



Guideline for Solid Waste Management Measures to Limit the Novel Coronavirus (Covid-19) Outbreak

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List of Abbreviations

WHO	World Health Organization
PPE	Personal Protective Equipment
NMSWMS	National Municipal Solid Waste Management Strategy

Introduction

The current crisis has spread the emerging Coronavirus (Covid-19), which was declared by the World Health Organization (WHO) as a "pandemic", causing massive human and economic losses. Precautions and vigilance must be maintained to preserve our health and the health of those around us, as the principles of solidarity and communal responsibility grow for the time being to fight against this global pandemic.

Countries are strengthening responses procedures in order to control and limit the spread of the virus, by adopting preventive procedures, especially in the management field of municipal solid waste, to prevent the spread of the virus as it is necessary and required for the general interest. Whereas, safe waste management practices in communities, houses, markets, and health care facilities will help prevent the transmission of (Covid-19) from person to person.

This guide provides a set of procedures that enhance the fight against the spread of this pandemic in the field of solid waste management, in order to control the process of domestic waste accumulation, disinfection, sterilization and transportation to designated places and dealing with it according to the approved methods so that it does not turn into a fertile environment for gathering, proliferating, and spreading the novel Coronavirus.

Objectives

The main objectives of this guide in the pandemic we are living at is to ensure that:

- The waste management services is continuing in order not to have additional rise in the public health risks as a result of improper management of waste.
- Pay attention to the health and safety of waste management workers, especially those who collect waste, and take additional health and safety precautions in order to protect them against possible contamination from waste streams and/or used equipment.
- Highlight the need of treating the increasing quantities of health care and medical waste and disposing them safely, even though they do not pose any danger in spreading more infection and pollution.

It is very important that the garbage is collected in an orderly manner without any gaps or disruptions. Whereas, during this pandemic, there is no ability to tolerate more dangers and spread diseases due to the accumulated waste on the roads.

Targeted groups

Sanitizing and waste management workers are the second armor of public health advocacy after hospital and health system workers. It is necessary to emphasize that sanitizing and waste management personnel are among the most vulnerable in epidemic situations. The reason is that they are in direct contact with waste, where the relatively long duration that the viruses stay on the plastic and paper surfaces, and the rapid spread of the virus, makes the risk of infection in this category is very high and is higher than for ordinary citizens. Therefore, efforts between the concerned ministries and municipalities should be combined by taking the necessary preventive measures and procedures. At the same time, currently the role of these workers is very important, as countries like the United Kingdom have called them “key workers” and provided them with significant additional benefits and facilities to continue their work smoothly.

Enhanced protection procedures are needed for these workers especially in these difficult times, as the true value these workers bring has a major impact on our life quality, as we cannot face the pandemic without doctors, nurses, and waste collectors.

Necessary Procedures

Below are some basic guidelines and procedures, in addition to the general guidelines that apply to everyone, where they aim to increase the protection for these workers and prevent the spread of diseases in the community they belong to. Where it was found that the novel Coronavirus is a virus with a fragile outer membrane (fatty membrane), so it can be killed as soon as it gets exposed to common disinfectants (such as chlorine) or high temperatures. Procedures can be enhanced to limit and prevent the spreading of the virus.

Procedures for the municipal waste collection and transportation workers

The following guidelines are only concerned about municipal cleaners and waste collectors, and not hospitals or healthcare waste management personnel who meet stricter standards.

- Cleaning workers are required to use personal protective equipment (PPE) including ultra-filtering masks (double filtered), long-sleeved clothes with a cap (head covering) that are made of sealing fluid materials to the body, also elastic leather gloves, shoes, masks, and goggles or a full-face mask should be used to reduce the possibility of pollution from containers or garbage bags. Not only does it avoid the Coronavirus, but also any other possible health issues at a time when hospitals care is becoming increasingly difficult.
- The situation may require additional PPE depending on the cleaning / disinfectant products used and whether there is a risk of spraying.
- Repeated and proper hand hygiene and continuous sterilization of the worker's safety equipment are the most important procedures that must be followed to prevent the spread and transmission of infection from one worker to another.
- Applying the right and healthy behaviors and practices by working according to established instructions so that it would become a common behavior for the worker, such as avoiding touching eyes and nose without washing hands with soap and water for at least twenty seconds or with a substance that contains alcohol.
- Wear disposable gloves that can be disposed of inside the normal protective gloves that are worn in all circumstances. And not touching any bags or garbage boxes with bare hands under any circumstances.
- Cleaning workers should promptly report and inform the supervisor if any of the PPE is ruined (such as a cut in a glove) or any possible exposure.
- The responsible authorities must establish policies to protect the workers and provide trainings for all cleaning workers before submitting the cleaning tasks. The trainings should include the following concepts: when to use PPE, what PPE is needed, how to wear and use PPE, how to take it off, and how to get rid of it properly.

