

<b>Forum:</b>	Environment and sustainable development committee
<b>Agenda:</b>	On measures to install and promote sustainable disposability of pandemic equipment
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## Introduction

The outbreak of the COVID-19 pandemic has had an extraordinary impact on global health and the environment. According to WHO, there are over 25 million confirmed cases and more than 5 million deaths worldwide. The pandemic has made measures such as the restriction of human flow and the need for vaccination which led to the high demand for protective equipment such as gloves and masks.

By the end of the year in 2020, the Pfizer-BioNTech COVID-19 vaccine is officially approved by the food and drug administration (FDA). According to statistics gathered by the University of Oxford, 7.78 billion doses of vaccine have been administered worldwide meaning 53.5% of the population is now vaccinated.

To prevent further transmission of the virus, the demand, and consumption of Personal Protective Equipment (PPE) such as gloves, masks, and respirators has increased drastically. Globally, the production of medical waste during the pandemic has increased from 200 tons per day in 2020 and has increased up to over 29,000 tons per day in 2021 after a request made by the WHO (World health organization) to boost the production of disposable PPE, has brought up a new challenge on the management and disposal of waste. The accelerated growth of PPE waste has put immense pressure on waste facilities, transfer stations, material recovery facilities, incinerators, and landfills.

PPE waste is the source and potential carrier of pathogens and chemical contaminants. Current evidence suggests that the virus from the equipment can persist on the surface for 72 hours and up when the conditions are favorable, leading to the risk of waste management practitioners at a high risk of infection.

Although a great amount of effort has been made in attempts to alleviate environmental pressure by PPE waste, there is still a lack of effective approaches for managing PPE production, transportation, retail, usage, and treatment during the pandemic. Sustainable disposal needs to be ensured.

## Key Terms

Personal Protective Equipment (PPE): PPE is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses. This includes eye and face protection, hand protection, body protection and respiratory protection, etc.

Disposable plastic: Are items made of plastic that is made to be only used once before being thrown away or recycled.

Healthcare waste: Healthcare waste includes all the waste generated by healthcare establishments, research facilities, and laboratories. It comes mostly from the administrative and housekeeping functions of health-care establishments and may also include waste generated during maintenance of health-care premises.

Sustainable waste management: Sustainable waste management aims to keep materials in use for as long as possible and minimize the amount of solid waste that is disposed of in a landfill or through incineration.

Material recovery facility: A materials recovery facility receives, separates, and prepares recyclable materials for marketing to end-user manufacturers.

Linear economy: The linear economy is based on a 'take-make-dispose' concept. The approach of linear economy involves the process of the collection of raw material for transforming them into finished goods and to be distributed to customers until it is accumulated as waste.

## General Overview

### Municipal waste management

Municipal Solid Waste (MSW), includes the collection, transportation, processing, recycling, or disposal of waste, it is the key component of Municipal Waste Management involved in Covid-19 associated PPE waste. These systems are frequently linked to municipal administration, recycling/reuse, incineration, and landfills are the most popular amongst waste management strategies. According to

statistics provided by the world bank on waste management, 37% of waste is disposed of through landfills. Meaning that the most preeminent form of disposal is by using landfills

According to experts, landfills emit more greenhouse gases than incinerators, even the best landfills allow chemical waste to leak into the environment. Landfills also necessitate a large amount of land space away from cities. On the other hand, incinerators can also emit toxic air pollution and greenhouse gases, which have been shown to have the ability to spread Covid-19, incinerators often require a large upfront investment and ongoing maintenance.

### **Healthcare waste management**

Healthcare waste is the waste generated by any healthcare facilities, medical laboratories, and biomedical research facilities. Improper treatment of healthcare waste poses severe risks of transmission of the virus to waste pickers, waste workers, health workers, patients, and the community through exposure to infectious agents. Poor management of the waste emits toxic and deleterious contaminants into society.

However, contamination of highly contagious agents such as the COVID-19 virus has created enormous instability in healthcare waste handling and subsequent recycling because of the volume of the waste generated and its contagious nature.

