



**Ethiopian Food, Medicine and Healthcare Administration and
Control Authority**

**Healthcare Waste Management
Directive**

**June, 2005
Addis Ababa**

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Preamble

WHEREAS, it is found necessary to protect public health from health risks associated with unsafe healthcare wastes;

WHEREAS, it is found necessary to avert problems related with poor management of healthcare waste and require compliance with applicable standards;

WHEREAS, it is found necessary to create favorable conditions to encourage private investors to participate in the proper healthcare waste management system;

WHEREAS, with a view to better organize the healthcare waste regulatory system it is found necessary to standardize health care waste management practice;

NOW, THEREFORE, this directive is issued in accordance with Article 55 (3) of the Food, Medicine and Healthcare Administration and Control Proclamation No.661/2009.

Part One - General

1. Short Title

This directive may be cited as “Healthcare Waste Management Directive No. 16 / 2013.”

2. Definitions

Without prejudice to the definition provided under proclamation No. 661/2009, in this directive unless the context otherwise requires:

- 1) “hazardous wastes” means wastes generated in health facilities that poses substantial or potential threats to public health or the environment;
- 2) “untreated wastes” means wastes which are not immobilized, disinfected, sterilized, encapsulated incinerated or which is not treated with other methods;
- 3) “pathological or human anatomical waste” include human organs, tissues, placentas removed during surgery or autopsy, waste blood or body fluids;
- 4) “sharps wastes” means wastes that pose potential risk of injury and infections due to their puncture or cutting properties, including syringes, needles, broken glass, blades;
- 5) “non-infectious wastes” means wastes that are not contaminated with blood or body fluids including usual household or municipal waste;
- 6) “chemical waste” means wastes that comprise discarded solid, liquid or gaseous chemicals including cleaning, housekeeping, and disinfecting product;
- 7) “infectious waste” means wastes that comprise all biomedical and health care waste known to have the potential of transmitting infectious agents to humans or animals which include material contaminated with blood or body fluids;
- 8) “heavy metals waste” means both discarded or non-functional materials and equipment with heavy metals and derivatives, including batteries, thermometers and manometers;
- 9) “healthcare waste management” means discipline associated with the control of generation, segregation, collection, storage, transfer and transport, processing treatment and disposal of healthcare wastes in a manner that is in accordance with best principles of public health, economics, engineering, conservation, aesthetics and other environmental considerations;

- 10) “waste segregation” means the separation of the entire waste stream generated in health facilities by color coding containers including different waste groups according to the specific treatment and disposal requirements;
- 11) “healthcare facilities” means hospitals, health center, health post, clinic, diagnostic center and other related facilities licensed to provide health services;
- 12) “waste collection” means removing waste bags from the service point and taking to storage or disposal area including quantifying waste by volume, labeling as to its source, and recording;
- 13) “waste storage” means placing wastes in a secured and separate place until a specified time for treatment and disposal;
- 14) “waste treatment” means treating wastes to make it free from any hazards or infection risk before discharging to the environment;
- 15) “healthcare waste” means a by-product of health care facility that includes potential risk and non risk wastes;
- 16) “biomedical wastes” means waste that is generated during the diagnosis, treatment or immunization of human beings or in related research activities;
- 17) “pressurized container waste” means wastes consisting of full or empty containers with pressurized liquids, gas, or powdered materials, including gas containers and aerosol cans;
- 18) “general waste” means wastes largely composed of domestic or house hold type of waste which is non-hazardous to human beings;
- 19) “secured landfill” means a careful engineered depression in the ground to prevent spillage and pollution of the environment.
- 20) “appropriate organ” means, as the case may be, the Ethiopian Food, Medicine, Healthcare Administration and Control Authority or a regional government organ authorized to implement food, medicine and healthcare administration and control activities or other organ duly authorized by law;
- 21) “disposal firm” means any waste management company licensed to dispose health care waste;
- 22) “disposal referral system” means out sourcing system to pass on health care wastes to a licensed disposal firm, supplier, manufacturer or central disposal site for disposal service for fee;

- 23) “effluent” means a non-chemical liquid wastes that comes out of laundry, kitchen, toilet, shower and laboratory rooms which may be contaminated by pathogenic microorganisms;
- 24) “high temperature incinerator” means an incinerator that generates at least 1200°C in the secondary chamber, and is fitted with gas cleaning equipment;
- 25) “medium temperature incinerator” means a two-chamber incinerator with minimum temperature of 600 °C;
- 26) “waste inertization” means a variant of encapsulation and involves removing the packaging materials including blister packs, paper, cardboard and plastic from the health care waste and then crushing and mixing wastes with cement, lime and water;
- 27) “waste encapsulation” means a landfill approach to reduce the risk of healthcare waste through immobilizing the healthcare waste in a solid block within a plastic or steel drum.
- 28) “Authority” means the Ethiopian Food, Medicine and Health Care Administration and Control Authority.

3. Objective

The objective of this directive shall be to protect the public from health risks and hazards associated with healthcare wastes.

4. Scope of Application

This directive shall be applicable on all healthcare facilities regulated by the **Authority or appropriate organ** that manage healthcare wastes.


Part Two - Solid Healthcare Waste Management

5. Waste Minimization

Any person who is involved in healthcare waste generation shall make sure appropriate waste minimization measures are taken and these include the responsibility to make sure:-

1. Quantity of healthcare wastes are minimized to the need for disposal;
2. material and supplies are purchased with the intent that they produce no or minimal waste;
3. employees of the health facility observe this directive and other applicable laws regarding healthcare wastes minimization;
4. good practice of waste minimization within the facility is monitored and evaluated;
5. the availability and implementation of waste minimization plan within the facility;
6. waste reuse and recycling practice are in a place, if applicable;
7. for the purpose of this sub article “waste minimization” means reduction of wastes generated from health care facilities and health related institutions by means of source reduction, recycling, waste segregation and good management and control practice.

