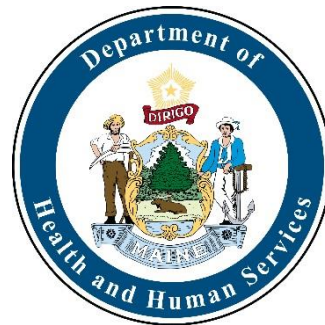


Personal Protective Equipment Supply Shortage Strategies

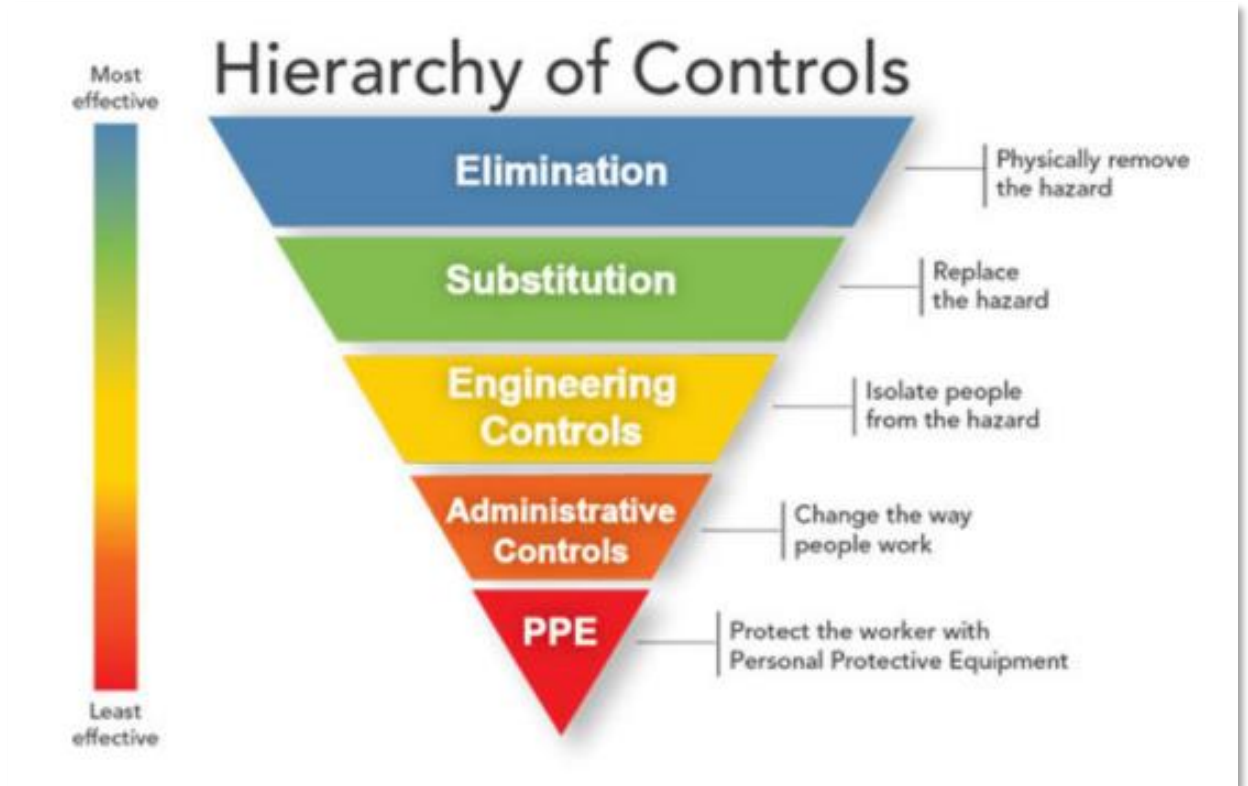
Maine CDC Healthcare Epidemiology Program

9/28/2021



Respiratory Protection & Controlling Exposures

- N95 respirators are the PPE most often used to control exposures to infectious pathogens transmitted via the airborne route, though their effectiveness is highly dependent upon proper fit and use.
- **N95 respirators are intended to be used once and then properly disposed of and replaced with a new N95 respirator.** The optimal way to prevent airborne transmission is to use a combination of interventions from across the hierarchy of controls, not just PPE alone.
- Applying a combination of controls can provide an additional degree of protection, even if one intervention fails or is not available.
- Respirators, when required to protect HCP from airborne contaminants such as some infectious agents, must be used in the context of a comprehensive, written respiratory protection program that meets the requirements of [Occupational Safety and Health Administration \(OSHA\) Respiratory Protection standardexternal icon](#). The program should include medical evaluations, training, and fit testing.



