Infection Control & Hospital Epidemiology (2022), 1–2
doi:10.1017/ice.2022.63

Letter to the Editor

Response to "Severe acute respiratory coronavirus virus 2 (SARS-CoV-2) surface contamination in staff common areas and impact on healthcare worker infection: Prospective surveillance during the coronavirus disease 2019 (COVID-19) pandemic"

David J. Weber MD, MPH[1,2], Emily E. Sickbert-Bennett PhD, MS[1,2], Bobby G. Warren MPS[3] and Deverick J. Anderson MD, MPH[3]

[1]Division of Infectious Diseases, School of Medicine, University of North Carolina, Chapel Hill, North Carolina, [2]Department of Infection Prevention, UNC Medical Center, Chapel Hill, North Carolina and [3]Division of Infectious Disease, School of Medicine, Duke University, Durham, North Carolina

To the Editor—We read with great interest the recent paper by Zhang et al,[1] which demonstrated severe acute respiratory coronavirus virus 2 (SARS-CoV-2) RNA contamination in staff common areas in an acute-care hospital. Many investigators have assessed the frequency and level of environmental contamination (ie, surfaces and air) in rooms housing patients with coronavirus disease 2019 (COVID-19).[2,3] However, to our knowledge, this is one of few studies to evaluate SARS-CoV-2 contamination outside patient rooms in units or hospitals providing care for patients with COVID-19. Given the finding of SARS-CoV-2 RNA in common areas of the hospital, this paper is likely to generate substantial concern among healthcare personnel (HCP). Therefore, we would like to provide some comments and context for this important finding regarding the likelihood that viable SARS-CoV-2 is present in common areas in an amount sufficient to pose a risk to HCP.

First, the recovery of SARS-CoV-2 RNA in areas remote from patient care locations is not surprising based on earlier reports that have assessed the potential spread of microbes using surrogate molecular markers. Jiang et al[4] pioneered the use of cauliflower DNA to map the potential spread of microbes by placing toy balls contaminated with cauliflower DNA for 1 hour in a daycare center room. They demonstrated rapid contamination of multiple surfaces and objects in the room, some spread to other rooms, and importantly, spread to the homes of some children. Oelbert et al[5] placed cauliflower DNA on a single telephone in a pod in a pediatric intensive care unit and demonstrated rapid spread to 58% of surfaces sampled in the pod, to 18% of surfaces sampled in 5 other pods, and to 30%–80% of surfaces sampled in the nursing station, physician charting area, and the changing room.[5]

Second, as noted by Zhang et al, SARS-CoV-2 can survive on environmental surfaces for hours to days. However, SARS-CoV-2 is an enveloped virus and environmental survival is limited. In laboratory studies, viable SARS-CoV-2 persisted for a median of 2 days (range, 30 minutes to 7 days) on surfaces, depending on the type of surface.[6] Survival is enhanced at lower temperatures and humidity.

Third, as noted by Zhang et al, the finding of SARS-CoV-2 RNA does not necessarily equate to the presence of viable virus. The review by Kanamori et al[2] reported 4 studies in hospitals in which environmental contamination was simultaneously assessed by SARS-CoV-2 and viral culture. Among these studies, 3 reported detection of SARS-CoV-2 RNA on surfaces (ie, 7.7%–75% of surfaces sampled), but no study detected viable virus by culture.[2] Gonçalves et al[3] reviewed 37 studies that assessed surfaces for SARS-CoV-2 contamination. Viral viability was assessed in multiple studies but was not confirmed in any study (methods: swab, 6 studies; gauze pads, 1 study; and RT-qPCR 6 studies). Viable virus has rarely been identified on environmental surfaces in the rooms of patients with COVID-19.[7] In addition, Zhang et al determined the presence of SARS-CoV-2 RNA by detecting the N1 region of SARS-CoV-2 RNA; however, using a detection method that ascertained both the N1 and N2 regions, which is commonly done in environmental sampling, may have added specificity to their study and may have decreased the amount of possible viable SARS-CoV-2 detected.

