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IX0900: Infection Control During Construction, Renovation and Maintenance in Health Care Facilities

EFFECTIVE DATE: October 2018
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1.0 PURPOSE

- Provide guidelines to reduce the risk of healthcare related infection that can be caused by the dispersal of dust, bacteria and fungi into the environment through construction, renovation and maintenance activities
- Protect patients, visitors and all healthcare providers
- Provide tools for clear communication between stakeholders
- Ensure adherence to CSA [Z317.13-17](#) and CSA [Z8000-18](#) (or latest edition)

2.0 DEFINITIONS

- **Constructor:** – A person who undertakes construction, renovation, maintenance or repair work (contractor, subcontractor, construction manager, construction worker or tradesperson)
- **Construction air handling unit (CAHU):** A machine used to move HEPA filtered air into or out of a construction site
- **Environmental containment unit (ECU):** A collapsible and portable containment unit to protect the environment from the dispersal of contaminants
- **Environmental Services:** Housekeeping, waste management, pest control, and hazardous material clean up
- **High-efficiency particulate air (HEPA) filter:** An air filter with an efficiency of 99.97% in the removal of airborne particles 0.3 µm or larger in diameter
- **Dust Barrier (hoarding):** Impermeable dust barrier from floor to the underside of the deck (including the areas above false ceilings) consisting of polyethylene and gypsum wall board
- **Multidisciplinary team (MDT):** Consists of two or more stakeholders depending on the scope of the project. These stakeholders may include representatives from healthcare providers, administration, environmental services, project manager, constructor, infection control practitioner and other individuals identified during the process

3.0 ROLES AND RESPONSIBILITIES

3.1 Multidisciplinary Team (MDT)

- 3.1.1 Determine Class of Preventative Measure as per CSA Z317.13-17 (p. 96-99)
- 3.1.2 Ensure an Infection Control Work Plan is completed. Constructor may use own or [template](#). (Appendix 2)
- 3.1.3 Organize regular project meetings to review Infection Control progress/issues as required
- 3.1.4 Ensure the infection control documents in the [appendices](#) are utilized.
- 3.1.5 Determine which projects will require one or more members to visit/review the work area on an ongoing basis to ensure adherence of preventative measures. Review contractor's [Daily Preventative Measures Checklist](#) (Appendix 3)

- 3.1.6 Has the authority to stop work activities if there is a significant safety risk due to failure of adherence to the required infection control preventative measures. If work stoppage is required, inform the project manager ASAP
 - 3.1.7 Ensure that the construction area has been terminally cleaned by environmental services before occupancy
 - 3.1.8 Ensure that infection control requirements have been met upon project completion and/or commissioning
- 3.2 Infection Prevention and Control Practitioner (ICP)**
- 3.2.1 Provide input on facility infrastructure as per the CSA Z8000-11 (or latest edition)
 - 3.2.2 Participate as a member of the MDT for preventative measures III and IV projects from planning through completion/commissioning
 - 3.2.3 Shall be notified of **ALL** work involving Population Risk Group 4
 - 3.2.4 Review [Infection Control Work Plan](#) (Appendix 2) with MDT and determine who will complete and sign off the [Infection Control Measures Permit](#) (Appendix 1) prior to project commencement
 - 3.2.5 Provide education for Plant Services and external contractors. Link to PHSA online education module [Infection Control During Construction, Renovation and Maintenance](#)
 - 3.2.6 Monitor for construction related infections during and immediately after construction-related activities
- 3.3 Project Manager**
- 3.3.1 Participates as a member of the MDT
 - 3.3.2 Act as a liaison between the Constructor, ICP/MDT
 - 3.3.3 Must inform ICP/MDT of any changes to the scope of work or preventative measures
- 3.4 Constructor** Complete section 3 of the [Infection Control Measures Permit](#) for levels III and IV projects (Appendix 1). The MDT to determine Preventative Measures Level
- 3.4.2 Preventative Measure I and II do not require an IC permit, however appropriate preventative measures shall still be utilized per CSA Z317.13-17
 - 3.4.3 Submit the [Infection Control Work Plan](#) (Appendix 2) to the MDT for approval prior to commencement of work (including initiation of hoarding process)
 - 3.4.4 For ceiling lift and cable pulls installations only, complete the specific standardized permit: [Ceiling Lift Permit](#) (Appendix 5) or [Cable Pull Permit](#) (Appendix 6)
 - 3.4.5 Provide MDT a minimum of two business days' notice to complete the [Infection Control Measures Permit](#)
 - 3.4.6 Prior approval is required from the MDT for any changes to the Infection Control Measures Permit
 - 3.4.7 Demolition/construction/renovation can commence once the Infection Control Measures Permit has been signed by the MDT and posted at the construction site. The permit must remain posted for the duration of the project
 - 3.4.8 Complete the [Daily Preventative Measures Checklist](#) (Appendix 3) and post outside the construction zone. Frequency of checks to be determined by the MDT
 - 3.4.9 As per CSA Z317.13-17 perform site maintenance and post construction cleans
 - 3.4.10 [Hand hygiene practices](#) shall be followed per Appendix 4

3.5 Environmental Services

- 3.5.1 Participate as a member of the MDT
- 3.5.2 During construction increase cleaning adjacent to the construction site
- 3.5.3 Terminally clean construction area as directed by MDT before any occupancy of staff and/or patients (more than one terminal clean maybe required)

