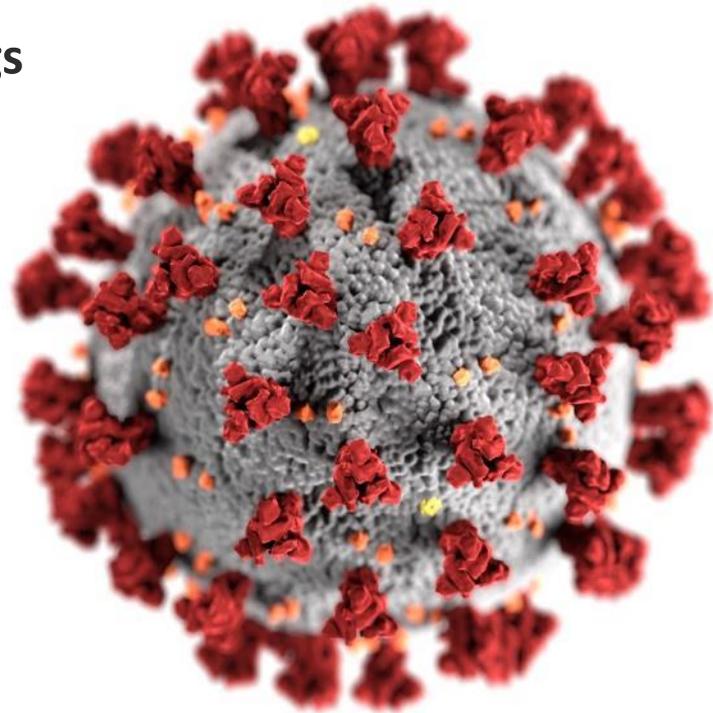


Operational Considerations for Personal Protective Equipment in the Context of Global Shortages for COVID-19 Pandemic

Intended for use in non-US healthcare settings



cdc.gov/coronavirus

Disclaimer

CDC does not recommend or endorse any strategies for personal protective equipment (PPE) use that differ from standard infection prevention and control (IPC) practice.

In times of crisis and global supply shortages, emergency strategies are temporary approaches for consideration. However, efforts to scale up rapid production of PPE should be prioritized.

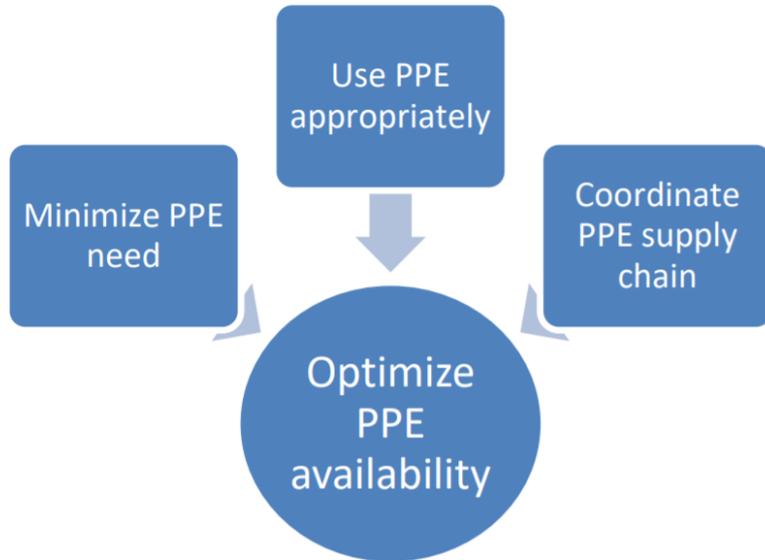
Whenever possible, emergency PPE strategies should not be used in hospital wards housing severe or critically ill patients with COVID-19, as well as those with known co-infections of multi-drug resistant or other organisms transmitted by contact (e.g., *Klebsiella pneumoniae*) or droplet (e.g., influenza virus).

Purpose and Scope of Presentation

- Purpose: to provide operational considerations to be used in conjunction with WHO's guidance on the [Rational use of personal protective equipment for coronavirus disease 2019 \(COVID-19\)](#) which defines strategies to optimize the availability of PPE and a summary of temporary measures during severe shortage of PPE*
- Scope: provides practical operational considerations for:
 - 1) Temporary measures included in WHO's guidance
 - 2) Several additional measures which are being utilized in some settings

* Because this presentation is intended to be used in conjunction with WHO PPE guidance, WHO terminology is used (e.g., medical masks) and WHO recommendations for healthcare worker PPE

