Coronavirus Disease 2019 (COVID-19)

Strategies for Optimizing the Supply of Disposable Medical Gloves

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Once PPE supplies and availability return to normal, healthcare facilities should promptly resume conventional practices.

Summary of update as of October 25, 2020:

- Added considerations for returning to conventional capacity practices.

Audience: These considerations are intended for use by federal, state, and local public health officials; leaders in occupational health services and infection prevention and control programs; and other leaders in healthcare settings who are responsible for developing and implementing policies and procedures for preventing pathogen transmission in healthcare settings.

Purpose: This document offers a series of strategies or options to optimize supplies of disposable medical gloves in healthcare settings when there is limited supply. It does not address other aspects of pandemic planning; for those, healthcare facilities can refer to COVID-19 preparedness plans.
Surge capacity refers to the ability to manage a sudden increase in patient volume that would severely challenge or exceed the present capacity of a facility. While there are no widely accepted measurements or triggers to distinguish surge capacity from daily patient care capacity, surge capacity is a useful framework to approach a decreased supply of gloves during the COVID-19 response. To help healthcare facilities plan and optimize the use of gloves in response to COVID-19, CDC has developed a Personal Protective Equipment (PPE) Burn Rate Calculator. Three general strata have been used to describe surge capacity and can be used to prioritize measures to conserve glove supplies along the continuum of care.

- **Conventional capacity**: measures consisting of engineering, administrative, and personal protective equipment (PPE) controls that should already be implemented in general infection prevention and control plans in healthcare settings.
- **Contingency capacity**: measure that may be used temporarily during periods of expected glove shortages. Contingency capacity strategies should only be

implemented after considering and implementing conventional capacity strategies. While current supply may meet the facility's current or anticipated utilization rate, there may be uncertainty if future supply will be adequate and, therefore, contingency capacity strategies may be needed.

- **Crisis capacity**: strategies that are not commensurate with U.S. standards of care but may need to be considered during periods of known gloves shortages. Crisis capacity strategies should only be implemented after considering and implementing conventional and contingency capacity strategies. Facilities can consider crisis capacity strategies when the supply is not able to meet the facility's current or anticipated utilization rate.

CDC's optimization strategies for glove supply offer a continuum of options for use when glove supplies are stressed, running low, or exhausted. Contingency and then crisis capacity measures augment conventional capacity measures and are meant to be considered and **implemented sequentially**. Once glove availability returns to normal, healthcare facilities should promptly resume standard practices.

Decisions to implement contingency and crisis strategies are based upon these assumptions:

1. Facilities understand their current glove inventory and supply chain
2. Facilities understand their glove utilization rate
3. Facilities are in communication with local healthcare coalitions and federal, state, and local public health partners (e.g., public health emergency preparedness and response staff) to identify additional supplies
4. Facilities have already implemented other engineering and administrative control measures including:
    - Use physical barriers and other engineering controls
    - Limit number of patients going to hospital or outpatient settings
    - Use telemedicine whenever possible
    - Exclude all HCP not directly involved in patient care
    - Limit face-to-face HCP encounters with patients
    - Exclude visitors to patients with known or suspected COVID-19
    - Cohort patients and/or HCP
5. Facilities have provided HCP with required education and training, including having them demonstrate competency with donning and doffing, with any PPE ensemble that is used to perform job responsibilities, such as provision of patient care

Once availability of gloves returns to normal, healthcare facilities should promptly resume conventional practices. Determining the appropriate time to return to conventional strategies can be challenging. Considerations affecting this decision include:

1. the number of patients requiring Transmission-Based Precautions (e.g., number of patients with suspected or confirmed SARS-CoV-2 infection)
2. whether there is evidence of ongoing SARS-CoV-2 transmission in the facility

3. the incidence of COVID-19 in the community
4. the number of days' supply of PPE items currently remaining at the facility
5. whether or not the facility is receiving regular resupply with its full allotment.

Conventional capacity strategies

Continue providing patient care as in usual infection control practice

Note: CDC does not recommend double gloves when providing care to suspected or confirmed COVID-19 patients.

- Continue use of approved disposable medical gloves in accordance with standard and transmission-based precautions in healthcare settings and when indicated for other exposures such as handling cleaning chemicals.
- Reinforce indications and recommended practices for non-sterile disposable glove use.
- Prioritize sterile gloves for surgical and other sterile procedures.
- Medical gloves for handling chemotherapy agents (chemotherapy gloves) should be prioritized for HCP handling chemotherapy and other hazardous drugs.
- Remind HCP about indications for when gloves are needed, as well as common care situations when gloves may not be needed.

