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Interim Guidance: Use of Personal Protective Equipment by Health Care Personnel in Resource-Constrained Settings

Background

The Oregon Health Authority (OHA) is following federal guidance on the use of personal protective equipment (PPE) by health care personnel (HCP). At the same time, we recognize that more detailed guidance, based on the best evidence we have to this point, will be useful to HCP and health systems. A common set of strategies listed in order of efficacy for infection prevention is important for our shared goal of protecting HCP. To this end, OHA has worked with a technical advisory group of infectious disease physicians and infection preventionists from around the state to develop this guidance. In most cases, it represents expert opinion, rather than stronger levels of evidence, which are currently lacking. Nonetheless, we have heard from multiple partners that a uniform “playbook” for response to this challenging situation would be valuable. We hope you will find it useful.

Definitions

- **Administrative controls:** work practices that prevent or reduce hazardous exposures.
- **Aerosol-generating procedures (AGPs):** procedures that generate small droplet nuclei in high concentration, presenting a risk for airborne transmission of pathogens not otherwise able to spread by the airborne route (e.g., coronavirus, influenza).
- **Emergency Use Authorization (EUA):** permission granted under section 564 of the Federal Food, Drug, and Cosmetic Act ([FD&C Act](#)) by the FDA Commissioner to allow unapproved medical products or unapproved uses of approved medical products for use in an emergency to diagnose, treat, or prevent serious or life-threatening diseases or conditions caused by chemical, biological, radiological, nuclear and high yield explosives (CBRN) threat agents when there are no adequate, approved and available alternatives.
- **Engineering controls:** measures that reduce or eliminate worker exposures to hazards, such as through exhaust ventilation or by placing a barrier between the worker and the hazard.

- **Expedient patient isolation room approach:** the use of portable high-efficiency particulate air (HEPA) filtration systems to establish a high-ventilation-rate, negative pressure, inner isolation zone that sits within a “clean” larger ventilated zone.
- **Expired PPE use:** use of PPE beyond the manufacturer-designated shelf life during patient care.
- **Extended use:** the practice of wearing the same PPE for repeated encounters with several patients, without removing the device between patient encounters.
- **Face mask:** mask covering nose and mouth to protect the wearer or the environment from respiratory droplets; includes procedure mask or surgical mask.
- **Industrial-grade PPE with EUA:** PPE designed for use in other industries determined by federal regulatory agencies to provide adequate protection in a health care setting.
- **NIOSH-approved particulate filtering facepiece respirator:** particulate respirators that meet or exceed standards for design suitability, quality assurance and laboratory performance, which includes filtration efficiency and ability to maintain a seal on the user’s skin. NIOSH, under authorization of the Occupational Safety and Health Act of 1970, provides a testing, approval and certification program assuring respirators used in the workplace meet the standards of 42 CFR Part 84. Since 1994, NIOSH has maintained a searchable, online version of the [Certified Equipment List](#).
- **Respirators with exhalation valves:** respirators with a valve allowing unfiltered breath from the wearer to escape into the environment. Such respirators should not be used for surgical and other procedures requiring a sterile field, are not appropriate for source control, and are not approved for decontamination under FDA-issued EUAs.
- **Re-use:** use of the same PPE by a single provider for care of several patients, with removal between patients. It also includes extended use of several pieces of equipment in rotation on successive days.
- **Re-use after decontamination:** the practice of using PPE that is permitted by the manufacturer to be decontaminated following an FDA authorized method so that it retains regulatory agency (e.g., NIOSH, FDA) approvals and authorizations. Such PPE can be returned to the general PPE supply or to the original user following decontamination.
- **Single use:** the practice of using the PPE for one encounter with one patient, then discarding it.
- **Source control:** use of protective equipment or other measures to prevent the spread of illness from an infectious person to others, for example, use of a mask by an infectious person to limit the spread of a respiratory illness.

Scope

This guidance is specific to PPE in the context of a COVID-19 pandemic in health care settings across the continuum of care. It outlines strategies for optimizing the supply of PPE in health care settings when PPE resources are constrained. Additional guidance for dental practices is available on the OHA website. Compliance with Oregon OSHA standards remains a requirement. A few standards that apply include, but are not limited to, Bloodborne Pathogens ([29 CFR 1910.1030](#)), Respiratory Protection ([29 CFR 1910.134](#)) and other PPE ([OAR 437-002-0134](#)).

Oregon OSHA is addressing supply chain considerations, including respirator shortages, through enforcement flexibilities, as discussed in the federal OSHA [Enforcement Memoranda](#) section of the [Standards](#) page.

See information on PPE flexibilities and prioritization in the [Personal Protective Equipment Flexibilities section](#) within the [Interim Guidance for U.S. Workers and Employers of Workers with Potential Occupational Exposures to SARS-CoV-2](#).

