209 Enhanced Environmental Cleaning with Hydrogen Peroxide (H2O2) gas and the effect on Hospital-acquired infection (HAI) rates and acquisition of methicillin resistant Staph aureus (MRSA) and vancomycin resistant enterococci (VRE)

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Background: The University of Pittsburgh Medical Center, Presbyterian is an 766-bed tertiary care facility. The Cardiac Thoracic intensive critical care (CTICU) consists of 2 units: CT10 & CT11, each with 10 beds and similar populations. In 12/08, the CIMR™ Infection Control Technology was installed in CT11. This technology is an ozone-free process that continuously disinfects viruses, bacteria, and fungi by producing 0.02 ppm of hydrogen peroxide (H2O2) gas from oxygen and water vapor in the air. This methodology found that within 24 hours, 96.4% to 99.9% microbial reduction was noted of surfaces contaminated with Staphylococcus aureus, E-Coli, Listeria monocytogenes, Candida albicans, Streptococcus, and Pseudomonas and thereafter new microbe reduction was virtually instantaneous. (Kansas State University and Sandia Labs) **Objective:** It was hypothesized that HAIs and MRSA/VRE acquisitions (As) would decrease if H2O2 disinfectant was employed. To test this technology in a healthcare setting, a test (T) unit was selected and the H2O2 unit was installed.

Methods: CT11 was selected as the T unit where on average 59% of patients were colonized with at least 1 significant pathogen. CT10 served as the control (C) unit. The unit was installed in the air handler unit (AHU). Positioning the H2O2 unit in the AHU as opposed to the air ducts serving the CT11 was done to ensure that all air entering the CT was treated and not mixed with untreated air. HAIs were defined using National Health System Network (NHSN) criteria. MRSA and VRE screening is routine in our hospital and "As" was defined as a positive following a negative screen. A six month period of HAI and MRSA/VRE As were compared pre and post installation and the T unit was compared to the C unit. **Results:**

Periods	HAIs	Patient Days	HAI rate	OR (CI)	P value	MRSA As	MRSA A rate	OR (CI)	P value	VRE As	VRE A rate	OR (CI)	P value
CT11 Pre 1/08-7/08	19	2158	8.8	1.89 (0.81,4.53)	0.16	4	1.9	1.19 (0.23,6.68)	1.0	20	9.3	2.25 (0.9,5.6)	0.07
CT11 Post 1/09-7/09	9	1928	4.6			3	1.5			8	4.1		
CT10 Pre 1/08-7/08	26	1854	14.0	1.35 (0.76,2.41)	0.38	1	0.5	0.52 (0.02,7.25)	1.0	7	3.8	0.5 (0.2,1.3)	0.16
CT10 Post 1/09-7/09	20	1924	10.3			2	1.0			15	7.8		
CT11 vs CT10 Pre			HAI rate	0.62 (0.33,1.17)	0.16	MRSA A rate		3.44 (0.37,80.9)	0.38	VRE A rate		2.4 (1.0,6.4)	0.05
CT11 vs CT10 Post			HAI rate	0.45 (0.19,1.03)	0.06	MRSA A rate		1.5 (0.2,12.8)	1.0	VRE A rate		0.5 (0.2,1.3)	0.21
All rates in #/1,000 pt-days													

Conclusions:

- CT11 HAI rate was reduced by 48% (8.8 vs 4.6) and the VRE A rate reduced by 56% (9.3 vs 4.1) during the post period, MRSA A rate was unchanged (1.5 vs 1.9).
- VRE A rates were significantly lower in the T vs C unit in the post period and the HAI rate trended towards significance. MRSA A was low in both time periods and in both units.
- Ongoing analysis is planned and further investigation of this technology is merited.