WHO has set out guidelines to support companies in the management of healthcare waste. These guidelines help to manage the highly contagious healthcare waste from the pandemic. Proper healthcare waste management is a crucial part of reducing the spread of COVID-19 and increasing the recyclability of materials by disinfecting and sorting out health care wastes facilities sustainable management, instead of sending them to landfills.

### **Treatment**

According to recommendations provided by the world bank, all countries are not compelled to

using the same treatment for their waste, they are encouraged to use the most appropriate form of affective for them.

### Incineration

Incineration is the most favored selection for the treatment of healthcare waste. Incineration is the process of using high temperature burning of waste used to destroy the organic constitution. However, incineration isn't the best treatment for the waste environment-wise, the process of incineration generates harmful pollution that may pose risks to the health of individuals in nearby communities.

### Pyrolysis

Pyrolysis is the process of thermal decomposition of materials at elevated temperatures in an inert atmosphere. It involves a change of chemical composition, which leaves mostly carbon as the residue, which is called carbonization. Pyrolysis is one of the most favored and effective methods of disposing of waste.

The pyrolytic oil produced during the process of pyrolysis is then converted into pyrolytic fuel that is very similar to the gasoline used in daily life, meaning it can be used in internal combustion engines without significant loss in engine performance.

### Landfills

Modern landfills are completely sealed to reduce contamination of the nearby groundwater. First, the ground is lined with clay. A thin layer of flexible plastic is placed on top of the clay layer. That allows the collection of leachate, the liquid that passes through the landfill and may draw out toxins from the trash. The leachate is collected through a drainage system that passes this contaminated water through pipes to a pool where it can be treated to remove the toxins before being released back into the environment.

Although modern landfills are designed to keep toxic trash contained, leaks do happen. Therefore, landfills are still dangerous to the environment and human health. The methane that is released due to the

decomposing waste is a potent greenhouse gas that contributes to global climate change. The air pollutants escaping from the landfill can also cause respiratory problems in people who live close to the landfill.

## **Timeline of Events**

*December 27, 2019:* A Chinese lab assembles a near-complete sequence of the virus, showing it to be like the virus that caused the 2002-03 SARS outbreak. The lab alerts health authorities.

*January 3, 2019:* The Chinese Center for Disease Control and Prevention obtains a full sequence of the virus, China reports cases to the WHO.

*January 24, 2020:* First confirmed coronavirus cases in Europe

*February 22, 2020,* The WHO announces the name of the virus as COVID-19

*March 7, 2020:* The number of confirmed cases surpass 100,000 globally, WHO issues a statement calling for action to stop, contain, control, delay and reduce the impact of the virus by every mean

*March 11, 2020:* COVID-19 is classified as a pandemic

*March 25, 2020:* UN Global Humanitarian Response Plan is established

*April 4, 2020:* WHO reports 1 million confirmed cases worldwide

*April 14, 2020:* Guidance on large-scale movement restrictions or lockdowns, are released

*June 5, 2020:* WHO published updated guidance on use of masks for controlling spread of disease

## **UN Involvement**

### **European Commission**

The European Commission has been in support of ensuring the least amount of damage during pandemic times. The commission has emphasized the importance of waste management during an epidemic, guidelines on managing and collecting waste have been released, such as not mixing household waste with medical waste and that medical waste should be treated as hazardous waste. The commission also encourages the proper usage and disposal of Personal Protective Equipments.

## **World Health Organization**

The world health organization played a crucial role during the pandemic. During lockdown procedure to prevent the spread of the virus, guidelines that are meant to enhance personal hygiene standards worldwide were increased and the urge for the separation of household waste, such as the requirement of leftover food and used masks not being allowed to be thrown away together. The world health organization also makes sure all pandemic equipment is treated carefully to prevent further transmission.

## **International Solid Waste Association**

The main objective of the international solid waste association is to ensure quality waste management. Policies on waste management during pandemic times list as the following:

- a strict hygiene procedure that needs to be followed by waste workers to ensure the least amount of contact to waste.
- Household waste during the epidemic should be stored separately before being sent to landfills or before incineration.
- Maintain high standards of recyclable waste
- Long-term recycling storage should be considered.
- The enhancement of personal hygiene is encouraged.

