

Infection Control for Health Care Facility Construction, Renovation and Maintenance

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Infection Control

- Prevent, minimize risk of infection/adverse event to patient, staff, visitors, physicians, and family members
- Covers entire building / campus
- Hot topic in patient safety
- Infection Prevention is in mainstream media
- Because: *It is Just the Right thing to do!*

Why an ICRA?

- Get everyone in same book
- Identify
 - Type and scope of work to be done
 - Services and patients in the vicinity of the work
 - Risks

Why an ICRA?

- Ensure
 - Appropriate precautions are identified prior to commencement of work
 - That adverse events are avoided
 - Safety is maintained at the construction site / project

Infections

Associated with Construction

- Well documented in the literature
 - Aspergillus spp
 - Legionella spp
 - Mold
 - Respiratory illness
- Institute of Medicines Report on Patient Safety
- JCAHO and CMS requirements for IC involvement with environment of care / construction activities

Evidence ICRA needed

- Several outbreaks/ adverse events have been directly correlated to construction activities where appropriate measures were not in place or taken.
- Need collaboration between disciplines to ensure all in same book and on same page
- Documentation that risks were assessed and precautions taken to protect. (litigation)

Uniqueness of Health Care Facilities

- Closeness to already compromised people
- Care being given (operations continue)
- More invasive procedures being done out of the hospital
- Public access/proximity to construction site
- Utilities can't be interrupted
- Need to maintain indoor air quality
- Risk of infection to patients



Closeness to patients

- Work in patient care areas
- Work in areas supplied by same HVAC
- Traffic flow of patients, visitors, staff, vendors, family members
- Safety issues
- Securing construction area





24/7 care may still being given

- Generally cannot interrupt services
 - Compare to having work done on your car while you are still using it
- Noise levels
- Vibrations from work
- Traffic patterns to get patients/visitors/staff from location to location

Utilities can't be interrupted

- Interruptions of utilities don't just cause an inconvenience
 - Safety hazard (increase risk of infection)
 - Life support
 - Delay of treatment
 - Critical infrastructure / redundancies

Need to maintain indoor air quality

- Need to ensure air quality not just inside project, but in adjoining areas
- HVAC system – supply and exhaust as well as filtration (be aware of air above the ceiling)
- Negative pressure needs (vent to outside)
- HEPA filtration (this is NOT negative pressure)
- Proximity to elevators
- Airflow patterns





Presence of persons with increase risk of contracting an infection

- Persons in health care facilities are more susceptible to contracting something from construction debris
 - Immuno compromised
 - Decreased respiratory function
 - Open wounds, incisions etc (more ports of entry)
 - Less protective clothing

'The *ICRA*'

(Infection Control Risk Assessment)

- Construction Activity types
 - Describes type of work to be done
 - Stratified into 4 types
- Risk Groups
 - Separates out the various types of health care in a facility
 - Divided into 4 groups
- Matrix
 - Uses above to determine level of precautions

Construction Activity Types

- Type A – Basic work creating a minimal risk
- Type B – Basic work that results in more disruption of environment
- Type C – Creation of particulate matter, removal of fixed components
- Type D – Major work resulting in particulate matter in air, new construction, major renovation

Risk of infection

- Presence of persons with increase risk of contracting an infection
- Presence of microorganisms that may cause infection
- All dust and debris has potential to cause illness in susceptible persons
- Construction workers may need to 'walk through' patient care areas

‘Walk through’ patient care areas

- Need to travel through the facility to get to work zone
- Location may be in a patient care area
- Dust etc can ‘attach’ to clothing and be spread throughout building

Risk Groups

Note: Not just the area where work is being done.
Takes into account the adjacent areas – beside,
above, and below the area.

