AiroCide®

A NASA DEVELOPED TECHNOLOGY

Confidential

Air Quality Test Report

Test Authorized By: Directorate of Health (Riyadh)
Test Location: King Saud Hospital
Country: Riyadh, Kingdom Of Saudi Arabia
Test Area: TB Ward (Male Section)
Test Dates: November 18th-21st, 2009
Test Sponsor: Durrat Al Mashrafi

Contents

King Saud Hospital

Riyadh – Kingdom Of Saudi Arabia
Date:18th-21st November 2009

AiroCide® Photocatalytic Air Purification Technology

Report includes the CFUs/m3 findings for both bacteria and fungi from air sampling pre and post AiroCide use in the TB Ward

Confidential Research prepared at the request of Dr Hesham Head of Directorate of Health (Riyadh) – Under Supervision from Ministry Of Health (KSA).

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Air Testing Protocol & Procedures

The following procedures are strictly followed when initiating and/or performing any and all air testing of AiroCide®

1 Project Initiation

Plates can only be shipped to an out of town location if it is certain they will be placed in a refrigerated environment upon receipt.

Plates must be stored in a refrigerator or in a thermal container with an ice pack prior to testing and following testing. Alternately, after sealing the exposed plates, store them in a refrigerated environment until they are ready to ship.

Before shipping, ensure the completed COC (chain of custody document) and all of the properly identified plates are in the insulated box.

Ensure that the cold packs that will be sent with the exposed plates.

If multi-day tests are conducted, it is best to send all of the plates on the last day of the test by FedEx in an insulated container containing an adequate number of frozen cold packs to ensure proper temperature during shipping.

Plates must be shipped **only** Monday through Thursday, as there is no weekend delivery possible. Arrangements for the proper cold storage of the plates over the Friday-Sunday time period must be made for the Monday FedEx pick up.

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2.1 Single Stage Air Sampler

The Aerotech 6® is a single stage microbial bioaerosol impaction sampler designed to test for viable fungi and bacteria. It is comparable to the Anderson N6 sampler. The Aerotech 6® is constructed of aircraft-grade aluminum. It is held together by 3 spring clamps and sealed with 2 o-ring gaskets. The unit consists of an inlet-cone, a jet classification stage and base plate. The impactor stage contains 400 precision-cut holes. When air is drawn through the sampler, multiple jets of air direct airborne particles toward the surface of the agar collection media. The Aerotech 6® meets NIOSH method 0800 and 0801 specifications. *This equipment meets IESO standards for sampling.

2.2 Sample Media. The following media in a 15 x 100 mm plastic Petri-dish are used with the Aerotech 6®. (Important: Glass Petri dishes will not fit inside the Aerotech 6® air sampler.

Bacteria: Tryptic Soy Agar with 5% Sheep Blood, Incubated at 25^{o} C

Fungi: Potato Dextrose Agar (PDA), Incubated at 28^{o} C

3.0 Preliminary Data

(Record and verify the following BEFORE any air sampling is conducted, and for every repetition of procedures.) Note – this part of the protocol directs you to make enough notes about the environment that you have information to discuss unexpected variations in the sample results.

3.1 Describe the room and the room's contents. Record the temperature, the general appearance, the size and the type of HVAC System Filtering System that is being used in this room, to include:

3.1.1 Any Type of filter (HEPA or other) that is in use

3.1.2 Filtration percentage (%) of HEPA or MERV if available

3.1.3 Filter change schedule if known

3.2 If available: note the number of air turns the HVAC system makes per hour in the chosen test site.

3.3 Does the test site have its own separate HVAC system? If not what other zones, if any, does it share air with?

3.4 Verify the maintenance schedule of both the HVAC filter element change if one exists and the room-cleaning schedule to insure that the air sampling will be conducted in the timeline of what can be established as the **"steady state"** of the room.

3.5 Verify that there has been NO construction within the last 30 days, and there will be NO new construction during the air sampling time period.

3.6 Make sure that there has been no water damage or structural damage to the facility

3.7 Make sure that the sampling media (Petri dishes) have come to room temperature before air sampling begins.

3.8 The agar plates should not be exposed to freezing cold temperature or extreme heat above 85^{o} F

3.9 **Important -** It is extremely important that the number of staff in the room be noted as well as the frequency of entry and departure from the room. If any "new" equipment is brought into the room this also should be noted.

4.0 Sampling Locations

Sampling should be taken in the selected locations in the range of 36" and 72" above the floor. The tripod should **NOT** be readjusted during air sampling. The air sampler should always face in an upward direction for **ALL** air samples.

5.0 Sampling Methods

5.1 Sanitation. The air sampler's bottom fixed aluminum plate; middle section (top and bottom) and top cap should be lightly swabbed with alcohol to sanitize between air samples.

Important: Excess alcohol left within or on the metal surfaces will potentially KILL bacteria or fungi that have been collected on the agar's surface thereby negatively affecting the air-sampling test. Be certain alcohol has **completely** evaporated before sampling.

5.2 Air Sampler Operation

5.2.1 Clean hands with a hands with an alcohol swap (and at any point where cross contamination is possible.) or wear throwaway gloves.

5.2.2 Connect the flexible tubing from the pump to the male connector on the sampler. Turn in the pump and verify that the flow rate is at 28.3 l/min.

5.2.3 Allow enough time for all of the alcohol to evaporate from the metal surfaces before sampling. You also can look at the metal surfaces and see if there are any alcohol-wet spots. In high humidity environments it may take 2 to 4 minutes for the surface to dry.

5.2.4 With the sampler sanitized and the inlet cone and jet classification stage removed, place an agar plate with its lid removed on the base of the sampler so the plate rests on the three raised metal pins. Immediately cover the plate with the jet classification stage and the inlet cone. Secure the device with the three spring clamps and visually check to be sure of a good seal.

Note: Take sampling media out of refrigerator (do not freeze) and let rise to room temperature before air sampling begins.

5.2.5 Using a stop watch turn on the vacuum pump for **exactly 3 minutes**. Air is drawn through the cone at 28 l/m and passes into the jet classification stage where it is accelerated and passes through small openings and is then impacted onto the agar plate. The exhaust air is then carried through the outlet on the base and into the vacuum hose attached to the pump.

5.2.6 After sampling, unhook the three clamps and remove the agar plate. Quickly replace the agar plate cover and label the back of the plate with the appropriate

sample identification information. Seal the plate with standard laboratory wax or wide Teflon tape and place in a zip lock bag inside an ice chest with blue ice*.