Strategies to Optimize the Availability of PPE



- High-level and continued efforts will be needed to maintain and scale-up the PPE supply chain to ensure availability of PPE in healthcare settings where it is needed, to avoid supply shortages, and allow adherence to IPC standard practice

Minimize PPE Need

- Facilities should implement engineering and administrative control measures for patients with COVID-19
 - Reducing or cancelling elective surgical procedures and non-critical/non-urgent outpatient visits
 - Reducing face-to-face healthcare worker (HCW) encounters with patients
 - Limiting the number of visitors to healthcare facilities
 - Cohorting patients and HCWs
 - Maintaining adequate space between patients and HCWs

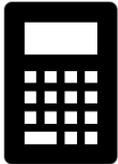
Use PPE Appropriately

- Facilities should ensure PPE use is rational and appropriate
 - PPE should be used based on:
 - The risk of exposure (e.g., type of activity)
 - The transmission dynamics of the pathogen (e.g., contact, droplet or aerosol)
 - PPE is generally intended to protect the wearer
 - The appropriate use of PPE can also protect others
- Facilities should provide HCWs with education and training

Coordinate PPE Supply Chain



- Facilities should communicate with local public health partners such as public health emergency preparedness and response staff and sub-national and national authorities regarding identification of additional supplies



- Facilities should understand their inventory and utilization rate
 - [Personal Protective Equipment \(PPE\) Burn Rate Calculator | CDC](#)
 - [WHO COVID-19 Essential Supplies Forecasting Tool](#)

Recommended Healthcare Worker PPE for COVID-19

- Gown
- Medical mask
(Respirator only if performing aerosol generating procedures)
- Eye protection (face shield or goggles)
- Gloves



Operational Considerations



Before Getting Started

- Review WHO's guidance on the [Rational use of personal protective equipment for coronavirus disease 2019 \(COVID-19\)](#) including the:
 - Considerations for decision making processes during severe shortages of PPE
 - Summary of temporary measures in the context of severe PPE shortage

Applying Appropriate Operational Considerations for Your Setting

1. Review the **general strategies** for optimizing PPE availability, then, apply as appropriate
2. Review the **PPE-specific strategies** and each of the associated considerations carefully, then, apply as appropriate based on:
 - The current PPE shortage scenario
 - The prioritized order as described in the flow-chart

General Strategies



Use PPE beyond Expiration Date

- When using PPE beyond the manufacturer-designated shelf life or expiration date, healthcare facilities should:
 - Inspect items closely prior to use to be sure they are in good condition with no degradation, tears, or wear that could affect performance

Use Reusable PPE

- When using reusable PPE, such as cloth gowns and reusable goggles, healthcare facilities should:
 - Follow manufacturer's instructions for reprocessing including cleaning and disinfecting and augment support staff as needed to ensure that equipment is reprocessed after each use
 - Establish systems to 1) routinely inspect, 2) maintain by such means as replacing missing fastening ties, and 3) replace reusable PPE when they are damaged, such as when gowns become thin or ripped (upon which time they should be disposed)