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

Respiratory Protection Program

For information & education on the aspects of a comprehensive respiratory protection program see the recorded webinar on the Maine Infection Prevention Forum Website:

<https://maineinfectionpreventionforum.org/courses/respiratory-protection-programs/>

Purpose: The fundamental goal of any respiratory protection program is to protect workers against any adverse health effect caused by inhalation of contaminants in the work environment. Respiratory protection programs also protect residents, patients, and visitors.

Key Points:

- Facilities need to have a functioning respiratory protection program as a part of routine operations.
- Facilities need to ensure medical evaluation, initial and annual fit testing
- Staff need to be educated/trained on proper respirator use (e.g., user seal checks, use, care, storage, maintenance, etc.)
- Facilities should return to contingency supply strategies.

Toolkit:

- Webinar – (recording/powerpoint), Title RESPIRATORY PROTECTION IN LTC SETTINGS (From the July 14th presentation)
- Template Respiratory Protection Plan with a Medical Clearance form
- Line List for tracking staff fit-testing/respiratory type



Course Content

Toolkit Documents

Toolkit Documents

Respiratory Protection Programs > Toolkit Documents

Please select the document below to download and view.

- ✓ Respiratory Protection Plan template with a template Medical Clearance included.
- ✓ Line List for tracking staff fit-testing/respiratory type
- ✓ Donning/Doffing infographic
- ✓ Facial Hair Infographic
- ✓ Hospital Toolkit



Note: both the template plan and line list can and should be tailored to each facility and/or any updated guidelines/regulations (maybe put that as a disclaimer?)

Respiratory Protection in Long Term Care

"In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. The program shall be updated as necessary to reflect those changes in workplace conditions that affect respirator use."

0:00 / 1:33:23



Video Recording Notes:

Video Starts at 02:50

Video Corrections:

- Slide "BLS Standard" removed the word "federal"; verbal correct made at 1:17:00
- Slide "Next Steps – Action Items" should read "Facilities should return to conventional supply"; verbal correction made at 1:14:12

Corrected slides are available separately to download

Respirator Use Key Points

How to Don a Particulate Respirator

NOTE: filtering facepiece respirators are designed to be worn by one individual, not shared

- Select your correct respiratory size and place over nose, mouth and chin
- Secure on head with straps. The top strap goes over and rests at the top back of your head. The bottom strap is positioned around the neck and below the ears. **Do not crisscross straps.**
- Fit flexible nose piece over nose bridge
- Adjust to fit. If shape of the N-95 is compromised, it may not fit properly
- **Perform a fit or seal check:**
 - Inhale – respirator should collapse
 - Exhale – check for leakage around face
 - Facial hair should not interfere with the mask seal
 - If you cannot achieve a proper seal, **do not** enter the contaminated area.

If during use you begin to have difficulty breathing, feel dizzy, or your face/eyes become irritated; immediately leave the area and remove your respirator.

How to Doff a Particulate Respirator

- Remove by pulling the bottom strap over back of head, followed by the top strap, without touching the respirator.
- Discard
- Perform hand hygiene

Infographics see:

- <https://maineinfectionpreventionforum.org/> (respiratory protection webinar)
- <https://ehs.msu.edu/assets/docs/don-doff-n95.pdf>



Respirator Use Key Points

- Although disposables cannot be cleaned or sanitized, routine inspection is still necessary.
- Determine whether the respirator straps hold the respirator tightly against the face. If not, discard the respirator. Do not attempt to tighten the respirator by knotting the straps.
- Inspect the respirator to determine if it is soiled or damaged. If so, discard the respirator.
- If shape of the N95 is compromised – can affect the fit
- If becomes damaged, wet, soiled, integrity is compromised, or if breathing become difficult, leave the contaminated area and replace the respirator
- A poorly maintained or malfunctioning respirator may actually be more dangerous than not wearing one at all.
- Reusable respirators must be stored in clean, dry, areas, and in accordance with the manufacturers' recommendations
 - PAPR should be stored in a manner to prevent deformation of the headpiece

Disposable Respirator

- Discard after use
- Do **not** store for future use



PPE Supply Capacities & Particulate Respirators

Conventional Capacity: measures consisting of engineering, administrative, and PPE controls that should already be implemented in general infection prevention and control plans in healthcare settings.