6. Waste Segregation

1. Healthcare facilities shall have the obligation to prepare and implement standard operating procedures in the handling of healthcare wastes;
2. It shall be the responsibility of the service providing health professional to appropriately segregate healthcare waste at the point of service delivery;
3. It shall be the responsibility of the health facility to make sure all waste bags or containers to be labeled containing basic information about the content and sources of wastes or department;
4. segregation shall be maintained in the subsequent waste management steps from collection to disposal;
5. All, non- sharp infectious waste shall be placed in yellow polyethylene bags having minimum 300 micron gauge and marked “danger! infectious waste” and indicated with the international biohazard symbol of; 
6. Every person who is involved in segregating healthcare wastes shall ensure the absence of infectious and hazardous healthcare waste in the domestic waste flow line;
7. Health professionals and waste handlers shall understand the color coding system and safe handling of waste in accordance with Annex 1 of this directive;
8. segregation shall be regularly monitored to ensure compliance or fulfillment;
9. safety box shall be located within arm’s reach of any place where injection is given and shall be sealed and collected when $\frac{3}{4}$ full and must never be emptied, reused or opened;

10. Where any waste is found not to be incinerated shall be segregated separately according to the type and nature of the waste;
11. Health professionals shall make sure used needles with syringes are put in safety box immediately after the injection without recapping;
12. Pharmaceutical wastes spilled or contaminated drugs or packaging containing drug residue generated from any place in the healthcare facility other than the store and dispensary area shall not be returned to the store or dispensary areas. They shall be contained in the correct container at the point of generation;
13. Employees of the health facility shall never attempt to correct errors of segregation by removing items from a bag or container.

7. Waste Reuse and Recycle

1. Where materials with no contamination shall be recycled according to the type of material to be recycled.
2. Recycling shall be carried out if recyclable materials are separated from the hazardous waste or contaminated materials and it shall be treated as mixed hazardous waste.
3. Wastes reuse, recycle and recovery shall be done only if there is no heavy metal and biological contamination.
4. All non-contaminated plastics and glass shall be delivered to or picked up by licensed local collectors capable of recycling them with environment-friendly techniques.

8. Waste Collection

- 1) Health facilities shall provide collection bags or bins at the point of waste generation and wastes shall be collected in accordance with Annex II of this directive;
- 2) Anatomical wastes and placenta shall be collected separately and immediately in plastic or galvanized metal containers with a tight –fitting cover; and removed immediately;
- 3) Bins used for healthcare waste collection shall be collected when $\frac{3}{4}$ full, spills shall be avoided and the reused bags and bins shall be cleaned and disinfected in a solution of 0.5% of sodium hypochlorite every time they are emptied;
- 4) No bags or bins shall be collected unless they are labeled with their point of generation and content;

- 5) Collection of healthcare waste shall include quantitative waste by volume, labeling as to its source and recording;
- 6) When the bags or bins are collected it shall be replaced immediately the same type.
- 7) The bag or bin shall be firmly fixed by lid or sealed with appropriate adhesive tapes; however, bags shall not be closed by stapling;
- 8) Healthcare professionals or waste handlers shall wear proper personal protective equipment when handling wastes and after use shall use antiseptic hand rubs or wash and dry their hand.;

9. Packing of Hazardous and Infectious Waste

- 1) Hazardous waste shall be packed, transferred, and disposed of properly to protect the healthcare professionals, waste handlers, public and the environment;
- 2) The packaging hazardous waste shall be appropriate for the type of waste involved, and it shall endure handling, storage, transportation, and treatment;
- 3) Infectious healthcare waste shall not be packed and compacted before treatment;
- 4) Large quantities of hazardous and infectious wastes shall be placed in containment tanks;
- 5) Plastic bags used to pack solid or semisolid wastes shall be tear-resistant and shall not keep in contact with sharp external objects;
- 6) Packaging of healthcare waste shall have:
 - a) An inner packaging comprising watertight primary receptacle of metal or plastics with leak proof seal like a heat seal, a skirted stopper or a metal crimp seal, a watertight secondary packaging; and absorbent material in sufficient quantity to absorb the entire contents placed between the primary receptacle and the secondary packaging; if several primary receptacles are placed in a single secondary packaging, they shall be individually wrapped so as to prevent contact between them
 - b) An outer packaging comprising having adequate strength for its capacity, mass and intend, and with a minimum external dimension of 100 mm and a list of contents shall be enclosed between the secondary packaging and the outer packaging and the outer packaging shall be appropriately labeled.


10. Waste Transportation or Transfer

- 1) Onsite transportation of healthcare wastes shall be done in accordance with the following provisions:
 - a) Bags or bins shall be transported from the service point to storage, treatment and disposal area and a disinfected and clean trolley or wheel barrow shall be used for transporting safety boxes and bins;
 - b) Employees safety shall be ensured by providing protective clothing or equipment and training;
 - c) The collection route shall be the most direct one from the collection points to the central storage, disposal sites and off sight and waste routes within the facility shall be designated to avoid the passage of waste through patient care area;
 - d) The collected waste shall not be left even temporarily, anywhere other than at the designated central storage or disposal site;
 - e) Container shall be covered with lids, puncture proof and leak proof during transport;
 - f) Carts and recyclable containers that are used repeatedly for transport and treatment of bagged waste shall be disinfected after each use;
 - g) The international hazard sign shall be displayed on the vehicle or container, as well as an emergency telephone;
 - h) Employees shall be properly trained in the handling, loading and unloading, transportation and disposal of healthcare wastes;
 - i) Employees shall be fully aware of emergency procedures for dealing with accident and spillage;
 - j) Yellow bags of hazardous healthcare waste and black bag of non-risk healthcare waste shall be collected on separate trolleys that shall be painted or marked with the corresponding colors and cleaned and disinfected regularly;
 - k) When handling or transporting plastic bags of infectious waste, care shall be taken to prevent tearing the bags. Instead of chutes or dumbwaiters, carts shall be used for transporting bags of infectious waste within the facility;
 - l) Waste shall be placed in rigid or semi rigid, leak proof containers before being loaded onto trucks;

