



**MJHH**  
**THE MIAMI JEWISH HOME & HOSPITAL**  
**(Miami Jewish Health Systems)**

**STUDY ON**  
**HOSPITAL INFECTION PREVENTION**

**ORIGINAL PUBLICATION ON JULY 25, 2008**

**THE CURRENT UPDATED ADDITIONAL TESTING STUDY  
PERIOD IS EXPECTED TO REQUIRE STUDIES THROUGH  
TO THE END OF OCTOBER 2018**

## **INTRODUCTION**

### **SECTION-I:**

**To better serve MJHH and its patients, the original full range of testing throughout numerous locations in the Miami Jewish Home & Hospital For The Aged's 740 bed hospital and nursing facilities was accomplished as of July 25, 2008. It was the first in a series of studies projected to continue over the years to provide the data and technology of how MJHH can become a leader in the USA in how to best prevent nosocomial infections in hospitals and other medical and nursing facilities around the country.**

**Secondary hospital infections now cause some 100,000 deaths, millions of infections and tens of millions of days of extended hospital stays each year, with total costs in the tens of billions.**

**MJHH has been testing a new range of stabilized microbial based (probiotic) solutions for some time, in the Hospital's goal to reduce both deaths and suffering, along with the huge potential huge cost savings factors involved.**

**The first series of tests was to analyze the results for a new methodology of infection control that appears to be a totally new class of unique solutions to directly control the microbiome or our facilities, as well as all of us as individuals.**

**This logic is based on Stabiotic (probiotic) products that have had major success in in a range of medical facilities in a number of countries around the world. The provider of the products was not involved in any of the testing, other than to furnish the product studied.**

### **SECTION-II:**

**Because of the extremely successful results of the first full series of testing that proved there was finally a way to stop the growth of nosocomial and antibiotic resistant infections, logs of the ongoing use of the StaBiotic products and then a new round of full testing of these type products with even far greater penetration and results with Purebiotic fogging or spraying.**

# MJHH - THE MIAMI JEWISH HOME & HOSPITAL REPORT ON TESTING PUREBIOTICS TO REDUCE NOSOCOMIAL INFECTIONS

By Neil Caseiro, Director Environmental Services & Special Projects

## THE PROBLEM

**Nosocomial infections** cause substantial morbidity & mortality, prolonging hospital stays and increase direct patient-care costs. The situation is rapidly growing even more disastrous because of the continued growing resistance of pathogens due to overuse of antibiotics and disinfectants.

To further exacerbate the problem, increasingly, hospital infections cannot be cured anymore with commonly-used antibiotics. For a medical complex of excellence, like MJHH, which sets the standards for cleanliness and procedures, serving as a model for the rest of the United States and the world, there are constant additional challenges to maintain preventative measures, especially since MJHH serves a more elderly population than most medical centers.

## ESSENTIAL FACTS:

- **Infections contracted in hospitals are the fourth largest killer in America.** Every year, some two million patients contract hospital infections, and an estimated 103,000 die as a result. This is as many deaths as from automobile accidents, AIDS, and breast cancer combined.
- **Hospital infections add some \$30.5 billion a year to our country's hospital costs.** This figure does not cover all the associated costs to individuals and to the business communities. However, though patients, insurers and taxpayers pay part of that cost, hospitals have to absorb much of the costs and that cost is growing as resistance to reimbursement to hospital acquired infections grow. As a result, infections seriously erode hospital operating incomes and for a not-for-profit organization like MJHH that serves the community, the continued best possible practices for preventing infections are critical to continue assuring the best possible use of resources for patient care. Of course, commercial hospitals have the same concerns, as preventing nosocomial infections can be the difference between profit and loss.
- **Terrorism & Natural Disasters:** It should be noted that better infection prevention in hospitals is essential to prepare for possible mass events like avian flu or bioterrorism. In any disaster hitting the U.S., the death toll would largely depend on what American hospitals do when the first infected patients are admitted. If hospitals have effective infection controls in place, they can better prevent epidemics like the bird flu from infecting other patients. If not, infections can burn through hospitals and nursing facilities. Today, most hospitals and other medical facilities are woefully under prepared, as most have failed to stop the spread of ordinary infections. MJHH strives to set the standards for other facilities and infection control is one of the first priorities.
- **The Major Problem:** It should be noted that insufficient hygiene and procedures are one of the key factors contributing to Nosocomial infections. Part of the solution to this reality is the reason for this study and report, which may also make up, in part, for human error.

## **THE MJHH HOSPITAL AND CARE FACILITIES**

Established in 1945, located at 5200 NE 2nd Avenue, Miami, FL 33137, MJHH offers the most comprehensive continuum of care for senior citizens in the Southeast United States. Located on 28 acres and in eight (8) building in the center of Miami, MJHH has a total of 740 beds along with an additional campus. The hospital provides the following key services: Subacute Care, Rehabilitation Therapy (in-patient and out-patient services), Skilled Nursing Care, Pulmonary Care, Long-Term Services and MJHH's satellite Douglas Gardens Medical Center provides 14 medical sub-specialties.

### **MJHH's departments include:**

Cardiology	Dermatology
Endocrinology	Gastroenterology
Nephrology	Neurology
Ophthalmology	Optometry
Orthopedics/Rehab. Evaluations	Pacemaker Clinic
Psychiatry	Pulmonary
Rheumatology	Urology/Incontinence Clinic
Wound Care Clinic	Gastro-Intestinal I series
Modified BA swallow (video fluoroscopy)	Psychological Testing



## **PROJECT INTRODUCTION**

Because we continue to see the data from around the country shows a large rise in nosocomial infections of patients due to greater numbers of highly resistant microbiological organisms resulting from the overuse of antibiotics and disinfectants, our Environmental Services Department at MJHH is constantly searching for better ways to protect against these realities.

Therefore, when one of MJHH's external benefactors called the hospital to suggest we look at a new probiotic based solution for preventing nosocomial infections, we were willing to review the data to see if the solution merited further study. The problem is that there are so many claims these days for new products to reduce secondary infections that sorting through them requires diligence and a factor always in short supply, time, to sort through them. However, we set up an initial meeting with the providers of the solution.

## **EVALUATION MEETING**

As the Director Environmental Services, I am responsible for all of the cleaning and servicing of all the buildings on the main 28-acre hospital and nursing home site. Therefore, I chaired the evaluation meeting in April of 2008 for the hospital in my department's offices. Also representing the hospital at the meeting was Pablo Mora, the Infectious Control Nurse for our facilities. The technology was presented by Lino G. Morris and Howard Zalkin who covered the sciences and functionality.