- Generally, a N95 if disposable, should be discarded after interaction with the affected client/patient/resident.
- 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)
- **Extended use of N95 respirators** can be considered for source control while HCP are in the healthcare facility, to cover one's mouth and nose to prevent spread of respiratory secretions when they are talking, sneezing, or coughing. When used for this purpose, N95s may be used until they become soiled, damaged, or hard to breathe through. They should be immediately discarded after removal.
- **Extended use of N95 respirators as respiratory protection is a [contingency capacity strategy](#).** If extending the use of a N95 as PPE, it would fall into the **Contingency capacity strategy** (see next section).

PPE Supply Capacities & Particulate Respirators

Contingency Capacity: measures that may be used temporarily during periods of expected N95 respirator shortages. Should only be implemented after considering and implementing conventional capacity strategies.

- In times of anticipated shortages, surgical N95 respirators should be prioritized for those HCW who are recommended to wear them as respiratory protection when caring for patients. Surgical N95 respirators should not be used by HCW who are only using them for source control.

- **Extended-Use:** practice of wearing the same N95 respirator for repeated close contact encounters with several patients/residents/clients, without removing the respirator between encounters.
 - Best suited to situation wherein multiple patients/residents with the same infectious disease/diagnosis, who care that require a respirator, are cohorted.
 - Is preferred over reuse (Crisis Capacity Strategy) because it involves less touching of the respirator and therefore less risk of contact transmission
 - Beyond anticipated shortages, increased feasibility and practicality may also be considered in decisions to implement extended use for HCP who are sequentially caring for a large volume of patients with suspected or confirmed SARS-CoV-2, including those cohorted in a SARS-CoV-2 unit, those placed in quarantine, and residents on units impacted during a SARS-CoV-2 outbreak.

PPE Supply Capacities & Particulate Respirators

Contingency Capacity: Extended-Use

- Before implementing should consider the following: 1) the ability of the N95 respirator to retain its fit, 2) contamination concerns, 3) practical considerations (e.g., meal breaks), and 4) [comfort of the user](#).
- N95 respirators should be discarded immediately after being removed.
- **If removed for a break (e.g., meal break/drink) it should be discarded, and a new respirator put on after the break.**
- Should be discarded when contaminated with blood, respiratory or nasal secretions, or other bodily fluids, and/or if structural integrity is compromised.
- HCW can consider using a face shield or surgical facemask over the respirator to reduce contamination of the respirator, especially during aerosol generating procedures or procedures that might generate splashes and sprays. It is not known how facemasks placed over the respirator can affect the fit so caution should be used.
- If necessary to re-use the respiratory (*i.e., taking off/re-donning, or storing before re-donning*), then it would be classified as limited-reuse and the re-use section under crisis capacity should be adhered to.

PPE Supply Capacities & Particulate Respirators

Crisis Capacity: strategies that are not commensurate with U.S. standards of care but may need to be considered during periods of known N95 respirator shortages. Should only be implemented after considering and implementing conventional and contingency capacity strategies. Facilities can consider crisis capacity when the supply is not able to meet the facility's current or anticipated utilization rate.

Strategy - Limited Re-use: practice of using the same N95 respirator by one HCP for multiple encounters with different patients/residents/clients but removing it (i.e., doffing) after each encounter. Respirator is stored in between encounters to be put on again ('donned') prior to the next encounter with a patient/ resident/client. **Guidelines:**

