

# Construction & Renovation Measures in Healthcare Facilities

GDIPC

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## Element : E-5

- **Sub- Element (4)**
- **Activities for auditing:**
  - ✓ **(D)** documentation
  - ✓ **(SI)** staff interview
  - ✓ **(O)** observation
- **Score (0-1-2-NA)**

## Sub- Element (E-5.1)

**There is a written policy and procedures for IC considerations during demolition, renovation, and construction projects. (D)**

## Documentation review of policy and procedure, which should be:

### – **Comprehensive and well descriptive: it entails (but not limited to):**

- Establishment of multidisciplinary team which is composed of Infection Control, General Services, Risk Management and Housekeeping personnel. The team is responsible for planning and implementing proactive preventive measures for the whole duration of the construction project and in establishing clear lines of communication among all concerned to ensure patient safety.
- Authority (directed to all departments and construction team) of infection control department to be pre-informed before starting any construction & renovation activities or projects (i.e., maintenance personnel should obtain an Infection Control Construction Permit)

- Infection Control Risk Assessment Matrix of Precautions for Construction & Renovation (ICRA): infection control precautions during construction & renovation and upon completion of project (i.e., type I, II, III, and IV), after identifying:
  - a) Type of Construction Project Activity (i.e., type A, B, C and D).
  - b) Patient Risk Group that will be affected during construction & renovation activities (i.e. LOW RISK, MEDIUM RISK, HIGH RISK and HIGHEST RISK)
    - Role of infection control personnel in providing education to workers and staff involved in the project to ensure through periodic follow up those preventive measures are outlined, implemented and maintained during all phases of any construction and renovation projects
    - Authority of infection control department to stop construction projects if breaches in preventive measures arise that may expose patients and HCWs to infections or environmental hazards

- **Fully applicable:** all elements of the policy can be applied and comply with the hospital's scope of services
- **Based on scientific references** approved by MOH (CDC, WHO & APIC)
- **Signed from authorized personnel** (i.e., owner of the policy / hospital director or medical director / concerned department)
- **Approved by IC committee**
- **Valid** (updated within 2 - 3 years and when indicated)

### **Comment:**

Approval by IC committee is required for the infection control manual as a whole before distribution and also for individual policy after major changes

## Sub- Element (E-5.2)

**IPC team is involved prior to, during, and after any construction, demolition, and renovation project (Planning, ICRA, IC permit, continuous follow - up and authority to stop the project). (D , SI)**

## Review the following documents:

- 1) Multidisciplinary team meetings that indicate involvement of infection control team in planning and executing any construction & renovation projects
- 2) Infection Control Construction Permit: infection control department's permission was taken before starting any construction & renovation activities
- 3) Infection Control Risk Assessment Matrix (ICRA): posted at the construction & renovation site with all precautions (proactive preventive measures) are outlined and very well explained to the construction staff (or at least the supervisor of each shift) to be strictly implemented and maintained during all phases of the project.

- 4) Periodic follow up of IC Practices and other preventive measures during all phases of the construction & renovation project. This is depending on the PATIENT RISK GROUP (e.g., construction projects involving HIGH RISK patient care areas as surgical units require frequent visits as compared to construction activities in LOW-RISK areas as general administrative area)
- 5) Authority of infection control department to stop the construction project if there is breaches in IC practices that may expose patients and HCWs to infections or environmental hazards

**Note:**

Ask about the Infection Control Construction Permit / Infection Control Risk Assessment Matrix (ICRA) /documents for regular follow up / documents for stopping the construction projects (if any) of an ongoing demolition, renovation, or construction project or the last project(s) that has (have) been executed

## Staff interview should be focused on:

- Infection control director: he/she should be aware of his/her department's involvement in planning and executing any construction & renovation projects (e.g., prior to execution of construction & renovation activities that involve critical units, there should be some arrangements to shift patients to other areas, isolation of construction & renovation site, creation of dust barriers, isolation of HVAC system... etc.) and their understanding of importance of ICRA, permission, follow up and stopping the construction project when required
- Stakeholders of construction & renovation projects (e.g., site manager or project's supervisor of the ongoing shift): he/she must be familiar with involving IC department in every step of the project starting from planning to execution to completion. Also, he/she should understand that all personnel involved in construction & renovation activities must be very well aware of IC precautions (proactive preventive measures), to strictly implement and maintain IC practices during all phases of such activities