Contingency capacity strategies

Decrease length of stay for medically stable patients with COVID-19

Selectively cancel elective and non-urgent procedures and appointments for which gloves are typically used by HCP

Use of gloves past their manufacturer-designated shelf life for training activities
Non-sterile disposable gloves cleared by the Food and Drug Administration (FDA) are not required to have expiration date labeling ; however, some manufacturers choose to designate a shelf life.

Facilities may consider using gloves past their manufacturer-designated shelf life (if a shelf life is designated) for situations where HCP are **not** exposed to pathogens, such as during training activities.

Use of gloves conforming to other U.S. and international standards
Healthcare facilities may consider using disposable medical gloves that are *similar to* FDA-cleared surgical and examination gloves but are approved under other U.S. or international standards. Examples are shown in the table below.

Country	Performance Standard	May Be Used in Lieu of
U.S.	NFPA 1999-2018 (single use emergency	Examination gloves[a]

	medical gloves)	
	ANSI/ADA 76-2005	Examination gloves[a]
Europe	EN 455 (EN 455-1:2000; EN 455-2:2015; EN 455-3:2015; EN 455-4:2009)[b]	Surgeon's gloves (ASTM D3577-19)[c]
	EN 455 (EN 455-1:2000; EN 455-2:2015; EN 455-3:2015; EN 455-4:2009)[d]	Examination gloves[a]
	EN ISO 374-5:2016[e]	Examination gloves[a]
China	GB 10213:2016	Examination gloves[a]
Australia	AS/NZS 4011.1:2014 (latex) AS/NZS 4011.2: 2014 (vinyl)	Examination gloves (ASTM D3578-19) Examination gloves (ASTM D5250-19)
Japan	JIS T9107:2018	Surgeon's gloves (ASTM D3577-19)[c]
	JIS T9115:2018	Examination gloves[a]
Malaysia	MS 1155:2003	Examination gloves[a]
International	ISO 10282:2014	Surgeon's gloves (ASTM D3577-19)[c]
	ISO 11193-1:2008 (latex)	Examination gloves (ASTM D3578-19)
	ISO 11193-2:2006 (vinyl)	Examination gloves (ASTM D5250-19)

[a] Recognized standards for patient examination gloves include ASTM D3578-19 (latex rubber), ASTM D5250-19 (polyvinyl chloride), ASTM D6319 (nitrile rubber), and ASTM D6977 (chloroprene rubber).
[b] Surgeon's (surgical) gloves must be provided sterile and powderless; products meeting requirements for surgical gloves should have the mark "CE EN455."
[c] Surgeon's (surgical gloves) must be provided sterile and powderless.
[d] Examination gloves must be provided powderless; products meeting requirements for surgical gloves should have mark of "CE EN455."
[e] Gloves must have "CE mark" with certificate to indicate compliance with EN ISO 374-5 and have Level 2 or higher per EN ISO 374-2:2014.

Crisis Capacity Strategies

Cancel all elective and non-urgent procedures and appointments for which gloves are typically used by HCP

Use of gloves past their manufacturer-designated shelf life for healthcare delivery

Non-sterile disposable gloves cleared by the FDA are not required to have expiration date labeling; however, some manufacturers choose to designate a shelf life. Facilities may consider using gloves past their manufacturer-designated shelf life for healthcare delivery. Sterile gloves past their manufacturer-designated shelf life should not be used for surgical or other sterile procedures.

Prioritize the use of non-sterile disposable gloves

Non-sterile disposable gloves should be prioritized for use during activities when gloves are recommended to protect the hands from contact with potentially hazardous substances, including blood and body fluids (e.g., wound care, aerosol generating procedures).

Facilities may consider suspending use of gloves when entering the room of patients with endemic multidrug resistant organisms (e.g., MRSA, VRE, ESBL-producing organisms). However, HCP should wear gloves when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes, nonintact skin, or potentially contaminated intact skin could occur. When HCP are exposed to such MDROs, employers must ensure that hand hygiene protocols are stringently followed. These organisms can be carried on the skin and under the fingernails, leading to transmission to other patients or colonization of HCP.

Consider non-healthcare glove alternatives

In instances of severely limited or no available disposable medical gloves, non-healthcare disposable gloves (e.g., food service or industrial chemical resistance gloves) may be considered for situations where HCP are **not** exposed to pathogens. These gloves are available in many different materials, including polyvinyl chloride, nitrile, and latex. Sizing and limitations to dexterity should be considered. Additional information regarding glove alternatives can be found in the FDA guidance for medical glove conservation strategies. The recommended extended use guidance (below) **does not apply** to non-healthcare glove alternatives.

Extended use of disposable medical gloves

Note: The following extended use guidance applies only to disposable medical gloves and does not apply to non-healthcare glove alternatives.

