Infection Control Risk Assessment (ICRA) and Permit

An infection control risk assessment (ICRA) is a systematic process that determines level of risk to patients and defines controls to reduce risk. The purpose of the risk assessment is to identify the effects of the construction or renovation activities on air and water quality. Once the effects are understood, then control measures are designed and implemented for the purpose of reducing health risks to patients, visitors and staff.

Completing an ICRA for any construction or renovation project includes four steps:

1. Identify the type of construction
2. Identify the patient/resident or staff risk group that will be most affected
3. Determine the level of infection control classification using the ICRA Matrix
4. Assign appropriate controls that are needed to reduce or eliminate risk to patient/resident or staff risk group. Infection controls are documented in the ICRA Permit

Step 1: Identify the type of construction: For the purposes of performing an infection control risk assessment, construction activities have been divided into four types: A, B, C, and D. Each of these construction types is listed on the sample ICRA permit (below) and includes example construction activities for each type.

Step 2: Identify the patient/resident or staff risk group: Each healthcare facility may have its own unique patient/resident population with different susceptibility to construction related infections. Likewise, each facility may have different departments that have strict cleanliness requirements, which can be adversely affected by construction dust. For example, the Sterile Processing Department and Perioperative Department have very strict cleanliness requirements, whereas the facility’s lobby or waiting areas likely have less stringent cleaning requirements.

The patient/resident and staff risk group is obtained from a table with different assigned ratings of susceptibility to infections from airborne contaminants that may be released during construction/renovation activities. An example of one such table is provided. Another example can be obtained from [http://www.ashe.org/advocacy/organizations/CDC/pdfs/assessment_icra.pdf](http://www.ashe.org/advocacy/organizations/CDC/pdfs/assessment_icra.pdf)
<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Highest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative offices</td>
<td></td>
<td>Employee Health</td>
<td>Blood donor center</td>
<td>Any area caring for immunocompromised patients (ONC/BMT/Hematology)</td>
</tr>
<tr>
<td>Basement main hallways</td>
<td></td>
<td>Materials Management</td>
<td>Central supply</td>
<td>Cardiac Cath Lab</td>
</tr>
<tr>
<td>Cafeteria</td>
<td></td>
<td>Medical day treatment</td>
<td>Clinic lab</td>
<td>Cardiac Intensive Care Unit (CICU)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outpatient pharmacy</td>
<td>Dental clinic</td>
<td>Maternal Fetal Unit</td>
</tr>
<tr>
<td>Chapel</td>
<td></td>
<td>Physical therapy</td>
<td>Dialysis – Kidney center</td>
<td>Negative pressure isolation rooms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inpatient psychiatric unit</td>
<td>Endoscopy (Gl Lab)</td>
<td>Newborn Intensive Care Unit (NICU)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sleep lab</td>
<td>Emergency room</td>
<td>Operating rooms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flight team area</td>
<td>Pediatric Intensive Care Unit (PICU)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inpatient floors</td>
<td>Pharmacy (IV room)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pharmacy (inpatient)</td>
<td>Positive pressure isolation rooms</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Perioperative Admit /Discharge Unit</td>
<td>Sterile Processing Department (SPD)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Post Anesthesia</td>
<td>Adult Intensive Care Unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Care Unit (PACU)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Radiology – MRI, CT, Nuclear Medicine</td>
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</tbody>
</table>
Step 3: Determine the level of infection control classification using the ICRA matrix: Once the type of construction project and risk group is defined, then these two pieces of information are matched in a matrix to determine the infection control classification most appropriate for the project.

<table>
<thead>
<tr>
<th>Patient Risk Group</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW Risk Group</td>
<td>I</td>
<td>II</td>
<td>II</td>
<td>III / IV</td>
</tr>
<tr>
<td>MEDIUM Risk Group</td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
</tr>
<tr>
<td>HIGH Risk Group</td>
<td>I</td>
<td>II</td>
<td>III / IV</td>
<td>IV</td>
</tr>
<tr>
<td>HIGHEST Risk Group</td>
<td>II / III</td>
<td>III / IV</td>
<td>III / IV</td>
<td>IV</td>
</tr>
</tbody>
</table>

Step 4: Assign appropriate controls that are needed to reduce or eliminate risk to patient or staff risk group – See ICRA Permit

This form has been adapted using the Infection Control Risk Assessment Matrix of Precautions for Construction and Renovation. The original document can be downloaded at:


The Infection Preventionist can use the form within this section or the ASHE form to adapt to their particular needs and project characteristics.
## A Medical Center

<table>
<thead>
<tr>
<th>Location of Construction:</th>
<th>Permit No.:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Manager &amp; Cell:</td>
<td>Permit Start Date:</td>
</tr>
<tr>
<td>Construction Supervisor &amp; Cell:</td>
<td>Permit Expiration Date:</td>
</tr>
<tr>
<td>Infection Preventionist &amp; Cell:</td>
<td></td>
</tr>
</tbody>
</table>

