COLORADO
Department of Public Health & Environment

Interim Recommendations to Optimize the Supply of Personal Protective Equipment for Healthcare Personnel: COVID-19 Response

Issued March 9,2020. The Colorado Department of Public Health and Environment can authorize changes to these recommendations as new information emerges. Record of changes:

Change Number	Date of Change	Name	Date / signature
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I. Background

Infection control procedures including administrative rules, engineering controls, environmental hygiene, and appropriate use of personal protective equipment (PPE) are all necessary to prevent infections from spreading during healthcare delivery. For COVID-19, currently recommended PPE includes gloves, gowns, eye protection, and respiratory protection. This document provides guidance on sparing PPE in order to prevent or mitigate shortages of PPE. Guidance regarding other PPE recommendations and infection prevention control for healthcare personnel (HCP) can be found on the CDPHE COVID-19 web page.[1]

For the purposes of this guidance, HCP refers to all persons, paid and unpaid, working in healthcare settings engaged in patient care activities, including: patient assessment for triage, entering examination rooms or patient rooms to provide care or clean and disinfect the environment, obtaining clinical specimens, handling soiled medical supplies or equipment, and coming in contact with potentially contaminated environmental surfaces. This includes emergency medical services (EMS) clinicians (prehospital EMS and medical first responders) as well as home healthcare agency staff.

The scope of this document includes recommendations for optimizing PPE supply. Patient flow and clinical care strategies that may impact PPE utilization (e.g. testing protocols, inpatient cohorting, etc.) are outside the scope of this document. The intended audience for this document includes healthcare facilities (hospitals, clinics, etc.), long term care facilities engaged in healthcare provision, home healthcare agencies, and other entities that are routinely engaged in licensed provision of healthcare.

II. Guiding Principles

Protection for HCP responding to COVID-19 is the highest priority. The recommendations provided here are oriented around this core principle, and are intended to maintain the highest level of protection while avoiding wastage of PPE and providing appropriate guidance for extending the use of PPE in the context of current or future shortages.

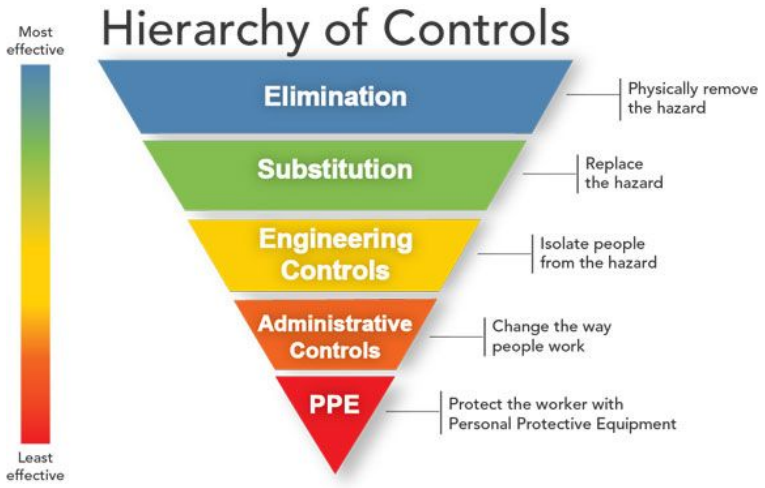
These recommendations were generated based on information available from CDC and FDA, in consultation with key clinical stakeholders engaged in the healthcare mitigation workgroup for COVID-19 response. Due to the rapid evolution of the COVID-19 epidemic, a formal stakeholder process was not convened. Stakeholder feedback and additional input for these recommendations are welcomed.

III. Assessment and Recommendations

III A. Context and Definitions

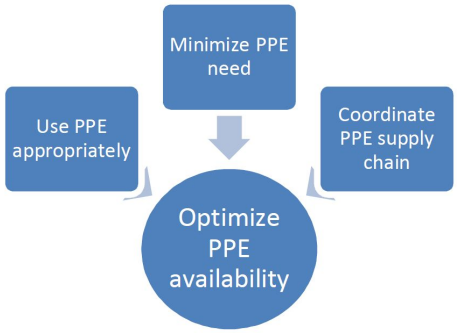
Strategies for optimizing PPE start with implementation of an appropriate hierarchy of controls for occupational exposures as shown in the figure below.