Risk Groups

- Highest – Those areas where greatest potential for adverse event exists in humans
- Medium High – Areas where there is a higher than likely potential risk for adverse events in humans.
- Medium – Locations where there is a potential risk for adverse events in humans.
- Lowest – Spots where there is minimal risk for adverse events in humans

Matrix

- Cross reference of Construction activity and risk group
 - Results in level of precautions to be taken
 - Four levels of precautions

Precautions

- Class I:
 - Minimize disruption of existing dust
 - Immediately replace ceiling tiles
- Least likely construction activity to result in adverse event
 - Above ceiling cabling
 - Replacing wallpaper
 - Outside work away from air intakes, patient entrances

Precautions

- Class II:
 - Contain minimal dust produced
 - Control air flow
 - Remove/isolate HVAC – protect system
 - Contain materials when in transport
 - Cleaning daily (or more frequently)

Precautions

■ Class III

- Consult with Infection Control / Epidemiology before work commences
- Isolate HVAC system
- Negative pressure, HEPA filtration
- Maintain appropriate and approved barriers
- Removal of barriers to minimize contamination of area
- Cover clothing for entry to area – remove upon exit

Precautions

- Class IV
 - Everything in Class I, II, and III plus:
 - Workers to wear cover clothing including shoe covers
 - Seal all holes pipes conduits etc (smoke tight)

Presence of microorganisms that may cause infection in construction worker

- Settling of microorganisms on topside of ceiling tile
- Contamination of carpet (carpet removal)
- Routine dust and other environmental contaminants
- False sense of clean environment
- Mold growth from unknown/ known water leaks
- Communicable illness in persons in general area
- Contaminated surfaces

All dust and debris has potential to cause illness in susceptible persons

- Don't need microorganism to cause illness
 - Particulates (silica, drywall, drywall mud, fumes)
 - Dust
 - Dirt

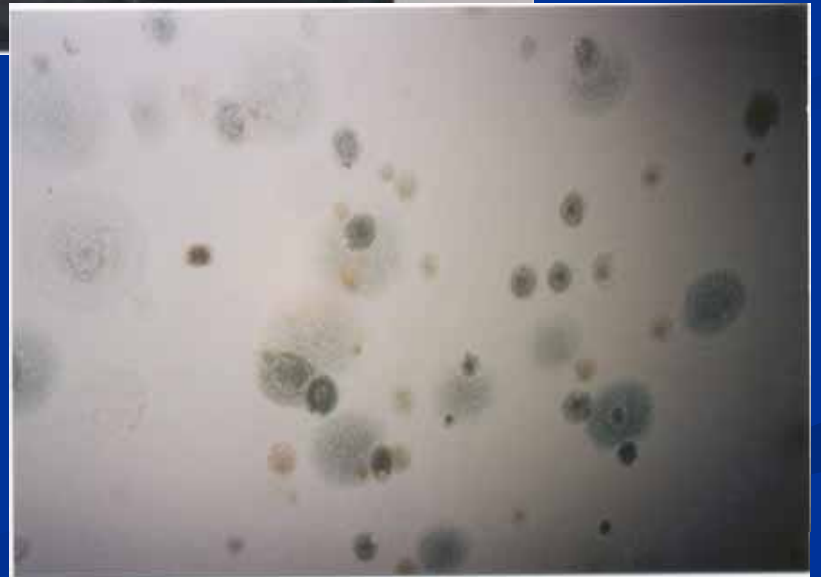
Monitoring Compliance

- Generally ICP responsible for rounding to monitor for compliance to ICRA (in hospital)
- Safety Officer has authority to STOP work until appropriate precautions in place
- Use a tool to document compliance
- Daily documentation of negative pressure generally responsibility of contractor – vary times of day it is done. (may need continuous monitoring)



Mold

- Mold is Mold
 - No mold is worse than any other
 - Some just have a worse reputation
 - They travel easily due to spores
 - Special precautions need to be taken for ALL mold removal / abatement
 - If you find mold – STOP, seal area off , and contact trained personnel



Infection Control Precautions

- Barriers
- HVAC/Air Pressure
- Noise / Vibration
- Clothing
- Traffic flow/ Delivery of supplies
- Removal of debris
- Daily or more frequent cleaning

Barriers

- ICRA will state what type of barrier needs to be installed
 - Drywall, plywood or vinyl board with sealed or caulked seams
 - Visqueen – minimum of 6 mil
- Purpose:
 - Isolation of the area from occupied areas
 - Sealed and airtight
 - Double door entry (Ante-room)
 - Walk off mats

Bad barrier



Good Barrier



HVAC/Air Pressure

- Filter return air ducts with HEPA filter
- Seal off supply – need negative pressure
- HEPA filter machine
- Prevent spread to other areas of facility

HVAC/ Air Pressure

- Sealed penetrations and intact ceilings
- Isotek monitor for continuous monitoring
- Tissue test for less critical areas
- Check / Change air filters frequently



