Healthcare construction
Role of the Infection Preventionist

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(NOTHING TO DISCLOSE)
Current state

- Many Infection Preventionists view their role as minor
- Many preventionists are intimidated by the complexity of the ICRA process
- Many executives view the role of the Infection Prevention and Control (IP&C) in construction as unnecessary
- Many executives view exclusion of IP&C from construction as cost savings
- Many architects and engineers consider regulatory standards as final deciding factors
- Architects and engineers may not understand the workflow of the areas they are designing
- Most IPs just don’t want to be involved with construction
What’s the big deal about doing construction in healthcare facilities?
Why all the strict rules?
Environmental contaminants

- CDC, EPA, APIC: under the right conditions, environmental contaminants become opportunistic pathogens that can lead to devastating infections.

- The environmental infection control program is designed to prevent the risk of such infections for patients, staff, visitors, contractors, etc.
Introduction of environmental contaminants into buildings

- During construction (exposure to the weather elements)
- Through openings in the building envelope (doors, windows, etc.)/ building pressurization
- Through the HVAC system
- Through moisture intrusion (flooding, high humidity)
- Through the water distribution system
Mold in buildings

- Every building contains mold
  - Mold is ubiquitous and usually found in spore form
  - If conditions are favorable, spores will germinate and form reservoirs

- Minimal growth requirements for mold
  - Moisture (humidity, water intrusion)
  - Proper temperature (room temp)
  - Organic nutrients (sheetrock)
Mold in buildings

- Reservoir: High concentration of microbial growth (fungal or bacterial) usually in the form of visible growth
How are patients exposed to mold and other contaminants during construction

- Most exposures to mold occur during construction and renovation in occupied facilities. Construction activities if not done under proper controls release dust and debris containing mold spores
  - Above ceiling work
  - Wall demo
  - Removal of millwork

- Exposure to mold can also occur through introduction of fungal spores to HVAC systems which are poorly maintained or equipped with low efficiency filters
  - Excavation for new construction adjacent to occupied facilities
  - Demolition of old buildings adjacent to occupied facilities

- Exposure can also occur if the building envelope is compromised during construction
- Exposure to Legionella after construction
Mold related illnesses

- Mold may cause a variety of human illnesses:
  - Allergic reactions (most common) – asthma, inflammation of the sinuses, inflammation of the lungs (pneumonitis), hypersensitivity
  - Toxin related illnesses – very rare (*Stachybotrys, Aspergillus*, etc.)
  - Opportunistic invasive infections – almost exclusively in immunocompromised hosts – Disseminated Aspergillosis
What is Legionella

- *Legionella* is a genus of bacteria comprised of many different species

- Often found in domestic water and thrives in warm temperatures (77-107.6 F). Also found in soil, stagnant water, and in scale and sediment (shower heads, faucets, cooling towers, and heating and AC systems).

- Normally introduced into the plumbing system during tie-in

- May also be introduced during construction if soil enters the water system (Infection Control must be notified immediately)

- *Legionella* most commonly cause respiratory illness which could range from flu-like symptoms to deadly pneumonia.

- Exposure commonly occurs by inhalation of water aerosols

- Preventative measures must be considered during the pre-construction risk assessment (draining pipes, heat flush, etc.)
Role of the Infection Preventionist

- Advocate – Patient safety
- Acquire knowledge – Learn the construction language (jargon)
- Educate – Raising awareness - Start with executives (buy-in), hospital staff, contractors
- Collaborate – ICRA team members (Executives, Facilities, EVS, Nursing, Architecture and Construction, Risk Management, etc.)
- Communicate – speak up, do not feel intimidated
- Guide – provide expertise
- Oversight – ensure all procedures and protocols are followed
- Inspect and verify – prior, during, and after construction
How to get started

- Review regulatory requirements:
  - CMS – defer to CDC guidelines for environmental infection control (2003)
  - Facilities Guidelines Institute (FGI)
    - Guidelines for building design and construction for hospitals and outpatient facilities (latest edition is 2014)
    - Over 42 States and Federal agencies have adopted or utilize the FGI guidelines
    - TJC surveyors use the FGI guidelines during accreditation surveys
  - Hospital Licensing Rules – State authority (Texas Department of State Health Services)
    - Title 25 Texas Administrative Code – Chapter 133 Hospital Licensing Rules (Effective June 21, 2007 and amended last May 24, 2013)

- Review industry guidelines and best practices – ASHRAE, ASHE, APIC, NADCA, etc.