[1] *https://www.colorado.gov/pacific/cdphe/resources-local-public-health-agencies-and-healthcare-providers*



Source: https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/index.html

Additional details regarding effective infection prevention control for COVID-19 are provided under separate cover and can be accessed through CDPHE.[2] Emphasis must be placed on measures to appropriately minimize the need for PPE through implementation of initial levels within the hierarchy of controls. The World Health Organization (WHO) has emphasized that the current global stockpile of PPE is insufficient, particularly for masks and respirators; and that the supply of gowns and goggles is also soon expected to be insufficient.[3] WHO has summarized the recommended approach as shown in the figure below:



This document focuses on optimization of PPE supply and sparing of PPE. Recommendations for PPE sparing are provided for each type of PPE currently indicated for use by HCP in COVID-19 response. For each type of PPE, current recommendations, supply chain assessment, PPE sparing options, and PPE sparing recommendations are provided. Key definitions:[4]

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[2] *https://www.colorado.gov/cdphe*

[3] WHO. Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19): Interim guidance 27 February 2020. *https://apps.who.int/iris/bitstream/handle/10665/331215/WHO-2019-nCov-IPCPPE_use-2020.1-eng.pdf*

[4] *https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/index.html*

- **Re-use**: Refers to the practice of using the same disposable PPE for multiple encounters with patients but removing it ('doffing') after each encounter. For example, an N95 respirator may be stored in between encounters to be put on again ('donned') prior to the next encounter with a patient. In general re-use refers more accurately to "limited re-use" since any disposable PPE can not be re-used indefinitely.
- **Extended use**: Refers to the practice of wearing the same PPE (disposable or re-usable) for repeated close contact encounters with several patients. For example, an N95 respirator may be used without removing the respirator between patient encounters. Extended use may be implemented when multiple patients are infected with the same respiratory pathogen and patients are placed together in dedicated waiting rooms or hospital wards.
- **Expired use**: Refers to the practice of using PPE beyond the manufacturer-designated shelf life.
- **Prioritized use**: Refers to scenarios where deviation from PPE standards are implemented for low-risk exposure protection and utilization of available PPE are prioritized for higher risk exposure protection. For example, this may include rotating expired stock into service before current stock is exhausted for utilization in lower-risk scenarios while current stock are reserved for utilization in higher-risk scenarios. Prioritized utilization can also include use of expired stock for training purposes.

III B. Supply Chain Logistics

For all PPE listed below, healthcare facilities and organizations should assess stock levels and utilization rates daily, with projected exhaustion dates updated at least once per week. In particular, it is critical that facilities understand their current N95 respirator inventory, supply chain, and utilization rate. Inventory should be subject to appropriate access controls, both to facilitate assessment of stock and to avoid loss of commodities that may be in high demand.

Supply chain status for specific PPE as shown below (section III.C) should be assessed at the facility level (and for larger institutions, within the overall network). Supply chain status can be described using these definitions:

- **No shortage**: Adequate stock on hand, with no current or expected changes in daily practice; and availability of resupply for order from commercial vendors.
- **Vendor reduced stock**: Limited or no availability of resupply for order from commercial vendors. This includes vendor determination that a product is on allocation (distribution restrictions that may include placing limitations on quantities sold, orders on hold or backordered, or limiting release to emergency-only use).
- **Facility reduced stock**: Reduced stock on hand in health care facility, referring to PPE conforming to established standards of care. Reduced stock represents approximately 50% or less, compared to normal stock levels on hand (items physically in inventory).

