

- [Society for Healthcare Epidemiology of America \(SHEA\) Spring 2015 Conference](#)

Skin, Clothes Contaminated After Protective Gear Removed

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ORLANDO, Florida — During the removal of personal protective equipment (PPE), the skin and clothing of healthcare workers can become contaminated, even when there are no lapses in the removal technique, according to new research.

However, after the implementation of an educational intervention, there was a dramatic reduction in the rate of contamination, researchers report.

The results suggest that simple educational interventions can significantly reduce the risk for contamination, they say.

"Knowing the correct way to don and doff PPE is extremely important because healthcare personnel can become contaminated with pathogens if they do this incorrectly," said Myreen Tomas, MD, from the Cleveland Veterans Affairs Medical Center.



Dr Myreen Tomas

"Such contamination can place them at risk, as seen by recent cases of healthcare personnel acquiring Ebola virus infection," Dr Tomas told *Medscape Medical News*.

"The risk for contamination can be particularly high during PPE removal, but there is limited information on the frequency and routes of personnel contamination during the doffing of PPE," she said here at the Society for Healthcare Epidemiology of America Spring 2015 Conference.



Dr Curtis Donskey

To shed light on these issues, Dr Tomas and her colleague, Curtis Donskey, MD, conducted a series of 435 simulations. Nurses, nurses aids, phlebotomists, radiology technicians, physical and occupational therapists, and other healthcare personnel who use PPE and interact with patients removed gowns and gloves that were "contaminated" with a fluorescent lotion.

The study was conducted at a community hospital, a county hospital, a tertiary care center, and the Cleveland VA Medical Center.

The researchers observed the healthcare workers removing their gloves and gowns to determine whether correct techniques were being used. They used black light to identify sites on skin and clothing contaminated with the fluorescent lotion.

"We were very surprised by what we found," Dr Tomas said.

Of the 435 PPE removal simulations, there were 200 instances (46%) of contamination. When the PPE removal technique was incorrect, contamination was more frequent.

"With contaminated glove simulations, 80% of providers were contaminated," Dr Tomas reported. "Even when we did not see any gross lapses in technique, about one-third were still contaminated."

The frequency of incorrect technique did not differ at the four centers ($P = .13$), nor did it differ or among the different healthcare providers ($P = .26$).

"The hands and neck were the most frequently contaminated sites," Dr Tomas reported.

A lot of small steps contributed to the contamination. Workers should ensure that wrists are completely covered by the gown and that there is no exposed skin, the gown should be removed by pulling it away from the body instead of over the head, the gown should be put on before the glove, and the gown and gloves should be the right size.

"If you pay attention to those little things, it will decrease your chances of becoming contaminated," Dr Tomas said.

However, she conceded, even a number of people who did all of these things got contaminated. "We are working on ways to decrease contamination because, although education works, improvement is needed," she explained.

Education and Practice

After an educational intervention to teach the correct way to don and doff protective equipment, there was a sustained reduction in skin and clothing contamination, from 73% to 5% ($P < .0001$).

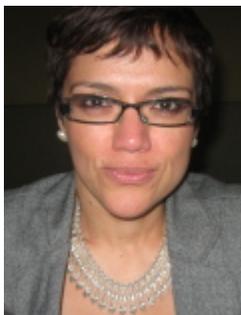
The use of fluorescent lotion is an excellent teaching aid, said Dr Donskey.

"Seeing is believing," he said. "There is nothing quite like seeing the contamination. We think it is essential for training, and not just for use in studies. It's not getting to zero, but we can dramatically improve contamination through education and practice."

The researchers say that healthcare providers do not get enough training in the safe use of protective equipment.

"They just learn this as they go along, so having validated training with validated steps would be helpful," Dr Tomas said.

Impressive Reduction



Dr Silvia Munoz-
Price

"These results are impressive," said Silvia Munoz-Price, MD, from Froedtert & the Medical College of Wisconsin in Milwaukee.

"To see such a major reduction in skin contamination just by the simple and relatively low-tech intervention of educating providers — going from 73% to 5% — is just a remarkable decrease," she told *Medscape Medical News*.

Dr Munoz-Price said she agrees that educating healthcare providers on the correct way to remove equipment is a good idea.

However, she cautioned, behaviors in a "real-life" setting are not easy to change.

In fact, some behaviors are not affected by education. "For example, even though we know that hand hygiene is important, we are not always compliant with it, despite the fact that we have been educated on how and when to wash our hands," she said.

"Still, I do think these results are impressive, but it is in a simulated environment," Dr Munoz-Price said. "How generalizable the data will be for our real-life situations needs to be explored."

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