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# Health Care Waste Management in the context of COVID-19 Emergency

(Interim Guidance)

*(Approved Date: 3 July 2020)*



**Government of Nepal**  
**MINISTRY OF HEALTH AND POPULATION**

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# 1. Introduction

Nepal government has legislation, policy and guidelines for healthcare waste management (HCWM) in place for treatment and disposal of infectious waste from health care facilities. However, compliance of these guidelines was a challenge even before the COVID-19 pandemic, and now becoming more and more challenging to manage huge amount of infectious wastes. They have been generated from both health care and non-health care settings including quarantine centers, holding areas, designated hotels and households associated with suspected and confirmed COVID-19 patients. Experience from some of the countries like China shows that the infectious medical waste in the hospital increased by 600 percent, while treating the COVID-19 cases (1).

Currently in Nepal, only few hospitals have well established health care waste management system, where functional waste autoclaves are being used. In many health care facilities, the infectious waste is either mixed with municipal waste and is being sent to landfills as normal waste, or burned in open areas or disposed openly, posing serious environment and health risks to all including health care providers and general public. The COVID-19 further aggravated the situation on its management. This guideline has been specifically developed to address these merging issues and expected to be used by health care managers, HCWM/IPC committee members, HCWs, cleaners at the facility level. It is also relevant for the authority specially managing the waste in quarantine centers at national and sub-national levels.

The corona virus is not very long activated outside the body, and therefore by this time it is considered that it poses minimal risk to waste handlers. Though the precise time it lasts depends on many factors, one study found that the COVID-19 virus remained viable up to 1 day on cloth and wood, up to 2 days on glass, 4 days on stainless steel and plastic, and up to 7 days on the outer layer of a medical mask (2). Another study (3) found that the COVID-19 virus survived 4 hours on copper, 24 hours on cardboard and up to 72 hours on plastic and stainless steel. The COVID-19 virus also survives in a wide range of pH values and ambient temperatures but is susceptible to heat and standard disinfection methods. There is limited study of COVID-19 virus survival in hospital waste water; however, one study found that other human coronaviruses survived only two days in dechlorinated tap water and in hospital wastewater at 20°C.

## 2. Objectives

In emergency like the current COVID-19 pandemic situation, the major issues are generation of huge volume of infectious wastes and management of the waste by selecting appropriate waste treatment technologies. In low-resource settings or emergency situations, transitional methods can be used while working towards putting the systems and resources in place to install, operate and maintain more advanced technologies in future. Hence, the objective of this guidelines is to respond to current crisis and incrementally improve the situation through use of locally viable technology having comparatively low risk on both public health by controlling the spread of the COVID-19 infection and environmental impact. Hence, the specific objectives of this document are

- to guide stakeholders on application of existing HCWM guidelines and procedures in emergency, basically in the context of COVID-19.
- to provide different types of technical options for managing healthcare waste produced by COVID-19 based on the resource available.
- to guide on standard procedure of cleaning and disinfection of used items and some surfaces and washing and disinfection of used linen and other clothes at health facilities, isolation ward and quarantine centers.

### 3. Scope of the guidelines:

This guideline covers,

Safe management of the waste generated in connection with all suspected and confirmed COVID-19 cases, both symptomatic and asymptomatic in different levels of health care facilities, isolation centers, quarantine centers including hotels, home quarantine and holding areas like port of entry from other countries. This guidance is considered as interim since many researches are going on and hence, about the existence (duration of the activation) of this new corona virus in different environment including the waste, so these recommendations may need to be updated as new information and evidence become available (4). It is recommended to follow HCWM 2014 (5) and WHO guidelines (6,7,8) for the issues not covered in this document.

### 4. Guiding Principles:

The fundamental aim of this document is to guide all the concerned government agencies, local bodies, donors, I/NGOs, and other stakeholders to follow best practice in planning and implementing HCWM. All should adhere to the following guiding principles for safely managing health-care waste, so that there will be less chance of the transmission of the COVID-19 virus to the people who encounters the waste produced.

