

Response to letter to the editor regarding “Occupational health risks associated with the use of germicides in health care”

To the Editor:

We thank the authors of the letter for their comments on the benefits and risks of using low-level disinfectants on environmental surfaces in hospitals based on our recent article “Occupational health risks associated with the use of germicides in health care.”¹ We take exception to many of the issues and criticisms raised by these authors. First, the authors have failed to note the substantial morbidity and mortality associated with health care-associated infections (HAIs) in the United States. A multistate prevalence survey estimated that in 2011 there were 648,000 patients with 721,800 HAIs in the United States; approximately 4.0% of inpatients had at least 1 HAI.² Additionally, approximately 75,000 patients with HAIs died during their hospitalization. Second, the authors have failed to describe the robust scientific literature that demonstrates the role of the contaminated surface environment as a risk factor for the transmission of HAIs.^{3,4} Although the authors note the importance of terminal room cleaning on preventing subsequent patients admitted to the room from acquiring a multidrug-resistant organism (MDRO), they do not cite the data that daily disinfection reduces the acquisition of MDROs on the hands of health care providers after contact with high-touch room surfaces,⁵ or that use of daily disinfection has been shown to decrease the incidence of MDRO-associated HAIs.⁶ Further, they did not note the importance of disinfecting shared medical devices, such as glucometers.⁷ Third, the authors misstated that “terminal room ‘cleaning’ subsequent to occupancy by a patient with VRE [vancomycin-resistant enterococci], MRSA [methicillin-resistant *Staphylococcus aureus*], *S aureus* or *C difficile* [*Clostridium difficile*] can prevent illness in the next occupant.” In fact, the study they cited recommended environmental room decontamination not cleaning.⁸ Further, although improved cleaning has been shown to decrease contamination of surfaces with *C difficile*, the addition of enhanced standard disinfection of *C difficile* rooms, which includes daily disinfection, further reduced environmental contamination.⁹ It is not surprising that use of a disinfectant is superior to a cleaning agent alone for reducing environmental contamination and HAI because cleaning agents, unlike

disinfectants, do not inactivate microbes, therefore allowing transfer of microbes between surfaces.¹⁰ Fourth, the authors correctly noted that many hospital infections are associated with medical devices, surgical site infections, inadequate hand hygiene compliance, and antibiotics. However, there is growing evidence that non-device-related infections are increasingly important HAIs.¹¹ Further, the Centers for Disease Control and Prevention (CDC) and multiple professional organizations have called for not just a reduction in HAIs but an elimination of HAIs.¹² This cannot be achieved without implementation of interventions to eliminate all transmission mechanisms of health care-associated pathogens, which would include disinfection of the surface environment in hospital rooms. Fifth, the authors correctly note that antimicrobial use is a precipitant for the development of MDROs. They imply but do not state that disinfectant use may lead to an increase in MDROs. However, there is a robust literature that currently used surface disinfectants do not in fact lead to an increase in MDROs.¹³ Sixth, the authors make a number of misleading statements regarding our recommendations including that we provided “blanket advice to disinfect environmental surfaces” and we “encouraged indiscriminate use of disinfectants on environmental surfaces.” If fact, we recommended the use of disinfectants only for decontamination of environmental surfaces in contact with patients (ie, patient rooms, procedure rooms, operating rooms) and did not recommend their use in nonpatient areas (eg, offices). Seventh, the authors failed to note that our recommendations are consistent with evidence-based guidelines, including those published by the CDC.¹⁴ Eighth, the authors failed to state that at UNC Hospitals we use disinfectants and provide personal protective equipment (PPE) to our health care personnel per the U.S. Environmental Protection Agency-approved label and in accordance with the manufacturer’s instructions. Ninth, at UNC Hospitals we take a broader view of protecting our health care providers than discussed by these authors. Therefore, we teach all health care personnel the proper use of disinfectants and provide appropriate PPE to all health care personnel, not just workers, because trainees and volunteers are not workers. Tenth, much of the literature is focused on risks of asthma and dermatitis from high-level disinfectants; many fewer studies have focused on currently used low-level disinfectant products. Eleventh, the authors state that “encouraging indiscriminate use of disinfectants on environmental surfaces may also lead to undertreatment of surfaces which do pose a real risk of microbe transfer and subsequent disease.” As previously noted, we take issue with the use of the word indiscriminate because we adhere to the CDC’s guidelines on disinfection and sterilization, but one should also note that there is no evidence that by adhering to the CDC’s guidelines (eg, regular disinfection of patient room surfaces [eg, once daily], disinfection of shared medical devices), we are undertreating surfaces the authors state are proven to decrease HAIs, such as terminal room disinfection. Finally, the current standard for evidence-based guidelines is the use of the Grading of Recommendations Assessment, Development and Evaluation, which is used by the CDC¹⁵ and professional organizations, such as the Infectious Diseases Society of America.¹⁶ The Grading of Recommendations Assessment, Development and Evaluation only recognizes methodologically well-conducted randomized clinical trials and prospective cohort studies. The authors state that >40 articles “have documented the association of cleaning products, and specifically disinfectants used in hospitals, with asthma.” However, none of the primary literature cited by the authors demonstrates this association using a randomized clinical trial or prospective cohort study.¹⁷⁻¹⁹

We do agree with the authors that additional and improved research should be undertaken, especially carefully done prospective studies with appropriate clinical tests to document possible aller-

gies to low-level disinfectants and disinfectant-precipitated asthma (eg, pulmonary function tests, human challenge studies). We also agree that health care facilities should provide health care personnel with the proper training and PPE to minimize exposure to chemicals used in the health care environment, including both high- and low-level disinfectants. Manufacturers should be encouraged to develop new low-level disinfectants that are effective while having a potentially lower toxicity, such as improved hydrogen peroxide products.²⁰ Finally, it is important to recognize that scientific evidence has demonstrated that low-level disinfectants used on environmental surfaces in patient rooms and shared medical devices in hospitals play a key role in reducing the incidence of HAIs, which are a major source of morbidity and mortality in the United States.

Conflicts of interest: D.J.W. is a speaker and consultant for Pfizer and Merck. D.J.W. and W.A.R. are consultants to Clorox.

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