Hospital Testing Report

MICROCHEM

The following report details the efficacy to continuously reduce pathogens on surfaces in a hospital setting.

IOWA HOSPITAL

Project Overview

The objective of the hospital trial was to validate the efficacy of the CASPR MedikTM continuous disinfection technology in reducing the levels of Bacterial and Fungal micro-burdens (MB) and the incidence of MRSA and VRE across the surfaces of a 29 bed Pulmonary Care unit. The trial included tracking the impact of installing the technology on the absenteeism rates for the staff dedicated to the unit.

Scope

CASPR MedikTM units were installed with the intention of treating all of the surfaces of the unit including patient rooms, nurses' stations, administrative offices, and public areas. Extensive environmental swabbing was utilized to determine the baseline level of MB prior to activation and then analyze the impact of the introduction of low levels of Hydrogen Peroxide into the environment of care. There were three different sets of data that were collected to measure the impact:

1. Pre-activation environmental swabbing was conducted according to a precise protocol on 52 locations in eight patient rooms, the nurses' stations, and nurses' computer room to establish a baseline for MB levels and the incidence of MRSA and VRE. During post-activation, the same locations were swabbed every four weeks to measure the impact of the technology on the level of MB and the incidence of MRSA and VRE.

2. Human Resources collected the absenteeism rates for the dedicated staff in the unit for the four-month trial and compared the data of the same group of employees for the same four month period the previous year.

3. The facilities team identified labor and expense avoidance associated with implementing the technology.

Results

- The continuous application of low levels of oxidizing molecules were found to exert a significant 78% and 97% reduction in the average Bacterial and Fungal MB found on the surfaces (1415 cfu/100"2 and 328cfu/100"2 for Bacteria and Fungi, respectively)
- The incidence of MRSA and VRE was reduced by 63% and 70% respectively
- During the trial the unit realized a 44% reduction in employee absenteeism for the four months (Nov – Feb) in comparison to the same period in the previous year (reduced absenteeism by 550 hours from 1313 to 762)
- Completely eliminated the use of Xenex UV disinfection machine and the labor and contract maintenance costs associated with it
- Increased unit throughput by shortening room turnover time by 30 minutes.

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OKLAHOMA HOSPITAL

Phase I

The contribution of surface contamination with pathogens to the development of HAIs has increasingly been linked in recent research. To measure the effectiveness of CASPR MedikTM at reducing surface contamination, an environmental swabbing was conducted in 50 locations to establish a baseline level for bacterial and fungal micro-burden levels as well as the incidence of MRSA. Post-activation swabbing occurred for three months following the baseline to measure the impact of the technology. Each test was conducted in a consistent manner to the initial baseline:

- Environmental swabbing was conducted every four weeks on Tuesdays at 5:30am prior to routine cleaning
- The same locations were swabbed according to a precise method and then expedited to MicroChem

Results

The average Bacteria micro-burden found in the pre-intervention testing was over 20x higher (8.9M CFU/2in.2) than the average found during the intervention (410K CFU/2in.2) :

- **Baseline:** 8,970,280
- **Test 1:** 303,773; 96.6% Reduction
- **Test 2:** 174,240; 99.96% Reduction
- **Test 3:** 752,895; 91.69% Reduction

The average Fungal micro-burden was also considerably reduced with 30 of 50 locations demonstrating greater than 90% reduction:

- **Baseline:** 1,679,881
- **Test 1:** No Fungal Results (Lab Contamination)
- **Test 2:** 88,419; 94.74% Reduction
- **Test 3:** 697,966; 58.5% Reduction

In the pre-intervention test for MRSA, 30 out of 42 locations and 9 out of 10 rooms were positive. All post-activation tests showed substantial reduction in positives; MRSA positives reduced to 2 out of 50 test locations:

- **Baseline:** 2,443
- **Test 1:** 92.8% Reduction
- **Test 2:** 1,591; 34.9% Reduction
- **Test 3:** 86; 96.59% Reduction

Conclusion

- >98% reduction in Bacteria micro-burden found on high-touch points
- >90% reduction in Fungal micro-burden averages
- 93% reduction of positive MRSA locations in final testing

Phase II

After the completion of Phase I, new testing was conducted to compare the miro-burden levels of the five treated rooms to five corresponding rooms that did not have CASPR MedikTM installed:

- 351 vs 361
- 353 vs 363
- 355 vs 365
- 357 vs 367
- 359 vs 369

Results

The results of Phase II were consistent with previous tests with the exception of three data points. Below is a comparison of Treated vs Untreated rooms, highlighting all with an 80%+ reduction:

Treated vs Untreated Room #	Bacterial Count % Reduction	Fungal Average % Reduction	MRSA Count % Reduction
351 vs 361	99.11%	99.27%	81.50%
353 vs 363	82.98%	84.84%	100.00%
355 vs 365	90.38%	93.32%	-2803.93%
357 vs 367	88.86%	80.28%	100.00%
359 vs 369	0.47%	-2.53%	100.00%

Conclusion

The Untreated rooms had more than 10x the amount of bacteria count (91% reduction) and more than 20x the amount of fungal average (95% reduction).

The MRSA count in room 355 was speculatively attributed to a super-shedder. However, looking at a pure room contamination comparison, only 2 out of 5 Treated rooms had MRSA while 5 out of 5 Untreated rooms had MRSA.

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