The proposed solution provided was the "PureBiotic (microbial control via external probiotics) type of Healthcare solutions". The key claims presented to the hospital for this new range of external probiotic type cleaning products were the extreme ability to control infections plus the facts that the products cleaned all the way down to the microscopic level and, unlike most cleaners and disinfectants that stopped working as soon as they

were dry, these solutions kept working for days at a day wet or dry. All of these claims were backed up by a wide range of studies and reports from other medical institutions, universities and other type facilities from many different areas which showed that the PureBiotics/StaBiotics (Probiotics-In-Progress) products appeared to prove a number of benefits wherever trialed. The six key prime points of interest presented were:

- 1) **RISK REDUCTION:** That the PureBiotic type products, as part of their cleaning process, actually changes and controls the environment on the surfaces cleaned that result in the elimination or great reduction of harmful bacteria and therefore, of the risk of nosocomial infections as well.
- 2) **ECONOMIC BENEFIT:** For humanitarian considerations the huge cost savings just from the major reduction in infections due to PureBiotics is normally listed at the end of the catalog of benefits after the reduction in deaths, pain and suffering, impact on the daily lives of the patients and their families. However, the great savings PureBiotics provide institutions means that all that money can be used for better patient care, equipment, supplies and more staff. The economics of using the breakthrough that PureBiotics represents, turns the use of PureBiotics from an expense item into a "Profit Center" for the hospital or institution with just the reduction of just one infection incidence.
- 3) **KEY REDUCTIONS:** Therefore, considering how many infections the average hospital has, reducing that figure by some two-thirds provides major benefits to the hospital, its budget and the patients. In this light, use PureBiotics should be thought of as insurance, and it would not be surprising that its use could result in lower insurance rates over time.
- 4) **KEEPS WORKING BETWEEN APPLICATIONS:** The PureBiotics products actually continued to work and provide ongoing protection for up to three days after application (depending on surface conditions, the product have shown viability from a number of hours to up to ten days, however as a general rule develop after tests showed how just spraying the PureBiotic Mist three times per week in a large chicken barn where tens of thousands of birds were eating and relieving themselves 24/7, seemed to provide the controls needed to eliminate routine use of antibiotics and still greatly lower the risk of morbidity and mortality as well as produce healthier and faster growing chickens while greatly reducing odors, set the stage for the time factor results also seen in human hospital testing).
- 5) Since one of the major problems with disinfectants is that they normally stop working in minutes as soon as they are dry, that the PureBiotics claims of ongoing viability were, of course, of major interest to our (or any) medical facility.
- 6) In line with the claims above in item 2, the cleaning action of the products also were claimed to be ongoing and normally lasting at least some 72 hours after each application. That in addition to the immediately cleaning provided, areas cleaned would continue to have cleaning action, such as grout between tiles rejuvenated to their original color/state.
- 7) Far more important is the claim that one of the key functions of the PureBiotics products is that they will eliminate bio-films (and any resulting bio-mats) and once

eliminated, the PureBiotics will prevent their re-growth. As bio-films are what protects pathogens, traps dirt along with supporting viruses and prevents disinfectants from working properly, this claim was also of great interest.

**Note** that we were advised that “PIP” stood for Probiotics-In-Progress and that, though the PureBiotics products produced immediate results, their overall affect was “progressive” and that they built up control over the first few weeks of use and then maintained this control thereafter.

- 8) Another claim was that the PureBiotic products could be used constantly and effectively without any damage to skin and that gloves were never needed for protection from any of the regular probiotic products, unlike with many standard products. Also, there was no odor or dangerous fumes to be concerned about.
- 9) An additional factor that stood out was the claim that using PureBiotics reduced workloads and storage requirements.

The representatives of PureBiotics at the meeting were Lino G. Morris, the CEO, Howard Zalkin from the Miami Area and Kim Heemskerk, a company representative.

**DECISION FACTORS:** Though the medical and scientific data presented for the PureBiotics solutions was impressive, we were, naturally, extremely skeptical without an internal test and the first question was if these products were worth the time and resources for proper testing. Therefore, we went through the following steps:

**MICROBIOLOGICAL VIEWPOINT:** From a microbiological viewpoint, our Infectious Control department representative, Pablo Mora, went through the actual mechanism of how the products worked, and determined that “if” the products worked as stated, then they were far ahead of the curve of current solutions and not only cleaned, but actually controlled the environment.

**EASE OF USE QUESTION:** An additional factor was that the products were extremely simple to use and required no special steps for their testing or in their use. One simply substituted the PureBiotics Probiotic cleaners for the regular products we currently used.

**REDUCTION OF NUMBERS OF PRODUCTS REQUIRED:** One other interesting factor of real importance to us that, if proved out, was the fact that the Hospital currently uses some 17 different cleaning products to be able to accomplish the required results and the PureBiotics line, due to the presented power of the products, would replace most of these current 17 products with only three (3) products that covers almost all areas of current cleaning and disinfecting. If so, this would also reduce overhead and space costs as well as eliminate additional demand on staff.

**DECISION:** Due to these factors, we decided to proceed with the testing.

### **TEST STRUCTURE AND MANAGEMENT**

As the Director Environmental Services, I took charge of directly supervising all the phases of the testing of the PureBiotics products used by the staff. To prevent wasting time on mishaps and due to the potential importance of the testing, I personally was

present for the sampling and cultures of all the areas being tested for both the pre-use testing and of all the weekly testing thereafter.

To avoid any question of outside interference, since the PureBiotics team requested to be present during testing and to take duplicate samples at the same times MJHH did for comparison, I asked them not to bring in any additional staff until the testing was over and to schedule all visits with me to limit access and for proper control.

In addition, I also controlled all the sampling as well as the storing of all the culture media from the tests. To do this, I supervised the taking of cultures and then, to maintain complete control, photographed and stored the resulting plates in the freezer section in the unit in my office to control access. To assure a solid review of the testing and usage results of the PureBiotics products, I have requested the input from a number of staff from different departments as part of the reviewing team for the Hospital.

### **TEST TARGET RESULTS**

As there was a great deal of natural skepticism about the projected results from the PureBiotics materials, even though highly desired, they were hard to accept. The premise was that by simply changing to cleaning with the PureBiotics probiotic line of products, a already clean hospital facility would further lower the risk of harmful bacteria in the hospital “over existing hospital products” by at least 50%, but actually by 80% in most cases to well over 90% in others and that should translate into an actual reduction of infection levels fairly rapidly by a third and it could be reasonably expected to reach an average of a two-thirds reduction as much of the biofilm was removed. Higher reduction of infection levels could be achieved by adding spraying or fogging to the cleaning procedures. After reviewing all the data presented, we picked a number of initial areas to test the PureBiotics products including patient rooms.

### **PRE-TESTING PREPARATIONS**

In preparation for the testing of PureBiotics, I wanted the testing to be as stringent as possible. Therefore, I sent my team to provide a special pre-cleaning of the areas in which PureBiotics would be tested, with the instructions to be extra thorough and pay attention to every inch of each area.

We felt that this was needed to properly provide a valid test of PureBiotics. It was felt that special attention and a thorough cleaning needed to be done by the Hospital’s cleaning staff of all the test areas using the Hospital’s existing acceptable cleaning products. This would then provide a realistic base line for the testing.

