



HEALTHCARE™

# Hydrogen Peroxide-Based Disinfectants in Healthcare Settings

Summary of Clinical Evidence



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## Spray-based disinfection methods may be useful in behavioral health care facilities where health care providers institute cleaning and disinfection procedures

**Facility:** Behavioral healthcare facility

**Purpose:**

To evaluate the utility and usability of wipe and spray versions of an improved hydrogen peroxide cleaner disinfectant to clean and disinfect high-use items in behavioral health settings.

**Methods:**

High-use items were cleaned and disinfected either after each use, or monthly, using either Clorox Healthcare® Hydrogen Peroxide Cleaner Disinfectant Wipes or Cleaner Disinfectant spray. The items were evaluated weekly for adenosine triphosphate (ATP) relative light units using a commercially available ATP meter. Staff were also surveyed for the preference for each method of cleaning items.

**Results:**

Use of the spray resulted in lower RLUs on items compared to the wipe when they were cleaned either after each use or monthly.

Five of the six staff surveyed preferred cleaning toys with the spray while two preferred cleaning solid surfaces with the spray. The lower RLU counts obtained when using the spray-based application may have been the result of more regular use of the spray than the wipes. Users may have considered the spray to be easier to use on irregularly-shaped objects

Cleaning occasion, product form	RLU	P-value
After each use, spray	1,767	0.002
After each use, wipe	22,892	
Monthly, spray	2,296	<0.001
Monthly, wipe	19,371	

Spray-based disinfection methods may be useful in health care facilities where health care staff drive performance of cleaning and disinfection.

**Reference:**

Wiemken TL, Powell W, Carrico R, Mattingly WA, Kelley RR, Furmanek SP, Johnson D, Ramirez. Disinfectant sprays versus wipes: Applications in behavioral health. American Journal of Infection Control, 2016; 44:1698-9.

## Contamination of soft surfaces with healthcare-associated pathogens could be reduced by simple and effective spraying with Clorox Healthcare<sup>®</sup> Hydrogen Peroxide Cleaner Disinfectant

**Facilities:** Louis Stokes Cleveland Veteran's Affairs Medical Center and a community hospital

### **Purpose:**

To evaluate the ability of two disinfectants, Clorox Healthcare<sup>®</sup> Hydrogen Peroxide Cleaner Disinfectant spray and 1:10 household bleach to decontaminate a range of soft surfaces in inpatient and outpatient settings in two hospitals.

### **Methods:**

In the laboratory, the ability of each disinfectant to kill methicillin-resistant *Staphylococcus aureus* (MRSA) and three strains of vancomycin-resistant enterococci (VRE) was evaluated by inoculating swatches with  $6\log_{10}$  of the microorganisms before spraying the swatches with the disinfectants. Following a 1 minute contact time, the swatches were neutralized and cultured to determine remaining microbial load.

In the two hospitals, surfaces including chairs, privacy curtains and blood pressure cuffs were sampled. A total of 433 samples were taken from inpatient rooms, outpatient rooms, physical therapy rooms and waiting rooms. For sampling, half of an identified area was swabbed and the sample cultured. The area was sprayed with the hydrogen peroxide disinfectant until wet and following a 1 minute contact time, the remaining area was swabbed and the sample cultured to determine the microbial load.

### **Results:**

In the laboratory study, use of both disinfectants resulted in a  $>6\log_{10}$  reduction of VRE and MRSA following a 1 minute contact time in the presence or absence of organic soil.

On soft surfaces in the hospital, spraying with the hydrogen peroxide disinfectant resulted in a decrease in the proportion of surfaces contaminated with bacteria from 90% (389/433 surfaces) to 7% (32/430 surfaces), a 90% reduction. The mean colony-forming units (CFU) was also decreased by almost 95%. Following spraying, no gram-negative bacilli or VRE was isolated from any surface previously contaminated and MRSA was only recovered from 2/433 surfaces..

Contamination of soft surfaces with health care associated pathogens could be reduced by simple and effective spraying with this improved hydrogen peroxide product.

### **Reference:**

Cadnum JS, Mana TSC, Jencson A, Thota P, Kundrapu S, Donskey CJ. Effectiveness of a hydrogen peroxide spray for decontamination of soft surfaces in hospitals. *American Journal of Infection Control*, 2015; 43:1357-9.