- m) If transportation and disposal cannot be immediately ensured anatomical waste shall be stored in the mortuary.
- 2) Offsite transportation of healthcare wastes shall be done in accordance with the following provisions:
 - a) Treated infectious wastes shall be transported in closed, leak-proof, rigid containers using trucks.
 - b) The transportation shall be properly documented and all vehicles shall carry a consignment note from the point-of collection to disposal facilities.
 - c) Vehicles used for the carriage of yellow bags shall be disinfected prior to use for next service.
 - d) The vehicles and containers used for the transportation of healthcare wastes shall not be used for any other purpose be locked at all times, except when loading and unloading; be free of sharp edges, easy to load and unload by hand, easy to clean and disinfected or on the road during transportation; shall carry adequate supplies of plastic bags, protective clothing, cleaning tools and disinfectant and shall be marked with the name and address of the waste carrier;
 - e) Separate arrangement of time shall be earmarked for transportation of bio-medical waste to reduce chances of its mixing with general waste
 - f) The transport shall be done through desiccated vehicles specially constructed for the purpose having fully enclosed body, lined internally with stainless steel or aluminum to provide smooth and impervious surface which can be cleaned with an internal body height of 2.2 meters.
 - g) The driver's compartment or section shall be separated from the load compartment with bulkhead.

11. Healthcare Waste Storage

- 1) The storage room shall be located within the premises of the healthcare facility and shall be close to the treatment unit, easily accessible for transportation, and shall be away from food storage and preparation areas;
- 2) Provision regarding segregation of wastes shall also be applicable, where appropriate, during storage;

- 3) Infectious wastes may be stored no longer than two days before being treated or disposed, however used safety boxes may be stored for a maximum of one week;
- 4) The storage room shall be totally enclosed or locked and secured, and only authorized person shall have access;
- 5) The storage room shall have adequate space, easy to clean and disinfect with an impermeable hard-standing base, good water supply, drainage and ventilation and protected from sunlight;
- 6) Containers used for storage shall be labeled and covered with lids;
- 7) The universal biological hazard symbol /  / shall be posted on the storage area door, waste containers, freezers, or refrigerators;
- 8) A supply of cleaning equipments, protective clothing and waste bags or containers shall be located close to the storage area;
- 9) Collected wastes shall not be stored even temporarily anywhere other than the designated storage room.

12. Healthcare Waste Treatment

- 1) Unless done in accordance with Annex III of this directive sharp and non-sharp infectious wastes shall not be disposed without prior treatment.
- 2) Without prejudice to sub-article 1 of this article non-infectious wastes shall be disposed without any prior treatment.
- 3) Healthcare waste may be treated through incineration, steam sterilization, gas or vapor sterilization, thermal inactivation or chemical disinfection.

13. Incineration

- 1) Incineration shall be used for treatment of sharp, non-sharp infectious wastes, pathological wastes including tissues and body parts and combustible non-infectious wastes. High temperature incineration technology (pyrolytic incinerator) shall replace low and medium temperature incinerators like brick incinerators whenever possible.
- 2) Low temperature incinerator like drum incinerator may only be used at health post levels.
- 3) The temperature used for incineration shall be maintained more than 600 °c.

- 4) The effectiveness of the incinerator in treating and destructing of infectious wastes shall be assessed and documented before use, if applicable.
- 5) Persons involved in incineration shall be trained in handling techniques to minimize personal exposure to hazards from infectious wastes and wear personal protective equipment.
- 6) Polyvinyl chloride plastics, photographic material, X-ray and other imaging materials, mercury thermometer, batteries, or Aerosols cans, or pressurized containers or ampoules or sealed vials and other items containing heavy metals shall not be burned or incinerated.
- 7) All incinerators or burning areas shall be fenced to prevent access by the community or animals. It shall be located away from houses and crops and shall be 30 meter away from the health care facility.
- 8) Highly infectious wastes from isolation wards or permanent treatment center like cholera shall always be incinerated onsite.
- 9) High temperature incineration shall be used on high-density wastes such as large quantities of animal body, animal bedding or fluids.
- 10) All incinerators shall be inspected and maintained by a qualified person on a regular basis.
- 11) If incineration cannot be performed, anatomical waste and placentas shall be buried at a sufficient depth depending upon the water table and add lime in the pit.
- 12) Every centrally located incinerator shall be a high temperature incinerator.

14. Steam Sterilization

- 1) Steam sterilization shall be used for treating only infectious wastes;
- 2) The Steam sterilizer shall be used at 30 minutes and 121°C with a pressure of 106 KPa.
- 3) For efficient use of steam sterilizer users' manual or manufacturers' instruction shall be considered.
- 4) Autoclaves used to treat waste shall be used only for waste treatment- never for treatment of instruments to be used clinically.
- 5) Autoclaves used for waste shall be located in a room separate from autoclaves used for clinical sterilization.