### **PRE-TESTING CULTURES**

After extensive cleaning and prior to using the PureBiotics products, we took cultures from a significant number of sites in the testing areas. Each site where cultures were taken were numbered and noted so as to properly repeat testing in each same exact area each week. For the cultures, 3M Test Kits were used with the 3M Quick Swabs for best accuracy. All testing was done in the presence of all the interested parties; however

complete control of the test sites and test kits used for testing for the hospital was controlled and retained by me.

Once the tests were incubated for the required time period, I then froze the samples in the freezer compartment of the refrigerator unit directly in my office in order to assure accuracy and the controlling of the entire testing done. Further, the samples were numbered by us without telling PureBiotics what slides went with which areas.

### **TEST RESULTS – FIRST PHASE**

It was also decided that the hospital staff would handle all the cleaning for the tests. After the pre-testing cultures were taken, the Hospital staff was trained in the simple procedures of using the PureBiotics Probiotic Products by the PureBiotics representatives and then our staff started cleaning as they always did, with the exception of only using PureBiotics products in the test areas set aside for this program. Note that the only requirement requested by PureBiotics was that no other products be used in the test areas.

### **WEEKLY CULTURING SCHEDULE**

It was decided that full culturing would be done once each week of all the areas being tested as the best way to judge progress.

### **PRE-PUREBIOTICS TESTING CULTURE MEDIA TESTS RESULTS**

The results of the cultures taken after cleaning with the hospital's normal products before the use of PureBiotics was initiated were a surprise. MJHH is one of the cleanest facilities in the USA and its staff extremely well trained. What the pre-testing cultures showed (and what turned out to be the norm in all hospitals, clinics, restaurants tested) is that even in the best of facilities with the most stringent of cleaning programs, using the most powerful of disinfectants in the facilities, true protection against pathogens is far more difficult than existing programs can normally expect to achieve.

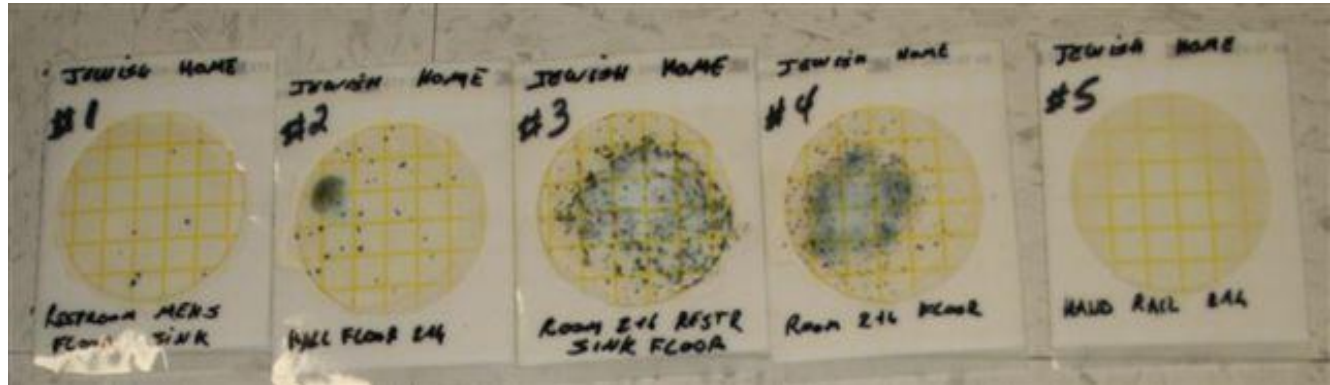
It was seen was that following infectious control procedures is critical because no matter how well an area is cleaned with normal disinfectants, it can be contaminated minutes later.

In the first round of testing, the locations selected including patient rooms, patient sinks, patient bathroom floors, between the beds, the hall hand railing between patient rooms, the tile outside patient rooms, the men's bathroom and toilet floor, as well as the department's door handle and work table.

For these first rounds of tests, the 3M culture media kits used were to detect staphylococcus. E-coli, Listeria, salmonella and a number of other tests were slated for round two if the probiotic products passed the first round. These are especially important for the food processing and serving areas.

**OVERALL PRE-PUREBIOTICS TESTING:** The following test cultures were some of the ones taken in the test areas shortly after the special cleaning by staff using standard hospital cleaning materials:





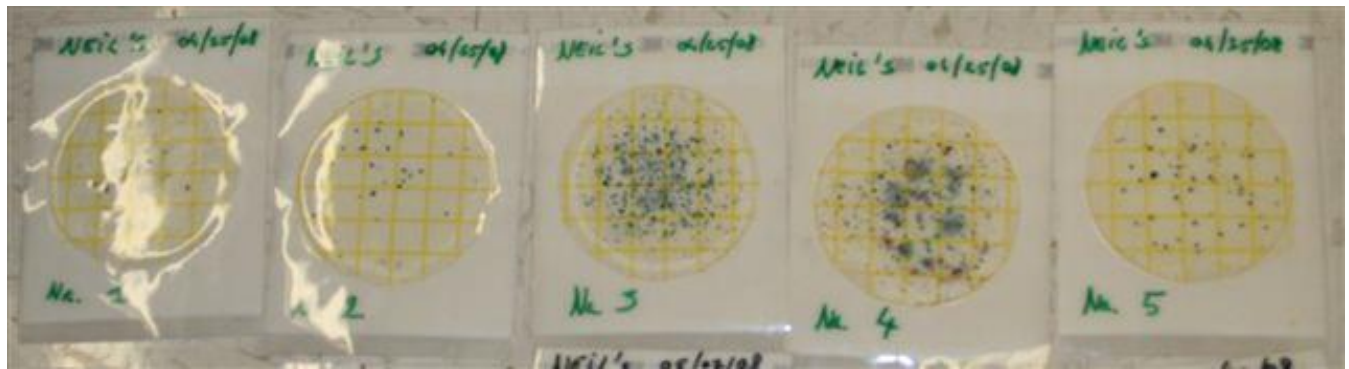
**Results using pre-test standard hospital cleaning products**

**POST-PUREBIOTICS USE CULTURE MEDIA TESTS RESULTS WEEK-1**

The following are the results below of the testing of the exact same areas as previously tested in the pre-PureBiotics use testing.

These first post-PureBiotics cultures were taken exactly one week after the start of the use of PureBiotics PIP in the test areas.

Note significant improvement in three of the badly contaminated areas. However, one contamination rise was noted in slide 5. Since this was an oddity with most of the test, it is not known if a simple mix up in products use or simply part of the normal fluctuations in line with the “progressive” nature of the product advised us that builds up over the first few weeks of use.