## Construction Project Type – Based upon the type of work, select (X) the construction project type

### Type A

**Inspection, Non-Invasive Activity:**
- Removal of ceiling tiles for visual inspection limited to 1 tile per 50 square feet

**Non-Invasive Activity:**
- Wall covering installation
- Electrical trim work installation (i.e. cover plates, data box covers)
- Minor plumbing repairs (all plumbing outside of wall cavities; i.e. change faucet)
- Minor patch and paint (without sanding)
- Changing door hardware, or making repairs on cabinetry or millwork hardware without sanding
- Activities which do not generate dust or require cutting of walls or access to ceilings other than for visual inspection

### Type B

**Small scale, short duration activities which create minimal dust or where dust migration can be controlled at the source:**
- Above ceiling access to install cabling, electrical equipment and/or conduits, electrical or lighting fixtures, to perform minor plumbing repairs or clean/inspect/repair VAVs, fan coil boxes or humidifiers
- Access to wall chase spaces via access panels for minor plumbing repairs, investigation, electrical work
- Cutting of walls or ceiling where dust migration can be controlled
- Minor floor repairs on vinyl or carpet flooring
- Installation of wall art/framed pictures

### Type C

**Work that generates a moderate to high level of dust or requires demolition, removal and build-back of any fixed building components or assemblies:**
- Sanding of walls for painting or wall covering
- Removal and reinstallation of floor coverings, ceiling tiles and casework
- New wall construction
- Minor HVAC duct work
- Major electrical work above ceilings
- Major cabling work above ceilings
- Core drilling operations
- Any dust generating activity which cannot be completed within a single work shift

### Type D

**Major Demolition and Construction Projects:**
- Activities which require consecutive work shifts
- Requires heavy demolition and removal of building systems (i.e. walls, floors, ceilings, and infrastructure including plumbing, electrical, HVAC)
- New construction

## Risk Group – Based upon the type of work, select (X) the Risk Group (See Risk Group List)

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Highest</th>
</tr>
</thead>
</table>
### ICRA Matrix – Using the matrix, select the ICRMR Classification – I, II, III, or IV

<table>
<thead>
<tr>
<th>Patient Risk Group</th>
<th>Construction Project Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>LOW Risk Group</td>
<td>I</td>
</tr>
<tr>
<td>MEDIUM Risk Group</td>
<td>I</td>
</tr>
<tr>
<td>HIGH Risk Group</td>
<td>I</td>
</tr>
<tr>
<td>HIGHEST Risk Group</td>
<td>II / III</td>
</tr>
</tbody>
</table>

### Infection Controls: Using the outcome from the ICRA Matrix, select (X) the appropriate controls. You can combine controls from different classifications, as needed.

**Preparation for work – Select Controls applicable for all Construction Project Types (✓)**

- All work personnel shall have clean clothing and shoes at all times when in the facility. Hard hats and high visibility clothing shall also be clean.
- All equipment, materials, waste carts and transfer carts shall be wiped clean prior to entry into the hospital and shall be clean at all times when moving throughout the hospital.
- Clean interior and exterior surfaces of HEPA filtered vacuum. Conduct detailed inspection of the vacuum to ensure clean, intact filters and proper seating of the HEPA filter on the filter gasket.
- Clean interior and exterior surfaces of HEPA filtered portable air scrubber. Conduct detailed inspection of the air scrubber to ensure clean, intact filters and proper seating of the HEPA filter on the filter gasket.
- Conduct detailed inspection of the HEPA filtered negative air machine to ensure clean, intact filters and proper seating of the HEPA filter on the filter gasket.
- Have available a HEPA filtered vacuum for the purposes of vacuuming dust and debris from equipment, materials, carts and personnel clothing
- Have available clean cloths and spray disinfectant or wipes for the purposes of wiping clean all equipment, materials and carts
- No tool belts, gloves, or rags shall be hanging from contractor belts or pockets. All small equipment (tool belts, tape measure, hammer, drywall saw, etc.) shall be placed inside cleanable portable containers.
- Have bunny suit ensemble (bunny suit, booties, hair bonnets) available
- Have booties available

**Class I and Class II Controls – Select all that apply (✓)**

- Immediately replace a ceiling tile displaced for visual inspection
- Place HEPA filtered portable air scrubber in area with open ceiling tile.
- Immediately upon replacement of ceiling tile, vacuum personnel clothing, equipment, ladder and floor to remove dust and debris generated by removing and replacing the ceiling tile.
- Close door to work area – the room will serve as containment.
- Remove all equipment and materials from room prior to beginning work.
- Place tape and plastic over cabinets and shelving within room.
- Place HEPA filtered portable air scrubber inside work area.
- Place HEPA filtered portable air scrubber outside of work area (in adjacent occupied spaces).
- Seal unused doors with tape.
- Coordinate with the Control Room a shut-down of the Terminal Box or Variable Air Volume Box serving the work area prior to covering the supply air diffuser.
- Securely seal and block off supply air diffusers.
- Securely seal and block off return air grills.
- Place MERV 11 filters over return air grills.
- Securely seal and block off exhaust air grills.
- Place MERV 8 filters over exhaust air grills.
- Place tacky mat at corridor entrance into the work area. Change tacky mat as needed so it remains effective at capturing dust and debris.
- Place tacky mat within work area at the exit to the adjacent corridor. Change tacky mat as needed so it remains effective at capturing dust and debris.
- Capture dust during drilling by placing the nozzle of a HEPA filtered vacuum at the drill point.
- Capture dust during cutting by placing the nozzle of a HEPA filtered vacuum at the cut point.
- Maintain a clean work area by vacuuming all affected surfaces with HEPA-filtered vacuums.
- Contain construction waste before transport in tightly covered containers. All trash carts shall be wiped clean (on all surfaces and wheels) prior to exiting the work area and again prior to re-entry into the hospital after dumping at the loading dock. This may necessitate placement of cleaning materials at the loading dock entrance.
- Cover transport receptacles or carts; tape covering down unless solid lid. All covers shall be clean and not stored on the floor when not in use; the covers shall be stored in a clean container or bag.

### Class III and Class IV Controls – Select all that apply (√)

- Remove or isolate HVAC system in area where work is being done to prevent contamination of duct system.
- Coordinate with the Control Room a shut-down of the VAV serving the work area prior to covering the supply air diffuser(s).
- Install all critical barriers,( i.e., sheetrock, plywood, plastic), to seal area from non-work area per attached infection control schematic.
- Install hard-wall barriers without anteroom.
- Install hard-wall barriers with anteroom.
- Install plastic wall barriers without anteroom.
- Install plastic wall barriers with anteroom.
- Install plastic sheeting above the ceiling up to the ceiling deck.
- Seal holes, pipes, conduits, and all other penetrations through containment barrier.
- Maintain negative air pressure within work site utilizing HEPA-equipped air filtration units.
- Discharge negative air to: _____________________ ___________________ (write in discharge location)
- Place manometers with data logging or printing capabilities in each anteroom. Measure pressure differential between work areas identified in the infection control schematic. Program alarm set point at -0.01/-0.02/-0.03 inches water gage (circle selection).
- Place HEPA filtered portable air scrubber inside work area.
- Place HEPA filtered portable air scrubber inside anteroom.
- Place HEPA filtered portable air scrubber outside of barriers at work area entrance.
- Do not begin construction work until barriers and other infection controls are inspected by the Infection Preventionist and an infection control permit is issued.
- When bunny suits, booties and hair bonnet/hat cover are required, all clothing should be stored off the floor inside the anteroom.
- Bunny suits shall be worn by all subcontractors within work area while dusty tasks are being performed. These tasks include demolition and installation/sanding drywall.
- Contain construction waste before transport in tightly covered containers. All trash carts shall be wiped clean (all surfaces and wheels) prior to exiting the work area and again prior to re-entry into the hospital after dumping at the loading dock. This may necessitate placement of cleaning materials at the loading dock entrance.
- Cover transport receptacles or carts; tape covering down unless solid lid. All covers shall be clean and not stored on the floor when not in use; the covers shall be stored in a clean container or bag.
- Anteroom shall be clean at all times.
Maintain a clean work area by vacuuming with HEPA-filtered vacuums.
Maintain a clean work area. Use dust suppressant when broom sweeping.
Workers are required to vacuum their clothes with a HEPA vacuum while in the anteroom and before exiting the work site
Workers are to wear bunny suits, booties and hair bonnets/hat covers when exiting the work area.
All personnel entering work site are required to wear shoe covers (booties). Shoe covers must be changed each time the worker exits the work area.
Install new HVAC ductwork using clean duct protocols - cover all open ducts at the end of each shift.

When work is above ceiling and requires the use of an Environmental Containment Unit – Select all controls that apply (√)

- Access above ceiling using a containment cube that has been cleaned on all interior and exterior surfaces
- Depressurize the containment cube using a HEPA filtered negative air machine
- Place HEPA filtered portable air scrubber in the work area and near the exhaust discharge of the containment cube
- Prior to exiting the cube, thoroughly clean (vacuum and wipe with disinfectant) the cube interior and all materials and equipment within the cube
- All work personnel shall thoroughly vacuum clothing and shoes prior to exiting the containment cube. Hard hats and high visibility clothing shall also be clean.
- Workers are to wear bunny suits, booties and hat covers when exiting the containment cube
- Contain construction waste in tightly covered cleanable containers.

Cut-out Box (Bird-box) Controls – Select all that apply (√)

- Use cutout box (bird box) when cutting drywall and/or installing electrical box and/or pulling cable into the box
- Depressurize cutout box using a HEPA filtered vacuum
- Prior to removing the cutout box from the wall, thoroughly vacuum all dust and debris from within the box, and then wipe the box interior with disinfectant
- Contain construction waste in tightly covered cleanable containers.

At the end of all construction select the appropriate activities that must be completed prior to patient/resident and staff occupancy (√)

- Coordinate construction turnover sequence with Epidemiology/Infection Preventionist/Industrial Hygienist
- Perform a construction area clean by wiping all work surfaces with disinfectant.
- Perform a construction area clean by wet mopping.
- Perform a construction area clean by vacuuming the floor, walls and other affected surfaces at the completion of work using a HEPA filtered vacuum.
- Coordinate an Environmental Services EVS terminal clean at the completion of the work.
- Coordinate an EVS triple-terminal clean at the completion of the work.
- Remove isolation of HVAC system in areas where work was performed.
- Perform test, balance and adjustment of the HVAC system as required by Facilities Management.
- Do not remove barriers from work area until completed project is inspected by the Infection Preventionist.
- Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.

List any additional controls not included above

Permit approved by: ____________________________________________________________
PRINT NAME __________________________ SIGNATURE ______________________________
Date: ______________________________
Infection Prevention discussion with Project Coordinator, Construction Superintendent, Manager and Foreman

In order to development effective infection controls, the IP must have a thorough understanding of the construction scope of work. The following list can be used to discuss the construction project with the Contractor.

1. **Nature** – Big picture information
   a. How long is task?
      i. Hours, days, weeks, months
   b. How invasive?
      i. Investigation only
      ii. Above ceiling cable pulls
      iii. Install card readers
      iv. Drywall cutting
      v. Remove carpet / vinyl flooring
      vi. Patch and paint
      vii. Major demolition and build-back

2. **Scope** – The details!
   a. Exact location of work – floor plans & walking the work area
   b. IP will need to characterize the work location
      i. Pressurized or depressurized to adjacent/adjoining rooms
      ii. Ventilation in work area
         1. Ducted supply and return air
         2. Plenum return air
         3. Exhaust present
      iii. Occupants in or near the area
      iv. Hospital materials moving through the area
c. Will wall and/or ceiling cavities be opened?

d. What tools will be used?
   i. Hand tools – drywall saws, sand paper block, hammer
   ii. Power tools – tin cutters, hammer drill, finishing sander

e. Is HVAC system part of the scope?

f. What downstream rooms will be affected?

g. Will air handling unit (AHU) be turned off?
   i. What areas will be affected?

h. For above ceiling work, determine if ceiling cavity is pressurized.
   i. What building materials and equipment will be transferred to the work location?

j. What waste materials will be generated?
   i. Where will recycle and waste dumpsters be located?
   ii. Can waste be removed through window chute?
   iii. What noise levels will be generated and when?

k. Will vibration be generated and when?

l. Will there be disruptions to:
   i. Medical gases
   ii. Electrical power
   iii. Fire detection / suppression
   iv. Water supply
   v. Emergency exit routes

m. Will there be core drilling through floors?

n. Does the scope include new domestic plumbing?
Containment Barrier Construction

Equipment

- Tacky mat
- Micromanometer
- Various hand tools
- HEPA filtered vacuum
- Barrier materials
- Fire-rated tape
- Disinfectant wipes
- Rigid walls
- Waste Containers
- HEPA filtered negative air machine and GFCI
- Polyethylene sheeting
- Door for rigid wall / Zippers for poly barriers

Sequence to build containments

1. Walk the work area to determine availability of electrical power. Use GCFIs as required by the facility’s project coordinator.
2. Do your math – how does blocking SA, RA, EX within the work area affect system balance? Plan and adjust system balance as needed. This may require measurement of airflow volume from potentially affected supply air (SA) and return air (RA) grills prior to beginning project.
3. Confirm that all medical supplies, medical equipment, curtains, blinds computers, etc. have been removed from the work area.
4. Reduce supply airflow into the work area by closing manual dampers and/or VAV boxes. Secure plastic or solid barrier over SA diffusers.
5. Install MERV 8 filters on RA grill.
   a. Step 2 and 3 will have the effect of creating slight depressurized condition within the work while containment barriers are being built.
6. Securely place painters plastic or shrink-wrap plastic over cabinets and wall and ceiling mounted equipment.
7. Build containment walls and anteroom.
8. Place tacky mats in locations identified in the ICRA Permit.
9. Install micromanometers in areas identified in the ICRA Permit. Program the alarm set-point as defined in the ICRA Permit.
10. Install and turn on HEPA filtered negative air machines. Simultaneously isolate RA grills.
11. Collect static pressure measurements in adjacent rooms and compare with values determined in Step 1.
12. Install above ceiling sheeting – monitor work area static pressure with ceiling open.
13. Place required infection control equipment in the anteroom – Tacky mat, HEPA filtered vacuum, disinfectant wipes, waste container, fire extinguisher. Other equipment might include booties, bunny suits, and hair bonnets.
14. Installed required signage and ICRA Permit on the exterior of the containment barrier.
15. Obtain approval from infection prevention prior to beginning work.
## Containment Barrier Removal

### Equipment

- HEPA filtered vacuum
- Disinfectant wipes
- Various hand tools
- Waste Containers

### Sequence to remove containments

1. Perform detailed construction cleaning on all surfaces within the work area and anteroom.
2. Perform construction clean on all exterior containment walls paying special attention to the tape that attaches the walls to the floor.
3. Obtain approval from infection prevention prior to removing containment.
   a. A series of Environmental Services (EVS) terminal cleans may be required prior to removing the containment or the removal task may be phased with several EVS terminal cleaning tasks between phases.
4. Keep the negative air machine on during containment removal.
5. Remove and secure tacky mats.
6. Removal all plastic sheeting covering equipment mounted on ceiling and/or walls.
7. Polyethylene sheeting barrier walls - Remove plastic sheeting walls from the top down - cut walls into manageable strips and then roll the plastic into itself so the dirty interior side is on the inside of the roll. Place the roll into trash bags. When full, all trash bags should be tightly sealed then placed into trash buggies with tight fitting lids.
8. Rigid barrier walls – separate wall panels one panel at a time. Place panels on a clean transfer cart. If walls are to be re-used, cover each wall panel with shrink wrap prior to placing into storage. This will keep the walls clean.
   a. During containment wall removal, immediately vacuum all debris generated. Do not allow debris to be tracked through the work area as containment walls are being removed.
9. Once all walls are removed, turn off negative air machine. Cover both ends of the machine in order to maintain cleanliness of the machine’s interior.
   a. Place the flex duct into waste bag and securely tie the bag prior to placement into trash buggy.
10. Remove isolation from return air grill(s).
11. Schedule an EVS terminal clean.
12. Once terminal clean is complete, remove isolation from the supply air diffuser(s).
Environmental Containment Unit (ECU)

Portable infection control barrier units are recognized by several names, including some specific manufacturer names. Common names include:

- ECU (environmental containment unit)
- Control cube or CUBE
- Pop-up containment unit
- Mobile containment unit
- HEPA Cart

**Purpose:** The purpose of this paper is to provide ECU use instructions that are designed to complement infection control practices during construction and renovation activities within healthcare facilities.

ECU users must understand and follow all manufacturers’ set-up and use instructions as presented in the ECU user’s manual.

**ECU Criteria:** Only ECU’s meeting the following structural design and use practices shall be permitted:

- The ECU must effectively satisfy all required infection control standards set by the CDC, the Joint Commission, CMS and APIC.
- The ECU must be structurally sound to withstand depressurization at 0.01 inches water gage.
- The ECU must be sized and designed to tightly fit ceiling and HVAC access points.
- The ECU must have side access panels to allow safe entry and exit of personnel and equipment.
- The ECU must be large enough to hold personnel, equipment (i.e. ladder, tools), and cleaning equipment such as a HEPA filtered vacuum.
- The ECU must have controlled access portholes, and the portholes must be properly sized for electrical cords, cable (for cable pulls), manometer tubing, and negative air machine inlet collars.
- The ECU must be built of non-combustible or limited combustible materials that will not contribute to the development or spread of fire.
- The ECU must be able to be cleaned with hospital approved cleaning agents without a compromise of the unit’s structural or performance integrity.

**Construction or Renovation Tasks Where an ECU Shall Not Be Used:**

- Welding or metal flame cutting operations, and
- Tasks that require the use of hazardous chemicals.
ECU Infection Control Equipment: The following equipment should be obtained, be in a clean condition, and ready for use prior to setting up the ECU:

- Portable HEPA filtered vacuum that is clean and has been inspected to ensure proper function and filtration
- Hospital approved disinfectant and clean cloths
- Negative air machine capable of pulling 300 to 800 CFM
- Inspect the negative air machine to ensure the filter is not damaged, properly fitted to filter gaskets and the unit’s blower and fan are clean.
- Manometer, if required by Infection Control Risk Assessment (ICRA)
- As needed – extension cords, painter tape, duct tape, bunny suits, booties, hair bonnets

Pre-use Instructions:

- Inspect the ECU for cleanliness and damage. If damaged, repair per manufacturer’s instructions. If repair is inadequate, obtain another ECU that is without damage.
- The ECU should be clean and free of dust, removable stains, and debris on both inside and outside surfaces.
- If the ECU will be used in environmentally controlled areas, (i.e. surgical department, isolation rooms), disinfect the unit according to the controlled area cleaning requirements prior to entering the controlled area. Pay particular attention to the cleanliness of the unit’s bottom surface, and if applicable, the unit’s casters.
- Obtain and connect a negative air machine capable of pulling 300 to 800 CFM. Make sure the negative air machine is properly inspected and cleaned.
- The exhaust termination point for the negative air machine will be determined on a case by case basis with input from the hospital infection control personnel.

Use Instructions:

- Place the ECU under the ceiling panel or tile where ceiling access will occur.
- Lock the wheels.
- One person outside the ECU will guide the person inside the ECU while the enclosure is being raised. When raising the ECU walls, DO NOT lift the ceiling grid. Stop when the top of the ECU walls are ½ to 1 inch below the grid.
- Plug in the negative air machine. Secure the electrical cord to the floor in order to eliminate tripping hazard.
- Confirm all necessary equipment and tools are in the ECU.
- One person will enter the ECU while the second person, the spotter, remains outside the ECU.
• The person within the ECU will unzip one or two panels at the top of the ECU.
• The spotter will turn on the negative air machine.
• The person within the ECU can now open the ceiling panel or remove the ceiling tile.
• When the ECU will be used while conducting tasks other than visual observation, the person within the ECU will vacuum or wet-wipe visibly dusting and dirty surfaces above the ceiling where the work will be conducted. The cleaning of dirt and debris within the ceiling space will be conducted prior to any other work tasks. The purpose of cleaning the ceiling space is to prevent the unnecessary dislodging of dust and debris that may fall onto the worker or within the ECU.
• Whenever personnel working within the ECU must exit the unit, they will always thoroughly vacuum themselves, (shoulders to shoes), using the HEPA filtered vacuum.
• All waste materials will be placed into a trash container that can be tightly sealed. Plastic waste bags are acceptable.
• A spotter will be positioned outside the ECU to direct pedestrian traffic around the unit and support the personnel working inside the unit.
• When working in controlled environments (i.e. operating areas, sterile processing, etc.) don and doff protective clothing in accordance with hospital policy.

Post-use Instructions:
• At the end of the work tasks, and prior to exiting the unit, personnel will clean all equipment used within the unit.
• The cleaning of the unit’s interior and personnel will take place in the following order. The negative air machine shall remain on during the listed cleaning tasks.
  • Vacuum ladders, waste containers, tools and all other equipment.
  • Vacuum personnel within the unit, shoulders to shoes.
  • Vacuum all interior surfaces of the unit. Pay particular attention to the portholes for the electrical cords and negative air machine inlet collar.
  • Wet-wipe or vacuum the HEPA filtered vacuum, including the vacuum hose and electrical cord.
• Drop the containment walls.
• Turn off and disconnect the negative air machine.
• Close the top of the unit.
• Unplug the electrical cord and wipe clean.
• Inspect the unit for damage, and if necessary, repair per manufacturer’s instructions.
Storage:

- ECU’s shall be stored in clean and dry locations, and not subject to damage from near-by construction materials, outdoor weather conditions, or sunlight.
- Both inlet and outlet ports on the negative air machine should be covered to protect the cleanliness of the machine’s interior.
Manometer Alarm Response Procedure and Call Tree

Manometer Alarm call is received

Hour of Day

3pm to 11:30 pm

ABC Construction
Proj sup name, xxx-xxx-xxxx
Proj foreman xxx-xxx-xxxx

Proceed to affected work area
Obtain manometer static pressure reading

Is the work area Pressurized or Depressurized

Pressurized (+)

Hospital Facilities
In house phone: x-xxxx
xxx-xxx-xxxx

If alarm condition is on OR floor, Hospital Facilities obtain static pressure measurements for all ORs in Surgery and CV Lab

Depressurized (-)

Investigate condition of containment and negative air machine
Correct as needed
Note date, time, findings and corrective actions on ABC Construction Inspection Form

Call Hospital Proj Coordinator xxx-xxxx
xxx-xxxx
Hospital Safety xxx-xxxx

11:30 pm to 3 pm

Call Hospital IP xxx-xxxx-xxxx
A Medical Center
Infection Control Commissioning Plan
Date _____________

The purpose of this document is to present the Infection Control Commissioning Plan for the Medical Center Renovation Project.

Definitions
1. Above Ceiling Construction Clean – above ceiling surfaces are free from non-adhered substances and debris
2. Clean Construction Protocols – construction cleaning protocols established in the Clean Construction Protocols document referenced below. The protocols dictate infection control requirements for different construction activities conducted within the renovation space and will be implemented according to the turnover schedule.
3. Daily Clean – cleaning of floors and horizontal surfaces using MEDICAL CENTER and EPA approved disinfectants. During transition into the new facility, daily clean will also include equipment, furniture, etc. as these items are moved into rooms and corridors. Daily clean is performed by MEDICAL CENTER EVS.
4. Preliminary Air Monitoring – an evaluation of air quality using instruments that count particles of various size distributions in a given volume of air.
5. Red Line Protocols – the adherence to hygienic and infection prevention practices and procedures in patient care areas and support areas as if patients are occupying designated red line areas/departments
6. Single Terminal Clean – cleaning by physical removal of visible soil from objects and surfaces and disinfection by eliminating many or all pathogenic microorganisms using MEDICAL CENTER and EPA approved disinfectants. Single terminal clean (1xT) is performed by MEDICAL CENTER Environmental Services (EVS).
7. Triple Terminal Clean – conducting a Single Terminal Clean on all surfaces three sequential times. Triple terminal clean (3xT) is performed by MEDICAL CENTER EVS.
8. Viable Air Monitoring – an evaluation of air quality to determine the concentration of viable fungal spores enumerated and identified to the species levels for Aspergillus or other select fungi to the species level.

Conditions
• Air handling systems will be fully operational prior to implementation of red line protocols.
• Final HEPA filters will be installed in designated air handling units prior to commencing terminal cleaning.
• Daily and Terminal cleaning will be implemented according to an established turnover schedule agreed upon by MEDICAL CENTER Construction Coordinator, Infection Preventionist, EVS Supervisor and Contractor.
• Particle counting and/or viable air monitoring strategy will be prepared by industrial hygiene contractor and MEDICAL CENTER Infection Preventionist and will occur per the turnover schedule. It should be noted that air monitoring must begin after implementation of red line protocols and triple terminal cleaning.
• Two weeks will be allowed to remediate any air quality issues identified by air
• Construction or rework performed after terminal cleaning will be performed in accordance with Clean Construction Protocols and/or Infection Control Risk Assessment (ICRA) and approval of a Method of Procedure (MOP) as required by MEDICAL CENTER.

Reference Documents

• Infection Control Commissioning Support Document and Appendices
• Infection Control Commissioning – Cleaning and Disinfection
• Cleaning Instructions for Wipe-Down Stations
• Infection Control Commissioning Air Monitoring Strategy
Infection Control Commissioning Support Document

Ventilation System - Air Handling Units X, Y

1. System Commissioning

Have the systems been formally commissioned and independently witnessed?

<table>
<thead>
<tr>
<th>AHU#</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Name of independent body:

Date of commissioning:

Do the drainage systems on the air handling unit comply with design criteria?
Yes ___
No ___

Do volumetric airflow, air exchange rates and pressure differentials comply with design criteria?
Yes ___
No ___

Commissioning Agent responsible party

______________________________  ______________________  _________
Print Name                        Signature                  Date
2. Ventilation System Hygiene

Were all systems installed following clean duct protocols, including factory sealed, protected in transit, protected during storage, cleaned on-site during installation, protected after installation?

<table>
<thead>
<tr>
<th>AHU#</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Department from clean duct protocol (describe in detail):

General Contractor confirms that the contract work listed above has been completed as described.

General Contractor responsible party

_________________________  ___________________  ________
Print Name            Signature             Date

3. Level of filtration fitted to the air handling units

<table>
<thead>
<tr>
<th>Filter Stage</th>
<th>Manufacturer</th>
<th>MERV#</th>
<th>Model #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Proper seating and fitting of all filters        YES □  NO □
Filter bank and housing is air-tight              YES □  NO □
Outside air inlet shaft is clean and free from standing water  YES □  NO □
### Air Handling Unit Y

<table>
<thead>
<tr>
<th>Filter Stage</th>
<th>Manufacturer</th>
<th>MERV#</th>
<th>Model #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Proper seating and fitting of all filters: YES □ NO □
- Filter bank and housing is air-tight: YES □ NO □
- Outside air inlet shaft is clean and free from standing water: YES □ NO □

Commissioning Agent  
responsible party  
____________________  ____________________  __________
Print Name  Signature  Date

General Contractor confirms that the contract work listed above has been completed.  
General Contractor  
responsible party  
____________________  ____________________  __________
Print Name  Signature  Date
Room/Space Hygiene

1. **Above Ceiling Construction Clean**

   Above ceiling construction clean conducted in XXXX □ YES □ NO □

   Above ceiling construction clean documents attached in Appendix ______

2. **Room/Space Construction Clean**

   Room/space construction clean conducted in XXXX □ YES □ NO □

   Room/space construction clean documents attached in Appendix ______

3. **MEDICAL CENTER EVS Terminal and Daily Clean**

   MEDICAL CENTER Environmental Services has conducted terminal, daily and triple-
   terminal clean in XXXX □ YES □ NO □

   All cleaning was conducted in accordance with the *Infection Control Commissioning –
   Cleaning and Disinfection* protocols? □ YES □ NO □

   MEDICAL CENTER Environmental Services cleaning supervised by: ________________________________

   MEDICAL CENTER responsible party ___________________________ ___________________________ ___________________________

   Print Name ____________________________________________ Signature ____________________________ Date ___________
**Equipment Decontamination**

Equipment decontamination means that all equipment placed into the below listed areas was transferred, clean and disinfected per attached protocols.

1. **Patient Rooms – XXXX**
   
   All equipment and materials that were moved into patient rooms were moved and cleaned per MEDICAL CENTER protocols
   
   Move and clean dates: 
   Supervised by: 

   YES □   NO □

2. **Medical Supply Rooms – XXXX**
   
   All equipment and materials that were moved into medical supply rooms were moved and cleaned per MEDICAL CENTER protocols
   
   Move and clean dates: 
   Supervised by: 

   YES □   NO □

3. **Nourishment Rooms – XXXX**
   
   All equipment and materials that were moved into Nourishment Rooms were moved and cleaned per MEDICAL CENTER protocols
   
   Move and clean dates: 
   Supervised by: 

   YES □   NO □

MEDICAL CENTER responsible party

<table>
<thead>
<tr>
<th>Print Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
</table>
### TURNOVER SEQUENCE for Medium/Low Risk Areas
#### STEP-BY-STEP PROCEDURE

<table>
<thead>
<tr>
<th>Step</th>
<th>Date/Time Start</th>
<th>Date/Time Complete</th>
<th>Description</th>
<th>Action By</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>Plumbing tie-ins complete; plumbing disinfection performed</td>
<td>MEP</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>Daily water flush</td>
<td>GC</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>All supply and return air grills are securely covered. HEPA filtered negative air is still depressurizing the work area.</td>
<td>GC</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>Perform and complete a detailed construction clean – remove dust and debris from ALL surfaces</td>
<td>GC</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>Infection Prevention inspection</td>
<td>IP</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>EVS performs a triple terminal clean</td>
<td>EVS</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td>Infection prevention inspection</td>
<td>IP</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>Barriers are removed, negative air machines off, plastic over supply and return grills is removed.</td>
<td>GC</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td>EVS performs terminal clean</td>
<td>EVS</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>Testing, adjusting and balancing can occur. ICRA needed for access above the ceiling.</td>
<td>MEP</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td>EVS performs daily terminal clean each day to the date of first patient occupancy</td>
<td>EVS</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td>TAB and Commissioning complete</td>
<td>GC</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td>CO awarded</td>
<td>GC</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td>Daily water flush to the date of first patient occupancy</td>
<td>EVS</td>
<td></td>
</tr>
</tbody>
</table>
## TURNOVER SEQUENCE for Operating Rooms
### STEP-BY-STEP PROCEDURE

<table>
<thead>
<tr>
<th>Step</th>
<th>Date/Time Start</th>
<th>Date/Time Complete</th>
<th>Description</th>
<th>Action By</th>
<th>Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>Plumbing tie-ins complete; plumbing disinfection performed</td>
<td>MEP</td>
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</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>All supply and return air grills are securely covered. HEPA filtered negative air is still depressurizing the work area.</td>
<td>GC</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>Perform and complete a detailed construction clean – remove dust and debris from ALL surfaces.</td>
<td>GC</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>Infection Prevention inspection</td>
<td>IP</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>EVS performs a triple terminal clean</td>
<td>EVS</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td>Clean AHU, install new pre and final filters</td>
<td>IP</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>Infection Prevention inspection of AHU and supply air diffusers in OR – after completion of final filter installation</td>
<td>IP</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td>Conditioned supply air on; work area depressurized using construction exhaust; return air grills filtered; return air exhausted at the AHU</td>
<td>GC</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>GE install equipment with access to above ceiling</td>
<td>Vendor</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td>GE out of ceiling</td>
<td>Vendor</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td>EVS terminal clean followed by daily terminal cleaning to the date of first patient occupancy</td>
<td>EVS</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td>IP inspection of AHU, supply air diffusers and all work area</td>
<td>IP</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td>Particle counting monitoring and viable samples in all work areas – if acceptable, perform terminal clean and remove barriers (return air functional/exhaust air removed)</td>
<td>IP</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td>EVS to perform terminal clean after barriers down</td>
<td>EVS</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td>Testing, adjusting and balancing can occur. ICRA needed for access above the ceiling.</td>
<td>MEP</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td>TAB and Commissioning complete</td>
<td>GC</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td>CO awarded</td>
<td>GC</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td>Daily water flush to the date of first patient occupancy</td>
<td>EVS</td>
<td></td>
</tr>
</tbody>
</table>