*There is no need to further refrigerate the plates if they will be delivered within 24 hours to the appropriate laboratory that will be conducting the analysis.

5.2.7 Before taking another sample, be sure that your hands and the sampling device have again been sanitized.

Note: There should be hundreds of small "dimples," or indents, the sampling media from the impact of the air. If there are no indents, this means that the air sampler was not sealed properly. The plate without the indents should be discarded and the procedure repeated with a new agar plate.

5.2.8 When transporting or storing sampling media plates, keep the media side up so excess moisture does not adversely affect the integrity of the media or the test.

5.3 Sampling Intervals

Because different areas of the test site will be sampled there is no reason to have a time delay between air-sampling specimens. In fact, since what we are testing how the AiroCide® system(s) assists and/or aids the existing HVAC systems filtering system in removing CFUs, it is important to conduct the air sampling in different areas of the test site as quickly as is reasonable.

5.4 Labeling Samples

All sample petri dishes must be labeled with a number corresponding to its location in the test site per your COC time/location/data sheet, use a wax pencil. (See Attachment A.)

6.0 Sampling Procedures

The Test Protocol should be conducted as follows:

6.1 Baseline

Samples are taken at a test site on one (1) day with NO AiroCide® units operating. If you are testing an Operating Room (OR) the **base line** is the time just before the operation, begins meaning before the equipment, staff, doctor and patient arrive (an empty room).

6.2 Active Samples – AiroCide ON

Samples are taken at a test site on consecutive days while AiroCide® unit(s) have been OPERATING. If an (OR) after the equipment, staff, doctor and patient arrive and during the **"prep"** time which will vary. You should take several samples at the same locations as you took at the base line. Suggested areas of air sampling are the head, foot and each side of the patient

Purpose of the Study

Evaluate and quantify the affect of the installation of AiroCide devices in the TB Ward unit of King Saud Hospital. The study counted the microbial baseline levels for both bacteria and fungi/mold.

The expected performance outcome was a significant reduction of microorganisms responsible for the airborne transmitted nosocomial diseases.

Therefore, AiroCide's objective value for the King Saud Hospital system is to minimize the risk of nosocomial infections achieving 4 primary outcomes.

- Improve the healthcare services provided by the hospital.
- Reduce the morbidity and mortality due to this cause.
- Enhance 'best practices' for infection control.
- Cut down the healthcare costs generated by such diseases.

The Technology

AiroCide is a unique airborne pathogen killing technology that was funded, developed and used by NASA. It uses a patented combination of ultraviolet light and a proprietary titanium based photocatalyst that is capable of killing a wide range of airborne pathogens including bacteria, viruses, and molds, and is adept at promoting the breakdown of volatile organic compounds (VOC's). This study expands upon earlier documented proof that this technology has a direct application in all medical healthcare environments as it addresses the elimination of airborne infectious disease and improves overall patient care.

Testing Background and Expectations

In hospitals, it is important to keep in mind that there is a high population of immune-compromised patients. These infection susceptible patients include AIDS patients, geriatrics, neonatal patients, recent surgery patients (especially organ transplant recipients), Tuberculoses patients, chemotherapy and radiation therapy patients, cystic fibrosis and diabetics and the chronically ill and others whose immune system is suppressed or under stress. For these individuals, even low levels of pathogenic spores can be potentially fatal.

Therefore, air sampling tests were taken for both bacteria and mold/fungi in the TB Ward to prove the efficacy of the AiroCide system in removing airborne bacteria and fungi colony forming units (CFU's).

Despite sound cleaning practices witnessed within the TB WARD including surface disinfecting, entry precautions, including clothing coverage and gloves, and continual surveillance for cross contamination relatively high

baseline levels were measured. Our initial speculation for likely sources for ongoing generation of contamination would be air communication from the outer entry hallway and the cycling of the dedicated HVAC air handling system which may introduce bio burden.

It is important to keep in mind that any environment is continually faced with pathogen spikes occurring at irregular intervals as new contamination is introduced. Meaning, at any singular point in time, the graphical analysis of the environment could show a higher or similar level of contamination than that of a sample taken just a few minutes prior. For example, what happens to a room when a medical staff of two (2) are present versus the same room when seven (7) are present? Clearly, the opportunity for increased contamination exists when more people enter a room - which could result - in an upward or similar contaminate reading even though the AiroCide unit had been working. For clarification, the point here is not to focus on any singular sample – good or bad – but rather particular attention should be focused on the longer-term trend.

Note: Baseline samples revealed a great variety of both bacteria and fungi. Please, refer to the laboratory testing reports in the Appendix for details of bacteria and fungi/mold identification. Each plate analysis included total CFU/m3 level. specific Colony counts for the microorganisms were not cultured due to time constraints. We have worked under the assumption that bacteria is significantly stronger and viruses are much weaker in their DNA structure and have the same genetic makeup.

Tuberculosis – Background,Transmission & Annihilation with AiroCide

Tuberculosis (popularly known as "TB") is a disease caused by the bacteria *Mycobacterium tuberculosis*. It mainly infects the lungs, although it can affect other organs as well. When someone with untreated TB coughs or sneezes, the air is filled with droplets containing the bacteria. Inhaling these infected droplets is the usual way a person gets TB. One of the most dreaded diseases of the 19th century, TB was the eighth leading cause of death in children 1 to 4 years of age during the 1920s. As the general standard of living and medical care improved in the United States, the incidence of TB decreased. By the 1960s, it wasn't even in the top 10 causes of death among children of any age group.

But TB is making a comeback in many countries today, including the United States — particularly among the homeless, those in prison, and those rendered susceptible because of HIV infection.

