Case Study: Bio-decontamination of Mount Elizabeth Hospital using hydrogen peroxide vapour

The Challenge

As the Severe Acute Respiratory Syndrome (SARS) epidemic worsened in Singapore, it became clear that hospitals were forming focal points for the spread of the virus. At the height of the crisis Government sources estimated that 87% of new infections were hospital acquired. Although little was known about the method of transmission, research indicated that SARS could survive outside its host for up to 6 days, thereby representing a serious risk to staff and patients who came into contact with potentially contaminated hospital surfaces.

Laptop, Clarus™ R2 Generator and Aeration unit

In response to this problem our client, Parkway Healthcare Group, the largest private healthcare provider in Asia, sought to arrest the potential spread of the virus by bio-decontaminating risk areas of its Mount Elizabeth hospital.

Client Requirements

The client sought to bio-bio-decontaminate four partially occupied hospital wards, comprising 41 rooms of total volume 3200m^3. It was essential that patients were not unduly inconvenienced or worried and that wards not only remained open, but retained some capacity for new admissions.

The Solution

BIOQUELL's rapid, residue free Room Bio-bio-decontamination Service (RBDS) utilises the microbicidal power of free radicals released by hydrogen peroxide vapour to bio-decontaminate rooms. The RBDS equipment first distributes hydrogen peroxide vapour throughout the area, ensuring all surfaces are bio-bio-decontaminated, before converting the gas to oxygen and water vapour, as described below.

Background: *Bio-decontamination within a room or chamber is achieved by depositing an even layer of approximately 1 micron* 'micro-condensation' *of* H_2O_2 *over all surfaces. The term* 'micro-condensation' *may be defined as a microscopic film of* H_2O_2*, which being at a sub-micron level is invisible to the naked eye. Scientific research has proven that it is this low temperature, residue-free deposit that actually deactivates micro-organisms during the gassing process.*

GAS $2H_2O_2$ CATALYST → $2H_2O$ (water) + O_2 (oxygen) Residue Free

Independent verification of the technology against extremely resilient organisms such as anthrax, 'superbugs' such as MRSA and a number of viruses allows BIOQUELL to be absolutely confident of its efficacy against the SARS virus.

Methodology

By working closely with hospital staff, BIOQUELL were able to safely bio-decontaminate the required 41 rooms in 7 days, remaining flexible and sensitive to patient needs throughout.

For the sake of efficiency, BIOQUELL bio-bio-decontaminated 'blocks' of five or six adjacent rooms at one time, the residue-free nature of the technology allowing patients to be instantly moved into newly bio-decontaminated wards. When this was not possible BIOQUELL worked with the hospital team to provide alternative solutions, at one point decontaminating 6 rooms in three separate wards concurrently. This was made possible by the light and portable nature of the equipment, which has been designed to be handled by a single person.

Gassing Cycle Verification

The efficacy of the gas was proven using 'biological indicators.' These highly resilient *Bacillus stearothermophilus* spores were exposed to the RBDS cycles. All were de-activated indicating that full bio-decontamination had been achieved.

Conclusions and Feedback

BIOQUELL is confident that any SARS virus in the gassing zones was bio-deactivated - therefore negating the risk of SARS spreading from those areas, and ultimately realising the main requirement of the client. There have been no incidents of SARS at Mount Elizabeth hospital since the RBDS contract was carried out.

As an added benefit of the process, other environmentally associated hospital acquired pathogens (such as MRSA and VRE) were bio-deactivated, with the likely result of reducing hospital acquired-infection and all its associated costs. The implementation of a regular bio-decontamination programme would sustain this reduced re-infection level.

The publicity generated by the presence of BIOQUELL greatly contributed to restoring patient numbers, which had dwindled to a critical level as the public actively chose to avoid hospitals. This example demonstrates the financially compelling case for RBDS in private hospitals, where patients are in the position to choose other hospitals or simply stay away.

Parkway group have volunteered to act as a reference for the RBDS service. For details please contact BIOQUELL.

BIOQUELL Bio-decontamination solutions

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