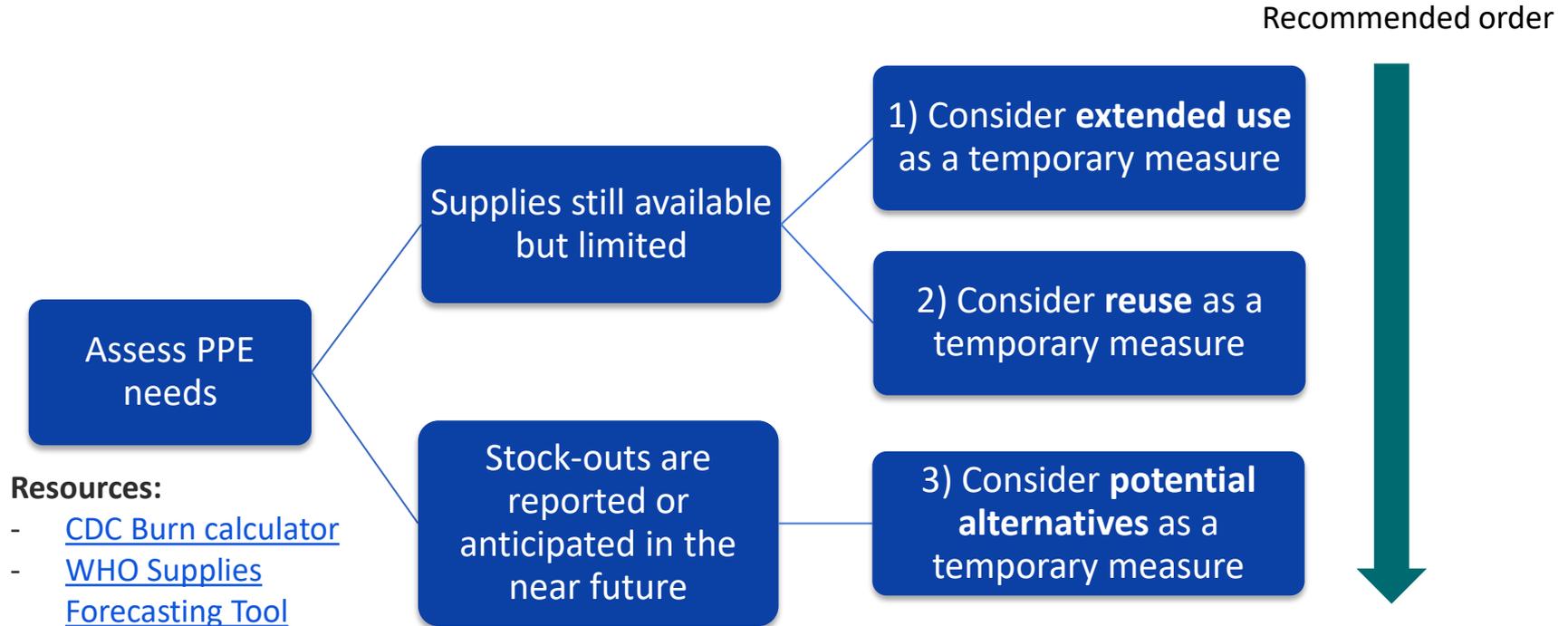
PPE-Specific Strategies



PPE Shortage Scenarios

- **Limited supplies:** PPE for direct clinical care is still available where recommended, but the supply is insufficient to enable full adherence to standard IPC practice
- **No PPE available:** PPE for direct clinical care is NOT available where recommended, due to supply shortages. Strategies under this scenario include potential alternatives to recommended PPE as a last resort during a crisis where standard PPE is not available

Prioritized Order of Actions



In some facilities, alternatives may be considered preferable to reuse (use operational considerations to guide decision-making)

Definitions

- **Extended use:** By one HCW among multiple patients with suspected or confirmed COVID-19 (one donning and doffing)
- **Reuse:** By one HCW among multiple patients with suspected or confirmed COVID-19 (multiple donning and doffing)
- **Potential alternatives:** Use of alternative items to recommended PPE as a last resort during a crisis where standard PPE is not available

Medical Masks

Extended use

Use for care of multiple patients with suspected or confirmed COVID-19 (multiple single-rooms when seen in succession or cohort of patients) by one HCW during a single shift

Reuse

Reprocessing and reusing medical masks for one HCW to use on multiple patients with suspected or confirmed COVID-19 for a limited time-period (multiple shifts) (*different than WHO temporary measures)

Potential Alternatives

- A. Use a face shield only OR
- B. Use a combination of a non-medical mask (also known as a face covering) and a face shield (*different than WHO temporary measures)

Medical Masks – Key Operational Considerations

Extended use

- If the mask becomes moist, damaged, visibly soiled, or difficult to breathe through, it should be removed and disposed following local protocols
- If the mask is removed for any other reason such as taking a break or completing a shift, it should be disposed following local protocols
- The potential duration of extended use depends on local and individual factors such as humidity and shift length
 - Likely a maximum of six hours
- **This strategy should be prioritized over reuse or any other approaches**

Medical Masks – Key Operational Considerations

Reuse

- Effectiveness of reprocessing methods for medical masks have not been established
- Potential reprocessing methods may be resource-intensive and therefore not feasible in many settings nor at facility level
- Facilities should establish standardized methods and protocols for ensuring the effectiveness of the process and that the integrity of the medical mask is maintained after reprocessing
- HCWs should inspect the mask prior to each reuse
- If the mask becomes damaged, soiled or difficult to breathe through, it should be removed from circulation and disposed following local protocols

Medical Masks – Key Operational Considerations

Potential Alternatives

- Non-medical fabric masks (also known as face coverings) are not considered PPE and their ability to protect HCWs is currently unknown
- Efforts should be made to obtain standardized masks made of fabrics that are approved by national or sub-national authorities and offer some level of filtration as well as a hydrophobic outer layer to allow some level of fluid resistance
- Masks should be removed and disposed following local protocols whenever needed such as when they become moist, visibly soiled, or damaged and upon exiting the isolation area per standard practice

Gowns

Extended use

Use during care of multiple patients with suspected or confirmed COVID-19 (multiple single-rooms when seen in succession or cohort of patients) during a single shift