Tuberculosis is spread only when people breathe air contaminated by a person who has active disease. Other related bacteria (called mycobacteria), such as Mycobacterium bovis or Mycobacterium africanum, can occasionally cause a similar disease.
People with active tuberculosis in their lungs often contaminate the air with bacteria when they cough, sneeze, or even speak. These bacteria can stay in the air for several hours. If another person breathes them in, that person may become infected. Thus, ***people who have contact with a person who has active tuberculosis (such as family members or health care practitioners who treat such a person) are at increased risk of getting the infection.***

Since 14+ years AiroCide is clinically proven to kill/annihilate all type of airborne bacteria by pulling the infected air through its reaction chamber and ensuring a collision with the hydroxyl radicals using the photocatalysis methodology;

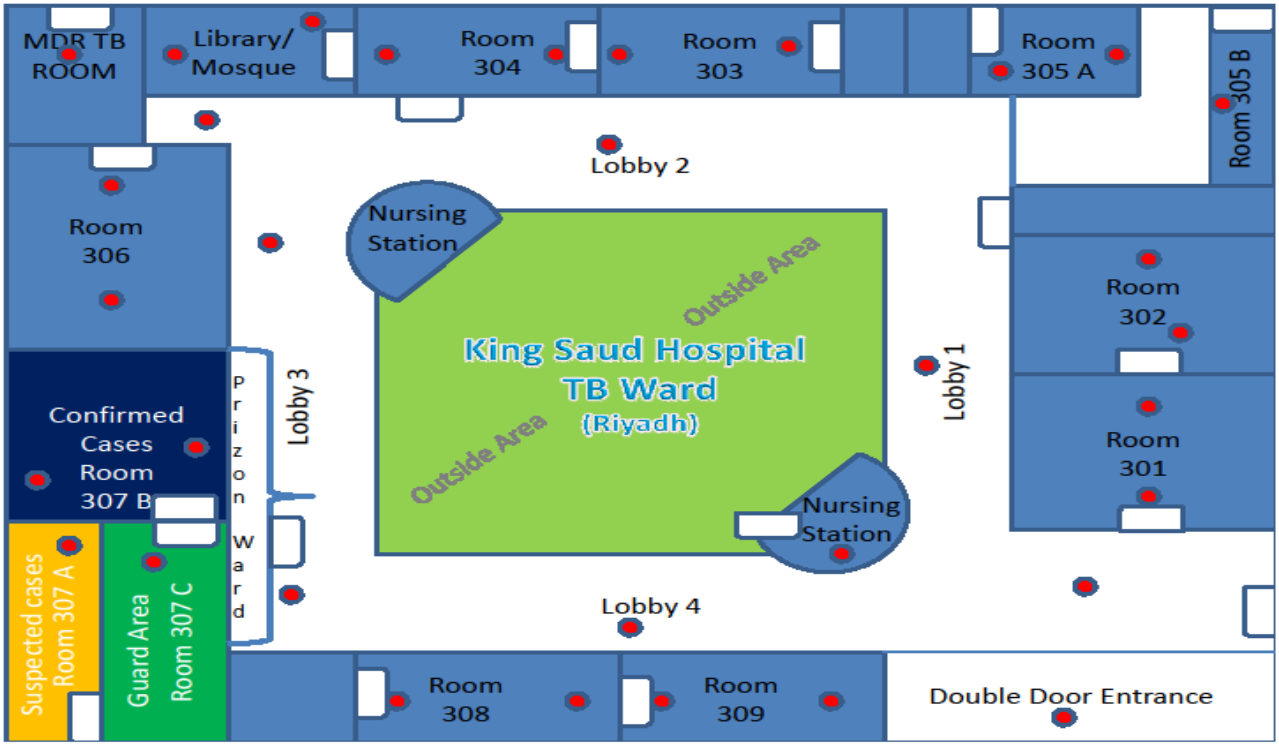
Photocatalysis - A catalyst is a substance that accelerates or enhances a chemical reaction, or in AiroCide's case, a photoreaction. Titanium dioxide (Ti02) when irradiated by UV energy produces a strong catalytic reaction. This reaction lowers the intensity field required for UV light to break organic covalent bonds. Hydroxyl radicals are produced as the UV strikes the titanium oxide coating. However with AiroCide the OH-radicals are surface bound in a molecular structure to the catalytic layer. These free electrons from the hydroxyl molecule (and super-oxide ions) are extremely potent oxidizing agents. Hydroxyl radicals are often referred to as "toxic oxygen". AiroCide uses this oxidizing potential to react with airborne organic compounds such as but not limited to Mycobacterium tuberculosis, it breaks organic bonds and creates a chemical oxidative reaction which eliminates the unwanted compound and produces trace amounts of water vapor and carbon dioxide.

There are numerous reasons as to why this particular NASA born technology or AiroCide has a significant advantage over other PCO and/or so-called Titanium dioxide catalytic systems.

Nano Particle Solution. The patented technique further refined by learned art in practice creates a nano solution which isolates a molecule in solution or substrate whereby no particle migration takes place. This process creates separate and multiple molecules that can be surface bound to generate optimum reactivity by orienting molecules for maximum angle access. Unlike naturally occurring TiO2 molecules closely packed together and with poor PCO characteristics and poor bonding compatibility, the NASA sol nanoparticles in solution can be properly aligned in a random membrane lattice maximizing the interactive surfaces.

Permanent Bonding. The above solution then can be bonded to a substrate or in the case of AiroCide's catalytic rings a borosilicate cylinder which will not delaminate and have an indefinite functional life. The coating process limits the size of the bond contact point which facilitates more molecular surface area for more reactive collisions with organic compounds. The surfaces have more area and pores for creating surface bound hydroxyl radicals which interact with contaminants. The result of this high reactivity is the ability to kill viruses, bacteria, mold/fungi and oxidize volatile organic compounds or VOCs.

TB Ward Background Information



Red Dots indicate test locations and white blocks indicate AiroCide installation(s)

The TB ward chosen to conduct the tests consisted of 14 rooms; each room had an average of 6 beds with 2 special rooms averaging 2 beds, open access hallways,

nursing stations and a double door entry way into the ward (Please refer to the drawing as attached).

A nurse station was positioned on two ends of the ward accommodating computer access, charting and consultation space; although only one station was actively used where the AiroCide unit was installed. Entry into the ward required the wearing of a lab coat, head cover and mask to further reduce outside bio-burden transmission into the clinical space.