- All COVID-19 related waste including the PPE is considered as infectious waste and should be collected, transported, treated and disposed according to standard procedures.
- In emergency, some by pass provision or transitional methods as interim solution may be applicable (6). Hence in many cases risk-based decision can be applicable by following a "precautionary", "duty of care" and "do no harm" principle with consideration of the highest safety possible. However, Infection prevention and control protocols need to be strictly followed (7,8).
- All the COVID-19 related health care waste should be managed under risk reduction principle and one should not forget that "Low risk doesn't mean no risk".

- Best practices for safely managing health-care waste should be followed, including assigning responsibility and sufficient trained human and material resources to segregate at source (if applicable), treatment and dispose of the waste safely.
- Management of hazardous waste in healthcare facilities should consider not only SARS-CoV-2, but also other clinically important hazardous waste, because hospitalized patients at increased risk of other infections due to underlying medical conditions and invasive procedures.

## Recommendations (steps of HCWM):

This guideline has been focused for the management of COVID-19 emergency related waste. Any system exercising best practice for infectious waste is considered to be able to manage waste potentially infected with SARS-CoV-2 too, unless the volume of the total infectious waste exceeds the existing capacity. Extra attention is paid while segregating the infectious waste as all the health-care waste produced during patient care, including those with confirmed and suspected COVID-19 infection, should always be considered as infectious and collected safely in clearly labeled and lined containers and sharp-safe boxes for sharp wastes. Otherwise, all the steps of HCWM systems including minimization, segregation, collection, transportation, storage, treatment and disposal should remain the same, and the recommendations have been provided accordingly:

### a. Minimization:

Reduction of wastes at source should be applied to the extent possible. It includes rational and risk-based use of PPEs (9), selection of materials with minimal packaging or unpackaging at green area (low risk of contamination with infectious agents) and use of materials that can be appropriately cleaned or disinfected etc.

### b. Segregation:

The types of hazardous waste in a facility vary according to the size of the facility and the services offered. Only the waste generated in administrative/waiting areas of health-care facilities can be considered as non-hazardous waste, otherwise all waste produced during COVID-19 patient care, is considered to be infectious and need to be segregated accordingly. Normally, in a small health care facility where only limited health services are offered, it is recommended that the infectious waste must be segregated at least in three different bins one for bio-degradable, another for non-bio-degradable and next for sharp wastes. But in the context of Nepal, based on the size and treatment capacity of ongoing COVID-19 designated hospitals and clinics, further segregation of the infectious wastes has been recommended as shown in three different modalities options as explained below or shown in flow diagrams ( Fig,3 &4).

### c. Collection, transportation and storage:

- All infectious wastes should be collected safely in clearly leveled lined containers and sharp waste in sharp-safe boxes. Even the waste segregated as non- hazardous from a health care setting should be collected and disposed in strong bags (preferably red colored bio-hazard bags) and closed completely before collection and disposal by municipal waste.
- Outside the hospital environment such as quarantine centers including home quarantine and holding areas like port of entry from other countries, used masks or entire set of PPE, tissues, and other non-biodegradable (COVID-19 related) waste is collected separately in bio-hazard bags (double bagged) closed completely and labelled with the date. There is no need to treat these materials with disinfectant first, but "swan neck" tied and the outside wiped with a 0.5% chlorine disinfectant solution could be additional measures to reduce the risk of spread of infection (Fig. 1).



**Fig. 1.** Waste in tied swan-neck bio hazard bags

- Storage place for highly Infectious waste (waste contaminated with blood and other bodily fluids, cultures and stocks of infectious agents from laboratory work, swabs, bandages, cotton gauzes and disposable medical devices and pathological wastes like human tissues, organs or fluids, body parts and all infectious sharp wastes must be selected sealed or tiled to allow easy disinfection and need to be identified as an infectious waste area by using the biohazard sign. Storage times for such infectious waste (e.g. the time gap between generation and treatment) should not exceed 24 hours.

