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## Legal Aspects of Medical Waste Management in Health Care Facilities and Protection of Environmental Health

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**Abstract:** Hazardous and Toxic Material Waste/ (Hazardous and Toxic Materials) is the residue of a business and/or activity that contains hazardous and toxic materials (B3). One of the B3 wastes is medical waste, which is infectious waste produced from activities in healthcare facilities, both in the form of solid and liquid waste. This medical waste is generated from activities such as hospitals, health centers, independent practice places, clinics, etc. facilities. Medical waste is an infectious object or item that must be managed properly, starting from the time of collection, and transportation, to the destruction process. Therefore, there needs to be legally binding regulations related to waste and its management. This research is descriptive and will produce an overview of B3 waste management regulations, especially medical waste with the protection of environmental health rights. The research approach used is a normative legal approach. The data collected is in the form of secondary data, while the analysis method used is qualitative. The results of the study show that the more human activities increase, the more waste is produced. Medical waste is one of the B3 wastes. Medical waste is waste that is directly generated from the diagnosis and treatment of patients in healthcare facilities, such as polyclinics, nursing, surgery, obstetrics, autopsies, and laboratory rooms. To avoid environmental risks, medical waste management must be done properly. Various laws and regulations for B3 waste management have been established, including Government Regulation Number 19 of 1994 (PP 19/1994) concerning Waste Management of Hazardous and Toxic Materials up to PP 101/2014. The provisions regarding B3 waste management are based on Law Number 32 of 2009 concerning Environmental Protection and Management (UUPLH). However, medical waste still needs to be synchronized with the provisions in Law Number 36 of 2009 concerning Health. Efforts to protect environmental health are carried out through the regulation and management of medical waste in healthcare facilities. Through the regulation and management of medical waste, it can prevent environmental pollution prevent the transmission of diseases (infections), and avoid the misuse of waste, so that it can maintain environmental health.

**Keyword:** Medical Waste, Regulation and Management of Medical Waste, Healthcare Facilities, Environmental Health.

## INTRODUCTION

Environmental pollution due to B3 (Hazardous and Toxic Materials) is a problem that is of concern to nations in the world. Starting from the emergence of cases of environmental pollution due to B3 such as in Minamata Bay (Japan), Love Canal (United States), Wabigon River (Canada), and Bhopal (India). B3 is one of the seven main environmental problems at the global level, so it requires cooperation among countries to overcome them. Initially, B3 waste was considered more of a problem in developed countries. However, in its later development, when B3 waste became one of the objects or commodities that could be traded, many developed countries made poor developing countries targets for B3 waste disposal, both legally (legally) and illegally (illegal), so that B3 waste was no longer considered a national and regional problem, but became a global problem (Tolba, 1990).

One of the B3 wastes is waste generated from healthcare facilities. As is known, health service facilities include hospitals, community health centers (PUSKESMAS), clinics, independent practice places, etc. These health service facilities produce various kinds of waste and B3 waste, both solid and liquid. The problem is that some of them do not manage well, due to complicated handling and high costs. Such conditions require the intervention of the Government to regulate it, carry out supervision and coaching, and specifically need to organize BIMTEK (Technology guidance) activities so that the medical waste does not have a bad impact on humans (environmental health) (Ontran Sumantri Riyanto et al., 2021).

In Article 1 Point 1 of Government Regulation Number 66 of 2014 concerning Environmental Health, it is stated that "Environmental Health is an effort to prevent diseases and/or health disorders from environmental risk factors to realize a healthy quality of the environment both from physical, chemical, biological, and social aspects." The right to a healthy environment is a right guaranteed by the Constitution. Furthermore, in Law Number 36 of 2009, it is also stated that a healthy environment is free from elements of health disorders, including waste, pollution, and, harmful chemicals (Ontran Sumantri Riyanto et al., 2021).

According to Government Regulation Number 101 of 2016, Medical waste is included in one of the B3 wastes, especially in the category of infectious waste, including waste that comes from patient care that requires isolation of infectious diseases or intensive care and laboratory waste; syringe marks, pieces of body tissue and others. B3 waste is the rest of a business and/or activity that contains hazardous and toxic materials. Medical waste is an infectious object or item that results from health service activities in healthcare facilities that are at risk to environmental health. Therefore, what must be managed properly starts from the time of collection, and transportation, to the destruction process. The more human activities increase, the more waste is produced, as well as the denser the intensity of health services, the more medical waste will be produced. Therefore, legally binding regulations related to medical waste and its management are needed (Shareefdeen, 2012).