- **Proper Fit & Function:**

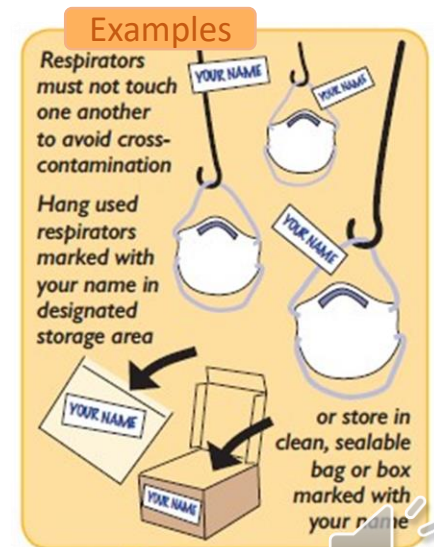
- It is important to **consult with the respirator manufacturer regarding the maximum number of donnings or uses they recommend** for the N95 respirator model.
 - ❖ *If no manufacturer guidance is available, data suggest limiting the number of reuses to **no more than 5 uses (5 donnings) per device by the same HCP** to ensure an adequate respirator performance.*
- HCW should always inspect the respirator and perform a [seal check](#) upon donning a re-used respirator
- N95 and other disposable respirators should not be shared by multiple HCW

- **Contamination:**

- Respirators soiled or grossly contaminated with blood, respiratory or nasal secretions, or other bodily fluids from patients should be discarded.
- Decreasing contamination: consider using a face shield or facemask over the respirator to reduce/prevent contamination, especially during aerosol generating procedures or procedures anticipated to generate splashed and sprays.

- *Review of appropriateness of reuse amongst patients/residents should be always be reviewed. For example, reuse should not be performed when caring for patients/residents/clients with varicella or measles, as contact transmission poses risk to HCWs.*

- **Storage:** hang used respirators in a designated storage area or keep them in a clean, breathable container such as a paper bag between uses (to prevent moisture retention). To minimize potential cross-contamination, store respirators so that they do not touch each other and the person using the respirator is clearly identified. Pack or store respirators between uses so that they do not become damaged or deformed. Storage containers should be disposed of or cleaned regularly.



PPE Supply Capacities & Particulate Respirators

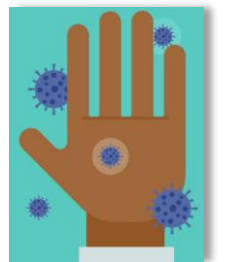
During times of crisis, practicing limited reuse on top of extended use can be considered, caution should be used to minimize self-contamination and degradation of the respirator.

Surfaces of a N95 respirators will become contaminated with pathogens while filtering the inhalation air of the wearer during exposures to pathogen laden aerosols. The pathogens on the filter materials of the respirator may be transferred to the wearer during contact when adjusting the respirator, improper doffing of the respirator, or when performing a user-seal check when redonning a previously worn respirator

- An effective strategy to mitigate the contact transfer of pathogens from the respirator to the wearer could be to issue each HCP a minimum of five respirators. Each respirator will be used on a particular day and stored in a breathable paper bag until the next week.
- This will result in each worker requiring a minimum of five N95 respirators if they put on, take off, care for them, and store them properly each day.
- This amount of time in between uses should exceed the 72 hour expected survival time for SARS-CoV-2. The total number of donnings should still not exceed five times before discarding the respirator, when no manufacturer instructions are provided to indicate otherwise.

Limited Reuse Scenarios:

1. An HCW wears a respirator to care for a patient, removes it after exiting the room, and then later returns to care for the patient and puts the same respirator on again. This would count as two uses or donnings.
2. An HCW wears a respirator during the first 3 hours of his or her shift, removes the respirator to eat lunch, and puts it back on after lunch. This would count as two uses or donnings.



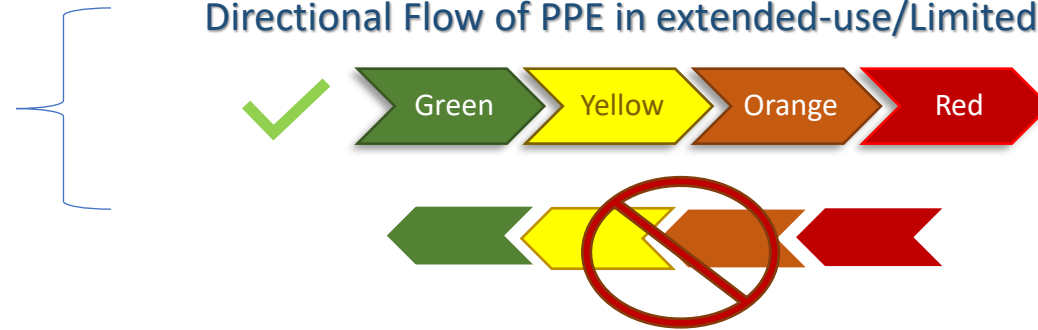
Limited Re-Use & Directional Flow Maine CDC Guidance

Can personal protective equipment (PPE) be re-worn between populations of cohorted patients/residents/clients (P/R/C)?

