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Comment on: “Proposed approach for reusing surgical masks in COVID-19 pandemic”

To the Editor: The article by Liu et al¹ provided valuable recommendations regarding the use of dry heat to facilitate surgical mask reuse. Prior studies exploring this method have largely focused on its effect on N95 respirator integrity rather than a quantification of its virucidal activity.² This makes it difficult to compare its virucidal advantage over ultraviolet C (UVC) and other methods.²

Dry heating requires direct supervision during its delivery, because too high a temperature (>100°C) is known to decrease the filtering capacity of respirators and masks.² In addition, the effect of dry heating on respirator—and possibly mask—integrity varies significantly depending on the approach used (laboratory oven, dry microwaving, or rice cooker without water)² and the specific respirator or mask model. For N95 respirators, failure of fit-testing after decontamination would have potential catastrophic effects on health care providers.³

The authors’ statement pertaining to UVC having “less penetration” and being “less virucidal” contradicts previous reports.^{2,4} Although UVC is known foremost as a surface decontaminant, our observations using a desktop UVC unit (Daavlin Desktop UVC Germicidal Lamp, Daavlin, Bryan, OH) indicated that when the outside-facing surface of N95 respirators is irradiated at virucidal dose (1 J/cm²),⁴ 10% of the dose can penetrate to the wearer-facing surface (Kohli et al, unpublished data, 2020). Hence, it is very likely that surgical masks may yield even greater UVC penetration given their larger particle penetration compared with respirators.¹ Furthermore, the addition of a reflective base, flipping of the masks, or the availability of units that allow irradiation of both surfaces of the mask at the same time (Orbitform Mask Sanitizer, Orbitform Medical, Jackson, MI)² can facilitate adequate irradiation of all surfaces.

Although testing against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has not been done, UVC has documented activity (≥3-log reduction) against SARS-CoV, Middle East respiratory syndrome coronavirus (MERS-CoV),⁵ and H1N1 influenza A virus.⁶ This was achieved after irradiation of N95 respirators at a dose of 1 J/cm² per side delivered in under 3 minutes.⁴ For surgical masks, being of a thinner material, it is likely that

the required dose and irradiation time is even lower.

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