Infection Prevention and Control requirements during healthcare construction and renovation – The ICP is not the enemy.

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### Objectives

- Introduce the Infection Control Practitioner (ICP)
- Examine a construction/renovation project from the ICP perspective
- Identify critical infection prevention requirements
- Identify the roadblocks preventing an effective working relationship
- Determine how to communicate effectively

### The Infection Control Practitioner

ICPs are responsible for a variety of services/departments within the hospital.
- Inpatient units
- Clinics
- Housekeeping
- Transportation
- Medical Reprocessing
- Staff/patient/visitor education
- Hand Hygiene
- Surveillance of hospital-acquired infections
- Construction/renovation/maintenance

**Goal:** To prevent hospital-acquired infections

### IPAC is a four letter word.

**Infection Prevention and Control**

### Hospital-acquired Infections (HAI)

- Infections that occur while in the hospital
- Costly to healthcare
- 250,000 patients acquire HAI annually - **11.6%**
- 8000-12,000 of those patients die of from their infections
- **4th leading cause in death in Canada**

Common Sources of Infection

- Dust
  - Demolition
  - Chase spaces (i.e. above false ceiling)
  - Soil excavation
  - Windows
- HVAC
  - Air intakes or exhaust in pt rooms not covered
  - Changing of air filters in pt care areas
  - Demo/replacement of ducts
  - Air filters not maintained
- Water supply
  - Soil from construction contaminates water supply
  - Repressurization

Construction-related Infections

- Fungal infections
  - Aspergillus - > 100 species
    - Aspergillus fumigatus
    - Aspergillus flavus
    - Aspergillus niger
    - HAI mortality rate: 65-100%
- Bacterial infections
  - Legionella pneumophila
    - HAI mortality rate: 24-80%
Aspergillosis

Legionella

- 1976 outbreak of unknown organism causing severe pneumonia – 221 ill and 34 deaths
- Source: water
- High-risk
  - Elderly
  - Chronic lung disease/smokers
  - Immunocompromised

Construction/Renovation Considerations

- Issue: Any change in water pressure or interruption to water supply resulting in stagnant water
- Design of plumbing system: Dead-end lines, attached hoses, shower nozzles, tap faucets, hot water tanks, and reservoirs
- Plumbing materials: Rubber washers and fittings

Potable Water

- Thermal shock treatment
  - Superheat water (min. 70°C), flush before reuse
- Shock Chlorination
  - Min. 50 ppm
- Preventive technologies
  - Copper-silver ionization

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**Proactive Approach**

- Control dust generation
- Prevent dust from infiltrating into patient care areas
- Prevent contamination of water sources

**Effective Communication Plan**

- Involve various groups early
  - Details needed for RFP
- Infection Control Risk Assessment (ICRA)
  - Early planning stage
  - Multi-disciplinary committee
- Include everyone in kick-off meeting
- Regular/standing meetings
  - Keep stakeholders/groups updated
- Identify a reporting structure/call list at the beginning
- Lots of walk-throughs

**When to involve us?**

“Preventative measures shall be outlined in construction documentation before any construction project is started including drawings, specifications, tender or bid documents.” CSA Z317.13-07

**Successful Risk Management**

- Commitment
- Understanding
- Cooperation

**Multidisciplinary Team**

- ICP's
- Facility engineers/maintenance
- Environmental services
- Architects
- Contractors
- Engineers
- Project management
- Hospital administration
- Hospital staff as appropriate

**Design Phase**

- Room size/spacing
- Physical barriers (single rooms)
- Location of sinks/cleaning facilities
- Negative pressure rooms (+/- anterooms)
- Distance between patients
- Location of waste disposal/sharps
- Storage
- Dirty + clean utility rooms
- HVAC
  - Dedicated vs. general exhaust
  - Positive/Negative pressure
  - ACH
Design

Materials and Finishes
- Floor (vinyl, terrazzo, carpet, applied epoxy)
- Ceiling (acoustic tile, Mylar, drywall)
- Materials (laminates/corian/stainless/wood/carpet/fabrics)
- Paint quality (epoxy/washable/flat)
- Backsplash and accessories

Construction Phase
- Hoarding
- Maintenance of negative pressure HEPA units
- Cleanliness
- Traffic/access to site
- Maintenance of construction materials (i.e. no wet dry wall, clean HVAC components)

Commissioning
- Walk-through
  - Cleanliness
  - Flooring, ceiling, sinks
- Deficiencies

Risk Assessment Matrix

<table>
<thead>
<tr>
<th>RISK GROUP</th>
<th>CONSTRUCTION ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type A</td>
</tr>
<tr>
<td>Group 1</td>
<td>I</td>
</tr>
<tr>
<td>Group 2</td>
<td>I</td>
</tr>
<tr>
<td>Group 3</td>
<td>I</td>
</tr>
<tr>
<td>Group 4</td>
<td>III</td>
</tr>
</tbody>
</table>

Example 1: KDC
- Krembil Discovery Centre, Toronto Western Hospital
- $165 million, 325 000 sq ft
- Mainly research with new clinical space
KDC

- Sign-off of design
  - No sign off = delayed approval = delayed tender = delayed start
- ICP representation at weekly progress meetings
- Establish good working relationship with PM, architect, site supervisor

Example 2: New Intensive Care Unit

Considerations:
- Spacing
- Storage
- Sinks
- HVAC
- Flow
- Dirty/clean utility

Intensive Care Unit
Example 3: Hand Hygiene Sinks

- ICP called to sign-off on new procedure room
- Wrong sink, incorrect adjacencies
- Had to replace sinks and install glass barrier
- $$$

Specific Requirements

- **Locations**
  - 1 sink per in-patient/procedure/exam room
  - 1 sink per 3 pts.
  - Within 6 m of nursing station
  - Dirty utility room
  - Medication prep room
- **Distances/adjacencies**
  - Free-standing, not inserted into or adjacent to counter
  - Min. 3 feet from patients or any fixed surface
- **Design features**
  - Dimensions: 14” x 10” with min. depth 9”
  - Hands-free
  - Spout not directly over drain
  - Free of aerators, strainers, rubber gaskets, overflow

Concluding Remarks

- Construction/renovation activities can result in hospital acquired infections
- Involve ICPs early in planning process
- Multi-disciplinary team
- Adhere to IC Risk Assessment
- Establish good working relationships
- Open communication!
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