Color scheme zone reference:

- **Green** with no COVID-19/ not infected
 - **Yellow:** asymptomatic quarantined
 - **Orange:** symptomatic but infection not confirmed
 - **Red** with COVID-19-positive P/R/C
- Note a "mixed" unit would be considered red*

Directional Flow of PPE in extended-use/Limited-reuse:



Guidance Specifics for Extended Use and Directional Flow:

- There should be **NO reuse of PPE between a known COVID-19 positive P/R/C and a COVID-19 unknown or negative P/R/C.**
- **Masks and eye protection** can be worn P/R/C to P/R/C more safely than gowns and gloves. Eye protection can be disinfected per manufacturer's instructions. Hand hygiene can be performed if a mask is handled.
- **Gowns/Gloves:** consider what else may be transmitted if the gowns and gloves are not changed between P/R/C. If they have a MDRO (e.g., *MRSA, VRE, ESBL, CRE*) or other potentially transmissible organism – then gowns and gloves **MUST** be changed after encounter.
 - If gowns are in low supply and use must be extended, then if there is even a suspicion of a splash or spray from blood or body fluids, then the gown must be changed. If interaction is minor, a gown could be used for extended use, if needed.
 - Do not recommend hand sanitizing gloves or washing hands with gloves on to extend their use. Micro tears in gloves occur and washing gloves will likely add to product degradation. Therefore, gloves should be changed after each patient/resident/client interaction or more frequently per best practice guidelines.

See these links for more guidelines from Federal CDC:

- Gowns: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/isolation-gowns.html>
- Gloves: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/gloves.html>
- Eye protection: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/eye-protection.html>



Supply Crisis Strategies



Key Points:

1. Implementation comes with risk

- Although extended use and reuse of respirators have the potential benefit of conserving limited supplies of disposable N95 respirators, it comes with potential risk. The most significant risk is of contact transmission from touching the surface of the contaminated.