Noise / Vibration

- Can cause dislodging of particulate on ceiling tiles
- Can travel to other areas
- Interfere with procedures
- Distracting to staff (concentration)
- Annoying to people who are sick

Clothing/ Equipment additional sources of contamination

- Shoes
- Clothing
- Tools
- Equipment
- Carts

Traffic flow / Delivery of Supplies

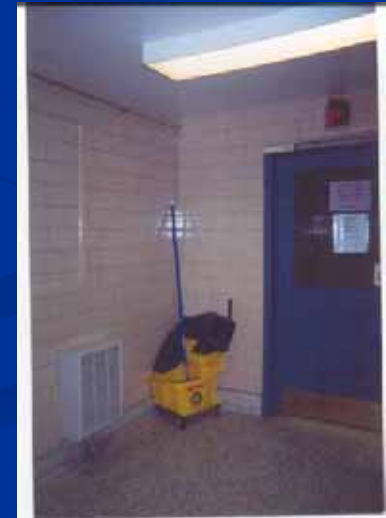
- Use only approved routes
 - For getting to and from construction site
 - For debris removal
 - Delivery of supplies and equipment
- Post signs as requested to limit unauthorized traffic
- Notify facility of unauthorized individuals in work area

Removal of debris

- Use ONLY approved routes and during times approved by facility
- Cover and make sure cover is secure and tightly fitting
- Mist down debris that is powdery and may become airborne
- Make sure outside including wheels of container are clean and not tracking dust etc

Daily or more frequent cleaning

- Keep work area, especially 'ante room', clean
- Wet mop and clean or change mop head frequently to avoid spreading
- Sweeping produces dust into the air – only damp mop
- Make sure no dust, debris is on clothing/boots or shoes when leaving the area



Building Codes

- MI Minimum Health Care facility Design Requirements -
 - Need to meet these requirements
 - AIA guidelines worth while to review and consider
- Need to educate architects that location for many things in a health care facility are critical for the safety of patients
 - Location of hand washing sinks, paper towels, soap, hand sanitizer, seating, supplies etc

New things to Consider

- Surge Capacity:
 - For communicable diseases
 - Mass casualty incidents
- Multi-purpose design of areas
- Conversion to negative pressure areas
- Respiratory etiquette
- Ability to clean/disinfect surfaces
- Securing the site

Old things to Remember

- Replacement issues - carpet and other fixtures that produce dust when removed
- Locations of outlets, switches, sharps containers, sinks, hand sanitizer etc
- Configuration of room – ease for staff to complete patient care without risk of contaminating hands or environment
- Think – “What’s behind this wall”



More things to Remember

- Work in non-patient care areas can impact patients
 - Work on water lines
 - Work on HVAC systems
 - Proximity to elevator shaft's
 - Air intakes
 - Visitors/staff 'carrying in contamination on clothing

Design Issues

- Respiratory Etiquette – “Cover your Cough”
- Hand hygiene facilities
- Drinking fountains
- Ice machines
- Built in coffee makers
- Waste receptacles
- Traffic flow for patients and staff

Design issues

- Cleaning of surfaces: Need to stand up at a minimum to 'hospital approved disinfectants'
 - Furniture
 - Countertops and sinks
 - Wall coverings
 - Curtains
 - Hand rails
 - Flooring

Design of Rooms

- Locate staff hand washing sink in same location room to room
- Make sure there is sufficient room for everything needed at the sink and in the room
 - If you think you have enough room add another linear foot
 - Cup holder, paper towels, soap, sanitizer etc
 - Good lighting
 - Sealed countertop and splash guard

Design of Rooms

- Waiting areas
 - Respiratory etiquette
- Lobbies
- General restrooms
 - How do the doors open
 - Location of sinks and waste disposal

Uniformity

- Decreased number of errors when rooms designed uniform
 - Staff know where things are room to room
 - Location of IC things in same places
 - Sharps boxes, sinks, alcohol hand sanitizer, light switches, outlets, supplies (masks, gloves, gowns, goggles), waste receptacle, dirty linen hamper

Starting off

- Meeting with key players
 - Scope of project
 - End users defined
 - Blueprint even if just conceptual
 - Contractor training and education
 - Roles and responsibilities laid out and agreed upon
- Keep the communication going throughout the project

Medical Waste in MI

- Permits
- Containers
- Staging of containers
- Definition
- Responsibility

Questions?

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