West Virginia Hospital Association

Strategies for Optimizing the Supply of PPE based on CDC Guidance (Version 1, March 24, 2020)

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NJHA
New Jersey Hospital Association

Adapted from work by the New Jersey Hospital Association

Strategies for Optimizing the Supply of PPE based on CDC Guidance

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

This document offers a series of strategies or options to optimize supplies of isolation gowns in healthcare settings when there is limited supply. Surge capacity refers to the ability to manage a sudden, unexpected increase in patient volume that would otherwise 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 isolation gowns during the COVID-19 response. Three general strata have been used to describe surge capacity and can be used to prioritize measures to conserve isolation gown supplies along the continuum of care.

- **CONVENTIONAL CAPACITY:** measures consist of providing patient care without any change in daily contemporary practices. This set of measures, consisting of engineering, administrative, and personal protective equipment (PPE) controls should already be implemented in general infection prevention and control plans in healthcare settings.
- **CONTINGENCY CAPACITY:** measures may change daily standard practices but may not have any significant impact on the care delivered to the patient or the safety of healthcare personnel (HCP). These practices may be used temporarily during periods of expected PPE shortages.
- **CRISIS CAPACITY:** strategies that are not commensurate with U.S. standards of care. These measures, or a combination of these measures, may need to be considered during periods of known PPE shortages.

The following contingency and crisis strategies are based upon these assumptions:

1. Facilities understand their PPE inventory and supply chain
2. Facilities understand their PPE utilization rate
3. Facilities are in communication with local healthcare coalitions, federal, state, and local public health partners (e.g., public health emergency preparedness and response staff) regarding identification of additional supplies
4. Facilities have already implemented other **engineering and administrative control measures** including:
   - Reducing the number of patients going to the hospital or outpatient settings
   - Excluding HCP not essential for patient care from entering their care area
   - Reducing face-to-face HCP encounters with patients
   - Excluding visitors to patients with confirmed or suspected COVID-19
   - Cohorting patients and HCP
   - Maximizing use of telemedicine
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.

Strategy Table for Contingency and Crisis Capacity for Eye Protection

Contingency Capacity Strategies: Eye Protection	Considerations
Selectively cancel elective and non-urgent procedures and appointments for which eye protection is typically used by HCP.	
Shift eye protection supplies from disposable to re-usable devices (i.e., goggles and reusable face shields).	Consider preferential use of powered air purifying respirators (PAPRs) or full-face elastomeric respirators which have built-in eye protection AND Ensure appropriate cleaning and disinfection between users if goggles or reusable face shields are used.
Implement extended use of eye protection (practice of wearing the same eye protection for repeated close contact encounters with several different patients, without removing eye protection between patient encounters. Extended use of eye protection can be applied to disposable and reusable devices)	
Eye protection should be removed and reprocessed if it becomes visibly soiled or difficult to see through.	If a disposable face shield is reprocessed, it should be dedicated to one HCP and reprocessed whenever it is visibly soiled or removed (e.g., when leaving the isolation area) prior to putting it back on. See protocol for removing and reprocessing eye protection below AND Eye protection should be discarded if damaged (e.g., face shield can no longer fasten securely to the provider, if visibility is obscured and reprocessing does not restore visibility) AND HCP should take care not to touch their eye protection. If they touch or adjust their eye protection they must immediately perform hand hygiene AND HCP should leave patient care area if they need to remove their eye protection. See protocol for removing and reprocessing eye protection below.

