

effective interventions may be transferable to ICPP clinicians or clinicians within the hospital using low-value interventions relevant to ICPPs.

It is time to identify and reduce low-value interventions so we can focus on the most effective interventions and advance the science behind infection prevention. Identifying and prioritizing low-value infection prevention interventions is necessary to create a strategic approach to reducing waste of both resources and the efforts of healthcare providers. De-implementation within implementation science can provide a rigorous pathway to identifying and eliminating ineffective, high-resource practices.

**Acknowledgments.** The authors thank Dr. Elvin Geng for his thoughts and commentary that helped motivate the development of this letter.



**Financial support.** This work was supported by the Brown School and the Center for Dissemination and Implementation in the Institute for Public Health at Washington University in St. Louis. This work was also supported by the National Institute of Allergy and Infectious Diseases, National Institutes of Health (grant no. 1K23AI137321 to J. H. K.).

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

## References

- García R, Barnes S, Boukidjian R, *et al.* Recommendations for change in infection prevention programs and practice. *Am J Infect Control* 2022;50:1281–1295.
- McKay VR, Morshed AB, Brownson RC, Proctor EK, Prusaczyk B. Letting go: Conceptualizing intervention de-implementation in public health and social service settings. *Am J Community Psychol* 2018;62:189–202.
- Sreeramou P. Recent advances in understanding the epidemiology of healthcare-associated infections. *F1000Res* 2019;8.
- Schoberer D, Osmancevic S, Reiter L, Thonhofer N, Hoedl M. Rapid review and meta-analysis of the effectiveness of personal protective equipment for healthcare workers during the COVID-19 pandemic. *Public Health Pract (Oxf)* 2022;4:100280.
- Klompas M, Ye S, Vaidya V, *et al.* Association Between airborne infection isolation room utilization rates and healthcare worker severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections in 2 academic hospitals. *Clin Infect Dis* 2022;74:2230–2233.
- Larrosa MN, Almirante B. Isolation strategy for controlling the spread of multidrug-resistant organisms: Is this still an essential option in hospitals? *Enferm Infect Microbiol Clin (Engl Ed)* 2021;39:425–428.
- American Board of Internal Medicine (ABIM) Foundation. Choosing Wisely: promoting conversations between patients and clinicians. Choosing Wisely website. <https://www.choosingwisely.org/>. Published 2022. Accessed November 28, 2022.
- Norton WE, Chambers DA. Unpacking the complexities of de-implementation in inappropriate health interventions. *Implement Sci* 2020;15:1–7.
- Okoli C, Pawlowski SD. The Delphi method as a research tool: an example, design considerations and applications. *Inf Manag* 2004;42:15–29.
- Augustsson H, Ingvarsson S, Nilsen P, *et al.* Determinants for the use and de-implementation of low-value care in health care: a scoping review. *Implement Sci Commun* 2021;2:1–17.
- Colla CH, Mainor AJ, Hargreaves C, Sequist T, Morden N. Interventions aimed at reducing use of low-value health services: a systematic review. *Med Care Res Rev* 2017;74:507–550.

# Reconsidering the routine use of contact precautions in preventing the transmission of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) in healthcare settings

Guillermo Rodriguez-Nava MD<sup>1</sup> , Daniel J. Diekema MD, MS<sup>2</sup> and Jorge L. Salinas MD<sup>1</sup> 

<sup>1</sup>Division of Infectious Diseases & Geographic Medicine, Stanford University School of Medicine, Stanford, California and <sup>2</sup>Department of Medicine, Maine Medical Center, Portland, Maine

*To the Editor*—The predominant mode of transmission of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) has been the subject of debate since the start of the coronavirus disease 2019 (COVID-19) pandemic. Initially, droplets and contaminated fomites were believed to be the primary modes of transmission. However, a growing body of evidence indicates that the dominant mode of transmission of SARS-CoV-2 is likely to be the respiratory route. Despite this, infection prevention and control recommendations for healthcare workers have not been fully adapted to the new knowledge of SARS-CoV-2 transmission. We believe that, while

maintaining respiratory protection, the routine use of contact precautions should be replaced by standard precautions in healthcare settings: using barrier protection in situations when exposure to larger droplets and splashes is likely.