The impact caused by the physical properties of B3 waste on health in general is in the form of physical damage, such as injuries, shortness of breath, fainting, and even unconsciousness (Amanah, 2022). The impact of chemical properties includes fire, explosion, poisoning, corrosion of objects (equipment), and others. That is why medical waste must be managed properly.

According to WHO data, poor medical waste management can trigger the following dangers (Tolba, 1990) :

1. Infection, Medical waste usually contains pathogens that cause infection, namely viruses and bacteria. Medical waste often causes respiratory infections such as tuberculosis, and Streptococcus pneumonia, and viruses such as measles, which can occur as a result of incorrect waste disposal. In addition, medical waste also increases the risk of hepatitis A, B, or C, to HIV and Aids which can be transmitted through items contaminated with blood or body fluids.

2. Hazardous chemicals, medical waste often contains hazardous chemicals. If not disposed of properly, it can trigger poisoning. Chemicals in medical waste can also increase the risk of respiratory or skin diseases.
3. Genotoxic substances Research from Finland found that genotoxic substances in meids waste can increase the risk of miscarriage. In addition, genotoxic substances can increase mutagenic compounds in the body. These compounds can cause genetic mutations in human DNA, which can trigger cancer in somatic cells. When this substance affects germ cells (cells that makeup sperm and eggs), it can cause damage to our offspring. Also read: 4 Groups of People Who Need to Get the Covid-19 Vaccine
4. Radioactive substances Exposure to radioactive substances can cause headaches, dizziness, nausea, and vomiting. Radioactive substances can also cause burns to the skin or acute radiation syndrome. This substance can also result in long-term health effects such as cancer and cardiovascular disease. Exposure to radioactive substances can also cause death.

## **METHOD**

The research approach uses normative juridical, the nature of this research is descriptive-analytical in the form of a study of the legislation that regulates the management of B3 waste, especially health facility waste which will synergize with environmental health efforts. The data collected is in the form of a set of norms that apply to the regulation of medical waste. The data collection method is carried out by documentarian studies to produce secondary data which is carried out by tracing relevant library sources. Data analysis was carried out qualitatively (Creswell, 2019; Sugiyono, 2021).

## **RESULTS AND DISCUSSION**

### **Regulations on medical waste management in healthcare facilities**

The management of B3 waste, especially medical waste in health service facilities, is the responsibility of the Government, both central and regional. From the results of the study, it can be seen that the regulation of medical waste in health service facilities is based on several legal requirements as can be described below:

Law Number 32 of 2009 concerning Environmental Protection and Management (UUPPLH) defines B3 Waste in Article 1 point 21 and Point 22 defines B3 as follows: Point 21, hazardous and toxic substances hereinafter abbreviated as B3 are substances, energy, and/or other components that due to their nature, concentration, and/or amount, either directly or indirectly, can pollute and/or damage the environment, and/or damage the environment, and/or endanger the environment, health, and the survival of humans and other living things". Meanwhile, in point 22 it is stated that hazardous and toxic material waste, hereinafter referred to as B3 Waste, is the residue of a business and/or contains B3".

Furthermore, the activity as a provision for the implementation of UUPPLH, is Government Regulation Number 101 of 2014, concerning B3 Waste Management, defining B3 Waste in Article 1 number 3 which states: "Hazardous and Toxic Material Waste, hereinafter referred to as B3 Waste, is the rest of a business and/or activity that contains B3." Furthermore, in this PP, it is stipulated that waste from hospital and clinical laboratory activities is included in the list of B3 Waste. The types of waste include clinical waste, expired pharmaceutical products, contaminated laboratory equipment, pharmaceutical product packaging, laboratory waste, and residues from the incineration process (Hutajulu et al., 2022).

Medical waste is very important to be managed properly, considering that medical waste is included in the category of B3 waste. Some medical waste is included in the category of hazardous waste and some are included in the infectious category. Infectious waste is usually in the form of patient body tissues, syringes, blood, bandages, cultures,

materials, or equipment that come into contact with infectious diseases or other media that are thought to be contaminated by the patient's disease. Improper environmental management will risk disease transmission. Based on Law No. 8 of 2008 concerning Waste Management, each waste needs to be processed and separated based on its type to facilitate the destruction process, especially for medical waste classified as B3 Waste (Janik-Karpinska et al., 2023).

In the provisions of the Regulation of the Minister of Health Number 49 of 2016 concerning Procedures and Technical Requirements for the Management of Hazardous and Toxic Waste from Health Service Facilities, Article 5 states that, Health Facilities must manage B3 waste arising from health service facilities either internally or handed over to other parties which include the following stages:

1. Reduction and separation of B3 waste;
2. B3 Waste Storage;
3. B3 Waste Transportation;
4. B3 Waste Treatment;
5. B3 Waste Burial; and/or
6. B3 Waste Landfill.

