

COMMENTARY

Healthcare Workers' Hands and *Clostridium difficile* Spores: Making Progress?

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(See the article by Landelle et al, on pages 10–15.)

A decade into the new *Clostridium difficile* epidemic, the excessive morbidity, mortality, and healthcare costs associated with *C. difficile* infection (CDI) are now well recognized.^{1,2} The updated 2010 Society for Healthcare Epidemiology of America (SHEA) and Infectious Diseases Society of America (IDSA) guidelines for CDI prevention and treatment³ are incorporated into clinical practice, and multifaceted infection control bundles aimed at CDI prevention are adopted in most healthcare settings. Diagnosis using the more sensitive nucleic acid–based modalities is increasingly becoming the new standard. Reporting laboratory-identified CDI to the National Healthcare Safety Network is mandatory for all hospitals receiving payments from the Centers for Medicare and Medicaid Services, and comparisons between hospitals' CDI rates will soon become publicly available. Similar approaches to preventing healthcare-acquired infections—such as central line–associated bloodstream infections, for example—met with considerable success, with sustained zero rates in many intensive care units across the United States.⁴ Unfortunately, this has not been the case with CDI. The number of patients hospitalized with a primary CDI diagnosis in the United States more than tripled during the period 2000–2009.⁵ The steady increase in CDI diagnoses over the last decade across acute care settings appears to have stabilized only recently.⁵

The study by Landelle et al⁶ in this issue offers a vivid insight into why *C. difficile* might be so stubbornly persistent in our hospitals. The authors set out to quantify healthcare worker (HCW) hand contamination with *C. difficile* spores during patient care in a French university-affiliated hospital not affected by the hypervirulent NAP1/BI strain. They sampled HCWs' hands after glove removal at the end of patient care but before performance of hand hygiene and recovered the spores by treatment with 95% ethanol and filtration. Almost a quarter (24%) of HCWs caring for patients with CDI had hand contamination with spores. As expected, the risk

of spore contamination was higher when there was contact with infected body fluids through direct contact with patients, their medical equipment, or their adjacent environment (high-risk contact) or when there was a failure to use gloves. Interestingly, 44% of the HCWs with contaminated hands provided at least 1 episode of direct patient care without use of gloves, despite the fact that they were fully aware that they were being observed for study purposes. The amount of hand contamination in a hospital where the hypersporulating NAP1/BI strain is endemic and the degree of noncompliance with contact precautions in unmonitored healthcare settings remain open to speculation.

The study by Landelle and colleagues is timely and reinforces basic infection control principles that have become generally accepted: (1) HCWs' hands become contaminated with *C. difficile* spores during patient care; (2) glove use, while effective in reducing the incidence of CDI in the hospital setting,⁷ does not fully protect against contamination and remains largely underutilized by the exact HCWs who are most exposed during patient care; (3) *C. difficile* spores are exceptionally resistant to disinfectants such as alcohol; and (4) contaminated HCWs' hands likely provide an effective vehicle for in-hospital transmission of *C. difficile* spores. Cognizant of these principles, therefore, HCWs involved in direct care of patients with CDI would presumably seek to remove *C. difficile* spores from their contaminated hands immediately upon glove removal at the completion of each patient care task.

Ironically, 166 years after Semmelweis signaled the importance of antisepsis in medical practice, the appropriate type of hand hygiene in the CDI setting is still a matter of debate. Landelle and colleagues favor the Centers for Disease Control and Prevention's recommendation of hand hygiene with soap and water for all instances of CDI care. Additional support for this recommendation comes from previous stud-

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ies showing that washing with soap and water is superior to alcohol-based hand rub in removing *C. difficile* spores from volunteers' hands.^{8,9} Of course, compliance with effective hand washing (ie, 15 seconds of vigorous hand rubbing with soap and water before rinsing, as done during study conditions⁹) for hospitals with busy HCWs and problematic sink access is likely to remain suboptimal. In contrast, alcohol-based hand rub products are readily available and effectively germicidal for nosocomial pathogens such as methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant enterococci. Therefore, the SHEA and IDSA guidelines for CDI prevention recommend the use of hand washing with soap and water only in the setting of *C. difficile* outbreaks.³ Furthermore, studies documenting a rise in CDI incidence after the widespread use of alcohol-based hand hygiene products or a reduction in CDI rates with traditional hand washing are lacking. It is unclear whether such real-life studies of a single infection control intervention (eg, hand hygiene) are even possible in our current healthcare system, where the adoption of multiple preventive interventions has become the norm in an environment where performance on nosocomial infection reduction is closely tied to reimbursement. Last, while the clinical impact of HCW hand contamination with *C. difficile* in the horizontal transmission of CDI is implied, its exact contribution to the persistence of CDI in the acute care setting has not been adequately quantified in research studies.

In conclusion, the road to eradication of *C. difficile* from the healthcare environment is fraught with difficulties. Much work remains to be done in implementing what is known about the prevention of *C. difficile* horizontal transmission, and further studies are needed to answer current knowledge gaps. Improvement in antimicrobial stewardship programs and effective environmental cleaning within healthcare institutions must also be achieved for effective CDI prevention. Although these tasks may seem insurmountable, the recent examples of dramatic reductions in nosocomial CDI incidence across the United Kingdom and Europe¹⁰ and the beginning of nosocomial CDI reduction observed in some US states over the last few years¹ offer significant hope.

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