

## Summary conclusions from Clinical Papers UVC Room Ultraviolet Disinfection

### Room Decontamination with UV Radiation

William A. Rutala, PhD, MPH; Maria F. Gergen, MT (ASCP); David J. Weber, MD, MPH

**Conclusion:** This UV-C device was effective in eliminating vegetative bacteria on contaminated surfaces both in the line of sight and behind objects within approximately 15 minutes and in eliminating *C. difficile* spores.

### Terminal Decontamination of Patient Rooms Using an Automated Mobile UV Light Unit

John M. Boyce, MD;<sup>1,2</sup> Nancy L. Havill, MT;<sup>1</sup> Brent A. Moore, PhD<sup>3</sup>

**Conclusion:** The mobile UV-C light unit significantly reduced aerobic colony counts and *C. difficile* spores on contaminated surfaces in patient rooms.

### Decontamination with Ultraviolet Radiation to Prevent Recurrent *Clostridium difficile* Infection in 2 Roommates in a Long Term Care Facility.

Letter to the Editor – *Infection Control and Epidemiology* MAY 2012

**Conclusion:** Automated decontamination devices are able to reduce the number of organisms in places that are easily missed by or inaccessible to human cleaning. The UV radiation device requires less than 1 hour per bed (room) for a typical cycle and is easy to use. Routine use of UV radiation devices to decrease the environmental burden of pathogens is a feasible addition to current infection control and housekeeping measures and may ultimately help reduce rates of CDI among patients in hospitals and LTCFs. spores on contaminated surfaces in patient rooms.

### Disinfection of *Acinetobacter baumannii*-Contaminated Surfaces Relevant to Medical Treatment Facilities with Ultraviolet C Light.

Guarantor: Vipin. Rastogi, PhD Contributors: Vipin.Rastogi, PhD; Lalena Wallace, MS; Lisa S. Smith, MS

**Results:** *Efficacy of UVC Irradiation in Decontamination of A. Baumannii Cells on different surfaces:* "The UVC exposure resulted in >4log(CFU) reductions in viable cells for all three metal surfaces. The killing was complete because no turbidity was observed when the test coupons were incubated in tryptic soy broth. Complete killing or decontamination of inanimate surfaces may be a desirable goal in intensive care units and patient treatment facilities." " UVC irradiation is a cost effective, easy to use, non invasive, non corrosive approach with no adverse environmental effects."

### First UK trial of an automated UV-C room decontamination device.

Nikunj Mahida, Natalie Vaughan, Tim Boswell. *Nottingham University Hospital NHS Trust.*

**Result:** The UVC Unit was easy to use and room disinfection times were relatively short. Without the need to inactivate room ventilation or smoke detectors, we were able to disinfect 3 ITU single rooms within 3 hours. This device appears to achieve significant killing of key healthcare environmental pathogens including MRSA, VRE, MRA and Aspergillus. Further quote: Boswell:- "Our study further strengthens the premise that a simple to use , preventative system (continuous wave UVC) that inactivates pathogens is an invaluable asset to a hospital's infection control strategies. We have not only proven that the technology works in experimental conditions but it can be easily and comfortably adopted by a busy, real-world clinical environment and is an interesting alternative for terminal decontamination of an environment"

### UK Health and Safety Laboratory

"THOR's performance was better than the other systems tested during the controlled evaluation"

"THOR achieved total kill in all cases, regardless of challenge organism or BSA soiling level"

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### **The Benefits of Enhanced Terminal Room (BETR) Disinfection Study: A Cluster Randomized, Multicenter Crossover Study with 2x2 Factorial Design to Evaluate the Impact of Enhanced Terminal Room Disinfection on Acquisition and Infection Caused by Multidrug-Resistant Organisms (MDRO)** Center for Disease Control

**Results:** A total of 311,407 patients had 606,828 unique room stays in the study hospitals during the study; 24,589 eligible patients were exposed resulting in 122,873 exposure days (Figure 1). The clinical incidence of all target MDROs was 37% lower in Group B ( $p=0.03$ ) and 32% lower in Group D ( $p=0.01$ ) compared to Group A in ITT analyses (Figures 2 and 3). Results from PP analyses were largely similar.

**Conclusion:** Enhanced terminal room disinfection strategies that utilized UV-C emitters reduced the risk of acquisition and infection caused by target MDRO.

### **UV Light Disinfection Significantly Reduces Clostridium difficile Incidence**

NEW YORK (October 6, 2016)

**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.

### **UVC Emitters Effective Against SARS-COV-2 (COVID-19)**

Signify, independent testing.

The THOR UVC Robotic Room Disinfection system uses 24 high intensity UVC emitters with the specific output of 253.7nm for maximum germicidal efficiency. In laboratory testing, these light sources from Signify reduced the SARS-CoV-2 virus infectivity on a surface to below detectable levels in as few as 9 seconds for dried virus and 4 seconds for wet virus. Based on this data, it was determined that a dose of 22mJ/cm<sup>3</sup> will result in a reduction of 99.9999% in 25 seconds.

