

Health care worker use of N95 respirators vs medical masks did not differ for workplace-acquired influenza

Radonovich LJ Jr, Simberkoff MS, Bessesen MT, et al. **N95 respirators vs medical masks for preventing influenza among health care personnel: a randomized clinical trial.** JAMA. 2019;322:824-33.

Question: In high-exposure outpatient settings, how do N95 respirators and medical masks compare for preventing workplace-acquired influenza and other viral respiratory infections in health care workers (HCWs)?

Design: Cluster (outpatient clinic or setting) randomized controlled trial (Respiratory Protection Effectiveness Clinical Trial [ResPECT]). Clusters were rerandomized for each of 4 consecutive viral respiratory seasons over 4 years.

Blinding: Treatment allocation concealed; blinded (investigators, until study completion).*

Setting: 189 US adult and pediatric outpatient settings with a high prevalence of acute respiratory illness (e.g., primary care, urgent care, dental clinics, dialysis units, emergency departments, and transport services).

Participants: 2862 full-time HCWs \geq 18 years of age (mean age 43 y, 83% women) who were routinely within 6 feet (1.83 m) of patients. Key

exclusions: anatomical features that could interfere with respirator fit or medical conditions precluding safe participation.

Interventions: N95 respirators (189 clusters, 1993 HCWs, 2512 HCW seasons) or medical masks (191 clusters, 2058 HCWs, 2668 HCW seasons) to be worn by HCWs during the 12 weeks of the year with the highest expected incidence of viral respiratory illnesses and infections (season) over 4 consecutive viral respiratory seasons (48 wk). A new device was to be used when an HCW was within 6 feet of a patient with suspected or confirmed respiratory illness.

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*See Glossary.

Results: HCW use of N95 respirators vs medical masks in high-exposure outpatient settings (intention-to-treat analysis)

Outcomes	Event rates		Within a season†
	N95 respirators	Medical masks	Adjusted odds ratio (95% CI)
Laboratory-confirmed influenza‡	8.2%	7.2%	1.18 (0.95 to 1.45)§
	Event rates/1000 HCW-seasons		Adjusted incident rate ratio (CI)
Acute respiratory illness (with or without laboratory confirmation)	619	641	0.99 (0.92 to 1.06)
Laboratory-confirmed respiratory illness	148	156	0.96 (0.83 to 1.11)¶
Influenza-like illness**	51	62	0.86 (0.68 to 1.10)

HCW = health care worker; PCR = polymerase chain reaction; CI defined in Glossary. Primary outcome is indicated by boldface type.

†Season = 12 wk of the year with the highest expected incidence of viral respiratory illnesses and infections.

‡PCR detected influenza A or B virus in an upper respiratory specimen collected within 7 d of symptom onset; influenza detected in a randomly obtained swab from an asymptomatic participant; or influenza seroconversion (\geq 4-fold rise in hemagglutination inhibition antibody titers to influenza A or B virus between pre- and postseason serologic samples).

§10 024 HCW seasons were needed to detect a 25% relative reduction in laboratory-confirmed influenza in the N95 respiratory group (80% power, $\alpha = 0.05$).

||Self-reported acute respiratory illness with \geq 1 PCR-confirmed viral pathogen in an upper respiratory tract specimen collected within 7 d of reported symptoms and/or \geq 4-fold rise from pre- to postintervention serum antibody titers to influenza A or B virus.

¶15104 HCW seasons were needed to detect a 25% relative reduction in laboratory-confirmed respiratory illness in the N95 respiratory group (80% power, $\alpha = 0.05$).

**Temperature \geq 100° F (37.8° C) plus cough and/or a sore throat, with or without laboratory confirmation.

Bottom line: In high-exposure outpatient settings, HCW use of N95 respirators and medical masks did not differ for preventing workplace-acquired influenza or other viral respiratory infections.

Commentary: ResPECT showed that wearing particulate respirator (N95) masks provided no benefit to HCWs compared with standard medical ("surgical") masks for preventing acquisition of respiratory viral illnesses during peak influenza seasons. Although the trial lacked sufficient power to detect a 25% reduction in influenza cases with N95 respirators vs medical masks, the large sample plus the essential comparability of the results (actually showing a nonsignificant higher rate of influenza in the N95 group) makes it unlikely that we are missing a critical difference in effectiveness. Further, it is unlikely that other variables could have accounted for the lack of difference because the 2 groups were well matched for important risk factors.

Why didn't N95 masks work better? Probably because respiratory viruses are often transmitted by large droplets (1, 2), which should be adequately stopped by medical masks. Influenza vaccination rates were higher among HCWs using N95 masks than those using medical masks (79% vs 77%), yet 1% more of HCWs wearing N95 masks acquired laboratory-confirmed influenza. To me, this further supports a lack of superiority of N95 masks.

Although unlikely, it is possible that exposures outside of the medical setting could have overwhelmed any potential benefit of N95 masks vs medical masks.

Health care facilities should encourage influenza vaccination and masking unvaccinated employees during influenza season. However, the mask can be a medical mask and not the more uncomfortable and expensive N95 respirator. The real message is to stay home if you have a viral respiratory infection. If you are an HCW seeing patients with respiratory infections, practice the best infection prevention possible, including proper hand hygiene and use of personal protective equipment and a conventional medical mask to decrease exposure as indicated.

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