- When sanitizing, diluted bleaching solutions and alcohol solutions with at least 70% alcohol should be used in addition to effective and environmentally approved antiseptics. Following the manufacturer's instructions for appropriate application and ventilation.
- It must be verified that the product does not exceed its expiration date, also it is not permissible at all to mix the home bleach with ammonia or any other detergent. The diluted bleach solution is effective against Coronavirus when diluted properly.
- Sanitizing all transport and waste collection vehicles with a disinfectant containing at least 75% alcohol.
- Drivers and collection workers should avoid close contact with residents and / or employees of shops or companies.
- At the end of each shift, the vehicle's cabin must be sanitized - first the seats and the large surfaces then the surfaces that the driver and the front passenger touch regularly. Vacuum cleaner should not be used prior to disinfection and sterilization.
- Paying attention to the way of removing protective equipment, clothing and shoes. Usually equipment and clothing are removed in a way that comes into contact with all surfaces and objects that we do not want to be contaminated. So it is best to use the help of another person who wears gloves if there is any doubt about a possible contact with the virus or any other pollutant.
- Gloves and clothing should be taken off carefully to avoid contaminating the worker or the surrounding area. In addition to that hands should be cleaned after removing the gloves.
- Clothing should not be shaken after taking it off, especially in the presence of other people.
- In all cases, hands should be washed according to instructions and orders, and sanitizing should be carried out immediately after removing the equipment or clothing.
- PPE is sterilized in an automatic washing machine or put it in a sink for at least 30 minutes on high temperatures (60 to 90 degrees) and with fluids containing 0.05% chlorine or common antiseptics, by moving it constantly and rinsing it with clean water. After the manual or automatic washing is accomplished, it is recommended to dry the equipment with a dryer for at least 30 minutes at a temperature of 60 degrees.

- Each and every worker should have his own safety equipment, and it is forbidden to be used by anyone else.
- Masks should be sterilized and then checked to determine their efficiency and whether they can be reused.
- PPE that is not going to be used again should be treated as hazardous waste and placed in a special bag.
- Continuous personal hygiene procedures are an important barrier to prevent the transmission of the virus to the worker and from the worker to others.
- Workers' lockers and changing rooms must be cleaned and sanitized daily and regularly.
- One of the services that must be done regularly: containers cleaning and cars washing, periodically and systematically.

Procedures for health-care waste collection and transportation workers

Referring to the WHO recommendations and guidelines regarding safe management of waste, especially health care waste. The safe management of health care waste has the three following main principles: Reducing unnecessary waste, Isolating the regular waste from the hazardous waste and treating it in a way that reduces the risks on the health workers and society. Whereas, stricter procedures must be taken by health-care waste collection and transportation workers.

The most important arrangements for reducing potential risks:

- Workers who deal directly with the health care waste coming from people infected with the Coronavirus, must wear special safety clothing such as ultra-filtered masks (measured by Nano), long-sleeved clothes with a cap that are made of sealing fluid materials to the body, elastic leather gloves, shoes, masks and protective glasses or full face protector.
- Proper and sound management of health care waste at the source by health care waste collection and packaging workers according to the instructions of the Medical Waste Administration for the year 2001 (sorting medical waste according to colors).
- Supervisors should work with the intended authorities to ensure that appropriate local protocols and guidelines are followed, such as updated or additional guidelines for cleaning and disinfection, including locating new potential cases of Covid-19 cases.

- Rapid and daily transportation of health care waste, especially for the patients with Coronavirus, regardless of the generated amounts.
- Sanitizing the health care waste bags that are inside the waste containers or in the temporary storage area, especially the waste related to patients with Coronavirus. And also sanitize the storage area and the containers afterwards.
- Direct ravage of the remaining and residual waste inside the health units and hospitals (water bottles, tissue paper, food waste ...).