## Risk and transmission of SARS-CoV-2

Healthcare workers are at increased risk of acquiring and transmitting SARS-CoV-2. Contact precautions are implemented to safeguard patients and healthcare workers from the transmission of microorganisms through direct or indirect contact with skin, clothing, environment, blood, or other body fluids. In the context of respiratory viruses, protective clothing is intended to minimize the spread of droplets or bodily fluids to the skin and clothing of healthcare workers, thereby reducing the risk of secondary transmission to hands and subsequently to mucous membranes.

**Corresponding author:** Guillermo Rodriguez-Nava, Lane Building, 300 Pasteur Drive, Lane Building, Stanford, CA 94305-5107. Email: [guiro@stanford.edu](mailto:guiro@stanford.edu)

**Cite this article:** Rodriguez-Nava G, Diekema DJ, and Salinas JL. (2023). Reconsidering the routine use of contact precautions in preventing the transmission of severe acute respiratory coronavirus virus 2 (SARS-CoV-2) in healthcare settings. *Infection Control & Hospital Epidemiology*, 44: 1035–1037, <https://doi.org/10.1017/ice.2023.91>

At the onset of the COVID-19 pandemic, it was assumed that droplets and fomites were the primary transmission routes due to SARS-CoV-2 lower basic reproduction number, estimated at 2–3.<sup>1</sup> This assumption was based on a longstanding belief that all airborne diseases have high basic reproduction numbers and, therefore, are highly contagious.<sup>2</sup> Experimental models, including airflow simulations, suggest that respiratory transmission is the primary mode of SARS-CoV-2 spread. Although surface transmission is possible, epidemiological data and environmental studies suggest that it poses a low risk and is not the predominant mode of transmission. Quantitative microbial risk assessments show that the likelihood of contracting SARS-CoV-2 via fomites and secondary transmission is <1 in 10,000.<sup>3</sup>

Furthermore, the study of real-life indoor superspreading events provides more evidence that implicates aerosols as the most likely mode of transmission over fomites.<sup>2</sup> It is highly improbable that most people at these events would touch the same contaminated surface or be exposed to droplets produced by an infected individual at close range with a sufficient viral load to result in secondary transmission. However, the shared air in a poorly ventilated indoor setting is the common factor among all people in superspreader events.<sup>2</sup> In healthcare facilities, the use of administrative (eg, vaccination requirements, hand hygiene monitoring) and engineering controls (enhanced ventilation) are generally considered more effective than reliance on personal protective equipment.<sup>4</sup>

### What does the evidence say?

To our knowledge, no randomized trials have tested the effectiveness of contact precautions to prevent the nosocomial transmission of SARS-CoV-2. Observational studies have found a weak association between contact precautions for the care of patients with COVID-19 with lower risk of contracting the disease.<sup>5</sup>

Several investigations have studied the contamination and stability of SARS-CoV-2 on environmental surfaces. Under ideal experimental conditions, SARS-CoV-2 has been shown to remain viable for up to 28 days after surface inoculation.<sup>6</sup> In clinical settings, SARS-CoV-2 RNA has been recovered from patients' rooms up to 28 days after admission. However, not all environmental samples resulted in viable virus, with 0 to 33% of samples producing detectable cytopathic changes, mainly within the first week of illness onset.<sup>6–9</sup> In one study, contamination of personal protective equipment (PPE), such as isolation gowns, was rare during the management of COVID-19 patients, especially if the contact with the patient was brief ( $\leq 30$  minutes).<sup>10</sup>

### Potential adverse effects of contact precautions for COVID-19

The mental health of healthcare professionals was affected soon after the COVID-19 pandemic began. The constant use of PPE and the repeated donning and doffing procedures can lead to what is known as “PPE fatigue.”<sup>11</sup> This condition results in physical exhaustion and mental stress, making it difficult for healthcare workers to cope with the increased workload and long working hours. As a result, the use of contact precautions may have a negative impact on the mental health of healthcare workers, potentially contributing to burnout, anxiety, and depression, as well

as exacerbating claustrophobia, which has been reported with respirators but can be worsened with greater levels of personal protection, especially when the user is fully enclosed in the PPE.<sup>12</sup>

