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Guideline for Water, sanitation, hygiene and waste management for Prevention of COVID-19



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Water, sanitation, hygiene and waste management for the COVID-19

Introduction

In late 2019, an acute respiratory disease emerged, known as novel coronavirus disease 2019 (COVID-19). The pathogen responsible for COVID-19 is severe acute respiratory syndrome coronavirus (SARS-CoV-2, also referred to as the COVID-19 virus), a member of the coronavirus family. In response to the growing spread of COVID-19, WHO has published a number of technical guidance documents on specific topics, including infection prevention and control.

This guideline supplements the IPC documents by referencing and summarizing the WHO guidance on water, sanitation and health care waste that is relevant to viruses, including coronaviruses. This guideline is prepared for water and sanitation practitioners and providers. It is also for health care providers who want to know more about water, sanitation and hygiene (WASH) risks and practices.

The provision of safe water, sanitation and hygienic conditions is essential to protecting human health during all infectious disease outbreaks, including the COVID-19 outbreak. Ensuring good and consistently applied WaSH and waste management practices in communities, homes, schools, marketplaces and health care facilities will further help to prevent human-to-human transmission of the COVID-19 virus.

The most important information concerning WaSH and the COVID-19

• Frequent and proper hand hygiene is one of the most important measures that can be used to prevent infection with the COVID-19 virus. Safe



hygiene measures will protect from transmission of the virus from infected individuals and contaminated surfaces.

- Hygiene and Environmental health officers should work to enable more frequent and regular hand hygiene by improving access to hand hygiene facilities and using multimodal approaches.
- WHO and national guidance on the safe management of drinking-water and sanitation services applies to the COVID-19 outbreak. Extra measures are not needed. In particular, disinfection will facilitate more rapid die-off of the COVID-19 virus.
- Many co-benefits will be realized by safely managing water and sanitation services and applying good hygiene practices. Such efforts will prevent many other infectious diseases, which cause millions of deaths each year.
- Currently, there is no evidence about the survival of the COVID-19 virus in drinking-water or sewage.

1.1 COVID-19 transmission

The main routes of transmission are via respiratory droplets and direct contact. Any person who is in close contact with an infected individual is at risk of being exposed to potentially infective respiratory droplets. Respiratory droplets are generated when an infected person coughs or sneezes. Any person who is in close contact with someone who has respiratory symptoms (for example, sneezing, coughing) is at risk of being exposed to potentially infective respiratory droplets. Droplets may also land on surfaces where the virus could remain viable; thus, the immediate environment of an infected individual can serve as a source of transmission (known as contact transmission).



The risk of transmission of the COVID-19 virus from the faeces of an infected person appears to be low. Current evidence suggests that infectious COVID-19 virus may be excreted in faeces, regardless of diarrhoea or signs of intestinal infection. Approximately 2–27% of those with confirmed COVID-19 have diarrhoea and several studies have detected COVID-19 viral RNA fragments in the faecal matter of COVID-19 patients throughout their illness and after recovery. There have been no reports of faecal–oral transmission of the COVID-19 virus.

1.2 Persistence of the COVID-19 virus in drinking-water, faeces and sewage and on surfaces

The presence of the COVID-19 virus in untreated drinking-water is possible, it has not been detected in drinking-water supplies. Furthermore, other coronaviruses have not been detected in surface or groundwater sources and thus the risk of coronaviruses to water supplies is low. The COVID-19 virus is an enveloped virus. As such it has a fragile outer lipid membrane which makes it less stable, compared to non-enveloped viruses, in the environment. This membrane must be intact for enveloped viruses to attach to and infect host cells and the envelope can easily be damaged by oxidants, such as chlorine.

While there is no evidence to date about survival of the COVID-19 virus in water or sewage, the virus is likely to become inactivated significantly faster than non-enveloped human enteric viruses with known waterborne transmission (such as adenoviruses, norovirus, rotavirus and hepatitis A).

Recent evidence indicates that COVID-19 virus (SARS-CoV-2) survival on surfaces is similar to the survival of severe acute respiratory syndrome (SARS) coronavirus (SARS-CoV-1). The survival is consistent with previous data



summarized in a recent experimental study of the survival of human coronaviruses on surfaces, which found large variability, ranging from 2 hours to 9 days. The survival time depends on a number of factors, including the type of surface, temperature, relative humidity and specific strain of the virus. The same study also found that effective inactivation could be achieved within 1 minute using common disinfectants, such as 70% ethanol or 0.1% sodium hypochlorite (for details see Section of Cleaning practices).