Strategy Table for Contingency and Crisis Capacity for Eye Protection *Continued*

Crisis Capacity Strategies: Eyewear	Considerations
Cancel all elective and non-urgent procedures and appointments for which eye protection is typically used by HCP.	
Use eye protection devices beyond the manufacturer-designated shelf life during patient care activities.	If there is no date available on the eye protection device label or packaging, facilities should contact the manufacturer. The user should visually inspect the product prior to use and, if there are concerns (such as degraded materials), discard the product.
Prioritize eye protection for selected activities such as: During care activities where splashes and sprays are anticipated, which typically includes aerosol generating procedures. During activities where prolonged face-to-face or close contact with a potentially infectious patient is unavoidable.	
Consider using safety glasses (e.g., trauma glasses) that have extensions to cover the side of the eyes.	
Exclude HCP at higher risk for severe illness from COVID-19 from contact with known or suspected COVID-19 patients.	During severe resource limitations, consider excluding HCP who may be at higher risk for severe illness from COVID-19, such as those of older age, those with chronic medical conditions, or those who may be pregnant, from caring for patients with confirmed or suspected COVID-19 infection.
Designate convalescent HCP for provision of care to known or suspected COVID-19 patients.	It may be possible to designate HCP who have clinically recovered from COVID-19 to preferentially provide care for additional patients with COVID-19. Individuals who have recovered from COVID-19 infection may have developed some protective immunity, but this has not yet been confirmed.

Selected Options for Reprocessing Eye Protection

Adhere to recommended manufacturer instructions for cleaning and disinfection.

When manufacturer instructions for cleaning and disinfection are unavailable, such as for single use disposable face shields, consider:

- While wearing gloves, carefully wipe the inside, followed by the outside of the face shield or goggles using a clean cloth saturated with neutral detergent solution or cleaner wipe.
- Carefully wipe the outside of the face shield or goggles using a wipe or clean cloth saturated with EPA-registered hospital disinfectant solution.
- Wipe the outside of face shield or goggles with clean water or alcohol to remove residue.
- Fully dry (air dry or use clean absorbent towels).
- Remove gloves and perform hand hygiene.

Strategy Table for Contingency and Crisis Capacity for Isolation Gowns

Contingency Capacity Strategies: Isolation Gowns	Considerations
Selectively cancel elective and non-urgent procedures and appointments for which isolation gown is typically used by HCP.	
Shift gown use towards cloth isolation gowns. Reusable (i.e., washable) gowns are typically made of polyester or polyester-cotton fabrics. Gowns made of these fabrics can be safely laundered according to routine procedures and reused.	Care should be taken to ensure that HCP do not touch outer surfaces of the gown during care. Laundry operations and personnel may need to be augmented to facilitate additional washing loads and cycles Systems are established to routinely inspect, maintain (e.g., mend a small hole in a gown, replace missing fastening ties), and replace reusable gowns when needed (e.g., when they are thin or ripped)
Consider the use of coveralls.	Coveralls, typically provide 360-degree protection because they are designed to cover the whole body, including the back and lower legs, and sometimes the head and feet as well. While the material and seam barrier properties are essential for defining the protective level, the coverage provided by the material used in the garment design, as well as certain features including closures, will greatly affect the protective level. HCP unfamiliar with the use of coveralls must be trained and practiced in their use, prior to using during patient care.
Use of expired gowns beyond the manufacturer-designated shelf life for training.	The majority of isolation gowns do not have a manufacturer-designated shelf life. However, consideration can be made to using gowns that do and are past their manufacturer-designated shelf life. If there is no date available on the gown label or packaging, facilities should contact the manufacturer.
Use gowns or coveralls conforming to international standards.	Current guidelines do not require use of gowns that conform to any standards. In times of shortages, healthcare facilities can consider using international gowns and coveralls. Gowns and coveralls that conform to international standards, including with EN 13795 and EN14126, could be reserved for activities that may involve moderate to high amounts of body fluids.

Crisis Capacity Strategies: Isolation Gowns	Considerations
Cancel all elective and non-urgent procedures and appointments for which a gown is typically used by HCP.	
Extended use of isolation gowns.	Consideration can be made to extend the use of isolation gowns (disposable or cloth) such that the same gown is worn by the same HCP when interacting with more than one patient known to be infected with the same infectious disease when these patients housed in the same location (i.e., COVID-19 patients residing in an isolation cohort). This can be considered only if there are no additional co-infectious diagnoses transmitted by contact (such as Clostridioides difficile) among patients. If the gown becomes visibly soiled, it must be removed and discarded as per usual practices.

