



A Novel Antimicrobial Surface Coating Demonstrates Persistent Reduction of both Microbial Burden and Healthcare-Associated Infections at Two High-acuity Hospitals

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Background: Healthcare-Associated Infections (HAIs) pose substantial risks to patients and hospitals. Surface disinfection practices in hospitals have limited efficacy because surfaces are frequently and easily re-contaminated. A need for innovative technologies to address these challenges exists. One such innovation is a novel antimicrobial surface coating with potential to persistently reduce environmental bacterial load. Here, we use a multicenter, non-randomized, controlled, pre-post study design to assess the impact of an antimicrobial surface coating on environmental bioburden and HAIs at two high acuity hospitals.

Methods: An antimicrobial surface coating was applied via electrostatic spray to patient rooms and common areas in three selected units at each hospital. Quantitative surface cultures were sent to an independent microbiology laboratory pre- and 11-weeks post-application to identify total bacterial colony forming units (CFU). HAI outcomes from treatment and contemporaneous control units were assessed using National Healthcare Safety Network protocols for multidrug-resistant organism bloodstream infections (MDRO-BSI) and *Clostridium difficile* infections (CDI). We used Poisson regression models to compare HAI rates for treated and untreated units for 12-months before and after application of surface coating.

Results: Both hospitals showed statistically significant decreases in total bacterial CFU following application of the antimicrobial surface coating (64% and 75% decreases in Hospitals A and B, respectively, $p < 0.0001$). Across both hospitals, there was a 36% decline in pooled HAIs (hospital-onset MDRO-BSI + CDI) following application of surface coating in treated units (IRR=0.64, 95% CI=0.44-0.91), and no decline in HAIs over the same period in non-treated units (IRR=1.20, 95% CI=0.92-1.55).

Conclusions: Significant and persistent reductions in both microbial burden and associated HAIs occurred in units where surfaces were treated with antimicrobial surface coating, suggesting the potential for improved patient outcomes and reduced healthcare costs. Optimal implementation methods and long-term impact should be assessed with further study of this novel environmental control intervention.