

Improper removal of personal protective equipment contaminates health care workers

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More than one-third of healthcare workers were contaminated with multi-drug resistant organisms (MDRO) after caring for patients colonized or infected with the bacteria, according to a study published today in *Infection Control and Hospital Epidemiology*, the journal of the Society for Healthcare Epidemiology of America. The study found that 39 percent of workers made errors in removing personal protective equipment (PPE), including gowns and gloves, increasing the incidence of contamination.

"Based on these findings, we should reevaluate strategies for removing [personal protective equipment](#), as well as how often [healthcare workers](#) are trained on these methods," said Koh Okamoto, MD, MS, a lead author of the study. "An intervention as simple as education about appropriate doffing of personal protective equipment may reduce [healthcare worker](#) contamination with multi-drug resistant organisms."

Researchers at Rush University Medical Center monitored 125 healthcare workers in four adult intensive care units who were caring for patients colonized or infected with a MDRO, including methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus* (VRE). Researchers took more than 6,000 samples from healthcare workers' hands, gloves, PPE, and other equipment, such as stethoscopes and mobile phones, taking cultures before and after patient interaction.

Additionally, trained observers monitored the technique each worker

used to put on and remove their PPE and tracked errors based on guidelines established by the Centers for Disease Control and Prevention. The CDC suggests two removal methods for PPE—a gloves-first strategy, and an approach that removes gown and gloves together. Researchers also tracked a third method of removing the gown first. A significant majority of the healthcare workers had received training on appropriate methods for putting on and removing PPE within the past five years.

After patient contact, 36 percent of healthcare workers were contaminated with a MDRO. Contamination of healthcare workers' PPE was more common in settings of higher patient and environmental contamination. After removing their PPE, 10.4 percent were contaminated on their hands, clothes, or equipment.

Healthcare workers who made multiple errors when removing their PPE were more likely to be contaminated after a patient encounter, however the rate of making errors depended on the PPE removal method, with 72 percent of workers who used a glove-first removal making multiple errors. Examples of errors included touching the inside of the gown or glove with a gloved hand, touching the outside of the gown or glove with bare hands, and not unfastening the gown at the neck.

Given the high rate of hand contamination of those who used the gloves-first strategy, the authors recommend further research and possible reconsideration of this technique, as well as research to examine the impact of improved education for putting on and taking off PPE. Additionally, the authors note several limitations to their work, including the influence of observers on healthcare workers' practices and the potential that not all contamination was detected.

More information: Koh Okamoto et al, Impact of doffing errors on healthcare worker self-contamination when caring for patients on

contact precautions, *Infection Control & Hospital Epidemiology* (2019).
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