Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

American Journal of Infection Control 49 (2021) 1443–1444

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Brief Report

Building a personal protective equipment monitor team as part of a comprehensive COVID-19 prevention strategy

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Key Words:
SARS-CoV-2
Infection prevention
PPE monitor
Donning
Doffing
Employee safety

A B S T R A C T

We instituted Personal Protective Equipment (PPE) Monitors as part of our care of COVID-19 patients in high-risk zones. PPE Monitors aided health care personnel (HCP) in donning and doffing, which contributed to nearly zero transmission of COVID-19 to HCP, despite their care of over 1400 COVID-19 patients.

INTRODUCTION

A novel coronavirus, Severe Acute Respiratory Virus-2 (SARS-CoV-2), was recognized in late 2019 as the cause of the multisystem disease COVID-19. By late May 2021, over 33 million cases of COVID-19 were reported in the United States, leading to 590,000 deaths, including deaths of 3,600 health care personnel (HCP).[1,2] The infection prevention strategies for protecting HCP from transmission of highly communicable pathogens have been described.[3] The use of personal protective equipment (PPE) is a critical intervention in preventing the spread of transmission-based infections, including SARS-CoV-2.[3] It has been reported that 40 percent of HCP make errors while doffing their PPE, causing them to self-contaminate skin and clothing.[4-8] Therefore, it is recommended that PPE monitors be used to promote their colleagues' safety by guiding them through the donning and doffing processes.[6,9,10] Early in 2020, the University of North Carolina Medical Center (UNC-MC) chose to incorporate PPE monitors as part of its comprehensive prevention strategy to reduce the risk of staff self-contamination with COVID-19. This paper describes the implementation and use of PPE monitors to observe staff donning and doffing PPE in areas treating known or suspected COVID-19 patients. In addition, it describes the results of a survey of HCP regarding their view of the importance of PPE monitors.

METHODS AND APPROACH

This assessment was conducted at a 950 bed academic medical center. A multidisciplinary group including Infection Prevention (IP) and Nursing developed a PPE Monitor Team. Nursing employed staff from clinics and inpatient areas that closed temporarily because of the pandemic. PPE Monitor training was developed and taught by IP Nurses. The 2 hour training initially took place using video conferencing and then transitioned to on demand, web-based training modules. Education included fundamentals of disease transmission, hand hygiene, COVID-19 policies and signage, proper donning and doffing, and coaching tips. Completion of all modules was required. Education was developed from Centers for Disease Control and Prevention (CDC) guidelines. Experienced PPE monitors precepted trainee monitors during their first 12 hour shift as part of unit based training. Trainee monitors had a competency sheet that included items such

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Conflicts of interest: None to report.

https://doi.org/10.1016/j.ajic.2021.08.009

as unit layout, communication, expectations, and IP resources that was signed off by a supervisor.

Three units were designated COVID-19 high-risk containment zones with dedicated PPE monitors, while other areas were assigned monitors (if available) when there was a COVID positive and/or rule-out patient being treated at the location. Two to 3 PPE monitors typically worked in the high-risk zones, whereas 1 monitor was assigned to locations with a single patient. Approximately ten PPE monitors worked on each shift across the facility. PPE monitoring included N-95 respirators or positive air pressure respirators, face shields, gowns (single use or reused after laundering), gloves, and alcohol hand antiseptic. Staff were observed and coached as needed by the monitors to prevent self-contamination.

In the fall of 2020, a house wide survey was sent to all inpatient staff to assess their perceptions of the Medical Center's efforts to protect them from acquiring COVID-19. It included a question asking how much staff agreed or disagreed that PPE Monitors "play an important role in keeping our staff who care for COVID patients safe."

HCP COVID-19 infection data were obtained through contact tracing and a search of the Employee Health database maintained by Infection Prevention and Occupational Health. The UNC Institutional Review Board approved the study.

RESULTS AND DISCUSSION

UNC-MC Nursing House Supervisors took over management and deployment of the PPE Monitor team from IP after 3 weeks, in early April of 2020, while IP continued to train new monitors. Eighty three people participated in video conferencing training, and an additional 920 people took on-demand, web-based training as PPE monitors. Eventually, as closed areas reopened, PPE Monitors returned to their previous positions. Units with COVID patients used the training to educate their own staff to perform the role of PPE Monitor which accounts for the high number of staff trained. To limit reliance on unit staff as monitors and provide sustainability, UNC-MC created 10 per diem PPE Monitor positions in January 2021.

From April 1, 2020, through February 15, 2021, UNC-MC admitted 1,427 COVID-19 positive patients within the high-risk containment zones. Review of COVID-19 exposures revealed that during this period, there were only 2 possible health care associated COVID-19 transmissions on the containment units. These transmissions were determined "possible" as there were no identified PPE breaches or community sources for exposure. Outside of the containment zones, COVID infection rates mirrored that of the community.

Overall, 626 HCP answered the question on the house wide survey regarding their view of PPE monitors. Among respondents, 68 percent agreed or strongly agreed that "PPE monitors played an important role in keeping staff safe by preventing self-contamination during donning and doffing" (Fig 1). Importantly, only 13 percent disagreed. Based on respondents' survey comments, many who did not agree that PPE monitors played an important role in keeping staff safe worked in areas where monitors were not always available.

Among HCP job classes, providers (MDs/NPs/PAs) were less likely to see the value of the PPE monitors (61.1%) than nurses (66.8%), allied health (67.6%), and support staff (68.3%.) This is likely due to providers having more confidence donning and doffing for sterile procedures and surgeries.

HCPs who solely worked in the COVID containment zones were less likely to agree that the monitors kept staff safe (54.8%) than staff who worked solely in units with occasional COVID patients (66.6%). HCPs who reported working in both areas saw the most value in PPE monitors (77.8%). Since the survey occurred 6 months into the program, we speculate HCPs in the high-risk zones with dedicated monitors saw less value in the program over time, but HCPs floating between areas with and without monitors saw more value in units having dedicated monitors.

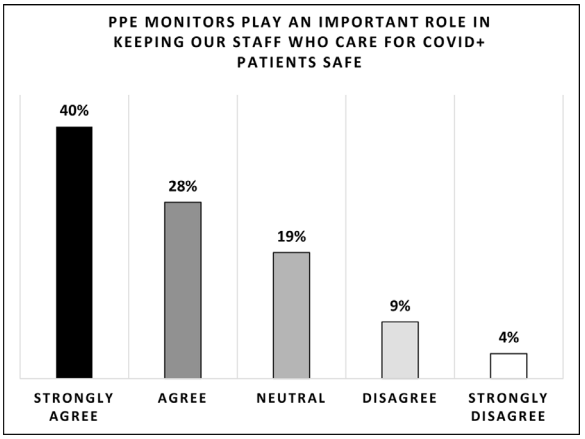

Fig 1. Percentage of health care personnel who agree or disagree in a hospital wide survey that personal protective equipment monitors play an important role in keeping staff safe.

CONCLUSION

Use of appropriate PPE is essential for protecting HCP who provide care for patients with known COVID-19. PPE monitors are recommended as a method to ensure that HCP properly don and doff PPE.[6,9,10] Our assessment demonstrates that PPE Monitors are an important part of a comprehensive COVID-19 prevention strategy.

ACKNOWLEDGMENTS

We wish to thank the UNC-MC Nursing House Supervisor team, the staff caring for COVID-19 patients, and all of the staff who have served as PPE Monitors and kept our colleagues safe.

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