



CASE STUDY

Disinfection Automation for Your High-Risk Surfaces

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OVERVIEW

The Problem:

Healthcare-associated infections (HAI) represent a common complication for hospitalized patients with significant financial implications for the healthcare system. An estimated 721,800 HAIs were reported in acute care hospitals in the United States in 2011, with a financial impact of \$33 billion. Recent data indicate that contaminated surfaces play an important role in the endemic and epidemic transmission of certain pathogens that cause healthcare-associated infections. Common pathogens can persist on hospital surfaces for days, weeks, and in the case of *C. diff*, even months. A growing body of literature now validates the use of various cleaning practices to improve environmental surface disinfection reduces HAIs and pathogen transmission in the hospital, but which ones should hospitals use?

The Solution:

To address the problem of environmental contamination and pathogen transfer, UV Angel designed and rigorously tested an intelligent and automated UV light decontamination system. Each UV Angel is attached to a high-touch hospital device to monitor its surface for inoculation events. Any use of the protected object passively triggers the UV Angel to begin a validated, disinfection cycle. By reducing the level of bioburden around patients and staff, UV Angel dramatically reduces the probability of pathogen transmission underlying healthcare-associated infections.

WHY DOES IT WORK?

Modeling transmission routes has provided proof of principle that contaminated surfaces are involved in transmission. These surfaces, like those on an IV pump,

HIGHLIGHTS

Of 203 baseline samples, 95.1% were positive for bacteria

25% of the baseline samples had HAI-related bacteria

> 99% reduction in keyboard bioburden

Analyzing 106,000 cycles, UV-C exposure was 15.1% of NIOSH limit

keyboard or a clinician's hands, serve to carry pathogens from patient to patient. When these transmission routes were analyzed mathematically, researchers concluded that increased disinfection alone or in combination with increased hand hygiene and protective apparel are the most useful for the control and containment of outbreaks. However, compared to hand-cleaning, these high-touch surfaces are disinfected far less often, until now. UV Angel reverses this paradigm and ensures that each high-risk surface is disinfected after every use to synergistically reduce transmission and HAI's.

THE PROOF

Setting:

The study took place in the intensive care unit of an academic hospital in Chicago, Illinois.

Methods:

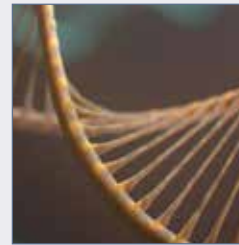
Baseline cultures were obtained from keyboards in intensive care units. Automated UV Angels were installed over keyboards and mice of those computers. The lamps were tested at varying cycle lengths to determine the shortest effective cycles. Various light cycle initiation delays after cessation of use were used to minimize cycle interruptions. Finally, 218 post-installation samples were analyzed.

Results:

Of 203 baseline samples, 193 (95.1%) were positive for bacteria, with a median of 120 colony forming units (CFU) per keyboard. There were numerous bacteria linked to healthcare-associated infections (HAIs), including Staphylococcus, Streptococcus, Enterococcus, Pseudomonas, Pasteurella, Klebsiella, Acinetobacter, and Enterobacter. Of the 193 keyboards, 25 (12.3%) had gram-negative species. Of 218 post-installation samples, 205 (94%) were sterile. Of the 13 that showed bacterial growth, 6 produced a single CFU. Comparison of pre- and post-UV decontamination median CFU values (120 and 0, respectively) revealed a >99% reduction in bacteria.



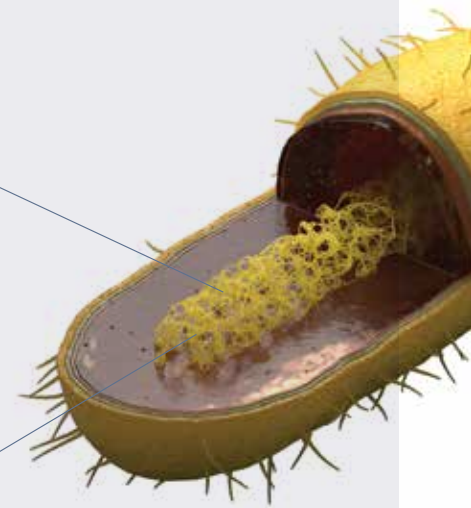
Patented UV-C technology alters pathogen DNA, rendering it incapable of reproduction and infection.



Before UV-C



After UV-C



CONCLUSION

The use of a real-time, automated UV Angel device produced sustained reductions in pathogens without endangering staff members and patients or requiring interruption to staff workflow.

BASELINE	KEYBOARD CULTURE VARIABLE	POST UV-C EXPOSURE
203	Sample Count	218
203.73	Mean CFUs	1.95
120	Median CFUs	0
0	Minimum CFUs	0
1024	Maximum CFUs	300
4.90%	Percent Sterile	94.04%

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