, the Centres for Disease Control (CDC) outlines three main types of policy evaluation.³⁸

Evaluating Policy Content: Does the content clearly articulate the goals of the policy, its implementation?

Evaluating Policy Implementation: Was the policy implemented as intended? Evaluating Policy Impact: Did the policy produce the intended outcomes and impact?

³⁷ RC Brownson, C Royer, JF Chiqui, KA Stamatakis, 'Understanding evidence-based public health policy' (2009) 99 *Am J Public Health* 1576–1583

³⁸ Centers for Disease Control, Step by Step – Evaluating Violence and Injury Prevention Policies. Brief 1: Overview of Policy Evaluation. Available at <<https://www.cdc.gov/injury/pdfs/policy/brief%201-a.pdf>> accessed 1 November 2023

The exercise of collecting and analysing data on the national policy and on shopfloor practice not only serves the purposes listed above but also drives accountability and informs the policy cycle. Policies should not be static; rather, policymaking should be an iterative process. Material from this domain also provides the basis for evidence-based legislation.

A wide range of methods and tools is available for assessing the HCWM policy and HCWM practices at various levels. This includes qualitative as well as quantitative methods, and mixed methods. Tools that are commonly applied include self-administered questionnaires, checklists, semi-structured interviews, normative audit, and focus groups.

The collection and analysis of data should be integral to both the national policy on HCWM and the accompanying implementation guidance.

2.6 Learn from Shared Experience

The national policy on HCWM should aim to promote both quality assurance (a summative exercise ensuring that minimum prescribed standards are met, usually for accountability, accreditation, and licensing purposes) and quality improvement (QI, a formative process aimed at continually improving performance). For both quality concepts, but particularly for QI, the underpinning ethos is that of lifelong learning at individual and organisational levels. For learning to take place, there must be an enabling environment. Policymakers charged with revamping the national policy on HCWM bear the responsibility of fostering an environment where health care workers and facilities can share learning.

Organisational learning can be promoted by use of data collected and analysed appropriately (see domain discussed

above). Feedback resulting from data analysis enhances learning and organisational memory. Learning is facilitated when there is a climate of information sharing, and this climate is engendered by stakeholder involvement (domain discussed above). Unfortunately, national, and local policies do not always clarify roles and facilitate coordinated action. For example, a study in Ethiopia found overlapping of mandates and lack of co-ordination among various government institutions responsible for HCWM.³⁹ This presents an unfavourable climate for organisational learning.

On the contrary, where a climate of information sharing prevails there is shared learning. This is demonstrated by a case study in Indonesia where Shared Learning Dialogue (SLD) led to increased government attention to waste management and the development of an Integrated Solid Waste Management Master Plan.⁴⁰ In SLDs, stakeholders representing disparate sectors or perspectives share experiences in an open manner and learn from each other in an atmosphere that breaks down barriers that typically occur between sectors, communities, and organisations.⁴¹ The process is iterative, so new knowledge is progressively generated. As stated above (under ‘Involvement of stakeholders’), stakeholder workshops are often held as ‘one-off’ activity. SLDs do more than that, and they are semi-

³⁹ ID Haylamicheal, SA Desalegne, ‘A review of legal framework applicable for the management of healthcare waste and current management practices in Ethiopia’ (2012) 30 *Waste Manag Res* 607-18. doi: 10.1177/0734242X11419891

⁴⁰ JA Lassa, E Nugraha, ‘From shared learning to shared action in building resilience in the city of Bandar Lampung, Indonesia (2014) 27 *Environment & Urbanization* 161–180. DOI: 10.1177/0956247814552233

⁴¹ Institute for Social and Environmental Transition (ISET). *The Shared Learning Dialogue: Building Stakeholder Capacity and Engagement for Resilience Action*. Climate Resilience in Concept and Practice Working Paper Series. (Boulder, Colorado, 2010). Available via <Climate Resilience in Concept and Practice: ISET Working Paper 1: The Shared Learning Dialogue: Building Stakeholder Capacity and Engagement for Resilience Action (i-s-e-t.org)> accessed 1 November 2023

structured interactions rather than just a series of meetings. National policy on HCWM should promote shared learning dialogues among stakeholders.