- 6) Containers like Plastic bags, metal pans, bottles and flask shall be used effectively in steam sterilization.
- 7) High-density polyethylene and polypropylene plastic shall not be used for steam sterilization.
- 8) If heat-labile plastic bags are used, they shall be placed in another heat-stable container that allows steam penetration such as strong paper bag, or they shall be treated with gas or vapor sterilization.
- 9) The following precautions shall be taken when using steam sterilization:
 - a) plastic bags shall be placed in a rigid container before steam treatment to prevent spillage and drain clogging;
 - b) bags shall be opened and caps and stoppers shall be loosened immediately before they are place in the steam sterilizer;
 - c) Persons involved in steam sterilizing shall be trained in handling techniques to minimize personal exposure to hazards from infectious wastes. Some of these techniques include:
 - 1) personal protective equipment/materials;
 - 2) minimization of aerosol formation by using disinfectant chemicals;
 - 3) prevention of waste spillage during autoclave loading and unloading;
 - 4) Prevention of burns from handling hot containers, and management of spills.
- 10) The autoclave temperature shall be checked with a recording thermometer or sterilization indicator strip to ensure that the proper temperature is being maintained for recommended time.
- 11) Steam sterilizers shall be routinely inspected and serviced following manufacturer instruction and the process shall be routinely monitored to ensure that the equipment is functioning properly.
- 12) High-density wastes such as large body parts, large quantities of animal bedding or fluids, shall not be steam sterilized or autoclaved.

15. Gas or Vapor Sterilization

- 1) Gas/vapor sterilization shall be used with caution since it is a suspected human carcinogen.
- 2) Persons involved in gas or vapor sterilization shall be trained in handling techniques to minimize personal exposure to hazards from infectious wastes and handling of sterilized materials. Handling techniques include use of personal protective equipment and materials, prevention of waste spillage during gas or vapor sterilization loading and unloading and prevention of burns from handling hot containers, and the management of spills.

16. Thermal Inactivation

- 1) Thermal inactivation shall be used for large volumes of infectious waste.
- 2) Solid infectious waste shall be treated with dry heat in an oven, using electric.
- 3) After treatment, the contents shall be discharged into the sewer or landfills in a manner that complies with federal and regional requirements.
- 4) Persons involved in thermal inactivation shall be trained in handling techniques to minimize personal exposure to hazards from infectious wastes. Handling techniques include use of personal protective equipment or materials, prevention of waste spillage during thermal inactivation loading and unloading or prevention of burns from handling hot containers, and the management of spills.

17. Chemical Disinfection or High Level Disinfection

- 1) The type of microorganism and disinfectant shall be considered when using chemical disinfection.
- 2) When possible chlorine and glutaraldehyde shall be used for disinfection following manufacturer instruction for concentration of the chemicals and contact time. Other relevant factors such as temperature, pH, mixing requirements, and the biology of the microorganism shall be considered.
- 3) The concentration for chlorine solution shall be 1% for 20 minutes and for glutaraldehyde shall be 2-4% for 20 minutes.

- 4) Ultimate disposal of chemical waste shall be conducted under the supervision of an inspector from the appropriate organ in accordance with applicable ambient environment standard.
- 5) No disinfectants shall be discharged into natural water bodies.
- 6) Persons involved in chemical disinfection shall be trained in handling techniques to minimize personal exposure to hazards from infectious wastes and handling of sterilized materials. Handling techniques include the use of personal protective equipment and materials, the prevention of exposure to pathogenic organism, the prevention of waste spillage during chemical disinfection loading and unloading, and the prevention of burns from handling hot containers, the management of spills, and methods of handling sterilized materials.

18. Healthcare Waste Disposal

- 1) Any person who wants to establish and operate a health care waste disposal firms shall be licensed by the Authority and the license shall be displayed in noticeable place in accordance with Annex IV of this directive;
- 2) In order to get license in accordance with sub-article (1) of this provision health care waste disposal firm shall have the following professionals:
 - a) environmental health professionals or public health professionals trained in Infection Prevention and Patient Safety and certified;
 - b) sanitary engineer (For landfill only);
 - c) waste handlers who shall be oriented in the healthcare waste management; and
 - d) security guards and other necessary administrative staff.
- 3) A disposal firm shall have secured disposal site depending on the Environmental Impact Assessment conducted with the supports of the Environmental Protection Authority (EPA) of Ethiopia;
- 4) A disposal firm shall have dedicated and secured transportation vehicle in accordance with applicable laws, necessary equipment for the licensed disposal method, security guards working 24 hours a day and 365 days a year;

- 5) A contractual agreement made between health institution and a licensed disposal firm shall be reported to the appropriate organ;
- 6) Healthcare wastes may be disposed using conventional sewer system for discharge of treated liquids, sanitary landfill disposal of treated solids and incinerator ash, small scale burial techniques for infectious wastes at lower level healthcare facilities, placenta pit for placenta and other anatomical wastes and ash pit for final disposal of ash;
- 7) Untreated infectious waste shall not be disposed by any method;
- 8) All treatment and disposal sites shall be fenced to prevent unauthorized access;
- 9) Burial shall not be used in areas with high water tables. The bottom of the burial pit shall be at least 1.5 meters above the groundwater level;
- 10) Facilities shall secure the services of reputable waste handling institution to ensure, to the extent possible, that final disposal of hazardous waste or infectious waste is performed according to applicable federal and local regulations;
- 11) Disposal shall be carried out based on the disposal methods in accordance with this directive;
- 12) The disposal firm shall take necessary measure to prevent diversion and scavenging during transport and disposal process;
- 13) All healthcare waste disposal requests made by healthcare facilities shall be reported to the appropriate organ by the disposing firm in accordance with Annex V this directive.

19. Waste Disposal Methods

- 1) Secured Burial (Controlled Non-Engineered Landfills) of Infectious Waste:
 - a) Burial pit shall be above water table where (the bottom of the pit shall be at least 1.5 meter above the ground water table) and fenced to prevent access by animals and the community.
 - b) Non-risk waste shall not be dumped in to infectious waste burial pits
 - c) If needle removers are used needles shall be dumped into a needle pit, barrel or appropriate container.
 - d) When pits are full it shall be capped with concrete and marked to prevent future excavation.

