Infection Control Risk Assessment: the Infection Preventionist’s Role in Construction
Key Concepts

• Use of ICRA is an important element in an infection prevention program
• Should be an integral part of all planning that involves renovation or construction at a healthcare facility
• IPs should have access to and be knowledgable regarding the Facility Guide Institute (FGI) construction guidelines.
Major Hazards, Implications, and Interventions

• Design-
  – Insufficient planning leading to compromise of air quality and potential for continued environmental contamination

• Mitigation
  – Systematic approach to construction and renovation activity is crucial to improving safety and risk reduction related to chemicals, dust allergens, microorganisms etc
Major Hazards, Implications, and Interventions

• Mitigation (Cont’d)
  – Erection of proper barriers
    • Dust buggy
    • Poly walls with and without zippers
    • Temporary hard walls
ICRA Definition and Purpose

• An ICRA must provide a strategic, proactive design to mitigate environmental sources of microbes and to prevent infectious hazards through architectural design.

• The 2006 Guidelines clarified activities associated with design planning, construction planning, and actual preparation for the construction project referred to as ICRMR (Infection Control Risk Mitigation Recommendations)
ICRA Elements Related to Design Features

• Numbers, location and types of AII and protective environment rooms

• Location of special ventilation and filtration of HVAC serving such areas as ED waiting and intake areas

• Air handling and ventilation needs in surgical services, AII and PE rooms, labs, local exhaust systems for hazardous agents/chemicals, and other areas with special needs
ICRA Elements Related to Design Features (cont’d)

• Water system to limit *Legionella* spp. And other water borne opportunistic pathogens
• Finishes and surfaces
ICRA Elements Related to Building site areas affected by Construction

- Impact of disrupting essential services to patients and employees
- Determination of specific hazards and protection levels for each
- Location of patients based on susceptibility to infection and definition of risks to each
- Impact of potential outages or emergencies and protection of patient during planned or unplanned outages, movement of debris, traffic flow, cleanup, and testing and certification
Preparation for Actual Construction

- Patient placement and relocation
- Standards for barriers and other protective measures to protect adjacent areas
- Temporary provisions for phasing of project
- Protection of occupied patient areas from demolition
- Measures to be taken for training of facility staff, visitors, and construction personnel
Construction Policy, Purpose and Elements

• Annual Review
• Approval by infection control committee and the governing board of trustees
• Ongoing communication of planned and intercurrent projects provided by facility manager
Additional CRP Elements

• Authority and Responsibility
• Strategic planning for air and water quality for each building including types of barriers and monitors
• Authority for determining unit closure issues
• Specific expectations for contractor accountability
• Communication linkages, including documentation responsibilities
Additional CRP Elements (cont’d)

• Criteria for emergency work stoppages and processes to stop and start.
• Educational needs for whom and by whom
• Occupational health expectations for contractors
• General traffic patterns
• Transport and manifest approval of waste materials and supplies
Additional CRP Elements (cont’d)

• Noise and vibration issues related to the project
• Emergency preparedness plans for major utility failures
• Phasing and Commissioning
IP Role at the Organization Level

• Facilitation and communication among health agencies facility administration regarding essentials for safe practice and infection control guidelines
• Consultation related to current and future patient populations and care delivery systems
• Evaluation of plans considering policies related to design
IP Role at the Organization Level (Cont’d)

- Determination of impact
- Review of proposed Construction plans
- Determination of environmental monitoring needs
- Determination of types and methods of education provisions for contractors
- Development of IP expectations into initial agreements
Codes, Standards, and Regulations

• Regulatory and accrediting agencies at all levels base licensing and certification decisions on whether or not facilities meet minimum construction standards.
• Usually these relate to the Federal Conditions of Participation from CMS
• County and local jurisdictions for fire and plumbing safety codes may supersede some regulations and become the authority having jurisdiction
Federal Agencies

- OSHA
- NIOSH
- CMS
- HRSA
- AIA/FGI
- NFPA
- TJC
- ASHE
Traffic

• Contributor to air contamination
• Patient movement should cause minimal exposure of patients to others
• Patients who are in Airborne Precautions should be transported using precautions defined by IP Program
• Visitor traffic routes should minimize contact with patients, and visitors should be assessed for communicable diseases
Traffic Continued

• Routes for transporting clean and sterile supplies from storage should not allow contact or permit temporary storage near contaminated materials.

• Laundry/Trash chutes are contaminated, and bags can rupture during use.

• Waste transport should be designed for maximum containment
Preparation for Demolition and Construction

- Focus on isolation of the construction area
- Some are classified minor or major based on the number and types of barriers needed
- Permits are issued according to the amount of risk of contamination of the environment exist
- The permit prescribes the needed barriers and precautions that will keep the environment from becoming contaminated
External Excavation Precautions

• Ideally should be done on off hours so that air handlers can be adjusted
• Excavation can produce an enormous amount of dust
• Working during off hours reduces traffic and opening of doors, which reduce the volume of unfiltered air that flows into the building during excavation activity.
Internal Construction and Renovation Activity

• Priority is to protect patient-care areas
• Most important risks of internal construction or renovation include:
  – Dust and debris may carry microbes (*aspergillus*)
  – Ventilation systems may malfunction from accumulation of dust and debris on filters, resulting in decreased airflow and filtration
  – Patient rooms, supplies, equipment and areas where patients may be treated may be contaminated.
Prevention Interventions