## **Relevant resolutions**

### **Center for disease control**

The center for disease control is a federal agency that conducts and supports anything related to health. The center creates professional information, promotes the importance of health in communities, and is in favor of the prevention of diseases, injury, and disability. The center of disease control is always prepared for new health preps and has a goal of improving the overall health of everyone.

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### **Basel convention (2020)**

The Basel convention is an international treaty that was designed to reduce the movement of hazardous waste between nations, it is specifically made to prevent the transfer of hazardous waste from more economically developed countries to developing countries. The convention is intended to decrease the rate of toxicity of waste generated to ensure an environmentally friendly environment and to assist developing nations in treating their hazardous waste sustainably.

### **Country's stance**

Australia: The Australian government has embraced the usage of single-use plastics and PPEs during the pandemic. According to a Guardian report, the government has postponed bans on single-use plastics and overturned plastic bag bans, to allow for greater preventative measures. However, the government has also announced a \$130 million investment into a Recycling Modernisation Fund, transitioning to a circular economy, where the waste management is more self-sufficient and effective (Thornton 4). While no data is currently available on the status of PPEs, according to Queensland Health's guidelines, Covid-19 related waste is treated as medical waste and disposed of like single-use plastics. Since no data is available on the impact of PPE waste, previous WWF estimates show that 85% of Australian seabirds are hurt by plastic pollution (1), and Australia recycles around 12% of its plastic, and the rest is dumped in landfills. These statistics suggest that the low level of recycling and high levels of plastic pollution is detrimental to the environment, but the government has shown its willingness to a greener future.

Canada: In Canada, less than 10% of all plastics are recycled (van Reenen 2), and 3 million tonnes are disposed of in landfills. 1/3 of plastic in Canada is meant for single-use plastic, currently including PPE, and has become one of the largest sources of plastic in freshwater. According to studies done in residential sectors, the pandemic has disrupted waste diversion practices and reduced their effectiveness. The Canadian government still has to develop stronger educational resources, invest in research and innovation, and develop sustainable plastic waste management systems (van Reiner 5).

China: The initial epicenter of Covid-19, in Wuhan, produced five times its normal waste capacity (Chen 1), and reports show 22 cities were operating over-capacity (Chen 1).

India: The pandemic has overburdened India's already depleted waste management system. According to data by the Central Pollution Control Board, India produced over 18,000 tonnes of Covid-19 waste between June and September (1). For India to reduce waste, waste industry experts suggest that India can manage the crisis by defining Covid-19 waste, identifying waste generators, and educational programs (Ahuja 8). Additionally, experts also suggest increasing recycling and sorting efforts to reduce the burden of waste on incineration and landfill treatment. India generates 26,000 tons of single-use plastic waste daily, which usually ends up as litter, and the government has set a goal of eliminating them by 2022 (C&EN 1).

Peru: Peru is a country fraught with bad sustainability and waste management policies. According to the WWF, "Lima, the largest city in the country where almost 10 million people live, about 8,468 tons of garbage are generated daily, which corresponds to 47% of the total produced. Whereof, only 4% is recycled." (WWF 2) Thus, recycling initiatives are needed, where most of the plastic pollution ends up littered. The Covid-19 impact on waste management is likely disastrous.



South Africa: According to UN environment reports, most of the waste ends up in unmanaged landfills and household burning, and there is little data to fully estimate the scale. Additionally, it has a large informal waste sector that receives little support. These problems are likely to be compounded by Covid-19.

South Korea: While South Korea at one point had a 60% recycling rate, some of the highest in the world, China's decision to stop importing waste has hurt South Korean waste management, further burdened by the waste management requirements of Covid-19. To recover, they have initiated a new scheme: the Green New Deal, which aims to increase resource and energy efficiency.

Spain: According to local Spanish media, "in Madrid and Catalonia, the country's two worst-affected regions, healthcare waste has increased by 300 and 350%" (Arevalo 4). Additionally, the only incineration facilities in Madrid and Catalonia have become overburdened with waste and are forced to resort to quick incineration, due to the pileup of medical and household waste (Arevalo 8).

