Form 9: Infection Control Preventive Measures Level 4

This form is filled out by the construction planning team or designated person(s) to identify the required preventive measures for the activity described in Form 1 “Infection Control Risk Assessment and Preventive Measures Analysis”. All CSA standards identified below refer to CSA Z317.13-07 Infection control during construction, renovation and maintenance of health care facilities.

Identify the appropriate measures by marking X the check boxes.

<table>
<thead>
<tr>
<th>Project Name :</th>
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<td>Form completed by:</td>
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Preventive Measures Level 4
Facilities Maintenance and Engineering/Contractors/Project Management

**Before Construction**

- The Project Manager shall identify essential services (e.g., water supply, electricity, and ventilation systems) that could be disrupted and appropriate measures to address the disruption. [CSA:7.1.2.1]
  
  Refer to [CSA:7.1.3.1]

- Determine a safe route for the transportation of clean or sterile supplies and equipment away from the construction area.

- Establish traffic patterns for construction workers that avoid patient care areas.

- Minimize exhaust output from the elevator cab in the construction area to ensure that it is not re-circulated into the health care facility and designate an elevator that shall be used solely by construction workers.

- Establish water temperature standards for the health care facility. (see CAN/CSA-Z317.1)

- Determine whether domestic cold, hot, and recirculation water lines will be affected by the construction.

  This assessment shall include:

  I. Identifying plumbing lines that will need to be
     - Shut off or interrupted using existing valves; or
     - Isolated by additional valves.

  II. Determining the method to be used to sanitize the water lines before occupancy.

  III. Drafting the procedure to be used to sanitize the water system, including identifying the required equipment.

  IV. Determining the flow path to be used to hyper chlorinate and flush water lines affected by the construction.
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<tr>
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<tr>
<td>☐ The construction planning team shall meet to determine appropriate infection prevention measures in accordance with ICRA. [CSA:7.1.4.2]</td>
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</table>

**During Construction**

**Dust Control**

Refer to [CSA:7.2.1.1]

☐ Immediately after Type A activity (e.g., visual inspection) has been completed, close access panels and replace displaced tiles.

☐ Clean the construction area with a HEPA filter-equipped vacuum cleaner, a wet mop, or both, as necessary. Refer to [CSA:7.2.2.2]

☐ Using drop sheets;

☐ Control dust by water-misting work surfaces while cutting.

*Note: Caution should be exercised when such techniques are used on cellulose or fibre-based materials that are intended to stay in place following construction work.*

☐ Seal windows and unused doors.

☐ Seal plumbing penetrations, electrical outlets, and any other sources of potential air leaks in the construction area

☐ Seal air vents in the construction area

☐ Place a walk-off map outside the entrance to the construction area to trap dust from the equipment and shoes of personnel leaving the area, and vacuum the mat daily with a HEPA filter-equipped vacuum cleaner, as well as when the mat is visibly soiled. Walk-off mats shall be of sufficient size to ensure that constructors have to place both feet on the mat at least once on exiting the construction area. Refer to Figure 2 and 3

Refer to [CSA:7.2.3.2]

☐ Erect an impermeable dust barrier, from the floor to the underside of the deck (including the areas above false ceilings) consisting of two layers of 0.15 mm (6 mil) fire-retardant polyethylene (or an equivalent barrier) and gypsum wallboard protection approved by the construction planning team. The dust barrier shall remain in place until the project is complete and the area has been cleaned thoroughly and inspected. After construction has been completed, the dust barrier shall be removed to prevent the spread of dust and other debris particles adhering to the barrier.

☐ Use impermeable vessels constructed to contain contaminants. Such vessels shall have a monolithic (one-piece) exterior shell constructed of a minimum of 0.20 mm (8 mil) fibre-reinforced, fire-retardant polyethylene. The construction of the vessel shall allow for containment of contaminants within the vessel and have ports through which HEPA-filtered vacuum cleaners or portable construction HEPA-filtered air units can be easily attached to draw the unit under negative pressure.

☐ Vacuum mechanical and electrical systems and spaces above drop or false ceilings, if necessary.

☐ Remove protective clothing before entering patient care areas.

**Ventilation**

☐ If possible, the ventilation system should be disabled until the project has been completed. An engineering analysis shall be performed to ensure that the fan systems continue to perform their intended function and that the operation of the HVAC system is not compromised. [CSA:7.2.2.3]

Refer to [CSA:7.2.3.3]

☐ Disable the ventilation system and seal duct openings in the construction area until the project is completed.

☐ Maintain negative pressure within the construction area by using portable HEPA filter-equipped air filtration units that include pressure gauges and an alarm. Filters shall be monitored and replaced if clogged or functioning below the
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- Ensure that the air is exhausted directly outside and away from intake vents and filtered through a HEPA filter. In conditions that prohibit exhausting the exhaust outside, air may be re-circulated in accordance with [CSA:6.6, 7.2.3.6].
- Ensure that the ventilation system is functioning properly and is cleaned if contaminated by soil or dust after the construction project is complete.