Extended use of disposable medical gloves by HCP refers to the practice of wearing gloves without changing them between patients or tasks. Disposable medical glove extended wear is most easily implemented when patients are cohorted, such as when caring for a group of patients with the same confirmed infectious disease diagnosis (e.g., patients with confirmed COVID-19) in a shared or adjacent location.

During glove supply crisis gloves can remain on but must be sanitized between patients within the cohort to prevent cross transmission of any other pathogens from patient to patient.

Gloved hands must be cleaned following cleaning procedures described in detail below at intervals where gloves would normally be changed (e.g., when moving from a 'dirty' to 'clean' task, between patients) or hand hygiene normally performed.

Disposable medical gloves should always be discarded after:

- Visible soiling or contamination with blood, respiratory or nasal secretions, or other body fluids occurs
- Any signs of damage (e.g., holes, rips, tearing) or degradation are observed
- Maximum of four hours of continuous use
- Doffing. Previously removed gloves should not be re-donned as the risk of tearing and contamination increases. Therefore, disposable glove "re-use" should not be performed.

After removing gloves for any reason, hand hygiene should be performed with alcohol-based hand sanitizer or soap and water.

Methods for performing hand hygiene of gloved hands for extended use of disposable medical gloves

CDC does not recommend disinfection of disposable medical gloves as standard practice. This practice is inconsistent with general disposable glove usage, but, in times of extreme disposable medical glove shortages, this option may need to be considered.

Alcohol-based hand sanitizer (ABHS)
ABHS is the preferred method for performing hand hygiene of gloved hands in healthcare settings when the gloves are not visibly soiled. Research has shown multiple disposable latex and nitrile glove brands maintained their integrity when treated with ABHS.[1-2] Disposable medical gloves can be disinfected for up to six (6) applications of ABHS or until the gloves become otherwise contaminated or ineffective (for one or more of the reasons stated in extended use guidance above). Follow hand hygiene guidance for proper application of ABHS.

Soap and water
If ABHS is not available, soap and water can be used to clean donned disposable medical gloves between tasks or patients. HCP planning to wash gloves with soap and water should wear long-cuffed surgical gloves; as washing may be impractical for short cuffed gloves where water may become trapped inside the worn gloves. Disposable medical gloves can be cleaned with soap and water up to 10 times or until the gloves become otherwise contaminated or ineffective (for one or more of the reasons stated in extended use guidance above). Follow hand hygiene guidance for proper soap and water hand hygiene procedures.

Diluted bleach solution as a disinfectant
Limited data[1] show that when nitrile gloves were tested in accordance with ASTM F739-12: "*Standard Test Method for Permeation of Liquids and Gases Through Protective Clothing*

Materials Under Conditions of Continuous Contact" using a 10-13% bleach solution, no permeation was observed.[3] Therefore, disinfection of disposable gloves using diluted bleach may be considered as outlined below.

1. Check gloves for signs of damage (e.g., holes, rips, tearing) or degradation (e.g., brittle, stiff, discoloration, tackiness). If damage or degradation is observed, discard the gloves and do not disinfect.
2. While gloves are donned, dip gloved hands into a dilute bleach solution for five (5) seconds to ensure complete coverage. Solution should not touch the skin.
3. Allow the dilute bleach solution to remain on the donned gloves for one minute (starting after removing gloved hands from the solution) to ensure adequate decontamination. Leave hands in a downward position to reduce the risk of the bleach solution dripping onto arms.
4. Rinse dilute bleach solution off gloved hands using water.
5. Wipe gloves dry with a clean, absorbent material.
6. Check gloves again for signs of damage (e.g., holes, rips, tearing) or degradation (e.g., brittle, stiff, discoloration, tackiness). If damage or degradation is observed, discontinue use and discard the gloves.

Instructions for making an appropriate dilute bleach solution can be found on the CDC website.

Although a diluted bleach solution has been shown to be effective for disinfecting disposable medical gloves, the odor and potential for respiratory irritation, potential for inadvertent spills, and potential staining of clothing are reasons this should be the last option for disinfection.[4] If disinfection using the diluted bleach method is conducted, it should be done in a well-ventilated area. Diluted bleach solution must be mixed fresh at least daily, and any time the solution becomes soiled with organic material, which can reduce the effectiveness of the bleach. Available permeation data[1] suggests that disposable medical gloves may continue to provide protection when disinfected with diluted bleach solution up to 10 times or until the gloves become otherwise contaminated or ineffective (for one or more of the reasons stated in extended use guidance above).[2-3]

Additional resources

- Strategies for Optimizing the Supply of Eye Protection
- Strategies for Optimizing the Supply of Gowns
- Strategies for Optimizing the Supply of Facemasks
- Strategies for Optimizing the Supply of N95 Respirators
- PPE Burn Rate Tracker app

Footnotes

[1] Disposable glove permeation test report provided by the manufacturer (2017; not published).

References

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