1.3. Safely managing wastewater and faecal waste

Sewage or wastewater treatment workers should protect themselves to appropriate levels depending on their exposure and whether the water has been treated since many infectious diseases may be transmitted through wastewater.

Best practices for protecting the health of workers at sanitation treatment facilities should be followed. Workers should wear appropriate personal protective equipment (PPE), which includes protective outerwear, heavy duty gloves, boots, goggles or a face shield, and a mask; they should perform hand hygiene frequently; and they should avoid touching eyes, nose and mouth with unwashed hands.

There is no evidence to date that the COVID-19 virus has been transmitted via sewerage systems with or without wastewater treatment. As part of an integrated public health policy, wastewater carried in sewerage systems should be treated in well-designed and well-managed centralized wastewater treatment works. Each stage of treatment (as well as retention time and dilution) results in a further reduction of the potential risk. A waste stabilization pond (that is, an oxidation pond or lagoon) is generally considered to be a practical and simple wastewater treatment technology that is particularly well suited to destroying pathogens, as relatively long retention times (20 days or longer) combined with



sunlight, elevated pH levels, biological activity and other factors serve to accelerate pathogen destruction. A final disinfection step may be considered if existing wastewater treatment plants are not optimized to remove viruses.

1.4 Keeping water supplies safe

A number of measures can be taken to improve water safety, starting with protecting the source water; treating water at the point of distribution, collection or consumption; and ensuring that treated water is safely stored at home in regularly cleaned and covered containers. Such measures can be effectively planned, implemented and routinely monitored to ensure continued effectiveness through the implementation of water safety plans.

Water utility managers can adopt a number of other preventive measures as part of a broader water safety planning approach. These include: ensuring adequate stocks of chemical additives and consumable reagents for testing are available, and supply chains with contingency measures are in place, ensuring that critical spare parts, fuel and contractors can still be accessed (including external laboratory testing for water quality monitoring and verification) and that there is sufficient contingency with regards to staff capacity and training to maintain the supply of safe drinking-water.

Moreover, household water treatment technologies are effective in removing or destroying viruses including boiling.

2. WaSH in health care setting

Existing recommendations for water, sanitation and hygiene measures in health care settings are important for providing adequate care for patients and protecting patients, staff and caregivers from infection risks.

The following actions are particularly important:

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- Engaging in frequent hand hygiene using appropriate techniques;
- Implementing regular cleaning and disinfection practices;
- Managing excreta (faeces and urine) safely, including ensuring that no one comes into contact with it and that it is treated and disposed of correctly and
- Safely managing health care waste produced by COVID-19 cases

Other important and recommended measures include providing sufficient safe drinking-water to staff, caregivers and patients; ensuring that personal hygiene can be maintained, including hand hygiene, for patients, staff and caregivers; regularly laundering bed sheets and patients' clothing; providing adequate and accessible toilets (including separate facilities for confirmed and suspected cases of COVID-19 infection); and segregating and safely disposing of health care waste.

2.1 Hand hygiene practices

Hand hygiene is extremely important to prevent the spread of the COVID-19 virus. All health care facilities should have regular programmes aimed at promoting best hand hygiene practices and ensuring the availability of the necessary infrastructure (equipment and supplies). Effective hand hygiene improvement strategies are multimodal and include the following integrated successful elements:

- System change ensuring availability of alcohol-based hand rub products, as well as water, soap and disposable tissue;
- Training and education of all health workers on hand hygiene best practices and their importance;



- Evaluation and feedback of hand hygiene infrastructure, compliance and other indicators;
- Reminders and communications to prompt and remind health care workers as well as patients and visitors about hand hygiene; and
- An institutional safety climate with visible commitment of senior managers and involvement of all staff.

In the context of the COVID-19 pandemic, all health care facilities should establish or strengthen their hand hygiene improvement programme and conduct rapid activities such as, at a minimum, procurement of adequate quantities of hand hygiene supplies, refreshers of hand hygiene training and reminders/communications about its importance to prevent the spread of the COVID-19 virus. Cleaning hands using an alcohol-based hand rub or with water and soap should be performed during the **‘My 5 Moments for Hand Hygiene’**. The health-care workers to clean their hands:-

- Before touching a patient
- Before clean/aseptic procedures,
- After body fluid exposure/risk,
- After touching a patient, and
- After touching patient surroundings

If hands are not visibly dirty, the preferred method is to perform hand hygiene with an alcohol-based hand rub for 20–30 seconds using the appropriate technique. When hands are visibly dirty, they should be washed with soap and water for 40–60 seconds using the appropriate technique. Hand hygiene should be performed at all five moments, including

- Before putting on PPE and after removing it, when changing gloves,

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- After any contact with a patient with suspected or confirmed COVID-19 infection, their waste or the environment in the patient's immediate surroundings,
- After contact with any respiratory secretions,
- Before food preparation and eating and
- After using the toilet.

