

Continuous Environmental Disinfection in the OR

A Case Study



Background

Surgical Site Infections (SSIs) represent 33% of the total cost of all healthcare acquired infections (HAIs)¹. While the patient's skin flora is typically thought to be the major source of pathogens associated with surgical site infections, recent studies have shown that the environment in the operating room (OR) is frequently contaminated with pathogens which can also be a source². Additional studies have shown that improved environmental hygiene can reduce the acquisition of pathogens and subsequent surgical site infections³.

Methods

A visible light disinfection system was installed into one orthopedic OR and its effect upon bacteria levels throughout the room was measured using Baird Parker Agar (BPA) contact media for a period of 30 days. During this time, each room was cleaned using the facility's standard work process. Infection rates were compared one year before and after the visible light disinfection (VLD) implementation.

Goal

To reduce the number of SSIs with the addition of the VLD system.

¹Zimlichman, E. et al. "Health Care-Associated Infections: A Meta-analysis of Costs and Financial Impact on the US Health Care System", JAMA Intern Med 2013; 173:2039-46

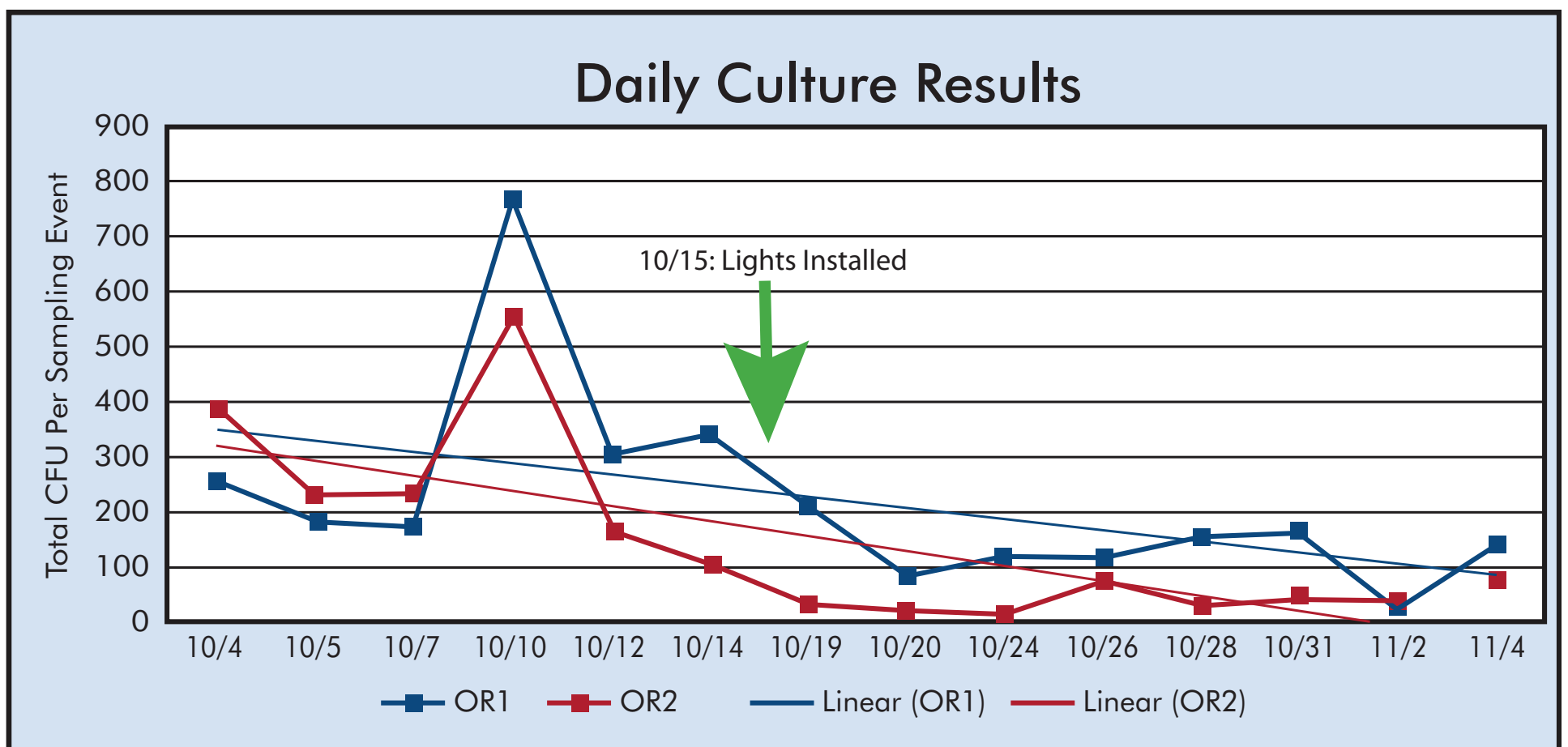
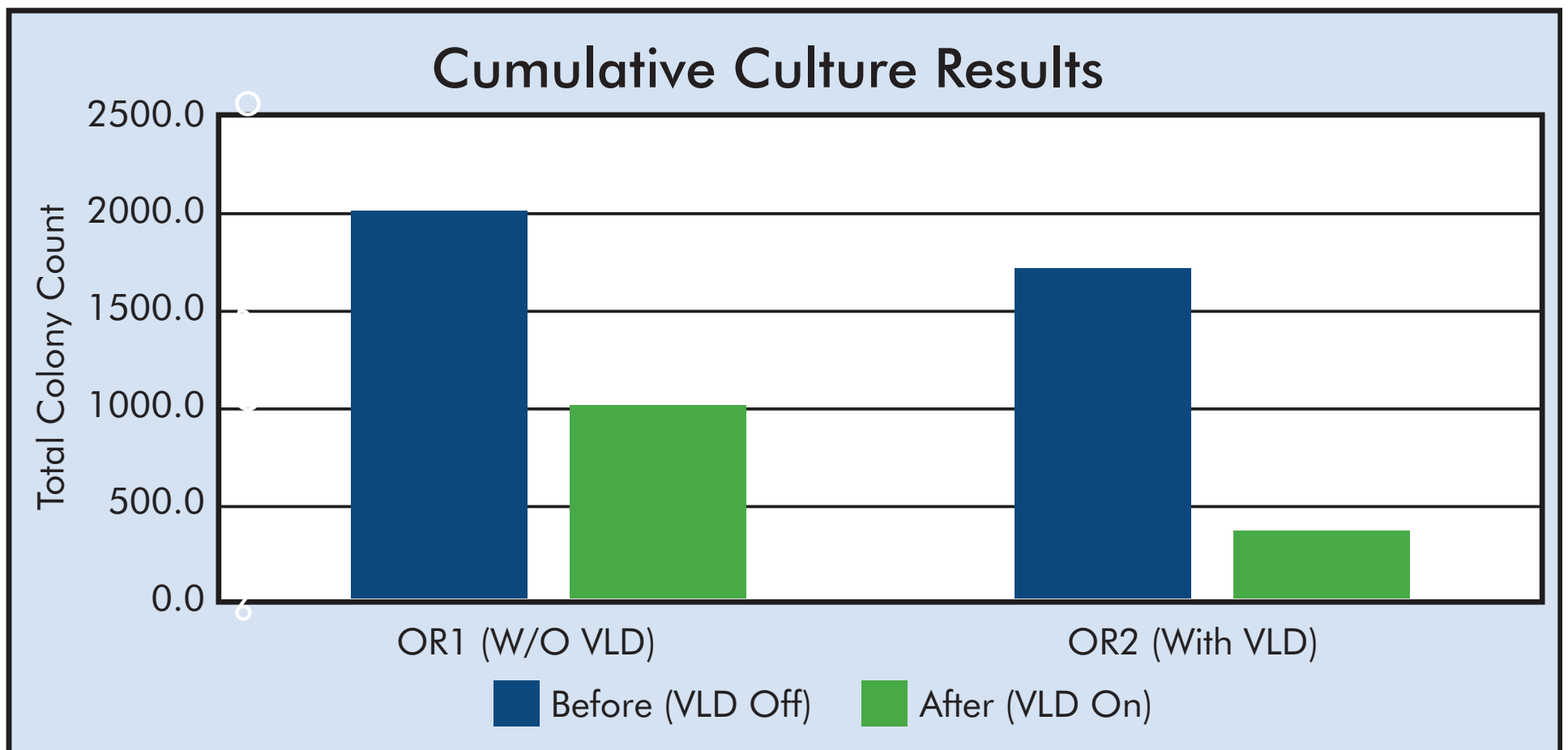
²Loftus R.W., et. al. "Transmission of Pathogenic Bacterial Organisms in the Anesthesia Work Area", Anesthesiology 2008;109:399-407; Birgand, G., et al. "Air contamination for predicting wound contamination in clean surgery: A large multicenter study", AJIC 2015; 43:516-521; Edmiston, C., et. al. "Molecular epidemiology of microbial contamination in the operating room environment: Is there a risk for infection?", Surgery 2005; 138(4):573-582; Boyce, J.M. "Evidence in Support of Covering the Hair of OR Personnel", AORN Journal 2014; 99(1):4-8