- e) Secured burial (Controlled non-engineered) and Sanitary landfills (Highly Engineered Landfills) may be used as an alternative health care waste disposal options.
 - f) Open dumping of health care waste in uncontrolled non-engineered landfill shall be prohibited.
 - g) Controlled non-engineered landfill shall be in compliance with acceptable Environmental Impact Assessment and shall not affect the aquifer, other watercourses or air.
 - h) Controlled non-engineered landfill shall be located at least 50 meters away from any ground water source be protected from flooding, water entry and runoff, be secured from scavenging by having security guards and security fence,
 - i) Controlled non-engineered landfill operation shall minimize the potential risks for polluting water resources and soil, the generation of landfill gas i.e. methane and carbon dioxide, smell, vermin and fire, destruction of natural or virgin sites and long term cost intensive clean-ups, remediation and monitoring.
 - j) Disposal by controlled non-engineered landfill method shall not be used for hazardous liquid wastes and hazardous materials containing free liquids, highly volatile and flammable liquid wastes, wastes containing appreciable quantities of mineral oils, spontaneously flammable or pyrophoric solids, shock sensitive explosives, compressed gases, highly reactive wastes, water soluble non-convertible materials and persistent organo-halogen compounds.
 - k) Health care wastes may be disposed by encapsulation or inertization using controlled non-engineered landfill method.
- 2) Sanitary Landfills (Highly Engineered Sanitary Landfill)
- a) Site selection, design and management of operations of highly engineered sanitary landfill shall be in compliance with acceptable Environmental Impact Assessment.
 - b) Highly engineered sanitary landfill shall be properly constructed in order to protect the environment, the aquifer, other watercourses and air.
 - c) The basement of highly engineered sanitary landfill shall be closed and sealed with impermeable materials to prevent gas emission to the open air and water leachate to the environment.

- d) Highly engineered sanitary landfill shall be constructed with gas extraction facility, groundwater monitoring facility and leachate treatment facility.
 - e) The gas extraction facility shall be designed either to burn collected gas or convert into energy.
 - f) Each day's solid waste shall be compacted and covered with soil to maintain sanitary conditions.
 - g) For the purpose of this sub article "highly engineered sanitary landfill" means an engineered landfill with landfill gas extraction, groundwater monitoring and leachate treatment facilities and monitored by trained staff.
- 3) Constructing an Incinerator
- a) The size of an incinerator to be installed shall depend upon the amount of health care waste, and made operational as per the specification outlined by Federal Ministry of Health and Federal Environmental Protection Authority of Ethiopia;
 - b) The ventilation of gases through the incinerator stacks, and the residue or ash shall be disposed in a sanitary landfill or ash pit;
 - c) The incinerators shall be properly designed, maintained, and operated to maximize the efficiency of the incinerator;
 - d) High temperature incinerator (above 1200°C) shall be used to treat chemical wastes that can be incinerated;
 - e) Incinerator operators shall wear protective equipment that shall be made of materials that do not easily burn or melt like gloves, boots, apron, goggles when loading and operating the incinerator;
 - f) Incinerator shall follow standard operating procedures including proper loading, preheating and control according to the design of the incinerator;
 - g) Incinerator operator shall remove ash from the ash chamber and before using the incinerator;
 - h) All incinerators shall be inspected and maintained by an Environmental Health Professional on a regular basis and report of inspection shall be given to all concerned;
 - i) In the absence of EHP, regular inspection shall be performed by public health professionals or health center heads or another qualified persons.

4) Specific Waste Disposal Methods

The following methods shall be applied for solid waste disposal in healthcare facilities:

- a) sharp wastes shall be treated and disposed using incineration with ash pit, secured on-site burial or transport to off-site treatment and disposal sites if available in their decreasing order;
- b) non-sharp Infectious wastes shall be disposed using on-site secured burial, encapsulation and/or inertization, onsite incineration with ash pit, or transport to off-site treatment and disposal sites if available;
- c) non-infectious wastes shall be disposed using:
 - 1) collection by municipal truck for landfill disposal,(if municipal collection and disposal service is available);
 - 2) Onsite secured burning.
- d) disposal shall take in account the aquatic life when disposing garbage to water bodies;
- e) disposal of wastes shall not reach to water sources through flooding and contamination;
- f) centralized disposal of waste shall consider distance from town, city, village, site selection, well drained burial ground and composed of porous type of soil during earth burial;
- g) body parts (amputated arms, legs, placenta, stillbirth, dead fetus) shall be buried in a special prepared closed disposal site;
- h) Secured land burial or deep well disposal shall be applicable for highly infectious wastes when necessary depending on the nature of soil formation and ground water table.

Part Three - Liquid Healthcare Waste Management

20. Collection and Transportation

- 1) Liquid infectious wastes may be placed in capped or tightly stopped bottles or flasks.
- 2) Precautions shall be taken to avoid spills or accidental releases of contained liquid wastes.
- 3) Liquid waste shall be collected in a vessel and heated by heat exchangers or a steam jacket that surrounds the vessel.
- 4) The engineering construction of sewer line shall be based on the construction code of the country.

- 5) Health facilities sewers shall not be connected to the main municipal sewer provided that the liquid waste is free from chemicals or shall have their own septic tank with seepage pit.
- 6) Health care facilities sewers shall have their own septic tank or shall be connected to the main municipal sewerage system if the municipal have treatment plant.
- 7) The sewer line of laundry and laboratory shall be connected to separate septic tank.