Framework

With the understanding that we may face sustained PPE shortages during the COVID-19 response, the guidance comprises four components while applying the [hierarchy of hazard controls system](#):

1. Implement engineering and administrative control measures to optimize PPE use.
 - These measures must fully be implemented when possible before other strategies for optimizing PPE supply are considered and implemented.
2. Use a tiered, sequential approach to optimize PPE supply.
 - Strategies for optimizing the supply of PPE are arranged in four tiers, with each successive tier representing increasingly resource-constrained situations. Employers must provide effective protections to health care providers during resource-constrained situations.
 - Within each tier and for each PPE type, the strategies are further organized by three elements that can be considered: the PPE type, the duration of its use, and any additional engineering or administrative controls. (See Table 1.) Table 1 also summarizes the CDC's conventional capacity strategies by PPE type.
 - Generally, Tier 1 and 2 strategies align with CDC's contingency capacity strategies, while Tier 3 and 4 strategies correspond to CDC's crisis capacity strategies.
3. Monitor PPE availability to guide optimal PPE use
 - Facilities and providers understand their PPE inventory, supply chain and [utilization rate](#).

- Facilities and providers are in communication with local health care coalitions, as well as local and state public health partners regarding identification of additional PPE supplies.
 - Facilities and providers must regularly assess the need for all optimization strategies by PPE type, and move to a lower-number tier when the supply of a specific PPE type allows, with the goal of eventually following conventional capacity strategies for all PPE types. The frequency of these assessments should increase as higher-numbered tier strategies are implemented. Note that outbreaks of multidrug-resistant organisms (MDROs) have been reported in dedicated COVID-19 units. The basis for transmission was multifactorial, with non-conventional use of PPE likely being an important factor.
4. Provide training to HCP on PPE use.
- Train HCP on PPE use according to [Oregon OSHA PPE standard](#).
 - Require HCP to demonstrate competency in donning and doffing PPE.

General required measures to minimize PPE use

Engineering controls

- Prompt isolation of symptomatic patients
 - Move from common waiting area to private room with door closed.
 - Selective use of airborne infection isolation rooms (AIIRs), e.g., when performing AGPs.
- Use of physical barriers
 - Glass or plastic windows in reception and patient areas (e.g., intake desk at emergency department, triage station, information booth, or pharmacy service counter)
 - Closed suctioning systems for airway suctioning for intubated patients
- Properly maintained HVAC systems
 - Investigate increasing percentage of outdoor air in the HVAC air supply
 - [Increase air filtration](#) to highest level (MERV 13 or 14) compatible with HVAC
 - Provide air movement from clean areas to contaminated areas.
 - Provide 6 room air changes per hour (ACH) in older buildings and 12 ACH in newer buildings (appropriate for high-risk areas).
- Consider use of portable HEPA air filtration units for source control (especially in higher-risk areas).
- Consider use of ultraviolet germicidal irradiation (UVGI) as a supplement to help inactivate viruses.

Administrative controls

- Limit the number of patients going to hospital or outpatient settings.
 - Implement a patient screening system and instruct those with mild to moderate symptoms who do not require a higher level of care to remain at home.
 - Use telemedicine when appropriate.
- Limit face-to-face HCP encounters with suspected or confirmed COVID-19 patients
 - Limit patient room and care area entry to medically essential HCP as much as possible (e.g., exclude dietary and housekeeping staff; medically essential personnel would assume these responsibilities).
 - As much as possible, while ensuring patient safety, reduce room entries by HCP providing direct patient care.
 - » Bundle activities while in the room with patients.
 - » Use out-of-room monitoring, phone and intercom communication, and self-administration of oral medications.
 - Decrease the length of hospital stays for medically stable patients with COVID-19.
- Follow OHA's COVID-19 [Guidance on Screening and Visitation at Acute Health Care Facilities](#).
- Source control
 - Use of face masks for suspected COVID-19 patients before they are placed in an AIIR or private room.
 - Require universal masking for all staff, patients and visitors to health care facilities.
- Cohorting patients
 - Cohort patients confirmed to have the same infection requiring transmission-based precaution (e.g., COVID-19) to facilitate extended PPE use
 - Patients co-infected with other pathogens that require transmission-based precautions (e.g., influenza, RSV) should not be placed in the same room with patients only infected with SARS-CoV-2 (i.e., COVID-19).
- Cohorting HCP
 - Assign designated teams to provide care for all patients with suspected or confirmed COVID-19 to facilitate extended PPE use.

Tiered approach to optimizing PPE

Tier 1 strategies

Consider implementing these strategies if PPE supply and rate of use make conventional capacity strategies (Table 1) unsustainable.