During the four (4) day regiment of testing, patient populations were relatively stable described as follows:

- ✓ Room 301: Nil (0) Last patient shifted out 72 hours prior
- ✓ Room 302: Three (3)
- ✓ Room 303: Four (4)
- ✓ Room 304: Six (6)
- ✓ Room 305A: One (1)
- ✓ Room 305B: Doctors Office
- ✓ Room 306: Five (5)
- ✓ Room 307A: Two (2) Suspected TB Case Jail Ward
- ✓ Room 307B: Five (5) Confirmed TB Case Jail Ward
- ✓ Room 307C: Two (2) Wardens Jail Ward Lobby
- ✓ Room 308: Two (2)
- ✓ Room 309: One (1)

The attending medical staff was typically comprised of 2 MDs (Tuberculoses/Infection control specialists) and 3 nurses. Day shift changes took place in the afternoons where three (3) to four (4) nurses replaced colleagues (minor overlap) and transferred patient status to the income nursing staff. Each morning at about 8-10am the MDs did rounds discussing each case and reviewing charts and vitals with the primary care nurse assigned to that part TB Ward. Cleaning practices for floor and equipment surfaces included a Clorox® and Lysol as a disinfectant

The entire TB Ward area had a dedicated air handling system which did not share common HVAC with outer areas or other units. The TB ward did not have any filtration such as Hepa Filters in place. *There was negative pressure in the rooms but was rarely used as the caregivers thought it was not effective enough to make a difference.*

AiroCide Unit Placement

A total of 19 AiroCide systems (15 GCS 100 and 4 GCS 50) were installed in the ward - patient rooms/areas including both isolation rooms with closed doors, Lobby, nursing station other open patient areas. Because of the openness of the rooms, and the proximity to the nursing station area, no additional units were deemed necessary in the open common spaces. Units were mounted on walls at eye level and in most cases were located behind the patient's bed. They were powered from the available power strips common to all rooms for powering vents and monitoring systems. The hospitals bio engineering staff assisted with placement and actual affixing to the walls.

Note: In rooms 305A power outlets were not available until the last day and hence only baselines (without AiroCide) samples were taken. In room 305B, the testing team did not have access to that room until the last day and were able to get only a 45 minute reading (post installation).

Air Sampling Protocol

Sampling points were selected after observing the each room layout and flow of staff and patients. 2 key points were selected in each patient room. Throughout the study when each sample was taken activities were noted like general activity in proximity to test site, whether the room/bed was occupied by patient and whether both nursing and MD presence was unusual. Notes were taken on cleaning schedules, food servings, patient/relative visits etc.

Anderson Sampling

The air samples were accomplished using an Anderson-Type sampler set at the same flow rate. In addition, the samples were taken from the same floor height and air was drawn through and into the agar media for the same time duration to guarantee a constant volume of air for each and every sample taken regardless of day, time or media type. This was essential to be able to render comparisons from different conditions and days of AiroCide purification of the space.

Baselines were taken on day 1 after installation and before the units were powered on. Mold/fungi and bacteria plates were obtained, sealed, labeled packed at appropriate temperatures with cold packs. Units were then powered on and the samples repeated each day for 3 successive days at different times of day and in the same sequence for each of the testing points.

Each day's sampled plates were sent to a third party microbiology lab for preparation, incubation of contents and analysis. The reported results included a total CFU/m3 count.

Test Results

As anticipated AiroCide technology had a significant impact on the environment:

- **Airborne bacteria were reduced by 76% over a 60 hour period of AiroCide purifying the air as compared to a baseline prior to AiroCide being activated.**

- **Fungi/mold level was reduced 71% over a 60 hour period of AiroCide purifying the air as compared to a baseline prior to AiroCide being activated.**

Note: On the 3rd day (60 hour) as the air samples were being drawn a thorough cleaning process was going on with bed sheet changes, dusting sweeping, Clorox/Lysol decontamination was used to wash the floors resulting in a pathogen spike as contaminants on floors, beds, furniture got airborne as noted in the 60 hour results. However the spike was not significant enough to affect the final result. However such spikes are common and decreasing trends continue beyond the 60 hour period as AiroCide works 24/7 in controlling and managing pathogen build up continuously.

As is typical, the largest percentage reduction occurred during the initial 24 hour period as baselines samples showed the highest levels of contamination. As time passed various spikes were encountered as new contamination threats entered the area, but AiroCide repeatedly brought those back down to lower safer levels. Results demonstrated one of the key operating advantages of the AiroCide technology, namely ongoing 24/7 steady microorganism protection.

Results show a significant impact on the environment during the 60 day period. Continued AiroCide use is expected to result in a long term trend to lower bacteria and mold/fungi levels. Be aware that microorganism reductions of this magnitude are not linear. As the result of this reduction, coupled with diffusion and dispersion, the statistical probability of contracting an airborne pathogen has been geometrically lowered.

Further, we would recommend additional unit placement in the Female ward, ICU, office areas and common visitor waiting areas outside of the TB WARD areas as well as within the transitioning corridor. We believe this will also help to reduce the ongoing levels of bio-burden not to mention due to the highly infectious nature of the diseases being treated in the hospital, it is extremely important to provide the added protection for the care givers alike.

Results – Bacteria

Location	Baseline	18 Hours	42 Hours	60 Hours	%Change
Room 301	840	198	72	60	93%
Room 302	540	168	42	102	81%
Room 303	462	220	72	114	75%
Room 304	570	174	120	120	79%
*Room 305A	120	N/A	N/A	N/A	N/A
**Room 305B	168		1 hour test	90	43%
Room 306	390	192	114	150	62%
Room 307A	150	120	60	90	40%
Room 307B	426	168	102	162	62%
Room 307C	138	120	24	78	43%
Room 308	540	180	96	138	74%
Room 309	150	60	48	90	40%
MRTB Room	120	90	78	60	50%
Library Mosque	240	114	60	42	83%
Lobby 1	240	120	18	30	88%
Lobby 2	120	54	29	24	80%
Lobby 3	480	150	60	42	91%
Nursing Station	90	60	29	18	80%
Main Entrance	120	114	30	36	70%

