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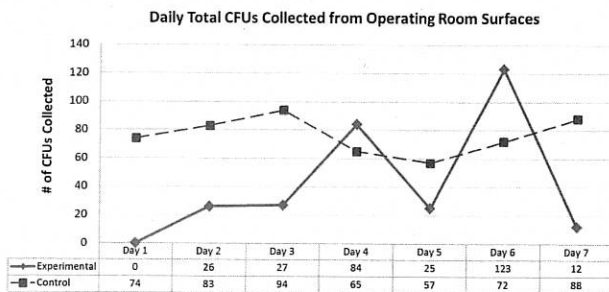
Decontaminating the Operating Room Environment Utilizing Persistent Technology

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BACKGROUND: The increasing complexity of the modern day operating room is making the task of adequately decontaminating this environment ever more challenging. Relying on standard cleaning procedures to maintain a safe operating environment has proven to be inadequate. This study looks at enhancing standard OR cleaning procedures with periodic decontamination of the environment, utilizing an electrostatically applied 40-micron quaternary ammonium and trichloroamine spray, to significantly reduce residual microbial contamination remaining after standard terminal cleaning.

METHODS: The efficacy of the spray was tested utilizing a blind randomized control trial. The study included 4 operating rooms, 2 experimental and 2 controlled. Each room was cultured in 5 identical locations for 7 days totaling 150 samples. The experimental group was treated with the solution, and then resampled to verify successful application. Each room was cultured daily to determine if the experimental group had a significant reduction in colony forming units (CFU).

RESULTS: There was an immediate statistically significant difference between the pre-spray and post-spray cultures collected 30 minutes after application in the experimental rooms, $p = 0.0154$, 95% CI [0.77, 5.63]. Five days after application of the solution, the experimental group exhibited a statistically significant reduction in CFUs, $p = 0.0162$, 95% CI [-7.64, -0.80]. When testing for persistence beyond 5 days, there was not quite a statistically significant difference between the two groups at 7 days, $p = 0.0519$, 95% CI [-6.77, 0.03].



CONCLUSIONS: This study demonstrates that disinfecting an operating room environment with a quaternary ammonium and trichloroamine solution, utilizing a 40-micron electrostatic sprayer, will significantly reduce CFUs remaining after standard terminal cleaning. Furthermore, the disinfectant maintained a significant reduction in CFUs for 5 days. To determine persistent disinfection for up to 7 days or more requires further research. This might include trialing several routine applications to reduce the pre-established microbial reservoir.