- Develop a plan:
  - Mitigate risk by developing a plan to reduce the likelihood of construction related infections
  - If your facility already has a plan make sure it is up to date and that you can understand it

- Demonstrate good outcome:
  - Infection prevention involvement prevents design errors that could result in massive additional cost
Phases of construction

- Pre-Design – The big picture – IP&C is usually excluded from this phase but should have input
  - Patient population – New construction vs. renovation
  - Scope of services (ORs, Cath Labs, Radiology, etc.)
  - Regulatory requirements

- Design – Crucial phase for IP&C involvement (avoid change orders)
  - Pre-construction risk assessment – Establish expectations and a project specific prevention plan

- Construction

- Post –construction commissioning
Design phase

- Specifications in Master Specs document – Needs to be reviewed periodically
- Infection Control specs
  - Floor finishes – Carpet vs. VCT, Non-wax vs. waxable flooring, rolled flooring vs. VCT tiles
  - Wall finishes – No vinyl wall covering, especially on wall with plumbing or adjacent to exterior walls
  - Domestic hot water distribution system – mixing valves vs. heat exchange
  - Air handling system – filtration efficiency – ventilation requirements
  - Humidity and temperature controls and monitors – OR, Cath Labs, invasive procedure areas including storage
  - Design features – Architectural designs, reveals, floating ceilings, etc.
  - Placement of sinks and hand hygiene stations
  - Hydration stations and breakrooms
  - Storage rooms – clean equipment, clean supplies, equipment staging areas, soiled utility
  - Water features – water fountains, water walls (discouraged but if can’t eliminate must be enclosed)
  - Number of airborne isolation and protective environment rooms – Anteroom?
- Meet face to face with designers, engineers, architects, etc.
- Be aware of regulatory standards (minimum standards) vs. hospital standards
- Ask to see the final design
**Preconstruction phase**

- Infection control permitting process
  - Infection control permit
    - Project manager
    - Contractors/subcontractors involved
    - Location of the project
    - Scope of project
    - Duration of the project
    - Routine preventative measures
  - Pre-Construction Risk Assessment (PCRA)
    - Every project is unique
    - Involves creating a multidisciplinary team to evaluate risk throughout the duration of the project
    - Must work closely with Safety
    - Evaluate risk and implement additional preventative measure (have a written document)
    - ICRA Document, floor plans, IC/Safety guidelines
Factors to consider for new construction

- Proximity of the new project to existing building (i.e. hospitals, clinics, etc.)
- Location of the HVAC fresh air intakes to adjacent buildings
- Type of work taking place at different periods (excavations, demolition, landscaping, paving parking lot, etc.)
- Location of dumpster
- Exposure of the building materials to the weather conditions (rain, heat, humidity, flooding, etc.)
- Water and utility outages
- Building tie-ins
Construction phase – IC monitoring

- Project schedule
- Monitoring
  - Ultimately the responsibility of the contractor (Master Specs document)
  - Monitoring tools should be available
  - IP&C routine rounding
  - May involve third party monitoring
  - May require environmental air sampling – Particle counts (baselines?)
    - Note: Do not collected air samples for cultures unless you know what to do with the results (not advisable). If you decide to collect air samples for cultures hire a third party contractor who is licensed and certified to do so.
  - Negative/positive pressure monitoring
  - Environmental hazard monitoring (containment integrity, construction traffic, Staff and patient complaints, dust control, etc)
- Surveillance
  - Active surveillance for positive fungal cultures
Post-construction

- Expectations should be established during PCRA
- Terminal cleaning (contractor and Environmental services)
- May require air sampling (particle counts vs. air cultures)
- May require post-construction IC evaluation (work completion, commissioning, walk through, etc.)
- Will probably require air balance and certification

***All must be considered when establishing a construction schedule***