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### Dilute Hydrogen Peroxide Technology for Reduction of Microbial Colonization in the Hospital Setting

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**Background:** It is estimated that hospital-acquired infections (HAIs) cost US hospitals over \$30 billion annually. Dilute hydrogen peroxide (DHP) technology is a new patented technology that utilizes ambient air to produce hydrogen peroxide as a near-ideal gas, creating concentrations of peroxide that are well below the Environmental Protection Agency safety thresholds. In laboratory testing, DHP has demonstrated potent disinfective activity against a variety of bacteria, fungi, and viruses.

**Methods:** DHP technology has never been studied in the healthcare environment. In this study, DHP was incorporated into a community hospital's 34-bed Cardiovascular/Telemetry (CV-Tele) unit's existing heating-ventilation-air-conditioning (HVAC) system. The study was designed to answer the question: Does DHP reduce microbial contamination in the hospital unit? In phase one of the study, culture samples were taken from functioning hospital rooms and common work areas before and after standard disinfection to establish a baseline of microbial colonization before the application of DHP technology. In phase two, samples were taken from the same rooms and work areas daily for one week after the institution of DHP technology.

**Results:** A significant reduction in microbial colonization was observed over seven days after instituting DHP technology as shown in Figure One. Complete eradication of *S. aureus*, *Candida parapsilosis*, *Pseudomonas putida*, *Flavobacterium meningosepticum*, *Pseudomonas picketti*, and *Citrobacter* was seen at seven days. In addition, a reduction in *Alcaligenes* (68%), *Pseudomonas aeruginosa* (95%), and *Enterobacter* (50%) was seen from time of terminal cleaning to seven days. Conversely, an increase in mold species was observed from post-cleaning to seven days.

FIGURE ONE	CFU Count (per 100mm)			Pre-Cleaning to 187 hour	Post-Cleaning to 187 hour
	Pre-Cleaning	Post-Cleaning	187 Hours	Reduction (%)	Reduction (%)
<b>Microbe</b>					
<i>S. Aureus</i>	8	0	0	100%	NA
<i>Alcaligenes Xylooxidans</i>	29	28	9	69%	68%
Mold	28	15	21	25%	-40%
<i>Candida Parapsilosis</i>	3	1	0	100%	100%
<i>Pseudomonas Aeruginosa</i>	25	20	1	96%	95%
<i>Enterobacter</i>	0	2	1	NA	50%
<i>Pseudomonas Putida</i>	2	0	0	100%	100%
<i>Flavobacterium Meningosepticum</i>	3	0	0	100%	100%
<i>Pseudomonas Picketti</i>	4	0	0	100%	100%
<i>Citrobacter</i>	23	11	0	100%	100%
<i>Corynebacteria</i>	0	9	0	NA	100%



**Conclusions:** DHP technology demonstrates activity against a variety of pathogenic microbes. The data strongly suggest that DHP effectively reduces microbial counts in the hospital setting which may help reduce hospital-acquired infection rates. Further study into the effects of DHP on HAIs is indicated.

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