Waste in healthcare facilities consists of medical and non-medical waste. There are :

#### 1. Medical Waste

According to the Regulation of the Minister of Environment and Forestry Number P.56/Menlhk-Setjen/2015 Article 1 number 3 states: "B3 waste is Hazardous and Toxic Material Waste, hereinafter referred to as B3 Waste, is the residue of a business and/or contains B3."

There are several terms that we need to know about the joint management of waste in medicine as regulated in P.56/Menlhk-Setjen/2015, including:

- a. Hospital waste is all waste produced from hospital activities in solid, liquid, or gaseous form.
- b. Solid waste is all hospital waste that is in solid form as a hospital activity consisting of solid and non-medical medical waste.
- c. Solid medical waste, which is solid waste consisting of infectious waste, pathological waste, sharp object waste, pharmaceutical waste, cytotoxic waste, pressurized container waste, and waste with a high content of heavy metals.
- d. Liquid waste is all wastewater including feces that come from hospital activities, likely to contain microorganisms, toxic chemicals, and radioactive materials that are harmful to health. Hospital wastewater is all liquid waste that is the result of the process of all hospital activities which includes domestic liquid waste, which is room waste from hospital rooms that may contain microorganisms, toxic chemicals, and radioactive.
- e. Gas waste is all gas-backed waste that comes from incineration activities in incinerator hospitals, such as kitchens, generator equipment, anesthesia, and the manufacture of cytotoxic drugs (Arlinda et al., 2022).
- f. Infectious waste is waste contaminated with pathogenic organisms that are not routinely present in the environment and such organisms in the amount of virulence which and enough to transmit diseases in susceptible humans.
- g. Pathological waste is waste in the form of disposal during surgery, autopsy, and/or other medical procedures including tissues, organs, body parts, body fluids, and/or specimens and their packaging.
- h. Cytotoxic waste is waste from contaminated materials from the preparation and administration of cytotoxic drugs for cancer chemotherapy that can kill and/or inhibit the growth of living cells.

#### 2. Non-Medical Waste

In addition to medical waste, healthcare facilities produce non-medical waste as well. Non-medical waste is domestic waste generated in these healthcare facilities. Most

of this waste is organic waste and not B-3 waste, so its management can be carried out together with existing municipal waste. These types of non-medical waste include liquid waste from laundry activities, liquid domestic waste, and solid waste.

Non-medical solid waste is all solid waste outside of medical solid waste generated from various activities, such as waste from kitchens, offices, parks, yards, treatment rooms, waiting rooms, and others that can be reused if there is technology (Arlinda et al., 2022).

Based on the results of the study, it is known that health service facilities must be able to minimize waste, namely, efforts made to reduce the amount of waste produced by reducing materials (reduce), reusing waste (reuse), and recycling waste (recycle). Meanwhile, the next stage is carried out in collaboration with the waste management party arising from health service facilities consisting of (Masruddin et al., 2021) :

#### 1. Sorting and reduction of medical waste sources.

According to the Minister of Environment Number P.56/Menlhk-Setjen of 2015, Article 6 states "The reduction and sorting of B3 Waste as referred to in Article 5 letter a must be carried out by B3 Waste Producers." B3 Waste Reduction as intended is carried out by, among other ways:

- a. Avoid using materials that contain Hazardous and Toxic Materials if there is another option;
- b. Carry out good governance of any material or materials that cause potential health problems and/or pollution to the environment;
- c. Carry out good governance in the procurement of chemicals and pharmaceutical avoidance materials for accumulation and expiration; and
- d. Carry out periodic prevention and maintenance of equipment according to schedule.

B3 Waste Sorting as mandated in Article 6 paragraph (3) of Ministerial Regulation Number P.56/Menlhk-Setjen of 2015 is carried out by, among other things:

- a. Separating B3 Waste based on the type, group, and/or characteristics of B3 Waste; and
- b. Accommodating B3 Waste according to the B3 Waste group.

Regarding B3 waste, Dyah Pratiwi argued that waste is sorted by considering the smooth handling of matters and storage, reducing the amount of waste that requires special treatment, separating B3 and non-B3 waste, trying as much as possible to use non-B3 chemicals, packaging, and clear labeling of various types of waste to reduce costs, labor, and disposal. Separation of hazardous waste from all waste at the waste-generating site will reduce the possibility of personnel and handling errors (Pratiwi & Maharani, 2013).