- **Facility contingency stock**: Reduced stock on hand (referring to PPE conforming to established standards of care) causing changes in daily practice but without significant impact on care delivered, patient safety, or HCP safety.[5] Contingency stock levels represent approximately 25% or less, compared to normal stock levels on hand (items physically in inventory).
- **Facility crisis stock**: Reduced stock on hand causing changes in daily practice that are not commensurate with established standards of care.[6]
- **Facility stock out**: Complete absence of PPE (exhaustion of disposable supplies after all available measures for alternate use have been applied; exhaustion of supplies needed to disinfect re-usable PPE; etc).

Further detail for assessment of supply chain can be described according to the geographic spread of shortages:

- **Sporadic**: Limited numbers of facilities impacted.
- **Local**: Impact in five or fewer public health jurisdictions in the state.
- **Regional**: Impact more than five but less than 26 (about half) of the public health jurisdictions in the state.
- **Widespread**: Impact in more than half the public health jurisdictions of the state.

Additional definitions:

- **Surgical mask**: Often referred to as face masks, although not all face masks are regulated as surgical masks.[7] Surgical masks may be labeled as surgical, isolation, dental, or medical procedure masks. A surgical mask is a loose-fitting, disposable device that creates a physical barrier between the mouth and nose of the wearer and the immediate environment. They may come with or without a face shield.
- **Filtering facepiece respirator (FFR)**: A protective device designed to achieve a very close facial fit and very efficient filtration of airborne particles. There are seven classes of filters: Ninety-five percent is the minimal level of filtration (the respirator blocks at least 95 percent of very small (0.3 micron) particles); this basic level is N95. All other FFR meet or exceed this standard. Other FFR include N, R, and P designations with filtration level 95, 99, or 100.[8]
- **Colorado Medical Cache**: Limited inventory of emergency supplies, including emergency PPE reserved for all but the most severe shortages that will significantly impact the ability of Colorado's healthcare system to provide emergency medical support to Colorado residents.
- **Strategic National Stockpile (SNS)**: Limited inventory of emergency supplies maintained by the federal government, including emergency PPE. SNS support in a public health emergency can be requested by state governments.

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[5] *https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/contingency-capacity-strategies.html*
[6] *https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/crisis-alternate-strategies.html*
[7] *https://www.fda.gov/medical-devices/personal-protective-equipment-infection-control/n95-respirators-and-surgical-masks-face-masks#s2*
[8] *https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/default.html*

Requests for assistance should be submitted according to the CDPHE Concept of Operations (CONOPS) for Coronavirus Disease (COVID-19) Personal Protection Equipment Shortage (available on the CDPHE web page).[9] Lead time for Colorado medical cache is approximately 2-3 days.

No specific reporting to CDPHE is requested for supply chain logistics, although CDPHE may request voluntary periodic updates.

III C. Supply Chain Status

Current assessment as of date of release / date of modification shown on the cover page:

1. Gloves: No shortage
2. Gowns: Vendor reduced stock (sporadic)
3. Eye Protection: No shortage
4. Respiratory Protection -- surgical mask: Vendor reduced stock (sporadic)
5. Respiratory Protection -- filtering facepiece respirator: Vendor reduced stock (widespread). Facility reduced stock (sporadic).

III D. Guidance

Local cooperation to share stock or redistribution of PPE across facilities according to availability and need is encouraged. Local emergency managers and local public health agencies should be consulted when considering related strategies.

Sparing recommendations should be considered if stock on hand is at 50% or lower than normal ("facility reduced stock" level as defined above). Strategies should be shifted to more intensive sparing measures, as shown below, if stock on hand is at 25% or lower than normal ("Facility contingency" level as defined above). **Alerting your local ESF-8 contact, as described above, should be pursued when stock on hand is expected to provide five days of supply -- before facility crisis level, as defined above, is reached**.

For each type of PPE, guidance is shown below. The tables show PPE sparing options for disposable PPE according to supply chain scenarios. These recommendations are intended for implementation at the facility level; the geographic spread (sporadic, local, regional, widespread) is not applicable in this context.

