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## Brief report

### The value of ready-to-use disinfectant wipes: Compliance, employee time, and costs

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Cleaning and disinfection practices of environmental surfaces are critical interventions for reducing health care-associated infections. We studied the value of ready-to-use cleaning and disinfection wipes compared with the traditional towel and bucket method. When using ready-to-use wipes, we found compliance to be significantly higher, a more rapid cleaning and disinfection process, and potential cost savings. Facilities should consider these products when making environmental services product selections.

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Cleaning and disinfection (CD) practices of environmental surfaces are critical interventions for reducing health care-associated infections (HAIs).<sup>1,2</sup> A challenge of the CD process is ensuring that the product is mixed and used properly.<sup>3</sup> Traditionally, environmental services staff have used towels saturated with diluted disinfectant contained in a bucket. This traditional “bucket method” has many opportunities for breakdowns in compliance. Locally, using the bucket method, we have noticed compliance issues regarding improper dilution, inappropriate towel selection (eg, cotton vs microfiber), “double dipping” of rags, reusing rags after touching the floor, and inadequate saturation of rags. We have also found these compliance issues to be associated with *Clostridium difficile* infection.<sup>4</sup> Eliminating opportunity for human error from the CD processes may prevent some of these compliance issues from occurring. Ready-to-use (RTU) CD wipes eliminate the need to pour and dilute disinfectant and provide appropriately saturated cloths tailored to the particular CD product. These RTU wipes may prove to be a novel method of removing some of these human errors. However, the impact of RTU wipes on compliance

has not been evaluated compared with traditional methods. The primary objective of this study was to evaluate the compliance related to using RTU wipes compared with the bucket method. The secondary objectives of this study were to evaluate timeliness and cost-savings of the RTU wipe method versus the bucket method.

## METHODS

This was an unblinded randomized study conducted during February 2013. Employees with environmental services responsibilities were invited to participate. Participants were randomized to use either the RTU wipes or the bucket method and were not provided additional training prior to use of the RTU wipes. One-step sodium hypochlorite cleaner/disinfectant solutions were used for both the bucket method and the RTU method. Once randomized, participants were instructed to disinfect 6 prespecified areas in 1 of 3 available patient rooms using the method to which they were randomized. Upon completion, the employee repeated the CD of the same 6 sites in the same room with the alternate method, with approximately 10 minutes of break time between tasks. Before the CD assignment, all areas were marked with an invisible fluorescent marker without the employee’s knowledge. Compliance was measured using a scoring system based on the residual fluorescent marker viewable under an ultraviolet light after completing the assignment. Points were assigned as follows: 0 points for a complete miss of the area; 1 point for a partial miss (smeared but still visible); and 2 points for completely removing the fluorescent marker, for a maximum of 12 points across all

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Conflicts of interest: None to report.

**Table 1**  
Compliance points by site

Site	Mean (SD) compliance points for RTU method	Mean (SD) compliance points for bucket method
Sink countertop	1.8 (0.67)	1.1 (0.78)
Bedside table	1.9 (0.33)	1.8 (0.44)
In-room dresser	2 (0)	1.3 (0.71)
Medicine cabinet	1.8 (0.67)	1.6 (0.73)
Wall-mounted cabinet	1.9 (0.33)	1.3 (0.87)
Toilet	1.2 (0.97)	1 (0.87)

NOTE. Minimum/maximum possible range for each site is 0 to 2 points.

6 sites. A stopwatch was used to calculate the time necessary to complete the CD of all 6 sites. The time began when the employee opened the RTU wipe container or dipped the rag into the bucket. We also evaluated the amount of time the surfaces remained wet for each method, up to 10 minutes. The Student's *t* test was used to evaluate the differences in the overall compliance score and time to complete the CD assignment between the 2 groups. Time-related cost savings were calculated using the average percent reduction in time using the RTU method versus the bucket method, an average of 15 rooms cleaned per day, an average of 20 minutes in each room, and an employee wage of \$10 per hour. R v2.15.1 (R Foundation for Statistical Computing, Vienna, Austria) was used for all analyses.

## RESULTS

Nine employees participated in the study: 8 environmental services workers and 1 nurse. The nurse was tasked with cleaning and disinfecting rooms when environmental services employees are not available. The average number of compliance points when using the RTU wipes was 10.6 (standard deviation [SD], 1.3), and the average points when using the cloth and bucket method was 8.1 (SD, 2.4;  $P = .017$ ). Further description of compliance by site can be found in Table 1. Time to completion of the CD assignment using the RTU wipe method was significantly lower (178.1 seconds [SD, 98.2]) than when using the bucket method (230.9 seconds [SD, 96.0],  $P = .003$ ). The surfaces wiped with the RTU wipes remained wet for more than 10 minutes, whereas the surfaces wiped using the bucket method remained wet for approximately 4 minutes. The direct time-related cost savings for the RTU wipes was \$38.58 (95% confidence interval: \$34.07–\$41.08) per employee per day.

## DISCUSSION

This study indicates that using ready-to-use CD wipes significantly increases compliance with CD practices and results in less personnel time needed to complete the same CD assignment as compared with the bucket method. Furthermore, we were able to determine potential cost savings after implementation of RTU wipes when switching from the bucket method.

The increase in compliance may be due to the ease of use of these products, including the ease of obtaining a new wipe when

they become dry or contaminated. Increased compliance with CD processes may lead to a lower environmental bioburden, leading to a decreased risk of transmission of health care-associated pathogens.<sup>5</sup> Interestingly, the surfaces wiped with the RTU product remained wet for much longer than did those wiped with the rags dipped in the bucket. This is due to participants wringing the towel prior to use for the bucket method. However, it is important to note that the surfaces remained wet for the appropriate contact times using both methods. It is unclear as to the potential impact of the wipe material (cotton rags vs RTU wipe material) on compliance observations. For example, it is possible that the RTU material is manufactured such that it smears or removes the fluorescent marker more readily than the cotton rag.

A more rapid CD process can assist the facility with prompt patient transfers and/or admissions. We have experienced significant patient movement locally, putting an exceedingly large strain on environmental services employees. Decreasing the time needed to complete the CD process may allow employees to put more focus on CD practices in other areas of the health care facility (eg, common areas).

There may be some limitations to the RTU wipes. For example, because the wipes and buckets are disposable, potential environmental impacts should be considered (eg, recycling). Furthermore, storage may be an issue for some facilities because a significant amount of product must be maintained to ensure it is available when needed. Our cost savings data are limited in that the calculation only accounts for the costs related to employee time. The actual institutional cost savings after implementing RTU wipes will vary based on the additional costs associated with the RTU wipes. For example, the total cost savings may be dependent on the contract pricing of the product, the number of wipes used per room, and the number of rooms cleaned and disinfected per day. However, the increase in compliance may lead to reductions in HAIs, which may offset any additional product-related costs. Future studies should examine the statistical cost-effectiveness of these products.

In conclusion, this study supports the use of RTU CD wipes over the traditional bucket method. Enhancing environmental processes may reduce the environmental bioburden, leading to reductions in HAIs because of environmentally hardy pathogens.

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