

## A walk-through of the study: “Ultraviolet -C (UVC) monitoring made ridiculously simple: UV-C dose indicators for convenient measurement of UV-C dosing”

Claes Lindahl, Intellego Technologies AB, Sweden, [claes.lindahl@intellego-technologies.com](mailto:claes.lindahl@intellego-technologies.com)

Shadowed areas and areas far away may be exposed to lower radiation levels compared to areas in direct line and/or areas close by. Colour changing dosimeters can be a cost effective tool to monitor UVC exposure of a specific surface and several studies in the last years have mentioned and showed on the benefits of using such dosimeters as an easy to use tool to quality assure UVC exposure. [1, 3,4,5]

In October 2019 a study was published by Jennifer Cadnum, Dr Curtis Donskey et.al [1] which specifically looked at colour changing dosimeters and its functionality with UVC disinfection equipment in a lab setting.

### Methods:

- In a laboratory setting, exposed MRSA and C.diff spores on steel disk carriers to UV-C for varying fluence exposures ranging from 10,000 to 100,000  $\mu\text{J}/\text{cm}^2$ .
- The UV-C indicators were placed adjacent to the carriers.
- Change in color of the indicators was correlated with dose, by radiometer reading, and  $\log_{10}$ CFU reductions.

### Results & Conclusion:

- UV doses required for a 3 log reduction of MRSA and C.diff were 10 000 and 46 000  $\mu\text{J}/\text{cm}^2$ , respectively.
- The dosimeters tested showed a visible colour change at 10 000  $\mu\text{J}/\text{cm}^2$  and a final colour change at 46 000  $\mu\text{J}/\text{cm}^2$ .
- Indicators were easy to use and took only seconds to place and easy to make the readout
- Additional studies are needed to evaluate the functionality in patient rooms and shadowed areas

Fig 1: Shows the colour change of the dosimeter, unexposed (yellow), 10mJ/cm<sup>2</sup> (3 log reduction of MRSA) 46 mJ/cm<sup>2</sup> and (3 log reduction of C.diff). UVC energy levels is stated on top of each dosimeter