- Use of unexpired, medical-grade PPE that follows FDA regulations obtained through usual vendors, other health care venues, the Strategic National Stockpile, or through State purchase and allocation.
- Use of protective equipment designed for use in other industries and determined by federal regulatory agencies to provide adequate protection in a health care setting. For example, FDA issued Emergency Use Authorizations (EUAs) on March 2 and March 27 allowing such use of filtering facepiece respirators (including NIOSH-approved N95s) and of powered air-purifying respirators (PAPRs). www.fda.gov/media/135763/download
- Use of PPE designed for reprocessing and re-use is an acceptable and, in many cases, preferred strategy, and can preserve PPE supplies. This includes use of goggles, re-processable face shields, launderable gowns, and re-processable alternatives to N95 respirators (e.g., elastomeric or powered air-purifying respirators [PAPRs]) after appropriate reprocessing.
- PPE should be changed with every patient encounter, with following exceptions:
 - Reuse of re-processable PPE devices with appropriate reprocessing between patient use.
 - Extended use of eye and respiratory protection among cohorted COVID-19 patients; however, gloves should always be changed with every patient encounter (i.e., single use) even in this context. Note: Under Tier 1, a cohort includes only patients with laboratory-confirmed COVID-19. It would not include patients with suspected, non-lab-confirmed illness.
 - Extended use of medical grade face masks by HCP for source control when a facility-wide universal masking policy is in place; mask should be changed when doffed and prior to any care for a patient in droplet precautions.
- Implementation of additional administrative controls applicable to the PPE type to conserve supply (e.g., prioritizing N95 respirators for AGPs or use of face shield over masks or respirators, with reprocessing of face shield between patients).
- Given the potential for future PPE supply shortage, consider collection and storage of doffed single-use respirators for future decontamination when their scarcity could make Tier 1 strategies unsustainable. This pre-emptive measure decreases the risk of having to implement Tier 3 or 4 strategies should severe, sustained supply chain disruptions occur in the future.
- Refer to Table 1 for more details.

Tier 2 strategies

Consider implementing these strategies if PPE supply and rate of use make Tier 1 strategies unsustainable.

- Use of the same medical grade PPE that follows FDA regulations through the regular authorization process or approved under EUAs as specified in Tier 1.
- Extended use of PPE may be implemented for eye and respiratory protection when providing care exclusively to patients without suspected or confirmed communicable respiratory infection or infection spread through contact transmission.
- Extended use of surgical masks, NIOSH-approved N95 FFRs, and other single-use respirators may be implemented, so long as care does not involve an AGP for a patient with suspected or confirmed communicable respiratory illness. They should be removed and discarded if they become visibly soiled or damaged. Single-use respirators should be discarded after use during an AGP for a patient with suspected or confirmed COVID or other serious infectious respiratory disease. Otherwise, they can be doffed and decontaminated as mentioned below.
- In the context of extended use, doffing and re-donning of eye and respiratory protection during the same shift is acceptable (e.g., after lunch break) if hands are cleaned before and after donning and doffing, and the PPE item in question is not damaged or visibly soiled.
- Use of decontamination systems approved by FDA under EUAs to decontaminate compatible NIOSH-approved N95 or N95-equivalent respirators for subsequent limited re-use. (See *Implementation Guidance for Re-use of PPE* for more details). At this time, several decontamination systems have received EUAs. NIOSH-approved respirators only retain their NIOSH approval status after decontamination if the respirator manufacturer permits decontamination with the specific system and cycle parameters used. For up-to-date information on FDA-approved decontamination systems, refer to FDA's [EUA information on PPE and related devices](#).
- Rotating re-use of multiple respirators assigned to a given HCP with at least a 5-day interval between uses of a given respirator. See page 22 for guidance on storage between uses.
- Implementation of additional engineering or administrative controls applicable to the PPE type (e.g., extended use of secondary coverage of N95 respirator, preferably with a face shield, to prevent droplet spray contamination of the respirator).
- Extended use of gowns can be considered when caring for a cohort of patients with the same, laboratory-confirmed pathogen. However, they must be doffed if used during care of a patient with known or suspected MDRO infection or colonization.
- Refer to Table 1 for more details.

Tier 3 strategies

Consider implementing these strategies if PPE supply and rate of use make Tier 2 strategies unsustainable.

- Use of PPE beyond the manufacturer-designated shelf life. (See *Implementation Guidance for Use of Expired PPE* for more details.) CDC recommends against [use of N95s beyond the manufacturer-designated shelf life in surgical settings](#).
- Use of respirators and other PPE that meet standards in other countries and have been approved for use in the health care setting under an FDA-issued emergency use authorization. NIOSH has raised concerns that it is difficult to pass a fit test and perform successful seal checks with N95 and other single-use respirators that have ear loops rather than over-the-head straps. A number of these products are on the FDA-approved list. We provide [NIOSH's concern](#) for your consideration in deciding whether or not to obtain and use this type of respirator.
- Limited re-use of face masks and limited re-use of N95 or N95-equivalent respirators designed for single use without decontamination or with decontamination using a decontamination system without an FDA EUA. (See *Implementation Guidance for Extended Use of PPE* and *Implementation Guidance for Re-use of PPE* below for more details.) Refer to CDC's [Decontamination and Re-use of Filtering Facepiece Respirators](#) for summary of decontamination methods, effect on device performance, and use recommendations after decontamination. Per CDC, ethylene oxide (EtO) is not recommended as a decontamination method, as it may be harmful to the wearer.
- Implementation of additional administrative controls applicable to the PPE type to conserve supply (e.g., prioritize non-sterile gloves for activities resulting in contact with hazardous substances, including blood and bodily fluids, such as wound care and AGPs).
- Refer to Table 1 for more details.