**Portable construction HEPA-filtered air units**  Refer to [CSA:7.2.3.4]
- Air exhausted from construction areas shall be HEPA filtered.
- HEPA filters and pre-filters for construction air handling units shall be visually inspected by the constructor at least daily and their condition shall be documented.
- Filters shall be replaced when loaded.
- At the beginning of any Preventive Measure Level 3 or 4 construction activity, portable construction HEPA-filtered air units shall be certified. They shall be recertified at least every 12 months and the recertification shall be documented.
- Construction, maintenance, and repair area exhaust air shall not be discharged to areas occupied by Population Risk Group 3 or 4.
- Measures related to re-circulated air shall require approval from the construction planning team.
- The relative space pressures between areas occupied by Population Risk Group 3 or 4 shall be continuously monitored and alarmed.
- Where the failure of either the portable negative air unit or the exhaust fan would compromise the relative pressurization of a Population Risk Group 4 area, the systems shall be interlocked.

**Impact on the facility HVAC system**  Refer to [CSA:7.2.3.5]
- The main facility system shall be verified for operation in accordance with design during construction work.
- The health care facility and constructor shall verify the pressure relationships for critical areas near the construction area (e.g., Population Risk Group 4 areas).

**Construction air handling**  Refer to [CSA:7.3.6]
- Permanent air handling systems should not be used for exhausting air from construction or renovation work areas. Temporary ductwork may be installed for such purposes. However, it shall not connect to the facility's HVAC system.
- In cases where air cannot be exhausted directly outside (not tying into another system), exhaust air may be piped to the building exhaust system if an engineering analysis has been performed by qualified personnel to ensure that exhaust air will not be re-entrained into the occupied building and the construction planning team approves piping to the exhaust system.
- In cases where air cannot be exhausted directly outside or piped through the building exhaust system, it may be re-circulated into areas of the building occupied by Risk Group 1 or 2, if construction planning team approval is granted.
- Construction exhaust air shall not be re-circulated into building areas occupied by Risk Group 3 or 4. Refer to Use of permanent exhaust below.

**Plumbing**
- Refer to [CSA:7.2.1.2]
- Ensure that gaskets and items made of materials that support the growth of *Legionella* are not being used;
- Ensure that faucet aerators are not installed or used;
- Schedule water interruptions during periods of low user activity (e.g., evenings)
- Maintain a dry work environment and report any water leaks through walls or substructures

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- Refer to [CSA:7.2.2.4]
- Avoid using collection tanks and long pipes (which allow water to stagnate)
- Hyper chlorinate (to a minimum of 50 parts per million) or superheat (to a minimum of 70 °C) stagnant domestic water (especially if *Legionella* is already present in the domestic water supply). The water lines in the construction area and adjacent patient care areas shall be flushed before reuse
- Plumbing and HVAC systems shall be supplied, installed, and commissioned in accordance with CAN/CSA-Z317.1, CAN/CSA-Z317.2, and CAN/CSA-Z318.0

### Site maintenance

- Refer to [CSA:7.2.2.5]
- Place debris in covered containers or cover it with a moistened sheet before transporting it for disposal.
- Clean the construction area with a HEPA filter-equipped vacuum cleaner, a wet mop, or both, as necessary.
- Place supplies and equipment in covered containers during transportation through the health care facility to prevent contamination in other areas.
- Remove the debris in the evening when patients are in their rooms and visitors have left. If this is not possible, debris should be removed at the end of the workday. Exposure of the occupants of the health care facility to debris shall be minimized.
- Engineering or operations and maintenance staff in the construction area shall clean outside the work area with a HEPA filter-equipped vacuum cleaner every day or more frequently if necessary. [CSA :7.2.3.7.1]

**Use of permanent exhaust** Refer to [CSA:7.2.2.6]
- The permanent air handling system shall be used for exhausting air from the construction zone via a portable negative air unit only under the following conditions:
  - The air handling system is an exhaust system that leads directly to the outdoors.
  - An engineering analysis is performed to ensure that the exhaust system continues to perform its intended function and that the operation of the HVAC system is not compromised.
  - The operation of the exhaust fan shall be monitored and alarmed to building operations staff and alarmed in the construction zone.
  - If the conditions outlined in the above three (3) items cannot be satisfied, then the steps outlined [CSA:7.2.3.6] in shall be followed.

- Refer to [CSA: 7.2.4.2]
- In addition to the above specifications, engineering or operations and maintenance staff or constructors shall:
  - Ensure that all access be from outside the occupied areas of the health care facility, or construct anterooms at access points to the construction area if access is from within the health care facility.
  - Place a walk-off mat outside and inside the anteroom to trap dust from equipment, debris, and the shoes of personnel leaving the construction area. Walk-off mats shall be of sufficient size to ensure that constructors have to place both feet on the mat at least once on exiting the construction area.
  - Ensure that the constructors leave the construction area through the anteroom so that they can be vacuumed with a HEPA filter-equipped vacuum cleaner before leaving; or
  - Wear protective clothing that is to be removed each time they leave the construction area and before going into patient care areas.
  - Repair holes in walls within 8 hours or seal them temporarily.