The use of isolation gowns can also cause physical side effects. Prolonged use of these gowns can lead to skin irritation, itching, and moisture-associated skin damage. Overheating and dehydration are also common side effects of wearing isolation gowns for extended periods of time, which can further exacerbate the physical and mental strain on healthcare workers.<sup>13</sup>

Additionally, the increased use of polypropylene PPE has led to significant environmental impacts, such as increased global waste and pollution. Medical waste has increased by 350%–500% in many countries, with >4 million metric tons of polypropylene PPE waste leaked into the environment since the pandemic began.<sup>14</sup> The long persistence of polypropylene in the environment for up to 450 years poses a risk to wildlife and contributes to environmental pollution.<sup>15</sup> The incineration of PPE waste in developing nations releases harmful gases, heavy metals, and polychlorinated biphenyls, further worsening ecological repercussions.<sup>14,15</sup>

### Revision and deimplementation of infection prevention strategies

When a novel respiratory virus emerges, it is important to take a comprehensive and holistic approach to understanding all possible modes of transmission, including airborne, droplet, and fomite. By acknowledging all potential routes of transmission, appropriate measures can be implemented to effectively mitigate the risk of spread and prevent transmission. As additional information emerges, it is crucial to reassess the efficacy of the measures that have been implemented. Measures that are not effective should be deimplemented, such as the use of contact precautions in preventing the transmission of SARS-CoV-2. This will allow healthcare workers to focus on measures that are more effective in preventing transmission and reduce the burden of unnecessary PPE use. Efforts then should be directed toward mitigating the dominant route of transmission, which in the case of SARS-CoV-2, is predominantly respiratory.

### Acknowledgments.

**Financial support.** This work was partially supported by the National Institutes of Health (NIH grant no. R25 AI 147369).


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

### References

1. Li Q, Guan X, Wu P, *et al*. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med* 2020;382:1199–1207.
2. Wang CC, Prather KA, Sznitman J, *et al*. Airborne transmission of respiratory viruses. *Science* 2021;373:eabd9149.
3. Science brief: SARS-CoV-2 and surface (fomite) transmission for indoor community environments. Centers for Disease Control and Prevention website. <https://www.cdc.gov/coronavirus/2019-ncov/more/science-and-research/surface-transmission.html>. Published 2021. Accessed March 3, 2023.
4. National Institute for Occupational Safety and Health (NIOSH). Hierarchy of controls. Centers for Disease Control and Prevention website. <https://>

- [www.cdc.gov/niosh/topics/hierarchy/default.html](http://www.cdc.gov/niosh/topics/hierarchy/default.html). Accessed March 30, 2023.
5. Belan M, Charmet T, Schaeffer L, et al. SARS-CoV-2 exposures of healthcare workers from primary care, long-term care facilities and hospitals: a nationwide matched case-control study. *Clin Microbiol Infect* 2022;28:1471–1476.
  6. Geng Y, Wang Y. Stability and transmissibility of SARS-CoV-2 in the environment. *J Med Virol* 2023;95:e28103.
  7. Coil DA, Albertson T, Banerjee S, et al. SARS-CoV-2 detection and genomic sequencing from hospital surface samples collected at UC Davis. *PLoS One* 2021;16:e0253578.
  8. Ben-Shmuel A, Brosh-Nissimov T, Glinert I, Bar-David E, et al. Detection and infectivity potential of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) environmental contamination in isolation units and quarantine facilities. *Clin Microbiol Infect* 2020;26:1658–1662.
  9. Lin YC, Malott RJ, Ward L, et al. Detection and quantification of infectious severe acute respiratory coronavirus-2 in diverse clinical and environmental samples. *Sci Rep* 2022;12:5418.
  10. Jung J, Song KH, Jeong H, Ham SY, Kim ES, Kim HB. Are coveralls required as personal protective equipment during the management of COVID-19 patients? *Antimicrob Resist Infect Control* 2021;10:164.
  11. Jin H, Liu L, Li Y, Chen C, Fu Q. Influence of different protection levels of PPE on nurses' physical fatigue during the COVID-19 pandemic. *Work* 2022;72:1143–1152.
  12. Levitin H. Personal protective equipment. In: Koenig K, Schultz C, editors. *Koenig and Schultz's Disaster Medicine: Comprehensive Principles and Practices*. Cambridge, UK: Cambridge University Press; 2016:219–231.
  13. LeBlanc K, Woo K, Wiesenfeld L, et al. Impact of prolonged PPE use on Canadian health professionals. *Br J Nurs* 2022;31:S30–S36.
  14. Ngoc SMV, Nguyen MA, Nguyen TL. COVID-19 and environmental health: a systematic analysis for the global burden of biomedical waste by this epidemic. *Case Stud Chem Environ Engin* 2022;6:100245.
  15. Nghiem LD, Iqbal HMN, Zdarta J. The shadow pandemic of single use personal protective equipment plastic waste: a blue print for suppression and eradication. *Case Stud Chem Environ Engin* 2021;4:100125.

