



Evaluation of an ultraviolet C (UVC) light-emitting device for disinfection of high touch surfaces in hospital critical areas.

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BACKGROUND

High touch near-patient surfaces have actually higher bioburden and can contribute to secondary transmission by the direct contact with the patient or via the hands of HCW^{1,2} and visitors³. Decontamination of the environment such as patient-care rooms before admission of subsequent occupants has therefore become of more importance in recent years and high-touch sites are recommended to be cleaned and disinfected on a more frequent schedule than minimal touch surfaces⁴. There has been much interest in the development of effective environmental disinfection strategies and in the last year the attention is focused on improve “no touch” technologies as Pulsed Xenon UV-Light system.



PURPOSE AND HYPOTHESIS

The aim of this study was to evaluate the effectiveness on the field of an ultraviolet C (UVC) light-emitting device in reducing environmental bacterial burden and the presence of pathogens when compared to the current standard operating protocol (SOP).

MATERIALS AND METHODS

In a 1158-bed hospital, according to the Standard Protocol, housekeeping staff applied the standard protocol (SP) and the UVC light-emitting device (Pulsed-Xenon Ultraviolet Light, Xenex) was located in each room after the SP procedure. Effectiveness in reducing bacterial burden and in eliminating high concern microorganisms was assessed by a plate or sponge contact method on five high touch surfaces, immediately pre- and post-procedures (345 sampling sites).