Functional hand hygiene facilities should be present for all health care workers at all points of care, in areas where PPE is put on or taken off, and where health care waste is handled. In addition, functional hand hygiene facilities should be available for all patients, family members and visitors, and should be available within 5 m of toilets, as well as at the entry/exit of the facility, in waiting and dining rooms and other public areas. An effective alcohol-based hand rub product should contain between 60% and 80% of alcohol should be used.

2.2 Sanitation

People with suspected or confirmed COVID-19 disease should be provided with their own toilets. Where this is not possible, all patients cohorted on a ward should have shared toilets that are not used by other patients. The toilet should have a door that closes, to separate it from the patient's room. Flush toilets should operate properly and have functioning drain traps. If it is not possible to provide separate toilets, the toilet should be cleaned and disinfected at least twice daily by a trained cleaner wearing PPE (that is, impermeable gown, of if not available, an apron, heavy duty gloves, boots, mask and goggles or a face shield). Furthermore, staff and health care workers should have toilet facilities that are separate from those used by all patients.



If health care facilities have toilets that are not connected to sewers, hygienic on-site containers and treatment systems should be ensured. On-site containers can be designed either for containment, storage and on-site treatment of excreta (e.g. pit latrines and septic tanks) or for containment, storage and safe conveyance for off-site treatment. For unlined pits, precautions should be taken to prevent contamination of the environment, ensuring that at least 1.5 m exist between the bottom of the pit and the groundwater table (more space should be allowed in coarse sands, gravels and fissured formations) and that the latrines are located at least 30 m horizontally from any groundwater source (including both shallow wells and boreholes).

A properly-designed septic tank will remove most solids from sewage, and the liquid effluent can infiltrate into the ground through a leach field or soak pit. If soil conditions are not favourable for infiltration, fully lined tanks can be used, however combined excreta and flushing water will necessitate frequent emptying.

Faecal sludge and wastewater from health facilities should never be applied on land used for food production, aquaculture or disposed in recreational waters.

2.3 Toilets and the handling of faeces

It is critical to conduct hand hygiene when there is suspected or direct contact with faeces (if hands are dirty, then soap and water are preferred to the use of an alcohol-based hand rub). If the patient is unable to use a latrine, excreta should be collected in either a diaper or a clean bedpan and immediately and carefully disposed of into a separate latrine used only by suspected or confirmed cases of COVID-19. In all health care settings, including those with suspected or confirmed COVID-19 cases, faeces must be treated as a biohazard and handled as little as possible. Anyone handling faeces should use PPE to prevent

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exposure, including long-sleeved gowns, gloves, boots, masks, and goggles or a face shield. If diapers are used, they should be disposed of as infectious waste as they would be in all situations. Workers should be properly trained in how to put on, use and remove PPE so that these protective barriers are maintained and not breached. If PPE is not available or the supply is limited, hand hygiene should be regularly practiced, and workers should keep at least 1 m distance from any suspected or confirmed cases.

If a bedpan is used, after disposing of excreta from it, the bedpan should be cleaned with a neutral detergent and water, disinfected with a 0.5% chlorine solution, and then rinsed with clean water; the rinse water should be disposed of in a drain or a toilet or latrine.

Chlorine is ineffective for disinfecting media containing large amounts of solid and dissolved organic matter. Therefore, there is limited benefit to adding chlorine solution to fresh excreta and, possibly, this may introduce risks associated with splashing.

2.4 Emptying latrines and holding tanks, and transporting excreta off-site

There is no reason to empty latrines and holding tanks of excreta from suspected or confirmed COVID-19 cases unless they are at capacity. In general, the best practices for safely managing excreta should be followed. Latrines or holding tanks should be designed to meet patient demand, considering potential sudden increases in cases, and there should be a regular schedule for emptying them based on the wastewater volumes generated. PPE (that is, a long-sleeved gown, gloves, boots, masks, and goggles or a face shield) should be worn at all times when handling or transporting excreta offsite, and great care should be



taken to avoid splashing. After handling the waste and once there is no risk of further exposure, individuals should safely remove their PPE and perform hand hygiene before entering the transport vehicle. Soiled PPE should be put in a sealed bag for later safe laundering (see Section 2.5.Cleaning practices).