Emergency Plans Applications

All agencies involved in solid waste management must prepare contingency plans for cases such as:

- Accumulation of waste on road sides.
- Employees' sickness or inability to work.
- The need to assist the municipalities or other service enterprises.
- Quarantine and outbreaks of a disease in an entire neighborhood.
- The need for emergency disinfection.

Guidelines to enhance the protection of the cleaning workers

There are many additional preventive procedures that citizens can be guided to follow, as awareness must be raised due to the late appearance of infected and unannounced cases in which the disease may be transmitted to workers in the field of municipal waste and then to people that they have a contact with and their communities.

In addition to that there is a necessity of stopping the operations that the waste sorting contractors do and stopping all the recycling and sorting processes done in landfills and transfer stations, which is done in cooperation with the municipalities, the reason is that the main principal of the emergency plan is prioritization, and in case of emergency in all kingdom regions, the priority will be collecting waste without sorting following the principle of preventive management according to National Municipal Solid Waste Management Strategy (NMSWMS) as approved by the government.

Additional guidelines and actions:

- Urge citizens to the necessity of selective sorting of organic waste such as food and vegetable residues and not mixing it with inorganic waste such as plastic and paper, in order to reduce the amount of waste, and to maintain the time schedule of waste disposal.
- It is necessary to know that all the protections used, such as gloves, masks and sanitizers, are not sortable and recyclable and must be placed in separate bags.
- Increase the awareness of the necessity of securing the bags and ensure the need to place them inside the waste container and spraying them with antiseptic material if possible.
- Waste sorting contractors should be monitored when opening bags and touching containers, and aware them of how serious is the pandemic and its rapid spread.
- Intensifying the supervision on the collection and transportation workers of health waste, and ensuring safe and considered treatment and disposal.
- Solid waste management intended parties should educate their staff and workers, who are doing the cleaning, washing and waste picking, on the symptoms of Covid-19 and provide instructions on what to do if any symptoms appeared within a minimum of 14 days after the last possible exposure to the virus, any employee must notify supervisors and the local health department immediately if they develop symptoms of Covid-19.

Guidelines in public places disinfection

Street disinfection mechanism

For the sake of public health and safety, streets must be cleaned and disinfected daily under emergency conditions, as is the case in the spread of the novel Coronavirus. There are different ways to clean roads and streets in neighborhoods and areas infected with the virus or under quarantine

TABLE1 : STREET DISINFECTION MECHANISMS

The Mechanism	Illustrative picture
<p>Disinfection and long distance mist spraying trucks using giant disinfection sprays</p>	
<p>Water flow trucks have two low pressure and high pressure water flushing/washing systems</p>	
	

Small vehicles



Motorcycles



Handheld hoses (spray gun)

To spray sidewalks and streets



Manual sprayers



Work guidelines and principles

The principle of sprayers in general is to transfer the antiseptic solution from the liquid state to a gaseous state (the sprayers eject the cleansing solution in the form of spray and vapor)

- Priority is given to busy and popular roads and streets
- The preferred time for spraying is at night and early morning
- Spraying is preferred at static wind speed, and in the event of winds, spraying is in the direction of the wind, not the other way around
- The solution used for disinfection (clean water with the addition of 0.05% alcohol / ethanol / chlorine)
- The angle of disinfection sprays for street disinfection vehicles must be a vertical angle (90 degrees) i.e. from the top to the bottom as much as possible, and also the pressure of the disinfection sprays should be less than 1 bar in order to prevent the virus from flying in the air and then spread to places that did not disinfected while passing the disinfection vehicle.
- Manual disinfection of containers or streets requires workers who have been properly trained for such work and properly trained in how to wear, use and remove PPE

Containers Disinfection

Waste containers located in virus-infected neighborhoods or areas should be disinfected after at least every emptying process, and the disinfection of containers is as follows:

- Starting from the container's surrounding by a distance of two meters and then to the container
- If there are liquid spilled around the container, it should be completely disinfected no matter its area
- from the outside and then to the inside of the container (from the outer body of the container and then from inside)
- Disinfection principal is close to steam spraying or pouring more than the high pressure of the disinfection liquid because the high pressure of the disinfection liquid towards or around the container leads to the virus flying out and spreading out of the container
- Automatic disinfection with special vehicles is one of the best ways to reduce biological risks because it works on the principle of full immersion of the container or complete washing, so there must be one special vehicle for automatic washing of containers every 2000 containers.