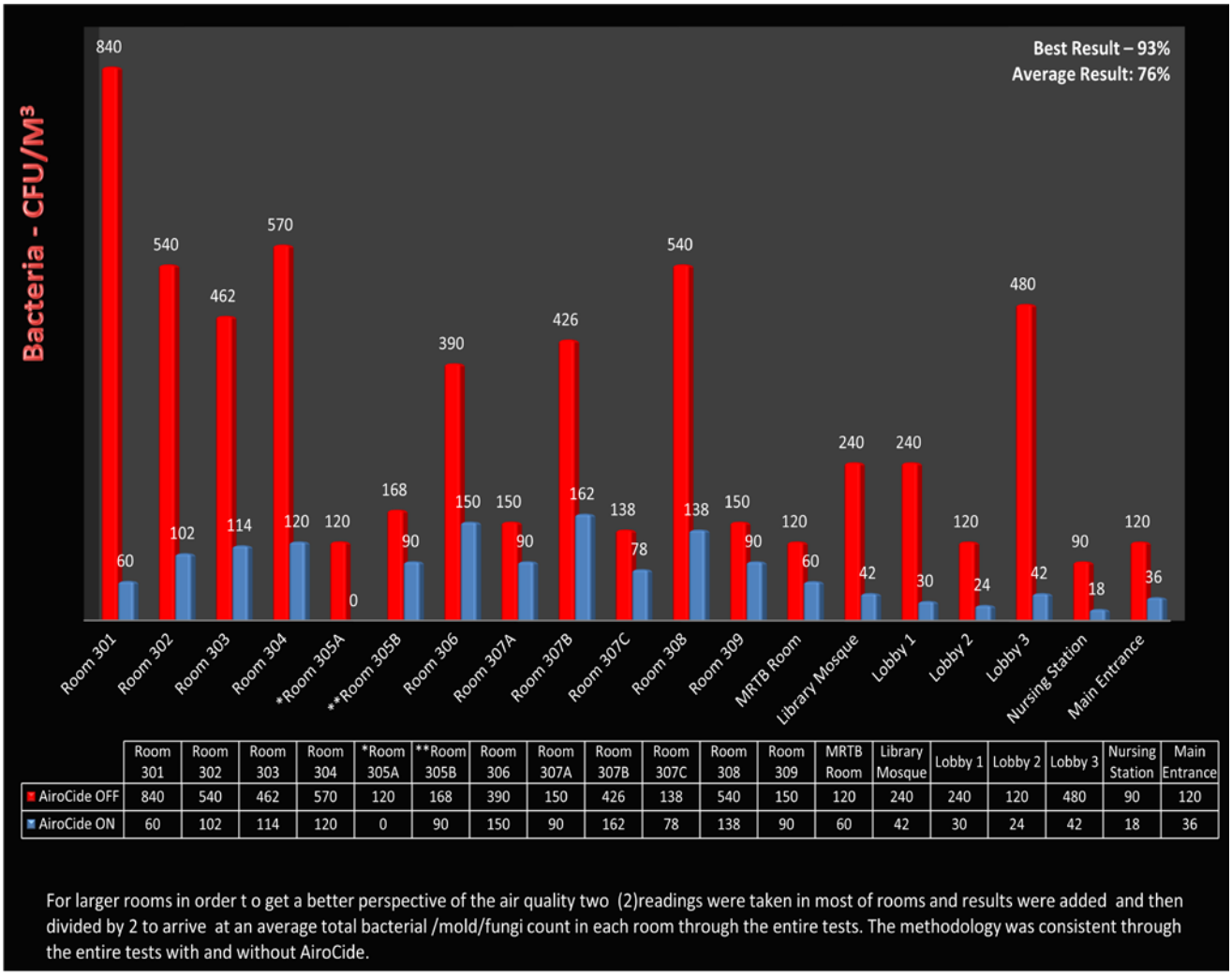
**220 Volt outlet was not available until after the test was completed therefore the room was eliminated but as the HVAC is shared within the Ward – Pathogens noted in the baselines have been recorded as they potentially could move through the shared ducts and spread to adjacent rooms/areas.*

***Room 305B was scheduled for a 3 hour test as requested by Dr Abdelrahman Ishaq (MOH) however due to the unavailability of access to the room only a 1 hour test was possible ie – once base line was established (without AiroCide) there was only one hour time gap between test & once AiroCide was turned on.*

Note: The least reduction was in the jail wards Room 307A, Room 307B, Room 307C due to constant lack of power in the wards. As per the jail warden, power was not allowed in the rooms and there was a constant switching on/off with every change in shifts. Power to the units was located outside the rooms and was controlled by wardens.

Main entrance and lobby areas showed a considerable improvement partially due to keeping the doors closed which were constantly kept open previously whereby introducing pathogens into the general ward areas.

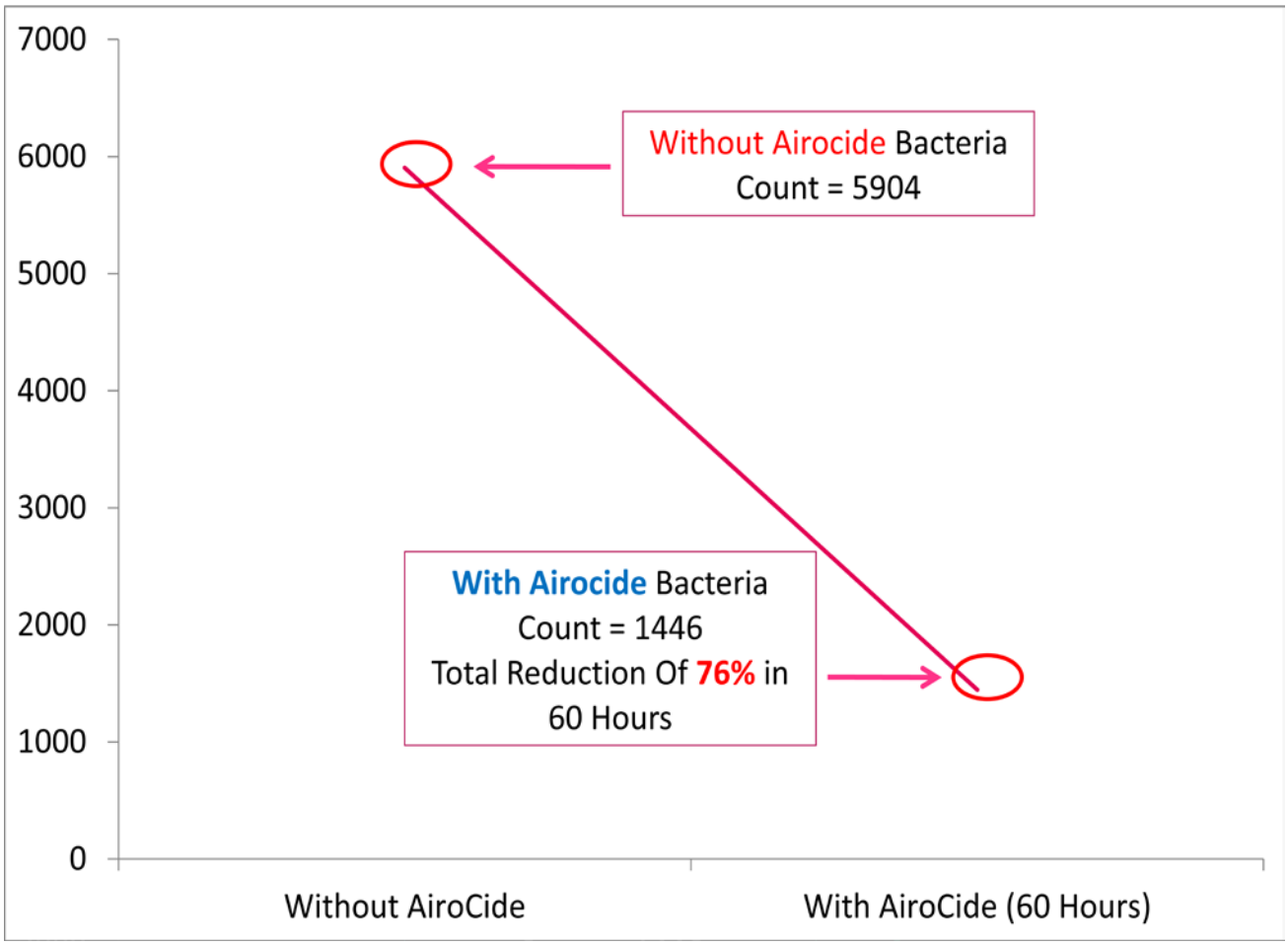
INDIVIDUAL AREA ANALYSIS (60 HOURS)