Where there is no off-site treatment, on-site treatment can be done using lime. Such treatment involves using a 10% lime slurry (calcium hydroxide) added at 1 part lime slurry per 10 parts of waste.

2.5 Safe management of health care waste

Health care facilities and quarantine sites should assign responsible and enough human and material resources to dispose of waste safely. All health care waste produced during the care of all patients, including confirmed COVID-19 patients is considered as infectious (infectious, sharps and pathological waste) and should be collected safely in clearly marked lined containers and sharp boxes. This waste should be treated, preferably on-site, and then safely disposed (see separate SOP on Health care waste management).

Leftover food and food wastes from quarantine sites, health care facilities, and isolation and treatment centers should bury in waste pit. Other waste produced be properly managed in separately and **never mixed** with Municipal wastes.

All those who handle health care waste should wear appropriate PPE (that is, boots, long-sleeved gown, heavy-duty gloves, mask, and goggles or a face shield) and perform hand hygiene after removing it. It can be expected that the infectious waste volume during the COVID 19 outbreak will increase, especially through the use of PPE. Therefore, it is important to increase capacity to handle and treat extra health care waste generated.



2.6 Environmental Cleaning and laundry

Laundry should be done and surfaces in all environments in which COVID-19 cases receive care (for example, treatment units, isolation centres) should be cleaned at least once a day and when a patient is discharged. Many disinfectants are active against enveloped viruses, such as the COVID-19 virus, including commonly used hospital disinfectants. Currently, WHO recommends using:-

- 70% ethyl alcohol to disinfect small areas between uses, such as reusable dedicated equipment (for example, thermometers);
- Sodium hypochlorite at 0.5% (equivalent to 5000 ppm) for disinfecting surfaces.

It is essential to clean surfaces with a detergent and water before applying a disinfectant. The disinfectant concentration and exposure time are critical parameters for its efficacy. After applying a disinfectant in to a surface, it is necessary to wait for the required exposure time and drying to ensure its killing effect on surface microorganisms.

All individuals dealing with soiled bedding, towels and clothes from patients with COVID-19 infection should wear appropriate PPE before touching it, including heavy duty gloves, a mask, eye protection (goggles or a face shield), a long-sleeved gown, an apron if the gown is not fluid resistant, and boots or closed shoes. They should perform hand hygiene after exposure to blood or body fluids and after removing PPE. Soiled linen should be placed in clearly labelled, leak-proof bags or containers, after carefully removing any solid excrement and putting it in a covered bucket to be disposed of in a toilet or



Machine washing with warm water at 60–90° C with 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 and soap in a large drum using a stick to stir and being careful to avoid splashing. The container should then be emptied, and the linens soaked in 0.05% chlorine for approximately 30 minutes. Finally, the laundry should be rinsed with clean water and the linens allowed to dry fully in sunlight.

If excreta are on surfaces (such as linens or the floor), the excreta should be carefully removed with towels and immediately safely disposed of in a toilet or latrine. If the towels are single use, they should be treated as infectious waste; if they are reusable, they should be treated as soiled linens. The area should then be cleaned and disinfected (with, for example, 0.5% free chlorine solution).

2.7 Safely disposing of grey water or water from washing PPE, surfaces and floors.

Clean utility gloves or heavy duty, reusable plastic aprons with soap and water and then decontaminate them with 0.5% sodium hypochlorite solution after each use. Single-use gloves (that is, nitrile or latex) and gowns should be discarded after each use and not reused; hand hygiene should be performed after PPE is removed. If grey water 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 septic system or sewer or in a soak-away pit. If grey water 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.



3. Considerations for WASH practices in homes and communities

Keeping best WASH practices in the home and community is also important for preventing the spread of COVID-19 in the population and when caring for suspected, confirmed or recovering cases at home.

Water service provision is an essential measure to allow for regular handwashing with soap, which is essential to protect individuals and reduce disease transmission in communities. It is especially important not to shut off water services because of inability to pay and governments should prioritize providing access to those without services through other immediate actions (e.g. protected boreholes, tanker trucks, extending piped supplies etc.).

Furthermore, those individuals and organizations involved in providing water and sanitation services (e.g. treatment plant operators, sanitation workers, plumbers) and those promoting hand hygiene in the community should be designated as providing “essential services” and be allowed to continue their work during movement restrictions and have the needed resources to protect their health (e.g. PPE and hand hygiene facilities).

