

A healthier



air supply

The Steril-Aire
"UVC Emitter™"
as used by the
In Vitro Fertilization
Cleanroom
Laboratory of the
Lehigh Valley
Hospital and Health
Network

A recent study carried out at an IVF Lab in the US has shown that **Steril-Aire's** UVC Emitters™ used in HVAC systems can play a critical role in improving clinical outcomes

A seven and a half-year study conducted in the *in vitro* fertilisation cleanroom laboratory of the Lehigh Valley Hospital and Health Network in the US found that the use of ultraviolet C or "UVC" lights installed in the HVAC system had a clinically significant impact on clinical pregnancy rates.

Presenting the findings at the annual meeting of the American Society for Reproductive Medicine (ASRM), Dr Kathryn WorriIow reported a significant increase in the rates of + beta and clinical pregnancy rates following the change-out (replacement) of 10 of the 13 systems with Steril-Aire UVC Emitters™ over the test period.

Clinical success in an IVF lab is critically dependent upon the quality of the ambient air, which is directly dependent in turn upon the heating and ventilation (HVAC) system.

The study led by WorriIow tracked three key components in the HVAC system – particulate filters, gas phase filters and UVC lights – along with the timing of their replacement, to determine whether these individual components affected markers of preimplantation embryogenesis and clinical pregnancy rates (CPR).

According to the findings: "There were no statistically significant differences... associated with the replacement of the particulate or gas phase filters in Testing Quarters 1-48. In contrast, immediately following 10 of the 13 UVC Emitter change-outs, the + beta hCG and clinical pregnancy rates increased 17.8% and 18.2% respectively."

The study found that UVC energy will destroy 90 – 99% of airborne microbial contaminants. By targeting the DNA and RNA of micro-organisms, UVC degrades and abates the proliferation of airborne and surface embryotoxic organics.

Of equal significance to the developing embryo is the suggested impact of UVC irradiation on the degradation of VOCs. Studies have demonstrated that VOC levels as low as 2.2 ppb can be embryotoxic to the embryo cultured *in vitro*.

The authors of the study conclude that although the use of UVC light represents a departure from the standard HVAC design used in many IVF laboratories, the results suggest that the use of UVC germicidal technology in the HVAC system serving the

IVF laboratory may play a critical role in providing optimal ambient air, leading to improved clinical outcomes.

The current study demonstrated that a clinically significant relationship existed between the replacement of the UVC Emitters™ and the associated clinical pregnancy rates.

The potential benefits of UVC Emitters™ are far-reaching; not only for their potential to improve clinical pregnancy rates in IVF clinics, but also for enhancing infection control in hospitals and healthcare environments, and for maintaining better ambient air in medical and pharmaceutical manufacturing cleanrooms.

The study also confirms the importance of adequate UVC output and replacement frequency in achieving desired results.

The study used high-output UVC lamps, supplied by Steril-Aire, of Burbank in California, with a replacement schedule of six to nine months. In the three of 13 UVC replacement test quarters that did not result in improved clinical pregnancy rates, outside factors may have played a role in the outcomes. As long as the lamps were functioning properly and were changed on schedule, results were consistently positive.

The message to anyone using UVC is that it is critical to select a device with adequate output and to replace the device consistently at required intervals to maintain that output. Otherwise, germicidal effectiveness will be diminished. ■

HVAC saves hospital \$500,000 a year in energy costs

The rising cost of energy to operate air conditioning systems is a problem for hospitals everywhere. But at Rio Grande Regional Hospital, a 320-bed hospital in McAllen, Texas, administrators are happy that, even in the face of a 33% utility rate increase, their electricity bill has declined over the past two years. The hospital attributes this drop to the incorporation of UVC lights from Steril-Aire into the air handling systems.

Oscar Molano, director of plant operations for the hospital, said: "We were looking for a way to save on air conditioning energy costs without compromising air quality or patient comfort."

Working with Rio Filter Supply Company, based in Harlingen, Texas, he learned that Steril-Aire UVC devices emit germicidal UVC energy that penetrates microbes and destroys their DNA and RNA, killing or deactivating them. UVC degrades mould and organic build-up deep inside HVAC systems to keep coils continuously clean – lowering HVAC energy costs by improving heat transfer and increasing net cooling capacity.



The Rio Grande Regional Hospital in Texas

After reviewing the benefits, Molano received approval to retrofit all 26 air-handling units (AHUs) with Steril-Aire UVC Emitters™ on a phased basis. Before UVC, the four 465-ton chillers serving the hospital were running at 99% capacity. Eighteen months later, after most of the AHUs were equipped with UVC, the same chillers were running at only 62% capacity.

During that period, electrical usage (in kilowatt hours) declined by 20.64%. This cancelled out a utility rate increase from US\$.06 per kWh to \$.08 per kWh. Thus, with the addition of UVC in 2005 and 2006, electrical energy costs from 2005 to 2006 remained at a constant average of \$166,900 per month.

By autumn of 2006, as Rio Grande was wrapping up the conversion to UVC, it determined that the hospital was now too cold, even with chillers running at reduced capacity. It was able to shut down two chillers completely, along with the chilled water pumps, condenser water pumps and cooling towers.

The two remaining chillers now run at 80% capacity. From January – May 2007, energy costs were down by \$240,885 compared with 2006 – a 29.5% saving.

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