The prospects of an SLD are bright in Lagos State, Nigeria, where the Lagos Waste Management Authority (LAWMA) has been collaborating through workshops, seminars, and other channels with stakeholders like the Ministry of Health, Health Facility Monitoring and Accreditation Agency (HEFAMAA), Lagos State Emergency Management Agency (LASEMA) and others, to sensitise healthcare facilities on HCWM.⁴²

Healthcare waste poses risks of harm to workers, patients, visitors, and the community. The Collection and Analysis of safety incident reports offers further opportunities for shared learning. Reporting requirements for safety incidents should be part of the national policy on HCWM.

3. THE LEGAL STATUS OF THE PROPOSED HCWM POLICY

Nigeria has had a national HCWM policy since 2013, but it has been dormant. Health facilities appear to be unaware of it – as stated above, none of the facilities assessed had guidelines on HCWM. One reason for this could be that the policy does not have the force of law.

⁴² Health facility waste management. <LAWMA enforces sanctions against improper medical waste disposal - Punch Newspapers (punchng.com)> accessed 1 November 2023; <Lagos prepares guidelines on medical waste management - Vanguard News (vanguardngr.com)> accessed 1 November 2023; <HEALTH FACILITY MEDICAL WASTE MANAGEMENT - HEFAMAA (lagosstate.gov.ng)> accessed 1 November 2023

Generally, policies are principles or guidelines that are recommended but not enforceable, while laws are rules, regulations or edicts that are enforceable and carry penalties for non-compliance. In some cases, a policy may have the force of law, if it is written into a statute or adopted by a court. For example, Nigeria's National Human Resources for Health Policy⁴³ has statutory footing in Part V, Section 1(i) of the National Health Act 2014 which mandates the development of a policy for the management of human resources within the national health system. In respect of the National Environmental Policy in Nigeria, Ekhaton argues that 'the policy is more advisory rather than regulatory in the context of oil and gas industry in Nigeria'.⁴⁴ Similarly, in respect of the National Taxation Policy in Nigeria, Richards⁴⁵ contends that the policy is not a legislation and he relied on a decision of the Nigerian Court of Appeal in *UBN Plc v Ifeoruwa Nig. (Ent.) Ltd*⁴⁶ which held that a policy document is not subsidiary legislation.

It is important that major national policies should have the force of law. This is illustrated by the World Health Organisation's observation that all countries that have achieved Universal Health Coverage (UHC), have done so on legal foundations.⁴⁷ For the proposed new HCWM policy to have

⁴³ Federal Ministry of Health. National Human Resources for Health Policy. Abuja: Federal Ministry of Health, 2020.

⁴⁴ EO Ekhaton, 'Environmental protection in the oil and gas industry in Nigeria: The roles of governmental agencies' (2013) 5 *International Energy Law Review* 196-203.

⁴⁵ NU Richards, 'Overview of the national tax policy and its implication for tax administration in Nigeria' (2019) 10 (2) *Nnamdi Azikiwe University Journal of International Law and Jurisprudence* 42-50.

⁴⁶ (2007) 7 *NWLR* (pt. 1032), 135

⁴⁷ World Health Organisation's Strengthening legal frameworks for UHC. Strengthening Legal Frameworks for UHC <https://www.who.int/activities/strengthening-legal-frameworks-for-uhc> accessed 1 November 2023

optimal impact it would have to be written into legislation passed by the National Assembly and domesticated by subnational governments.

4. CONCLUSION

The COVID-19 pandemic raised the salience (Phase 1 of the Ilot et al process described in the Introduction above) of HCWM. In the wake of the pandemic, the General Manager of the Lagos State Waste Management Board, Dr. Muyiwa Gbadegesin, was reported in the press as saying that: ‘In order to protect the health seekers, healthcare givers and to curb further spread of the current pandemic disease (COVID 19) amongst other diseases, the management has decided to sanction any healthcare facility found wanting in the separation of medical and domestic waste’⁴⁸. He also said the Agency had found many private and public health facilities to be non-compliant with recommended practice in waste management, thereby posing risks of harm to health waste haulers, refuse workers and the environment.

Research papers published before and during the COVID-19 pandemic show that the LAWMA experience of poor practice in HCWM is not an isolated one but a situation that prevails across the country. This indicates that the national policy on HCWM has not been embedded (Phase 3 of the Ilot et al process described above) in practice, seven years after its approval.

