

Don't Use N95 Masks for More Than 2 Days, Research Suggests

Ingrid Hein

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When reused for more than 2 days, nearly half of N95 masks fail, new research shows.

"N95 respirators used past day 2 had significant failure rates," Ronald Check, MD, St. Luke's University Hospital, Bethlehem, Pennsylvania, said in a presentation of his research at the American College of Emergency Physicians (ACEP) 2020, which was held online.

In the study, investigators evaluated masks that had been reused by healthcare workers in a single-center trauma unit. They recruited individuals who had been assigned masks that were of the correct size and that had been fit tested. Persons whose mask had not been fit tested were excluded from the study. Fit testing continued periodically throughout the workers' shift. At those times, the masks were checked for fit and for the quality of the seal.

For 5 days, the researchers evaluated masks using Occupational Safety and Health Administration qualitative fit-test guidelines.

For the first 58 masks evaluated, they found that 9% of masks failed on day 1 (n = 1/11), 6% failed on day 2 (n = 1/15), and on day 3, 50% of masks failed n = 7/14). On day 4, the failure rate continued to climb, with 4 of 6 failing. On day 5 of use, 5 of 11 failed.

Researchers continued evaluating masks, to a total of 115.

They found that 3 of 28 masks failed on the first day, 2 of 29 failed on day 2, 9 of 26 failed on day 3, 5 of 11 failed on day 4, and 10 of 21 failed on day 5. The larger dataset confirmed the original dataset; when used for more than 2 days, the odds ratio for failure was 7.1 (95% CI, 2.5 – 20; $P < .0001$).

"This suggests that disposable N95 respirators should only be safely used for two shifts," Check said.

CDC Protocol Extended for Reuse of N95

Because of a worldwide shortage of N95 masks, healthcare workers have been forced to reuse masks intended for single use.

"Soon after the first case was identified in late January in the United states, hospitals throughout this country were quickly faced with PPE [personal protective equipment] shortages," Check said.

That led the Centers for Disease Control (CDC) to implement protocols for extended use, "which meant donning for multiple patients without doffing," Check said. The CDC also extended use and reuse protocols such that healthcare workers could don and doff the same respirator multiple times for an extended period.

Check pointed out several limitations to the study. "We utilized a qualitative fit-testing strategy instead of a quantitative one," Check said. In addition, the number of times masks were used and the numbers of hours during which they were worn were self-reported, "and we did not control for the exact type of N95 respirator and the number of donnings and doffings," he said.

He also said that study participants may have used different methods for decontaminating masks, and "this was not controlled."

PPE Needs to Be Provided Daily

"The rates of mask failure after multiple days of use are staggering," Megan Ranney, MD, MPH, of Brown University, Providence, Rhode Island, told *Medscape Medical News*. Ranney is the cofounder of [GetUsPPE](#), a foundation providing free PPE to frontline workers and underresourced communities.

"We must, as a specialty and a nation, continue to push for our hospitals to be able to obtain and distribute a new N95 to every frontline provider every day," she said.

Although this study was small, "it highlights the dangers of reusing N95s and reinforces the importance of having adequate supplies of PPE for emergency departments...

"There should be hard-and-fast rules that we can't use them for more than 1 to 2 days," Ranney added.

Check has disclosed no relevant financial relationships. Ranney is the cofounder of GetUsPPE.org.

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Ingrid Hein is a health and technology reporter based in Hudson, Quebec, Canada.

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