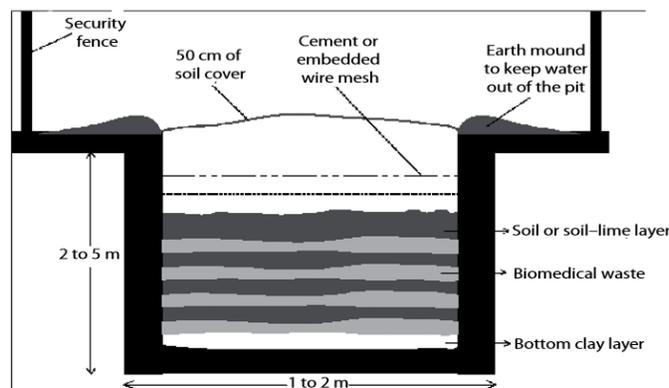
- Gloves, masks and other waste generated during at-home patient care should be placed into a waste bin with a lid in the patient's room before being disposed of as infectious waste.

#### d. Treatment:

- This waste should be treated, preferably on-site, and then safely disposed. If waste is moved off-site, it is critical to understand where and how it will be transported, treated and disposed (4).
- The waste should be treated prior to final disposal with use of non-combustion or steam-based treatment technologies such as autoclaves, microwaves to the extent possible (5,10,11).
- Chemical disinfection could be another option depending upon the local context and resources available.
- The burning of wastes is discouraged (5,10,11).

#### e. Onsite burial in pits:

- The health care facilities with limited resources may consider small burial sites/pits for different types of hazardous waste. It is practical for only limited periods of time (1–2 years) and for relatively small quantities of waste.
- Dig a pit 1–2 m wide and 2–5 m deep. The bottom of the pit should be at least 2 m above the groundwater. Line the bottom of the pit with clay or permeable material. Construct an earth mound around the mouth of the pit to prevent water from entering. Construct a fence around the area to prevent unauthorized entry. Inside the pit, place alternating layers of waste, covered with 10 cm of soil. When the pit is within about 50 cm of the ground surface, cover the waste with soil and permanently seal it with cement and embedded wire mesh (Fig. 2).



**Fig. 2.** Construction of a pit for onsite waste burial (7)

#### f. Leave for natural di-off:

- If there is secured storage area, some general waste like items such as water bottle, paper, card board, packing materials can be left for at least 7 days before sending for disposal as usual municipal waste.
- The waste collected from households can be left for 72 hours before sending for disposal as usual municipal waste. By this time, it poses minimal risk to waste handlers (12).

#### g. Disposal:

- If there is a possibility that masks, or PPE are being targeted for illegal reuse, they can be cut or mutilated before disposal.
- Sharp wastes should be first decontaminated, which then can be disposed of in concrete-lined sharps pits on facility premises or encapsulated by mixing waste with immobilizing material, such as cement, before disposal.
- Recycling activities should be avoided to prevent human contact with any potentially infectious domestic and medical waste. All non-biodegradable household waste should be treated as non-recyclable and disposed of through sanitary landfill as usual business. Landfill sites with informal waste picking will need increased restriction and high security.