United States: The US has a robust waste management system called the "cradle-to-grave" system that can adequately handle medical and household waste.. However, recycling has been stopped due to the risks of secondary transmission and local authorities have faced challenges there. According to a University of Michigan study, "In 2017, 52% of MSW generated in the U.S. was disposed of in 1,269 landfills" (6) and "in 2017, 12.7% of MSW generated in the U.S. was disposed of through waste incineration with energy recovery" (8). From this, while there is a clear and strong environmental impact, the US is equipped to deal with the waste management of Covid-19 but should focus resources on developing a circular economy.

## **Possible Solutions**

### **Further widespread of quantitative data**

One of the major deficiencies of environmental response during the pandemic is the lack of quantitative data on waste management of Personal protection equipment. This critically limits a nation's ability to respond, future possible efforts should include the gathering of data collection to determine the effectiveness of current waste management actions on reducing Personal protection equipment pollution, and the unraveling of the increasing number of Personal protection equipment due to the pandemic.

### **Developing policies related to plastic alternative trade**

Apart from sustainability innovations, a study by Pew Charitable Trusts stated that “if no action is taken, the number of plastics dumped into the ocean will triple by 2040, from 11 to 29 million tones per year.” The study also stated that around 80% of plastic pollution could be reduced during the same period, through the combination of modifying inadequate regulation. measures recommended would be to encourage different business models, and initiatives to reduce the amount of plastic produced, this includes designing Products and packaging that can be further recycled and expanding waste collection measures and guidelines in developing countries. United Nations Conference on Trade and Development (UNCTD) is urging governments to promote non-toxic, biodegradable, or easily recyclable alternatives, such as natural fibers, rice husk, and natural rubber. United Nations Conference on Trade and Development (UNCTAD) concluded that global trade policies also have an important role to play in reducing pollution. Analysis from the organization pointed out, trade policies have to be effective and coordinated with global rules. The way countries have been using trade policy to fight plastic pollution has mostly been uncoordinated, which limits the effectiveness of their efforts. There are limits to what any country can achieve on its own. Therefore, UN agencies can facilitate cooperation and the development of trade policies to facilitate the economic viability of plastic substitutes.

### **Sustainable Alternatives to Pandemic Equipment**

More research into environmentally friendly methods of disposal could help reduce the impact of waste management. According to a study in the journal *Biofuels*, plastic from PPEs can be transformed into

renewable liquid fuels, which can be equal to fossil fuels. Once plastic from PPEs is disposed of, they usually end up in landfills or oceans and natural degradation needs decades. According to the study's findings, PPE waste can be converted into fuel using pyrolysis. This includes a chemical process for breaking down the plastic at high temperature – between 300-400 degrees centigrade for an hour – without oxygen

### **Education and training**

Another aspect of resolving this problem is to raise awareness on waste management and to emphasize the importance of sustainable waste management in all nations. Companies can cooperate with local governments to inform the general public on how to sort and store waste.

### **Improvement on managing municipal waste and healthcare waste**

According to guidelines presented by the United Nations Environment Program (UNEP), household waste should be segregated before it is being transported to decrease the risk of hazardous waste and environmental damage if inadequately disposed of. To reduce this problem to the least, UNEP suggests the proper sorting of waste that minimizes human contact and promotes strong hygiene standards for waste collection. When transporting the waste, waste companies should have trained professions with PPE and use specific vehicles and equipment to minimize the risk of secondary transmission.

During times of pandemic, solutions to adequate management of healthcare waste management are required to ensure the safety of all people. Strategies and systems with strong oversight to improve waste segregation, destruction, and disposable practices to meet the goal of international standards for waste management. Guidance documents published by the world health organization (WHO) includes management of waste from injection activities, mass immunization activities, and primary health centers. WHO has also developed a series of training modules on practices in health care management that includes and covers all aspects of waste management activities, including the identification and classification of wastes and safe disposal using non-incineration or incineration strategies.

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