In ALL SCENARIOS healthcare facilities should continue communication and measures to support appropriate utilization and avoid PPE use when not required. PPE must be utilized only when indicated, and not used in other circumstances that do not require PPE according

[9] *https://www.colorado.gov/pacific/cdphe/resources-local-public-health-agencies-and-healthcare-providers*

to established standards of care and PPE. In particular, utilization of FFR vs. surgical masks may require focused communication and monitoring.

In ALL SCENARIOS, healthcare facility supply chain tracking of stock and utilization on an ongoing, frequently updated basis will be critical.

Note that some tables shown below currently reflect similar or the same recommendations across different types of PPE. The tables are not being consolidated, however, to allow for future updates that may impact one type of PPE specifically.

1. Gloves
    a. Current PPE recommendations: Single-use, non-sterile gloves.
    b. PPE sparing options:

	Re-use	Extended Use	Expired Use[10]	Prioritized Use
Vendor reduced stock	No	No	No	No
Facility reduced stock	No	No	No	No
Facility contingency	No	No	Consider	Consider
Facility crisis	Consider	Consider	Yes	Yes
Facility stock out	Consider	Consider	Yes	Yes

2. Gowns
    a. Current PPE recommendations: Isolation gown, disposable or cloth. Cloth gowns should be laundered after each use.
    b. PPE sparing options:

	Re-use	Extended Use	Expired Use[11]	Prioritized Use
Vendor reduced stock	No	No	No	No
Facility reduced stock	No	No	No	No
Facility contingency	No	No	Consider	Consider

[10] Shelf life depends on the type of glove and storage conditions. FDA "Guidance for Industry and FDA Staff: Medical Glove Guidance Manual" (https://www.fda.gov/media/90612/download) states on p.17 that expiration date labeling is optional, and real-time stability studies may be conducted to verify that medical gloves maintain their barrier properties. In addition, guidance available from OSHA may be adapted for this circumstance (OSHA. Personal Protective Equipment. Publication 3151-12R, 2004. Available at https://www.osha.gov/Publications/osha3151.pdf; p.29). Details from these materials are shown in appendix.

[11] Shelf life depends on the type of gown and storage conditions. Guidance regarding gowns that have passed their shelf life is not available.

Facility crisis	Consider	Consider	Yes	Yes
Facility stock out	Consider	Consider	Yes	Yes

Consider purchase of more durable / re-usable materials to augment facility supply of gowns.

3. Eye protection
    a. Current PPE recommendations: Goggles or a disposable face shield that covers the front and sides of the face. Reusable eye protection (e.g., goggles) must be cleaned and disinfected according to manufacturer's reprocessing instructions prior to re-use.
    b. PPE sparing options:

	Re-use	**Extended Use**	**Expired Use**[12]	**Prioritized Use**
Vendor reduced stock	No	No	No	No
Facility reduced stock	No	No	No	No
Facility contingency	No	No	Consider	Consider
Facility crisis	Yes	Yes	Yes	Yes
Facility stock out	Yes	Yes	Yes	Yes

Consider purchase of more durable / re-usable materials to augment facility supply of eye protection.

4. Respiratory protection: Surgical mask
    a. Current PPE recommendations: CDC recommends a surgical mask for symptomatic individuals, as a method of source control to reduce onward viral transmission. WHO recommends a surgical mask for routine care of COVID-19 patients by HCP, but this guidance has not been adopted by CDC or CDPHE.
    b. PPE sparing options:

	Re-use	**Extended Use**	**Expired Use**[13]	**Prioritized Use**
Vendor reduced stock	No	No	No	No
Facility reduced stock	No	No	No	No
Facility contingency	No	No	Consider	Consider

[12] Shelf life depends on the type of eye protection and storage conditions. Guidance regarding eye protection that has passed its shelf life is not available.
[13] Shelf life depends on the type of surgical mask and storage conditions. Guidance regarding surgical masks that have passed their shelf life is not available.