Potential Alternatives

Potential alternatives: disposable aprons, disposable laboratory coats, reusable patient gowns or laboratory coats, combinations of clothing

Gowns – Key Operational Considerations

Extended use

- If it becomes visibly soiled, the gown must be removed using appropriate technique for reprocessing or disposal following local protocols (followed by appropriate donning of a new gown)
- If it is removed for any other reason such as taking a break or completing a shift, the gown should be sent for reprocessing or disposed of following local protocols
- **This strategy should be prioritized over reuse or other approaches**

Gowns – Key Operational Considerations

Potential Alternatives

- Selection of potential alternatives should take into consideration the availability and attributes, such as impermeability and comfort of the wearer, and whether there are enough available to allow frequent replacement
- Alternatives should be removed using appropriate technique for either reprocessing or disposal following local protocols whenever needed (e.g., when moist, visibly soiled, or damaged) and upon exiting the isolation area

Eye Protections (Goggles and Face Shields)

Extended use

Use during care of multiple patients with suspected or confirmed COVID-19 during a single shift

Reuse

- A. Reprocessing and reusing disposable face shields for one HCW to use on multiple patients with suspected or confirmed COVID-19 OR
- B. Dedicating a supply of reusable goggles or face shields to an isolation area

Potential Alternatives

Using safety glasses such as trauma glasses

Eye Protections – Key Operational Considerations

Extended use

- If eye protection becomes visibly soiled, it should be removed using appropriate technique and sent for reprocessing or disposal following local protocols
- If eye protection is removed for any other reason such as taking a break or completing a shift, it should be sent for reprocessing or disposed following local protocols

Eye Protections – Key Operational Considerations

Reuse

Option A. Reprocessing and reusing disposable face shields for one HCW to use on multiple patients with confirmed or suspected COVID-19

- A face shield should be dedicated to one HCW
- They should be immediately reprocessed when they are visibly soiled, whenever they are removed such as when leaving the isolation area, and at least daily (after every shift)
- After reprocessing, store face shield in a transparent plastic container and label with the HCW name to prevent accidental sharing between HCW
- Examine prior to each reuse to ensure the integrity of the foam pad, elastic strap, and clarity of the visor

Eye Protections – Key Operational Considerations

Reuse

Option B. Dedicating a supply of reusable goggles or face shields to an isolation area

- Items should be reprocessed after each use and stored at the entry to the isolation area, in a dedicated area equipped for reprocessing adjacent to the isolation area (dirty and clean storage area)

Potential Alternatives

- The selection of potential alternatives should include those that have extensions to cover the side of the eyes

Respirators

Extended use

Use on multiple patients with suspected or confirmed COVID-19 (multiple single-rooms when seen in succession or cohort of patients) during a single shift

Reuse

Reprocessing and reusing respirators for one HCW to use on multiple patients with suspected or confirmed COVID-19

Respirators – Key Operational Considerations

Extended use

- The potential number of hours of extended use would be dependent on local and individual factors such as humidity and shift length. In practice, this would likely be a maximum of six hours

Reuse

- If the respirator becomes damaged, soiled or difficult to breathe through, it should be removed from circulation and disposed following local protocols

Decontamination of Respirators

- At present, there are no CDC and/or NIOSH-approved methods for filtering facepiece respirator (FFR) decontamination prior to reuse ([guidance available](#))
- Most promising methods (not validated) for respirator reprocessing:
 - Vapor of hydrogen peroxide
 - UV radiation lamp
 - Moist heat
 - Dry heat

Overall Summary of Actions in Presentation

Step 1

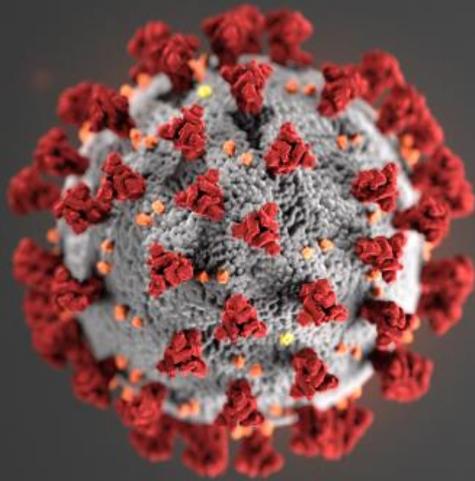
Familiarize yourself with WHO's guidance on the options for temporary measures during severe shortage of PPE

Step 2

Apply these operational considerations as appropriate for your setting

Step 3

Ensure that broader efforts to improve supply chain are continued in order to return to standard practices



For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