Note: Gloves must still be changed with every patient encounter.

Tier 4 strategies

Consider implementing these strategies if PPE supply and rate of use make Tier 3 strategies unsustainable.

Tier 4 strategies should only be implemented when all local and regional resources have been exhausted. Note: If health care facilities anticipate the need for, or emergently begin to use, Tier 4 strategies, the [local public health authority](#) should be notified.

- If no medical grade PPE is available, see:
 - CDC's [Considerations for Selecting Protective Clothing used in Healthcare for Protection against Microorganisms in Blood and Body Fluids](#) for gowns and coveralls.
 - [OSHA](#) standards and recommendations for protective clothing based on protective properties.

- Use of re-purposed items as PPE. Examples include safety glasses that cover side of eyes, lab coats, patient gowns, or disposable, impermeable aprons.
- Use of self-made or locally produced PPE with characteristics that suggest efficacy in providing necessary level of infection prevention. Examples include:
 - **Eye protection:** impermeable, transparent shield with sufficient coverage of the face and side of eyes, fashioned from plastic beverage bottles or other clear plastic
 - **Masks:** multi-ply, tightly woven material that is reasonably moisture resistant, such as GORE-TEX, sterilization wrap (typically used to wrap surgical instruments to maintain sterility), or material from furnace filters or vacuum cleaner bags might be used to produce masks that completely cover the nose, mouth, and chin
 - **Gowns:** multi-ply or moisture-resistant material designed to cover all clothing
- Various durations of use can be implemented, depending on PPE type and device. (See Table 1.)
- Implementation of additional engineering and administrative controls applicable to the PPE type (e.g., use of expedient patient isolation room approach, designate convalescent HCP for provision of care to known or suspected COVID-19 patients). The latter example should be evaluated as an option based on the **most up-to-date** science regarding the duration and degree of protection conferred by past infection.
- Refer to Table 1 for more details.

Table 1. Personal Protective Equipment Usage Guideline

		Eye Protection	Face Masks	N95 Respirators or Approved Equivalent*	Isolation Gowns	Gloves	
Conventional capacity strategies	Baseline (pre-pandemic)	Equipment specifications	Medical grade, FDA-cleared	Medical grade; must be FDA-cleared for activities where splashes and sprays are anticipated	Medical grade, NIOSH-approved, fit-tested [†]	Medical grade, conforms to U.S. or international standards, or NIOSH specifications	Medical grade, FDA-cleared
		Duration	Single use	Single use	Single use	Single use	Single use
		General considerations		<ul style="list-style-type: none"> • Prioritize FDA-cleared surgical masks for activities with anticipated splashes and sprays (e.g., surgical procedures) • Face masks not regulated by FDA, such as some procedure masks, which are typically used for isolation purposes, may not provide protection against splashes and sprays 	<ul style="list-style-type: none"> • Implement respiratory protection program that complies with Oregon OSHA’s respiratory protection standard [29 CFR 1910.134] [†] • See CDC guidance on conventional capacity practices for more details, including prioritization of surgical N95 respirators, and use of alternatives to N95 respirators (e.g., elastomeric half-mask and full facepiece air purifying respirators, PAPRs) 	Prioritize surgical gowns for surgical or other sterile procedures	<ul style="list-style-type: none"> • Double gloving not recommended for care of suspected or confirmed COVID-19 patients • See CDC guidance on conventional capacity practices for more details

			Eye protection	Face masks	N95 respirators or approved equivalent*	Isolation gowns	Gloves
Contingency capacity strategies	Tier 1	Equipment specifications	<ul style="list-style-type: none"> • Medical grade, authorized by FDA under EUA • Reprocessable face shields or goggles preferred • Consider preferential use of PAPRs or full-face elastomeric respirators, which have built-in eye protection 	Medical grade; must be FDA-cleared for activities where splashes and sprays are anticipated	<ul style="list-style-type: none"> • Medical grade, NIOSH-approved, fit-tested[†] • Industrial grade, approved by FDA under EUA, fit-tested • Alternatives to N95 respirators, NIOSH-approved*, fit-tested 	Medical grade, conforms to U.S. or international standards, or NIOSH specifications (launderable gowns or coveralls preferred)	Medical grade, FDA-cleared or conforming to other U.S. and international standards
		Duration	<p>Single use</p> <p>Exceptions: extended use in care of cohorted COVID-19 patients; re-use of goggles and reprocessable face shields with appropriate reprocessing between patient use</p>	<p>Single use</p> <p>Exceptions: extended use in care of cohorted COVID-19 patients; extended use by HCP for source control in the context of a universal masking policy; mask should be changed when doffed and prior to any care for a patient in droplet precautions</p>	<p>Single use</p> <p>Exceptions: extended use in care of cohorted patients with the same infection requiring airborne precautions; re-use of reprocessable alternatives to N95 respirators such as elastomeric or powered air purifying respirators with appropriate cartridges</p>	Single use	Single use