**Post-PureBiotics Use Results – Week -1**

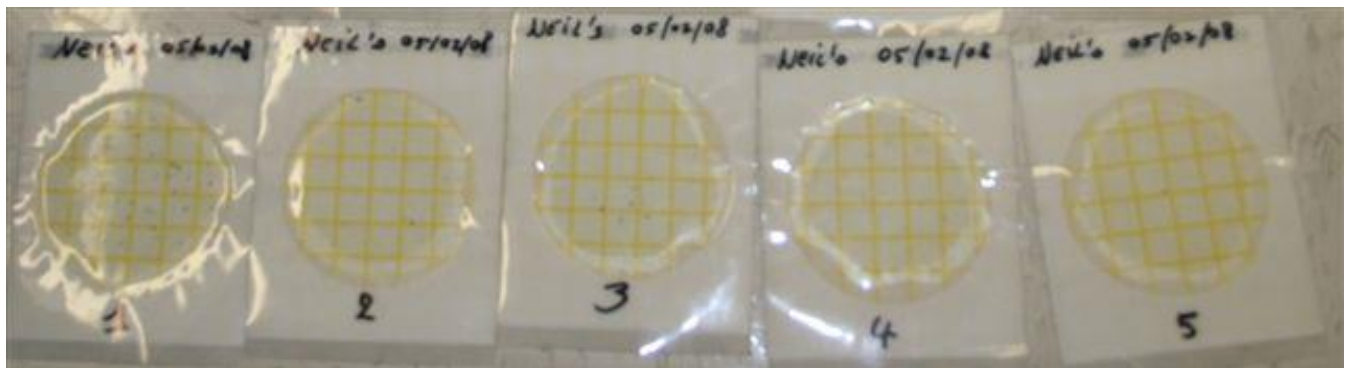
**ONGOING POST-PUREBIOTICS CULTURE MEDIA TESTS RESULTS WEEK-2**

The following are the results of the week-2 testing of the exact same areas as previously tested in both the pre-PureBiotics use testing and then repeated the first week after the start of the use of PureBiotics PIP in the test areas.

As can be seen, by the end of the second week of PureBiotics PIP usage, all of the areas were almost totally devoid of any harmful bacteria.

During the first week, there was a spike in test area number 5, but it is not known if other products were used in the area or what the reason was for the small spike that day, or if this is just the natural progression stated by PureBiotics at the beginning of the testing that the PIP products are progressive and take a week or two to take hold and control the areas to which they were applied.

However, overall in all the areas tested using PureBiotics PIP products, within two weeks of starting, the PIP products appeared to take firm hold of the areas tested and produced cleaner and safer areas.



### ***Post-PureBiotics Use Results – Week – 2***

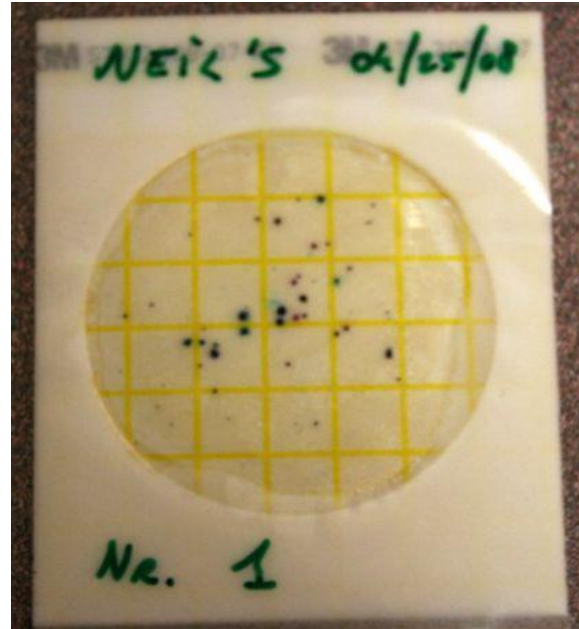
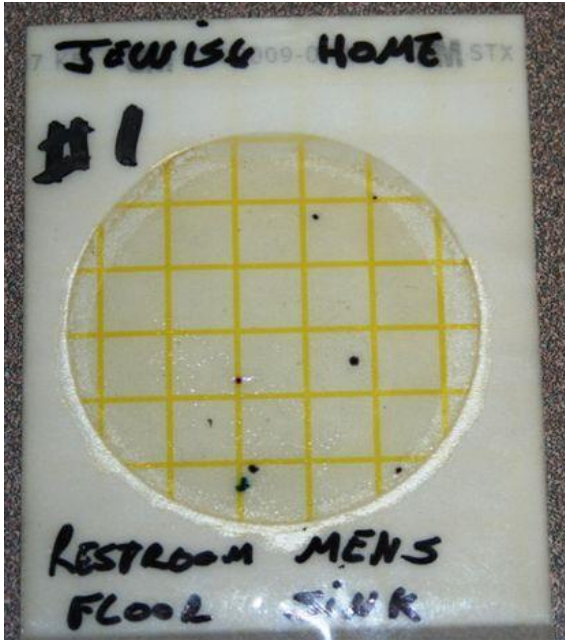
#### **ANALYSIS OF ANY PROBLEM AREAS**

Though it can be seen that the PureBiotics applications made rapid and major progress for heavily contaminated areas in just the first week, there were several spots where there were small spikes that did not follow the general trend.

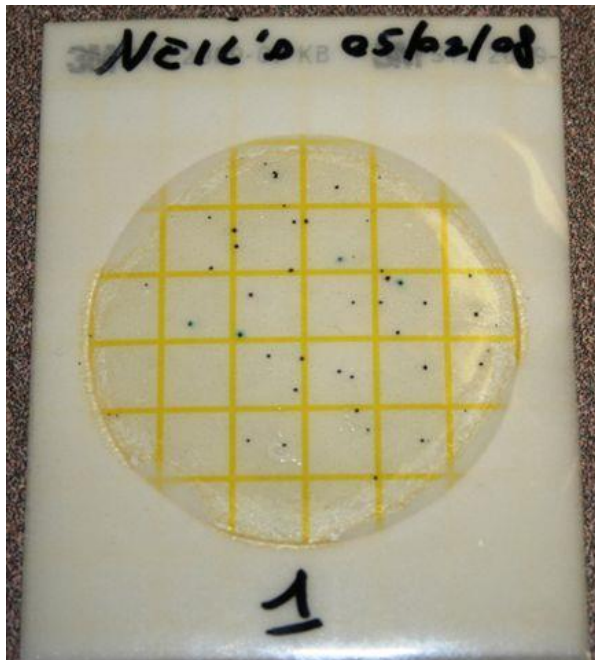
It is not known why or if it was due to mixing of products, but it would be interesting to do extensive long term testing of many areas where strict controls of the products used in each test area is done to see what might cause this.

However, by the second week of PureBiotics use, it was seen that the product did take hold. Here are the areas that required a second week.

