

1 **Decontamination and Reuse of N95 Respirators with Hydrogen Peroxide Vapor**
2 **to Address Worldwide Personal Protective Equipment Shortages During the**
3 **SARS-CoV-2 (COVID-19) Pandemic**

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16 **Abstract**

17 The SARS-CoV-2 (COVID-19) pandemic has placed a tremendous amount of strain on resources
18 in the healthcare setting. One of the most pressing issues is the rapid depletion of personal
19 protective equipment (PPE) used in the care of patients. This is a significant concern for
20 healthcare workers' health and safety. Many entities have depleted or soon will exhaust their
21 stockpile of PPE despite adopting PPE sparing practices as the number of COVID-19 cases in the
22 U.S. increases at an almost exponential rate and manufacturers struggle to keep up with the
23 worldwide demand. This potential shortage is particularly concerning for commonly used N95
24 respirators and Powered-Air Purifying Respirators (PAPRs). Recently, the U.S. Occupational
25 Safety and Health Administration (OSHA)¹ even temporarily suspended the requirement to
26 perform annual fit testing of respirators to allow entities to conserve respirators and preserve
27 them for patient care. These measures are unprecedented and highlight the urgent need for
28 entities to develop solutions to proactively address what could be potentially a grave
29 occupational health issue.

30 At Duke University and Health System, we have evaluated and will begin utilizing Hydrogen
31 Peroxide Vapor to decontaminate and reuse N95 respirators. In this communication, we briefly
32 discuss the decontamination validation process and post-decontamination performance
33 validation conducted at Duke. This validation, which is supported by previous laboratory
34 testing, funded by the FDA, demonstrated that N95 respirators still met performance
35 requirements even after decontamination with Hydrogen Peroxide Vapor in the laboratory
36 setting for over 50 times². While previous studies have shown the applicability of the Hydrogen
37 Peroxide Vapor process, we have also confirmed that the respirator still functions as designed,
38 using our standardized human N95 fit testing methodology. We will now use this internally
39 validated and Duke Institutional Biosafety Review Committee (IBRC) approved laboratory
40 decontamination process in the clinical setting to dramatically extend the life of our N95
41 respirators. We hope that sharing our processes through this brief communication can help
42 other entities with access to Hydrogen Peroxide Vapor to evaluate the potential applicability of
43 this technology at their facility or partner with those who may already have this capability
44 including other private sector life science organizations.

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