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

HYDROGEN PEROXIDE VAPOR & HYDROGEN PEROXIDE GAS PLASMA

CORONAVIRUS INACTIVATION

Data not available for COVID-19 on N95s

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- Hydrogen peroxide inactivates viruses and highly-resistant bacterial spores[1,2]

N95 MASK INTEGRITY

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- HPV for up to 20 cycles does not degrade filter quality, straps, or fit for 3M 1860 N95s[2,3]
- Low dose HPGP for 2 cycles does not degrade fit for 3M 8822 N95s[4]

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- High dose HPGP reduces filtration of 3M 1860 & KC PFR95 N95s[5]

KEY CONSIDERATIONS

Data from specific N95 models may not apply to other models

Trained personnel required - HPV and HPGP systems are dangerous

N95s should be isolated and returned to original user

N95 user seal check should be performed before each reuse

Correct machine settings must be confirmed

RISKS

Insufficient off-gas time and residue may pose a respiratory and skin hazard

Some HPGP protocols reduce filtration efficiency

Insufficient dosing may lead to insufficient decontamination

Hydrogen peroxide is a powerful oxidizer and presents a combustion and explosion risk

IMPLEMENTATION

Note: 'VHP' and 'HPV' are sometimes used interchangeably but can also refer to different techniques.

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- CDC released guidance on HPV for decontaminating N95s[6]
- HPV systems have recently received FDA authorization[7]
- Processing procedures for HPV have been developed[3]
- HPGP systems are under review by the FDA[8]

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- Systems and processes are complex and dangerous and require trained personnel

CONCLUSION

If implemented properly, and N95s are not soiled, it is likely that both HPV and HPGP machine-standard protocols inactivate SARS-CoV-2 and bacterial spores. HPGP and HPV are distinct processes; decontamination durations and maximum recommended reuse cycle recommendations are extremely different.

SUPPORTING RESEARCH [1] Heckert et al., 1997; [2] Battelle, 2016; [3] Schwartz 2020; [4] Dutch National Institute for Public Health and the Environment, 2020; [5] Bergman, 2010; [6] CDC, 2020; [7] Battelle, 2020; [8] Personal Communication, J. Yarwood, ASP