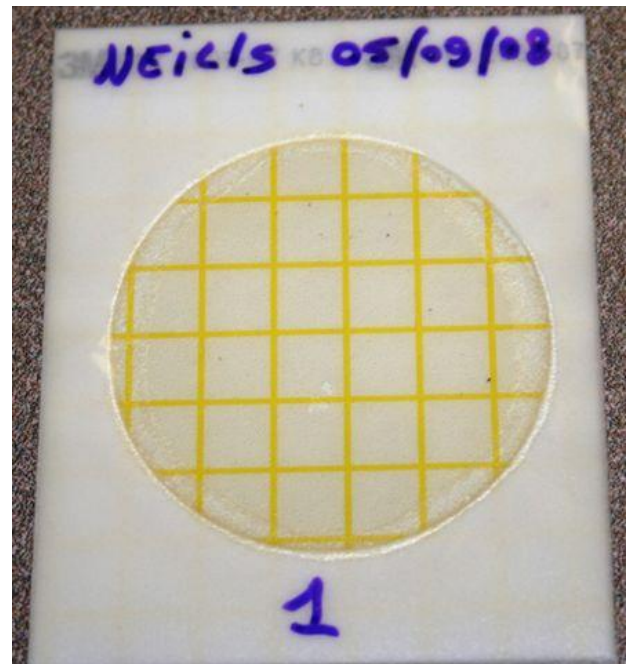
**Below, for area one, the left slide is pre-testing and the right slide is after the first week of testing**, which did not show control of the area, which may or may not be due to outside factors:



However, in the **second (2<sup>nd</sup>) week of testing**, the PureBiotics PIP appeared to take hold of the area and then in the **third (3<sup>rd</sup>) week**, the control of the area appears complete and all testing from that point on remained clear of contamination.



**Week-2**



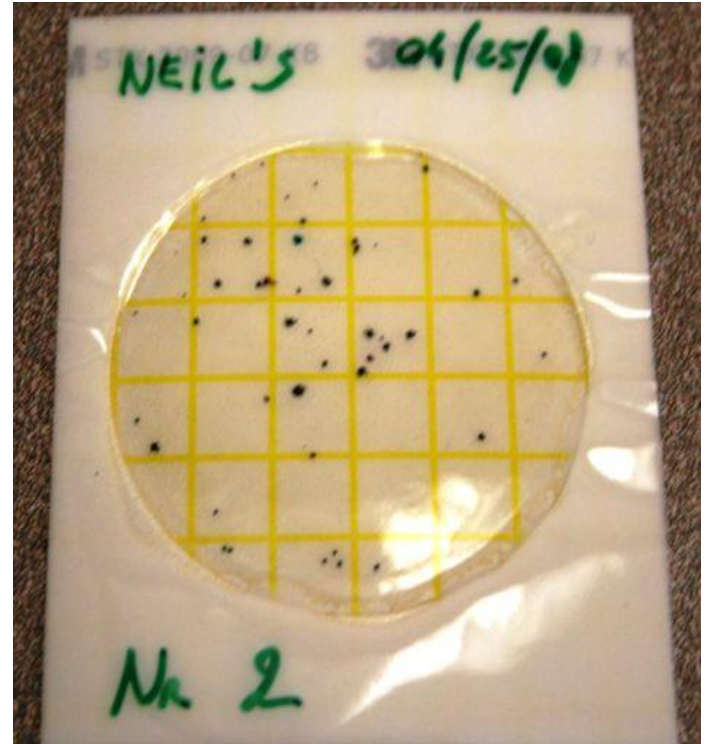
**Week-3**



Progress of PureBiotics PIP usage testing in a more heavily contaminated area:

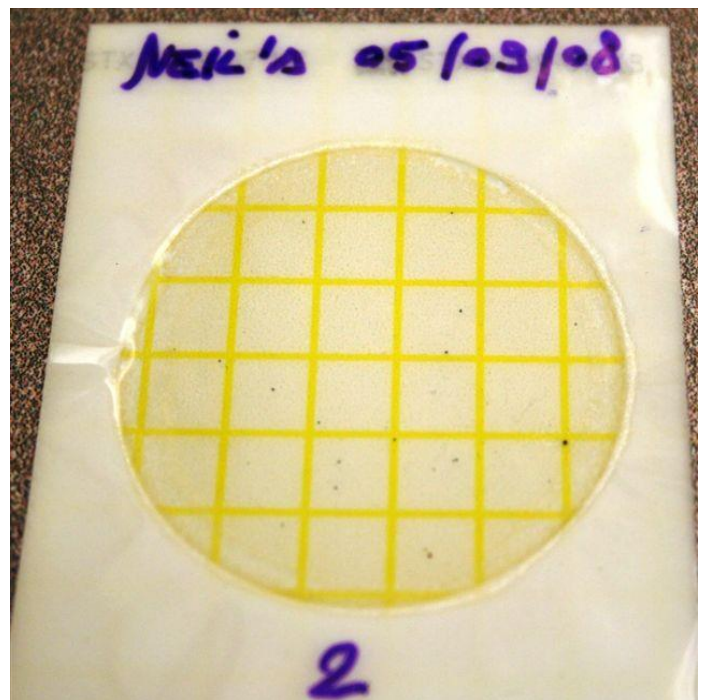
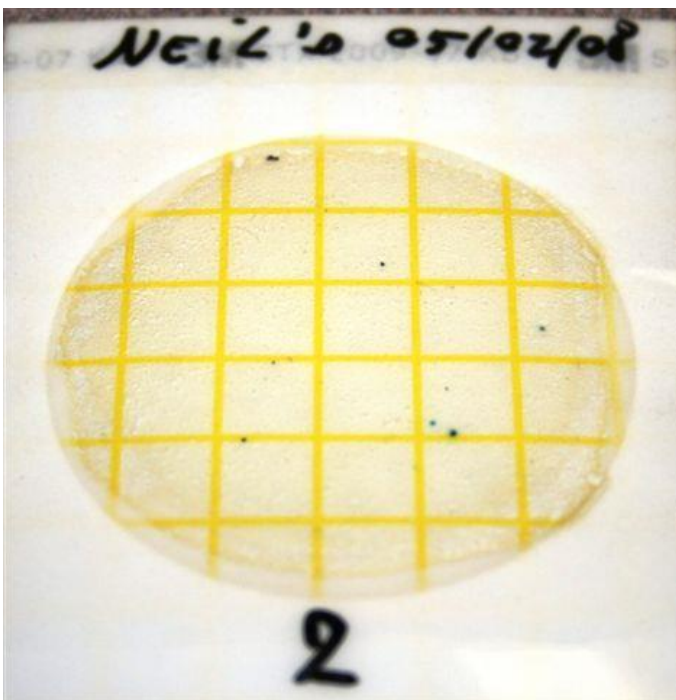
*Culture testing before PureBiotics use*

