

# Case Study

HEALTH IS IN THE AIR

INGENIOUS AIR



## Key Benefits

- ✓ Meets or exceeds strict ISO 7 cleanroom criteria.
- ✓ Cooling, heating & high specification air purification in one system.
- ✓ Flexible design allows easier installation into a tight space.
- ✓ Parts requiring routine maintenance are outside of the laboratories, reducing disruption.

## Meeting Cleanroom Standards in Two IVF Laboratories

### The Problem

The London Women's Clinic in prestigious Harley Street provides pioneering fertility treatment to help patients have a healthy baby. The clinic needed air conditioning, heating and air purification for two state-of-the-art egg collection and implantation laboratories. Stringent ISO 7 cleanroom standards had to be met to correctly control the environment:

1. Even temperature control:  $\pm 1^{\circ}\text{C}$
2. Low relative humidity: 25 – 40%
3. Air changes through air purification module per hour: 20

In addition, limited space and low ceiling height made installation potentially difficult in this striking, listed building.

### The Solution

One 14kW Ingenious Air (Small Duct) system was installed in each laboratory. The air handling units (AHU) were located out of the way in a cupboard, allowing maintenance work to be carried out without disruption to the clients or the business. Flexible ducting and multiple choices for positioning the AHU, cooling coil and air purification module made installation straightforward. Each laboratory required a different configuration to fit.

Discreet, white air outlets were positioned in the ceiling to keep temperatures even, comfortable and draught-free.

### Follow Up

The clinic carries out independent monitoring and all ISO 7 requirements are achieved or surpassed. Temperature control is within  $\pm 0.5^{\circ}\text{C}$  and 36 air changes are achieved per hour. The high specification purification cleans the air and removes bacteria, viruses, pollutants, dust and allergens. Each laboratory provides the required controlled environment for treatments to be most effective.

## Hard Surfaces Biocontrol in Hospitals Using Microbial-Based Cleaning Products

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### Abstract

**Aim:** This study aims to evaluate the effect of a novel cleaning procedure based on the mechanism of biocontrol, on the presence and survival of several microorganisms responsible for HAIs (i.e. coliforms, *Staphylococcus aureus*, *Clostridium difficile*, and *Candida albicans*) on hard surfaces in a hospital setting.

**Background:** Healthcare-Associated Infections (HAIs) are one of the most frequent complications occurring in healthcare facilities. Contaminated environmental surfaces provide an important potential source for transmission of many healthcare-associated pathogens, thus indicating the need for new and sustainable strategies.

**Methods:** The effect of microbial cleaning, containing spores of food grade *Bacillus subtilis*, *Bacillus pumilus* and *Bacillus megaterium*, in comparison with conventional cleaning protocols, was evaluated for 24 weeks in three independent hospitals (one in Belgium and two in Italy) and approximately 20000 microbial surface samples were collected.

**Results:** Microbial cleaning, as part of the daily cleaning protocol, resulted in a reduction of HAI-related pathogens by 50 to 89%. This effect was achieved after 3–4 weeks and the reduction in the pathogen load was stable over time. Moreover, by using microbial or conventional cleaning alternatively, we found that this effect was directly related to the new procedure, as indicated by the raise in CFU/m<sup>2</sup> when microbial cleaning was replaced by the conventional procedure. Although many questions remain regarding the actual mechanisms involved, this study demonstrates that microbial cleaning is a more effective and sustainable alternative to chemical cleaning and non-specific disinfection in healthcare facilities.

**Conclusions:** This study indicates microbial cleaning as an effective strategy in continuously lowering the number of HAI-related microorganisms on surfaces. The first indications on the actual level of HAIs in the trial hospitals monitored on a continuous basis are very promising, and may pave the way for a novel and cost-effective strategy to counteract or (bio)control healthcare-associated pathogens.

### References

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**Data Availability:** The authors confirm that all data underlying the findings are fully available without restriction. All relevant data are within the paper and its Supporting Information files.

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