			Eye protection	Face masks	N95 respirators or approved equivalent*	Isolation gowns	Gloves
Contingency capacity strategies	Tier 1	Additional engineering or administrative controls		<ul style="list-style-type: none"> • Control access by visitors (e.g., remove from public areas, but made available for symptomatic patients) • Preserve medical grade face masks by supplying visitors and asymptomatic patients with cloth face coverings for source control 	<ul style="list-style-type: none"> • Prioritize for AGPs • Plan for and implement just-in-time fit testing in context of a full respiratory protection program[†] • Consider changing from quantitative to qualitative fit testing • <u>Temporarily suspend annual fit testing</u> (initial fit testing as well as additional actions are required)[†] • Retain and reserve expired N95 respirators for training and fit testing 		Use expired (when indicated by manufacturer) gloves for training

			Eye protection	Face masks	N95 respirators or approved equivalent*	Isolation gowns	Gloves
Contingency capacity strategies	Tier 2	Equipment specifications	Same as Tier 1	Same as Tier 1	Same as Tier 1	Same as Tier 1	Same as Tier 1
		Duration	<p>Extended use also an option when providing care exclusively to patients without suspected or confirmed communicable respiratory infection or infection spread through contact transmission.</p> <ul style="list-style-type: none"> • Re-use of face shields designed for single use, after <u>appropriate reprocessing</u> 	<ul style="list-style-type: none"> • Extended use also an option when providing care exclusively to patients without suspected or confirmed communicable respiratory infection or infection spread through contact transmission. Use with an impermeable face shield completely covering the face mask is strongly recommended. • Doffing and donning during the same shift (e.g., after lunch break) in the context of extended use as described above, if hands are cleaned before and after donning and doffing, and facemask is not damaged or visibly soiled 	<ul style="list-style-type: none"> • Extended use (exception: single use only for AGP in care of patient with suspected/confirmed communicable respiratory infection) • Limited re-use of single-use respirators after reprocessing by a compatible decontamination system <u>approved by FDA under an EUA</u>; NIOSH-approved respirators only retain their NIOSH- approved status after decontamination if manufacturer permits decontamination with the specific system and cycle parameters used; may only be used after AGPs if manufacturer or third-party guidance or procedures available 	Same as Tier 1, plus extended use can be considered when caring for cohort with lab-confirmed COVID or other shared pathogen; gown must be doffed if leaving patient care area or if used during care of patient with known or suspected MDRO infection/colonization	Same as Tier 1

			Eye protection	Face masks	N95 respirators or approved equivalent*	Isolation gowns	Gloves
Contingency capacity strategies	Tier 2				<ul style="list-style-type: none"> • Doffing and donning of a single-use respirator during the same shift (e.g., after lunch break) in the context of extended use as described above, if hands are cleaned before and after donning and doffing, and respirator is not damaged or visibly soiled • Rotating re-use of multiple respirators assigned to a given HCP with at least a 5-day interval between uses of a given respirator 		
	Tier 2	Additional engineering or administrative controls		<ul style="list-style-type: none"> • Same as Tier 1, <u>and</u> • Restrict use to HCP only (homemade masks, tissues or other barriers can be used by patients for source control) 	<ul style="list-style-type: none"> • Same as Tier 1, <u>and</u> • Use secondary barrier (cleanable face shield preferred) and masking patients to prevent droplet contamination of N95 respirators 		Same as Tier 1

			Eye protection	Face masks	N95 respirators or approved equivalent*	Isolation gowns	Gloves
Crisis capacity strategies	Tier 3	Equipment specifications	Same as Tiers 1 and 2, but expired product can also be used	Same as Tiers 1 and 2, but expired product can also be used (must be FDA-cleared for activities where splashes and sprays are anticipated)	<ul style="list-style-type: none"> • Medical grade, NIOSH-approved, expired but evaluated by NIOSH, fit-tested; CDC recommends against use of N95s beyond manufacturer-designated shelf life in surgical settings. 	Same as Tiers 1 and 2, but expired product can also be used; extended use for cohorted patients with lab-confirmed COVID-19	Same as Tiers 1 and 2, but expired (when indicated by manufacturer) – expired sterile gloves should not be used for surgical or other sterile procedures
					<ul style="list-style-type: none"> • Medical grade, approved under standards used in other countries similar to NIOSH (see CDC guidance regarding use limitations during AGPs) • Medical grade, NIOSH approved, expired but not evaluated by NIOSH, fit-tested 		