#### h. Safety and Health:

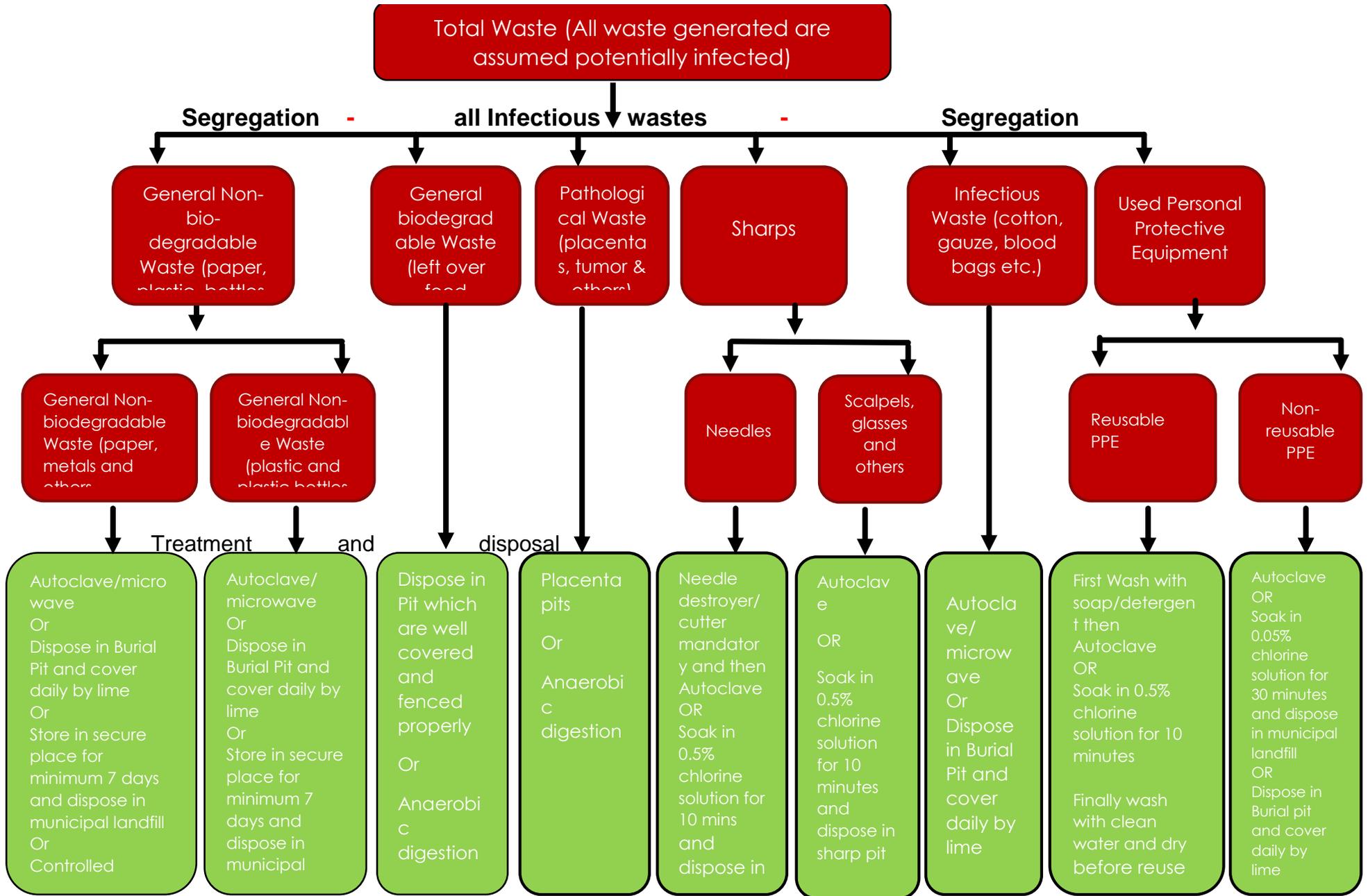
It is strongly recommended that healthcare facilities should make sure that their employees and those of their sub-contractors are adequately trained, protected with PPE as recommended, and are provided with vaccination against tetanus, hepatitis and can access to 24 hours post exposure prophylaxis. All those who handle health-care waste in a health care facility should wear appropriate PPE (boots, long-sleeved gown, heavy-duty gloves, mask, and goggles or a face shield) and perform proper hand hygiene after removing it (9,10). While handling waste at home and quarantine centers, gloves, masks and protective clothing (e.g., plastic aprons) should be used at a minimum. For hand-hygiene, if alcohol-based hand rubs or soap and water are not available or feasible, then using chlorinated water (0.05%) for handwashing is an option as a short-term measure (5).