• Barrier Placement - isolate the area from occupied areas during construction using sealed, airtight barriers

• Air-filtering - it should be determined if construction area uses fresh/outside or recirculated air; filters should be added or return vents should be covered

• Noise and vibration - potential for vibration or disturbances to dislodge dust collected above suspended or false ceilings should be recognized and the effect of vibration on contamination of plumbing
Prevention Interventions Cont’d

• Ventilation- should be monitored to ensure exhaust maintains negative airflow in construction zone

• Debris Removal- use of a chute with HEPA-filtered negative air machine is preferred for debris removal over use of elevators but is not always possible. If not possible ensure debris is covered during transport
Prevention Interventions Cont’d

• Environmental Air Sampling- indications for taking environmental cultures should be critically reviewed because cultures are unlikely to provide useful information
  – Should only be done by experienced trained staff
Prevention Interventions cont’d

• System Balancing - after completion of construction, the ventilation system should be balanced to design specifications
  – Filters should be examined for plugging or leakage
  – Preventive maintenance or cleaning of ductwork, vents or induction units should have been agreed upon beforehand
Prevention Interventions Cont’d

• Water Issues-
  – Lines should be flushed thoroughly before occupation
  – Increased risk of loosened internal corrosion and scale during vibration of water pipes
  – Increases potential for water contamination
Prevention Interventions Cont’d

• Contractor Clean Up
  – Contractors should complete removal of partitions
  – Contractors should clean and disinfect according to specific agreements

• Facility Clean Up
  – Staff perform routine cleaning before returning area to service
  – Recleaning and disinfecting of surfaces and equipment may be necessary
Internal Construction /Major Renovation

- Increased potential for contaminating dust and debris on air filters
- HVAC units may be disrupted and nonfunctional during certain periods of construction
- Medical vacuum systems and water supply may be affected
- Contamination of patient rooms, supplies, equipment, and areas patient may visit may occur.
External Prevention Interventions

• All of the previously discussed interventions and
  – Cleaning of air handlers
  – Schedule utility shut downs for low activity times
  – Plan ahead for utility shut downs.
Review Prep before Occupancy

• The following processes usually are done as part of an operation project team. The facility’s punch list is invaluable. Be sure to check
  – Airflow, pressures, filters, location of air intakes and vents
  – Drains to the sanitary sewer system connected and functioning
Steps 2 weeks Before Moving into New Facility

• Use processing packs to check steam or gas sterilizers
• Verify correct water temperature
• Complete written schedules and procedure for routine maintenance
• Determine transportation systems
• Walt through the facility with local health department facility management
Steps 1 week Before Moving into New Facility

• Evaluate HVAC
• Evaluate laminar air hoods for effective operation
• Open all faucets simultaneously to test drain effectiveness
• Check that aerators are not on designated faucets
• Check floor drains
• Ensure cleaning has been completed.
Steps 1 week Before Moving into New Facility Cont’s

• Ensure that hand hygiene products are in dispensers and that dispensers function properly
• Ensure registered pest control and management are functioning and checked
• Be prepared to intensify surveillance for HAIs and monitoring of infection prevention practices
**Infection Control/Epidemiology Construction Permit**

Project Name: BMCM Emergency Department Expansion  
Project Location: Emergency Department and adjacent hallway

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Describe Project: Construction to include installation of fire and smoke caulking above ceiling in North and West corridor’s adjacent to ED space. Will use dust buggy while in corridor.

**Project Manager Contact:**
Kolby May Chase Pritchard Chase A. Shimek  
Phone # 214-476-0037  
214-926-2709  
979-218-2577

**Contractor Contact:**
Bob Guill  
Phone # 214-326-4452

**Phase 1 of 3**

Infection Preventionist (IP) selects project class below, based on Construction Risk Assessment Matrix:

**Class I**
- Use methods to minimize dust
- Seal unused doors with duct tape
- Wipe surfaces with cleaner/disinfectant
- Wet mop and/or vacuum with HEPA-filtered vacuum before leaving work area
- Place dust/sticky mat at entrance/exit
- Contain waste before transport in tightly covered containers

Date: ________  
IP initials: ________  
Comments: ____________________________

**Class II**
- Use methods to minimize dust
- Seal unused doors with duct tape
- Wipe surfaces with cleaner/disinfectant
- Wet mop and/or vacuum with HEPA-filtered vacuum before leaving work area
- Place dust/sticky mat at entrance/exit
- Contain waste before transport in tightly covered containers
- Complete all barriers before work begins
- IP to list barrier type here: __________ dust buggy __________

Date: 4-21-2014  
IP initials: BH  
Comments: __make sure dust buggy is snug to the ceiling: __________

**Class III**
- Use methods to minimize dust
- Seal unused doors with duct tape
- Place dust/sticky mat at entrance/exit
- Contain waste before transport in tightly covered containers
- Complete all barriers before work begins
- IP to list barrier type here: __________
- Isolate HVAC system in area where work is being done
- Maintain negative pressure in work site using HEPA air filtration units
- Install manometer and record reading twice a day while work is being done
- Seal holes, pipes, conduits, and punctures appropriately
- Do not remove barriers until completed project is checked by Infection Prevention & Control/Epidemiology and is cleaned by Environmental Services
- Remove barriers carefully to minimize spread of dust and debris

**APPROVAL PROCESS DOCUMENTATION**

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<tr>
<td>4-21-2014</td>
<td>Brenda Helms</td>
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Questions?