

## **DUE DILIGENCE REPORT ON MEDICAL WASTE MANAGEMENT IN SRI LANKA**

### **I. Background**

1. In December 2020, the Government of Sri Lanka (GOSL) requested the Asian Development Bank (ADB) to assist in the procurement and rollout of vaccines against the COVID-19 pandemic. In response to this request, ADB proposed the \$150 million Responsive COVID-19 Vaccines for Recovery Project which will be funded through the Asia Pacific Vaccine Access Facility (APVAX) and the regular country allocation. It is expected that this three-year project will be effective in July 2021. The project will provide vaccination for 18.2% of the population in Sri Lanka. The project is aligned and developed in close collaboration with the World Bank which is allocating \$80.5 million to support the purchase of vaccines and rollout for 13.6% of the population in Sri Lanka.

2. The project is targeting the entire country across all 26 health districts in all provinces (Central, North Central, Sabaragamuwa, Uva, Western, North Western, Northern, Eastern and Southern) ensuring that the geographically, socially, and economically-deprived populations are protected from the effects of COVID-19. GOSL is fully committed to provide vaccination against COVID-19 to reach 80% coverage by 2023.

3. The four project outputs are (i) COVID-19 vaccines delivered; (ii) vaccination information dissemination and monitoring systems strengthened; (iii) capacity of vaccine transport systems expanded; and (iv) vaccine-related medical waste management strengthened.

4. The expanded COVID-19 vaccination program in Sri Lanka is estimated to result in the need to discard around 32 million syringes and nearly 3.2 million vials. The large number of polymerase chain reaction (PCR) tests carried out (over 3,500,000 tests as of 2 June 2021, the daily use of personal protective equipment (PPE) and masks in health care settings and quarantine centers) also add to the volume of waste generated due to COVID-19. In addition, a substantial volume of solid waste will also be generated in the form of discarded PPE, discarded face masks by the public, and stationery. Furthermore, the conversion of routine secondary care level hospitals as COVID-19 treatment hospitals, will require well-designed wastewater management systems to treat the effluents.

5. This report is prepared to document the government's legal and regulatory framework, as well as current practices for medical waste management; to identify possible shortcomings in service provision that could affect the success of a COVID-19 vaccination campaign; and to review and document the government's plan to manage COVID-19 related waste including COVID-19 immunization waste.

6. The assessment was undertaken through meetings and interviews with the Ministry of Health (MOH) and its relevant divisions and units, the Ministry of Environment (MOE), the Central Environmental Authority (CEA), and literature search for related circulars and documents of GOSL. Considering the restrictions brought about by the pandemic, most of these meetings and interviews were conducted through a virtual platform.

### **II. LEGAL AND REGULATORY FRAMEWORK**

7. Sri Lanka has a comprehensive and robust legal and policy framework to regulate and guide waste management including management of Medical Waste (MW). The overarching regulations on waste management is governed through the National Environmental Act (NEA)

No. 47 of 1980 and its subsequent amendments. The Directorate of Environmental and Occupational Health and Food Safety (DE&OH) is the key unit within MOH that oversees the environmental compliance related to operations of the MOH. Sri Lanka is also a signatory to around 40 multilateral environmental agreements of which several are related to biosafety, health and sanitation, and hazardous waste. Relevant national regulations and requirements, and international guidelines on Medical Waste Management (MWM) are discussed in the succeeding sections.

#### **A. National Regulatory Framework Applicable to the Establishment and Operation of Waste and Health Care Facilities**

8. The national environmental act and its amendments provide guidance for sustainable development with the management of natural resources in Sri Lanka. It is also the basic national decree for protection and management of the environment which paved the way for the creation of the CEA. Several main regulatory provisions in the NEA implemented by the CEA allows assessment, management, and mitigation of environmental impacts.

##### **i. Environmental Impact Assessment**

9. The broader legal framework for the environmental impact assessment (EIA) process in Sri Lanka was laid down by the amendments made to NEA in 1988 through National Environmental (Amendment) Act, No. 56 of 1988. The provision relating to EIA is contained in Part IV C of the NEA. The procedure stipulated in the Act for the approval of projects listed as prescribed projects requires submission of initial environmental examination (IEE) report and/ or EIA report. The list of 'prescribed projects' are included in a Schedule in an Order published by the Minister of environment in terms of section 23 Z of the act in the Gazette Extra Ordinary No. 772/22 dated 24th June 1993. This amendment made EIA mandatory for certain projects in Sri Lanka and transformed the CEA as the main enforcement and implementing agency.

