



Minimize patient exposure and possible litigation

A proactive approach is required to decrease the occurrence of construction-related nosocomial (hospital-acquired) infections.

Construction and maintenance activities in hospitals and other health care facilities can cause dust containing fungal spores and water aerosols containing Legionella bacteria to become airborne and can cause serious or fatal infections to patients near the project area. Even relatively minor work can cause serious infections if performed near susceptible patients.

If dust particles contaminated with bacteria and fungi are dispersed during construction, there may be health risks for patients, staff and visitors. Early planning in construction and renovation projects must integrate infection prevention and control, engineering services and building design to prevent nosocomial (hospital-acquired) infections, and minimize allergen load and other workplace hazards.

Particulate generated during construction or renovation activities can contain mould known as Aspergillus. As Nosocomial Aspergillosis is often associated with construction activities, isolation of the work area and monitoring of the work area and monitoring activities become key components of construction in these and similar areas. Numerous published reports have linked construction activities in hospitals to outbreaks of Aspergillosis which have had fatal outcomes to multiple patients. It is essential that preventive measures be undertaken to decrease patients' or residents' exposure to dust particles contaminated with aspergillus spores.

Fungal infections, particularly due to fungi of the Aspergillus family, are a major concern of the Health Canada standard. Several Aspergillus species can cause infections in susceptible patients. Aspergillus exposures and other fungal spores or bacteria may occur by a variety of pathways: through infiltration of outside unfiltered air, disturbance of dust in ceiling systems or other cavities, demolition of equipment, fibrous insulating material, roller-blind casings, fireproofing material, or from mould growth in the facility.

The key to eliminating Aspergillus infections is to minimize the dust generated during the construction activity and to prevent dust infiltration into patient care areas adjacent to construction. These activities will also eliminate other dust-borne fungi (e.g. Rhizopus) that may cause invasive fungal infections.

Understanding the relation between these organisms and construction and renovation



activities leads to a better understanding of the need for preventive measures. Aspergillus organisms are fungi found ubiquitously in soil, water, and decaying vegetation. The fungal spores (conidia) proliferate on dead organic debris and can remain viable for months in dry locations. During construction and renovation activities, spores can be dispersed on dust or dirt particles when floors, walls or ceilings are penetrated. Since Aspergillus spores are small (2.5 µm-3.5 µm) and settle very slowly (0.03 cm per second), they can remain suspended in air for prolonged periods. This increases the likelihood that they will be inhaled or will contaminate environmental surfaces.

To control this risk, Health Canada and the Canadian Standards Association (CSA) have issued extensive guidelines for the conduct of construction or maintenance activities near patients or other high risk areas. The CSA Guideline Z317.13-03 "Infection Control during Construction or Renovation of Health Care Facilities" and Health Canada's document titled, "Construction-related Nosocomial infections in Health Care Facilities", classified the construction work into four activity types (A,B,C &D) and four risk groups (1,2,3 &4). The combination of the activity type and risk group determines which Preventive Measure class (I, II, III or IV) is to be followed. These classes share similar steps as those followed in asbestos and mould abatement procedures. Contractors performing work in health care facilities must take care to apply these standards with diligence to minimize the very real risk of their work causing illness and death in susceptible patients.

Appropriate infection prevention and control measures must be employed throughout construction and renovation projects in health care facilities to reduce health risks. Controlling the risk

requires the collaborative effort of many involved in a construction project. For smaller scale projects, these would include at least the infection control practitioner at the facility, engineering services, the architects and engineers responsible for the project and, of course, the contractor and subcontractors. Larger scale renovations may require a specialist consultant to design the containment and ventilation controls and to supervise and test the ongoing isolation methods. Infection prevention and control professionals must be involved in each phase of the project to ensure that the appropriate preventive measures are initiated and followed. All personnel involved in the construction or renovation activity should be educated and trained in the infection prevention measures. For example, the infection control personnel could educate the project managers and contractors who then ensure that the construction workers receive the appropriate education.

This approach is becoming widely recognized as necessary in all health care construction. It is the standard expected of construction when hospitals remain operational during renovations. Adherence to these guidelines will minimize patient exposure and possible litigation as a result of nosocomial infections.

Preventive measures have been shown to be effective in health care facilities as well as in commercial and residential buildings undergoing renovations. These preventive measures are effective in decreasing the incidence of construction related fungal infections. They are cost-effective because the patients' safety will be maintained and litigation cases prevented. ■

Camille Atrache is chief operating officer and partner at Tri-Phase Environmental Inc.