## Caution on mandatory public reporting

David Birnbaum PhD, MPH 

Applied Epidemiology, Sidney, British Columbia, Canada

*To the Editor*—Gonzalo Bearman's otherwise excellent commentary suggests that mandatory public reporting of risk-adjusted patient infections offers important value, citing 2 references.<sup>1</sup> Having run one state's mandatory program as a research opportunity, I feel compelled to raise a yellow card on that score. Mandatory public HAI reporting to accelerate safety improvement is a noble experiment, but it remains of unproven value and cost-effectiveness. One of Bearman's 2 references, a systematic review with meta-analysis,<sup>2</sup> derives its statistical significance from cardiac surgery mortality reporting but includes only 1 study regarding HAI, a study that finds no impact of public reporting on hospital infection rates. His other reference<sup>3</sup> finds that hospitals in states newly enacting HAI reporting mandates soon demonstrated greater reduction in CLABSI rates but later no greater reduction than what was seen in states without mandates. Given the cliché that “data unites, theories divide,” there are 3 possible interpretations. First, legislative mandate could motivate change. For example, Marsteller et al<sup>3</sup> notes that at baseline hospitals in states with new or impending legislation started with higher CLABSI rates than hospitals in states without a mandate and were more likely to then adopt well-known prevention strategies. Second, legislative mandates do not impact performance. Several studies fail to find statistically significant association, so a single positive signal could be the result of random chance variation or bias. Third, some could appear to be doing better than others simply due to widely ranging

rates of underreporting. Standardized methods that are practical, sustainable, and internationally credible for ongoing assurance of reliable quality exist that can be used for annual validation to confirm hospitals meet predefined sensitivity and specificity requirements in their data reporting, but the vast majority of American state HAI programs have performed no credible ongoing validation.<sup>4</sup>

Together with colleagues across the 10 academic domains needed to address a sequence of research questions leading to understand what works, for whom, in what settings (Fig. 1), we used one state's mandatory HAI program to seek answers.<sup>5</sup> Essentially, all participating hospitals continued to exceed our annual validation requirements for high-quality reporting, and all maintained low HAI rates, which were not affected by adding reporting requirements. Risk-stratified rates were more meaningful and accurate indicators of performance than risk-adjusted ratios.<sup>4,6</sup> And as others have reported about public reporting websites, the general public showed little evidence of using such websites to actually influence their care decisions.<sup>7</sup> Today, as before, “More research is needed to better understand what health care consumers need on the WWW to support their decision making involving HAIs.”<sup>8</sup>

### Acknowledgments.

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

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

**Corresponding author:** David Birnbaum, PhD, MPH, Applied Epidemiology, 609 Cromar Road, North Saanich, BC V8L 5M5, Canada. Email: [David.birnbaum@ubc.ca](mailto:David.birnbaum@ubc.ca)

**Cite this article:** Birnbaum D. (2023). Caution on mandatory public reporting. *Infection Control & Hospital Epidemiology*, 44: 1037–1038, <https://doi.org/10.1017/ice.2023.90>