

UV Light Disinfection Significantly Reduces Clostridium difficile Incidence

New research shows automated UV light device curbs CDI by 25%



Abstract

Objective: To evaluate the impact of no-touch terminal room no-touch disinfection using ultraviolet wavelength C germicidal irradiation (UVGI) on *C. difficile* infection (CDI) rates on inpatient units with persistently high rates of CDI despite infection control measures. DESIGN Interrupted time-series analysis with a comparison arm.

Setting: 3 adult hematology-oncology units in a large, tertiary-care hospital.

Methods: We conducted a 12-month prospective valuation of UVGI. Rooms of patients with CDI or on contact precautions were targeted for UVGI upon discharge using an electronic patient flow system. Incidence rates of healthcare-onset CDI were compared for the baseline period (January 2013-December 2013) and intervention period (February 2014-January 2015) on study units and non-study units using a mixed-effects Poisson regression model with random effects for unit and time in months.

Results: During a 52-week intervention period, UVGI was deployed for 542 of 2,569 of all patient discharges (21.1%) on the 3 study units. The CDI rate declined 25% on study units and increased 16% on non-study units during the intervention compared to the baseline period. We detected a significant association between UVGI and decrease in CDI incidence (incidence rate ratio [IRR], 0.49; 95% confidence interval [CI], 0.26-0.94; $P=.03$) on the study units but not on the non-study units. The impact of UVGI use on average room-cleaning time and turnaround time was negligible compared to the baseline period.

Conclusions: Targeted deployment of UVGI to rooms of high-risk patients at discharge resulted in a substantial reduction of CDI incidence without adversely impacting room turnaround. Infect Control Hosp Epidemiol 2016;1-6.

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Ultraviolet C light disinfection to clean unoccupied patient rooms significantly reduced *C. difficile* infections (CDI) in high-risk patients who later occupied those rooms, according to a study published today in *Infection Control & Hospital Epidemiology*, the journal of the Society for Healthcare Epidemiology of America. The no-touch device, used after patients with CDI were discharged from the hospital, also **resulted in substantial healthcare savings, estimated between \$350,000 and \$1.5 million annually.**

"UV light disinfection is a fast, safe, and effective technology to reduce the risk of *C. difficile* infection associated with the hospital environment," said David Pegues, MD, lead author of the study and a professor of Medicine in the Perelman School of Medicine at the University of Pennsylvania. "The success of this technology is dependent on Environmental Services employees as a critical partner in our ongoing efforts to eliminate hospital-acquired infections such as *C. difficile* and to improve patient safety."

The study was conducted in three hematology-oncology units at the Hospital of the University of Pennsylvania during a one-year period (February 2014-January 2015). Results showed that **adding UV disinfection to typical disinfection protocols reduced the incidence of CDI by 25 percent** among new patients in these units, compared to the prior year. At the same time, CDI rates increased 16 percent in the non-study units during this period. The team found that **using the ultraviolet robot after a room cleaning by members of the Environmental Services team not only reduced the number of infections, but did so without adversely impacting room turnaround time.** According to this study, room cleaning took only five minutes longer on average compared to non-study units.

"These findings have real implications for both health systems and patients. The effectiveness and efficiency of **UV-C robots make it a practical and cost effective technology that will benefit hospitals around the country and save people's lives,**" said Pegues.

The technique, known as ultraviolet wavelength C germicidal irradiation, uses short-wavelength ultraviolet light to kill microorganisms. CDI is one of the most common healthcare-acquired infections in the United States and is associated with serious complications. It is resistant to many surface disinfectants and can persist on surfaces, making it an ongoing risk for transmission to patients.

David Pegues, Jennifer Han, Cheryl Gilmar, Brooke McDonnell, Steven Gaynes. "Impact of Ultraviolet Germicidal Irradiation for Terminal Room Disinfection on *C. difficile* Infection Incidence among Hematology Oncology Patients." Web (October 6, 2016).

About ICHE

Published through a partnership between the Society for Healthcare Epidemiology of America and Cambridge University Press, *Infection Control & Hospital Epidemiology* provides original, peer reviewed scientific articles for anyone involved with an infection control or epidemiology program in a hospital or healthcare facility. ICHE is ranked 13th out of 158 journals in its discipline in the latest Web of Knowledge Journal Citation Reports from Thomson Reuters.

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