	Room 301	Room 302	Room 303	Room 304	*Room 305A	**Room 305B	Room 306	Room 307A	Room 307B	Room 307C	Room 308	Room 309	MRTB Room	Library Mosque	Lobby 1	Lobby 2	Lobby 3	Nursing Station	Main Entrance
AiroCide OFF	840	540	462	570	120	168	390	150	426	138	540	150	120	240	240	120	480	90	120
AiroCide ON	60	102	114	120	0	90	150	90	162	78	138	90	60	42	30	24	42	18	36

For larger rooms in order t o get a better perspective of the air quality two (2)readings were taken in most of rooms and results were added and then divided by 2 to arrive at an average total bacterial /mold/fungi count in each room through the entire tests. The methodology was consistent through the entire tests with and without AiroCide.

KING SAUD HOSPITAL – TB WARD BACTERIA REDUCTION CHART



Note: Decreasing trend line will continue beyond the 60 hour reduction level of 76%.

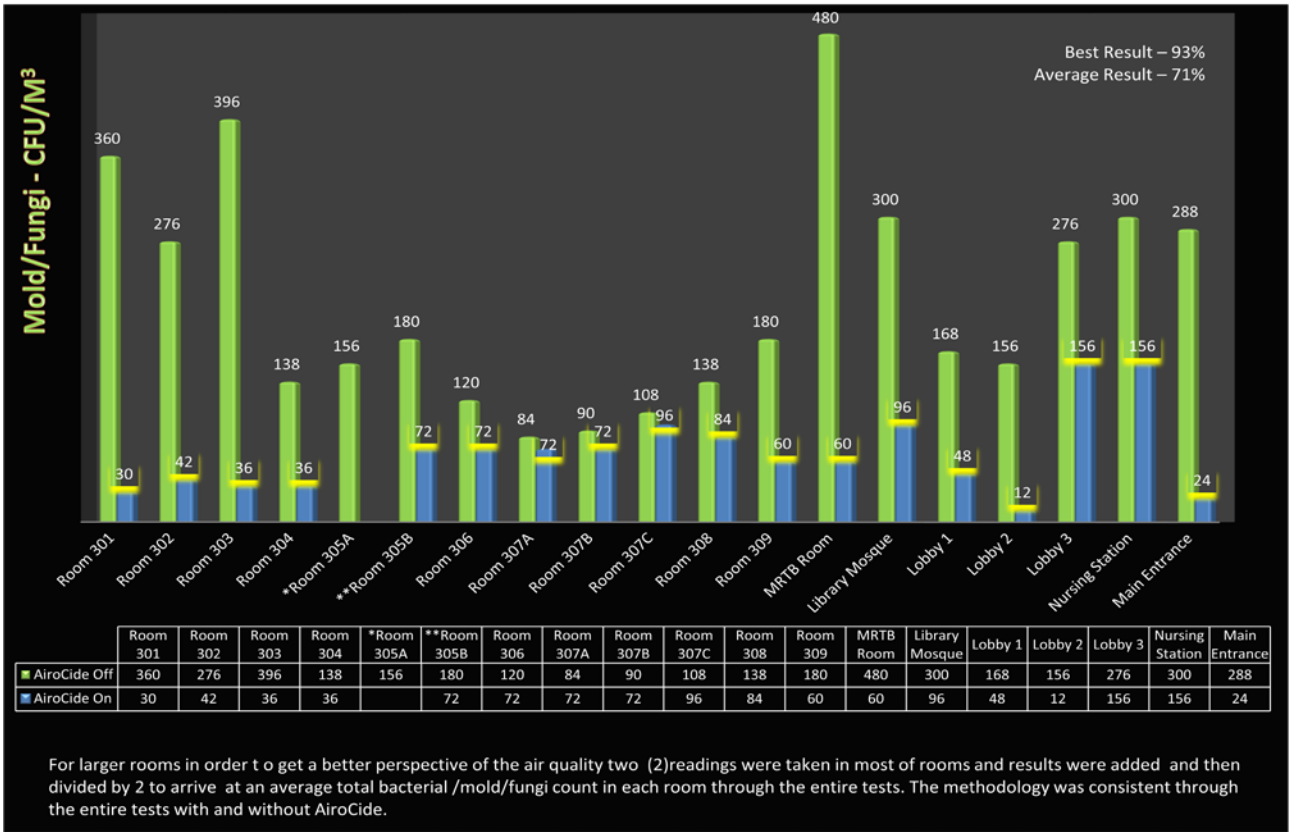
Results – Mold

Location	Baseline	18 Hours	42 Hours	60 Hours	%Change
Room 301	360	52	42	30	91%
Room 302	276	54	36	42	85%
Room 303	396	90	48	36	91%
Room 304	138	78	42	36	73%
*Room 305A	156				
**Room 305B	180		(1hr test)	72	60%
Room 306	120	72	30	72	40%
Room 307A	84	108	84	72	14%
Room 307B	90	78	42	72	20%
Room 307C	108	96	84	96	11%
Room 308	138	66	60	84	39%
Room 309	180	156	96	60	66%
MRTB Room	480	72	48	60	87%
Library Mosque	300	240	24	96	68%
Lobby 1	168	12	24	48	71%
Lobby 2	156	60	12	12	92%
Lobby 3	276	120	84	156	43%
Nursing Station	300	216	144	156	48%
Main Entrance	288	12	24	24	92%

Note: The least reduction was in the jail wards Room 307A, Room 307B, Room 307C due to constant lack of power in the wards. As per the jail warden, power was not allowed in the rooms and there was a constant switching on/off with every change in shifts. Power to the units was located outside the rooms and was controlled by wardens.