21. Treatment and Disposal of Liquid Waste

- 1) All effluent in healthcare facilities shall be drained to a septic tank or cesspool for both storage and treatment in the compound of the healthcare facilities which shall not have leakage and contaminate the water sources and the environments.
- 2) The design of sewer shall be depend on the volume of sewage to be conveyed and discharged.
- 3) Liquid waste shall be free from chemicals or shall have their own septic tank with seepage pit
- 4) Health facilities sewers shall be connected to the main municipal sewer or shall have their own septic tank.
- 5) liquid wastes shall be treated before discharging to the environments;
- 6) Liquid infectious wastes shall be treated based on the municipal recommendation with preferred chemical disinfections before discharging to the environments.
- 7) Wastes containing solids like sediment shall be treated with a physical process like settling (similar to preliminary or primary treatment of sewage) to remove solid materials;
- 8) Treatment and disposal of liquid wastes shall not reach to water sources through flooding or any other means.
- 9) Containment areas or devices shall not be located where accidental release of the contained liquid can threaten health or safety.
- 10) Containment areas or devices shall use temporary dikes to intercept flows and direct them to a containment area or device for capture and use a sediment trap for capturing and

treating sediment laden liquid waste or capture in a containment device and allow sediment to settle.

22. Alternative Treatment Methods for Liquid Wastes

Without prejudice to the above provisions oxidation pond with all recommended scientific procedures, Septic tank with or without seepage pit or treatment plant may be used in the treatment and disposal of liquid wastes.

Part Four - Accident and Spillage, and Occupational Risk Management

23. Accident and Spillage Management

- 1) All healthcare facilities staff members shall be properly trained and prepared for emergency response including procedures for treatment of injuries, cleanup of the contaminated area, and prompt reporting of all incidents of accidents.
- 2) The following actions shall be taken when accident and/or spillage occurs:
 - a) wear personal protective equipment;
 - b) decontamination or disinfection, rinsing, and wiping dry of the spillage area with an absorbent cloth,
 - c) decontamination or disinfection of the protective clothing if necessary;
 - d) reporting of the accident to the infection control officer or staff;
 - e) all cases shall be registered by the management team of the health care facilities staff and reported to the district health authorities when necessary;
 - f) it is highly recommended to perform blood tests following an injury to ensure that the injured staff has not been contaminated by pathogens like Human Immune Virus (HIV) Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV) and post exposure prophylaxis service shall be available;
 - g) each health care facility shall maintain a written manual accessible to staff that includes procedures for each type of spill that could be expected in the health care facilities staff;
 - h) sharp injury reporting and recording system shall be in placed at each Health care facilities staff for prompt response and prevention.

24. Safety, Prevention and Control of Occupational Risks

- 1) Protective duty clothing, gloves, masks and eye protection shall be identified and provided to the workers responsible for waste collection, transportation and disposal.
- 2) Precautions shall be taken at prevention of waste spillage during loading and unloading.
- 3) Care shall be taken to prevent burns from handling hot containers
- 4) Drivers, collectors and other waste handlers shall be aware of the nature and risk of the waste.
- 5) Written instructions shall be provided regarding the procedures adopted in the event of spillage or accidents.
- 6) Workers shall be protected by vaccination against tetanus and hepatitis B.
- 7) Workers shall be instructed to use gloves and other personal protective equipment while working in contaminated areas and with contaminated materials.
- 8) All healthcare facility staffs involved in the handling of healthcare wastes shall keep their personal hygiene and wash their hands with antiseptics thoroughly after removing personal protective equipments.
- 9) Concerned facility officials shall undertake periodical supervision to ensure that all healthcare facility staffs shall abide with appropriate working procedures and protocols.
- 10) Desks and countertops shall be free of sharps.
- 11) Needles and other sharp instruments shall be discarded in designated puncture-resistant containers and not in trash cans or plastic bags.
- 12) There shall be no recapping of needles.
- 13) Workers shall examine and handle soiled linens and similar items as if they contained hazardous/infectious items.
- 14) Workers shall take appropriate measures to limit further contagion from health care wastes by practicing universal precautions.

Part Five - Miscellaneous Provisions

25. Training on Healthcare Waste Management

All healthcare facility staffs involved in the handling of healthcare wastes shall receive:

- 1) periodical instruction or training at least once biannually to keep them aware of the techniques to avoid occupational risk;
- 2) healthcare waste management and infection prevention training;
- 3) explanation of the healthcare waste management plan;
- 4) assignment of roles and responsibilities for implementation of the plan;
- 5) refresher training shall be given periodically; and
- 6) regular meetings to discuss and reinforce waste management practices.

26. Duty to Cooperate

The concerned federal and regional bodies shall have the duty to cooperate with the executive organ with a view to facilitating to effectively discharge its duties under this directive.

27. Complaints Handling

- 1) Any person who is aggrieved on anything in this directive may lodge his complaint within 30 days from the date of decision to the grievance hearing body established by the appropriate organ
- 2) The body that received a complaint in accordance with sub-article (1) of this article shall render its decision within 30 days

28. Inapplicable Laws

No directive or practices or circular letter shall, in so far as it is inconsistent with this directive, be applicable with respect to matters provided by this directive.

29. Effective Date

This directive shall enter into force one year from the date of the signature by the Director General of the authority.

