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.

**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\(^1,2\*\)
- **+** ≥ 1.0 J/cm² of UV-C yields 2-log reduction of viable *B. subtilis* spores on N95 FFRs\(^1\)
- **+** UV-C light may not reach inner N95 layers for all N95 model\(^s\)
- **+** Elastic straps require additional chemical disinfection\(^1\)
- **-** 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

**IMPLEMENTATION**

- **+** Reference documents from University of Nebraska Medical Center\(^8\) for implementation

**CONCLUSION**

If implemented properly using sensors to ensure ≥ 1.0 J/cm² 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.

**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 cycles\(^6\)
- **-** Some damage to N95 seen at high UV-C doses (≥ 120 J/cm²)\(^6\)
- **-** 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

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\(^*\) = not peer-reviewed

**Supporting Research**


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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.

**UNSUITABLE METHODS**

Only UV-C light with a peak wavelength of 254 nm has demonstrated substantial germicidal effects on N95 FFRs\(^2\). UV-A (320-400 nm) is not germicidal. UV-B (280-320 nm) has lower germicidal efficiency and has not been validated for N95 FFR decontamination.\(^2\)

Only use UV-C light sources with a peak wavelength of 254 nm.

- **Sunlight**
  - Sunlight reaching the Earth’s surface does not contain UV-C light;\(^3\) there is no evidence in the peer-reviewed literature to support sunlight-assisted decontamination of N95 FFRs.

- **Consumer UV Products**
  - Many consumer UV products do not emit UV-C with sufficient irradiance, and have peak emission in the UV-A range (e.g., nail polish curing lamps,\(^4\) tanning bed lamps,\(^5\) etc.), which is ineffective for decontamination. Other consumer products may additionally have uniformity or shadowing concerns.

- **< 200 nm UV Sources**
  - UV sources emitting < 240 nm light can produce ozone, which is hazardous to human health.\(^5\) Sufficient ventilation is necessary to reduce ozone concentration.\(^7\)

- **Measuring dose from lamp power**
  - UV-C irradiance should not be calculated from rated lamp power, as bulbs do not have 100% efficiency in converting electrical energy to optical power.\(^8\) Use a UV-C specific sensor to measure irradiance at the N95 surface.

- **Doses for air or surface decon**
  - Viral inactivation protocols designed for surfaces or air are insufficient/not effective for N95 decontamination.\(^9\) Use a substantially higher UV-C dose of 1.0 J/cm\(^2\) at the N95 surface.\(^1\)

- **Biosafety Cabins**
  - Many UV-C sources used in research laboratories (e.g., biosafety cabinets) have unacceptable non-uniformity and low power.\(^10\) Thorough characterization of the UV-C dose at the N95 surface is required for sufficient decontamination.

**SUPPORTING RESEARCH**


\(^*\) = not peer-reviewed

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