Best practice is to use new N95s. Decontamination does not solve the PPE shortage crisis, and is an emergency practice to be considered during the COVID-19 pandemic. Efficacy and safety of N95 decontamination has not been fully characterized.

COVID N95 DECON & REUSE



UV-C

N95DECON

Use appropriate UV-C source
Validate 1.0 J/cm² dose with sensor
Expose both sides of N95 mask

CORONAVIRUS INACTIVATION

Peer-reviewed data not available for SARS-CoV-2



- ≥1.0 J/cm² of UV-C inactivates* viruses similar to SARS-CoV-2 on N95 FFRs^{1,2**,3}
- ≥1.0 J/cm² of UV-C yields 2-log reduction of viable *B. subtilis* spores on N95 FFRs⁴
- UV-C light may not reach inner N95 layers for all N95 models⁵
- Elastic straps require additional chemical disinfection¹
- Shadows can block UV-C rays & can leave parts of N95 contaminated
- * ≥ 3-log inactivation

KEY CONSIDERATIONS

Ensure accurate UV-C dose on all surfaces of N95

Measure dose at N95 surface with UV-C specific sensor

Return N95s to original users and ensure handling minimizes cross-contamination

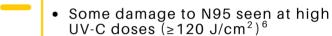
Perform user seal check before each reuse

Be aware that data from tests on specific N95 models may not apply to other models

N95 INTEGRITY



- N95 keeps fit and filter performance after 10-20 cycles of 1.0-1.2 J/cm² UV-C ^{2**}
- Each don/doff can reduce N95 fit; some models fit unacceptably after 5 don/doff cycles⁹



 Strap and facepiece damage seen on some N95 models after UV-C^{7**}

RISKS

UV light is harmful to eyes and skin; proper training, engineering controls, and PPE are required before use

If UV-C source is underpowered, decontamination times may be infeasible

UV-C may not decontaminate N95 straps or eliminate risk of bacterial co-infection

Cosmetics and sunscreen on N95 may reduce decontamination efficacy

Non-uniform irradiance can affect dose, and subsequently, decontamination efficacy

IMPLEMENTATION



 Reference documents from University of Nebraska Medical Center⁸ for implementation



 Validate each UV-C source and protocol with a UV-C sensor to ensure adequate dose for decontamination at the N95 surface

CONCLUSION

If implemented properly using sensors to ensure $\geq 1.0 \text{ J/cm}^2 \text{ UV-C}$ dose to the N95, this method likely inactivates SARS-CoV-2; however, this has not yet been confirmed directly with SARS-CoV-2. This method may protect against some bacterial co-infection risks but not all.

SUPPORTING RESEARCH

[1] Mills et al., 2018; [2] Heimbuch & Harnish, 2019**; [3] Lore et al., 2012; [4] Lin et al., 2018; [5] Fisher and Shaffer, 2010; [6] Lindslev et al., 2015; [7] Parsonal Safety Division, 3M, 2020**; [8] Lowe et al., 2020; [9] Bargman et al., 2012

[6] Lindsley et al., 2015; [7] Personal Safety Division, 3M, 2020**; [8] Lowe et al., 2020; [9] Bergman et al., 2012 ** = not peer-reviewed

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