Done at Addis Ababa, this 11th day of June, 2013

Yehulu Denekew

Director General

Ethiopian Food, Medicine and Healthcare Administration and Control Authority

Annex I: Three Bins Waste Segregation System – Minimum Standard

Segregation Category	Color-Coded Container	Location
Non-risk waste (paper, packaging, food, boxes, glass, plastic, etc.)	Black bin	In all rooms where non-risk waste may be generated and in all public areas and it shall not be located in public areas
Infectious clinical waste. (Any materials containing blood or body fluids such as gauze, dressings, cultures, IV lines, gloves, anatomical waste, etc.)	Yellow bin	In all rooms where infections waste is generated.
Sharp waste (syringes, needles, lancets, blades, scalpels, broken glass, etc)	Yellow safety box	within arm's reach of any place where injection is given

Additional Waste Segregation Categories with its Appropriate Color Codes

Waste Category	Type of Color Coding Container
Noninfectious (paper, packing material, plastic bottles, food, cartons)	Black bag or bin
Infectious (Gloves, dressings, blood, body fluid ,used specimen container and like)	Yellow with biohazard symbol bag or bin
Highly infectious (anatomical waste, placenta pathological waste and like)	Red + biohazard symbol bag or bin
Chemical(Formaldehyde, pathological, chemical, solvents, organic and inorganic chemicals and like)	Brown bag or bin

Radioactive(any solid ,liquid, or pathological waste contaminated with radioactive isotopes of any kind and like)	Yellow with radioactive label bag or bin
Sharps(Needles, needle of IV set, scalpels, knives, blades, lancets, and broken glass, syringes and needles and like)	Yellow ,marked 'SHARPS' Biohazard symbol bag or bin
Waste with high contents of heavy metals	Red secure container
Effluents	Red flask or container

Annex II: Summary of Procedures

Category of Waste	Segregation	Collection	Storage	Disposal
Sharps	Immediately in safety boxes	Collected when 3/4 full	Dry, covered, secure area, destroyed within one week	Incineration
Infectious waste	Immediately in a yellow bin	Daily	Dry, covered, secure area, destroyed within two days (except for placenta and other anatomical waste which require daily disposal)	Incineration Or pit burial
General waste	Immediately in a black bin	Daily	Dry, covered, area, destroyed within two weeks	Incineration burial, or land fill
Food waste	Immediately in a food waste bin (black bin)	Immediately after meal times	Food waste can be stored for up to one day	Off-site disposal, compost or burial

Annex III: Treatment and Disposal Method for Different Healthcare Facility Wastes

Type of Waste	Treatment and Disposal Options
Human Anatomical Waste (Human tissues, organs, body parts)	<ul style="list-style-type: none"> Secured Burial(1-2meters wide,2-5meters deep and at least 1.5meters above the water table) covered with 10-30 cm layer of soil at every time waste is added to the pit earth and 50 m away from any water source) High or medium temperature Incinerator.
Animal waste (Animal tissues, organs, body parts, carcasses, bleeding parts, blood and experimental animals used in research)	<ul style="list-style-type: none"> High or medium temperature incinerator. Secured Burial(1-2meters wide,2-5meters deep and at least 1.5meters above the water table) covered with earth
Clinical waste(wastes from lab culture, specimens from microorganisms, vaccines, cell cultures, toxins, dishes, devices used to transfer cultures)	<ul style="list-style-type: none"> Autoclaving High Incineration Secured Burial, (1-2meters wide,2-5meters deep and at least 1.5meters above the water table, covered with earth) Chemical treatment
Sharps waste (Needles, Syringes, scalpels, blades, glass)	<ul style="list-style-type: none"> Incineration using properly built high or medium temperature incinerator. Secured Burial
Discarded medicines and cytotoxic drugs (outdated, contaminated, discarded drugs)	<ul style="list-style-type: none"> As per the Directives produced by FMHACA
Soiled waste (contaminated with blood and body fluids including cotton, dressings, soiled plasters, linen)	<ul style="list-style-type: none"> Secured Burial(1-2meters wide,2-5meters deep and at least 1.5meters above the water table) covered with earth) Incineration Autoclaving/Microwaving/ Chemical treatment

Non-infectious waste	<ul style="list-style-type: none"> • Autoclaving/Microwaving • Mutilation and Shredding • Chemical treatment • Steam sterilization(not applicable for non infectious wastes)
Liquid waste (Waste generated from laboratory and washing, cleaning, disinfection)	<ul style="list-style-type: none"> • Disinfection by chemical treatment and discharge to the drains/Sewers/ • Septic tank with Seepage pit or Oxidation pond. • Chemical treatment for liquid wastes from Laboratory, x-ray and imaging services.
Incineration ash	<ul style="list-style-type: none"> • Secure pit burial (1-2meters wide,2-5meters deep and at least 1.5meters above the water table) covered with earth) • Sanitary land fills
Large densely /populated Hazard and non hazard Combustible waste	<ul style="list-style-type: none"> • Low, medium ,high temperature incineration not less than 850 degree celcius • burning (1-2meters wide,2-5meters deep and at least 1.5meters above the water table) covered with earth)
Chemical waste	<ul style="list-style-type: none"> • Chemical disinfection and discharge into the drains • Disposal in secured land fills
General waste such as office waste, food waste and garden waste	<ul style="list-style-type: none"> • Disposed in secured landfills/ash pit, • Sanitary landfills.

Annex IV: Healthcare Waste Management Application Form

To: (Name of the Firm) _____

Subject: _____

I/We _____ of (Address) _____ undertaking the business of (specify) _____ hereby apply for healthcare waste management

License Number _____ issued on _____

Location of business _____

Name of person in charge _____

Reason for request: _____

Type of waste _____

Quantity:

Weight _____

Volume _____

Date of application _____
applicant _____ (Stamp)

Signature of

Cc:

To appropriate body

Annex V: Reporting Format for Healthcare Waste Managing Firm

Name of the firm: _____, Address of the firm _____

Serial Number	Date of request	HCW Receive date	Requester		Healthcare waste					Remark
			Name	Address	Type	Quantity	Unit	Package type	Disposal date	