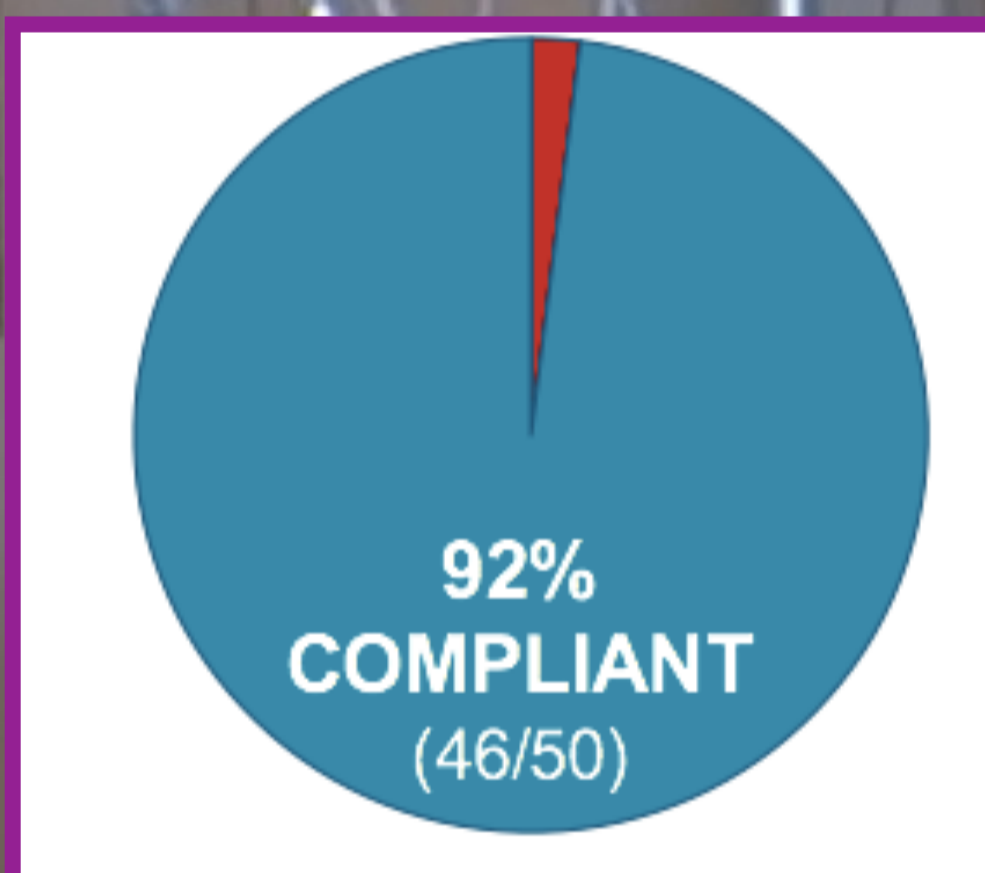
RESULTS

In 9 operating rooms, 2 Intensive Care Units (ICU) and 5 patient rooms, 135 samples were collected after healthcare activity (dirt condition) and 210 after the sanitisation procedure (125 after SP and 85 after SP+ UVC light disinfection). According to the Italian hygiene standard (ISPESL, 2009), 16 of 140 surfaces in operating rooms showed TBC >50 CFU/24 cm² (hygiene failures), while all samples were compliant applying the SP+UVC disinfection. All 20 samples collected in ICU (20) and 48 of 50 collected in patient rooms were compliant by applying both protocols (Fisher-test, p<0.05). High concern microorganisms (spores of *C. difficile* and *KPC-K. pneumoniae*) were isolated only after the SP whereas after UVC-disinfection all samples were negative. As concern overall reduction in CFU on high-touch surfaces, the reduction after PX-UV ranged from 6% (p<0,0001) and 5% (p<0,0001) in patient rooms and ICU, respectively; 166% (p<0,0001) for operating theaters with low turnover and 94% (p<0,0001) for operating theaters with high turnover.

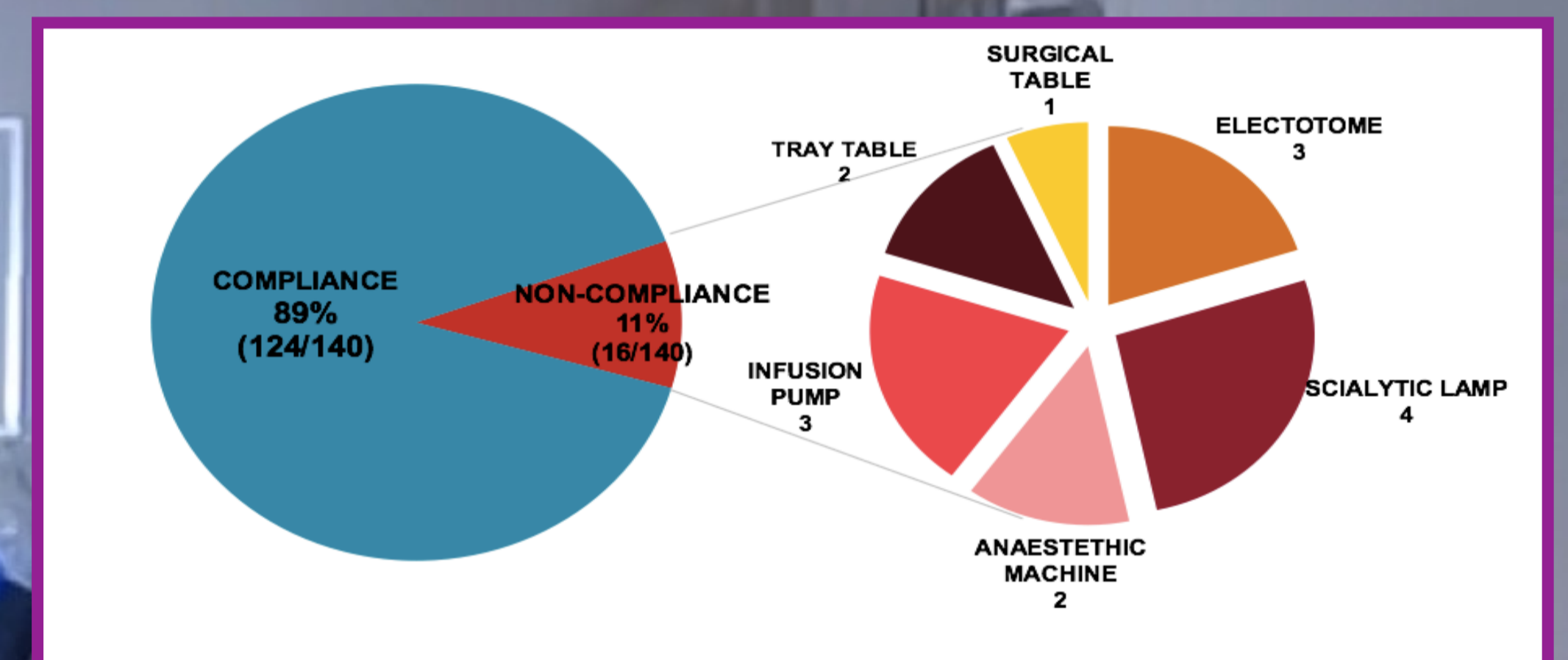
Microbial loads and presence of alert microorganisms in patient rooms before and after application of the sanitization protocols