Strategy Table for Contingency and Crisis Capacity for Isolation Gowns *Continued*

Crisis Capacity Strategies: Isolation Gowns	Considerations
Re-use of cloth isolation gowns. Disposable gowns are not typically amenable to being doffed and re-used because the ties and fasteners typically break during doffing. Cloth isolation gowns could potentially be untied and retied and could be considered for re-use without laundering in between.	In a situation where the gown is being used as part of standard precautions to protect HCP from a splash, the risk of re-using a non-visibly soiled cloth isolation gown may be lower. However, for care of patients with suspected or confirmed COVID-19, HCP risk from re-use of cloth isolation gowns without laundering among (1) single HCP caring for multiple patients using one gown or (2) among multiple HCP sharing one gown is unclear. The goal of this strategy is to minimize exposures to HCP and not necessarily prevent transmission between patients. Any gown that becomes visibly soiled during patient care should be disposed of and cleaned.
Prioritize gowns. Gowns should be prioritized for the following activities: • During care activities where splashes and sprays are anticipated, which typically includes aerosol generating procedures • During the following high-contact patient care activities that provide opportunities for transfer of pathogens to the hands and clothing of healthcare providers, such as: dressing, bathing/showering, transferring, providing hygiene, changing linens, changing briefs or assisting with toileting, device care or use, wound care	Surgical gowns should be prioritized for surgical and other sterile procedures. Facilities may consider suspending use of gowns for endemic multidrug resistant organisms (e.g., MRSA, VRE, ESBL-producing organisms).
When No Gowns Are Available In situation of severely limited or no available isolation gowns, the following pieces of clothing can be considered as a last resort for care of COVID-19 patients as single use. However, none of these options can be considered PPE, since their capability to protect HCP is unknown. Preferable features include long sleeves and closures (snaps, buttons) that can be fastened and secured. • Disposable laboratory coats • Reusable (washable) patient gowns • Reusable (washable) laboratory coats • Disposable aprons • Combinations of clothing: Combinations of pieces of clothing can be considered for activities that may involve body fluids and when there are no gowns available: Long sleeve aprons in combination with long sleeve patient gowns or laboratory coats, open back gowns with long sleeve patient gowns or laboratory coats, sleeve covers in combination with aprons and long sleeve patient gowns or laboratory coats	Reusable patient gowns and lab coats can be safely laundered according to routine procedures. Laundry operations and personnel may need to be augmented to facilitate additional washing loads and cycles Systems are established to routinely inspect, maintain (e.g., mend a small hole in a gown, replace missing fastening ties) and replace reusable gowns when needed (e.g., when they are thin or ripped).

Strategy Table for Contingency and Crisis Capacity for Face Masks

Contingency Capacity Strategies: Face Masks	Considerations
Selectively cancel elective and non-urgent procedures and appointments for which a facemask is typically used by HCP.	
Remove facemasks for visitors in public areas.	Healthcare facilities can consider removing all facemasks from public areas. Facemasks can be available to provide to symptomatic patients upon check in at entry points. All facemasks should be placed in a secure and monitored site. This is especially important in high-traffic areas like emergency departments.
Implement extended use of facemasks. Extended use of facemasks is the practice of wearing the same facemask for repeated close contact encounters with several different patients, without removing the facemask between patient encounters.	The facemask should be removed and discarded if soiled, damaged, or hard to breathe through. HCP must take care not to touch their facemask. If they touch or adjust their facemask they must immediately perform hand hygiene. HCP should leave the patient care area if they need to remove the facemask.
Have patients with symptoms of respiratory infection use tissues or other barriers to cover their mouth and nose.	