10. Under the NEA, construction of any solid waste disposal facility having a capacity exceeding 100 tons per day and construction of waste treatment plants treating toxic and hazardous waste are considered as 'prescribed projects' due to their potential environmental impacts during construction and operation.

##### **ii. Environmental Protection License**

11. The Environmental Protection License (EPL) is a regulatory/legal tool that has been introduced to control and prevent pollution from waste discharges through the adoption of appropriate pollution abatement technologies. The activities for which EPL is required are stipulated in the Gazette Notification No. 1533/16 dated 25 January 2008. The NEA specifies categories of 'prescribed projects' which would need to comply with these regulations and are supported by gazetted discharge and emission standards depending on the industry type as well as the receiving environment.

12. Part A of the schedule of the Gazette Notification No. 1533/16 includes the following activities related to waste management for which EPL is required:

- (i) Solid waste recovery/ recycling or processing plants having a capacity of 10 or more metric tons per day.

- (ii) Solid waste disposal facility having a disposal capacity of 10 or more metric tons per day.
- (iii) All toxic and hazardous waste treatment facility or disposal facilities or recycling/ recovering or storage facilities.
- (iv) Health care service centers generating infectious wastes, including medical laboratories and research centers.

13. The EPL regulation classifies industries into three categories, namely, A, B, and C corresponding to the high, medium, and low polluting potential of the relevant activity discharging/emitting waste into the environment. While EPL for A and B categories are directly administered by the CEA, issuing EPL for category C is delegated to the local authorities under the powers of the NEA. CEA has published standards for various parameters such as effluent quality, air quality, noise, and *interim standards* for vibration.

### iii. Disposal of Scheduled Waste

14. The National Environmental (Protection & Quality) Regulations No.1 of 2008 published through Gazette notification No. 1534/18 (dated 25.01.2008), deals with hazardous waste from specific and nonspecific sources and these wastes are called scheduled waste. Any effluent discharges and waste discharges (scheduled waste) should conform to the standards. The notification has three parts and eight schedules of which part I deals with the issue of environmental protection license for emission/disposal of waste, and part II deals with the issue of license for the management of scheduled waste (Hazardous Waste) and part III on general matters including definitions and the effectiveness and validity of the license issued under National Environment (protection and quality) regulation No. 1 of 1990 published in Extraordinary Gazette No. 595/16 of February 1990. The eight schedules include the tolerance limits, applications, formats for reporting, categorization of non-specific and specific waste etc.

### iv. Other Regulations Related to Pollution Control enacted under the provisions of NEA

**Table 1: Other Laws, Regulations and Policies Related to Pollution Control**

Laws and regulations	Provisions and main content	Applicability to the project
National Environment (Ambient Air Quality) Regulation 1994; and Amendment of Gazette Notification Number 1562/22 dated 15th August 2008.	Establishes permissible ambient air quality standards during proposed project activities.	Ambient air quality should be established before construction and be monitored during construction, especially activities involving earthwork.
National Environment (Noise Control) Regulations 1996. Gazette Notification Number 924/12 dated 23rd May 1996; and National Environmental (Vehicle Horns) Regulations, No. 1 of 2011.	Regulates maximum allowable noise levels for construction activities during subproject activities	Noise levels should be strictly monitored for conformity, especially during excavations and backfilling.
Pradeshiya Sabha Act, No. 15 of 1987; and National Environmental (Municipal Solid Waste) Regulations No. 1 of 2009.	Regulates dumping municipal solid waste at any place other than places designated for such purpose by the relevant local authority during proposed project activities.	Municipal solid waste (MSW) generated in hospitals are mostly handed over to relevant local authority.

Source: Asian Development Bank.

