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

HEAT & HUMIDITY

CORONAVIRUS INACTIVATION

Data not available for COVID-19 on N95s

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- 60°C–75°C for 30min inactivates related coronaviruses in solution[1–5]
- 70°C at 85% humidity for 30min inactivates H1N1 and H5N1 flu (non-coronavirus) on N95[6,7]

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- Method does NOT inactivate all bacterial or mold spores on N95

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- No data on heat inactivation of coronaviruses on N95s

N95 MASK INTEGRITY

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- N95 keeps filter performance at 5 cycles of 60°C heat, 80% humidity[8]
- N95 shown to keep proper seal after 1 cycle at 65°C, 85% humidity[6]

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- Repeated thermal cycles may damage N95 fit and filtration[8,9]

?
- Different N95 makes and models may respond differently to heat[9]

KEY CONSIDERATIONS

Data from tests on specific N95 models may not apply to other models

N95s should be isolated and returned to original user

N95 user seal check should be performed before each reuse

RISKS

Untested protocol - virus may survive if temperature, humidity, or duration is too low

N95 fit and filtration may be damaged if the temperature is too high or after multiple cycles

N95 will NOT be sterilized by low heat and humidity

IMPLEMENTATION

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- CDC has released guidance on heat and humidity for decontaminating N95s[10]
- Many devices can maintain 65–80°C, 50–85% humidity (warming cabinets, water baths, autoclaves, ovens)

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- Method has not been validated in an FDA-approved process

CONCLUSION

Heat and humidity for N95 decontamination is currently unproven for inactivation of SARS-CoV-2. Its use should be evaluated by relevant authorities. This is a low-cost technique that could be easy to implement in a wide range of settings. However, excessive thermal cycling may damage N95 fit and filtration. Moreover, this approach will NOT protect against all bacterial and mold co-infection risks. If risks are mitigated, this protocol merits future FDA feasibility studies.

SUPPORTING RESEARCH

[1] Darnell et al., 2006; [2] Darnell & Taylor, 2004; [3] Rabenau et al., 2005; [4] Duan et al., 2003; [5] Pagat et al., 2007; [6] Heimbuch et al., 2011; [7] Lore et al. 2012; [8] 3M, 2020; [9] Viscusi et al., 2009; [10] CDC, 2020

N95DECON