Reducing Healthcare Associated Infections in Critical Care Units

presented by Infection Controls, Inc.

This white paper examines the effectiveness of the GermBlast process in the critical care setting of a healthcare facility. Critical care patients are often most susceptible to infection due to their health status, comorbidities, and weakened immune system. Infection Controls, Inc. provides the GermBlast Service in order to eliminate dangerous microorganisms and reduce infection rates. This paper outlines what GermBlast is, details of the study, and an analysis of the results.

The Problem

Healthcare associated infections (HAIs) are a growing concern for healthcare facilities. According to the U.S. Department of Health and Human Services, one out of every 20 patients will contract an HAI related to the patient's hospital care. This number is estimated to be even higher in critical care units where patients often have multiple opportunities for infection and are in a weakened state. In addition, reimbursement through CMS and some insurance companies is decreasing for most HAIs.

The root of the problem exists in transmission opportunities in the chain of infection including touch points in rooms and on equipment. These critical touch points are places where an infected patient dwells or places that he/she touches. Hand touch sites are the most common places where cross-infection of HAIs occurs. In fact, studies show that over 50% of critical touch points in a hospital room are not cleaned appropriately.(1)

Infection Controls, Inc. seeks to curb the rising level of HAIs by introducing GermBlast, a comprehensive service that eliminates dangerous microorganisms in the environment. This white paper will explore the implementation of GermBlast in a healthcare setting.

The Solution: GermBlast Service

GermBlast is a proprietary service created by Infection Controls, Inc. GermBlast includes a combination of innovative modalities that build upon each other to systematically remove dangerous microorganisms on critical touch points in the environment.

Our GermBlast service utilizes microfiber impregnated with antimicrobial silver and copper to scratch the surface of biofilm, a protective layer that colonized microorganisms produce. After surfaces have been pretreated, they are treated with a combination of disinfecting sprays, high temperature steam, dry mist hydrogen peroxide, and advanced ultraviolet light systems. Finally, surfaces are treated with a protective polymer that prevents re-colonization of microorganisms for up to 90 days.

Data collection and analysis plays a central role in the GermBlast process. Quantitative data allows organizations to make educated decisions about the strategies they use to control microorganism growth in the environment. ATP testing is the most efficient way to collect quantitative microorganism data in the environment. ATP (adenosine triphosphate) is a coenzyme that transports chemical energy within cells for metabolism. GermBlast provides clients with access to their data through the GermStats system. This system allows customers to review their data through trend analysis and statistical process control charts. GermStats also allows customers to enter their own ATP data for trend analysis.

Education is also a key element of the GermBlast process. Our education team consists of microbiologists, healthcare administrators, and epidemiologists who provide on-site training customized to client's needs.

The Study

The three month study was performed in a critical care unit of a large Texas Hospital. The critical care unit was selected for the trial because it had a very high incidence of HAIs. Six months of data was provided prior to the start of the study. This data established a baseline infection rate.

The critical care unit held patients that were healing from large wounds. Thus, multiple surgeries and treatments were often performed over time. In the past, this unit might see a patient for up 90 days. During the course of treatment the patient could contract an HAI multiple times in various trauma sites. In order to compare data from month to month, factors such as number of patients and average length of stay required standardization. Thus, all infection rate data was converted to a statistic called "infection hours per 100 patient hours." This is calculated as follows:

Base HAI Rate x Number of Admissions x Average Length of Stay / 100

This rate eliminates any bias in the data derived from changes in length of stay or number of patients treated in the unit.

The full GermBlast Service was performed on patient rooms after every discharge. Shared patient care areas were treated daily. Visitor areas and nursing stations were treated once a week. ATP samples were collected prior to the beginning of each GermBlast treatment as an additional data step to detect environmental trends.