#### **v. Draft National Policy on Health Care Waste Management**

15. The government drafted a comprehensive national policy on health care waste management in 2001. This policy covered three main sections as:

- (i) General considerations on MWM and the institutional mechanism for policy implementation that should be set up at national level.
- (ii) Provisions for the safe management of MW in medical institutions, including regulations and MWM plans.
- (iii) Provisions for the implementation of and the monitoring of MWM plans at national and provincial levels including legislation, provision of human and financial resources, training and awareness and participation of the private sector.<sup>1</sup>

16. The institutional mechanism for implementing the national policy was envisaged under three levels of management as: at the central level, at the provincial level and at the local level.

17. Although this national policy on health care waste management remains as a draft, it has been well-adopted and implemented by healthcare facilities in the country.

#### **vi. National Guidelines on Health Care Waste Management**

18. The draft national guidelines for healthcare waste management in 2001 include features to (i) provide a better understanding of the fundamentals of MWM planning and (ii) direct health care facilities (HCFs) in setting necessary procedures and standards to comply with policy and legislative requirements. These have been drafted in a form that provides all fundamental elements that should be integrated into future legislation specific to HCW. Although guidelines were reviewed by the National Committee on Clinical Waste Management as well as the MOH, it did not receive formal endorsement by the government.

19. These draft national guidelines contain both practical and conceptual information on MWM covering four main sections:

- (i) Definition and categorization of MW, including potential harmful effects that can result from its improper management.
- (ii) Procedures for segregation, packaging, labelling, collection, storage, transportation, and disposal (including the selection of appropriate treatment and disposal technologies for MW) that should be applied and followed by all HCFs in the country.
- (iii) Instructions for the implementation of health care waste management plans, including detail description of duties and responsibilities of health care provider at various levels.
- (iv) Instruction for personnel of Central and Provincial Health Services who oversee MWM to ensure smooth implementation of the guidelines and to set up regular

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<sup>1</sup> Government of Sri Lanka, Ministry of Health. 2001. *Draft National Policy on Health Care Waste Management*. Colombo.

monitoring mechanisms.

20. In 2007, concise guidelines for MWM were prepared under the Hospital Efficiency and Quality component of the Sri Lanka Health Sector Development Project<sup>2</sup> based on the detailed draft guidelines prepared in 2001. The concise guidelines which mainly contain sections in waste categorization and health care waste management procedures have been formally adopted and incorporated into the Handbook of Infection Control.

#### a. Code of Hygiene

21. Management of MW is an integral part of hospital hygiene and infection control that must be reinforced with internal rules. In 2008, the government developed a comprehensive Code of Hygiene that completed the existing Infection Control Handbook. The national code of hygiene contains recommended MWM procedures and is seen as part of an overall set of actions to control the hygiene conditions within the hospital. It sets out duties and responsibilities of medical and non-medical staff regarding hygiene procedures to be applied, recommended practices to maintain high level of hygiene and ongoing management and managerial activities to be carried out in the hospital. The code of practice must be implemented along with the MWM guidelines.

22. **National Color Code.** In 2006, the MOH developed a national color code for implementing a uniform system for separating HCW streams based on the type of waste, treatment, and disposal methods. The code recommends technical specifications for bags and bins to be used for different waste types. The national color code identifies 7 specific categories in Table 2.

**Table 2: National Color Code for Segregation of Medical Waste**

Color	Category	Contents
Yellow	Infectious	Cultures or stocks from microbiology, tissues from surgeries/autopsies, material, or equipment in contact with blood or body fluids soiled linen, dialysis equipment such as tubing and filters.
Yellow with red strips	Sharp waste	Sharps, needles and IV sets contaminated with body fluids
Black	General waste	General or municipal waste that is uncontaminated
Green	Biodegradable waste	Garden, kitchen, and food waste
Red	Glass waste	Uncontaminated drink bottles, water bottles
Blue	Paper waste	Paper, cardboard, and office stationery
Orange	Plastic waste	Uncontaminated plastic medicine bottles, saline bottles without IV sets, plastic bags

Source: Ministry of Healthcare and Nutrition, Government of Sri Lanka. 2006. National Colour Code for the Segregation of Hospital Waste. General Circular No. 01-12/2006. Colombo.

23. The national policy on HCWM to this date remains a draft as all attempts for its formal adoption in the past have not been successful. As a result, there have been no legal enactments made to operationalize the policy. As such, to this date, the national policy, and guidelines on HCW management serves as a broad guideline only with no mandatory binding legal requirement. The only legal requirement for HCW in Sri Lanka stems from the NEA, as explained below.