3.1 Hand hygiene

Hand hygiene is one of the most important measures that can be used to prevent COVID-19 infection. In addition to preventing diarrhoeal disease, hand hygiene has been shown to prevent respiratory illness. Hand-washing should be performed after coughing and sneezing and/or disposing of a tissue, on entering the home having come from public places, before preparing food, before and after eating and feeding/breastfeeding, after using the toilet or changing a child’s diaper and after touching animals.



Universal access to hand hygiene facilities should be provided in front of all public buildings and transport hubs – such as markets, shops, places of worship, schools and train or bus stations. Functioning hand-washing facilities with water and soap should be available within 5 m of all toilets, both public and private. Use of these facilities should be obligatory and civil society and the private sector can be engaged to support the functioning and correct use of such facilities.

The number or size of the hand hygiene stations should be adapted to the number and type of users (e.g. children, those with limited mobility, etc.) to encourage use and reduce waiting times. Regular supervision and feedback should be done by leadership of the public health sectors. Filling, supervising and maintaining supplies should be the responsibility of the manager of the building or store, transport provider etc. or with a private entity.

3.2 Hand Hygiene materials

The ideal hand hygiene materials for communities and homes in order of effectiveness are:

- Water and soap or ABHR
- Ash
- Water alone

Hand hygiene stations can consist of either water (e.g., sinks attached to a piped water supply, refillable water reservoir or clean, covered buckets with taps) equipped with plain soap or alcohol based hand rub dispensers. Where ABHR or bar soap is not feasible, a liquid soap solution, mixing detergent with water can be used. Normal soap is effective in inactivating enveloped viruses such as coronavirus.

Regardless of the type of material, the washing of both hands, rubbing of hands, and the amount of rinsing water in particular, are important determinants in the reduction of pathogen contamination on hands.

3.3 Water quality and quantity requirements for hand-washing

The quality of water used for hand-washing does not need to meet drinking-water standards. However, efforts should be made to use and source water of the highest quality possible (e.g. an improved water sources. Where water is limited, hands can be wetted with water, the water then turned off while lathering with soap and scrubbing for at least 20 seconds and then turned on again to rinse. Water should always be allowed to flow to waste and hands should not be rinsed in a communal basin as this may increase contamination of the wash water and could possibly re-contaminate hands.

3.4 Hand-washing facility options

A number of design features should be considered in selecting and/or innovating on existing hand-washing facility options. These features include:

- Turning the tap on/off: either a sensor, foot pump, or large handle so the tap can be turned off with the arm or elbow
- Soap dispenser: for liquid soap either sensor-controlled or large enough to operate with the lower arm; for a bar of soap, the soap dish should be well-draining, so the soap doesn't get soggy
- Grey water: ensure the grey water is directed to, and collected in, a covered container if not connected to a piped system
- Drying hands: paper towels and a bin provided; if not possible encourage air drying for several seconds
- Materials: generally, the materials should be easily cleanable and repair/replacement parts can be sourced locally

Accessible: should be accessible to all users, including those with limited mobility



3.5 Treatment and handling requirements for excreta

When there are suspected or confirmed cases of COVID-19 in the home setting, immediate action must be taken to protect caregivers and other family members from the risk of contact with respiratory secretions and excreta that may contain the COVID-19 virus.

Frequently touched surfaces throughout the patient's care area should be cleaned regularly, such as tables and other bedroom furniture. Dishes should be washed and dried after each use and cups and eating utensils not shared with others. Bathrooms should be cleaned and disinfected at least once a day. Regular household soap or detergent should be used for cleaning first and then, after rinsing, regular household disinfectant containing 0.1% sodium hypochlorite (that is, equivalent to 1000 ppm or 1 part household bleach with 5% sodium hypochlorite to 50 parts water) should be applied.

PPE should be worn while cleaning, including mask, goggles, a fluid-resistant apron and gloves, and hand hygiene with soap and water or an alcohol-based hand rub should be performed after removing PPE.

Consideration should be given to safely managing human excreta throughout the entire sanitation chain, starting with ensuring access to regularly cleaned, accessible and functioning latrines and to the safe containment, conveyance, treatment and eventual disposal of sewage.

3.6 Management of waste generated at home

Waste generated at home during quarantine, while caring for a sick family member, or during the recovery period should be packed in strong black bags and closed completely before disposal and eventual collection by municipal waste services.

Used tissues or other materials used when sneezing or coughing should immediately be thrown in a waste bin. After such disposal, correct hand hygiene should be performed.