Crisis Capacity Strategies: Face Masks	Considerations
Cancel all elective and non-urgent procedures and appointments for which a facemask is typically used by HCP.	
Use facemasks beyond the manufacturer-designated shelf life during patient care activities.	If there is no date available on the facemask label or packaging, facilities should contact the manufacturer. The user should visually inspect the product prior to use and, if there are concerns (such as degraded materials or visible tears), discard the product.
Implement limited re-use of facemasks. Limited re-use of facemasks is the practice of using the same facemask by one HCP for multiple encounters with different patients but removing it after each encounter. As it is unknown what the potential contribution of contact transmission is for SARS-CoV-2, care should be taken to ensure that HCP do not touch outer surfaces of the mask during care, and that mask removal and replacement be done in a careful and deliberate manner.	The facemask should be removed and discarded if soiled, damaged, or hard to breathe through. Not all facemasks can be re-used. Facemasks that fasten to the provider via ties may not be able to be undone without tearing and should be considered only for extended use, rather than re-use. Facemasks with elastic ear hooks may be more suitable for re-use. HCP should leave patient care area if they need to remove the facemask. Facemasks should be carefully folded so that the outer surface is held inward and against itself to reduce contact with the outer surface during storage. The folded mask can be stored between uses in a clean sealable paper bag or breathable container.

Strategy Table for Contingency and Crisis Capacity for Face Masks *Continued*

Crisis Capacity Strategies: Face Masks	Considerations
Prioritize facemasks for selected activities such as: • For provision of essential surgeries and procedures • During care activities where splashes and sprays are anticipated • During activities where prolonged face-to-face or close contact with a potentially infectious patient is unavoidable • For performing aerosol generating procedures, if respirators are no longer available	
When No Facemasks Are Available, Options Include: Exclude HCP at higher risk for severe illness from COVID-19 from contact with known or suspected COVID-19 patients. Designate convalescent HCP for provision of care to known or suspected COVID-19 patients. Use a face shield that covers the entire front (that extends to the chin or below) and sides of the face with no facemask. Consider use of expedient patient isolation rooms for risk reduction. Consider use of ventilated headboards. HCP use of homemade masks: In settings where facemasks are not available, HCP might use homemade masks (e.g., bandana, scarf) for care of patients with COVID-19 as a last resort. However, homemade masks are not considered PPE, since their capability to protect HCP is unknown. Caution should be exercised when considering this option. Homemade masks should ideally be used in combination with a face shield that covers the entire front (that extends to the chin or below) and sides of the face.	During severe resource limitations, consider excluding HCP who may be at higher risk for severe illness from COVID-19, such as those of older age, those with chronic medical conditions, or those who may be pregnant, from caring for patients with confirmed or suspected COVID-19 infection. It may be possible to designate HCP who have clinically recovered from COVID-19 to preferentially provide care for additional patients with COVID-19. Individuals who have recovered from COVID-19 infection may have developed some protective immunity, but this has not yet been confirmed. Portable fan devices with high-efficiency particulate air (HEPA) filtration that are carefully placed can increase the effective air changes per hour of clean air to the patient room, reducing risk to individuals entering the room without respiratory protection. NIOSH has developed guidance for using portable HEPA filtration systems to create expedient patient isolation rooms. The expedient patient isolation room approach involves establishing a high-ventilation-rate, negative pressure, inner isolation zone that sits within a “clean” larger ventilated zone. NIOSH has developed the ventilated headboard that draws exhaled air from a patient in bed into a HEPA filter, decreasing risk of HCP exposure to patient-generated aerosol. This technology consists of lightweight, sturdy, and adjustable aluminum framing with a retractable plastic canopy. The ventilated headboard can be deployed in combination with HEPA fan/filter units to provide surge isolation capacity within a variety of environments, from traditional patient rooms to triage stations, and emergency medical shelters.

Strategy Table for Contingency and Crisis Capacity for N95 Respirators

In the continuum of care, the following measures can be categorized as contingency capacity, which may change daily practices but may not have any significant impact on the care delivered to the patient or the safety of the HCP. The following measures may be considered in the setting of a potential impending shortage of N95 respirators. The decision to implement these practices should be made on a case by case basis taking into account known characteristics of the SARS-CoV-2 and local conditions (e.g., number of disposable N95 respirators available, current respirator usage rate, success of other respirator conservation strategies, etc.).