#### vii. Guideline for Management of COVID-19 Infectious Waste

24. The DE&OH of MOH in March 2020 had issued a guideline to manage COVID-19 related infectious waste (Annex 1). As per this guideline, the infectious waste generated from any public

<sup>2</sup> Financed by the World Bank.

health care facility treating COVID-19 cases shall be treated only through incineration and/ or MetaMizer.<sup>3</sup>

25. Furthermore, the guideline directs all such health care facilities (HCFs) in Western, Central and Southern provinces to handover the infectious waste to Sisili Hanaro Encare (Pvt) Ltd for incineration. HCFs in other provinces are required to use either incinerators or MetaMizers located on-site.

#### viii. Factories Ordinance under Labour Code of Sri Lanka

26. An ordinance developed to make provisions for the safety and welfare of workers in factories. The ordinance include several parts as, (i) Regulation of Factories and Approval of Factory Buildings, (ii) Health (General Provisions), (iii) Safety (General Provisions), (iv) Welfare (General Provisions), (v) Health, Safety and Welfare (Special Provisions and Regulations), (vi) Notification and Investigation of Accidents and Industrial Diseases, (vii) Employment of Women and Young Persons Hours and Holidays, (viii) Special Applications and Extensions, (ix) Home Work, (x) Miscellaneous, (xi) Administration, (xiii) Offences, Penalties and Legal Proceedings<sup>4</sup>, (xiv) Application of Ordinance, and (xv) Interpretation and General Interpretation.

27. This ordinance adequately address special needs to be satisfied at workplace with respect to women and young. This ordinance under the labor code of Sri Lanka aims to create an environment for occupational safety and health at all workplaces and secure workers welfare requirements.

#### ix. National Institute of Occupational Safety and Health Act, No. 38 of 2009

28. The act provides for the establishment of the national institute of occupational safety and health and the formulation of a policy on occupational safety and health standards. The act aims to create an environment for occupational safety and health at all workplaces to protect both the employers and employees.

### B. Relevant International Agreements, Conventions and Best Practices

29. The government has been a party to several biosafety, health and sanitation, and hazardous waste management agreements listed in Table 3.

**Table 3: International Agreements to which Sri Lanka is a Party and Best Practices**

Agreement	Ratification date	Objectives
<b>Biosafety, Health, and Sanitation</b>		
Biological weapons convention (1972)	26 March 1975	The convention on the prohibition of the development, production and stockpiling of bacteriological (biological) and toxin weapons and on their destruction.
Agreement on the application of sanitary and phytosanitary measures (1995)	1995	Broadly, the sanitary and phytosanitary measures covered by the agreement are those aimed at the protection of human, animal or plant life or health from certain risks.
Cartagena protocol on biosafety (2000)	11 September 2003	The Cartagena protocol on biosafety to the convention on biological diversity is an international agreement on

<sup>3</sup> This is a hybrid autoclave medical waste treatment unit that simultaneously uses steam-based sterilization and shredding to treat clinical waste. A volume reduction of 90% and weight reduction of 30% of waste could be achieved through the process and the processed material which is granular in nature can be recycled or buried in landfills safely.

<sup>4</sup> Part XII- Sections 106 and 107 repealed by Law, No.12 of 1976.