³Catalanotti A., et. al. "Influence of pulsed-xenon ultraviolet light-based environmental disinfection on surgical site infections", Am J Infect Control 2016; 44:e99-e101

Results

The results from the test room show a continuous, average bacterial reduction of between 56%-88% from the sampled surfaces as compared to those in the two weeks before and after the VLD system installation. Infections were tracked for 12 months and showed a 73% reduction in the test room as compared to the baseline period.

Room	Oct-2015 to Oct-2016		Oct-2016 to Oct-2017		SSI Change	Bacterial Reduction	P-Value
	# of Cases	# of SSI	# of Cases	# of SSI			
OR-1 (Adjacent Control)	662	8	660	2	$\geq -75\%$	$\geq -62\%$	0.029
OR-2 (w/IC)	788	11	850	3	$\geq -73\%$	$\geq -85\%$	0.011
OR-3 (Distant Control)	751	6	809	7	$\leq +17\%$	Not Measured	Not Measured
Total	2201		2319				



Conclusion

These results combined with previous studies related to improved environmental hygiene in the OR demonstrate that continuous environmental disinfection plays a role in reducing surgical site infections.

- SSI prevention requires multiple activities throughout the entire perioperative and postoperative time.
- We have to keep asking “What more can we do?”
- VLD provides another means of protection for our patients by continuously reducing bacteria in the OR environment.
- Lights may provide greater benefit in outcomes when paired with a robust SSI prevention program.



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