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- Ensure that ventilation systems are working properly in adjacent areas.
- Carefully remove barrier walls and use short term protection to minimize environmental contamination during removal.
- Before substantial completion and occupancy, the constructor shall obtain an infection control post construction checklist from the construction planning team and, once all checklist items have been satisfied, complete the checklist and return it to the construction planning team. Detailed inspections shall be performed to confirm that all checklist items have been satisfied. [CSA: 7.2.4.8]
- During construction, events that can present infection risks occur; intervention procedures shall be implemented immediately to resolve the problems. [CSA: 7.2.4.6]

**After Construction**

- After construction has been completed, the dust barrier shall be removed in such a manner to prevent the spread of dust and other debris particles adhering to the barrier.
- The construction planning team shall review the preventative measures that were undertaken and access their effectiveness. [CSA: 7.3.1]
- The engineering or operations and maintenance staff or constructors shall ensure that the construction area is free of equipment and debris.
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<th>Environmental Services/Infection Control/Healthcare Staff</th>
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<td><strong>Before Construction</strong></td>
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<tr>
<td>☐ The health care staff, in conjunction with infection prevention and control personnel, shall collaborate to minimize occupant exposure by identifying high-risk patients who might need to be temporarily moved away from the construction area. [CSA: 7.1.2.2]</td>
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<tr>
<td><strong>During Construction</strong></td>
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<tr>
<td>☐ Report discolored water and water leaks to the maintenance and infection prevention and control departments. [CSA: 7.2.1.4]</td>
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<tr>
<td>☐ Ensure that patient care equipment and supplies are protected from dust exposure. [CSA: 7.2.3.9]</td>
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<tr>
<td><strong>Environmental Services</strong></td>
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<tr>
<td>☐ Refer to [CSA: 7.2.3.7.2]</td>
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<tr>
<td>☐ Environmental services staff shall increase the frequency of cleaning in areas adjacent to the construction area while the project is underway.</td>
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<tr>
<td>☐ Environmental services staff shall wet mop and vacuum the area with a HEPA filter-equipped vacuum cleaner as necessary and when the work is complete.</td>
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<td>☐ Environmental services staff shall wipe exposed surfaces with a hospital-grade disinfectant.</td>
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<tr>
<td>☐ Environmental services staff shall ensure that the construction area is thoroughly cleaned when work is complete. [CSA: 7.2.4.3]</td>
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<tr>
<td><strong>Infection Prevention and Control Personnel</strong></td>
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<tr>
<td>☐ Refer to [CSA: 7.2.3.8]</td>
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<tr>
<td>☐ Infection prevention and control personnel shall be responsible for collaboration with the environmental services staff to ensure that the construction area is thoroughly cleaned when work is complete.</td>
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<tr>
<td>☐ Infection prevention and control personnel shall be responsible for inspecting the integrity of the dust barriers.</td>
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<tr>
<td>☐ Infection prevention and control personnel shall, in collaboration with the facility project manager, be responsible for designating a traffic pattern for constructors that avoids patient care areas and a traffic pattern for clean or sterile supplies and equipment that avoids the construction area.</td>
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<td>☐ Infection prevention and control personnel or designate shall regularly visit the construction area to ensure that preventative measures are followed. The frequency of their visits shall be determined by the construction planning team. [CSA: 7.2.4.4]</td>
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<td>☐ Infection prevention and control measures shall be constantly monitored and shall be reviewed at every construction and project management meeting. [CSA: 7.2.4.5]</td>
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<tr>
<td><strong>Health Care Staff</strong></td>
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<tr>
<td>☐ Refer to [CSA: 7.2.3.9]</td>
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<tr>
<td>☐ The health care staff shall ensure that patient care equipment and supplies are protected from dust exposure.</td>
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<tr>
<td>☐ The health care staff shall ensure that patients do not go near the construction area.</td>
</tr>
<tr>
<td>☐ The health care staff shall ensure that staff does not visit the construction area.</td>
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<tr>
<td>☐ The health care staff shall report discoloured water and water leaks to maintenance and infection prevention and control personnel</td>
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#### Environmental Services/Infection Control/Healthcare Staff

**After Construction**

- The construction planning team shall review the preventative measures that were undertaken and assess their effectiveness. [CSA: 7.3.1]

- The construction planning team shall conduct a final inspection to ensure that the ventilation system is functioning properly in the construction area and adjacent areas. [CSA: 7.3.2.1]

- Infection prevention and control personnel shall ensure that the construction area has been thoroughly cleaned before building occupants are readmitted to the completed construction area. [CSA: 7.3.2.2]

Refer to [CSA: 7.3.2.3]

- Environmental Services and health care staff shall ensure that the construction area has been cleaned with a HEPA filtered-equipped vacuum cleaner, a wet mop, or both, as necessary, and that horizontal work surfaces have been cleaned and disinfected per Environmental Services protocols.

- Environmental Services and health care staff shall report discoloured water and water leaks to the maintenance and infection prevention and control departments.

- Before the completed construction area is occupied, any portions of the infection control plan still in effect shall be reviewed by the construction planning team. If necessary, such portions shall be incorporated into the health care facility’s ongoing operating policies and procedures. [CSA: 7.3.3]