Agreement	Ratification date	Objectives
		biosafety as a supplement to the convention on biological diversity.
<b>Hazardous chemicals, waste, and emissions</b>		
Basel convention on the control of transboundary movements of hazardous wastes and their disposal (1989)	28 August 1992	To reduce transboundary movements of hazardous waste; to dispose of hazardous and other waste as close as possible to the source; to minimize the generation of hazardous waste; to prohibit shipments of hazardous waste to countries lacking the legal, administrative and technical capacity to manage & dispose of them in an environmentally sound manner.
Rotterdam convention (1998)	19 January 2006	To promote shared responsibility and cooperative efforts in the international trade of certain hazardous chemicals, to protect human health and the environment; to contribute to the environmentally sound use of those hazardous chemicals by facilitating information exchange, providing for a national decision-making process on their import/export.
Stockholm convention on persistent organic pollutants (POPs) (2001)	22 December 2005	To protect human health and the environment from persistent organic pollutants (POPs). Guidelines on best available techniques and provisional guidance on best environmental practices on Persistent Organic Pollutants have been issued including those specific to medical waste management including incineration.
Kyoto Protocol (1997)	3 September 2002	The Kyoto Protocol demands an emission reduction of climate-affecting gases in various industrial sectors.
Paris Agreement (2015)	21 September 2016	The Paris Agreement is a legally binding international treaty on climate change. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.
<b>International best practices</b>		
Standards and best practices to operate a health care laboratory.  World Health Organization (WHO) Technical Guidance on Coronavirus disease (COVID-19): Infection prevention and control / WASH.	These technical guidance will help: (i) to establish laboratories and standard testing methods to be adopted in testing for COVID-19 virus, and (ii) determine the risk of COVID-19 virus infection of all HCWs who have been exposed to a COVID-19 patient/samples and then provides recommendations for appropriate management of these HCWs, according to their infection risk.	Follow recommendations and Guidelines of: <ul style="list-style-type: none"> <li>• Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases. Interim guidance 2 March 2020<sup>5</sup></li> <li>• Water, sanitation, hygiene, and waste management for the COVID-19 virus - Interim guidance 19 March 2020<sup>6</sup></li> <li>• Other Technical Guidance published by the WHO: Coronavirus disease (COVID-19) technical guidance: Infection prevention and control / WASH<sup>7</sup></li> <li>• ISO 15189 (2003): Medical laboratories — Particular requirements for quality and competence</li> <li>• Specific Criteria for Medical/Clinical Testing Laboratories: Sri Lanka Accreditation Board (SLAB), 2015</li> <li>• Guidelines on the Establishment of Accreditation of Health Laboratories, WHO, 2007<sup>8</sup></li> <li>• Laboratory quality standards and their implementation, WHO, 2011<sup>9</sup></li> </ul>

Source: Asian Development Bank.

<sup>5</sup> <https://apps.who.int/iris/bitstream/handle/10665/331329/WHO-COVID-19-laboratory-2020.4-eng.pdf?sequence=1&isAllowed=y>

<sup>6</sup> <https://www.who.int/publications-detail/water-sanitation-hygiene-and-waste-management-for-covid-19>

<sup>7</sup> <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/infection-prevention-and-control>

<sup>8</sup> [https://www.who.int/ihr/training/laboratory\\_quality/11\\_cd\\_rom\\_publications\\_sea\\_hlm\\_394.pdf](https://www.who.int/ihr/training/laboratory_quality/11_cd_rom_publications_sea_hlm_394.pdf)

<sup>9</sup> <https://apps.who.int/medicinedocs/documents/s22409en/s22409en.pdf?ua=1>

### III. Assessment of Current Practices in Medical Waste Management

30. The World Health Organization (WHO) categorizes MW in to three broad categories: (i) non-hazardous or general MW; (ii) hazardous MW (chemical/ radioactive); and (iii) hazardous MW (infectious).<sup>10</sup> Approximately 75-90% of MW include non-hazardous waste which include waste generated from administrative, kitchen and housekeeping functions at HCFs and may also include packaging waste and waste generated during maintenance of health care buildings. The remaining 10-25% is considered as hazardous waste which may pose a variety of environmental and health risks.

31. Sri Lanka has 9 provinces and 26 health districts or regions as presented in Table 4.<sup>11</sup>

**Table 4: List of Health Districts in Sri Lanka**

Province	Health district
Western	Colombo, Gampaha, Kalutara
Southern	Galle, Matara, Hambantota
Central	Kandy, Matale, Nuwara Eliya
Sabaragamuwa	Kegalle, Ratnapura
Uva	Badulla, Monaragala
North central	Anuradhapura, Polonnaruwa
North western	Kurunegala, Puttlam
Northern	Jaffna, Kilinochchi, Mannar, Vavuniya, Mullaitivu
Eastern	Trincomalee, Batticloa, Ampara, Kalmuni

Source: Asian Development Bank.

32. As per the 2018 statistics provided by the MOE, an estimated amount of 20-23 metric tons of MW is produced in the country daily. Segregation of MW is practiced in these HCFs and they are stored separately. The MW generated in government HCFs in these regions are treated using both onsite and off-site systems. Following section discuss how MW is managed by government HCFs in the nine provinces of the country.