## Sub- Element (E-5.3)

**IPC team is involved prior to, during, and after any construction, demolition, and renovation project (Planning, ICRA, IC permit, continuous follow - up and authority to stop the project). (D , SI)**

## Review the following documents:

- 1) Infection Control Policy for Microbiological cultures after construction which should:
  - Microbiological culture should be conducted after construction in operating theaters and positive pressure protective environment isolation rooms.
  - Microbiological cultures should also be conducted based on requirement e.g. during outbreak to identify the source (environmental surfaces, water samples etc.)
- 2) Check the microbiological cultures result for previous construction and renovation projects to ensure that they only performed for Operation room OR and Protective Environment room PE.

## Ask the staff about:

**IC precautions and other preventive measures required during construction & renovation and upon completion of project which should:**

- Microbiological cultures should be done before opening of OR and PE rooms after construction and renovation projects at these areas
- Ask for corrective interventions if the culture results were positive.
- Ask about the microbiological cultures during outbreak situations e.g

**Candida Auris outbreak in Adult ICU, Acinetobacter Baumannii outbreak in Neonatal ICU. etc.**

## Microbiologie Air & Environnemental Surfaces Sampling:

- Particulate and microbiologic air sampling has been used when commissioning new HVAC system installations, such sampling is particularly important for newly constructed or renovated protective environments or operating rooms.
- Sampling should be limited to determining the density of fungus spores per unit volume of air space; High numbers of spores may indicate contamination of air handling system components prior to installation or a system deficiency when culture results are compared with known filter efficiencies.
- Never do environmental surface sampling and cultures for newly constructed healthcare areas or buildings.

## Sub- Element (E-5.4)

**IPC measures are followed during the construction, demolition, and renovation projects by using infection control risk assessment (ICRA).  
(D,O,SI)**

## Review the following documents:

**Infection Control Risk Assessment Matrix (ICRA)**, which should:

- Be formulated and posted at the construction & renovation site
- Identify accurately type of construction project activity (i.e., type A, B, C and D) & patient risk group that will be affected during construction & renovation activities (i.e. LOW RISK, MEDIUM RISK, HIGH RISK and HIGHEST RISK)
- Entail all required IC precautions (i.e., proactive preventive measures: type I, II, III, and IV), that must to be strictly implemented, maintained and periodically observed through follow up visits during different phases of the project
- Be signed by all involved stakeholders

## Observe the ongoing construction & renovation project to:

- 1) Check the presence of formulated ICRA, that is posted appropriately in visual catchment of personnel involved in construction & renovation activities
- 2) Watch if all IC practices and other preventive measures highlighted in ICRA are strictly implemented and continuously practiced or not.

## Ask the staff about:

IC precautions and other general preventive measures required during construction & renovation and upon completion of project (i.e., type I, II, III, and IV), Examples:

- Isolation of areas
- Traffic control plan with signage placement
- Moving/placement of patient in other areas
- Sealing of window/door/air ducts/plumbing penetrations
- Creation of dust barriers
- Exhaustion of air in construction side directly outside
- Use of negative pressure/HEPA filters to contain dust or other dust suppression mechanisms

- Use of appropriate PPE by workers involved in construction activities
- Removal of debris at periods of low activity in containers that are tightly covered
- Reporting an unusual observation like discoloration of water, dust in units above, below, beside, behind or in front of the construction site
- Post construction preventive measures (It mainly depends on the area involved, (e.g., critical units: oncology ward, OR ...etc.): housekeeping activities (cleaning and disinfection that may include HVAC system according to construction type), flushing of water lines and/or environmental sampling.

## **Pre-construction and Renovation Infection Control Risk Assessment Permit Matrix of Precautions for Construction & Renovation**

**Step One:** Construction activity type Construction activity type is defined by the expected amount of dust generated and duration of the involvement of the heating, ventilation and air conditioning (HVAC) systems. Identifying the Type of Construction Project Activity (Type A-D).