Contingency Capacity Strategies: N95 Respirator	Considerations
Decrease length of hospital stay for medically stable patients with COVID-19	Currently, CDC recommends discharge of patients with confirmed COVID-19 when they are medically stable and have an appropriate home environment to which to return. If patients cannot be discharged to home for social rather than medical reasons, public health officials might need to identify alternative non-hospital housing where those patients can convalesce.
Use of N95 respirators beyond the manufacturer-designated shelf life for training and fit testing.	In times of shortage, consideration can be made to use N95 respirators beyond the manufacturer-designated shelf life. However, expired respirators might not perform to the requirements for which they were certified. Over time, components such as the strap and material may degrade, which can affect the quality of the fit and seal. Because of this, use of expired respirators could be prioritized for situations where HCP are NOT exposed to pathogens, such as training and fit testing. As expired respirators can still serve an important purpose, healthcare facilities should retain all N95 respirators during the early phases of this outbreak.
Extended use of N95 respirators Practices allowing extended use of N95 respirators, when acceptable, can also be considered. The decision to implement policies that permit extended use of N95 respirators should be made by the professionals who manage the institution's respiratory protection program, in consultation with their occupational health and infection control departments with input from the state/local public health departments.	CDC has recommended guidance on implementation of extended use of N95 respirators in healthcare settings. Extended use has been recommended and widely used as an option for conserving respirators during previous respiratory pathogen outbreaks and pandemics. Extended use refers to the practice of wearing the same N95 respirator for repeated close contact encounters with several different patients, without removing the respirator between patient encounters. Extended use is well suited to situations wherein multiple patients with the same infectious disease diagnosis, whose care requires use of a respirator, are cohorted (e.g., housed on the same hospital unit). It can also be considered to be used for care of patients with tuberculosis, varicella, and measles.

Strategy Table for Contingency and Crisis Capacity for N95 Respirators *Continued*

Contingency Capacity Strategies: N95 Respirator	Considerations
Limited re-use of N95 respirators for tuberculosis Re-use refers to the practice of using the same N95 respirator by one HCP for multiple encounters with different patients but removing it (i.e. doffing) after each encounter. This practice is often referred to as "limited reuse" because restrictions are in place to limit the number of times the same respirator is reused.	It is important to consult with the respirator manufacturer regarding the maximum number of donnings or uses they recommend for the N95 respirator model. If no manufacturer guidance is available, data suggests limiting the number of reuses to no more than five uses per device to ensure an adequate safety margin. N95 and other disposable respirators should not be shared by multiple HCP. CDC has recommended guidance on implementation of limited re-use of N95 respirators in healthcare settings. For pathogens for which contact transmission is not a concern, routine limited reuse of single-use disposable respirators has been practiced for decades. For example, for tuberculosis prevention, a respirator classified as disposable can be reused by the same provider as long as the respirator maintains its structural and functional integrity. To extend the supply of N95 respirators during an anticipated dwindling supply, HCP could be encouraged to reuse their N95 respirators when caring for patients with tuberculosis disease. To maintain the integrity of the respirator, it is important for HCP to hang used respirators in a designated storage area or keep them in a clean, breathable container such as a paper bag between uses. It is not recommended to modify the N95 respirator by placing any material within the respirator or over the respirator. Modification may negatively affect the performance of the respirator and could void the NIOSH approval.

CRISIS/ALTERNATE STRATEGIES

These crisis capacity or alternate strategies accompany and build on the conventional and contingency capacity strategies. The following measures are not commensurate with current U.S. standards of care. However, individual measures or a combination of these measures may need to be considered during periods of expected or known N95 respirator shortages. It is important to consult with entities that include some combination of: local healthcare coalitions, federal, state, or local public health officials, appropriate state agencies that are managing the overall emergency response related to COVID-19, and state crisis standards of care committees (if applicable). Even when state/local healthcare coalitions or public health authorities can shift resources between health care facilities, these strategies may still be necessary.