#### 1. Handling of Non-Hazardous Solid Waste

33. The non-hazardous waste generated in hospitals are mostly given to local authorities for disposal. Waste like cardboard are collected by scrap collectors. There is a demand for kitchen and used food waste from piggeries, therefore farmers collect such waste from many of these HCF. Such food waste is also used for composting by local authorities. However, delays in collecting such wastes are a common issue in the country. Under such situations, some HCFs tend to use burial pits (especially the food waste) or burn such waste using drum incinerators or do open burning.

#### 2. Handling of Hazardous Solid Waste

34. MOH, CEA and a private entity (Sisili Hanaro Encare (Pvt) Ltd) had signed a tripartite agreement to handle all types of clinical waste generated in public health institutions located in Western, Central and Southern Provinces. In July 2019, a new agreement was signed by these three parties extending this for another 10 years. The list of such institutes is provided in Appendix A1 of this agreement. The agreement extends to other provinces for collection and safe disposal

<sup>10</sup> World Health Organization. (2014) Safe management of wastes from health-care activities (Second edition).

<sup>11</sup> These health districts are related to administration of health facilities in the country. There are 25 administrative districts in the country.

of cytotoxic waste generated by public health institutes in such provinces. The list of such HCFs is listed under list A.2 of the same Appendix.

35. The types of clinical waste listed in this agreement are as follows:

Type I – General clinical waste (Bandages, IV cannula etc)

Type II – Sanitary waste (Sanitary napkins, Diapers etc.)

Type III – Sharps (Syringes, Sutures, Slides etc.)

Type IV – Cytotoxic waste and expired pharmaceuticals

36. Sisili Hanaro Encare (Pvt) Ltd has established an incinerator and storage facility (30 containers) extending within a land lot of two acres. The facility is setup in a land lot located at Kerawalapitiya within the zone which was declared as a waste management park by the Sri Lanka Land Reclamation and Development Corporation (SLLRDC) in 2017. This multi-chamber incinerator operates between 1000 – 1200 °C with possibility to operate at over 1400 °C with a capacity of 20 metric tons per day. The facility is operated with an EPL and complying with national emission standards. The facility also complies with Best Available Technologies (BAT) and Best Available Practices (BAP) as noted in Stockholm Convention. Around 10 metric tons of clinical waste is incinerated at this facility daily and the ash is given to brick makers.

37. As per the agreement, Sisili Hanaro Encare (Pvt) Ltd must provide color coded packaging for in-hospital waste segregation and storage. This facility and its operations are subjected to a standards and conditions check by the CEA once in three months.

38. The project financed by the Australian government<sup>12</sup> had setup five incinerators (with two stage incineration) complying with BAT and BAP and operated with EPL (2 in northern province, one each in Batticaloa, Badulla and Polonnaruwa districts) and 20 MetaMizer units. These incinerators and MetaMizer units were to be operated on a cluster basis, where MW waste collected from selected HCFs in the nearby areas were to be brought to such facility for incineration or sterilization and shredding through the MetaMizer units which on average handle around one metric ton daily (around 5 cycles are done daily). This rate could be increased if a greater number of cycles could be conducted, and more waste is brought for shredding. All these facilities are operational, but due to insufficient fund sources the clustering operation has not been a success.

39. Other than these facilities there are another 30-40 two-chamber incinerators installed within the country. All these incinerators are operated with EPL and confirms to national emission standards.

40. The COVID-19 pandemic resulted to an increase in waste generation from hospitals, laboratories, and other health facilities. Wastes generally consists of the personal protective equipment (PPE) used by medical frontliners and their patients. These wastes have been adequately handled through the existing systems as discussed above.

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<sup>12</sup> Establishment of clinical waste management systems in the needy hospitals in Sri Lanka under Australian Assistance. The agreement has been signed on 12 December 2013 between EFIC Bank of Australia as lender and Democratic Socialist Republic of Sri Lanka Acting by and through its Ministry of Finance and Planning as burrower.

### **3. Handling of Pathological Waste**

41. Pathological waste includes human tissues, organs, body parts, fetuses and other similar waste from surgery, biopsies, and autopsies. All anatomical waste is usually incinerated in crematoriums. However, the hospital infection control manual (2005) developed by Sri Lanka college of microbiologists provides guidance for safe burial of such waste and burning of contaminated dressings, cotton swabs and drip sets in a concrete lined pit (after collecting in yellow bags) which is practiced in some public HCFs.

42. As per the directive by the government, all remains of COVID-19 diseased patients so far have been cremated at the nearest crematorium along with the PPE used by the staff who handle such remains. A thorough disinfecting process also follows involving such staff, vehicles, and other equipment.

### **4. Handling of Radioactive Waste**

43. As directed under chapter VI of Sri Lanka Atomic Energy Act, No. 40 of 2014 on radioactive waste, the HCFs who use such radioactive material shall collect and store the radioactive waste in appropriate containers and return to the atomic energy authority.

### **5. Handling of Health Care Wastewater**

44. Health care wastewater includes: (i) blackwater (sewage) which is highly polluted wastewater that contain high concentrations of fecal matter and urine, (ii) graywater (sludge) containing more dilute residuals from washing, bathing, laboratory processes, laundry, and technical processes, and (iii) stormwater which is the rainfall collected on HCF roofs, grounds, yards, and paved surfaces.

45. While public HCFs have proper stormwater drainage systems which are operational at varying degrees this water usually ends up at a common discharge point nearest to the HCF. However, the treatment of blackwater and graywater differs especially in tertiary and secondary public HCFs. Some of the public (secondary) HCFs designated for treatment of COVID-19 patients are operated with centralized Sewage and graywater Treatment Plants (STP) and majority operate with decentralized system which includes septic and soakage tanks. These treatment plants are designed considering the bed capacity. Of the COVID-19 designated public HCFs, around 18 have centralized aerobic STPs. While some HCFs have been installed with new STPs most of the existing and old plants do not properly operate mainly due to lack of maintenance and expansions made to hospitals after such STPs were installed. Further these STPs should operate with a valid EPL from CEA. However, information from CEA reveals that there are many delays in obtaining the EPL by respective HCF or by MOH.

46. Radioactive effluents are discharged into retention tanks where they are left until the radioactivity is decayed to back-ground level and then discharged into septic tanks. However, most of these retention tanks and septic tanks need to be renovated (e.g., tanks in Maharagama cancer hospital).

## **IV. Monitoring of Health Care Waste Management**

47. At present, the DE&OH is the focal at MOH who monitors the management of health care waste. The EPL which is an annual license needs yearly renewal. Therefore, the CEA as the

regulatory authority in issuing EPLs, conduct annual visits and inspects these sites to assess the present level of operations before issuing the renewal.

48. In terms of documentation, the DE&OH has adopted the COVID-19 Vaccine Introduction Readiness Assessment Tool (VIRAT) developed in December 2020 by WHO in collaboration with the Pan American Health Organization (PAHO). The tool monitors four core areas: (i) planning and management; (ii) supply and distribution; (iii) program delivery; and (iv) supporting systems and infrastructure to be utilized in the COVID-19 immunization waste management.

## V. Government's Plan in Managing COVID-19 Waste

49. As noted under legal and regulatory framework of this report, the health authorities of Sri Lanka were instrumental in issuing guidelines in managing COVID-19 infectious waste in the early stage of the pandemic. The following strategies have been adopted and will continue to be implemented:

50. **Immunization waste segregation at point of waste generation.** The concept of waste minimization/ separation will continue be used in reducing the amount of waste handled and its associated cost. Separation of waste is most effective when done at the source, e.g., a syringe becomes hazardous waste after use, but its original package does not. Therefore, packaging can be placed into a non-hazardous waste container, but the needle and syringe are considered infectious and should be placed into a sharps bin. This process minimizes the quantity of waste labeled as hazardous.

51. **Immunization waste collection and transport at site.** Guidelines on COVID-19 waste management provides instructions on how such wastes shall be handled, collected and transported. It also provides guidance to staff who transport this waste to processing/ disposal sites. Existing transport systems for disposal of MW have many shortcomings including insufficient transport vehicle fleet. The proposed project to be funded by ADB shall assist the government in strengthening the transportation of MW to selected disposal facilities.