Type	Activities
<p><b>Type A</b></p>	<p><b>Activities that do not generate dust or require cutting of walls or access to ceilings other than for visual inspection: (inspection and non-invasive activities)</b>  <i>Includes but is not limited to:</i></p> <ul style="list-style-type: none"> <li>• Removal of ceiling tiles for visual inspection only, e.g., limited to 1 tile per 50 square feet</li> <li>• Painting (but not sanding)</li> <li>• Wallcovering, electrical trim work, minor plumbing</li> </ul>
<p><b>Type B</b></p>	<p><b>Activities that generate minimal dust</b>            Small scale, short-duration activities that create minimal dust <i>Includes, but is not limited to:</i></p> <ul style="list-style-type: none"> <li>• Installation of telephone and computer cabling.</li> <li>• Access to chase spaces.</li> <li>• Cutting of walls or ceiling where dust migration can be controlled.</li> </ul>

<p><b>Type C</b></p>	<p><b>Activities that generate a moderate to the high level of dust or requires demolition or removal of any fixed building components or assemblies:</b>  <i>Includes but is not limited to:</i></p> <ul style="list-style-type: none"> <li>• Sanding of walls for painting or wall covering</li> <li>• Removal of floor coverings, ceiling tiles and casework</li> <li>• New wall construction</li> <li>• Minor ductwork or electrical work above ceilings</li> <li>• Major cabling activities</li> <li>• Any activity which cannot be completed within a single work shift.</li> </ul>
<p><b>Type D</b></p>	<p><b>Major demolition and construction projects</b>  <i>Includes, but is not limited to:</i></p> <ul style="list-style-type: none"> <li>• Activities that require consecutive work shifts</li> </ul>
	<ul style="list-style-type: none"> <li>• Requires heavy demolition or removal of a complete cabling system</li> <li>• New construction.</li> </ul>

**Step Two:** Using the following table to identify the Patient Risk Groups that will be affected

Group	Area
<b>Group 1: Low Risk</b>	<ul style="list-style-type: none"> <li>▪ Office areas</li> <li>▪ Non-patient areas</li> </ul>
<b>Group 2: Medium Risk</b>	<ul style="list-style-type: none"> <li>▪ Materials management</li> <li>▪ Physical therapy / occupational therapy/speech therapy</li> <li>▪ Admission / discharge</li> <li>▪ Public corridors (through which patients and supplies pass)</li> <li>▪ Echocardiography</li> <li>▪ Nuclear medicine</li> <li>▪ MRI</li> <li>▪ Respiratory therapy</li> <li>▪ Cafeteria</li> <li>▪ Dietary</li> <li>▪ Patient areas not listed in Groups 3 or 4</li> </ul>

**Group 3:  
High Risk**

- Critical care units (CCU)
- Emergency room
- Radiology
- Labor and delivery
- Microbiology / radiology laboratories
- Intensive care units (ICU)
- Intermediate care nursery
- Newborn nursery
- Long term / sub-acute units
- Dialysis
- Endoscopy
- Outpatient surgery
- Paediatrics
- Pharmacy
- Post-anesthesia care unit
- Surgical units

**Group 4:  
Highest Risk**

- Any area caring for immunocompromised patients
- Burn Unit
- Cardiac Catheterization Lab
- Central Sterile Supply
- Intensive Care Units
- Negative pressure
- Isolation rooms
- Oncology
- Operating rooms including C-section room

*\* **Note:** If more than one risk group will be affected, select the higher risk group*

**Step Three:** Match the Patient Risk Group (Low, Medium, High, Highest) with the Planned Construction Project Type (A, B, C, D) on the following matrix:

Patient Risk Group	Construction Project Type			
	Type A	Type B	Type C	Type D
LOW-Risk Group	I	II	II	III/IV
MEDIUM Risk Group	I	II	III	IV
High-Risk Group	I	II	III/IV	IV
HIGHEST Risk Group	II	III/IV	III/IV	IV