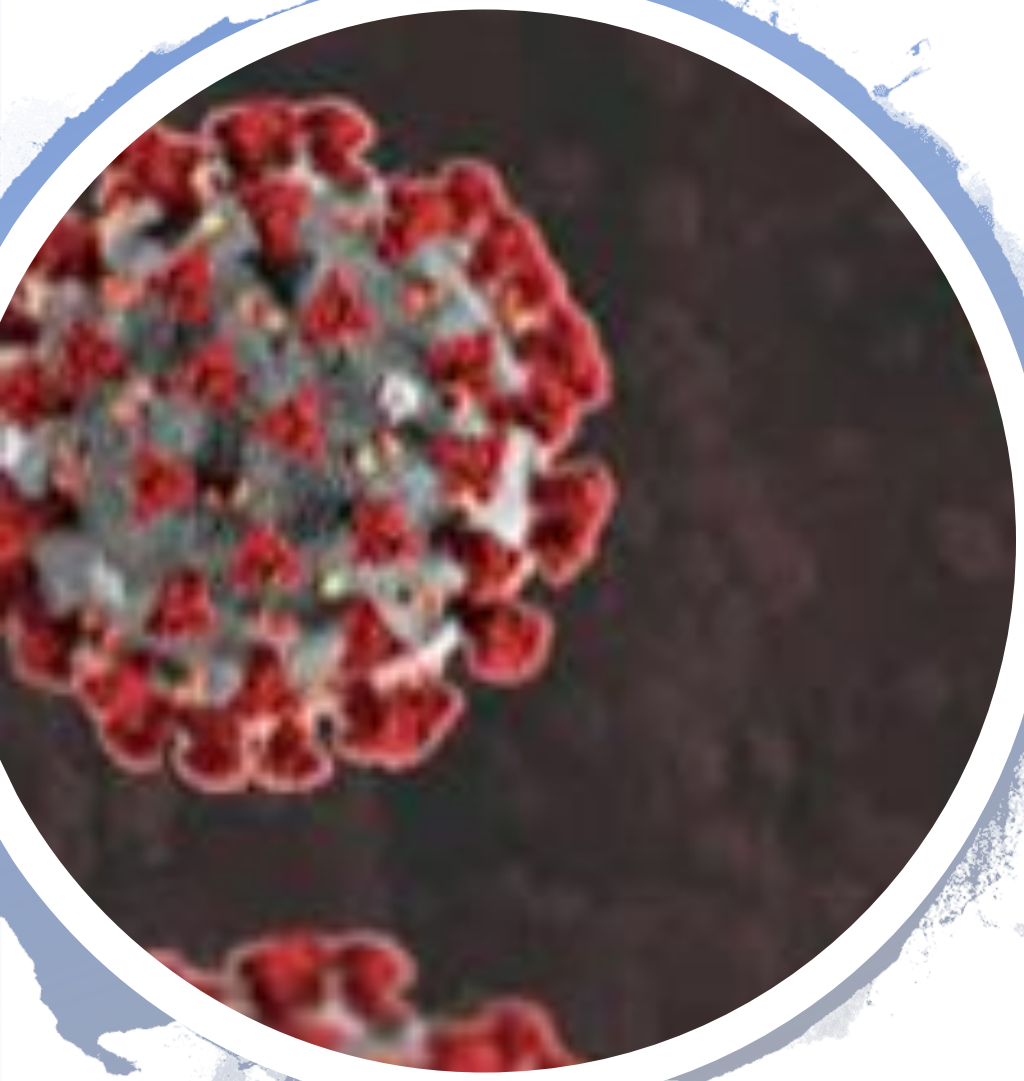
2. Recommended the person responsible for respiratory protection at the facility review CDC guidance on PPE capacity and extended-use limited-reuse to determine if it can be safely implemented (i.e., a risk assessment)

3. Train and educate staff so they understand the process and can safely implement

4. Monitor and audit the process ongoing during implementation

5. Note, some devices have not been FDA-cleared for reuse. Some manufacturers' product user instructions recommend discard after each use (i.e., "for single use only"), while others allow reuse if permitted by infection control policy of the facility.

6. Remember to consider appropriate directional flow



References

- <https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/index.html#crisicapstrategies>
- <https://www.aohp.org/aohp/portals/0/documents/conference/2016B007%20Pompeii%20&%20Novak.pdf>
- <https://ehs.msu.edu/assets/docs/don-doff-n95.pdf>
- https://www.une.edu/sites/default/files/respiratory_protection_program_training.pdf
- <https://www.cdc.gov/niosh/npptl/hospresptoolkit/training.html>
- <https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedguidanceextuse.html#riskextended>
- https://www.osha.gov/video/respiratory_protection/fittesting_transcript.html
- <https://www.ctdol.state.ct.us/osa/n95trainingmaterial.htm>
- <https://www.osha.gov/Publications/OSHA3767.pdf>
- <https://www.osha.gov/SLTC/etools/hospital/hazards/tb/tb.html#trainingandEducation>
- https://www.osha.gov/SLTC/healthcarefacilities/infectious_diseases.html
- Respiratory Protection: <https://www.cdc.gov/niosh/npptl/hospresptoolkit/default.html> & <https://www.osha.gov/Publications/osa3079.pdf>
- How to use PPE: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/using-ppe.html>
- How to evaluate if extended or reuse is needed: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/decontamination-reuse-respirators.html#:~:text=CDC%20recommends%20limiting%20the%20number,manager%20or%20appropriate%20safety%20personnel> . This site as talks about the risks of extended and reuse.
- Strategies for optimizing N95 Supply: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/index.html>
- OSHA Fit-Testing: https://www.osha.gov/video/respiratory_protection/fittesting_transcript.html#:~:text=Qualitative%20fit%20testing%20is%20normally,cover%20your%20mouth%20and%20nose.&text=Quantitative%20fit%20testing%20uses%20a,in%20order%20to%20detect%20leakage.

Questions? E-mail MECDC.HAI@maine.gov