Main entrance area showed an improvement of over 92% partially due to keeping the doors closed which were constantly kept open previously whereby introducing pathogens into the general ward areas.

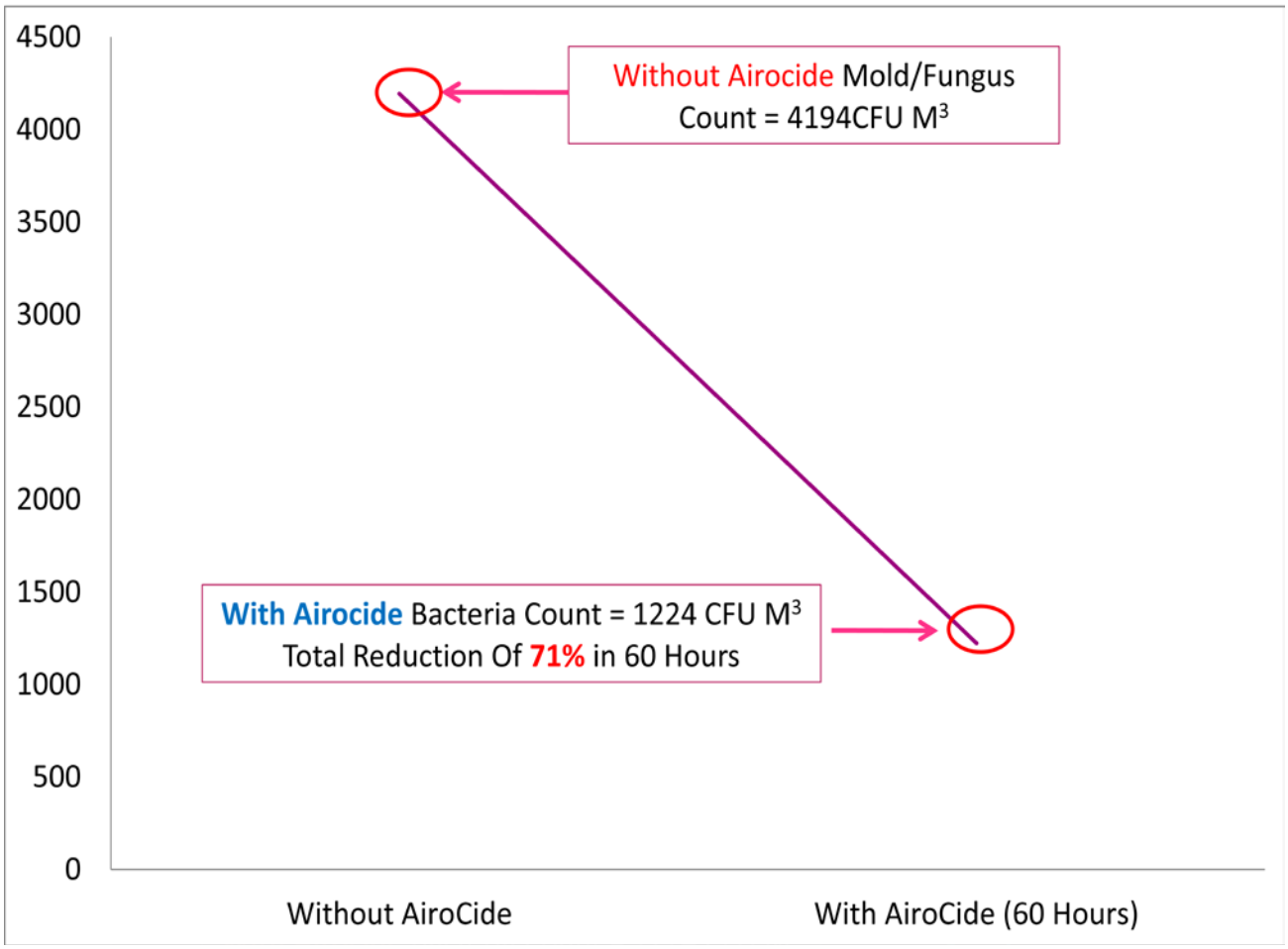
INDIVIDUAL AREA ANALYSIS (60 HOURS)



	Room 301	Room 302	Room 303	Room 304	*Room 305A	**Room 305B	Room 306	Room 307A	Room 307B	Room 307C	Room 308	Room 309	MRTB Room	Library Mosque	Lobby 1	Lobby 2	Lobby 3	Nursing Station	Main Entrance
AiroCide Off	360	276	396	138	156	180	120	84	90	108	138	180	480	300	168	156	276	300	288
AiroCide On	30	42	36	36		72	72	72	72	96	84	60	60	96	48	12	156	156	24

For larger rooms in order t o get a better perspective of the air quality two (2)readings were taken in most of rooms and results were added and then divided by 2 to arrive at an average total bacterial /mold/fungi count in each room through the entire tests. The methodology was consistent through the entire tests with and without AiroCide.

KING SAUD HOSPITAL – TB WARD MOLD/FUNGI REDUCTION CHART



Note: Decreasing trend line will continue beyond the 60 hour reduction level of 71%.

Conclusions

- Airborne bacteria were reduced by 76% over a 60 hour period of AiroCide purifying the air as compared to a baseline prior to AiroCide being activated.

- Fungi/mold level was reduced by 71% over a 60 hour period of AiroCide purifying the air as compared to a baseline prior to AiroCide being activated.

- Informal interviews were conducted with patients nurses and doctors on their experience post installation. Patients felt they coughed less, nurses and doctors felt the area smelt much better (reduction in VOC's).

- One of the reasons for better smelling was as direct effect of the reductions in the Volatile Organic Compounds (VOC's) by AiroCide which were being generated by using hand sanitizers located across the ward and Lysol (used to clean floors). As hands are scrubbed with the alcohol and floors are washed, VOC's are generated in the form of phenol which is known to cause fatigue and red eyes in individuals who come in constant contact with this carbolic acid. Phenol and its vapor are corrosive to the eyes, the skin and the respiratory tract. AiroCide is proven to eliminate all types of VOC's from the indoor environment including phenol.