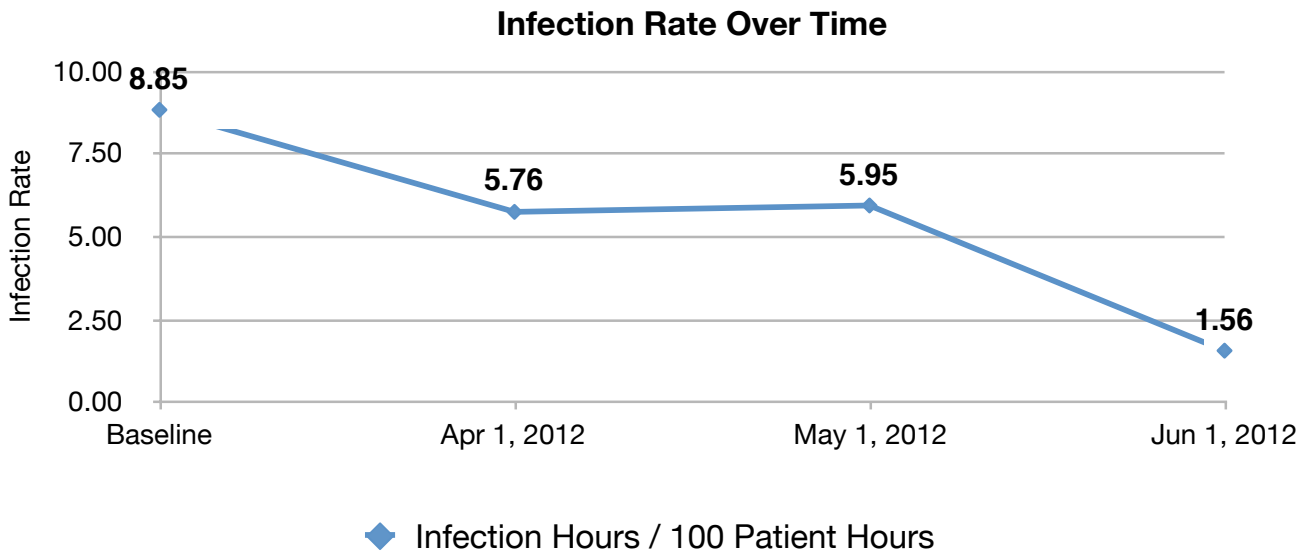
All other variables related to infection control remained unchanged throughout the course of the study. This ensures that any changes in infection rate can be directly attributed to the implementation of GermBlast service in the unit.

The Results

GermBlast service began on April 1, 2012. The GermBlast service included all facets of the core GermBlast process. Data was collected, analyzed, and trended over time in order to monitor the process and make adjustments as necessary. Education for nurses, environmental services, and infection control staff created a holistic infection control vision and strategy.

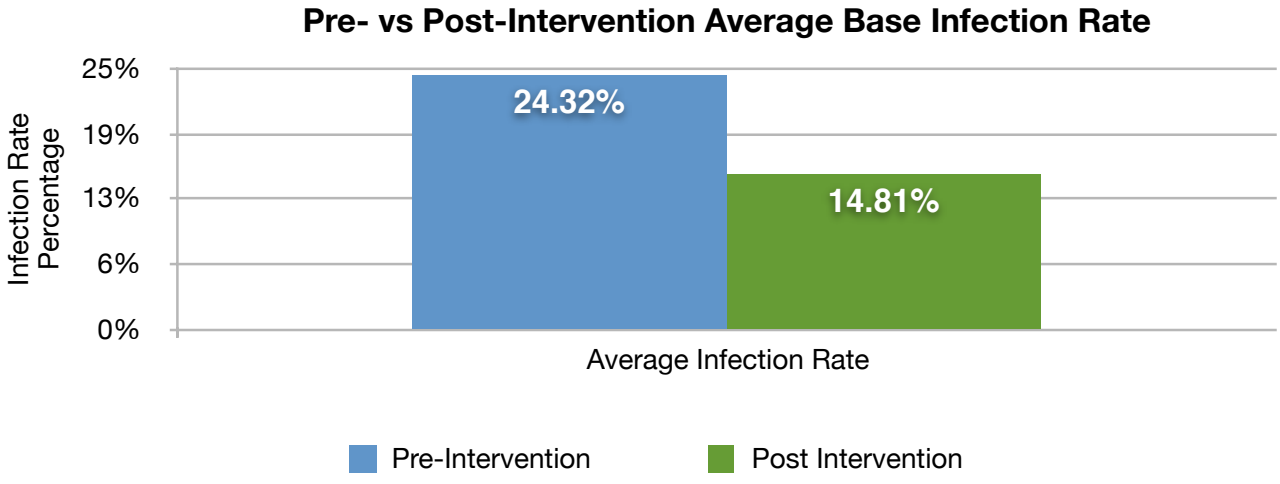
During the baseline timeframe, the unit's three major infections were *P. aeruginosa, S. aureus*, and coagulase-negative *S. aureus*. *P. aeruginosa* was the primary concern because it was responsible for destroying several skin grafts which then required additional surgeries to repair. It was estimated that a single *P. aeruginosa* infection was costing the unit over $40,000.

