Decreasing Operating Room Contamination of Surfaces and Air with Pulsed Xenon Ultraviolet Disinfection (PX-UVD)

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INTRODUCTION
There is evidence that environmental contamination and insufficient surface disinfection contribute to the transmission of pathogens associated with healthcare-acquired infections (HAIs).1 Among HAIs, surgical site infections are the most expensive. Germicidal irradiation produced by the pulsed xenon ultraviolet (PX-UV) portable device produces energy in the 200-320 nm range which is cidal for microorganisms.2 We evaluated the effects of (PX-UVD) by comparing bacterial contamination on surfaces and in the air of operating rooms (ORs) after standard cleaning (SC) and a quick clean (QC), as defined as cleaning the bed and visible soiled areas, followed by PX-UVD.

METHODS
Twelve surfaces in 2 ORs, including the anesthesia keyboard, anesthesia cart, anesthesia controls, intravenous infusion pole, overhead lamp, bed control, Bair hugger control, floor, nurse's mouse, cautery power control, inside door surface and Mayo stand, were sampled before and after between-case SC. Contact agar plates (Remel) were used and colony counts determined after incubation at 35°C for 48 h. Before and 60 after SC cultures were obtained followed by 72 cultures after a QC and PX-UVD. Four 5 minute PX-UV treatment cycles were performed at standardized locations in the OR, based upon mapping conducted by Xenex personnel utilizing a UV-C radiometer (International Light Technologies 1700) to determine the optimal treatment time. Two devices were utilized simultaneously to reduce total room contamination by Xenex personnel utilizing a UV-C radiometer (International Light Technologies 1700) to determine the optimal treatment time. During PX-UV, the frequency of positive cultures was similar (19.4% vs. 16.7%, p=0.745).

RESULTS
There is an increase in contamination with subsequent cases despite routine cleaning (not significant); PX-UVD decreases the contamination between cases.

Statistical analysis was performed by Sarah Simmons, MPH, CIC, Clinical Support Manager, Xenex Healthcare Services.

CONCLUSIONS
SC did not significantly decrease surface contamination or bioburden in our OR. However, a QC and PX-UVD resulted in a significant reduction (55%) in positive surface cultures and bioburden (81%) compared to SC. PX-UVD also observed a significant decrease in bioburden after QC and PX-UVD may even be greater in a busy OR since we observed a significant decrease in bioburden after QC and PX-UVD as compared to SC after the third case. This finding warrants further investigation. We plan to identify whether the cultured organisms are typical pathogens associated with infections.

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