Crisis Capacity Strategies: N95 Respirator	Considerations
When N95 Supplies are Running Low Use of respirators beyond the manufacturer-designated shelf life for healthcare delivery	Consideration can be made to use N95 respirators beyond the manufacturer-designated shelf life for care of patients with COVID-19, tuberculosis, measles, and varicella. However, respirators beyond the manufacturer-designated shelf life may not perform to the requirements for which they were certified. Over time, components such as the straps and nose bridge material may degrade, which can affect the quality of the fit and seal. Many models found in U.S. stockpiles and stockpiles of healthcare facilities have been found to continue to perform in accordance with NIOSH performance standards. However, fluid resistance and flammability were not assessed. Use of the N95 respirators recommended in Release of Stockpiled N95 Filtering Facepiece Respirators Beyond the Manufacturer-Designated Shelf Life: Considerations for the COVID-19 Response can be considered. It is optimal to use these respirators in the context of a respiratory protection program that includes medical evaluation, training, and fit testing. If used in healthcare delivery, it is particularly important that HCP perform the expected seal check, prior to entering a patient care area. CDC does not recommend using N95s beyond the manufacturer-designated shelf life in surgical settings.
Use of respirators approved under standards used in other countries that are similar to NIOSH-approved N95 respirators	Other countries approve respirators for occupational use and approve respirators to these standards. These products are evaluated using some methods similar to those used by NIOSH, and some methods that are different, but are expected to protect HCPs. These respirators are expected to provide protection to workers. Those with equivalent or similar protection to NIOSH-approved respirators may be available to provide respiratory protection to workers exposed to harmful airborne particulate matter. These devices are expected to be suitable alternatives to provide protection during the COVID-19 response when supplies are short.

Strategy Table for Contingency and Crisis Capacity for N95 Respirators *Continued*

Crisis Capacity Strategies: N95 Respirator	Considerations
Limited re-use of N95 respirators for COVID-19 patients	Limited re-use of N95 respirators when caring for patients with COVID-19 might become necessary. However, it is unknown what the potential contribution of contact transmission is for SARS-CoV-2, and caution should be used. Re-use should be implemented according to CDC guidance. Re-use has been recommended as an option for conserving respirators during previous respiratory pathogen outbreaks and pandemics. It may also be necessary to re-use N95 respirators when caring for patients with varicella or measles, although contact transmission poses a risk to HCP who implement this practice.
Use of additional respirators beyond the manufacturer-designated shelf life for healthcare delivery	Use of additional N95 respirators beyond the manufacturer-designated shelf life for care of patients with COVID-19, tuberculosis, measles, and varicella can be considered. However, respirators beyond the manufacturer-designated shelf life may not perform to the requirements for which they were certified. Over time, components such as the straps and nose bridge material may degrade, which can affect the quality of the fit and seal. Some models have been found NOT to perform in accordance with NIOSH performances standards, and consideration may be given to use these respirators as identified in Release of Stockpiled N95 Filtering Facepiece Respirators Beyond the Manufacturer-Designated Shelf Life: Considerations for the COVID-19 Response. In addition, consideration can be given to use N95 respirators beyond the manufacturer-designated shelf life that have not been evaluated by NIOSH. It is optimal to use these respirators in the context of a respiratory protection program that includes medical evaluation, training, and fit testing. It is particularly important that HCP perform the expected seal check, prior to entering a patient care area.
Prioritize the use of N95 respirators and facemasks by activity type The number of infectious particles required to cause an infection (infectious dose) is often uncertain or unknown for respiratory pathogens. Further, there is often uncertainty about the influence of factors such as exposure duration and nature of clinical symptoms on the likelihood of infection transmission from person-to-person. When facemasks must be used by HCP entering a patient care area, source control (i.e. masking of symptomatic patients) and maintaining distance from the patient are particularly important to reduce the risk of transmission.	This prioritization approach to conservation is intended to be used when N95 respirators are so limited that routinely practiced standards of care for all HCP wearing N95 respirators when caring for a COVID-19 patient are no longer possible. N95 respirators beyond their manufacture-designated shelf life, when available, are preferable to use of facemasks. The use of N95s or elastomeric respirators or PAPRs should be prioritized for HCP with the highest potential exposures including being present in the room during aerosol generating procedures performed on symptomatic persons. See Table below for “Suggested facemask or respirator use, based upon distance from a patient with suspected or known COVID-19 and use of source control”.