			Eye protection	Face masks	N95 respirators or approved equivalent*	Isolation gowns	Gloves
Crisis capacity strategies	Tier 3	Duration	<ul style="list-style-type: none"> • Same as Tier 2 	<ul style="list-style-type: none"> • Same as Tier 2, <u>and</u> • Limited re-use 	<p>Limited re-use, other than as described in Tier 2 above, without decontamination or decontamination using a system without an FDA EUA^Δ</p>		Same as Tiers 1 and 2
		Additional engineering or administrative controls	<ul style="list-style-type: none"> • Prioritize for selected activities (e.g., splashes and sprays anticipated as in AGPs, prolonged face-to-face contact with potentially infectious patient) 	<ul style="list-style-type: none"> • Same as Tier 2, <u>and</u> • Prioritize for HCP in procedures with high risk of transmission (e.g., emergent surgeries or procedures, activities with anticipated splashes and sprays, activities requiring prolonged face-to-face or close contact with potentially infectious patient, AGPs if respirators no longer available) 	<ul style="list-style-type: none"> • Same as Tier 2, <u>and</u> • Prioritize by activity type (e.g., AGPs) and <u>based on distance from patient and use of source control</u> • If no respirators are available, whenever possible, AGPs should be deferred or patients should be transferred to facilities where adequate respiratory protection is available 	<ul style="list-style-type: none"> • Prioritize for selected activities (e.g., splashes and sprays anticipated as in AGPs, high-contact patient care activities including bathing or showering, changing linens, wound care) 	<ul style="list-style-type: none"> • Same as Tiers 1 and 2, <u>and</u> • Prioritize non-sterile gloves for activities resulting in contact with hazardous substances, including blood and bodily fluids (e.g., wound care, AGPs)

			Eye protection	Face masks	N95 respirators or approved equivalent*	Isolation gowns	Gloves
Crisis capacity strategies	Tier 4 (medical grade PPE scarce)	Equipment specifications	Consider safety glasses (e.g., trauma glasses), swim masks, or other protection that extends to cover side of eyes	<ul style="list-style-type: none"> • Face shield covering chin and sides of face or in combination with homemade mask • AGPs if respirators not available; transfer to another facility with necessary PPE isn't feasible 		<ul style="list-style-type: none"> • Launderable gown (see duration below) • Consider gown alternatives that have not been evaluated as effective (e.g., lab coats, patient gowns, disposable aprons, combinations of clothing) 	<ul style="list-style-type: none"> • Same as Tier 1, 2, or 3 • Non-health care glove alternatives (e.g., food service or industrial chemical resistance gloves) only for situations with no exposure to pathogens
		Duration	<ul style="list-style-type: none"> • Extended use • Re-use after appropriate reprocessing 	<ul style="list-style-type: none"> • Extended use • Re-use after appropriate reprocessing (face shields) and laundering (homemade masks) 		<ul style="list-style-type: none"> • Re-use of launderable isolation gowns without laundering in between uses • Single use or re-use of gown alternatives 	<ul style="list-style-type: none"> • Extended use of disposable medical grade gloves (exception: dispose of gloves after direct care of patients with MDRO infection (e.g., MRSA, VRE, ESBL-producing organisms); • Single (not extended) use of non-health care gloves

			Eye protection	Face masks	N95 respirators or approved equivalent*	Isolation gowns	Gloves
Crisis capacity strategies	Tier 4 (medical grade PPE scarce)	Additional engineering or administrative controls	<ul style="list-style-type: none"> ● Offer non-COVID care assignments to HCP at higher risk for severe illness from COVID-19 ● Designate convalescent HCP for provision of care to known or suspected COVID-19 patients 	<ul style="list-style-type: none"> ● Offer non-COVID care assignments to HCP at higher risk for severe illness from COVID-19 ● Designate convalescent HCP for provision of care to known or suspected COVID-19 patients ● Use expedient patient isolation room approach ● Use ventilated headboards in combination with HEPA filter units 	<ul style="list-style-type: none"> ● Offer non-COVID care assignments to HCP at higher risk for severe illness from COVID-19 ● Designate convalescent HCP for provision of care to known or suspected COVID-19 patients ● Use expedient patient isolation room approach ● Use ventilated headboards in combination with HEPA filter units 		

* Approved equivalents for an N95 include NIOSH-approved P95 and R95 FFRs and others approved for medical use through an FDA EUA, such as respirators providing greater respiratory protection including elastomeric half- and full-face respirators or PAPRs with appropriate cartridges. However, use of respirators with an exhalation valve is not recommended for use during surgical procedures due to concerns about potential contamination to the procedural field.

† In any medical, dental or other facility in which respirators are used for a procedure, the facility must establish and maintain a [respiratory protection program](#) for its employees at all times.

△ Decontaminating with ethylene oxide is discouraged at this time due to potential harmful effects to the wearer.

Implementation guidance for extended use of PPE

Extended use is preferred over re-use on the assumption that it is safer for HCP to leave their respiratory protection and eye protection in place, to reduce the risk of self-contamination through frequent donning and doffing.

1. Eye protection

Extended use when providing care to cohorted COVID-19 patients is a Tier 1 strategy.

Extended use when providing care exclusively to patients without suspected or confirmed communicable respiratory infection or infection spread through contact is a Tier 2 strategy.

- Should not be touched or adjusted; hand hygiene to be performed immediately if touched or adjusted by HCP
- Should be removed and reprocessed when visibly soiled or difficult to see through
- Should be discarded if damaged
- Should be doffed before meals and restroom breaks and when leaving the patient care area. Doffing and re-donning during the same shift (e.g., after a lunch break) is an acceptable Tier 2 strategy if hands are cleaned before and after donning and doffing, and the face shield or other eye protection is not damaged or visibly soiled. In this context, doffing and re-donning would not be considered a re-use strategy as specified in Table 1.
- When visibly soiled, should be discarded (for disposable face shields) or reprocessed (for reprocessible face shields) according to [protocol](#) for removing and processing eye protection.

