Critical shortage or lack of personal protective equipment in the context of COVID-19

Considerations for health-care settings

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1. Introduction

1.1 Background

Coronavirus disease 2019 (COVID-19) has disrupted the global supply chain of personal protective equipment (PPE) while creating a huge surge in demand. Considerations therefore need to be taken if these supplies are not available in health-care settings.

This document provides considerations and potential strategies for health-care facilities caring for patients with suspected or confirmed COVID-19, where access to PPE for health-care workers is either limited or unavailable. It focuses on health-care worker safety and measures to reduce transmission.

This guidance complements the WHO guidance document *Rational Use of Personal Protective Equipment for Coronavirus Disease (COVID-19) and Considerations during Severe Shortages*.[1]

1.2 Target audience

This document is intended for public health authorities and individuals in the health sector who are involved in decisions about PPE use and alternatives in the context of COVID-19.

2. Use of PPE in health-care settings

2.1 PPE considerations

PPE includes gloves, medical/surgical face masks, goggles, face shields, gowns and respirators (N95, FFP-2 and FFP-3). This document will refer to these collectively under the term PPE.

Where there is a critical shortage or complete lack of PPE, temporary measures must be taken to mitigate the impact.

Such measures may include:

- extended use of PPE (using for a longer period than recommended without removing);
- reprocessing (reusing after cleaning or decontamination/sterilization) of either reusable or disposable PPE;
- using alternative items to replace evidence-based standards recommended by WHO, which may include repurposing readily attainable items (see table of suggested alternatives on page 2); and
- use of PPE beyond its manufacturing-stated expiration date if they remain in good condition, with no visible signs of degradation that could affect their functional properties.

If having to prioritize PPE within a health-care setting, consider redistribution to those caring for:

- critically ill COVID-19 patients;
- patients with known co-infections of multidrug-resistant organisms; and
- other patients posing a high infection risk to health-care workers.

After use, disposable PPE should be removed carefully, disposed of into a closed clinical waste bin and hand hygiene performed. If PPE is being reprocessed, care must be taken when handling these items.

2.2 Extended use, reprocessing and decontamination of PPE

While there may be a critical shortage of PPE, reusing PPE without an appropriate reprocessing/decontamination process is considered inadequate and unsafe. The reuse of potentially contaminated PPE items is a source of risk to health-care workers and transmission of infection to patients.

PPE equipment, including masks, respirators and gowns, should be removed and appropriately discarded after prolonged use:

- if it becomes wet, soiled or damaged;
- if it is exposed to splashing of chemicals, infectious substances or body fluids including blood; or
- when providing care outside of a designated cohort of COVID-19 patients.

Methods for reprocessing masks and respirators are not well established or standardized due to a lack of available evidence. In keeping with the recommended two-step process of cleaning followed by disinfection, this may not be possible for masks and respirators that cannot be cleaned without losing their functional integrity. While efforts are under way to research reprocessing of such items, reprocessing methods should be considered only when essential.

There is currently no quality evidence on medical mask reprocessing; therefore, it is not advised. Regarding respirator reprocessing, methods that are not validated but have been considered include using vaporized hydrogen peroxide, ethylene oxide or ultraviolet (UV) radiation lamps.[1]

2.3 Potential alternatives where PPE is lacking

Where there is a complete lack of PPE, as a last resort, health-care facilities may need to repurpose readily attainable items to substitute WHO-recommended items.

During aerosol-generating procedures (e.g. tracheal intubation, non-invasive ventilation, tracheostomy, cardiopulmonary resuscitation, manual ventilation before intubation, bronchoscopy), health-care workers should use airborne precautions and wear appropriate PPE, including a respirator (e.g. N95, FFP2 or equivalent standard). No alternatives to WHO-approved respirators can be recommended.

When determining appropriate alternatives for PPE (not including respirators), health facilities must consider the desired or required properties of the item:

Limited PPE Items	Desired Properties	Suggested Alternatives
Disposable gloves	Impermeable Not easily torn Thin/malleable to preserve dexterity Easily removable	Washing-up/rubber gloves Plastic bags
Gowns/ Aprons	Impermeable Not easily torn Good coverage of torso and arms Easily removable	Raincoats Rain ponchos Bin liners/trash bags Laboratory coats

3. Health-care setting considerations

The use of PPE must be implemented in combination with administrative and environmental controls to prevent the spread of infection and achieve the desired outcome. The following considerations enable decision-makers to implement measures to reduce the transmission risk of COVID-19 in order to support a health-care system that may have a critical shortage or lack of PPE.

