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Prophylactic Air Management to Control Mycobacterium Tuberculosis and other airborne diseases.

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The ability of infectious microbes to initiate and spread infection depends on several factors. These factors include survivability, infectivity and susceptibility of the potential host. The traditional infection control matrix does not put enough emphasis on the airborne transmission of infectious agents. Much emphasis is placed on the sterility of surfaces, instruments and the general patient location.

Yes, isolation is considered but normally only in cases of highly transmittable infectious diseases such as Tuberculosis. Very little consideration and care is given to the actual air circulating around the patient. Consider the fact that approximately 845 H1N1cells placed end to end would span a distance less than the diameter of an average human hair.

The average adult breathes approximately 25,000 liters of air a day. Inherent in the infection process initiated by the inhalation of infectious droplet nuclei is the area of deposition within the respiratory tract. This deposition is influenced by hygroscopicity, which causes an increase in the size of inhaled particles through moisture take-up as they move within the human airways. The initiation of the disease process may require only small infective doses because the agents have an affinity for specific tissue and possess one or more potent virulence factors that render them resistant to inactivation.

Infection from Francisella tularensis is reported to result from a single organism whose virulence is associated with a cellular capsule. Only a few cells of Mycobacterium tuberculosis are required to overcome normal lung clearance and the inactivation mechanisms in a susceptible host. All infectious agents come from a source, whether human, animal, a surface material or a process.

Sources can be managed, either through removal, such as mold contaminated building materials, or modification, such as purging hot water systems to eliminate Legionella species. Patients with active TB can be housed in negative-pressure rooms, required to wear respiratory protection and/or placed in laminar-flow beds until confirmed as non-infectious.

Ensuring that a building or section of a building is utilized for the activity it was designed for will reduce or eliminate airborne pathogenic infections. Buildings and furnishings need to be designed so they can be effectively inspected, cleaned and maintained. Design intervention is important when designing new facilities or additions and renovations to existing facilities. Design intervention may include special exhaust ventilation or the addition and inclusion of U.V. lights for microbial contamination control.

Cutting edge technology includes the introduction of organic, non GMO, chemical, drug and alcohol free anti-pathogenic solutions micro-vaporized directly into the building HVAC systems for maximum effectiveness. This is because unquestionably, the most overlooked part of traditional infection control practice is in fact the HVAC system including its associated air delivery components.

By its very nature a HVAC system handles dirt, dust, moisture and vast amounts of air which contains oxygen. It is essentially a large laboratory culturing medium for the proliferation of fungi, bacteria, yeasts and viruses. The proper prophylactic management of the air side component in the infection control matrix begins with a proper and thorough bio-aerosol sampling protocol. It is critical that the person conducting this sampling protocol have extensive knowledge of not only the biological side of the equation but also an extensive hands-on background in HVAC.

Introduction of the anti-pathogenic solution should be done through micro-vaporization down to 2-5 microns in size. This size aerosolization will allow the Tuberculocide to be entrained within the building's conditioned air supply. The disinfection process will thereby be extended throughout the buildings HVAC system(s) and the conditioned spaces the air supplies.

What are the potential benefits of such a system?

1. Highly sanitized supply air in T.B. wards and clinics beyond current methodology.
2. Shorter patient rehabilitation time due to the reduction of airborne respirable M. Tuberculosis.
3. More frequent bed space to treat additional patients.
4. Reduced costs per patient for treatment.

For maximum effectiveness it must be utilized in conjunction with a properly engineered and properly applied and patented micro- vaporization device. We believe there is great potential and possibility. It is breakthrough technology being applied in an unconventional manner.

If we are to break the back of the Tuberculosis pandemic new thinking is required and this is exactly what is needed. An understanding of how the facility components and systems meld together and affect each other comes only from the perspective of a professional who sees the spread of airborne pathogens such as Mycobacterium Tuberculosis outside the norms of past researchers and forges ahead.

Tuberculosis infection rates can be reduced. It is a process of measuring (sampling), managing (application of proper methods and materials) and monitoring through consistent follow-up.

This unique and innovative system can be used to control all building pathogenic bio-aerosols regardless of building type, location or use.

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