#### 2. Medical waste storage

- a. Colored bags should be discarded if they contain 2/3 of the parts. Then the top is tied and clearly labeled.
- b. The bag must be transported by holding its neck, so that if it is carried it swings away from the body, and is placed in a certain place to be collected.
- c. Waste collection officers must ensure that bags of the same color have been made into one and sent to the appropriate place.
- d. The pouch should be stored in a box that is resistant to ticks and pests before being transported to its disposal site (Pratiwi & Maharani, 2013).

#### 3. Collection (storage) of medical waste.

Medical waste generated from each unit in treatment with treatment support is collected by regulations and policies referring to the Decree of the Minister of Health Number 1428/Menkes/SK/XII/2006. The collection of this waste is based on the classification of solid medical waste types starting from sources consisting of infectious waste, pathological waste, sharp object waste, pressurized container waste, and waste with high heavy metal content. The following are the requirements for solid medical waste collection sites according to Djohan & Halim, namely:



- a. It is made of strong material, quite lightweight, rust-resistant, waterproof, and has a smooth surface on the inside.
  - b. In each waste generator, there must be a separate waste collection point for medical waste and non-medical waste.
  - c. Plastic bags are transported every day or less than a day if 2/3 of the waste is filled.
  - d. Sharp objects should be stored in a special place (safety box) such as bottles or safe cartons.
  - e. Containers for infectious and cytotoxic medical waste that are not in direct contact with waste must be immediately cleaned with a disinfectant solution if they are to be reused, while plastic bags that have been used and are in direct contact with the waste.
4. Medical waste separation
- a. Waste must be separated from the source.
  - b. All high-risk waste should be clearly labeled.
  - c. It is necessary to use plastic bags of different colors, which indicate where the plastic should be transported for incineration or disposal.
5. Transportation of medical waste

Waste bags are collected and separated at the same time according to their color code. The handling of special vehicles (there may be cooperation with the Public Works Office) vehicles used to deal with the waste should be emptied and cleaned every day, if necessary (for example, if there is a waste bag leak) using a chlorine solution. Ministerial Regulation Number P.56/Menlhk-Setjen in Article 12 states that B3 Waste Producers for B3 Waste generated from the location of B3 Waste Producers to 1. B3 Waste Storage places used as transfer depots; or 2. B3 Waste Processors who have B3 Waste Management permits for B3 Waste Treatment activities; or B3 Waste Carriers that have a Permit. B3 Waste Management for B3 Waste Transportation Activities, if the Transportation of B3 Waste is carried out outside the work area of health service facilities, transportation is carried out using motorized vehicles such as 4 (four) wheels or 3 (three) wheels B3 waste must be placed in a permanent tub and closed behind the rider with the size: width less than 120 cm and height less than or equal to 90 cm measured from the driver's seat or saddle (Masruddin et al., 2021).

Transportation is divided into two, namely internal and external transportation. Internal transport starts with the initial containment from the point of disposal or to the incinerator (on-site processing). It is usually used as a stroller, and it is cleaned regularly and the implementing officer is equipped with protective equipment and special work clothes. External transportation is the transportation of medical waste to an off-site disposal site. External transportation requires proper implementation procedures and must be followed by the officers involved. These procedures include complying with local transportation regulations.

Medical waste is transported in special containers, it must be strong and not leak. Medical waste should be transported as often as needed. Carriage While waiting to be taken to the incinerator, or transported by the Health Office shall (Arlinda et al., 2022):

1. Stored in eligible containers.
2. Placed in a strategic location, evenly distributed in size adjusted to the frequency of collection with separate color-coded bags.
3. It is placed in a dry/easy-to-dry place, the floor does not seepage, and washing facilities are provided.
4. Safe from irresponsible people, from animals, and free from insect and rat infestations.
5. Affordable garbage collection (Yustina, 2021).

## **Regulation of medical waste management as an effort to protect environmental health based on medical management regulations**

It should be noted that some of the health risks that may be caused by environmental pollution from medical waste include: infectious diseases (hepatitis, diarrhea, measles, AIDS, influenza, etc.). Waste can be categorized as B3 waste with the following criteria: explosive; Flammable; reactive; Toxic; cause infection; and corrosive. In addition to the ones mentioned above if we discuss medical waste then the packaging of expired medicines and medicines is included as waste containing hazardous and toxic materials and waste of hazardous and toxic materials (Hartami et al., 2023).

Given how great the risk of medical waste produced by health service facilities is to the health of the human health environment) (including the need to regulate medical waste as an effort to protect environmental health.