2. Gowns

Extended use of gowns can be considered in Tier 2 for the serial care of cohorts of patients with laboratory-confirmed COVID-19 or another shared pathogen.

- Should only be considered if there is no infection or colonization among patients with another pathogen transmitted by contact (e.g., *Clostridioides difficile*, multidrug-resistant organism)
- Should be removed and discarded or laundered as per [usual practices](#) when visibly soiled

3. Face masks

Extended use in care of cohorted COVID-19 patients is a Tier 1 strategy, as is extended use by HCP for source control in the context of a universal masking policy. Extended use is an acceptable Tier 2 strategy when providing care exclusively to patients without suspected or confirmed communicable respiratory infection or infection spread through contact.

- Should be removed and discarded if soiled, damaged or hard to breathe through
- Should not be touched or adjusted during care; hand hygiene to be performed immediately if touched or adjusted by HCP
- HCP should leave patient care area if they need to remove the face mask
- Should not be worn over multiple shifts
- Should be doffed before meals and restroom breaks. Doffing and donning during the same shift (e.g., after lunch break) in the context of extended use as described above is acceptable as a Tier 2 strategy if hands are cleaned before and after donning and doffing, face mask is not damaged or visibly soiled, and face mask is not temporarily stored in a bag such as recommended for limited re-use (see re-use implementation guidance) but rather is in the user's view at all times with social

distancing observed. One approach to mitigating contamination risk is to place the face mask on a clean paper towel, outside surface down, taking care to handle it to the fullest extent possible by the ear loops. In this context, doffing and re-donning would not be considered a re-use strategy as specified in Table 1.

4. N95 filtering facepiece respirators (NIOSH-approved)

Extended use in care of cohorted patients with the same infection requiring airborne precautions is a Tier 1 strategy. Extended use is an acceptable Tier 2 strategy when providing care exclusively to patients without suspected or confirmed communicable respiratory infection or infection spread through contact. However, respirators designed for single use should be discarded after any AGP in care of a patient with suspected/confirmed COVID-19 or other serious communicable respiratory infection).

- Well-suited to situations wherein multiple patients with the same infectious disease diagnosis requiring airborne precautions are cohorted, e.g., tuberculosis, varicella, measles or other infectious diseases where use of an N95 respirator or higher is recommended
- Maximum recommended extended use period is 12 contiguous hours
- Doffing and donning during the same shift (e.g., after lunch break) in the context of extended use as described above is acceptable as a Tier 2 strategy if hands are cleaned before and after donning and doffing, the respirator is not damaged or visibly soiled, and it continues to pass a seal check. In this context, doffing and re-donning would not be considered a re-use strategy as specified in Table 1, and such doffs do not count towards the maximum number of re-uses (i.e., doffs) in the re-use implementation guide below.
- If touching respirator is necessary for comfort, to maintain fit, or for doffing before meals or restroom breaks, hand hygiene should be performed before and after touching or adjusting respirator. HCP should leave the patient care area if they need to adjust/remove the respirator.
- Should be discarded:
 - » Following use during an AGP for a patient with suspected or confirmed communicable respiratory infection
 - » If visibly contaminated with blood, respiratory or nasal secretions, or other bodily fluids from patients
 - » If obviously damaged or the respirator becomes hard to breathe through
 - » Following close contact with, or exit from, the care area of any patient co-infected with an infectious disease requiring contact precautions
- Consider collection for future decontamination and re-use, as appropriate, if no criteria requiring disposal are met
- Can be combined with re-use using either of the following methods:
 - » Decontamination using an FDA-approved process that is compatible with the model of respirator, according to the manufacturer.
 - » Rotating use of multiple respirators assigned to a given HCP with at least a 5-day interval between uses of a given respirator. Discard respirator after use during an AGP for a patient with communicable respiratory illness. Oregon OSHA's respiratory protection standard requires respirators to be

stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture and damaging chemicals. They must be packed or stored to prevent deformation of the facepiece.

5. Gloves

- To be used only in a Tier 4/emergent scenario
- Applicable only to disposable medical grade gloves, and not to non-health care glove alternatives
- Most easily implemented when patients are cohorted based on the same confirmed infectious disease diagnosis (e.g., confirmed COVID-19) in a shared or adjacent location
- Must be sanitized between patients within cohort to prevent cross transmission of any other pathogens from patient to patient, and at other intervals where gloves would normally be changed (e.g., when moving from “dirty” to “clean” task); refer to [CDC guidance regarding methods for performing hand hygiene of gloved hands](#)
- Should always be discarded after:
 - » Visible soiling or contamination with blood, respiratory or nasal secretions, or other bodily fluids
 - » Any signs of damage or degradation
 - » Maximum of four hours of continuous use
 - » Doffing (i.e., re-use should never occur)
- Hand hygiene should be performed after removing gloves for any reason

Implementation guidance for re-use of PPE

1. Eye protection

Reprocessing and re-use of goggles or a face shield designed for multiple use is a Tier 1 strategy. Reprocessing and re-use of a face shield designed for single use is a Tier 2 strategy.

