”Dirt, Bugs and Masks”
(Airborne Infectious Diseases and Respiratory Protection)

Bob Janssen

Prevention Policy & Regulation Review
Policy & Research Division
WorkSafeBC
PO Box 5350 Stn Terminal
Vancouver, BC V6B 5L5, Canada
E-mail: bob.janssen@worksafebc.com

Surgical masks are seen by many in the medical community to be effective in providing protection against transmission of infectious diseases. It is also commonly believed that infectious disease organisms that could potentially be spread by the airborne route following coughing and sneezing poses little or no risk of infection beyond a 3 foot or 1 meter distance such that a surgical mask is not required beyond that distance. Respirators are seen as devices used for protection against industrial chemicals; they have no place in a medical setting. Furthermore, most infectious organisms are believed to be spread by the droplet route of transmission; very few are spread by airborne transmission (droplet nuclei). When airborne, only droplet nuclei (defined as those less than 10 μm in diameter) are capable of entering the respiratory tract to cause disease.

These assumptions were challenged during the SARS crisis when occupational hygienists teamed up with medical practitioners to form the SARS Scientific Committee in Vancouver. As the result of this colloboration, protocols were developed ensuring healthcare workers were adequately protected from the disease. This included the use of respiratory protection when in close proximity to SARS patients and during certain clinical procedures. Many issues remain unresolved, however.

This presentation will examine the infection control protocols currently practiced based on measures prescribed by World Health Organization, CDC-Atlanta and Health Canada. Medical concepts about droplets and droplets nuclei will be compared with occuptional hygiene concepts – inhalable, thoracic and respirable size fractions, and the potential for particles and droplets and their respective sizes that can be inhaled into the respiratory tract. Clinical procedures, sneezing, coughing and their potential for aerosol generation will be discussed. The basis of the 3 foot / 1 meter rule will be also be examined using particle physics as the framework. It will be shown that a 100 μm droplet becomes a 10 μm droplet within a matter of seconds under normal conditions in a standard hospital setting. Finally, the performance of the N95 family of respirators will be summarized relative to particle and droplet size.