

Study Summary: The Clorox® Total 360® System and Clorox Healthcare® Hydrogen Peroxide Cleaner Disinfectant Wipes bundle effectively reduces the bioburden in fire and emergency response vehicles

Purpose:

To examine the impact of the Clorox® Total 360® System and Clorox Healthcare® Hydrogen Peroxide Cleaner Disinfectant Wipes bundle on environmental cleanliness in fire rescue stations in Pasco County, Fla.

Background:

Proper disinfection of emergency response vehicles, which can include ambulances, buses and fire trucks, is an important component of the infection prevention and control equation because the people that operate these vehicles and the patients transported in them can come into regular contact with disease-causing pathogens. Patients, paramedics, emergency medical technicians (EMTs), and fire fighters all risk exposure to blood-borne pathogens in particular (e.g., hepatitis B and C, and HIV), and can also come in to contact with antibiotic-resistant bacteria like methicillin-resistant *Staphylococcus aureus* (MRSA). Multiple studies have examined this issue and concluded that pathogens are in fact present in emergency response vehicles, and the risk of transmission for workers using and operating these vehicles in particular is increased as a result.¹⁻⁴

Overview:

The goal of this study was to examine the impact of the Clorox® Total 360® electrostatic sprayer system and Clorox Healthcare® Hydrogen Peroxide Cleaner Disinfectant Wipes on environmental cleanliness in fire rescue stations in Pasco County, Fla. Environmental swabbing of high touch surfaces in vehicles and station common areas showed that the Clorox® Total 360® System and Clorox Healthcare® Hydrogen Peroxide Cleaner Disinfectant wipes bundle effectively reduced bacteria, yeast and mold levels.

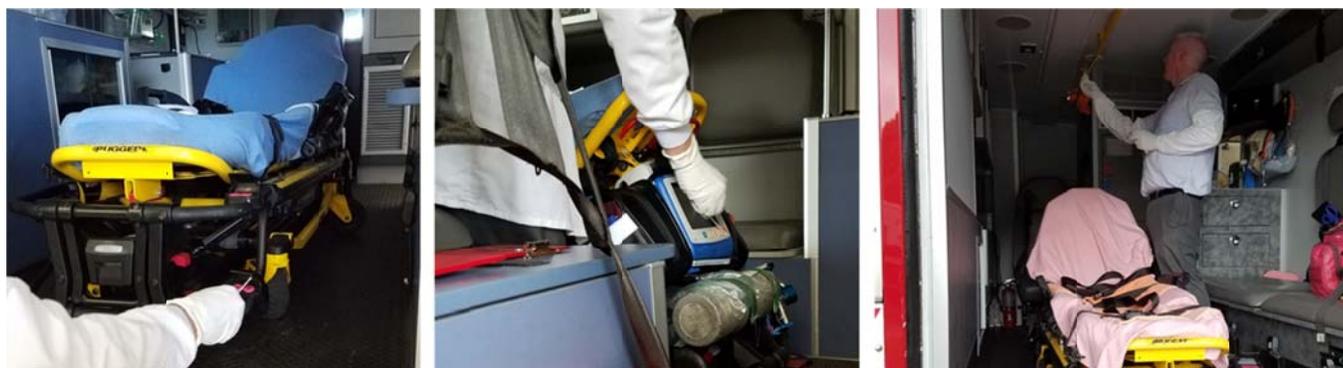


Figure 1. Emergency vehicles were cleaned and disinfected using Clorox Healthcare® Hydrogen Peroxide Cleaner Disinfectant Wipes and the Clorox Commercial Solutions® Clorox® Total 360® Disinfectant Cleaner₁, sprayed through the Clorox® Total 360® System. Examples of vehicle sites swabbed for bacteria, yeast and mold are shown [here](#).