Strategy Table for Contingency and Crisis Capacity for N95 Respirators *Continued*

Crisis Capacity Strategies: N95 Respirator	Considerations
When No Respirators are Left Exclude HCP at higher risk for severe illness from COVID-19 from contact with known or suspected COVID-19 patients Designate convalescent HCP for provision of care to known or suspected COVID-19 patients Expedient patient isolation rooms for risk-reduction Ventilated Headboards	During severe resource limitations, consider excluding HCP who may be at higher risk for severe illness from COVID-19, such as those of older age, those with chronic medical conditions, or those who may be pregnant, from caring for patients with confirmed or suspected COVID-19 infection. It may be possible to designate HCP who have clinically recovered from COVID-19 to preferentially provide care for additional patients with COVID-19. Individuals who have recovered from COVID-19 infection may have developed some protective immunity, but this has not yet been confirmed. Portable fan devices with high-efficiency particulate air (HEPA) filtration that are carefully placed can increase the effective air changes per hour of clean air to the patient room, reducing risk to individuals entering the room without respiratory protection. NIOSH has developed guidance for using portable HEPA filtration systems to create expedient patient isolation rooms. The expedient patient isolation room approach involves establishing a high-ventilation-rate, negative pressure, inner isolation zone that sits within a "clean" larger ventilated zone. In the absence of any remaining supply of N95 respirators, it may be possible to use this technology in conjunction with HCP wearing facemasks. NIOSH has developed the ventilated headboard that draws exhaled air from a patient in bed into a HEPA filter, decreasing risk of HCP exposure to patient-generated aerosol. This technology consists of lightweight, sturdy, and adjustable aluminum framing with a retractable plastic canopy. The ventilated headboard can be deployed in combination with HEPA fan/filter units to provide surge isolation capacity within a variety of environments, from traditional patient rooms to triage stations, and emergency medical shelters. In the absence of any remaining supply of N95 respirators, it may be possible to use this technology in conjunction with HCP and/or patients wearing facemasks.
HCP use of non-NIOSH approved masks or homemade masks	In settings where N95 respirators are so limited that routinely practiced standards of care for wearing N95 respirators and equivalent or higher level of protection respirators are no longer possible, and surgical masks are not available, as a last resort, it may be necessary for HCP to use masks that have never been evaluated or approved by NIOSH or homemade masks. It may be considered to use these masks for care of patients with COVID-19, tuberculosis, measles, and varicella. However, caution should be exercised when considering this option.

Resources:

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

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

NIOSH Approved N95 Particulate Filtering Facepiece Respirators: Manufacturers Listed Alphabetically: https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/n95list1.html

Suggested facemask or respirator use, based upon distance from a patient with suspected/known COVID-19 and use of source control

HCP planned proximity to the case patient during encounter	Facemask or respirator determination	
	Patient masked for entire encounter (i.e., with source control)	Unmasked patient or mask needs to be removed for any period of time during the patient encounter
HCP will remain at greater than 6 feet from symptomatic patient	HCP remaining at this distance from the patient should not need to enter the patient care area; if entry required: no facemask or respirator	HCP remaining at this distance from the patient should not need to enter the patient care area; if entry required: no facemask or respirator
HCP will be within 3 to 6 feet of symptomatic patient	HCP remaining at this distance from the patient should not need to enter the patient care area; if entry required: facemask	HCP remaining at this distance from the patient should not need to enter the patient care area; if entry required: facemask
HCP will be within 3 feet of symptomatic patient, including providing direct patient care	Facemask	N95 respirator/ elastomeric /PAPR, based on availability
HCP will be present in the room during aerosol generating procedures performed on symptomatic persons	N95 respirator/ elastomeric /PAPR, based on availability	N95 respirator/ elastomeric /PAPR, based on availability