3.1 Environmental controls

Environmental controls aid to reduce the spread of pathogens and the contamination of surfaces and objects.

Some suggestions to combat this spread:

- Declutter clinical areas, removing all non-essential items and objects to reduce surfaces that may become contaminated.
- Regularly clean all areas that COVID-19 patients come into contact with.
- Optimize ventilation in the areas designated for the care of COVID-19 patients.
- Ensure adequate space to maintain physical distancing of at least 1 metre between patients and health-care workers.

3.2 Administrative controls

Administrative controls relate to the implementation of operational infrastructure within health-care settings to minimize the risk to health-care workers. All health-care workers should be kept up to date with any changes to guidance and clinical practices regarding COVID-19.

Some suggestions of administrative controls to implement:

- Develop infection prevention and control (IPC) policies.
- Perform IPC training for all staff regarding hand hygiene, environmental cleaning/disinfection, proper wearing and removal of PPE, etc.

4. Patient management considerations

It is essential to establish differentiated care pathways for patients with suspected or confirmed COVID-19, to reduce the risk of transmission within health-care settings and to allow health-care workers to take appropriate PPE precautions.

4.1 Triage

- Consider triaging patients in open-air environments, if facilities allow.
- Use physical barriers such as glass or plastic windows, where possible, to communicate with patients when no physical contact or clinical examination is required. Appropriate situations for such constructs may be initial screening/triage areas, registration desks or pharmacy windows where medication is being collected.

4.2 Sample collection

- Perform sample collection in a well-ventilated environment, and consider doing it outside, if facilities allow.
- Consider patient self-collection of samples.

4.3 In-patient policy

Wherever possible, limit admission of patients who present with mild symptoms that can be managed safely in home isolation. Consider not admitting or discharging patients early if they meet all of the following criteria:

(i) not requiring oxygen;
(ii) medically safe for discharge/not requiring in-patient medical advice; and
(iii) independent in activities of daily living (ADLs).

For patients who meet the first two criteria but require assistance with ADLs, still consider not admitting or discharging them early, provided they have the necessary support from their family or designated carers in place and the ability to isolate in their home.

4.4 General considerations for the in-patient care of COVID-19 patients

- Limit interaction with the patients and their environment, where possible. Do not touch the patients or their environment unless absolutely necessary.
- Consider allowing self-administration of medications while in hospital, if a patient is able to do so.
- When physical interaction with a patient is necessary, perform these tasks with the patient facing away from the health-care worker, such as from behind the patient, to reduce direct droplet transmission.

4.5 Management of COVID-19 patients in isolation rooms and wards

- Consider cohorting patients with COVID-19 in the same room. These patients should have confirmed COVID-19 and not require isolation for another reason (i.e. co-infection with multidrug-resistant organisms). Ensure that patients' beds are kept at least 1 metre apart.
- Designate dedicated health-care workers/teams for COVID-19 patient care only so that they can use PPE for longer periods.
- Where possible, communicate with the patients from outside of the room. Consider communicating with the door closed or using telecommunications.
- Allow only health-care workers providing direct care to enter the room, and only when essential, while still maintaining patient safety. If they are able to carry out multiple tasks during the same interaction, this will minimize the number of times the room is entered.

4.6 Management of COVID-19 patients in intensive or critical care

- Limit performance of non-critical aerosol-generating-procedures.
- Where possible, reserve available WHO-recommended PPE for health-care workers caring for critically ill COVID-19 patients or other locally important pathogens.

5. Considerations for disposal and handling of dead bodies

COVID-19 is transmitted through respiratory secretions. To date, there is no evidence of infection from exposure to the bodies of persons who died from COVID-19.[2]

Where PPE supplies are limited, consider the following:

- Apply standard precautions, including hand hygiene, before and after handling the body and the environment.
- Immediately remove and wash clothing worn while handling the body. Individuals who have handled the body should immediately wash themselves.

6. Guidance development

6.1 Acknowledgements

This document was developed by a guidance development group composed of staff from the WHO Regional Office for the Western Pacific (WHO Health Emergencies Programme and Division of Health Systems and Services).

6.2 Guidance development methods

This document was developed based on adaptation of WHO COVID-19 global interim guidance, review of relevant literature, expert consultation, and guideline development group discussion and consensus.

6.3 Declaration of interests

Interests have been declared in line with WHO policy, and no conflicts of interest were identified from any of the contributors.

References

1. Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages [interim guidance]. Geneva: World Health Organization; 2020.
2. Infection prevention and control for the safe management of a dead body in the context of COVID-19 [interim guidance]. Geneva: World Health Organization; 2020.

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