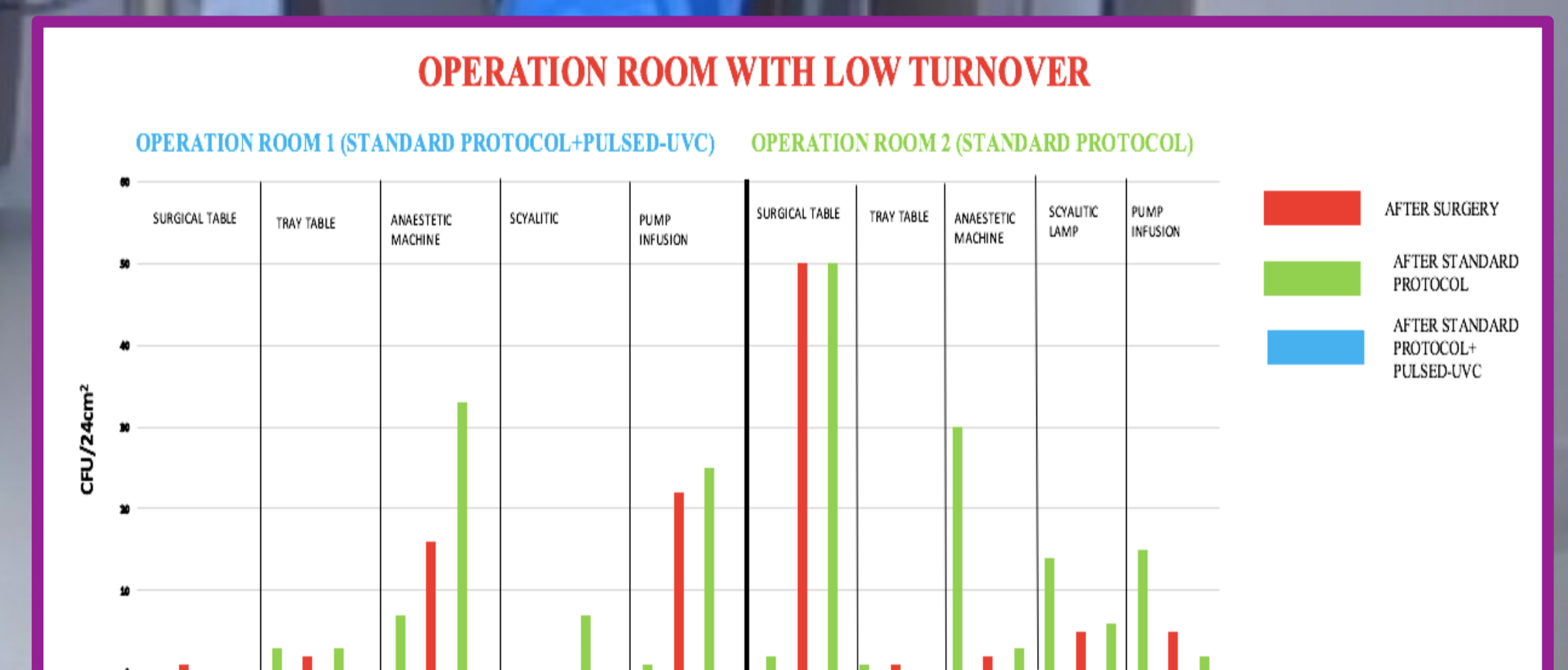
Non-compliant microbial loads, in patient rooms (Dancer S., JHIC 2004)



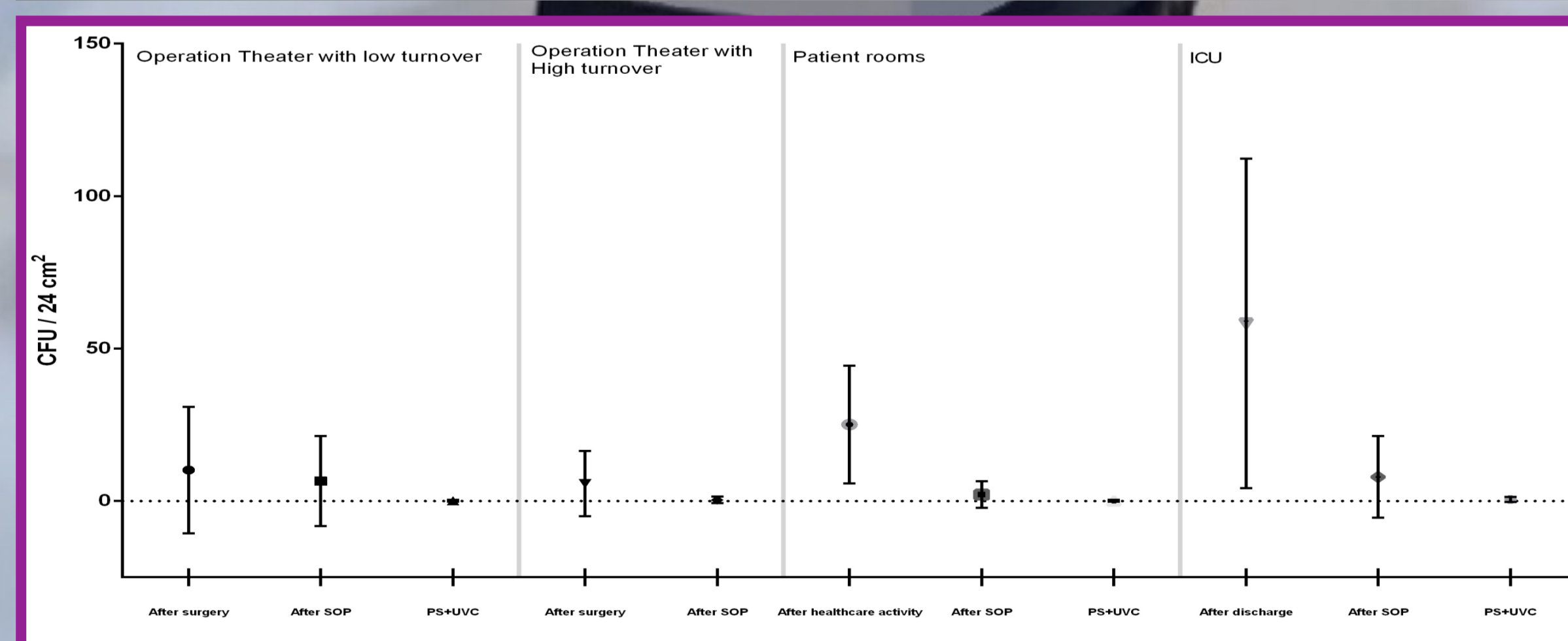
Non-compliant microbial loads, in operation room (ISPESL guidelines, 2009)



Microbial loads and presence of alert microorganisms in operation room before and after application of the sanitization protocols



Means microbial load and Standard Deviations before and after application of the sanitization protocols in the different settings



CONCLUSIONS

The implementation of the sanitisation procedure applying the UVC-disinfection after the SP resulted effective both in the reduction of hygiene failures and in control environmental contamination by high concern microorganisms.

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