



# Portable Negative Pressure Systems Optimize Efficacy and ROI for Pentamidine Treatments

A new study was conducted to compare the efficacy of a portable negative pressure system (PNPS) and an airborne infection isolation room (AIIR) on the mitigation of fugitive emissions of nebulized Pentamidine isethionate.

Findings showed the PNPS to be seven times more effective than AIIR, and nineteen times more effective than a normal enclosed treatment room. Treatment conducted in a negative pressure room had 615% higher fugitive concentration of Pentamidine compared to when conducted with PNPS.

Aerosolized Pentamidine is a powerful drug utilized in the prevention and treatment of Pneumocystis carinii pneumonia (PCP), often found in post-transplant patients who are on extrinsic immunosuppressant therapy or have acquired immune deficiency syndrome (AIDS). Due to a high prevalence of pulmonary tuberculosis (TB) among this patient population and the often-difficult task of diagnosing TB, the risk of spreading TB during treatment is significant.

An additional risk of aerosolized Pentamidine is to the healthcare worker, its embryotoxic and respiratory irritant properties pose an occupational hazard. Due to this, aerosolized Pentamidine is given to patients using a Respigard nebulizer in a negative pressure isolation room in a hospital setting, equipped with high air-exchange ventilation and HEPA filtered exhaust, an airborne infection isolation room (AIIR).

The study compared the efficacy of AIIR vs PNPS in the reduction of fugitive emissions generated during a simulated aerosol treatment of Pentamidine.

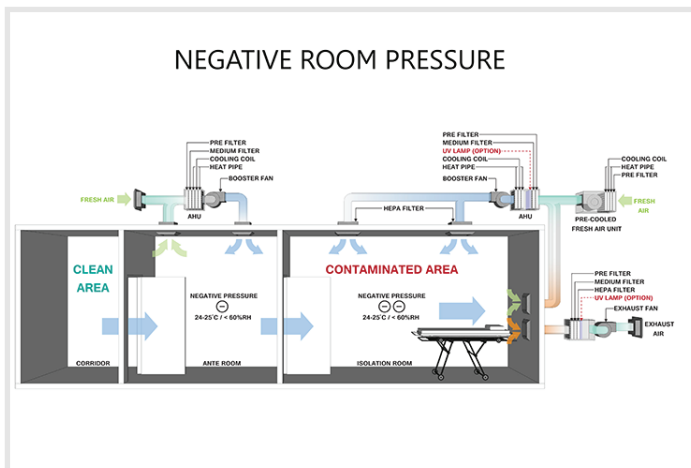
The experiment was conducted with a teaching airway manikin placed in the center of an AIIR room, directly in front of the exhaust vent to simulate the potential effects on a patient from an exhaust cabinet. The experiment was divided into eight separate trial runs with different controls in place.

In the experimental group, the air handling system in the AIIR was off and instead, the Safer Medical Products PNPS was used to remove aerosolized particulates produced during nebulization.



Safer Medical's PNPS is a lightweight AC/DC vacuum source that uses HEPA filtration attached by respiratory tubing to a clear polycarbonate barrier shield that is affixed to the outside of an aerosol mask. The vacuum operates at 260 liters (about 68.68 gal) per minute and provides an open negative pressure of 5.2 kPa.

Trial #1 was a 'dry run' without the nebulizer in place to get a baseline for background measurement. Trials #2-#4 are the experimental arm, in which the PNPS was used with the nebulizer and AIIR air handling in the room was turned off. Trials #5-7 represented the control arm and only used the nebulizer and the AIIR. Trial #8 was conducted to simulate a normal room or 'worse case' scenario, so nebulizer was utilized without AIIR nor PNPS turned on.

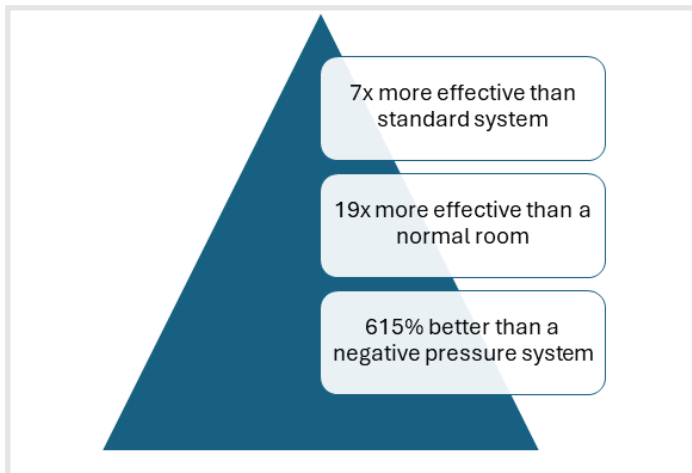




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Results showed the experimental group (PNPS) had a significantly lower mean concentration of fugitive Pentamidine (0.0879 m g/m<sup>3</sup>) compared to the control group (AIIR) (0.622 mg/m<sup>3</sup>).

The fugitive emission concentration of nebulized Pentamidine was seven times greater in a traditional airborne infection isolation room than with SafER Medical's PNPS, and nineteen times greater in a normal enclosed treatment room than with SafER Medical's PNPS. Findings have a statistical significance of a p value <0.05 and have been verified by an independent biostatistician.



Currently, most hospitals equipped with a negative pressure room and nebulizer system are experiencing major backlog of patients waiting for treatment. When the nebulizer is utilized, protocol requires the room is empty for up to thirty minutes post treatment and before the next patient.

Sterilization and wipe down of equipment is required. This process results in full waiting rooms and extremely long wait for patients from checking in to when they receive treatment.

Isolating fugitive Pentamidine particles is critical for the safety of both the patients and medical staff, however inefficiencies with full negative pressure rooms cause throughout problems and can cost tens of thousands of dollars in lost revenue for hospitals and respiratory therapists.

SafER Medical's PNPS provides a portable alternative to negative pressure rooms that is lightweight, inexpensive, and can stay with a patient from initial intake, to treatment, and throughout their hospital stay.

**The ROI for SafER Medical portable systems is exponentially higher than for negative pressure room alternatives.**

SafER PNPS is a fraction of the cost of the traditional negative pressure hospital room. The vacuum is priced at \$3,500 and includes a three-year warranty. Respiratory shield is \$100 and Endoshield is priced at \$160. The masks are a single purchase and reusable to the patient.

Weighing a little over six pounds, SafER's PNPS products, the Respiratory Shield and Endoshield, have a streamlined and lightweight design that allows hospital staff to place patients safely in any treatment room available with assurance that infection is contained and will not spread to staff or other patients. PNPS takes up little space and allows for additional medical procedures to take place simultaneously. Increased patient placement flexibility will contribute significantly to hospital capacity, productivity, and overall revenue.

SafER's PNPS can be used bedside with a patient in a prone position, in the ICU, ED, and during emergency transport.

Also, there are no annual equipment recertifications required for SafER Medical's PNPS, and the device can be utilized by a medical professional without an RT present. SafER PNPS significantly outperformed a high flow negative pressure room in reduction of aerosolized Pentamidine.

**SafER Medical portable negative pressure systems improve treatment throughput, boost revenues, protect staff, and enhance patient outcomes.**