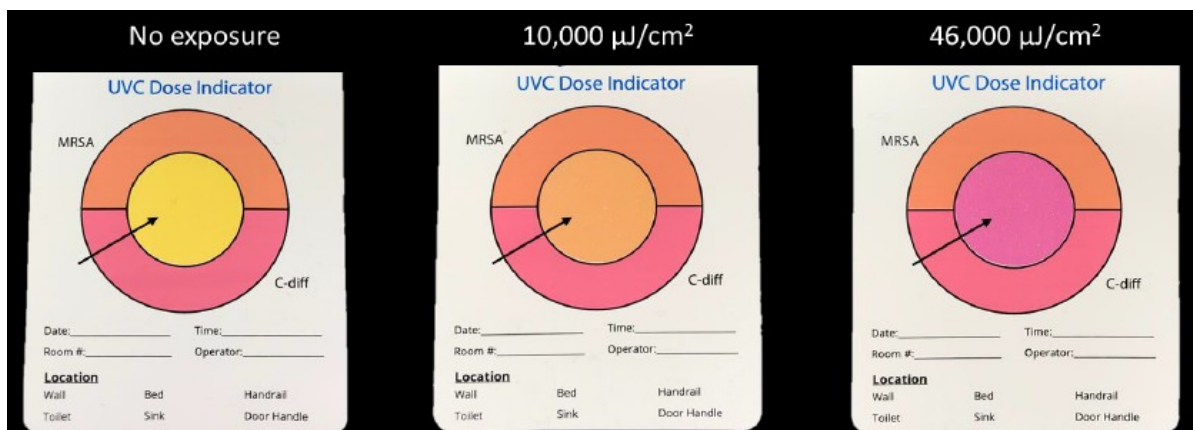
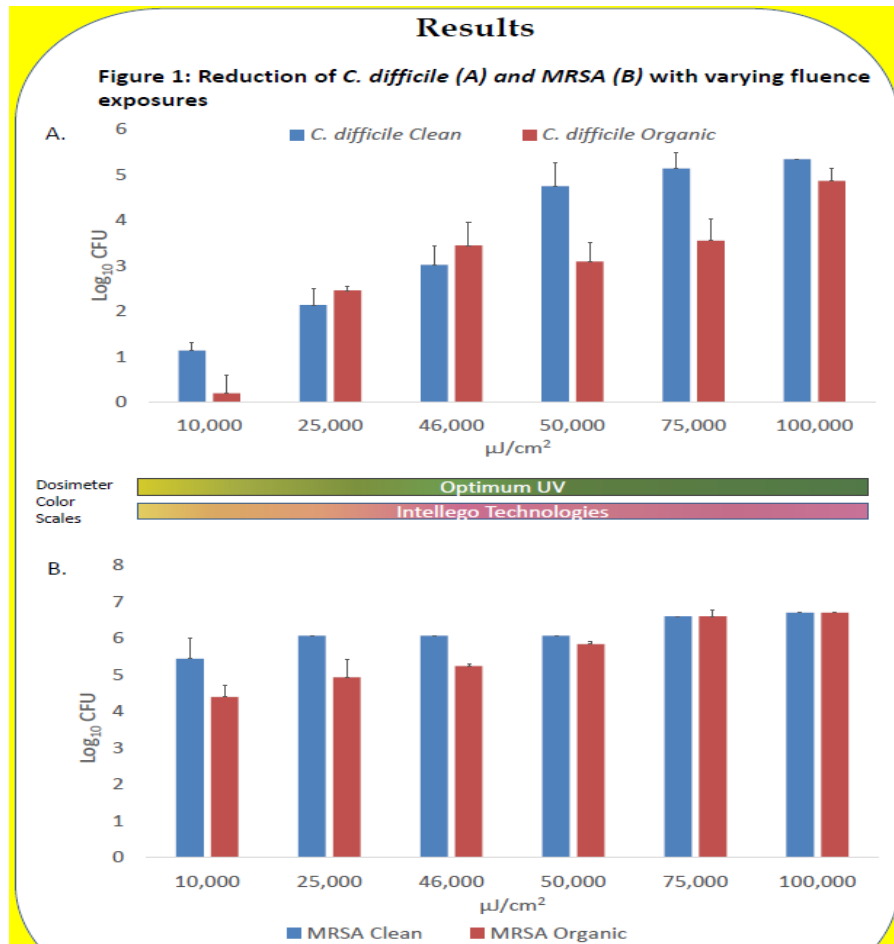


Fig 2:UVC energy levels correlated to log reduction of C.diff and MRSA



References:

[1] Jennifer L. Cadnum, BS, Curtis Donskey, MD, et.al, “Ultraviolet -C (UVC) monitoring made ridiculously simple: UV-C dose indicators for convenient measurement of UV-C dosing”

[2] John M. Boyce, MD;1,2 Patricia A. Farrel, MT et.al, “Impact of Room Location on UV-C Irradiance and UV-C Dosage and Antimicrobial Effect Delivered by a Mobile UV-C Light Device”, infection control & hospital epidemiology june 2016, vol. 37, no. 6

[3] Marie Lindblad, Fredrik Huss, MD et.al, “Ultraviolet-C decontamination of a hospital room: Amount of UV light needed”, JBUR 5947 No. of Pages 8

[4] Jennifer L. Cadnum, BS, Curtis Donskey, MD, et.al, “A comparison of the efficacy of multiple ultraviolet light room decontamination devices in a radiology procedure room”, Infection Control & Hospital Epidemiology (2019), 40, 158–163

[5] John M. Boyce MD and Curtis J. Donskey MD, “Understanding ultraviolet light surface decontamination in hospital rooms: A primer”, Infection Control & Hospital Epidemiology (2019), 1–6