

Time-and-Motion Evaluation of Dilutable vs Ready-to-Use (RTU) Disinfectants



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Overview

Dilutable disinfectant products, which use automated dispensing systems to dilute concentrates, are common in healthcare settings because of their perceived cost advantages and ability to generate large volumes of solution. However, multiple studies have documented inconsistencies in automated dilution systems.^{1,2,3,4} In this study, Dr. Curtis Donskey and researchers at the Cleveland VA Medical Center conducted a real-world time-and-motion study with Environmental Services (EVS) personnel to assess how switching from a dilutable quaternary ammonium disinfectant to ready-to-use (RTU) wipes could impact the time needed for cleaning and disinfection and overall compliance.

Using a time-and-motion framework, researchers observed 9 to 10 EVS personnel on medical-surgical wards during 2- to 4-hour periods across a 6-month period before and after the product transition. After 40 hours of observation, the researchers found that compared to the dilutable disinfectant, RTU wipes:

- ▶ Reduced the time needed to gather supplies for post-discharge room cleaning and daily disinfection practices
- ▶ Improved overall compliance and adherence
- ▶ Increased the number of high-touch surfaces cleaned.

Key Findings

Compared with the use of a dilutable disinfectant, the implementation of RTU wipes reduced the average preparation time from 13.2 to 3.8 minutes per room ($p = 0.002$) and the total time spent cleaning per room decreased from 65.2 to 50.8 minutes, though this difference was not statistically significant ($p = 0.08$). Compliance scores significantly increased after switching to RTU wipes, with the average score increasing from 11.5 to 17.7 ($p = 0.003$). Portable medical equipment was disinfected only 16% of the time after use, and was used directly on a new patient without prior disinfection 36% of the time.

Methods

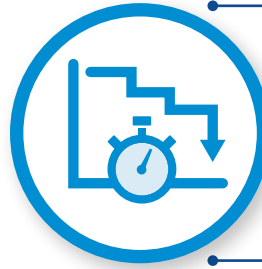
Daily and post-discharge cleaning and disinfection practices in patient rooms were observed first with a dilutable quaternary ammonium disinfectant and then after a switch to RTU disinfectant wipes. Time spent in a patient's room completing EVS tasks was recorded and a standardized compliance score for the observed quality of cleaning practices was calculated for each EVS worker.

Results

A switch from a dilutable disinfectant to RTU wipes resulted in:



Average preparation time **reduced** from 13.2 to **3.8** minutes per room*



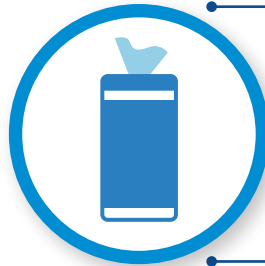
Total time spend per room **decreased** from 65.2 to **50.8** minutes



Compliance scores **increased** from 11.5 to **17.7***



Percentage of high-touch surfaces cleaned **increased** from 84% to **90%**



88% of EVS personnel **preferred** RTU wipes vs. dilutables

Portable medical equipment monitoring found that:



Only **16%** of devices were cleaned after use, and only when RTU wipe canisters were attached to the equipment



Devices were used directly between patients without disinfection **36%** of the time

Conclusions

Surface disinfection can help reduce the risk of healthcare-associated infections (HAIs), but only when performed correctly. Despite study limitations, this research highlights the variability that exists across cleaning practices in healthcare settings. RTU wipes offer the advantage of eliminating errors related to dilution and product mixing, while supporting more consistent disinfectant application, improved compliance, and quicker product preparation.

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*Statistically significant, $p < 0.05$



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