If the current outbreak of the 2019-nCoV Coronavirus causes a very large surge of patients that depletes both our healthcare provider’s PPE stock and that of the State of Delaware Public Health Warehouse stock, healthcare providers and emergency medical services may need to look at the option of using existing PPE in manners that are not normal practice. This includes extending their use or reusing the PPE, namely the N95 masks.

It must be noted that 3M, the manufacturer of the bulk of N95 masks in the DPH warehouse, does not recommend reusing a mask. Their literature all states that that decision is up to the “local health authority and infectious control practitioner.”

The National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA) define and regulate respirator use in the United States. Both agencies address procedures for reusing or extending the use of respirators during a pandemic, and these recommendations are used in developing this document.

NIOSH document [Pandemic Planning: Recommended Guidance for Extended Use and Limited Reuse of N95 Filtering Facepiece Respirators in Healthcare Settings](https://www.cdc.gov/niosh/topics/hcwcontrols/recommendedguidanceextuse.html) recommends that healthcare agencies “implement practices allowing the extended and limited reuse of N95 respirators…” and defines extended use and reuse of respirators:

**Extended** use is the practice of the provider wearing the same N95 respirator for repeated close contacts with several patients, without removing the mask. Extended use alone is unlikely to degrade respiratory protection.

**Reuse** is the practice of using the same N95 respirator for multiple encounters with patients but removing it after each encounter.

OSHA offers the following narrative in [Pandemic Influenza Preparedness and Response Guidance for Healthcare Workers and Healthcare Employers](https://www.osha.gov/Publications/3328-05-2007-English.html#RespiratoryProtectionforPandemicInfluenza):

If a sufficient supply of respirators is not available during a pandemic, healthcare facilities may consider reuse as long as the device has not been obviously soiled or damaged (e.g., creased or torn), and it retains its ability to function properly. Data on reuse of respirators for infectious diseases are not available. Reuse may increase the potential for contamination; however, this risk must be balanced against the need to provide respiratory protection for healthcare workers.

Reuse of a disposable respirator should be limited to a single wearer (i.e., another wearer should not use the respirator). Consider labeling respirators with a user's name before use to prevent reuse by another individual.

If disposable respirators need to be reused by an individual user after caring for infectious patients, employers should implement a procedure for safe reuse to prevent contamination through contact with infectious materials on the outside of the respirator.

One way to address contamination of the respirator's exterior surface is to consider wearing a face shield that does not interfere with the fit or seal over the respirator. Wearers should remove the barrier upon leaving the patient's room and perform hand hygiene. Face shields should be cleaned and disinfected. After removing the respirator, either hang it in a designated area or place it in a bag. Store the respirator in a manner that prevents its physical and functional integrity from being compromised.

In addition, use care when placing a used respirator on the face to ensure proper fit for respiratory protection and to avoid unnecessary contact with infectious material that may be present on the outside of the mask. Perform hand hygiene after replacing the respirator on the face.

Both NIOSH and OSHA stress that the danger to the healthcare provider comes from exposure to any particulate that is found in the surface of the mask. They both recommend that the masks be disposed of whenever there is obvious contamination or if an aerosolizing procedure was done on a patient. It would be important that all providers receive training on proper donning and doffing of a possibly contaminated mask, especially with hand hygiene.

The State of Delaware Public Health Division suggests that all healthcare agencies and emergency medical services providers develop policies and procedures using the following recommendations from NIOSH and OSHA:

***Respirator*** ***Extended Use***:

* + 1. Develop clearly written procedures to advise staff to take the following steps to reduce contact transmission after donning
    2. Discard N95 respirators following use during aerosol generating procedures.
    3. Discard N95 respirators contaminated with blood, respiratory or nasal secretions, or other bodily fluids from patients.
    4. Discard N95 respirators following close contact with, or exit from, the care area of any patient co-infected with an infectious disease requiring contact precautions.
    5. Consider use of a cleanable face shield (preferred) or a surgical mask over an N95 respirator and/or other steps (e.g., masking patients, use of engineering controls) to reduce surface contamination.
    6. Perform hand hygiene with soap and water or an alcohol-based hand sanitizer before and after touching or adjusting the respirator (if necessary for comfort or to maintain fit).
    7. Discard any respirator that is obviously damaged or becomes hard to breathe through

***Respirator Reuse****:*

1. Discard N95 respirators following use during aerosol generating procedures.
2. Discard N95 respirators contaminated with blood, respiratory or nasal secretions, or other bodily fluids from patients.
3. Discard N95 respirators following close contact with any patient co-infected with an infectious disease requiring contact precautions.
4. Discard any respirator that is obviously damaged or becomes hard to breathe through
5. Use a cleanable face shield (preferred) or a surgical mask over an N95 respirator and/or other steps (e.g., masking patients, use of engineering controls), when feasible to reduce surface contamination of the respirator.
6. Hang 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 and the person using the respirator is clearly identified. Storage containers should be disposed of or cleaned regularly.
7. Clean hands with soap and water or an alcohol-based hand sanitizer before and after touching or adjusting the respirator (if necessary for comfort or to maintain fit).
8. Avoid touching the inside of the respirator. If inadvertent contact is made with the inside of the respirator, perform hand hygiene as described above.
9. Use a pair of clean (non-sterile) gloves when donning a used N95 respirator and performing a user seal check. Discard gloves after the N95 respirator is donned and any adjustments are made to ensure the respirator is sitting comfortably on your face with a good seal.