The raised salience of HCWM post-pandemic affords an opportunity to revisit, update and embed the national policy on HCWM. In seizing this opportunity, the pervasive thinking

⁴⁸ Newspaper report. <LAWMA enforces sanctions against improper medical waste disposal - Punch Newspapers (punchng.com)> accessed 1 November 2023

must change from the linear pattern, which tends to assume that dissemination and implementation will flow naturally from policy approval, to complex adaptive thinking which recognises the complexity of relationships and contextual factors at play in the process of embedding the policy. Towards this end, RADICAL is presented in this paper as a fit-for-purpose framework for developing, implementing, and monitoring the national policy on HCWM. This framework recognises and accommodates the complexities of policy formulation and implementation. It captures all domains pertinent to the three phases described by Illot et al. Further, as it is an integrated rather than linear framework (see Figure 1), it has interconnectedness of domains as an intrinsic attribute. This attribute makes it consistent with complex adaptive thinking. Each domain informs and is informed by other domains (represented by the double-ended arrows in Figure 1). For example, Collection and Analysis of data could Involve stakeholders; stakeholders in turn share what Learning they have acquired from analysed data, and shared learning will Raise awareness. And so on.

Elamir⁴⁹ mentions ‘two limitations’ of the RADICAL framework: that it is still conceptual and that risk management processes should not be described as frameworks. Although the composite RADICAL framework has not been tested formally, the constituent domains (e.g., stakeholder involvement, designing for quality, organisational learning) have all been tested in numerous studies across the globe. The question ‘What is a framework?’ has been addressed comprehensively by

⁴⁹ H Elamir, ‘Enterprise risk management and bow ties: going beyond patient safety’ 26 (3) (2020) *Business Process Management Journal* 770-785

Partelow (2023).⁵⁰ In simple terms, a framework could be a structure, a concept, a system (of rules, ideas, or beliefs), or any other device that assists in organizing and categorizing information or ideas, and which constitutes a footing upon which any emerging elements can be elaborated. The RADICAL framework is compliant with the guiding points for framework development put forward by Partelow.⁵¹

In practical terms, the framework can be used to check the comprehensiveness of the national policy, devise strategies for implementation, set metrics for evaluation of policy and practice, design checklists for audit, set agenda for group and inter-agency meetings, produce legislation for HCWM, create curricula for education programmes, conduct accreditation exercises, institute/conduct/report research projects, and benchmark national indices against international standards. Its evidence base is observational rather than experimental, but its adoption does not necessarily require dedicated financial or material resources. It is open to further development, and to being subjected to experimental assessment, such as assessing objectively whether adoption of this framework tangibly impacts on the embedding of the national policy on HCWM.

⁵⁰ S Partelow, 'What is a framework? Understanding their purpose, value, development and use' (2023) 13(4) *Journal of Environmental Studies and Sciences* DOI:10.1007/s 13412-023-00833-w

⁵¹ Ibid

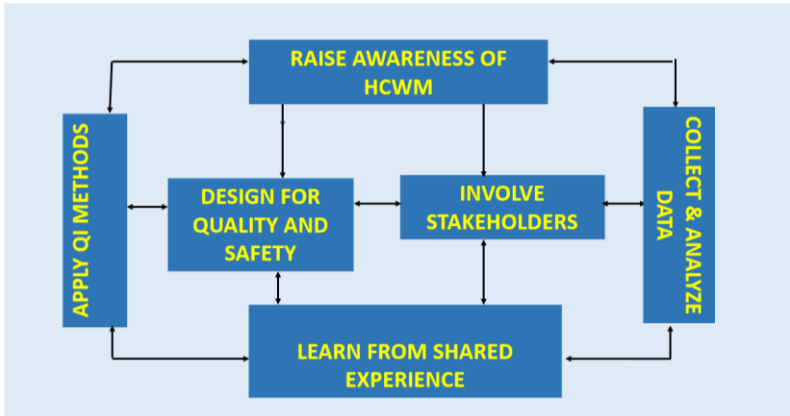


Figure 1: The RADICAL framework applied to Healthcare Waste Management (HCWM)