## Treatment modalities

### A. Collecting all the waste as infectious waste and treating accordingly (limited segregation)

All COVID-19 related waste is considered to be infectious waste, so all the waste (including the waste normally considered general waste in normal situation) is collected in the Red Bins as infectious waste and transported/ stored/ treated and disposed as per the national guidelines (5). It is only possible if the quantity of the waste generated is quite low and the treatment capacity in the facility is enough to treat the entire waste generated as infectious. Autoclave or microwave with shredder might be more effective in this context for efficient treatment of the mixed waste and reduction in waste volume

**B. Applying different treatment options, based upon services available (further segregation of infectious wastes)**



**Fig.3. Flow chart for treatment option B Chart**

### C. Waste Management from Household

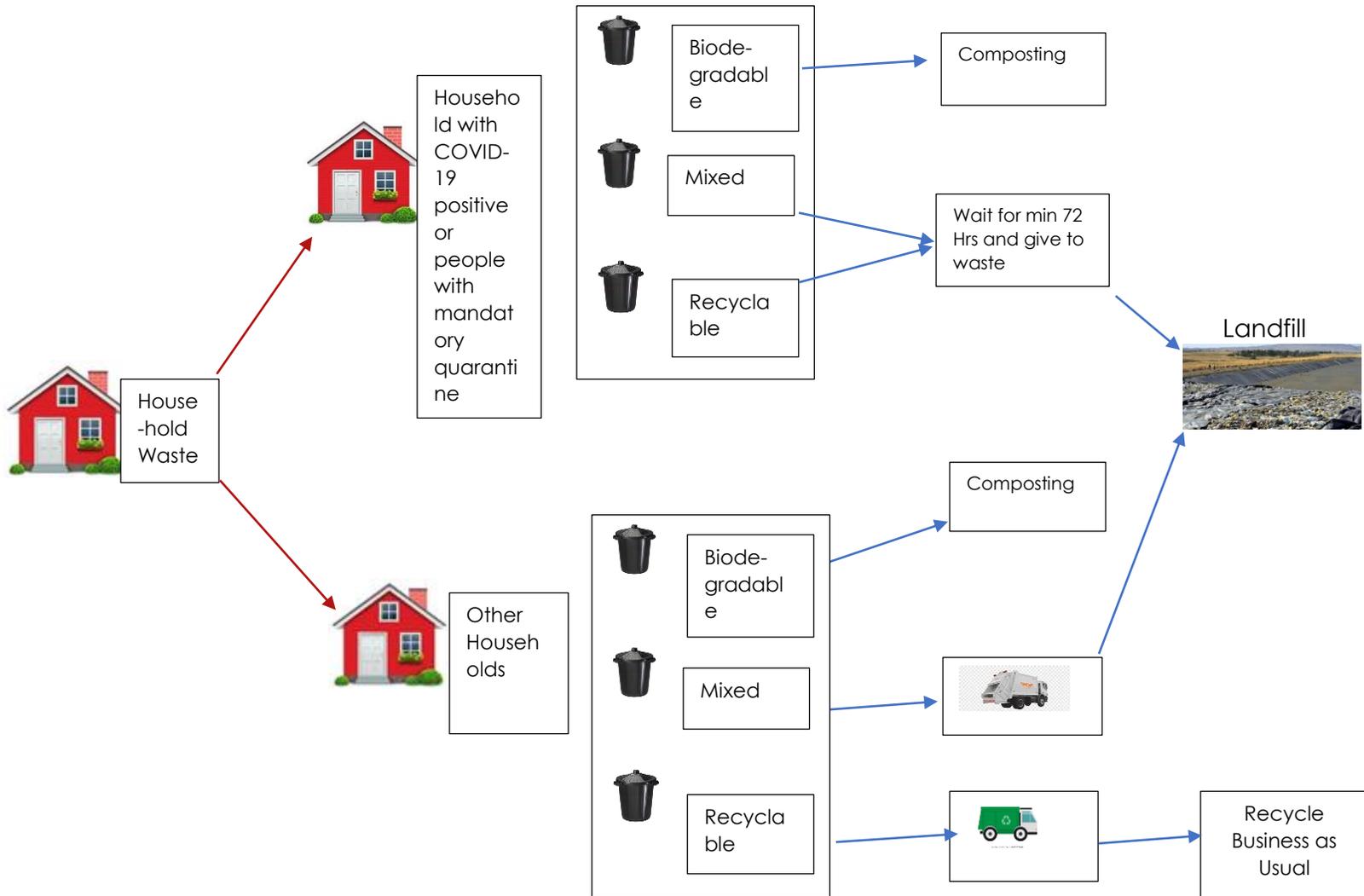


Fig.4. Flow chart for treatment option C

## Management of wastewater from HCFs

In some studies, viral fragments have been found in excreta and because of other potential infectious disease risks from excreta, hospital wastewater should be treated in well-designed and well-managed wastewater treatment plants, and there is no need of extra consideration for COVID-19 virus related wastewater. However, a final disinfection step may be considered if existing wastewater treatment plants are not optimized to remove viruses. If greywater includes disinfectant used in prior cleaning, it does not need to be chlorinated or treated again. However, it is important that such water is disposed of in drains connected to a sewerage system or in a soak-away pit. If greywater is disposed of in a soak-away pit, the pit should be fenced off within the health facility grounds to prevent tampering and to avoid possible exposure in the case of overflow (4).

### Washing, cleaning and disinfection:

- a. Existing recommended cleaning (physically removing contamination by foreign material) and disinfection procedures (reducing the number of viable microorganisms to a less harmful level) for health-care facilities should be followed consistently and correctly. For disinfection, it recommends using (4,13):