Regulations on the management of medical waste about environmental health are based on the provisions of Article 28 H paragraph (1) of the 1945 Constitution, "Everyone has the right to live a prosperous life in birth and mind, to live, and to get a good and healthy living environment and the right to receive health services." As an implementation of the mandate of the '45 Constitution, Article 65 of the Constitution states that "Everyone has the right to a good and healthy environment as part of human rights".

According to Law Number 36 of 2009 concerning Health, related to the regulation of the right to a healthy environment is formulated in the provisions of Article 6 of the Health Law, "Everyone is mentioned as having the right to a healthy environment for the achievement of a degree of health." (Hartami et al., 2023).

The provisions on environmental health in the Health Law are formulated in Chapter XI Articles 162 to 166, which are specifically related to medical waste contained in Articles 162 and 163. Article 162 states that, Environmental health efforts are aimed at realizing a healthy environmental quality, both physical, chemical, biological, and social that allows everyone to achieve the highest level of health.

Furthermore, the provisions of Article 163 state that,

1. The government, local governments, and communities ensure the availability of a healthy environment and do not have adverse health risks.
2. A healthy environment as intended in paragraph (1) the environment includes settlements, workplaces, recreational places, and public places and facilities.
3. A healthy environment as referred to in paragraph (2) is free from elements that cause health problems, including: a. liquid waste; b. solid waste; c. waste gas; d. waste that is not processed by the requirements set by the government; e. disease animals; carrier of f. hazardous chemicals; g. noise that exceeds the threshold; h. ionizing and non-ionizing beam radiation; i. polluted water; j. polluted air; and k. contaminated food.

Based on the provisions mentioned above, it can be interpreted that the right to environmental health is guaranteed through provisions on waste management, one of which is medical waste generated by healthcare facilities.

To protect environmental health, the prohibition of dumping is also regulated. In the provisions of Article 1 point 24 of the UUPPLH, it is stated that what is meant by dumping is: "The activity of disposing of, placed, and/or inserting waste and/or materials in the amount, concentration, time, and location of certain environmental requirements into a certain living medium" (Larasati et al., 2022). Furthermore, the provisions of Article 60 of the UUPPLH state that, "Everyone is prohibited from dumping waste and/or materials into environmental media without permission".

In the context of enforcing regulations related to B3 waste and efforts to protect environmental health, it is regulated about sanctions for violators of the UUPPLH in Article 104 which is formulated that: "Every person who dumps waste and/or materials into environmental media without a permit as referred to in Article 60, shall be sentenced to a

maximum of 3 (three) years in prison and a maximum fine of Rp3,000,000,000, 00 (three billion rupiah)".

According to the WHO's management of medical waste, technical arrangements on the actions to be taken by officers are urgently needed, from waste storage to the destruction of incinerator waste. At the stage of storing waste bags, the bags must not be full, the waste collection officer must ensure that the bags of the same color have been made into one and sent to the intended place accordingly. This prevents the negative impact of waste management, both the environment on officers and the surrounding community. Arifin as quoted from Nursamsi, Thamrin, and Deni Evizon stated that the disposal and destruction of medical waste at the Health Center always pays attention to the fact that clinic waste must be burned (incinerated), or stockpiled with lime and disposed of on the same day so that it does not decompose. Waste generated by hospitals and ensure that the handling, processing, and disposal of waste carried out cause harm without adverse environmental health impact (Nursamsi et al., 2017).

## CONCLUSION

Based on the discussion above, it can be concluded that health service facilities are one of the producers of B3 waste, one of which is waste that is categorized as infectious and has a risk to the health of the surrounding environment, therefore it can be concluded as follows:

1. Waste management regulations in health service facilities are based on several legal provisions, including the UUPPLH the Health Law, and the Law on Waste. Government Regulation Number 101 of 2014 concerning B3 Waste Management and several other implementing regulations. The purpose of regulation on waste management is to prevent environmental pollution that will have an impact on health (disease transmission) Environmental health is one of the aspects of public health, which is a guarantee for the realization of the highest degree of public health.
2. Efforts to protect environmental health are carried out through the management of medical waste in healthcare facilities. These efforts are carried out as a form of the Government's responsibility to realize the right to a healthy environment through the regulation of B3 waste, one of which is medical waste produced by health service facilities. The regulation of medical waste management in healthcare facilities is one of the efforts to protect the health of the environment. Especially preventing environmental pollution and preventing disease transmission. Efforts to protect environmental health are carried out through regulations on management, transportation to dumping/disposal provisions. The ban on dumping/waste disposal is also equipped with provisions on sanctions, which is also an arrangement to protect environmental health.

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