

FAQ on Reuse of N95 Respirators

1. Mask vs respirator

A mask — including both a surgical mask and a cloth mask — does not provide respiratory protection to the wearer. It may be useful for source control as surgical masks are intended to protect others from the wearer's respiratory droplet emissions. Unlike respirators, surgical masks are not required to be fit tested, which allows leakage around the edge of the mask. They are also not subjected to rigorous NIOSH filter certification, which measures the filter efficiency of each respirator from very small airborne particles.

A respirator is specifically designed to provide respiratory protection for the wearer by filtering out airborne contaminants. There are various types of respirators, most of which form a tight seal around the face. Respirators vary in their level of protection and filter efficiency. Elastomeric and powered air-purifying respirators (PAPR), for instance, provide higher levels of respiratory, eye and face protection from infectious particles than N95 filtering facepiece respirators. N95 filtering facepiece respirators filter out at least 95% of the small particles that are most likely to go deep into the lungs.



N95 filtering facepiece respirator



Surgical mask — note how loosely the mask fits to the person's face

2. Reuse vs extended use — is there a difference?

Reuse refers to the practice of repeated donning and doffing of the same respirator. This means the same respirator is used for multiple patient encounters, removing it between each of those encounters.

Extended use refers to the practice of wearing the same respirator for multiple patient encounters

without removing it in between. This means a nurse puts on an N95 and doesn't take it off until some time later, even though they may be seeing different patients or going in and out of a patient's room multiple times.

3. What does it mean for an N95 to be decontaminated?

Decontamination of disposable, single-use N95 respirators means the employer collects used N95s and sends them to a contractor to remove contaminants that have accumulated on the respirators. CDC/NIOSH recognizes in their new guidance that there

is insufficient evidence to show that any decontamination method is both safe and effective against SARS-CoV-2. Based on NNU's evaluation of the available scientific evidence, there is no method that is shown to be safe and effective.¹

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4. But employers say they must implement these extended use, reuse, and decontamination policies because there aren't enough N95s. A decontaminated N95 is better than a bandana, right?

There is no validated, scientific evidence that multiple re-use or decontamination of N95s is safe and will adequately protect a health care worker from exposure to SARS-CoV-2 and other pathogens. Extended use and reuse of disposable N95s can increase the risk of exposure and transmission to others. The frequent donning and doffing of N95s may greatly increase cross contamination of various pathogens in addition to SARS-CoV-2, especially

when nurses and other health care workers are fatigued and exhausted from each shift.

Instead of racing to the lowest standard possible, employers should provide other types of respirators that have equivalent or higher levels of protection, such as elastomeric, PAPRs, industrial N95s, other kinds of filtering facepiece respirators (N/P/R-100, etc.), and comparable respirators from other countries (KN95s, FFP2/3).

5. Doesn't the FDA approval of Battelle's hydrogen peroxide system mean it's safe?

No, FDA's approval of Battelle's hydrogen peroxide system is insufficient to prove it's safe. The FDA's Emergency Use Authorization letter states that Battelle's system "may be effective at preventing exposure to pathogenic airborne particulates," without adequately demonstrating how effective it is in decontaminating SARS-CoV-2 specifically. The risk and benefit analysis used as justification for this authorization compared decontaminated N95s to a scenario where no respiratory protection was used (such as wearing bandanas). The FDA does not provide any evidence beyond this comparison. What

the FDA's approval of Battelle's system means is that a decontaminated N95 may only offer protection equal to a bandana. Nurses and health care workers who will reuse these decontaminated N95s must be adequately informed of the potential risks including failure of fit and filtration efficiency, and reduction in breathability, as mandated by the FDA.

Report Adverse events MedWatch by submitting the online FDA Form 3500 (<https://www.accessdata.fda.gov/scripts/medwatch/index.cfm?action=reporting.home>) or by calling 1-800-FDA-1088.

6. What does OSHA require?

Federal OSHA recently announced that employers may consider reuse of N95 respirators if alternative NIOSH-approved respirators are not available. Employers will not be cited for violating respiratory protection standards so long as they adhere to CDC guidance. This deference is irresponsible and fails to

protect nurses and other health care workers from COVID-19.

Cal/OSHA has not released any statement or guidance on reuse of N95 respirators.

7. The employer says that there is evidence to show that their decontamination method is safe and effective. They quote this study from Stanford

The study from Stanford did not test all aspects needed to determine that dry heat and hot water vapor are both safe and effective methods of decontamination for N95s.

What the study did: Researchers from Stanford University recently tested decontaminating N95 respirators using dry heat from an oven as well as hot water vapor from boiling water.

