

Dead body management in the context of the novel coronavirus (COVID-19)

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(interim recommendations, April 7, 2020)

Objective

- To provide recommendations on the management of dead bodies in the context of the novel coronavirus (COVID-19) in healthcare facilities.

These recommendations are preliminary and subject to review as new evidence becomes available.*

Key considerations

- In December 2019 a novel coronavirus (SARS-CoV-2) was identified as the causative agent of a severe acute respiratory illness (COVID-19) in Wuhan, China. (1, 2) The virus spread to different countries and WHO declare a pandemic on March 11, 2020. (3)
- There are still some uncertainties in the natural history of the COVID-19, including source(s), transmissibility mechanisms, viral shedding, and persistency of the virus in the environment. Human-to-human transmission has been documented, with incubation period from 2 to 14 days.
- Transmission of infectious diseases associated with management of dead body can occur and can be exacerbated by non-compliance to standard and transmission-based precautions, especially in healthcare settings. **Aerosol-generating procedures (AGP)[†]** have a role in the spread of the disease (1, 4), as well as contaminated hands of healthcare providers, surfaces and fomites.
- **Assess the risk during the mortuary care process** and provide adequate explanation to the family, **respecting the cultural context of the local community**. If indicated, provide personal protective equipment (PPE) to the family, with instruction in its use. **Manage each situation on a case-by-case basis**, balancing the rights of the family with the risks of exposure to infection.
- As of the day of this publication, the following precautions are recommended for the care of patients with suspected or confirmed cases of COVID-19[‡]:
 - For any suspected or confirmed cases of COVID-19: **standard + contact + droplet precautions**
 - For any suspected or confirmed cases of COVID-19 and AGP: **standard + contact + airborne precautions**

Management of dead bodies in the context of the COVID-19

Packing and transfer of the body from the isolation room/ward/other setting to a mortuary, crematorium or burial

- Ensure that mortuary staff and the burial team apply standard precautions at all times (i.e. perform hand hygiene, environmental cleaning) including appropriate use of PPE; long sleeved gown, gloves and facial protection if there is a risk of splashes from the patient's body fluids or secretions onto the body or face of the staff member.

* Updated information on the 2019-nCoV can be obtained at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.

[†] Aerosol-generating procedures (AGP) include: positive pressure ventilation (BiPAP and CPAP), endotracheal intubation, airway suction, high frequency oscillatory ventilation, tracheostomy, chest physiotherapy, nebulizer treatment, sputum induction, bronchoscopy, and necropsies.

[‡] For the most update information available for infection prevention and control for the 2019-nCoV, please refer to: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance>.

- Body bags are not necessary for packing the body. Wrap the body in cloth or any other tissue for transfer and remove it as soon as possible to the mortuary area.
- Keep both handling and movement of the body at minimum.
- PPE requirements for transport team (if change of team from that which is packing the body) include gloves and gown/apron.
- No special vehicle is required.

Mortuary care

- During preparation of the deceased (e.g. cleaning of body, tidying of hair, trimming of nails and shaving) wear appropriate PPE (gloves, gown, mask, eye protection – Table 1). Mortuary staff and funeral directors must be advised of the biohazard risk.
- Apply principles of cultural sensitivity. If the family of the patient wishes to view the body after its removal from the isolation room or related area, they may be allowed to do so with following standard precautions at all times, hand hygiene. Give the family clear instructions not to touch or kiss the body.
- Embalming is not recommended.
- Empty body bags must be disposed of as infectious waste.
- Cleaning should be conducted in accordance with manufacturer’s instructions for all cleaning and disinfection products (e.g., concentration, application method and contact time, etc.).

Burial

- Decedents with COVID-19 can be buried or cremated.
- Check local requirements that may dictate the handling and disposal of the remains of individuals who have died of COVID-19.

Autopsy including engineering and environmental controls

- Safety procedures for deceased individuals infected with an acute respiratory illness (ARI), including COVID-19, should be consistent with those used for any autopsy procedure. In general, the known hazards of work in the autopsy room seem to arise from contact with infectious materials and, particularly, with splashes onto body surfaces of health-care workers rather than from inhalation of infectious material. However, if a patient with COVID-19 died during the infectious period, the lungs and other organs may still contain live virus, and additional respiratory protection (N-95 or equivalent respirators) is needed during procedures that generate small-particle aerosols (e.g. use of power saws and washing of intestines). Therefore, *postmortem* examinations of patients with COVID-19 deserve special caution. (5)
- Ensure that safety measures are in place when performing *postmortem* examinations and collection of samples for microbiologic analyses. Engage a minimum number of staff in the procedure, and perform only if:
 - an adequately ventilated room suitable for the procedure is available.
 - appropriate PPE is available; scrub suit, surgical mask or if AGP particulate respirator or N95 mask, long sleeved fluid-resistant gown, gloves (either two pairs or one pair autopsy gloves) and face shield (preferably) or goggles, boots.
- Placement of PPE: put on PPE in antechamber room (before entering autopsy room) and remove in designated dress out room.