  - 70% ethyl alcohol to disinfect small surface areas and equipment between uses, such as reusable dedicated equipment (for example, thermometers);
  - sodium hypochlorite at 0.1% (1000 ppm) for disinfecting surfaces and 0.5% (5000 ppm) for disinfection of blood or bodily fluids spills in health-care facilities.
- b. After applying disinfectant to a surface, it is necessary to wait for the required exposure time and drying to ensure that surface microorganisms are killed. All individuals in charge of environmental cleaning, laundry and dealing with soiled bedding, towels and clothes from patients with COVID-19 infection should wear appropriate PPE, including heavy-duty gloves, a mask, eye protection (goggles or a face shield), a long-sleeved gown, and boots or closed shoes. They should perform hand hygiene after exposure to blood or body fluids and after removing PPE (4).
  - Soiled linen should be placed in clearly labelled, leak-proof bags or containers, after carefully removing any solid excrement. The excrement can be temporarily put in a covered bucket and need to be carefully disposed of in a toilet or latrine.
  - Machine washing with warm water at 60–90°C and laundry detergent is recommended. The laundry can then be dried according to routine procedures.
  - If machine washing is not possible, linens can be soaked in hot water with soap/detergent in a large drum using a stick to stir, taking care to avoid splashing. The drum should then be emptied, and the linens soaked in 0.05% chlorine solution for approximately 30 minutes. Finally, the laundry should be rinsed with clean water and the linens allowed to dry fully, if possible in sunlight.
- c. It is recommended that utility gloves or heavy-duty, reusable plastic aprons are cleaned with soap and water, and then decontaminated with 0.5% sodium hypochlorite solution each time they are used. Single-use gloves made of nitrile or latex, and gowns should be discarded as infectious waste after each use and not reused; hand hygiene should be performed after PPE is removed (4).

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