- If a disposable face shield is reprocessed:
 - It should be dedicated to one HCP,
 - It should be reprocessed whenever it is visibly soiled or removed (e.g., when leaving the isolation area) and at least daily (after every shift) prior to putting it back on. See [protocol](#) for removing and reprocessing eye protection.
 - After reprocessing, a face shield should be stored in a transparent plastic container and labeled with the HCP name to prevent accidental sharing between HCP.
- It should be discarded if damaged (e.g., face shield can no longer fasten securely, face shield’s contour is distorted and no longer provides adequate coverage, or if visibility is obscured and reprocessing does not restore visibility).

2. Gowns

- In Tier 4, consider limited re-use without laundering in between where the gown is used as part of standard precautions to protect HCP from a splash, as the risk may be lower. The risk of re-use without laundering when caring for suspected or confirmed COVID-19 is unclear. Note that this strategy aims at minimizing exposure to HCP and does not necessarily prevent transmission of pathogens between patients.

- Should be removed and laundered if becomes visibly soiled

3. Face masks

Limited re-use of face masks involves using the same face mask by one HCP for multiple encounters with different patients but removing it after each encounter. It is a Tier 3 strategy.

- Ideally reserved for activities with low transmission risk such as dispensing medications or other activities that do not involve close, direct contact with patients in droplet precautions
- Not all face masks can be re-used: single-use masks with elastic ear loops may be more suitable for re-use than those fastened via ties.
- Should not be touched or adjusted during care; hand hygiene to be performed immediately if touched or adjusted by HCP
- Removal and replacement of mask should be performed in a careful and deliberate manner
- Should be removed and discarded if soiled, damaged or hard to breathe through
- HCP should leave patient care area if they need to remove the face mask. If possible, face masks should be carefully folded with outer surface held inward and against itself to reduce contact with outer surface during storage. Masks can be stored between uses in a clean sealable paper bag or breathable container.
- Re-use should be limited to one shift.

4. N95 filtering facepiece respirators (NIOSH-approved)

For Tier 2 strategies involving single-use respirators, see Table 1, above.

- Prioritize re-use for pathogens for which contact transmission is not a concern (e.g., tuberculosis)
- The maximum number of re-uses (i.e., doffs) should be in accordance with manufacturer guidance or, if not available, be no more than five uses per device. As indicated above, doffs related to breaks during a single shift in the context of extended care as described above would not count towards this maximum number of doffs.
- Should not be shared by multiple HCP unless decontaminated in between using a system with an FDA-approved EUA that is compatible with manufacturer recommendations
- Place used respirators in a designated storage area, or keep them in a clean, breathable container such as a paper bag between uses. To minimize potential cross-contamination, store respirators so that they do not touch each other, with the person using the respirator clearly identified by labeling storage containers or respirators themselves (e.g., on the straps). Storage containers should be disposed of or cleaned regularly.
- If touching respirator is necessary for comfort or to maintain fit, hand hygiene should be performed before and after touching or adjusting respirator.
- Avoid touching inside of respirator. If inadvertent contact is made with the inside of the respirator, discard the respirator and perform hand hygiene as described above.

- Use a pair of clean (non-sterile) gloves when donning a used N95 respirator and performing a user seal check, as re-use may change the shape of a disposable respirator and affect fit. Discard gloves after the N95 respirator is donned and any adjustments are made to ensure the respirator is sitting comfortably with a good seal.
- Should be discarded:
 - » Following use during an AGP for a patient with suspected or confirmed communicable respiratory infection
 - » If contaminated with blood, respiratory or nasal secretions, or other bodily fluids from patients
 - » Following close contact with, or exit from, the care area of any patient co-infected with an infectious disease requiring contact precautions
 - » If obviously damaged, seal check is unsuccessful, or if hard to breathe through
- Consider collection for compatible decontamination and re-use, as appropriate, if no criteria requiring disposal are met.
- Additional guidance on potential methods can be found [here](#).

5. Gloves

- Disposable, medical grade gloves should never be re-used.

Implementation guidance for use of expired PPE

If no date is indicated on the device or packaging, facilities should contact the manufacturer.

Reserve for settings where there is a lower risk of transmission (e.g., non-surgical); prioritize the use of unexpired FDA-cleared surgical masks and NIOSH-approved respirators, as appropriate, for health care providers in procedures where there is high risk of transmission to the health care provider or the patient due to exposure to blood, respiratory secretions or other body fluids, including AGPs.

The user should visually inspect the device prior to use and, if there are concerns (e.g., degraded materials or visible tears), discard the product.

Acronyms:

- AGP: aerosol generating procedure
- EUA: Emergency Use Authorization
- HCP: health care personnel
- MDRO: multidrug-resistant organism
- NIOSH: National Institute for Occupational Safety and Health
- OSHA: Occupational Safety and Health Administration
- PAPR: powered air purifying respirator

References

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