Environmental Management Consulting, Inc.

INDOOR AIR QUALITY CONCERNS DURING CONSTRUCTION IN THE HEALTH CARE SETTING

Introduction

The increase of documented nosocomial (hospital acquired) infections occurring during construction activities in hospitals has prompted the development and enhancement of guidelines for construction in the health care setting. There are currently approximately 5500 hospital in the United States. An annual national rate of nosocomial infections of approximately 2.1 million and a related cost of 3 billion dollars. Of the 2.1 million nosocomial infections, 5000 are known to be related to construction.

The Center for Disease Control (CDC) has developed the "Guidelines for Environmental Infection Control in Health Care Facilities", which offers guidelines for infection control during construction. The AIA in January 2006 has updated "The Guidelines for Design and Construction of Health Care Facilities". The AIA guidelines state that "design and planning for renovation and new construction projects shall require consultation from infection control and safety personnel. Early involvement in the conceptual phase helps ascertain the risk for susceptible patients". The guidelines require an "Infection Control Risk Assessment (ICRA)" by the multi-disciplined infection control committee including contractor representatives. An ICRA provides for strategies, proactive design to mitigate environmental sources of microbes and for prevention of infection through architectural design.

Before construction begins, the focus of preparations should be on isolation of the construction/renovation area. The ICRA will qualify the extent of construction and the subsequent risks posed. This will dictate the need for barriers and other controls. Project complexity varies with time, number of workers, whether contractors work continuous shifts, scope and degree of activity (high or low dust generation) and the proximity to patients with varying degrees of risk for infection.

Controlling the Dusts

Contractors doing work in hospitals must control the migration of dusts, vapors and odors. The ICRA will include some of the following based on the nature and location of construction.

- Barrier Systems: The area should be isolated as the project requires small, short duration generating minimal dusts may use fire rated plastic sheeting, but should be sealed at full ceiling height with at least 2 foot overlapping flaps for access to entry. Any project that produces moderate to high levels of dust requires rigid, dust proof and fire rated barrier walls (e.g., drywall) with caulked seams for a tight seal. Large dusty projects need an entry vestibule for clothing changes and tool storage.

The entry area should have gasketed doorframes; tight seals should be maintained at the full perimeter of walls and wall penetrations. An interim plastic dust barrier may be required to protect the area while the rigid impervious barrier is being constructed.

- Traffic Control: Designated entry and exit procedures must be defined, egress paths should be free of debris, designated elevators should be used during scheduled times; and only authorized personnel should be allowed to enter the construction zone. Signage should direct pedestrian traffic away from the construction area and materials.

- Demolition: Debris should be removed in carts with tightly fitted covers using designated traffic routes. Efforts should be made to minimize use of elevators with transport during the lowest period of activity. Debris should be removed daily and at times specified by agreements. If chutes are used to direct debris outside, HEPA filtered negative air machines should be used and sealed when not in use.

- Exterior Windows: Windows should be sealed to minimize infiltration of excavation debris.

- Visual Monitoring: Compliance with barrier maintenance includes education of staff for simple clues indicating a breech.

<u>Ventilation and Environmental Control</u>

The proper airflow between the construction area and the occupied space is critical!

- Air System Flow: It should be determined whether the construction area uses fresh/outside or re-circulated air, filters should be added or return vents sealed as needed. Air must flow from clean to dirty areas.

- Negative Air Pressure: the air within the construction area must be negative with respect to surrounding areas. Constant negative pressure within the zone should be monitored with an alarmed device, which must be maintained and monitored. Exhaust from construction air should be directed outside away from outside air intake for air handling units with no re-circulation if possible.

Regardless of the nature of construction work that your firm may undertake in the health care setting, it is vital that your company be aware of the guidelines offered by the AIA and the CDC. The Wisconsin Healthcare Engineering Association offers a healthcare construction certification seminar that most healthcare organizations will require prior to doing work in their facility. The one-day seminar offers valuable information on infection control during construction. Your company should develop a plan for controlling dusts and communicating the plan to all involved employees.