

The Role of Hydrogen Peroxide Vapor Systems in Infection Control **Infection Control Today/ By Mark Hodgson November 2010**

In the continual challenge faced by infection preventionists to drive down healthcare-acquired infection (HAI) rates, the impact of the environment as a reservoir of pathogens is becoming increasingly clear. It has been demonstrated that not only do pathogens shed by prior occupants of a room remain viable for prolonged periods, but that these present a significantly increased risk of infection to subsequent room occupants. While routine cleaning can reduce the microbiological burden in a patient room it does not always eliminate the presence of bacteria and hence risk of infection. Even where very stringent cleaning regimens are in place, it is a constant challenge to maintain high-quality cleaning in a room. As increasingly resistant organisms are shed by patients into the environment, the need to prevent infection becomes ever more pressing. How clean do you need to get to reduce infection rates?

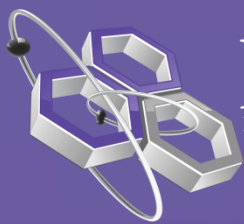
The hydrogen peroxide vapor (HPV) system relies on micro-condensation to effect total elimination of pathogens, including endospore forming bacteria such as *Clostridium difficile*, from the inanimate environment. It has been established that the closest proxy for "total elimination" is a full six-log reduction of spore-forming bacteria, usually in the form of biological indicators.

HPV can be used proactively to prevent infection or reactively to stop outbreaks. HPV is used in hospitals worldwide, primarily for the terminal disinfection of rooms used to care for patients with MDROs to reduce the risk of acquisition for subsequent room occupants. The most efficient way to achieve this is to have HPV decontamination equipment on the hospital site integrated into the hospital's procedures. This can be achieved either as a service or through equipment purchase. Another key application of HPV in hospitals is for decontamination during outbreaks. Decontamination of areas used to care for patients who have acquired an outbreak strain can help to prevent the outbreak reoccurring from an environmental source. Other applications in hospitals include decontamination for mobile medical equipment, fixed installations in high risk areas, and preventative decontamination of lower risk areas.

HPV fills the space in the room distributing evenly through the space regardless of the room configuration, this allows the vapor to work around corners in shadow areas and behind equipment and other obstructions. Once the saturation vapor pressure of peroxide is reached a micro condensation layer of hydrogen peroxide is deposited on to all the surfaces in the room. The micro-condensation layer is a highly concentrated hydrogen peroxide producing a rapid kill of all microorganisms, one feature of the micro-condensation process is that the kill rate is independent of the concentration of peroxide in the air, typical time dose relationships do not apply using this method. The micro-condensation process provides a full three-dimensional kill.

Following a dwell time to allow a full six-log kill the aeration unit is activated. Hydrogen peroxide vapor is drawn in to the aeration unit and the peroxide is broken down in to oxygen and water vapor. This leaves the room free from pathogens and much safer for the next occupant.

This process has been applied to hospitals throughout the world to reduce infection rates; in the U.S. alone more than 1,500 rooms a month are treated using this process. As the number of published studies showing reduced infection rates increases, the level of acceptance of the process is increasing. HPV is now regularly deployed to stop outbreaks and prevent infections in some of America's busiest hospitals. Many hospitals have benefited from the major savings available from the application of HPV due to reduced infection rates.



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