52. **Immunization waste treatment and disposal.** The guideline states that COVID-19 infectious waste needs to be treated within 24 hours from disposal. All vaccination centers conduct on-site waste segregation. The segregated waste is transported to the nearest secondary HCF. The waste collected in Western, Central and Southern Provinces are taken by Sisili Hanaro Encare (Pvt) Ltd for incineration. In other provinces these are incinerated or shredded through MetaMizer units or burned in concrete pits. This waste is usually treated (incinerated or shredded) in the same day, but all these facilities have adequate storage to store such waste if they cannot be treated within the same day as they were transported. However, the project could support in providing concrete pits to temporarily store the bottom ash from incinerators and residue from MetaMizer units.

53. **Training on HWCM.** Staff handling infectious waste need to be educated on how best to protect them from contamination. Waste separation at source which is practiced by medical staff involved in the vaccination program could be improved by highlighting the need to reduce the amount of waste labeled as hazardous waste.

## VI. CONCLUSION

54. A set of comprehensive and robust laws and policies are available in Sri Lanka in handling MW. These include the laws and regulations enacted through the NEA and by MOH. At the onset

of COVID-19 pandemic of in the country the DE&OH of MOH has issued clear guidelines in management of COVID-19 infectious waste. Therefore, the vaccination waste generated through the proposed vaccination program which is also be supported by ADB shall be managed through the existing systems in MW management.

55. Activities under Output 4 proposed under the project shall further strengthen the management of MW including the waste generated through the vaccination program and treatment of COVID-19 patients in COVID-19 designated hospitals.

## Annex 1: Guideline for management of COVID-19 infectious waste

දුරකථන ) 0112669192 ,  
0112675011  
தொலைபேசி ) 0112698507 ,  
0112694033  
Telephone ) 0112675449 ,  
0112675280

ෆැක්ස් ) 0112693866  
பெக்ஸ் ) 0112693869  
Fax ) 0112692913



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சுகாதார மற்றும் சுதேச வைத்திய சேவைகள் அமைச்சு  
Ministry of Health & Indigenous Medical Services

To All PDHSs, RDHSs and  
All Heads of Institutions

### Guideline for Management of COVID-19 infectious waste

Infectious waste generated from healthcare institutions treating COVID-19 cases shall be treated using only the following methods.

1. Incineration
2. Using a metaMizer

These two methods of treatment should be used in all healthcare institutions designated for treating COVID-19 cases.

1. Handover the infectious waste generated in Healthcare institutions in Western, Central and Southern Provinces to Sisili Hanaro Encare (Pvt) Ltd for incineration.
2. Use either incinerators or metaMizers to treat the clinical waste in all other provinces.

Please advise the staff to adhere to the following in managing infectious waste from COVID-19 cases /wards.

Infectious waste generated from suspected and confirmed COVID-19 cases should be collected in yellow polythene bags of minimum 300 gauge and tied well. It should then be put in another yellow bag (double bagged) and tied and sealed with appropriate adhesive tape. Mark the waste bag with a red label as "COVID-19 waste" for easy identification and prioritized disposal.

Sharps should be placed in cardboard sharp boxes which should be puncture proof and leak proof. Sharp boxes should be designed with a small inlet so that items can be dropped in but no item can be removed. It should be closed when  $\frac{3}{4}$  full.

Make sure that the sharp box has a handle. Mark the sharp box with a red label as “COVID-19 waste” for easy identification and prioritized disposal.

COVID-19 waste containing yellow polythene bags and sharp boxes should be transported separately in a trolley or a cart which is easy to load, clean and disinfect and treated on priority basis on the same day.

The staff transporting this waste needs to wear proper personal protective equipment (PPE) such as gloves, masks, boots and overalls at all times.

The staff at the treatment facility needs to wear proper personal protective equipment such as industrial gloves, masks, boots and overalls.

Infectious waste handling staff need to be educated on how to protect them and should be provided with washing facilities with adequate soap and water.

Arrangements need to be made to treat COVID-19 infectious waste within 24 hours.

Waste management process needs to be supervised by a team nominated by the Head of the Institution

For any clarifications please contact the Director (E&OH)



Dr. Lakshman Gamlath

DDG (EOH &FS)