- Perform autopsies in an adequately ventilated room, i.e. natural ventilation with at least 160L/s/person air flow or negative pressure rooms with at least 12 air changes per hour (ACH) and controlled direction of air flow when using mechanical ventilation. (6)
- Minimize AGP in the autopsy room (e.g. during lung excision) avoiding the use of power saws whenever possible
 - avoiding splashes when removing, handling or washing organs, especially lung tissue and the intestines; and
 - using exhaust ventilation to contain aerosols and reduce the volume of aerosols released into the ambient air environment; exhaust systems around the autopsy table should direct air and aerosols away from health-care workers performing the procedure (e.g. exhaust downward).
- For reduction of AGP during autopsy, consider:
 - use of containment devices whenever possible (e.g. biosafety cabinets for the handling and examination of smaller specimens).
 - use of vacuum shrouds for oscillating saws.
 - do not use high-pressure water sprays.
 - if opening intestines, do so under water.

Environmental Cleaning

- Human coronaviruses can remain infectious on inanimate surfaces for up to 9 days. Surface disinfection with 0.1% sodium hypochlorite or 62 – 71% ethanol significantly reduces coronavirus infectivity on surfaces within 1 min exposure time. It is expected a similar effect against the SARS-CoV-2. (7)
- Chlorine should be diluted to 0.1% (1000 ppm) daily and be keep it out of sunlight. Clean all surfaces by:
 - wearing appropriate PPE.
 - removing any spill/body fluids with absorbent (paper) towels then dispose of them immediately as infectious waste.
 - cleaning surfaces with water and detergent.
 - applying chlorine 0.1% or other disinfectant standardized by the health-care facility – if sodium hypochlorite solution is used, wet the surface with the solution and allow at least 10 minutes contact time.
 - rinsing the area with clean water to remove the disinfectant residue (if required).

Personal protective equipment – Summary

Table 1 presents a summary of the use of personal protective equipment⁵ according to the procedure related to the mortuary management of COVID-19.

Table 1 – Use of personal protective equipment according to the procedure related to the mortuary management of COVID-19.

Procedure	Hand hygiene	Gloves	Surgical Mask	Respirator (N-95 or similar)	Long sleeved impermeable gown	Facial protection(*)
Managing the body inside the isolation room	✓	✓	✓		✓	✓
Removal of the body from the isolation room or similar area	✓	✓	✓		✓	✓
Mortuary care	✓	✓	✓		✓	✓
Necropsies	✓	✓		✓	✓	✓

(*) – face shield preferred

Table 2 presents a summary of the required equipment for mortuary management of COVID-19.

Table 2 – Technical specifications for personal protective equipment for procedures related to the mortuary management of COVID-19.

Equipment	Details
Hand hygiene	<ul style="list-style-type: none"> • alcohol based hand rub • running water • liquid plain soap for hand hygiene • disposable towel for hand drying (paper or tissue)
Personal protective equipment	<ul style="list-style-type: none"> • gloves • waterproof plastic apron • long sleeve gowns • anti-fog goggles • face shield • N95 respirator or surgical mask
Waste management and environmental cleaning	<ul style="list-style-type: none"> • disposal bag for bio-hazardous waste • Soap and water or detergent • disinfectant for surfaces – hypochlorite solution 0.1% (1000 ppm)

⁵ For the technical specifications of PPE, please refer to [Requirements and technical specifications of personal protective equipment \(PPE\) for the novel coronavirus \(2019-ncov\) in healthcare settings](#).

Comprehensive plan for dead body management in the context of COVID-19

- The rapid spread of COVID-19 and the increase in deaths, can generate the accumulation of victims in different care sites such as hospitals, homes, nursing homes, among others.
- This creates the need to activate an inter-agency dead body management plan, ** under the coordination of the civil protection or police authorities at all territorial levels, according to the country's rules and/or exceptional measures associated with COVID-19.
- Although these plans exist for disaster situations, the peculiarity of the pandemic requires their adjustment, in view of which it is necessary to pay special attention to the following aspects:
 1. The plan must be an inter-agency process which includes civil authorities, civil protection, police, forensics team, funeral homes, cemeteries, the health sector, logistics and communication. The latter is essential to reach the community not only with information on the progress of the pandemic and the measures adopted, but also with respect to deaths and with clear guidance on the decisions in this regard and the procedures to avoid further suffering and anxiety.
 2. The political authorities must create a timely decision-making framework for comprehensive management of corpses, which includes verification, collection, final disposal, and information management to the community. These steps must be taken to avoid extreme unilateral measures that are unnecessary and not very functional, such as disposal in mass graves, non-technical incineration, even leading to other risks such as social conflict and psychosocial harm.
 3. It is important to consider the need to expand the temporary storage capacity of bodies using refrigerated containers or alternate facilities with availability of refrigeration. These solutions must be analyzed on a case-by-case basis.

References

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** For more information on dead body management plans, consult the Pan American Health Organization. Management of dead bodies after disasters: A field manual for first responders. Second (revised) edition. Washington, D.C.: PAHO, 2016. Available at <https://iris.paho.org/bitstream/handle/10665.2/31295/9789275319246-eng.pdf?sequence=1&isAllowed=y>, accessed April 4, 2020.