## Use of Clorox Healthcare<sup>®</sup> Hydrogen Peroxide Cleaner Disinfectant spray is an alternative to laundering privacy curtains between patients and could be integrated into health care practices

**Facility:** University of North Carolina School of Medicine

**Purpose:**

This study evaluated the ability of Clorox Healthcare<sup>®</sup> Hydrogen Peroxide Cleaner Disinfectant spray to reduce microbial contamination on hospital privacy curtains

**Methods:**

The grab area of privacy curtains in 37 hospital rooms from three different areas of the hospital was sampled using RODAC plates. Different areas of the same curtain grab areas were sampled again with RODAC plates after spraying with Clorox Healthcare<sup>®</sup> Hydrogen Peroxide Cleaner Disinfectant. The RODAC plates were cultured to determine the level of microbial contamination on the curtains.

<p><b>22</b> ISOLATION ROOMS <i>C. difficile</i>, VRE, <i>S. aureus</i>, another MDRO</p> 	<p><b>5</b> NON-ISOLATION ROOMS</p> 	<p><b>10</b> OUTPATIENT ROOMS (ED)</p> 
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**Results:**

The privacy curtains in all 37 rooms were contaminated prior to disinfection with an average 260.6 colony-forming units (CFU) per curtain. The number of pathogens that can cause healthcare-associated infections averaged 12 CFU per curtain. Privacy curtains in ICU Isolation rooms were most contaminated

Following treatment with the hydrogen peroxide spray, the overall microbial load on the curtain grab areas was reduced by 96.8%. In ICU rooms of patients on contact precautions, vancomycin-resistant enterococci (VRE) and methicillin-resistant *Staphylococcus aureus* (MRSA) were completely eliminated. The cost of decontaminating a privacy curtain with this product is \$0.01 for 3 sprays per curtain. The cost to replace a curtain based on EVS salary is estimated at \$4.72 per curtain, not including laundry and turnover costs.

Using improved hydrogen peroxide IHP is an alternative to laundering privacy curtains between patients and could be integrated into health care practices.

**Reference:**

Rutala WA, Gergen MF, Sickbert-Bennett EE, Williams D, Weber DJ. Effectiveness of improved hydrogen peroxide in decontaminating privacy curtains contaminated with multidrug-resistant pathogens. American Journal of Infection Control, 2014; 42(4):426-8

## Clorox Healthcare<sup>®</sup> Hydrogen Peroxide Cleaner Disinfectant can be an option for between-case cleaning and disinfection in the operating room.

**Facility:** A single hospital in Louisville, KY

**Purpose:**

To evaluate the effectiveness of an improved hydrogen peroxide cleaner disinfectant used between-case in the operating room and how its use impacted the incidence of surgical site infections.

**Methods:**

Prior to surgery, 10 sites in the operating room including the overhead light handle, cart drawer, IV fluid pole knob and hanger, the chair seat and OR table were swabbed for adenosine triphosphate (ATP) and relative light units (RLU) determined for each site. After the first surgery, the sites were swabbed again, and a fluorescent marker placed at each site. The room was then cleaned and disinfected using Clorox Healthcare<sup>®</sup> Hydrogen Peroxide Cleaner Disinfectant. Sites were re-swabbed and fluorescent dye removal evaluated using a black light. This process was repeated for three consecutive surgeries during the same day for eight days. Five sites with RLU <1,000 (considered to be clean) and five sites with RLU >1,000 (considered to be dirty) were evaluated for aerobic colony counts using RODAC contact plates.

**Results:**

Cleaning efficacy as measured by RLU values in three ORs ranged from 84% after the third surgery of the day to 96% after the first surgery. Overall, 84% of the 10 sites had a compliance score of 1 (fluorescent marker partially removed). No colony-forming units were observed on any of the 10 RODAC contact plates. No surgical site infections were reported during the study period, although the study sample size meant that any reduction in SSI could not be evaluated.

This ready to use improved hydrogen peroxide cleaner disinfectant was shown to be effective at removing ATP from surfaces. High compliance with cleaning practices was demonstrated, which may have been facilitated by the ready-to-use product which consists of pre-moistened wipes, has a short dwell time and has good surface compatibility. This product can be considered as a good option for between-case cleaning and disinfection in the operating room.