Method:

High touch surfaces (65 total) in 11 vehicles and two fire station common areas at facilities in Pasco County, Fla., were swabbed before and after disinfection with Clorox Healthcare® Hydrogen Peroxide Cleaner Disinfectant Wipes and the Clorox Commercial Solutions® Clorox® Total 360® Disinfectant Cleaner₁, sprayed through the Clorox® Total 360® System. Vehicle surfaces swabbed included seats, cabinet doors, door handles, stretchers, medical equipment, keyboards, steering wheels, shared headsets and hand rails (Figure 1). Surfaces swabbed inside the stations included the refrigerator handle, TV remote, radio and alarm buttons, door handles and locker handles. Colony forming units

were quantified using standard microbiological techniques. Statistical analysis was performed on the resulting bacterial counts using Minitab® 18.1.

Results:

Environmental swabbing showed a statistically significant decrease in total bacteria, yeast and mold counts following use of the Clorox® Total 360® System and Clorox Healthcare® Hydrogen Peroxide Cleaner Disinfectant Wipes. Prior to disinfection, the mean bacteria, yeast and mold count for all surfaces combined was 254,637 CFUs. Following disinfection, the mean counts were reduced by 96% to 9,392 (p-value=0.000).

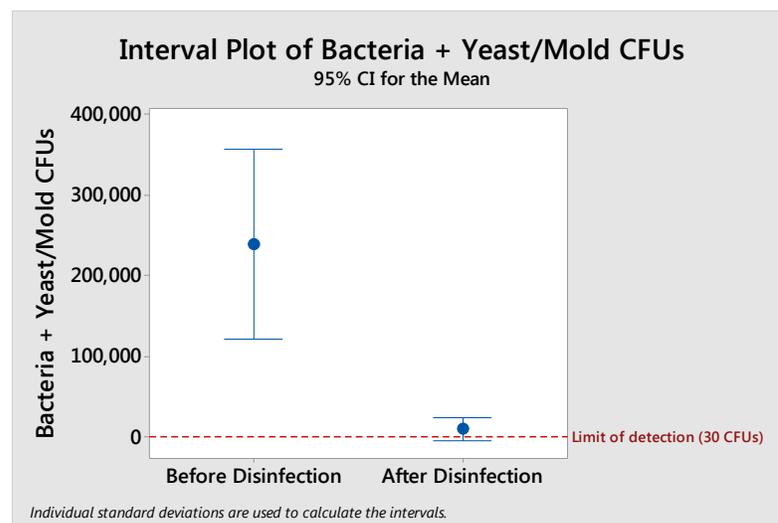


Figure 2. Average bacteria, yeast and mold counts for all surfaces combined, before and after disinfection. Sites with colony forming units (CFUs) that were too numerous to count (TNTC) were counted as 1,800,000 CFUs for the purposes of statistical analysis. The lower limit of detection, 30 CFUs, is indicated by a red dotted line.

Conclusions:

Cleaning and disinfection of surfaces in Pasco County rescue vehicles and facility common areas with the Clorox® Total 360® System and Clorox Healthcare® Hydrogen Peroxide Cleaner Disinfectant Wipes effectively reduced bacterial contamination, helping to eliminate the environment as a source of infection. Pasco County has since incorporated this disinfectant bundle into their vehicle decontamination protocols. This study was conducted over two days, but daily cleaning and disinfection would be expected to reduce and keep the level of disease-causing pathogens at or near zero, helping to prevent infections in the station staff and the patients they transport.

For more information on the Clorox® Total 360® System, please visit www.CloroxTotal360.com

References:

- (1) Roberts, M. C.; Soge, O. O.; No, D.; Beck, N. K.; Meschke, J. S. Isolation and Characterization of Methicillin-Resistant *Staphylococcus Aureus* from Fire Stations in Two Northwest Fire Districts. *Am. J. Infect. Control* **2011**, *39* (5), 382–389.
- (2) Rago, J. V.; Buhs, L. K.; Makarovaite, V.; Patel, E.; Pomeroy, M.; Yasmine, C. Detection and Analysis of *Staphylococcus Aureus* Isolates Found in Ambulances in the Chicago Metropolitan Area. *Am. J. Infect. Control* **2012**, *40* (3), 201–205.
- (3) Roline, C. E.; Crumpecker, C.; Dunn, T. M. Can Methicillin-Resistant *Staphylococcus Aureus* Be Found in an Ambulance Fleet? *Prehospital Emerg. Care* **2007**, *11* (2), 241–244.
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