*Week-1 test after start of PureBiotics use*



*Week-2 testing*

*Week-3 testing*





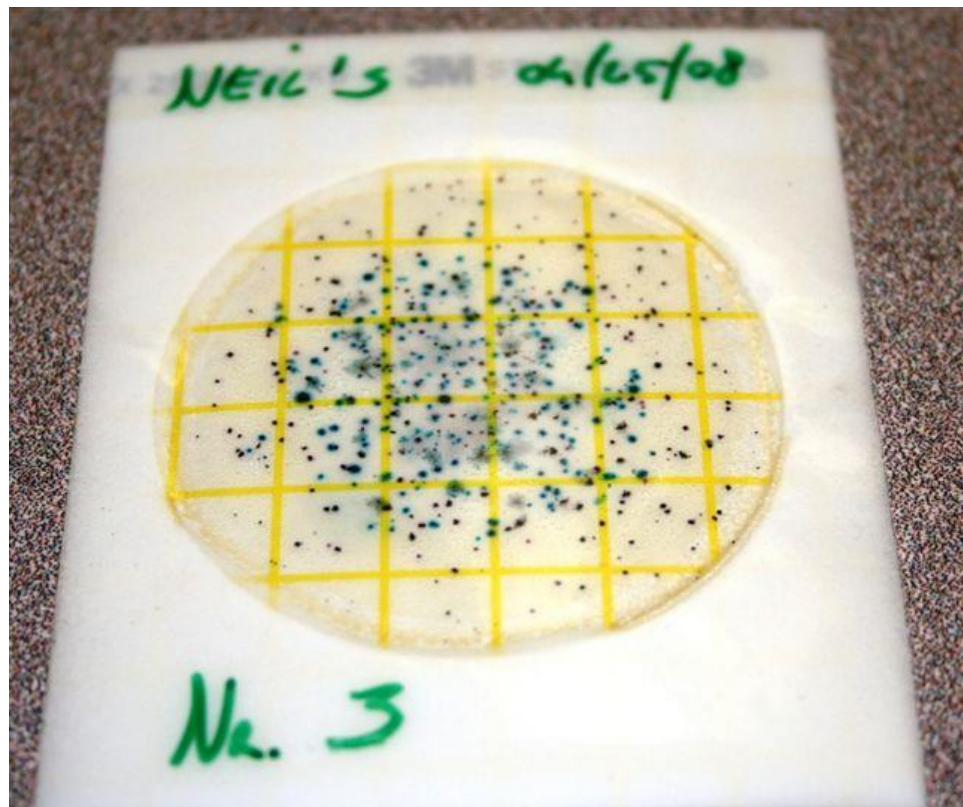
**Progress of PureBiotics PIP usage testing in the most heavily contaminated area:**

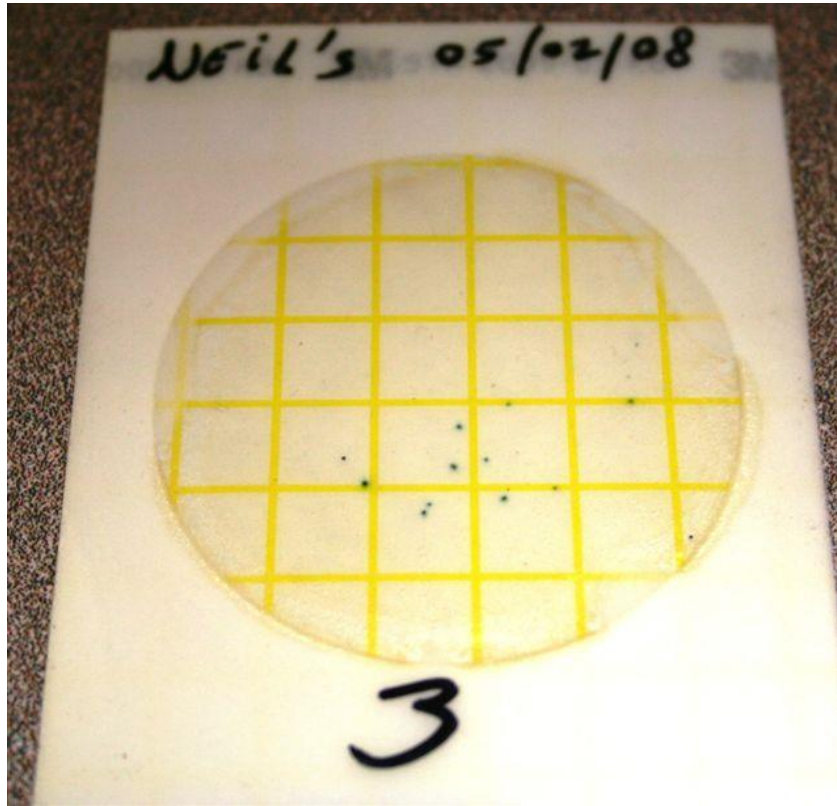


*This room was the most contaminated starting point.*

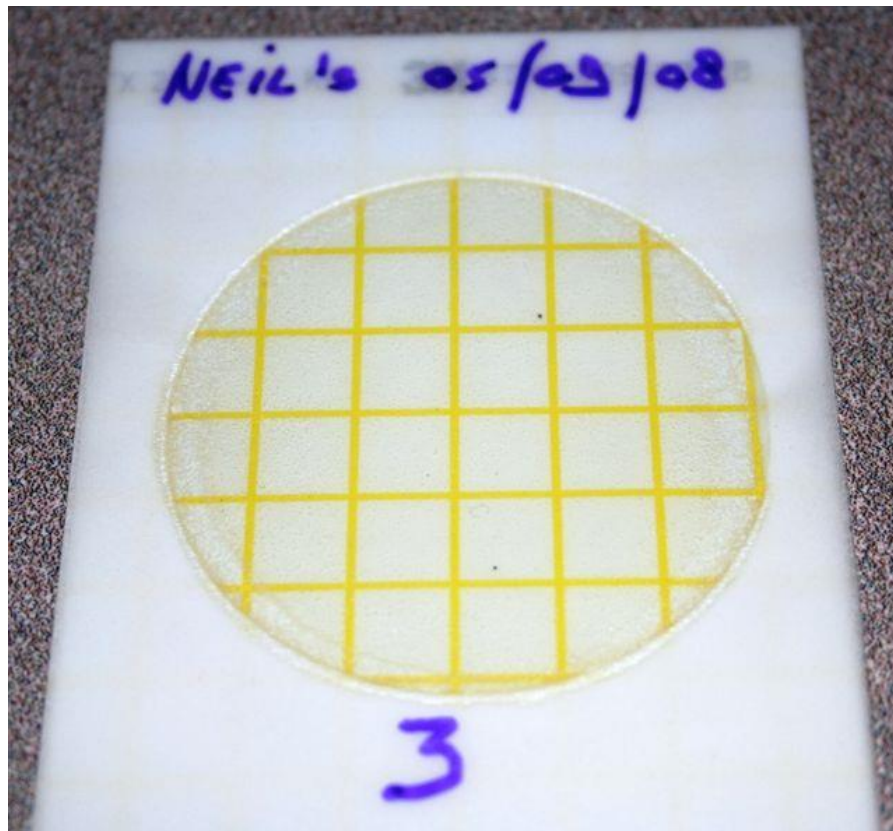
*These slides were the pre-testing samples taken*

**Week-1**  
**After one week of PureBiotics PIP use the reduction in pathogens was significant**





*The further reduction in contamination can be seen in Week-2 above  
and then In Week-3 below of continued PureBiotics PIP use*



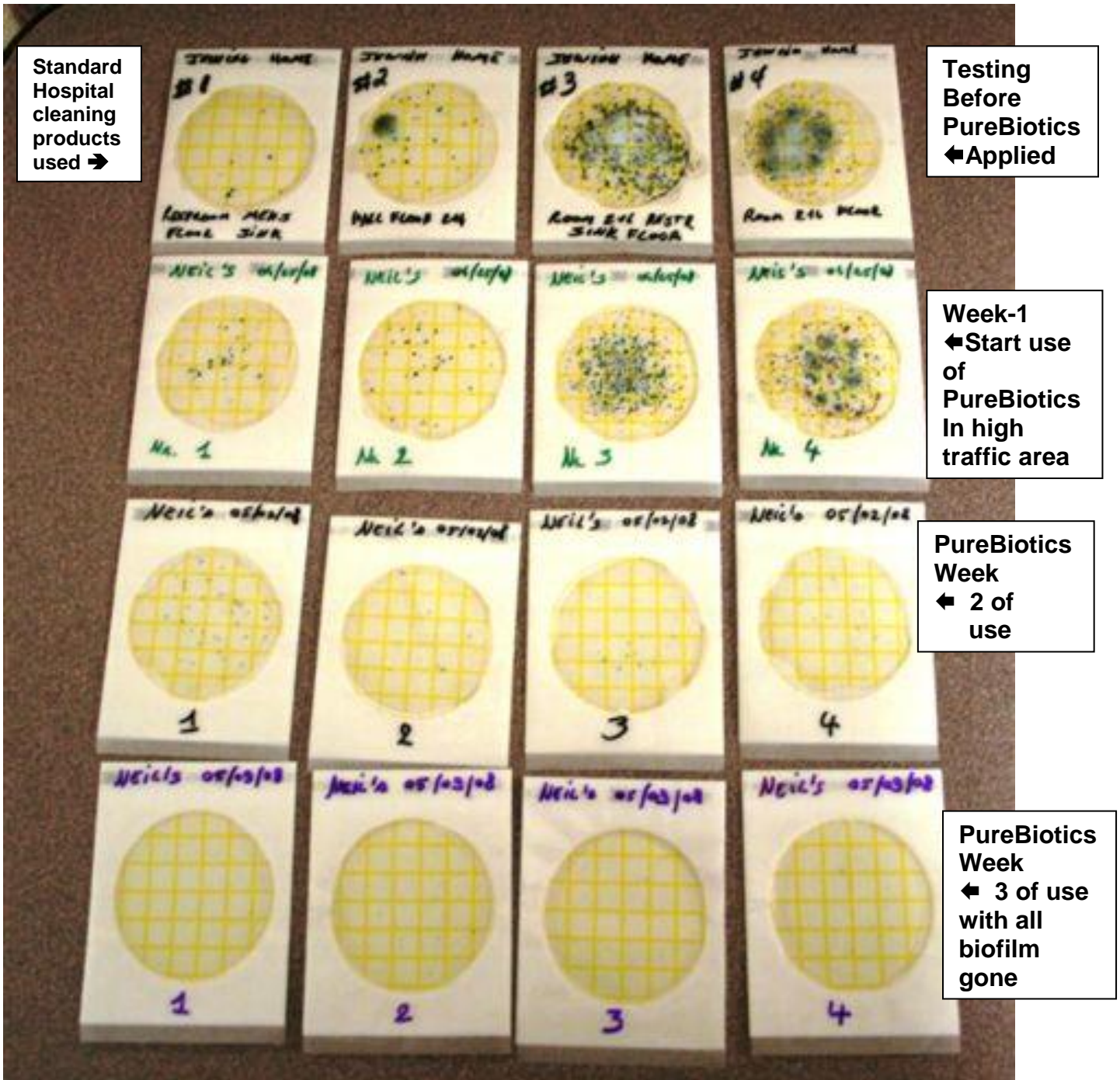


**MJHH PATTERN OF RESULTS WITH PUREBIOTICS TESTING**

As can be seen by the overall view of the first group of tests, the pre-testing cultures are in the top row to set the standard. The second row is the test results from after one week of using PureBiotics PIP Healthcare – the 3<sup>rd</sup> row is week-2 and the 4<sup>th</sup> row is week-3.

The PureBiotics products performed as claimed, that the Probiotics-In-Progress action of PureBiotics would build control of the environment in all areas used over a short period of a few weeks. In support of this, the test results were fairly dramatic by the end of the second week and showed solid control by week-3.

This resulting control & reduction of pathogens has now continued for 3 months.



**In all locations that we used and tested the PureBiotics PIP cleaning products, the results were all positive and greatly reduced or eliminated pathogens. In most cases the products provided fairly immediate positive results and in the rest of the cases, solid control of all areas was established by the end of the second week.**

**Once established in any area, PureBiotics has continued to perform and provide protection for us without faltering. After the two weeks start up phase, without failure, PureBiotics' performance has been exceptional now going into the 4<sup>th</sup> month.**

### **NOTE - EXCEPTION THAT PROVED THE POINT**

It is important to note that there was one incident during the testing period that we at first thought was a problem with PureBiotics when there was a serious spike in Staphylococcus contamination by the bed in patient room 216.

Since room 216 was posted with a sign to only use PureBiotics and no other products, when the contamination was discovered, we notified the PureBiotics people and to confirm the situation, we spoke to the staff for that area and then discovered that there was a death in that room during the night shift and due to some body fluids spilled, the duty person thought disinfectants should be used instead of PureBiotics.

The interesting point was that where PureBiotics had been left in place, there was no contamination. However, only where standard disinfectants had been used was there a spike in contamination. This was a major point of confirmation of the effectiveness of the PureBiotics probiotic action.

### **WHY DISINFECTANTS DO NOT PROVIDE ONGOING PROTECTION**

Because seemingly smooth surfaces at the macro level are actually highly pitted, rough and fractured on a microscopic level, and all these potholes and indentations fill with biofilm produced by harmful and unwanted bacteria and that communicate via quorum sensing. These layers of biofilm protect these pathogens as well as viruses and along with trapping dirt and other contaminants.

Bacteria build biofilm for protection the same way that bees build hives for shelter and colony life. Disinfectants normally only penetrate the top layer of the biofilm of bacteria. In minutes after the disinfectant dries, what is then left is an open, "and uncontested" landscape full of dead bacteria that is a food source for the opportunistic bacteria protected by the bio-film. That is why it was most surprising to find that disinfectants are always a temporary and potentially dangerous solutions compared to PureBiotic products that also provide ongoing control of environments with beneficial bacteria.

### **TEST & RESULTS – PHASE TWO**

Due to the unexpected, but exceptional results of using the PureBiotics products in our initial testing, the use of PureBiotics products was expanded to additional areas of the Hospital.

One interesting test of the StaBiotic action was demonstrated with use on the kitchen floors where you can see in the photos that use of PureBiotics actually lightened the grout

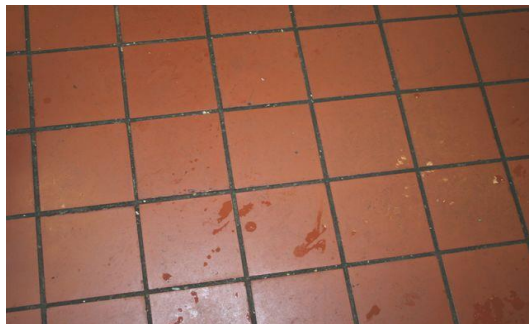


back towards its original color. We understand this was due to the elimination of the bio-film build-up that normally occurs between tiles that usually requires re-grouting.

**THE CLEANING PROPERTIES OF PUREBIOTICS**

The main thrust of this summary report has first been the control of infectious bacteria and to what degree was PureBiotics’ ability to biologically control pathogens in all the test areas. In addition to the control provided, the PureBiotics are also cleaning products, which proved to provide exceptional results. One of the important function points of the tested product line is that they are progressive in action. Unlike disinfectants and normal cleaners, PureBiotics’ products keep working for normally at least 72 hours after each application. This was a claim that was not taken at face value at first until after several weeks had gone by in phase two testing in the kitchen area when it was seen that the grout in the kitchen floors had lightened.

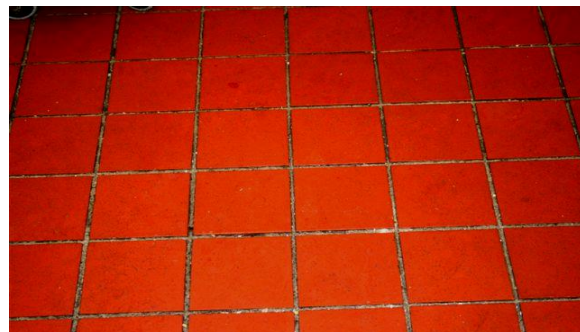
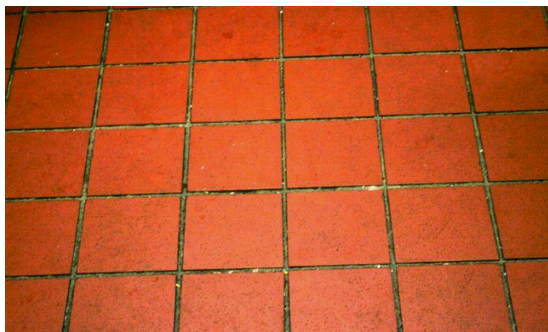
It was then seen that each cleaning produced cleaner surfaces over time with each application. It was interesting that in using PureBiotics, mops stay clean. The cleaning of any surface was immediate and excellent according to normal cleaning standards and better in most cases than other products. The only exception was some types of dried matter in a few cases that took a second application. However, ingrained stains and heavily traffic areas also kept getting lighter and lighter with each week’s usage. This supported the PureBiotics PIP claims that the product both kept protecting against pathogens and kept providing cleaning action for some 72 hours after each application.



*Pre-PureBiotics MJHH Kitchen Floor*



*Grout in kitchen tiles starting to lighten with PureBiotic Floor Cleaner use*



*There was significant lighting of the tiles & grout after several weeks from black to gray and this continued with use of the PureBiotic Cleaner, The lightening of the grout continued on a weekly basis until the grout appeared to return to its natural original color as did most surfaces cleaned with the PureBiotic Cleaners.*

## CONCLUSIONS

In the months since the Hospital started using PureBiotics microbiological based products, it has been seen that harmful bacteria have been reduced to levels that do not any longer show up on most testing.

Further, of interest to medical facilities, the ongoing action of these stabilized probiotic products between applications have proved to keep protecting the cleaned surfaces between cleanings for days at a time instead of becoming ineffective as soon as they are dry like most disinfectants. Also of significant interest to us is that though extremely effective, the products have no caustic chemicals or fumes and are safe enough to use as skin cleansers.

It should be noted that in addition to the obvious benefits of PureBiotics for patient safety, the product line also serves as a major insurance policy for the hospital to reduce the risk and costs of law suits in addition to the direct and not reimbursable costs of treating nosocomial infections. And, of course, to be able to provide the best in patient safety.

In addition to the protection against pathogens, the PureBiotics PIP product line has also proved to be exceptional cleaners. The three PureBiotics PIP products used were the PIP Floor Cleaner, the PIP All Purpose Cleaner and the PIP Sanitizer Cleaner for rest room areas and all have performed perfectly and have impressed everyone that has been part of the testing.

### NOTE ABOUT PUREBIOTIC MIST SPRAY

The one PureBiotics product that was not originally part of the testing protocol is the PureBiotics Mist (Probiotic Environmental Control) Spray.

This spray was not included as it has not in the past been normally considered a direct cleaning product, though it also does provide significant protection against the risk of pathogenic and unwanted bacteria.

The PureBiotic Mist Allergy Relief Spray originally was normally used on bedding plus furniture and cloth objects that harbor dust mites where patients may spend time when out of bed. The spray has a major affect on reducing dust mite and other allergens and contaminants (like smoke), which are a major health factor for patients with allergies, asthma, COPD and other breathing problems.

The benefits on all that have tested the PureBiotic Mist Spray to date, including staff that tested the solution, were so effective that we started spraying the bed sheets with the spray to provide the healing effects realized by reducing the allergens that sap patient immune systems, including non-asthma/non-allergic patients.

The product also has a number of other applications to reduce contamination and allergens in ventilation systems and to provide protection from harmful bacteria in hard to

reach areas, tubing and other situations. This has led to the decision that in the next round of testing, using the spray would allow the almost labor free ability to reach all those areas in a facility that is difficult to access and/or are missed by regular cleaning staff.

Further, its use in HVAC systems have provided extremely beneficial data which may significantly further reduce hospital infection rates that will be tested in the next study.

Studies on the costs of infections found that post surgical wound infections more than double a patient's hospital costs (infections after surgery increases costs by **119%** on average, at teaching hospitals, and **101%** percent at a community hospitals. Urinary tract infections increase hospital costs by **47%** & **35%** respectively.

The average ventilator-associated pneumonia infection adds over **\$40,000** to hospital costs and *Staphylococcus aureus* infections are especially costly, more than tripling the average hospital costs.

It is hoped that this report (and the future ones to come) will provide both an additional safety factor and an economical solution for our facilities.



**Neil Caseiro, Director Environmental Services & Special Projects**  
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