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, MPH1,2, Emily E. Sickbert-Bennett, PhD, MS1,2, Bobby G. Warren, MPS3, Deverick Anderson, MD, MPH3

1Division of Infectious Diseases, School of Medicine, University of North Carolina, Chapel Hill, NC, 27599
2Department of Infection Prevention, UNC Medical Center, Chapel Hill, NC, 27514
3Division of Infectious Disease, School of Medicine, Duke University, Durham, NC, 27710

Corresponding Author: David J. Weber, MD, MPH, Division of Infectious Diseases, Bioinformatics Building, Suite 2163, Campus Box 7030, 130 Mason Farm, Chapel Hill, NC, 27599-7030

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Dear Editor:

We read with great interest the recent paper by Zhang and colleagues that demonstrated SARS-CoV-2 RNA contamination in staff common areas in an acute-care hospital.¹ Many investigators have assessed the frequency and level of environmental contamination (i.e., surfaces, air) in rooms housing patients with COVID-19.²³ However, to our knowledge this is one of few papers to evaluate SARS-CoV-2 contamination outside of 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 in a sufficient amount is present in common areas to lead to a risk for COVID-19 by 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. pioneered the use 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.⁴ They demonstrated rapid contamination of multiple surfaces/objects in the room, some spread to other rooms, and importantly spread to the homes of some children. Oelbert et al. 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, 18% of surfaces sampled in 5 other pods, and 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, it is important to note that 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 the type of surface⁶. 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. reported four studies in hospitals in which environmental contamination was simultaneously assessed by SARS-CoV-2 and viral culture; three studies reported detection of SARS-CoV-2 RNA on surfaces (7.7%-75%) but no study detected viable virus by culture.² Goncalves et al. reviewed 37 studies that assessed
surfaces for SARS-CoV-2 contamination; viral viability was assessed in multiple studies by was not confirmed in any (methods: swab, 6; gauze pads, 1; RT-qPCR 6). Viable virus has rarely been identified on environmental surfaces in the rooms of patients with COVID-19. 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 as is commonly done in environmental sampling may have added specificity to their study and 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 (i.e., current recommendations for use of personal protective equipment prevent acquisition of SARS-CoV-2). Summerlin-Long et al. reported that among HCP who worked in units that provided care to 1,427 patients with COVID-19, there were only two possible healthcare associated COVID-19 acquisitions. Kayl et al. 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. assessed the risk for SARS-CoV-2 seropositivity among US HCP in 4 large healthcare systems in 3 states. In this cross-sectional study of US HCP in 3 states, 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.

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 as an infectious dose of virus would still need to be transferred from the environmental surface to a body site capable of leading to infection (i.e., 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.
References:


