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**Policy:**

Ensure maximum prevention of cross contamination between patients and maintenance personnel by following specific procedures when performing maintenance and renovations.

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**Prevailing Codes and Standards:**

Guidelines for design and construction of Health Care Facilities - 2012, APIC, TJC-EC.02.06.05

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**PM Cross Reference:**

Task 57, 62 & 63; Craft 1; Equip # DP..., pressure rel  
Task 1 & 2; Craft 13; Equip # FCU..., fan coils  
Task 4; Craft 20; Equip # AHU..., air handlers  
Task 11 through 15; Craft 20; Equip # AHU..., AHU filters  
Task 15; Craft 12; check pipes

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**Procedure:**

**I. Occupational Health**

- A. Employees who are exposed to body fluids should notify supervisor immediately and report to the Employee Health Clinic.
- B. Cuts, oozing wounds, blistering conditions, etc. are more susceptible to infection from body fluid sources. The supervisor is responsible to ensure that employee conditions which pose cross contamination problems are reported to the Occupational Health Nurse, or assign the employee duties away from patient care areas.
- C. Hepatitis B vaccinations are available to at risk personnel. Occupational Health will assess risk at the request of the supervisor.
- D. TB skin tests are done annually by Occupational Health.
- E. Orientation
  - 1. New personnel are counseled on infection control policies during departmental orientation.
  - 2. Maintenance personnel are counseled on infection control measures as needed.

**II. Protective Attire**

- A. Protective attire (splash-proof gowns, gloves, masks, goggles, etc.) are furnished by Physical Plant to employees and contractors. Protective attire will be provided by Night Maintenance after hours. Protective attire should be worn as specified in this policy and at any point where contact of body fluids may be a possibility.

- B. Masks - Masks are designed for specific functions such as air borne and splash problems, and misuse could result in loss of protection. For example, submicron (also known as TB or "Duck Bill" masks) are designed for respiratory protection but do not protect from fluid splashes. Both fluid and airborne submicron masks are available.
- C. Gloves
  - 1. Latex gloves are not to be used.
  - 2. Gloves are only to be worn during contact with a possible infectious source (i.e. all body fluids) and shall be removed immediately when leaving the risk source.
  - 3. Hands are to be washed immediately after glove removal.
- D. If any clothing, personal or other, becomes contaminated with any type of foreign body fluid or potential pathogen (sewer sludge is to be considered infectious), the clothing will be removed immediately and delivered to the laundry for processing. The article of clothing may or may not be returned to the owner.

### III. Access

- A. Occupied Patient Rooms:
  - 1. Consult the nursing supervisor before entering rooms with precaution signs on the door.
  - 2. Standard universal precautions always apply (treat all patients as if they may be infectious).
  - 3. Hand washing is required before entering and after leaving the room.
  - 4. A submicron mask is required in rooms indicating respiratory precaution. (A hospital variance report is to be filled out if the mask is not available.)
- B. Special Care Areas (isolation rooms, newborn nursery, neonatal nursery, surgery, delivery and central medical supply)
  - 1. Before Entering:
    - a. Contact the Head Nurse for proper attire requirements.
    - b. Wash hands thoroughly with soap and running water for a minimum of 10 seconds.
    - c. Take into the room **ONLY** those tools that are necessary, and make sure they have been **cleaned** and **disinfected**.
  - 2. Before leaving:
    - a. Wash hands thoroughly with soap and running water for a minimum of 10 seconds.
    - b. Use paper towels to turn off faucets.
    - c. Clean tools with an approved cleaning agent.
- C. Additional Special Care Area Access Requirements
  - 1. Newborn Nursery and Neonatal Area - long sleeve gowns are to be worn.

2. Surgical Suite and OB Suite
  - a. When working or passing through the restricted corridors between the OB or Surgical Suites, a gown, hair cover and booties are worn.
  - b. When working in an operating room, a surgical mask, scrub suit, hair cover, booties and gloves are worn.
3. Central Medical Supply
  - a. Decontamination Room
    - 1) Wear gown, booties, hair cover and gloves.
    - 2) Upon leaving, remove all exposed articles of clothing and place them in appropriate receptacle and clean tools thoroughly with cleaning agent.
  - b. CMS Work Areas - wear gown, hair cover and booties.

#### IV. Preventive Maintenance

- A. Filter changing:
  1. When changing room air filters, gloves and Submicron masks are to be worn. Hands are to be washed thoroughly with an antiseptic soap when task is complete.
  2. Filters are changed according to manufacturer's recommendations and specific equipment guidelines which are found on the PM system task sheet.
  3. Filters should be handled with care in an effort not to dislodge entrapped particles.
  4. All filters transported inside buildings shall be bagged at point of removal.
  5. Isolation room filters are changed quarterly or semiannually as scheduled by the preventive maintenance system or when notified by Nursing Service. Filters are to be bagged immediately before transporting and discarded as normal waste.
- B. Fan Coil Assembly:
  1. Coils are cleaned every two years.
  2. Drain pans are cleaned with coil cleaner annually, or as needed to eliminate any accumulation of algae or slime. Cleaner other than bleach must be approved by Infection Control.
  3. After cleaning, drain pans are rinsed with a 1:10 ratio of bleach solution.
  4. Two small algaecide tablets are placed in each drain pan to control microbial growth.
- C. Air Handler Assembly:
  1. Coils are cleaned annually.
  2. Drain pans are cleaned with coil cleaner annually, or as needed to eliminate any accumulation of algae or slime.
  3. After cleaning, drain pans are rinsed with a 1:10 ratio of bleach solution.
  4. Two large algaecide tablets are placed in each drain pan to control microbial growth.

## D. Cooling Water Towers:

1. Cooling water towers are visually inspected and tested (water analysis) daily for algae and receive treatment as needed.
2. Tower basins and hot water pans are cleaned every six months.
3. Chemicals used to treat algae must conform to the following conditions:
  - a) Registered with the EPA.
  - b) Applied according to manufacture recommendations.

## E. Plumbing

1. Vacuum breakers are installed and maintained according to plumbing standards to prevent back siphoning.
2. Sinks are maintained in accordance with preventive maintenance procedure defined by area. Aerators shall be removed.
3. Overhead sewage lines are inspected in response to leaks.
  - a. Vinyl gloves will be worn when handling any waste water lines or when working on or around waste lines that have been leaking. Hands MUST be washed after removal of gloves.
  - b. Goggles and fluid mask will be worn anytime there is danger of waste products being splashed into the eyes.
  - c. Splash proof gowns will also be worn.
4. Drain Cleaning/Clearing
  - a. Protective clothing will be worn during all drain cleaning/clearing. This includes but not limited to: protective suits, rubber gloves, eye protection and rubber boots. This protective equipment is NOT to be worn away from the immediate work area.
  - b. At the point of entry of work area, place floor mats down to minimize the tracing of contaminates throughout the area.
  - c. Under emergency conditions turn off water to affected area. Notification to the area Supervisor and to Safety must be made.
  - d. All contaminated articles shall be disposed of in the appropriate waste containers and removed from the building.
  - e. All equipment will be washed down (cleaned) prior to placing equipment back in storage area.
5. Suspected pathogen contaminated lines that are removed and items not subject to cleaning shall be bagged and disposed of as hazardous waste.

## F. Extreme caution should be exercised when working on waste lines, around trash receptacles, accumulation of debris, or the incinerator to prevent the possibility of needle sticks.

## G. Roof Exhaust:

1. Submicron masks and gloves will be made available at key

- exits to the roof, but will be used at the employee's discretion.
2. Protective items will be disposed of in trash cans at the point of glove and mask distribution.
- H. Tools are cleaned after each use with Infection Control approved disinfectant. Contamination from any body fluids shall require immediate cleaning.
- I. Medical Gases & Vacuum - Tests are performed in accordance with NFPA 99. This includes operational pressure tests, purge tests, cross connection testing, outlet flow tests, leak tests, alarm tests and purity tests. Inspection of systems and backup systems are specified in the Utility Management Plan and scheduled through preventive maintenance.

## V. Construction

- A. Any project requiring a dust partition shall have full implementation of the guidelines. Costs will include coveralls, masks, materials for cleaning and time. Debris transport constraints also will occur additional time.
- B. Isolation of the construction area
1. Containment methods must be discussed with Associate Director of Physical Plant or representative before removal of ceiling because this is a high risk area for organisms such as aspergillus and stachybotlys.
  2. The project site must be completely contained with construction barriers extending from the floor, beyond the false ceiling, to the underside of the floor above. The areas must be partitioned with sheet rock barriers. This area should be vacuumed prior to beginning construction including above ceiling. A project of short duration and minimal construction can use fire rated plastic sheeting, at the discretion of Physical Plant staff.
  3. All penetrations into the construction area must be sealed, windows closed, and air supply ducts capped. Exhaust should remain in service.
  4. Construction barricade entrances must be kept closed at all times. Traffic by health care workers through construction is prohibited.
  5. Any dust tracked outside of the barrier area must be removed immediately.
  6. Debris must be transported in covered containers with tight-fitting covers. Waste is not transported through patient/surgery areas without approval of project manager and affected department director.
  7. Carts used for disposal of materials. i.e., tiles, etc. must be covered by plastic before transport into and out of the hospital away from patients and staff.

8. Any material/surfaces that become soiled or saturated with any fluids will be removed immediately.
  9. Thorough cleaning of construction area at end of each work day and end of project is mandatory. Environmental Services must clean outside the immediate construction area daily and at the end of the day.
  10. Tacky mats and carpet mats will be used outside the immediate construction area to reduce dust and debris being tracked into other areas.
  11. Construction activities involving the ceiling in patient occupied areas require that the patient is removed from the area and the room should be left vacant for thirty minutes before patient is allowed back in room.
  12. Education/training programs will be provided by Physical Plant or representative to all workers including subcontractors.
  13. A daily check list (attached) will be posted at the entrance to each project. It is the responsibility of the supervisor, foreman or project leader to ensure the checklist is adhered to, checked daily and returned to the Facility Maintenance Manager each week.
- C. Attire
1. During portion of construction where exposure is high (especially demolition) submicron mask must be worn by all workers.
  2. Jumpsuits and hair covering must be worn during demolition and discarded before leaving the area. This attire should be worn when there is excessive dust.
- D. Air
1. Negative pressure must be maintained within the project site at all times by the use of negative air fan or units fitted with high-efficiency filters.
  2. All air-handling ducts must be shut down or covered during all demolition activities.
  3. The portable HEPA air filter systems will be placed adjacent to the construction area.
    - a. Each portable unit will be inspected and serviced at the conclusion of a construction project. This will include removal of filters, thoroughly cleaning the surfaces (frame, panels and blower), inspect and repair electrical components, replace pre-filters (35%) and HEPA filter (95%), as necessary, and cover unit with plastic.
    - b. Maintenance staff, vendors and contractors may check out unit from Physical Plant and should examine it for cleanliness prior to placing in service.
    - c. During a construction project, the unit will be inspected daily, the pre-filter will be changed as necessary, not to exceed weekly. Unit is equipped with fan speed filter load indicator and hour meter.

## VI. Infection Control Risk Assessment

1. Prior to beginning any construction, demolition or renovation project, the hospital will conduct an Infection Control Risk Assessment (**ICRA**), to determine the potential risk of transmission of various agents in the facility. The ICRA will identify risks that airborne agents pose to certain patient groups. The ICRA shall be conducted by a panel with expertise in:

- infection control
- risk management
- facility design
- construction
- ventilation
- safety
- epidemiology

Only building areas anticipated to be affected by construction will be addressed.

The panel shall provide through documentation, those actions needed to result in a safe Environment of Care for the duration of the project. This includes planning, design and construction. The findings and requirements must be communicated to designers, construction managers, workers and affected staff. Contract documents must require the contractor to implement these specific requirements during construction.

The ICRA shall address but not be limited to the following:

- a) The impact of disrupting essential services to patients.
- b) Patient placement or relocation.
- c) Placement of effective barriers to protect susceptible patients from airborne contaminants.
- d) Air handling and ventilation needs in surgery and other sensitive areas, protective environment rooms, laboratories, exhaust systems and other special areas.
- e) Determination of additional numbers of airborne infection isolation or protective environment rooms.
- f) Consideration of the domestic water system to limit waterborne opportunistic pathogens.

The assessment for internal and/or external construction projects also includes patient protection from demolition, ventilation and water management following; planned or unplanned power outages, movement of debris, traffic flow, cleanup, and certification.

Projects should include phasing to minimize disruption of existing patient services.

Phasing consideration should include:

- negative pressure
- emergency procedures
- criteria for protection interruption
- roof surface construction
- notification of interruptions
- noise and vibration control
- dust barriers
- air quality, filtration and air balance

Acceptance criteria for mechanical systems shall be specified. Medical gas certification and critical ventilation specifications for air balance and filtration shall be verified before acceptance.

VII. **Construction / Infection Control Matrix**

In order to minimize the risk of patient infection and to reduce staff and visitor discomfort and inconvenience as a result of various types of construction projects, an infection control matrix will be utilized. This plan will standardize the process in which infection control guidelines will be implemented for different demolition, renovation and construction projects in the many different areas of the hospital.

**Infection Control Matrix  
Demolition, Renovation, Construction**

The matrix will cross reference:

- a) Project (**construction activity** - degree of difficulty) with,
- b) risk group (**level** of infection control risk) and the resultant will provide,
- c) infection control construction procedure (**class** of preventive measures necessary).

a) **Construction Activity Types**

Type A	Inspection and Non-Invasive Activities. Includes but is not limited to removal of ceiling tiles for visual inspection, painting (but not sanding), wall covering, electrical trim work, minor plumbing and activities that do not generate dust or require cutting of walls of access to ceilings other than for visual inspection.
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Type B	Small-scale, short duration activities that create minimal dust. Includes but is not limited to installation of telephone and computer cables, access to chase spaces, cutting of walls or ceiling where dust migration can be controlled.
Type C	Any work that generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies. Includes but is not limited to sanding walls for painting for painting or wall coverings, removing floor coverings, ceiling tiles ad casework; new wall construction, minor ductwork or electrical work above ceilings; major cabling activities and any activity that cannot be completed with a single work shift.
Type D	Major demolition and construction projects. Includes but is not limited to activities that require consecutive work shifts, heavy demolition or removal of a complete ceiling system and new construction.

b) Infection Control Risk Groups (level)

Group 1 Lowest	Group 2 Medium	Group 3 Medium-High	Group 4 Highest
1.Office areas 2.Physical Plant 3.Environmental Services 4.Laboratory	1.All other patient care units (e.g., ultrasound, rehabilitation) 2.Toxicology	1. Emergency room 2. Radiology/MRI 3. Post-Anesthesia Care Units 4. Labor and delivery 5. Newborn nurseries 6. Outpatient Surgery 7. Nuclear medicine 8. Admission/discharge units 9. Echocardiography 10.Dialysis, inpatient 11.Blood draw area 12.Central medical supply 13.Cardiopulmonary 14.Outpatient services 15.Pediatrics, inpatient	1. Surgery, inpatient 2. Labor and delivery operating rooms 3. Cardiac catherization 4. Intensive care units 5. Oncology 6. Anesthesia and pump areas 7. Endoscopy 8. Pharmacy 9. Radiation therapy 10.Burn center 11.Bone Marrow Transplant 12.Oral Surgery

		16.Oncology, inpatient 17.ICUs	
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**Cross Reference Matrix**

Construction Activity				
Risk Level	Type "A"	Type "B"	Type "C"	Type "D"
Group 1	I	II	II	III / IV
Group 2	I	II	III	IV
Group 3	I	III	III / IV	IV
Group 4	II	III / IV	III / IV	IV

**c) Infection Control Construction Procedures by Class**

<b>Class I</b>	<ol style="list-style-type: none"> <li>1. Execute work by methods to minimize raising dust from construction operations.</li> <li>2. Immediately replace any ceiling tile displaced for visual inspection.</li> <li>3. Minor demolition for remodeling.</li> </ol>
<b>Class II</b>	<ol style="list-style-type: none"> <li>1. Provides active means to prevent airborne dust from dispersing into atmosphere.</li> <li>2. Water-mist work surfaces to control dust while cutting.</li> <li>3. Seal unused doors with duct tape.</li> <li>4. Block off and seal air vents.</li> <li>5. Wipe surfaces with disinfectant.</li> <li>6. Contain construction waste before transport in tightly covered containers.</li> <li>7. Wet mop and / or vacuum with HEPA-filtered vacuum before leaving work area.</li> <li>8. Place dustmat at entrance and exit of work area.</li> <li>9. Remove or isolate HVAC system in areas where work is being performed.</li> </ol>
<b>Class III</b>	<ol style="list-style-type: none"> <li>1. Inform Infection Control of construction projects.</li> <li>2. Isolate HVAC system in area where work is being done to prevent contamination of duct system.</li> <li>3. Complete all critical barriers or implement control cub method before construction begins.</li> <li>4. Maintain negative air pressure within worksite using HEPA-filtered air filtration units.</li> <li>5. Do not remove barriers from work area until complete project is thoroughly cleaned by environmental services department.</li> </ol>

	<ol style="list-style-type: none"> <li>6. Vacuum work area with HEPA-filtered vacuums.</li> <li>7. Wet mop with disinfectant.</li> <li>8. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.</li> <li>9. Contain construction waste before transport in tightly covered containers.</li> <li>10. Cover transport receptacles or carts. Tape covering.</li> <li>11. Remove or isolate HVAC system in areas where work is being performed.</li> </ol>
<p><b>Class IV</b></p>	<ol style="list-style-type: none"> <li>1. Inform Infection Control of construction projects.</li> <li>2. Isolate HVAC system in area where work is being done to prevent contamination of the duct system.</li> <li>3. Complete all critical barriers or implement control cube method before construction begins.</li> <li>4. Maintain negative air pressure within worksite using HEPA-equipped air filtration units.</li> <li>5. Seal holes, pipes, conduits, and puncture appropriately.</li> <li>6. Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving worksite or they can wear cloth or paper coveralls that are removed each time they leave the worksite.</li> <li>7. All personnel entering worksite are required to wear shoe covers.</li> <li>8. Do not remove barriers from work area until completed project is thoroughly cleaned by the environmental services department.</li> <li>9. Vacuum work area with HEPA-filtered vacuums.</li> <li>10. Wet mop with disinfectant.</li> <li>11. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.</li> <li>12. Contain construction waste before transporting in tightly covered containers.</li> <li>13. Cover transport receptacles or carts. Tape covering.</li> <li>14. Remove or isolate HVAC system in areas where work is being done.</li> </ol>

Once the construction precautionary procedure has been established, the in-house construction crew or contractor will be expected to follow the control measures established. Situations are different for each project and implementation may vary.

**VIII. Confined Space Entry**

- A. See Confined Space Policy
- B. Raw sewage manholes, grease trap and laundry chute will not be entered without the use of a respirator and protective clothing such as Ti-Vac disposable suits and gloves.

- C. Air ducts, boiler fire boxes, steam and mud drums may also require special protective equipment in accordance with the Confined Space Policy.

**IX. Air Pressure Requirements - Positive and Negative Air Pressure Relationships:**

- A. Checked according to preventive maintenance schedule. (See policy on HVAC pressure relationships.)
- B. Documentation is maintained with the preventive maintenance records.
- C. Monthly reports are submitted to Infection Control and Nursing Administration.

**X. Daily Check**

In order to ensure that effective barriers remain in place, proper ventilation is maintained and precautionary measures are taken to minimize migration of construction contaminants, the in-house construction crew will post and maintain a daily check list.