What the study found: Both methods tested were effective for decontamination of E coli and did not affect respirator integrity. This study does not prove the ability of these methods to decontaminate

SARS-CoV-2. SARS-CoV-2 and other pathogens may survive if temperature, humidity, or duration is too low.

Other important info: The use of microwaves and ovens is not recommended as studies have also found that they can melt materials on respirators including straps.^{2 3} Further, other studies show that repeated thermal cycles may damage respirator fit and filtration, rendering them less effective.^{4 5}

8. The employer says that there is evidence to show that their decontamination method is safe and effective. They quote this study from Duke

The study from Duke University did not test all aspects needed to determine that hydrogen peroxide vapor is both a safe and effective method of decontamination for N95s.

What the study did: Duke University recently studied a decontamination method for N95s that uses hydrogen peroxide vapor.

What the study found: This study did not prove the ability of the method to decontaminate SARS-CoV-2. This method also did not evaluate whether this method decontaminates the layers within the N95 filter medium. The authors of the study claim that their method eliminates off-gassing hazards to the wearer with sufficient aeration.

Hydrogen peroxide vapor has little to no odor, which means that traces of off-gassing may not be detected by the wearer, making it difficult to protect

themselves. Breathing in hydrogen peroxide can cause upper airway irritation, shortness of breath, and chest tightness. Exposure to high concentrations can cause severe mucosal congestion of the trachea and bronchi and delayed accumulation of fluid in the lungs. Prolonged dermal exposure from any chemical residue can also cause irritation and temporary bleaching of skin and hair.

Other important info: Nurses and other health care workers whose employers use this decontamination method should be informed of the potential risks, including the lack of evidence for safety and efficacy of decontamination. Employers should also immediately medically monitor their staff and implement a reporting system for health care workers to report symptoms of respiratory illness, skin irritation and cancer.

9. What about this website that was created by a group of scientists — www.N95decon.org?

A group of scientists from institutions including the University of California, Berkeley; University of California, San Francisco; University of Chicago; Stanford; Georgetown University; Harvard University; Seattle University; University of Utah; Massachusetts Institute of Technology; and University of Michigan; and from Consolidated Sterilizers and X, the Moonshot Factory got together supposedly to research methods to decontaminate and reuse respirators.

The results of their investigation and review of available studies also determined that there is no safe and effective method to decontaminate and reuse respirators.

Nevertheless, they make recommendations on “promising methods” that might be used to decontaminate and reuse respirators and provide fact sheets on the most promising methods. Notably, they warn “Efficacy and safety has not been fully characterized.”

10. Do homemade masks provide protection?

No, homemade cloth masks do not provide respiratory protection. Unlike N95 filtering facepiece respirators used in health care settings, cloth masks have neither the particle filtration mechanism nor the airtight face seal design to filter at least 95% of infectious particles, and protect against droplet spread, splashes and other body fluids. One study reported that cloth or homemade masks provided

little to no protection for respiratory illnesses due to poor filtration and pathogen retention.⁶

Wearing masks can be an important part of source control because a mask can reduce the respiratory droplets emitted by the wearer. However, according to one study, surgical masks were three times more effective at reducing respiratory droplets emitted by the wearer than homemade cloth masks.⁷

1 https://act.nationalnursesunited.org/page/-/files/graphics/0320_COVID19_RespiratorReuse.pdf.

2 Viscusi, DJ et al (2009), “Evaluation of five decontamination methods for filtering facepiece respirators,” *Ann Occup Hyg*, 53(8): 815-27. Online at <https://www.ncbi.nlm.nih.gov/pubmed/19805391>.

3 3M Technical Bulletin (March 2020).

4 <https://multimedia.3m.com/mws/media/1816576O/disinfection-of-disposable-respirators-technical-bulletin.pdf>.

5 Viscusi, DJ et al (2009), “Evaluation of five decontamination methods for filtering facepiece respirators,” *Ann Occup Hyg*, 53(8): 815-27. Online at <https://www.ncbi.nlm.nih.gov/pubmed/19805391>.

6 MacIntyre CR, et al. A Cluster Randomised Trial of Cloth Masks Compared with Medical Masks in Healthcare Workers. *BMJ Open*, 2015. DOI: 10.1136/bmjopen-2014-006577.

7 Davies, A., et al. Testing the Efficacy of Homemade Masks: Would They Protect in an Influenza Pandemic? *Disaster Medicine and Public Health Preparedness*, Cambridge University Press, 2013. DOI: 10.1017/dmp.2013.43.