Fourth, multiple studies that have assessed the risk of HCP working in COVID-19 units have demonstrated that providing care to patients with COVID-19 does not necessarily place HCP at risk (ie, current recommendations for use of personal protective equipment prevent acquisition of SARS-CoV-2).[8–10] Summerlin-Long et al[8] reported that among HCP who worked in units that provided care to 1,427 patients with COVID-19, only 2 possible healthcare-associated COVID-19 acquisitions were detected. Kayı et al[9] performed a systematic review and meta-analysis of the risk factors for seropositivity in HCP before the era of vaccination and reported that working as a frontline HCP was inconsistent in its association with higher seroprevalence. Jacob et al[10] assessed the risk for SARS-CoV-2 seropositivity among US HCP in 4 large healthcare systems in 3 states. In this cross-sectional study, community exposures were associated with seropositivity to SARS-CoV-2, but workplace factors, including workplace role, environment, or contact with patients with known COVID-19, were not.[10]

Author for correspondence: David J. Weber, MD, MPH, E-mail: David.Weber@unchealth.unc.edu

Cite this article: Weber DJ, *et al.* (2022). Response to "Severe acute respiratory coronavirus virus 2 (SARS-CoV-2) surface contamination in staff common areas and impact on healthcare worker infection: Prospective surveillance during the coronavirus disease 2019 (COVID-19) pandemic". *Infection Control & Hospital Epidemiology*, https://doi.org/10.1017/ice.2022.63

In conclusion, this study may raise concerns that HCP may be exposed to SARS-CoV-2 in common areas of hospitals. Clearly, the next step is to repeat this study assessing both SARS-CoV-2 RNA and viable virus. However, even if viable virus is found, it would not necessarily equate to a high likelihood of acquisition of COVID-19 because an infectious dose of virus would still need to be transferred from the environmental surface to a body site capable of leading to infection (ie, mouth or eyes). If future studies demonstrate frequent and/or high contamination of viable virus on surfaces in common rooms or clinical studies suggest that HCP are acquiring infection in common rooms not attributable to provider-to-provider transmission, then we will need to revise our infection prevention mitigation strategies to protect HCP.

Acknowledgments.

Financial support. No financial support was provided relevant to this article.

Conflicts of interest. All authors report no conflicts of interest relevant to this article.

References

1. Zhang HL, Kelly BJ, David MZ, *et al.* Severe acute respiratory coronavirus virus 2 (SARS-CoV-2) surface contamination in staff common areas and impact on healthcare worker infection: prospective surveillance during the coronavirus disease 2019 (COVID-19) pandemic. *Infect Control Hosp Epidemiol* 2021. doi: 10.1017/ice.2021.468.
2. Kanamori H, Weber DJ, Rutala WA. Role of the healthcare surface environment in severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission and potential control measures. *Clin Infect Dis* 2021;72: 2052–2061.
3. Gonçalves J, da Silva PG, Reis L, *et al.* Surface contamination with SARS-CoV-2: a systematic review. *Sci Total Environ* 2021;798:149231.
4. Jiang X, Dai X, Goldblatt S, *et al.* Pathogen transmission in childcare settings studied by using a cauliflower virus DNA as a surrogate marker. *J Infect Dis* 1998;177:881–888.
5. Oelberg DG, Joyner SE, Jiang X, Laborde D, Islam MP, Pickering LK. Detection of pathogen transmission in neonatal nurseries using DNA markers as surrogate indicators. *Pediatrics* 2000;105:311–315.
6. Aboubakr HA, Sharafeldin TA, Goyal SM. Stability of SARS-CoV-2 and other coronaviruses in the environment and on common touch surfaces and the influence of climatic conditions: a review. *Transbound Emerg Dis* 2021;68:296–312.
7. Ahn JY, An S, Sohn Y, *et al.* Environmental contamination in the isolation rooms of COVID-19 patients with severe pneumonia requiring mechanical ventilation or high-flow oxygen therapy. *J Hosp Infect* 2020;106:570–576.
8. Summerlin-Long S, Selimos A, Brewer B, *et al.* Building a personal protective equipment monitor team as part of a comprehensive COVID-19 prevention strategy. *Am J Infect Control* 2021;49:1443–1444.
9. Kayı İ, Madran B, Keske Ş, *et al.* The seroprevalence of SARS-CoV-2 antibodies among healthcare workers before the era of vaccination: a systematic review and meta-analysis. *Clin Microbiol Infect* 2021;27:1242–1244.
10. Jacob JT, Baker JM, Fridkin SK, *et al.* Risk factors associated with SARS-CoV-2 seropositivity among US healthcare personnel. *JAMA Netw Open* 2021;4:e211283.