Cc: Appropriate Body

Annex VI: Checklist for Inspection of Healthcare Waste Management

1. General Information of the organization

1.1. Name of the organization/firm _____

1.2. Type of the organization/firm _____

1.3. Address of the organization/firm

a) Region _____

b) Zone/sub _____

c) City _____

d) Worda _____

e) Kebele _____

f) House number _____

g) Phone number _____

h) E-mail, P.O.Box) _____

1.4. Is there 24 hours availability of safe, clean and adequate water supply? (With its reservoir)? _____

1.5. Availability of Health care waste management plan? ____yes ____no

2. Organizational setup

2.1. Is there fulltime assigned staff for HCW management? yes___ no___

a) Environmental health/ public health professional yes ___ no ___

b) Sanitary engineer yes ___ no ___

c) Waste handlers yes ___ no___

2.2. Is there a functional Committee for Infection prevention and patient safety/Healthcare waste management? yes___ no___

2.3. Is there availability of properly constructed and adequate Latrine (flash/pit)? yes___ no___

2.4. Is there (adequate) availability of sinks and hand washing materials? yes___ no___

3. Are the following Health care waste management activities practiced during Segregation?

a) 3 Bin system in place yes___ no___

b) Proper segregation practice yes___ no___

c) SOP for segregation posted yes___ no___

d) Availability of PPE yes___ no___

- e) Are visual aids or instructions present near the waste receptacles to help in proper segregation? Yes____ no ____ what's used? _____
- f) Are all hazardous waste containers labeled with the word "Hazardous Waste"?
Yes____ No_____
- g) Are the containers marked with the accumulation start date? Yes____ no____
4. Are the following activities practiced during waste Collection?
- a) Timely collection of segregated waste (annex 2) yes____ no____
- b) Proper labeling yes____ no____
- c) availability of Vehicles (trolley, ...) yes____ no____
- d) Availability of Supplies? yes____ no____
- e) Availability of PPE yes____ no____
5. Are the following activities practiced during waste packing?
- a) Are wastes properly tied /sealed? yes____ no____
- b) Properly packed yes____ no____
- c) Availability of Personal Protective Equipments (PPE) yes____ no____
6. Are the following activities practiced during waste Storage?
- a) Availability of Room for storage yes____ no____
- b) Location of the room
- Easy accessible yes____ no____
 - Away from food source yes____ no____
 - Away from public yes____ no____
- c) Properly lighted yes____ no____
- d) Proper ventilation yes____ no____
- e) Is the room easily cleanable yes____ no____
- f) Lockable/secured storage room yes____ no____
- g) Availability of PPE yes____ no____
- h) Storage time practiced for:
- Infectious waste_____
 - Non infectious waste_____
- i) Availability of septic tank with seepage pit yes____ no____
- j) Is all hazardous waste stored in either a satellite accumulation area and/or a separate

hazardous waste storage area? Yes____ No_____

k) Are there any hazardous wastes stored in tanks? Yes____ No_____

l) Are all hazardous waste storage containers in good condition? Yes____ No_____

m) Are all hazardous waste containers kept closed except when filling or adding waste?
Yes____ No_____

7. Are the following activities practiced during waste transportation?

a) Availability of appropriate Trolley/cart/car yes____ no____

b) Proper handling of waste during transportation yes____ no____

c) A space for cleaning vehicles and linked with sewerage line (drainage) yes____
no____

d) Availability of cleaning agents and disinfectants yes____ no____

e) Availability of Personal Protective Equipments (PPE) yes____ no____

8. Are the following activities practiced during waste treatment?

a) Availability of treatment site yes____ no____

b) Types of treatment methods used yes____ no____

c) Properly built incinerator yes____ no____

d) Availability of Personal Protective Equipments (PPE) yes____ no____

9. Are the following activities practiced during waste Disposal?

a) Sewerage system including (Sewer line, septic tank, seepage pit, etc)

b) yes____ no____

c) Proper disposal of infectious and non-infectious waste yes____ no____

d) Availability of placenta pit yes____ no____

e) Presence of Incinerator yes____ no____

f) condition of incinerator (functional, distance) Yes No --

g) Protected sanitary landfill yes____ no____

h) Availability of Personal Protective Equipments (PPE) yes____ no____

10. Are the following activities practiced on occupational Safety issues?

a) Training and sensitization for staffs yes____ no____

b) Vaccination for staffs (Hep B) yes____ no____

c) Recording and reporting of incidents yes____ no____

d) Post Exposure Prophylaxis (PEP) service yes____ no____

- e) Health care risk management yes____ no____
11. Is there any policies and procedures?
- a) Availability of Guidelines/directives yes____ no____
- b) SOPs yes____ no____
- c) Recording and reporting system yes____ no____
12. What departments are responsible for HCWM at your health care facility?
- a) Health and Safety_____
- b) Maintenance/facility_____
- c) Environmental Health_____
- d) Nursing_____
- e) Other (specify)_____
13. Does the facility have a waste management or environmental committee?
- Yes_____ No_____
14. Does the facility have an on-site laundry operation? Yes____ No_____
15. Does the facility have recycling programs? What are they? (i.e.: paper, plastic, aluminum, steel, cardboard, pallets, food waste, etc?)
- Yes____ No_____
16. If yes for Q14, how much waste was reused /recycled? _____
17. Are Staffs trained on waste management methods? (Technical and administration staffs)
- Yes____ No_____
- How often? _____
18. Is there Personnel trained on proper clean up procedures?
- Yes____ No_____
19. Are patient kits (bedpans, water jug, etc.) reusable?
- Yes____ No_____
20. Are sharps containers reusable?
- Yes____ No_____
21. Are oil traps cleaned periodically?
- Yes____ No_____
22. Are the following point's practices during waste management?
- a) Availability of recording and reporting forms yes____ no____

b) Staff training documentation

yes ____ no ____

23. Challenges encountered during healthcare waste management practice in the healthcare facility-----

24. The name of the facility head-----

Signature-----

Date-----

25. Name of inspectors

Signature

Date

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