

# Negative Pressure Isolation Rooms with HEPA and Ultraviolet

## Are the Best Means of Controlling Hospital Acquired Infections

Indoor Air Quality (IAQ) has been a concern for people in the healthcare industry for many years. In recent years, TB has made a comeback in a form that is much more resistant to existing antibiotics, and the recent SARS pandemic has raised the concern over airborne infection spreading in hospital environments. In response to the medical community's requirements, a series of innovative, ultraviolet-HEPA air purification systems was developed for a variety of environments and needs. These include the NQ 500 (fixed or mobile), NQ1000, NQ 2000 and the NQ Clarifier Medical.

The elimination of the SARS virus and TB bacteria (mycobacterium tuberculosis) is especially critical due to the severe health implications. However, the basic options are similar; exchange the air and kill the virus and bacteria in the contaminated air.

There are two basic approaches to improving indoor air quality:

One approach is to clean the existing interior air. Hospitals have been building 'negative pressure rooms' where the air is continually exhausted and replaced by fresher air. This approach is expensive and non-portable. Costs to build a typical negative pressure room range from \$50,000 to \$100,000.

The other approach, killing the pathogens, requires a relatively high dose of ultraviolet (UV) radiation installed into HVAC systems, but the cost of this is considerable as well. The marketplace needed a lower cost, more flexible alternative, hence the NQ 500.

Hospital News reports (October 1996) "The City of Toronto reports one of the highest rates of TB in the country with 14 cases per 100,000 patients in 1995."

Mt. Sinai Hospital, a downtown teaching hospital in Toronto was considered to be a high-risk facility for treating TB patients. In 1995, Mount Sinai developed an

extensive policy for handling patients with known or suspected cases of TB. As part of their management process, patients with suspect TB were to be isolated. These isolation rooms were equipped with NQ 500's.

Today, Mount Sinai continues to have a high confidence level when entering a patient room equipped with the NQ 500.

Karen Green, Infection Control Practitioner at Mt. Sinai Hospital says, "We used to have isolation rooms on each unit which complied with the specifications required by the hospital when it was originally built. A few years ago, working closely with Engineering and Biomedical Engineering, we looked at upgrading these rooms. The price tag, however, was high at between \$ 50,000.00 to \$100,000.00 per room. That's when we decided to purchase portable air handling units for our patient areas."

The HEPA filtration systems, which are equipped with Ultraviolet light, create optimal airflow patterns in the room. They can be installed on a permanent or portable basis; create negative airflow; provide at least twelve (12) air exchanges per hour; and are exhausted directly to the outside.

"Establishing these rooms is only the beginning of the management process," says Dr. Allison McGeer, Infection Control Practitioner. "Because hospitals are large buildings, and renovations are always made, rooms have to be regularly controlled to be sure that the air flow patterns do not change." *Hospital News, October 1996*

*Dr. Allison McGeer, Director of Infection Control, Mt. Sinai Hospital in Toronto. Dr. McGeer is also an infection control consultant to The Scarborough Hospital and The Baycrest Centre for Geriatric Care.*

# The NQ 500 UVGI/HEPA Air Purification System is an effective and economical solution for health care providers

“I think that many hospitals will be looking at renovating their existing facilities to provide much more airborne isolation capacity...yours (the NQ 500) is a far cheaper alternative to building or renovating HVAC systems,” says Dr. Michael Gardam of the University Health Network, Toronto Ontario.

*Dr. Gardam, is the Director of Infection Prevention and Control & Medical Director of the Tuberculosis Clinic, University Health Network, Toronto ON.*

The NQ 500 can be used to:

- Create Negative Pressure Isolation Rooms
- Increase ACH by recirculating clean air
- Create both Negative Pressure and recirculate clean air

Given the fact that many infections are transmitted via the airborne route (in SARS and tuberculosis), HEPA filtration and Ultraviolet Germicidal Irradiation are the new standards required for infection control, especially for the SARS virus. The Occupational Safety and Health Centre ([www.oshc.dole.gov.ph/announcement-sars2.htm](http://www.oshc.dole.gov.ph/announcement-sars2.htm)): recommends the use of adequate ventilation systems supplemented by high-efficiency particulate air (HEPA) filtration and ultraviolet germicidal irradiation (UVGI) as an effective strategy to control the spread of SARS.

The NQ 500 is much more than a mobile UV/HEPA air purification system to create negative pressure isolation rooms. It's an engineered solution that provides improvements to the removal efficiency of your existing filtration system.

This being said, the NQ 500 was developed 9 years ago in response to increased transmission of TB. The NQ 500 is designed with UVGI dosage 46,000 microwatts/sec/cm<sup>2</sup> on high speed, 56,000 microwatts on low speed. This is 4 – 5 times more UV dosage than what is required to deactivate TB and at least 2 times the germicidal dosage for the corona-virus.

Installing an NQ 500 to create a negative pressure isolation room will significantly lessen the impact of occupational exposures to infectious particulates. The NQ 500 is being used successfully to recirculate air and create negative pressure in hospitals such as:

- TB Clinic, University Health Network, Toronto, TB Clinic. - Dr. Gardam
- Isolation Rooms, Mt Sinai Hospital, Toronto.- Dr. Alison McGeer & Karen Green
- Negative Pressure/Isolation Rooms, Sunnybrook Women's College Hospital, Toronto – Clare Barry
- Bronch Rooms throughout Ontario
- Over 700 hospitals in the U.S. and Canada (references supplied upon request).