A breath of fresh air for the Adelaide Women's and Children's Hospital

HEPA filtration in high risk areas of hospitals such as operating theatres has been an industry standard for many years.

Bacteria, viruses and other airborne particulate matter pose significant health risks and challenges to the health of patients and medical professionals.

However, the treatment of contaminated air in ***moderate risk areas*** including recovery suites, neo natal wards, and oncology wards has received far less focus.

This is generally because, the pressure and energy consequences of extending conventional HEPA filtration have often proved insurmountable.

This mindset can now change, with **Plasma Shield**.

This technology has been demonstrated to be able to match the performance of HEPA filtration with only 50% of the pressure drop (<110 pascals).

Consequently a viable solution for moderate risk zones can now be delivered without fan upgrades.

At a recent installation in the Post Surgical Recovery Suite at the Women's and Children's Hospital in Adelaide, this hypothesis was proven.

An independent study by researchers at the University of Adelaide, demonstrated the significant improvement in air quality compared with the existing MERV-13 filter.

See over for details.

SECTOR
Hospital

LOCATION
Post Surgical Recovery Suite
Women's and Children's Hospital, Adelaide

PROJECT SIZE
220m²

CHALLENGE
Risk of infection from airborne contaminants to patients and staff.

SOLUTION
100% air treatment of outdoor and recirculated air.

OUTCOMES - HEALTH
- Results measured in the duct via a single pass equal to HEPA (99.97%).
- Results measured against the existing MERV 13 filter in the space with doors open, an improvement in the virus-like particles of 94% and bacteria-like particles of 87%.

OUTCOMES - ENERGY
HEPA filtration efficiency of 99.97% was achieved at a pressure drop equal to that of a MERV 13 filter and 50% lower than conventional HEPA filtration.

Women's and Children's Hospital ADELAIDE

THE UNIVERSITY OF ADELAIDE AUSTRALIA

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KEY RESULTS

The results showed a reduction in bioaerosols, including a **94% drop of virus** like particles and an **87% drop of bacteria** like particles.

In the long range virus exposure scenario (>2 m), these results are similar to the impact of a medical professional wearing a surgical mask throughout an entire shift.

This was confirmed with complementary particle measuring equipment, indicating that the performance of the **Plasma Shield** system is **matching or exceeding** the HEPA filtration standard.

RISK MITIGATION

Global best practice for reducing the risk of disease transmission through exposure to infectious aerosols is governed by ASHRAE Standard 241.

The Standard 241 provides the ability to substitute actual outdoor air with an Equivalent Clean Airflow.

Plasma Shield facilitated nearly 100% clean air provision using this method without incurring the associated HVAC infrastructure and operational costs.

The installation is a great example of how the **Plasma Shield** can be retrofitted to an existing air handling unit to deliver significant improvements in indoor air quality.

The modular configuration provided flexibility to conventional filters, so that retrofitting could occur seamlessly and cost effectively.

Expectations for high standards of microbial stewardship in hospitals are ever increasing. Now we can have Operating Theatre quality air in areas where it was prohibitive previously

Dr Chris McGowan, Former SA Health Chief Executive

Reduction of microbial load - Plant Room (Supply Air)

Location	Pre Intervention (CFU/m^3)	Post Intervention (CFU/m^3)
Plant Room Supply Air	150	18
Plant Room - Outdoor Air Intake	516	486
Reduction (%)	**71%**	**96%**

Reduction of Bacteria load - Plant Room (Supply Air)

Location	Pre Intervention (CFU/m^3)	Post Intervention (CFU/m^3)
Plant Room Supply Air	120	4
Plant Room - Outdoor Air Intake	202	166
Reduction (%)	**41%**	**98%**

Reduction of fungi load - Plant Room (Supply Air)

Location	Pre Intervention (CFU/m^3)	Post Intervention (CFU/m^3)
Plant Room Supply Air	30	14
Plant Room - Outdoor Air Intake	314	320
Reduction (%)	**90%**	**96%**

Figure 1. Table Taken from *"Report of the Plasma Shield Intervention Trial in the Women's and Children's Hospital Recovery Suite"* Dino Pisaniello-Adjunct Professor in Occupational and Environmental Hygiene School of Public Health, University of Adelaide, 16 February 2024

* Pre-intervention is using a conventional MERV 13 filter and Post-intervention was replacing the MERV 13 filter with **Plasma Shield**

Figure 2. A Bank of 5 MMD-600 Plasma Shield units substituted for the MERV-13 Filter.

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