The results on infection rates were dramatic. GermBlast was able to significantly reduce the critical care unit's infection rate. The infection rate per 100 patient hours during the baseline period averaged 8.85 across six months. In April the rate dropped 35% down to 5.76 and remained close to that in May as well. In June the infection rate plummeted to 1.56, an 82% decrease in



the infection rate.

Throughout the course of the intervention, *P. aeruginosa* infections were almost entirely eliminated from the unit. During the baseline period, the unit observed 21 *P. aeruginosa* infections. A single *P. aeruginosa* infection was documented during the GermBlast intervention period. The overall infection rate post-intervention strongly supports GermBlast's efficacy claims. The average of the base HAI rate compared between the pre-intervention period and post-intervention



period confirm a dramatic change in the rates.

Infections per Year = Annual Admissions * Infection Rate	Result
Infections without GermBlast = 260 * 0.2432	63.2
Infections with GermBlast = 260 * 0.1481	38.5
Difference in Infection Counts = 63.2 - 38.5	24.7

Projected Cost Savings

A projected cost savings per year was calculated by estimating the number of infections that can be prevented annually and apply an estimated cost per infection to this number.

In order to present a conservative cost savings number, several assumptions are used. While the base infection rate identifies the number of patients that contract an HAI, the rate does not reveal how many infections a patient contracts. In order to ensure that the estimate is as conservative as possible, this paper assumes one infection per patient counted in the infection rate.

The Base Infection Rate prior to GermBlast intervention was 24.32%. During GermBlast intervention the average infection rate was 14.81%. The hospital estimates that 260 patients are admitted to the unit annually.

Infections Per Year Calculation

In 2009, the CDC released a report based on published studies that estimates the cost per healthcare associated infections (HAI)[2]. The report only evaluates direct patient care costs and does not consider indirect costs. The report contained a low and high estimate of the attributable per patient costs of HAIs in 2007 dollars. The low estimate will be used in this white paper in order to ensure that the cost savings estimate is as conservative as possible. This cost per HAI is $20,549. Multiplying this value by the estimated number of prevented infections (24.7) results in an estimated annual savings of $507,560.30. The estimated annual cost for GermBlast service in that unit is only $80,592, resulting in a net savings of $426,968.30. This represents an ROI of 6.30.

What Can GermBlast Do For Your Organization

The results in this white paper show that utilizing GermBlast in a critical care setting results in a significant decrease in infection rates and costs associated with HAIs. So how can GermBlast become a part of your infection control strategy? **Contact GermBlast today at 877.771.3558.** Our team will schedule a free, confidential site survey which will help us better understand your facility and your specific needs.

References

1 William R. Jarvis, MD, JoAnn Schlosser, Ashley A. Jarvis, and Raymond Y. Chinn, MD. National point prevalence of Clostridium difficile in US health care facility inpatients, 2008. American Journal of Infection Control. May 2009. 263-270.

2 The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention. www.cdc.gov/HAI/pdfs/hai/Scott_CostPaper.pdf