Facility crisis	No	Consider	Consider	Yes
Facility stock out	No	Consider	Consider	Yes

5. Respiratory protection: Filtering facepiece respirator (FFR)
    a. Current PPE recommendations: Respiratory protection (i.e., a respirator) that is at least as protective as a fit-tested NIOSH-certified disposable N95 FFR. If reusable respirators (e.g., powered air purifying respirator/PAPR) are used, they must be cleaned and disinfected according to manufacturer's reprocessing instructions prior to re-use. CDC has issued additional guidance specific to respiratory protection. The CDC "Checklist for Healthcare Facilities: Strategies for Optimizing the Supply of N95 Respirators during the COVID-19 Response"[14] is shown in appendix. Additional guidance available from CDC includes:[15]

- Strategies for Optimizing the Supply of N95 Respirators
- Strategies for Optimizing the Supply of N95 Respirators: Conventional Capacity
- Strategies for Optimizing the Supply of N95 Respirators: Contingency Capacity
- Strategies for Optimizing the Supply of N95 Respirators: Crisis/Alternate Strategies
- Release of Stockpiled N95 Filtering Facepiece Respirators Beyond the Manufacturer- Designated Shelf Life: Considerations for the COVID-19 Response
- Recommended Guidance for Extended Use and Limited Reuse of N95 Filtering Facepiece Respirators in Healthcare Settings

    b. PPE sparing options:

	Re-use	**Extended Use**	**Expired Use**[16]	**Prioritized Use**
Vendor reduced stock	Consider[17]	Consider[18]	Consider	Consider
Facility reduced stock				

[14] *https://www.cdc.gov/coronavirus/2019-ncov/hcp/checklist-n95-strategy.html*
[15] *https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/index.html*
[16] Shelf life depends on the type of FFR and storage conditions. FFR that have passed their shelf life may be used in accordance with CDC guidance. Specific FFR models that have been tested for operational integrity past their shelf life are shown in appendix. Rotating expired stock into circulation early (before current stock is exhausted) for utilization in lower-risk scenarios may preserve current stock for utilization in higher-risk scenarios.
[17] For pathogens in which contact transmission is not a concern (e.g. tuberculosis), non-emergency reuse is routinely practiced as long as the FFR remains functional. Even when N95 respirator reuse is practiced or recommended, restrictions are in place which limit the number of times the same FFR is reused. Limited reuse has been recommended and widely used as an option for conserving respirators during previous respiratory pathogen outbreaks and pandemics.
[18] Possible under appropriate conditions (e.g. cohorted patients). Extended use has been recommended by CDC as an option for conserving respirators during previous respiratory pathogen outbreaks and pandemics. Key restrictions on re-use include visible contamination and use on patients that require contact precautions, among other details available in CDC guidance: *https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedguidanceextuse.html*

Facility contingency				
Facility crisis	Yes	Yes	Yes	Yes
Facility stock out	Yes	Yes	Yes	Yes

Limit respirators used during training: Determine which HCP do and do not need to be in a respiratory protection program and, when possible, allow limited re-use of respirators by individual HCP for training and then fit testing. Implement qualitative fit testing to assess adequacy of a respirator fit to minimize destruction of N95 respirator used in fit testing and allow for limited re-use by HCP.

Implementation of these measures should be conducted in alignment with CDC guidance referenced above.

APPENDIX

Medical glove operational integrity past shelf life

Medical glove shelf life depends on the type of glove and storage conditions. FDA "Guidance for Industry and FDA Staff: Medical Glove Guidance Manual" (*https://www.fda.gov/media/90612/download*) states on p.17 that expiration date labeling is optional, and real-time stability studies may be conducted to verify that medical gloves maintain their barrier properties. In addition, guidance available from OSHA may be adapted for this circumstance (OSHA. Personal Protective Equipment. Publication 3151-12R, 2004. Available at *https://www.osha.gov/Publications/osha3151.pdf*; p.29). Details from these materials are summarized here:

- Gloves should be inspected before each use to ensure that they are not made ineffective in any way. Any gloves with impaired protective ability should be discarded.
- Barrier property tests: A visual inspection will help detect cuts or tears but a more thorough inspection by filling the gloves with water and tightly rolling the cuff towards the fingers will help reveal any pinhole leaks.
- Gloves that are discolored or stiff may also indicate deficiencies.
- Sterile gloves for which packaging has been compromised

While not described in the FDA or OSHA publications referenced above, there are other practical consideration that may be considered:

- Inspection as described below may consume the gloves being tested. A sample of gloves from a particular box may be tested, and if protective ability of the gloves is confirmed, the remainder of the box can be considered for utilization. It is possible that the top layer of gloves in a box may be compromised while the remainder are intact.
- Sterile gloves for which packaging has been compromised (rendering the gloves non-sterile) may maintain their integrity and be considering for utilization as non-sterile medical gloves.

APPENDIX

Filtering Facepiece Respirator (FFR) operational integrity past shelf life

CDC Release of Stockpiled N95 Filtering Facepiece Respirators Beyond the Manufacturer-Designated Shelf Life: Considerations for the COVID-19 Response
https://www.cdc.gov/coronavirus/2019-ncov/release-stockpiled-N95.html

CDC/NIOSH believes the following products, despite being past their manufacturer-designated shelf life, should provide the expected level of protection to the user if the stockpile conditions have generally been in accordance with the manufacturer-recommended storage conditions and an OSHA-compliant respiratory protection program is used by employers. In alphabetical order, these models are:

3M 1860 (and 1860S, see comments below)
3M 1870 (and 1870S, see comments below)
3M 8210
3M 9010
3M 8000
Gerson 1730
Medline/Alpha Protech NON27501
Moldex 1512
Moldex 2201

Firm conclusions cannot be drawn for stockpiled N95 models beyond those tested in this study; however, the 3M 1860S is a smaller version of the 3M 1860 constructed from the same materials and is expected to perform in the same manner. The 3M 8000 is no longer produced; however, it should still be effective at protecting workers if the straps are intact and there are no visible signs of damage. The Kimberly-Clark 46827 (size small) and Kimberly-Clark 46727 (size regular) may not provide the expected level of protection to the wearer when past their manufacturer-designated shelf life of 5 years. In June 2018, Kimberly Clark issued a letter to customers regarding these models, reminding them that they should be disposed of if beyond their shelf life, regardless of whether a shelf life is designated on the product label/packaging. It is important to note that the results of this study are for stockpiled N95s which have undergone long-term storage and have exceeded any manufacturer-designated shelf life. These results are not an indication of this product's performance when purchased new for (1) just-in-time use or (2) routine use.

APPENDIX

CDC Checklist for Healthcare Facilities: Strategies for Optimizing the Supply of N95 Respirators during the COVID-19 Response

Checklist for Healthcare Facilities: Strategies for Optimizing the Supply of N95 Respirators during the COVID-19 Response
https://www.cdc.gov/coronavirus/2019-ncov/hcp/checklist-n95-strategy.html

Conventional Capacity Strategies consist of providing patient care without any change in daily practices

Engineering Controls (1)	
	Isolate patients in an airborne infection isolation room (AIIR)
	Use physical barriers such as glass or plastic windows at reception areas, curtains between patients, etc.
	Properly maintain ventilation systems to provide air movement from a clean to contaminated flow direction

Administrative Controls (2)	
	Limit the number of patients going to hospitals or outpatient settings by screening patients for acute respiratory illness prior to non-urgent care or elective visits
	Exclude all HCP not directly involved in patient care (e.g., dietary, housekeeping employees)
	Reduce face-to-face HCP encounters with patients (e.g., bundling activities, use of video monitoring)
	Exclude visitors to patients with known or suspected COVID-19
	Implement source control: Identify and assess patients who may be ill with or who may have been exposed to a patient with known COVID-19 and recommend they use facemasks until they can be placed in an AIIR or private room.
	Cohort patients: Group together patients who are infected with the same organism to confine their care to one area
	Cohort HCP: Assign designated teams of HCP to provide care for all patients with suspected or confirmed COVID-19
	Use telemedicine to screen and manage patients using technologies and referral networks to reduce the influx of patients to healthcare facilities