## Step Four: Description of Required Infection Control Precautions and activities class

Class	Before Construction	During Construction	After Construction
I	<ol style="list-style-type: none"> <li>1. Execute work by methods that minimizing dust dispersion.</li> <li>2. Provide MSDS for paints &amp; disinfectants.</li> </ol>	<ol style="list-style-type: none"> <li>1. Immediately replace any ceiling tile which may have been displaced for visual inspection.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean work areas upon completion of the task</li> <li>2. Clean up and dispose of in accordance with defined procedures.</li> <li>3. Disinfect surfaces in high-risk areas.</li> </ol>
II	<ol style="list-style-type: none"> <li>1. Provide active means to prevent air-borne dust from dispersing into the atmosphere.</li> <li>2. Block off and seal air vents.</li> </ol>	<ol style="list-style-type: none"> <li>1. Waste/debris must be disposed of on a regular basis to avoid accumulation.</li> <li>2. Contain construction waste debris before</li> </ol>	<ol style="list-style-type: none"> <li>1. Restore HVAC system, complete air balancing in the work areas.</li> <li>2. Vacuum work areas with HEPA filtered vacuums.</li> <li>3. Wipe surfaces with disinfectant.</li> </ol>

3. Seal unused doors with duct tape.
4. Place dust/sticky mats at the entrance and exit of work areas.
5. Isolate the HVAC system within the working zone if needed.
6. Provide MSDS for paints & disinfectants prior to use.

- transport in tightly covered containers.
3. Replace sticky mats when visually dusty.
  4. Water mist work surfaces to control dust while cutting.

Class	Before Construction	During Construction	After Construction
<b>III</b>	<ol style="list-style-type: none"> <li>1. Block off and seal air vents with a grill mask or other approved means.</li> <li>2. Seal unused doors with duct tape.</li> <li>3. Place dust/sticky mats at the entrance and exit of work areas.</li> <li>4. Isolate HVAC system within working zone if needed.</li> <li>5. Complete all critical barriers as indicated (i.e. a hard plastic sheet of at least 4mm thick kit or implement control cube method of hard plywood frame before construction begins).</li> <li>6. Provide MSDS for paints &amp; disinfectants prior to use.</li> </ol>	<ol style="list-style-type: none"> <li>1. Waste/ debris must be disposed of on a regular basis to avoid accumulation.</li> <li>2. Contain construction waste/debris before transport in tightly covered containers.</li> <li>3. Cover transport receptacles or carts. Tape covering unless solid lid.</li> <li>4. Maintain negative air pressure within the worksite.</li> <li>5. Vacuum work area with HEPA filtered vacuum machine on daily basis.</li> </ol>	<ol style="list-style-type: none"> <li>1. Restore HVAC system, complete air balancing in the work areas.</li> <li>2. Vacuum work areas with HEPA filtered vacuums.</li> <li>3. Wet mop areas with disinfectant.</li> <li>4. Remove barrier materials carefully to minimize the spreading of dirt and debris associated with construction.</li> </ol> <p><b>NOTE:</b> <b>Do not remove barriers from working areas until the entire project is officially released.</b></p>

IV	<p>In Addition to items in class III, the following preventive measures must be applied:</p> <ol style="list-style-type: none"> <li>1. Seal holes, pipes, conduits and punctures appropriately</li> <li>2. Construct an anteroom that will be used for</li> </ol>	<p>In Addition to items in class the following preventive measures must be applied:</p> <ol style="list-style-type: none"> <li>1. The anteroom must be cleaned with a HEPA</li> </ol>	<p>In Addition to items in class III, the following preventive measures must be applied:</p> <ol style="list-style-type: none"> <li>1. Spaces above false ceilings must be cleaned and be dust-free including all A/C ducts and water pipes.</li> </ol>
	<ol style="list-style-type: none"> <li>changing the necessary PPEs before entering/leaving the construction site.</li> <li>3. Place a sticky mat at the entrance of the anteroom.</li> <li>4. Waste/debris chutes must be available for waste disposal</li> <li>5. Maintain negative pressure within work site.</li> </ol>	<ol style="list-style-type: none"> <li>filtered vacuum daily.</li> <li>2. All personnel entering the worksite are required to wear shoe covers.</li> <li>3. Vacuum work area with HEPA filtered vacuum machine on daily basis.</li> <li>4. Change sticky mats once they are visibly dusty.</li> </ol>	<p><b>NOTE:</b> <b>Do not remove barriers from work areas until the entire project is officially released.</b></p>

**THANK YOU**