- The results prove that the AiroCide system provides a high level of effectiveness, reducing cross-contamination between health staff and patients and also improving the working conditions of the caregivers within the TB WARD.

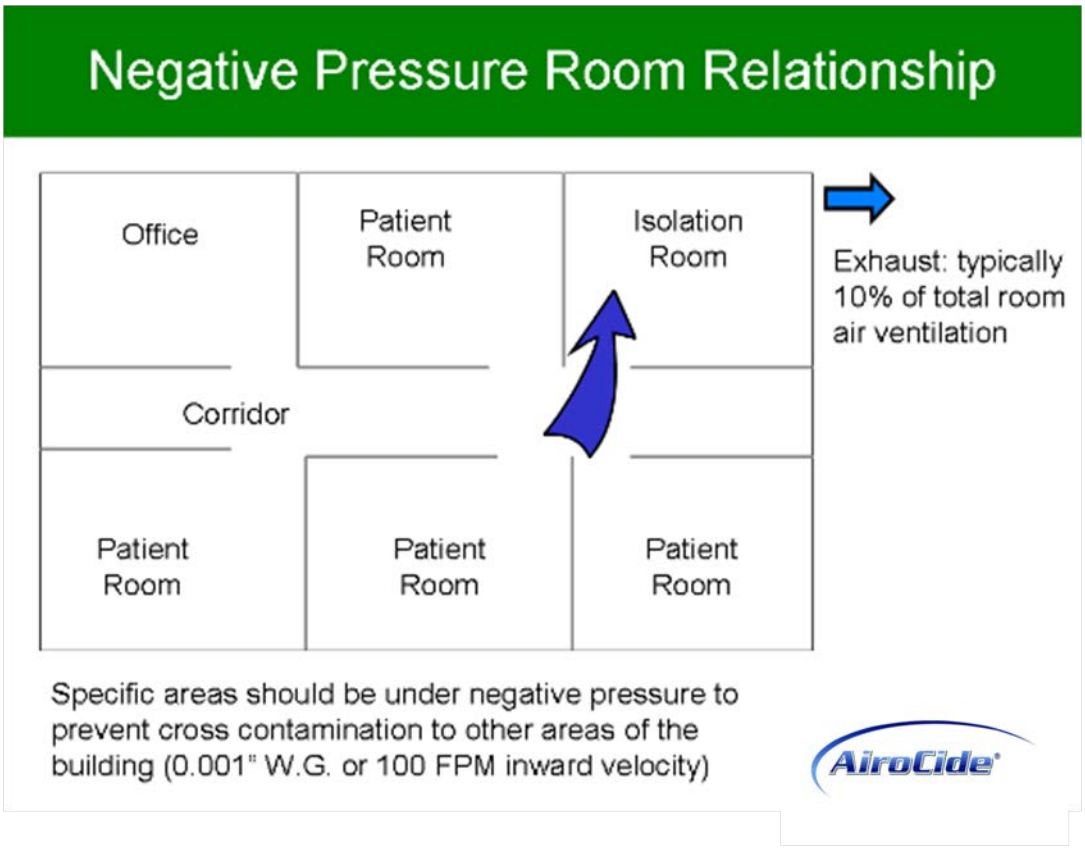
- Hospital acquired infections are a threat to patient safety and require improvement in clinical practice. We believe that AiroCide implementation will help the hospital reduce these known risks.

- AiroCide's low cost implementation and maintenance should be considered when weighing the cost/benefit analysis of reduced nosocomial infections. It is our belief that the reduction and prevention of such infections, as a result, will translate into significant savings for the hospital, patient and/or public health system.

- An opportunity for a unique public awareness position is supported by AiroCide installation. Specifically, its ability to deliver unequalled air purification could be effectively marketed to the affluent local Saudi population, as well the foreign medical tourism consumer.

AiroCide In Negative Pressure Rooms

Negative Room Pressure to Prevent Cross-Contamination A negative pressure room includes a ventilation system designed so that air flows from the corridors, or any adjacent area, into the negative pressure room, ensuring that contaminated air cannot escape from the negative pressure room to other parts of the facility.



Air naturally moves from areas of higher pressure to areas of lower pressure. When negative pressure exists, a continuous air current enters the room under the door, which prevents airborne particles generated in the room from escaping into the corridor. A common example of negative pressure is a bathroom with an exhaust fan. When operating correctly, and with the door closed, the fan prevents unwanted odors and moisture from escaping.

Negative pressure is created by balancing the room's ventilation system so that more air is mechanically exhausted from a room than is mechanically supplied. This creates a ventilation imbalance, which the room ventilation compensates by continually drawing in air from outside the room. In a well-designed negative pressure room, this air is pulled in under the door through a gap (typically about half an inch high) for that purpose. Other than this gap, the room should be as airtight as possible to prevent air from being pulled in through cracks and gaps, for instance those around windows, light

fixtures and electrical outlets. Leakage from these sources can compromise or eliminate room negative pressure, even if the system is balanced to achieve it.

Negative pressure in a room can be altered by changing the ventilation system operation or by the opening and closing of the room's doors, corridor doors or windows. When an operating configuration has been established, it is essential that all doors and windows remain properly closed in the negative pressure room and other areas (e.g., doors in corridors that affect air pressure) except when people need to enter or leave the room or area.

Although negative pressure rooms are widely used to control the spread of infections, but as described above they can be compromised if the pressure is lost. AiroCide with its proven ability to remove airborne infections can greatly assist in functioning/controlling the spread of infections in negative pressure rooms, to be clear, it is not recommended replacing negative pressure rooms with AiroCide technology, however *Airocide can greatly help boost and derive optimum performance in negative pressure rooms*.

AiroCide Technology can be further deployed in the following areas in healthcare applications:

- ✓ **Operation Theatres**
- ✓ **Intensive Care Units (ICU's)**
- ✓ **Organ Transplant Rooms**
- ✓ **Neonatal**
- ✓ **Patient Waiting Areas**
- ✓ **Pathology Labs**
- ✓ **Blood Banks**
- ✓ **Patient Rooms**
- ✓ **Negative pressure rooms**
- ✓ **Any area where Indoor Air Quality is of concern**

APPENDIX

LABORATORY REPORTS