APPENDIX

CDC Checklist for Healthcare Facilities: Strategies for Optimizing the Supply of N95 Respirators during the COVID-19 Response

	Train HCP on indications for use of N95 respirators
	Train HCP on use of N95 respirators (i.e., proper use, fit, donning and doffing, etc.)
	Implement just-in-time fit testing: Plan for larger scale evaluation, training, and fit testing of employees when necessary during a pandemic

	Limit respirators during training: Determine which HCP do and do not need to be in a respiratory protection program and, when possible, allow limited re-use of respirators by individual HCP for training and then fit testing
	Implement qualitative fit testing to assess adequacy of a respirator fit to minimize destruction of N95 respirator used in fit testing and allow for limited re-use by HCP

Personal Protective Equipment and Respiratory Protection (3)	
	Use surgical N95 respirators only for HCP who need protection from both airborne and fluid hazards (e.g., splashes, sprays). If needed but unavailable, use faceshield over standard N95 respirator.
	Use alternatives to N95 respirators where feasible (e.g., other disposable filtering facepiece respirators, elastomeric respirators with appropriate filters or cartridges, powered air purifying respirators)

Contingency Capacity Strategies may change practices but may not have a significant impact on patient care or HCP safety

Administrative Controls (2)	
	Decrease length of hospital stay for medically stable patients with COVID-19 who cannot be discharged to home for social reasons by identifying alternative non-hospital housing

APPENDIX

CDC Checklist for Healthcare Facilities: Strategies for Optimizing the Supply of N95 Respirators during the COVID-19 Response

Personal Protective Equipment and Respiratory Protection (3)	
	Use N95 respirators beyond the manufacturer-designated shelf life for training and fit testing
	Extend the use of N95 respirators by wearing the same N95 for repeated close contact encounters with several different patients, without removing the respirator (i.e., recommended guidance on implementation of extended use)
	Implement re-use of N95 respirators by one HCP for multiple encounters with different tuberculosis patients, but remove it after each encounter

Crisis/Alternate Strategies are not commensurate with current U.S. standards of care but may need to be considered during periods of expected or known N95 respirator shortages.

When N95 Supplies are Running Low

Personal Protective Equipment and Respiratory Protection (3)	
	Use respirators as identified by CDC as performing adequately for healthcare delivery beyond the manufacturer- designated shelf life
	Use respirators approved under standards used in other countries that are similar to NIOSH-approved N95 respirators but that may not necessarily be NIOSH-approved
	Implement limited re-use of N95 respirators for patients with COVID-19, measles, and varicella
	Use additional respirators identified by CDC as NOT performing adequately for healthcare delivery beyond the manufacturer-designated shelf life
	Prioritize the use of N95 respirators and facemasks by activity type with and without masking symptomatic patients

APPENDIX

CDC Checklist for Healthcare Facilities: Strategies for Optimizing the Supply of N95 Respirators during the COVID-19 Response

When No Respirators Are Left

Engineering Controls (1)	
	Use an expedient patient isolation room for risk-reduction
	Use a ventilated headboard to decrease risk of HCP exposure to a patient-generated aerosol

Administrative Controls (2)	
	Exclude HCP at higher risk for severe illness from COVID-19 from contact with known or suspected COVID-19 patients (i.e., those of older age, those with chronic medical conditions, or those who may be pregnant)
	Designate convalescent HCP for provision of care to known or suspected COVID-19 patients (those who have clinically recovered from COVID-19 and may have some protective immunity) to preferentially provide care)

Personal Protective Equipment and Respiratory Protection (3)	
	Use masks not evaluated or approved by NIOSH or homemade masks as a last resort

(1) Engineering Controls reduce exposures for healthcare personnel (HCP) by placing a barrier between the hazard and the HCP

(2) Administrative Controls refer to employer-dictated work practices and policies that reduce or prevent hazardous exposures

(3) Personal Protective Equipment and Respiratory Protection should be used as part of a suite of strategies to protect personnel, complementing the use of engineering and administrative controls as needed.