

**State of Kuwait  
Ministry of Health  
Infection Control Directorate**

**The role of infection control  
In design of health care facilities**

**2007**

## INTRODUCTION

Hospital design should ensure that patients, especially immunocompromised patients, are at no greater risk for infection within the hospital than outside. Because the microbial flora of a health-care facility can be influenced by its design,

The design of health-care facilities has undergone substantial changes in large part because patients with impaired host defenses now represent an increasing proportion of hospitalizations. As a result, both design and renovation of these facilities present unique challenges and opportunities for infection control professionals, who are often the only clinical staff associated with construction projects.

IC participation is critical in the initial planning and approval meetings during the design phase. Issues frequently addressed include budget, space constraints including storage and equipment cleaning areas, airhandling units, handwashing facilities, appropriate finishes, specific products with infectious implications, and applicable regulations.

**In each hospital when there is any construction will be done we should follow from step 1 to step 14**

## Infection Control Risk Assessment Matrix of Precautions for Construction & Renovation

**Step 1: Using the following table, *identify* the Type of Construction Project Activity (Type A-D)**

<b>TYPE A</b>	<p><b>Inspection and Non-Invasive Activities.</b> Includes, but is not limited to:</p> <ul style="list-style-type: none"> <li>▪ removal of ceiling tiles for visual inspection limited to 1 tile per 50 square feet</li> <li>▪ painting (but not sanding)</li> <li>▪ wall covering, electrical trim work, minor plumbing, and activities which do not generate dust or require cutting of walls or access to ceilings other than for visual inspection.</li> </ul>
<b>TYPE B</b>	<p><b>Small scale, short duration activities which create minimal dust</b> Includes, but is not limited to:</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>
<b>TYPE C</b>	<p><b>Work that generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies</b> Includes, but is not limited to:</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 duct work 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>
<b>TYPE D</b>	<p><b>Major demolition and construction projects</b> Includes, but is not limited to:</p> <ul style="list-style-type: none"> <li>▪ activities which require consecutive work shifts</li> <li>▪ requires heavy demolition or removal of a complete cabling system</li> <li>▪ New construction.</li> </ul>

**Step 2** Using the following table, *identify the Patient Risk Groups* that will be affected. If more than one risk group will be affected, select the higher risk group:

Low Risk	Medium Risk	High Risk	Highest Risk
<ul style="list-style-type: none"> <li>▪ Office areas</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cardiology</li> <li>▪ Echocardiography</li> <li>▪ Endoscopy</li> <li>▪ Nuclear Medicine</li> <li>▪ Physical Therapy</li> <li>▪ Radiology/MRI</li> <li>▪ Respiratory Therapy</li> </ul>	<ul style="list-style-type: none"> <li>▪ CCU</li> <li>▪ Emergency Room</li> <li>▪ Labor &amp; Delivery</li> <li>▪ Laboratories (specimen)</li> <li>▪ Newborn Nursery</li> <li>▪ Outpatient Surgery</li> <li>▪ Pediatrics</li> <li>▪ Pharmacy</li> <li>▪ Post Anesthesia Care Unit</li> <li>▪ Surgical Units</li> </ul>	<ul style="list-style-type: none"> <li>▪ Any area caring for immunocompromised patients</li> <li>▪ Burn Unit</li> <li>▪ Cardiac Cath Lab</li> <li>▪ Central Sterile Supply</li> <li>▪ Intensive Care Units</li> <li>▪ Medical Unit</li> <li>▪ Negative pressure isolation rooms</li> <li>▪ Oncology</li> <li>▪ Operating rooms including C-section rooms</li> </ul>

**Step 3:** Match the

Patient Risk Group (Low, Medium, High, Highest) with the planned ...  
 Construction Project Type (A, B, C, D) on the following matrix, to find the ...  
 Class of Precautions (I, II, III or IV) or level of infection control activities required

### Construction Project Type

Patient Risk Group	TYPE A	TYPE B	TYPE C	TYPE D
<b>LOW Risk Group</b>	<b>I</b>	<b>II</b>	<b>II</b>	<b>III/IV</b>
<b>MEDIUM Risk Group</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>
<b>HIGH Risk Group</b>	<b>I</b>	<b>II</b>	<b>III/IV</b>	<b>IV</b>
<b>HIGHEST Risk Group</b>	<b>II</b>	<b>III/IV</b>	<b>III/IV</b>	<b>IV</b>

**Note:** Infection Control approval will be required when the Construction Activity and Risk Level indicate that **Class III** or **Class IV** control procedures are necessary.

## Description of Required Infection Control Precautions by Class

During Construction Project

Upon Completion of Project

CLASS I	<ol style="list-style-type: none"> <li>Execute work by methods to minimize raising dust from construction operations.</li> <li>Immediately replace a ceiling tile displaced for visual inspection</li> </ol>	<ol style="list-style-type: none"> <li>Clean work area upon completion of task.</li> </ol>
CLASS II	<ol style="list-style-type: none"> <li>Provide active means to prevent airborne dust from dispersing into atmosphere.</li> <li>Water mist work surfaces to control dust while cutting.</li> <li>Seal unused doors with duct tape.</li> <li>Block off and seal air vents.</li> <li>Place dust mat at entrance and exit of work area</li> <li>Remove or isolate HVAC system in areas where work is being performed.</li> </ol>	<ol style="list-style-type: none"> <li>Wipe work surfaces with disinfectant.</li> <li>Contain construction waste before transport in tightly covered containers.</li> <li>Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.</li> <li>Remove isolation of HVAC system in areas where work is being performed.</li> </ol>
CLASS III	<ol style="list-style-type: none"> <li>Remove or Isolate HVAC system in area where work is being done to prevent contamination of duct system.</li> <li>Complete all critical barriers i.e. sheetrock, plywood, plastic, to seal area from non work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins.</li> <li>Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.</li> <li>Contain construction waste before transport in tightly covered containers.</li> <li>Cover transport receptacles or carts. Tape covering unless solid lid.</li> </ol>	<ol style="list-style-type: none"> <li>Do not remove barriers from work area until completed project is inspected by the owner's Safety Department and Infection Control Department and thoroughly cleaned by the owner's Environmental Services Department.</li> <li>Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.</li> <li>Vacuum work area with HEPA filtered vacuums.</li> <li>Wet mop area with disinfectant.</li> <li>Remove isolation of HVAC system in areas where work is being performed.</li> </ol>
CLASS IV	<ol style="list-style-type: none"> <li>Isolate HVAC system in area where work is being done to prevent contamination of duct system.</li> <li>Complete all critical barriers i.e. sheetrock, plywood, plastic, to seal area from non work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins.</li> <li>Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.</li> <li>Seal holes, pipes, conduits, and punctures appropriately.</li> <li>Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site or they can wear cloth or paper coveralls that are removed each time they leave the work site.</li> <li>All personnel entering work site are required to wear shoe covers. Shoe covers must be changed each time the worker exits the work area.</li> <li>Do not remove barriers from work area until completed project is inspected by the owner's Safety Department and Infection Control Department and thoroughly cleaned by the owner's Environmental Services Department.</li> </ol>	<ol style="list-style-type: none"> <li>Remove barrier material carefully to minimize spreading of dirt and debris associated with construction.</li> <li>Contain construction waste before transport in tightly covered containers.</li> <li>Cover transport receptacles or carts. Tape covering unless solid lid</li> <li>Vacuum work area with HEPA filtered vacuums.</li> <li>Wet mop area with disinfectant.</li> <li>Remove isolation of HVAC system in areas where work is being performed.</li> </ol>

**Step 4. Identify the areas surrounding the project area, assessing potential impact**

Unit Below	Unit Above	Lateral	Lateral	Behind	Front
Risk Group	Risk Group	Risk Group	Risk Group	Risk Group	Risk Group

**Step 5. Identify specific site of activity eg, patient rooms, medication room, etc.**

**Step 6. Identify issues related to: ventilation, plumbing, electrical in terms of the occurrence of probable outages.**

**Step 7. Identify containment measures, using prior assessment. What types of barriers? (Eg, solids wall barriers); Will HEPA filtration be required?**

Note: Renovation/construction area shall be isolated from the occupied areas during construction and shall be negative with respect to surrounding areas)

**Step 8. Consider potential risk of water damage. Is there a risk due to compromising structural integrity? (eg, wall, ceiling, roof)**

**Step 9. Work hours: Can or will the work be done during non-patient care hours?**

**Step 10. Do plans allow for adequate number of isolation/negative airflow rooms?**

**Step 11. Do the plans allow for the required number & type of hand washing sinks?**

**Step 12. Does the infection control staff agree with the minimum number of sinks for this project?**

**Step 13. Does the infection control staff agree with the plans relative to clean and soiled utility rooms?**

**Step 14. Plan to discuss the following containment issues with the project team.  
e.g. traffic flow, housekeeping, debris removal (how and when),**

## Infection Control Construction Permit

						Permit No: _____	
Location of Construction:				Project Start Date:			
Project Coordinator:				Estimated Duration:			
Contractor Performing Work				Permit Expiration Date:			
Supervisor:				Telephone:			
YES	NO	CONSTRUCTION ACTIVITY	YES	NO	INFECTION CONTROL RISK GROUP		
		TYPE A: Inspection, non-invasive activity			GROUP 1: Low Risk		
		TYPE B: Small scale, short duration, moderate to high levels			GROUP 2: Medium Risk		
		TYPE C: Activity generates moderate to high levels of dust, requires greater 1 work shift for completion			GROUP 3: Medium/High Risk		
		TYPE D: Major duration and construction activities Requiring consecutive work shifts			GROUP 4: Highest Risk		
CLASS I		1. Execute work by methods to minimize raising dust from construction operations. 2. Immediately replace any ceiling tile displaced for visual inspection.			3. Minor Demolition for Remodeling		
CLASS II		1. Provides active means to prevent air-borne dust from dispersing into atmosphere 2. Water mist work surfaces to control dust while cutting. 3. Seal unused doors with duct tape. 4. Block off and seal air vents. 5. Wipe surfaces with disinfectant.			6. Contain construction waste before transport in tightly covered containers. 7. Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area. 8. Place dust mat at entrance and exit of work area. 9. Remove or isolate HVAC system in areas where work is being performed.		
CLASS III		1. Obtain infection control permit before construction begins. 2. Isolate HVAC system in area where work is being done to prevent contamination of the duct system. 3. Complete all critical barriers or implement control cube method before construction begins.			6. Vacuum work with HEPA filtered vacuums. 7. Wet mop with disinfectant 8. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction. 9. Contain construction waste before transport in tightly covered containers.		
		<b>Date</b>			10. Cover transport receptacles or carts. Tape covering.		
		<b>Initial</b>			11. Remove or isolate HVAC system in areas where work is being performed/		
CLASS IV		1. Obtain infection control permit before construction begins. 2. Isolate HVAC system in area where work is being done to prevent contamination of duct system. 3. Complete all critical barriers or implement control cube method before construction begins. 4. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.			7. All personnel entering work site are required to wear shoe covers 8. Do not remove barriers from work area until completed project is thoroughly cleaned by the Environmental Service Dept. 9. Vacuum work area with HEPA filtered vacuums. 10. Wet mop with disinfectant.		
		<b>Date</b>			11. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.		
		<b>Initial</b>			12. Contain construction waste before transport in tightly covered containers. 13. Cover transport receptacles or carts. Tape covering. 14. Remove or isolate HVAC system in areas where work is being performed.		
Additional Requirements:							
_____ Date Initials				_____ Exceptions/Additions to this permit Date Initials are noted by attached memoranda			
Permit Request By:				Permit Authorized By:			
Date:				Date:			

## **References**

Centers for Disease Control and Prevention. Healthcare Infection Control Practices Advisory Committee (HICPAC) Draft Guideline for Environmental Infection Control in Healthcare Facilities, 2001

APIC State-of-the-Art Report: The role of infection control during construction in health care facilities, The 1997, 1998, and 1999 APIC Guidelines Committees