

The 7th Annual Health Risk Management Forum

Place: Arezzo Expo

The results of the research performed at Department of Rehabilitation Medicine At The S. Giorgio Hospital

Main Speakers:

Prof. Sante **Mazzacane** (Scientific Director of CIAS- Centro Ricerche Inquinamento fisico chimico microbiologico ambienti ad alta sterilit – Università di Ferrara).

Dr. Paola M. **Antonioli** (President ANMDO Emilia-Romagna- Direttore Struttura Dipartimentale, Igiene Ospedaliera – Qualità Servizi Ambientali- Risk Management Azienda Ospedaliero- Universitaria di Ferrara).

Highlights of the presentations:

Prof. Sante Mazzacane:

Chemical disinfectants have significant disadvantages. These traditional cleaning products have components that may have negative environmental effects and often cause allergic reactions or create sensitivities to workers.

It is well documented that there is a maximum number of organisms that can live at one time on a certain surface depending of the substrate. If large numbers of a new organism are introduced into the environment, they will compete for space and will exert pressure on the original organisms.

This is the mechanism by which the inclusion of Class 1 bacteria *Bacillus* spp. in the probiotic cleaning products acts. In the hospital environment the invading *Bacillus* bacteria overwhelm and competitively exclude pathogenic bacteria from the environment.

Biofilm is found commonly in the environment, and within that biofilm pathogenic microorganisms will often be found hiding in the layers. In order to be able to access and control these pathogens it is important to de-construct the biofilm. These products do that.

In summary, the use of the probiotic cleaning products displayed the following advantages:

- a. The pathogen load in the hospital was demonstrated to decrease over the course of time through both in vitro and su campo testing.
- b. This was verified by 14,400 samples that were taken and analyzed. These samples were done in real, operational conditions and on different types of surfaces in the presence of continuous recontamination.
- c. After comparing the cleaning procedures that were used for both the chemical products and the probiotic cleaning products we saw that the probiotic products reduced pathogens by a factor of 70-80% better than the chemical cleaners.

- d. We also demonstrated that when using the chemical cleaning the action of the disinfection of *S. aureus* and *E. coli* was relatively short-lived. *S. aureus* values increased by 80% from the first testing to re-testing six and one-half hours later. *E. coli* values increased by 145% during that time span. (Figure 1.)
- e. In contrast, the probiotic cleaning prolonged the effect of the cleaning. The values of *S. aureus* seven hours after cleaning were 48% what they were 13 hours earlier and values of *E. coli* were 40% of the values from 13 hours later. (Figure 1.)

Figure 1.

Chemical cleaning	30 minutes after disinfection	7 hours after disinfection
S. aureus	54.50 cfu/100 cm ²	97.95 cfu/100 cm ²
E. coli	9.41 cfu/100 cm ²	23.01 cfu/100 cm ²
Probiotic cleaning	6 hours before cleaning	7 hours after cleaning
S. aureus	30.50 cfu/100 cm ²	14.70 cfu/100 cm ²
E. coli	11.16 cfu/100 cm ²	4.60 cfu/100 cm ²

With these results we observed that the effect of suppression caused by the probiotics was stable over the course of time.

The second phase of our research was to determine if the reduction of pathogens in the environment translated into a corresponding reduction in nosocomial infections over a relatively long period of time (14 months).

During this phase of the research we monitored both the microbiological state and the incidence and prevalence of HAI's (hospital-acquired infections). The research was combined with a defined system of sanitization and management of the hospital environment. "

Dr. Paola M. Antonioli: "Our objective in the second phase of the research was to determine if there was a reduction of HAI's as well as a reduction of the microbial contamination in the environment. The results we are presenting are very interesting.

The management of the infective risk involves the patient, visitors and the operator and it has a clinical and economic impact which is relevant. In Europe, an average of 5% of patients acquires an HAI. Of all HAI's 14% are contacted while the patient in the hospital and 16.9% occur after surgery.

While not all HAI's are preventable, our project sought to create a safer environment for patients, workers, caregivers and visitors, while reducing the HAI's through proven and sustainable actions.

For the second phase of the research we chose the Rehab Center S. Giorgio which has 90 beds and a constructed area of 30.000 m².

In December 2011, new cleaning systems were implemented to overcome the use of traditional chemicals. The key elements and macro areas of intervention were: 1) Hand Hygiene, 2) Cleaning of the Health Care Environment by the use of Probiotics and 3) Good hospital practices.

The reduction in the hospital environment of potential pathogens was significant and the load of potential pathogens was reduced dramatically (Figure 2.).

Figure 2.

Overall Reduction of pathogens from probiotic cleaning compared to chemical cleaning	
S. aureus	90%
Pseudomonas	82%
Candida spp.	90%
Coliforms	92%
Acinetobacter spp	78%

From January 2012 to October 2012 there was a reduction was **34.3%** in Hospital Acquired Infections at the Rehab Center S. Giorgio. Our conclusion is that the use of probiotic enhanced products significantly reduces pathogens in the hospital environment for greater durations than disinfectants, and that along with good hospital practices and good hand hygiene there can be significant reductions in Hospital Acquired Infections.

Photos of the Event:

