



Microbac

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HOSPITAL ROOM TEST

*14 Minute Dri-Mist™ Treatment followed by 10 Minute Z-vac™ Cycle
in Patient Room No. 7024 at the POH Regional Medical Center in Pontiac, Michigan*

Initiation of Project: September 20, 2007
Report Date: September 27, 2007

OVERVIEW

This study was undertaken to examine the effectiveness of a room and vehicle sterilizing system ("System") manufactured by Zimek Technologies, LLC ("Zimek") to kill high concentrations of bacteria which were found in Patient Room No. 7024 ("Room") located in the Pontiac Osteopathic Hospital Regional Medical Center in Pontiac, Michigan ("POH"). The Zimek System consists of two separate machines connected by an umbilical control cord: (1) Zimek's Room & Vehicle Sterilizer (model 4060A); and (2) Zimek's Micro-Particle Evacuator (model 2950).

Zimek's Room & Vehicle Sterilizer produces negatively charged micro-particles of Zimek's microbicidal QD disinfectant called "Dri-Mist,™" which is designed to sterilize the interior air and disinfect surface areas wherever free air flows in the treated interior environment. The Z-vac™ is a high-tech mobile air filtration system that not only vacuums remaining Dri-Mist™ micro-particles from a treated environment, it can also be independently used as an indoor air filter removing infectious contaminants smaller than one micron.

The specific goal of this study was to determine the bactericidal effectiveness of the quaternary ammonium "high efficiency" Zimek Dri-Mist™ treatment under conditions of high bacterial levels thereby demonstrating that continued use of the Zimek System provides a healthier environment for medical staff and patients who occupy a hospital room.

On September 20, 2007, sponge tests were performed in the Room, which is used as a semi-private patient room with a door separating it from an entrance hallway, and contains one bathroom with its own door and with two beds separated by a cloth curtain. The Room measured 16' wide by 21' long by 9' high for a total area of 336 square feet and volume of 3024 cubic feet of air space.

METHODOLOGY OF TESTING AND DRI-MIST™ TREATMENT

The following areas of the Room were marked with a numbered one inch square piece of blue masking tape: (1) Window ledge; (2) Wall center headboard; (3) Chair seat; (4) Floor; (5) Food table; (6) Picture frame; (7) Bath door; (8) Draw curtain; (9) Bath floor; and (10) Call box.

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Shower caps were taped over the ceiling smoke detectors to prevent the Dri-Mist™ micro-particles from setting off the smoke alarm, and HVAC return ducts in the treatment area were covered to prevent the accidental migration of micro-particles to unintended areas.

1. Before Dri-Mist™ Treatment – 1st Specimen Test

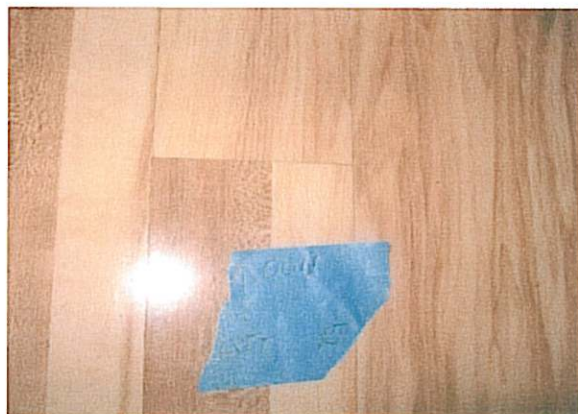
Sponge tests were taken by a Zimek technician and sent to Microbac Laboratories Inc. (“Microbac”). The technician used sterile sponges containing 10 mL of Letheen Broth with sterile four inch by four inch (4”x 4”) templates to obtain bacterial samples from each tested area.¹ A sponge sample of sixteen square inches was taken to the left of the numbered tape 12-14 minutes prior to Zimek’s Dri-Mist™ treatment. **The technician was instructed by the hospital staff that the Room had not been occupied for at least two weeks and had been cleaned after the last patients were vacated.**

Tested Areas:

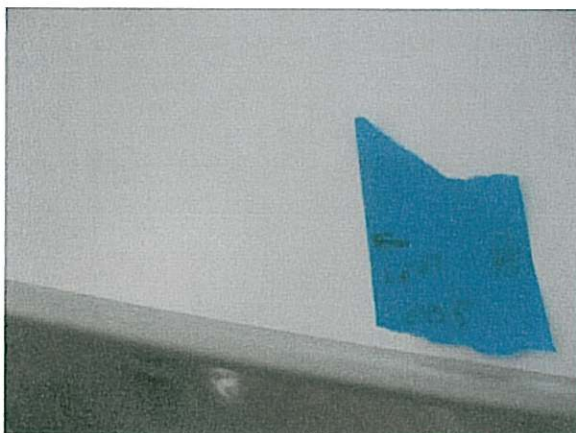
3. Chair Seat



4. Floor



5. Food Table



9. Bath Floor



¹ The sterile sponges, manufactured by Biotrace International, were obtained from 3M Company. Each contained 10 mL of Letheen Broth. ID#VEN0019-432; Lot #H1507223; Expiration date: 7/10/2008; ISO 9001-2000 Certified

2. During and After Dri-Mist™ Treatment – 2nd Specimen Test

The Room & Vehicle Sterilizer applied Zimek's Dri-Mist™ treatment (Zimek QD micro-particles) for 14 minutes. It was noted by Zimek's technician that the Zimek Dri-Mist™ micro-particle treatment penetrated everywhere from floor to ceiling. Following the 14 minute Dri-Mist™ treatment period, Zimek's Z-vac™ was automatically calibrated for a 10 minute cycle in order to vacuum the remaining airborne Dri-Mist™ sterilizing micro-particulates from the treated room and filter the air to remove further contaminants smaller than one micron in size.



The Dri-Mist™ treatment is a non-corrosive dry disinfectant application. Immediately after the Z-vac™ cycle ended, a second sponge sample of sixteen square inches was taken to the right of each piece of numbered tape (post-treatment sponge samples).

LABORATORY ANALYSIS: SPECIMEN SAMPLES OF PRE-EXISTING BACTERIAL CONTAMINANTS

1. Procedure for Analyzing Sponge Samples

Ten sponge samples were taken before the Dri-Mist™ treatment and ten sponge samples were taken after the Dri-Mist™ treatment. These twenty samples were transported back to Microbac's laboratory in Venice, Florida in a cooler. The temperature of the sponges upon return to the laboratory September 21, 2007 was 12° C.

Each sponge was placed on the vortexor for seven seconds to thoroughly remove the bacteria from the sponge into the 1 mL of Lethen Broth contained in the sponge tube. Half of the Lethen Broth was removed under sterile conditions and pipetted into a zero dilution petri dish. The other 0.5 mL of Lethen Broth was added to a test tube containing 9.5 mL of sterile deionized water. The tube was shaken for seven seconds in a one foot arc to thoroughly disburse any bacteria present from the sponge sample test.

One mL of this mixture was pipetted into a second petri dish representing the 10⁻¹ dilution. A 0.1 mL aliquot was pipetted into a third petri dish representing the 10⁻² dilution. 12 to 15 mL of PCA, Plate Count Agar, at 46.2° C was poured into each petri dish. Each petri dish was then swirled eight times in a clockwise direction, eight times in a counter-clockwise direction and eight times in a figure eight fashion to thoroughly distribute any bacteria from the sponge in the PCA. After cooling for thirty

minutes, to form a gel, each petri dish was inverted and placed into the 35° C incubator for a twenty four hour incubation period.

Counts of the bacterial colonies, each stemming from one colony forming unit, CFU, were recorded in the laboratory notebook. As each sample stems from one-half of the Lethen Broth, the laboratory counts are doubled in the report to represent the true count per sponge.

RESULTS

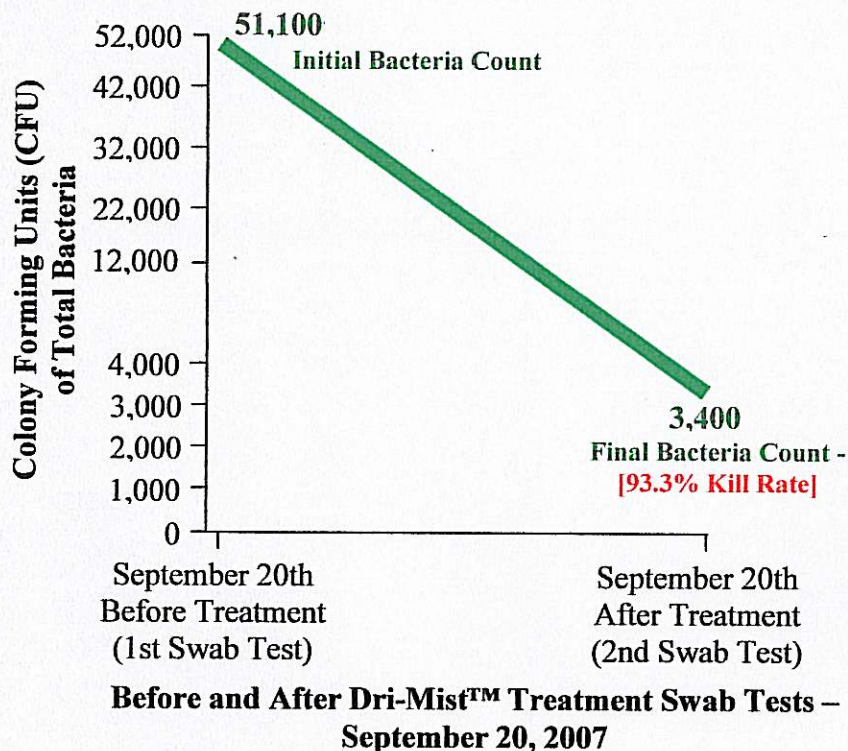
Based on the results of the pre-existing bacterial contaminant levels, a data table and graph of these pre-existing bacterial contaminant levels were prepared, and total kill rates of contaminant levels were determined on each treatment area per swab tested, as follows:

RESULTS OF TOTAL PLATE COUNT OF BACTERIA² (CFU/ sponge) – 4 in² of Surface Area

Treatment Area		1 st Swab Test Before Dri-Mist™ Treatment 09/20/07	2 nd Swab Test After Dri-Mist™ Treatment 09/20/07	Kill Rate % of CFU Killed between 1 st and 2 nd Swabs 09/20/07
1	Window ledge	0	0	0.0%
2	Wall center headboard	0	0	0.0%
3	Chair seat	6,500	300	95.4%
4	Floor	12,000	2,100	82.5%
5	Food table	2,500	100	96.0%
6	Picture frame	0	0	0.0%
7	Bath door	0	0	0.0%
8	Draw curtain	0	0	0.0%
9	Bath floor	100	0	100.0%
10	Call box	30,000	900	97.0%
Total Plate Count of Bacteria		51,100	3,400	
Total % Kill Rate of CFU				93.3%

² CFU = “Colony Forming Units” of bacteria per specimen from an approximately four inch by four inch area located as noted.

RESULTS OF TOTAL PLATE COUNT OF BACTERIA



KEY FINDINGS

The total colony forming units (CFU) of all bacteria found in the areas tested in the Room was significantly reduced by the 14 minute Dri-Mist™ treatment from 51,100 to 3,400, **resulting in a total bacteria kill rate on September 20th of 93.3%.**

CONCLUSIONS

The study proved that Zimek's Dri-Mist™ treatment is very effective in killing bacteria in the Room.

Respectfully submitted by:

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