**Reference:**

Wiemken TL, Curran DR, Kelley RR, Pacholski EB, Carrico RM, Peyrani P, Ramirez JA. Evaluation of the effectiveness of improved hydrogen peroxide in the operating room. *American Journal of Infection Control*, 2014; 42:1004-5.

## Clorox Healthcare<sup>®</sup> Hydrogen Peroxide Cleaner Disinfectant Wipes is a highly effective surface disinfectant

**Facility:** Yale-New Haven Hospital, New Haven, CT.

**Purpose:**

This study evaluated the efficacy of an activated hydrogen peroxide cleaner disinfectant wipe using aerobic colony counts and an adenosine triphosphate bioluminescence assay.

**Methods:** In a 500-bed university-affiliated hospital, ten high-touch surfaces in a convenience sample of 72 patient rooms were sampled before and after cleaning with Clorox Healthcare<sup>®</sup> Hydrogen Peroxide Cleaner Disinfectant Wipes. High-touch surfaces included bedside rails, over-bed table, television remote control, telephone, bedside panel, chair arm, blood pressure cuff, toilet seat, grab bar, and faucet handles.

In the first sampling method, agar plates were used to measure aerobic colony counts (ACC). The number of sites with less than 2.5 and less than 0.4 colony-forming units (cfu)/cm<sup>2</sup> was recorded. In the second method, an adenosine triphosphate (ATP) bioluminescence assay system was used to sample surfaces and those with relative light units of <250 were considered to be clean.

**Results:**

After cleaning, 99% of 704 cultures yielded <2.5 cfu/cm<sup>2</sup> of aerobic colony counts (ACC); 96% yielded <0.4cfu/cm<sup>2</sup>; 75% of surfaces yielded no growth after cleaning. The median ACC before cleaning was 63.1 cfu and 0 cfu after cleaning. Between 54-89% of the 10 sites yielded no growth after cleaning.

557 sites had ATP readings of over 250 RLU prior to cleaning; after cleaning, 70% of these sites had ATP readings <250 RLU and were considered clean. Between 43-97% of the 10 sites yielded less than 250 RLU. The personnel cleaning experienced no adverse effects when using the product.

The Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant Wipe evaluated in the study proved to be an effective surface disinfectant, as reflected by ACC and ATP bioluminescence assays.

**Reference:**

Boyce JM, Havill NL. Evaluation of a new hydrogen peroxide wipe disinfectant. Infection Control and Hospital Epidemiology 2013; 34(5):521-523.

## Improved hydrogen peroxide products are an option to clean and disinfect non-critical environmental surfaces and patient equipment

**Facility:** University of North Carolina Health Care, Chapel Hill, NC.

**Purpose:**

This study compared the antimicrobial activity of two improved hydrogen peroxide formulations against older, standard hydrogen peroxide formulations and a quaternary ammonium chloride (quat) formulation.

**Methods:** The quantitative carrier test, a standard of ASTM International was used to determine the antimicrobial activity of four products against methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *enterococci* (VRE) and multi-drug resistant *Acinetobacter baumannii* (MDR *A. baumannii*). The improved hydrogen peroxide disinfectants were Clorox Healthcare® Hydrogen Peroxide Cleaner Disinfectant (The Clorox Company), Oxivir TB (Diversey), and 3% hydrogen peroxide solution (Owens and Minor). The quat disinfectant was A456-II (1:256 dilution) (Ecolab).

**Results:**

The two improved hydrogen peroxide products resulted in a  $>6\log_{10}$  reduction in all pathogens after 30 seconds, even in the presence of 5% organic soil. They were similar or superior in efficacy to the QUAT tested. Both improved hydrogen peroxide products and the quat product were significantly more effective than standard hydrogen peroxide solutions.

Improved hydrogen peroxide products such as Clorox Healthcare® Hydrogen Peroxide Cleaner Disinfectant and Oxivir-TB are an option to clean and disinfect non-critical environmental surfaces and patient equipment.

**Reference:**

Rutala, WA, Gergen MF, Weber DJ. Efficacy of Improved Hydrogen Peroxide against Important Healthcare-Associated Pathogens. *Infection Control and Hospital Epidemiology*, 2012; 33(11):1159-1161.