4.0 REFERENCES

- 4.1 Canadian Standards Association (CSA) Standard, Canadian Health Care Facilities, Standards Update Service Z8000-18 (July 2018)
- 4.2 Canadian Standards Association (CSA) Standard Infection control during construction, renovation, and maintenance of health care facilities, Standards Update Service Z317.13-17 (January 2017)
- 4.3 Infection Control during Construction, Renovation and Maintenance, Online PHSA Learning Hub, Fraser Health

5.0 APPENDICES

- [Appendix 1](#) Infection Control Measures [Permit](#)
- [Appendix 2](#) Infection Control Work Plan [Template](#)
- [Appendix 3](#) Daily Preventative Measures [Checklist](#) (for constructors)
- [Appendix 4](#) Hand Hygiene [for Constructors](#)
- [Appendix 5](#) Standard [Permit for Ceiling Lift Installation](#)
- [Appendix 6](#) Standard [Permit for Cable Pulls](#)

Appendix 1

Infection Control Measures PERMIT

Section 1: (to be completed by a member of the MDT)

Project name/location:	Project Manager/phone:
Project start date:	Project completion date:
Constructor performing work:	Clinical Representative/phone:

Section 2: Preventative Measures Table (to be completed by a member of the MDT)

Population Risk Group	Construction Level			
	Type A	Type B	Type C	Type D
Group 1	I <input type="checkbox"/>	*II <input type="checkbox"/>	II <input type="checkbox"/>	III <input type="checkbox"/> IV <input type="checkbox"/>
Group 2	I <input type="checkbox"/>	*II <input type="checkbox"/>	III <input type="checkbox"/>	IV <input type="checkbox"/>
Group 3	I <input type="checkbox"/>	*II <input type="checkbox"/>	III <input type="checkbox"/>	IV <input type="checkbox"/>
Group 4	I-III Contact ICP <input type="checkbox"/>	*II <input type="checkbox"/> IV <input type="checkbox"/>	III <input type="checkbox"/> IV <input type="checkbox"/>	IV <input type="checkbox"/>

*Denotes where a lower level might be used in accordance with Z317.13-17 Clause 7.5

Section 3: Infection Control Work Plan (completed by Constructor) If using the optional [template](#), paste details below

SAMPLE

Signature of constructor:	Position: email	Date:
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Section 4: (to be completed by MDT)

- Infection control plan reviewed and accepted
- Work plan attached to permit
- Visual inspection of hoarding if feasible (photos may be acceptable)

MDT designate signature/electronic signature

Date:

Post completed permit and work plan at construction site entrance

Type of Construction Activity

<input type="checkbox"/> Type A Inspection and Non-Invasive Activities. Includes, but is not limited to,	a) activities that involve a single controlled opening in a wall or ceiling for minor work or visual inspection, that is accessed by <ol style="list-style-type: none"> removing no more than one ceiling tile; or opening of an access panel on a wall or ceiling; b) painting (but not sanding) and wall covering; c) electrical trim work; d) minor plumbing work that disrupt the water supply to the localized patient care area (i.e. one room) for less than 15 min e) other maintenance activities that do not generate dust or require cutting of walls or access to ceilings other than for visual inspection
<input type="checkbox"/> Type B Small scale, short duration (e.g. less than 2h) activities that create minimal dust. Includes, but is not limited to,	a) activities involving access to and use of chase spaces; b) cutting a small opening in a contained space where dust migration can be controlled, e.g., cutting of walls or ceilings to provide an access point for installing or repairing minor electrical work, ventilation components, telephone wires or computer cables; c) sanding or repair of a small area of a wall d) plumbing work that disrupts the water supply of more than one patient care area for less than 30 minutes
<input type="checkbox"/> Type C Activities that generate a moderate to high level of dust, cause a moderate service disruption, require demolition, require removal of a fixed facility component (e.g., a sink) or assembly (e.g. countertop, cupboard) or cannot be completed in a single work shift. Includes, but is not limited to,	a) activities that require sanding of a wall in preparation for painting or wall covering b) removal of floor coverings, ceiling tiles and casework c) new wall construction d) minor ductwork e) electrical work above ceilings f) major cabling activities g) plumbing work that disrupts the water supply of more than one patient care area for more than 30 min, but less than 1 h.
<input type="checkbox"/> Type D Activities that generate high levels of dust, activities that necessitate significant service disruptions and major demolition and construction activities requiring consecutive work shifts to complete. Includes but is not limited to,	a) soil excavation; b) new construction that requires consecutive work shifts to complete; c) activities that involve heavy demolition or removal of a complete cabling system; d) plumbing work that disrupts the water supply of more than one patient care area (i.e. two or more rooms) for 1 h or more.

Population Risk Group

<input type="checkbox"/> Group 1	<ul style="list-style-type: none"> • Office Areas • Unoccupied wards 	<ul style="list-style-type: none"> • Public areas • Laundry and Soiled linen sorting or storage areas 	<ul style="list-style-type: none"> • Physical plant workshops • Housekeeping room and closets
<input type="checkbox"/> Group 2	<ul style="list-style-type: none"> • Patient care areas, unless listed in group 3 or 4 • Outpatient clinics (except oncology and surgery) 	<ul style="list-style-type: none"> • Admission and discharge units • Autopsy and morgue • Waiting rooms 	<ul style="list-style-type: none"> • Occupational therapy and Physical therapy areas remote from patient care areas
<input type="checkbox"/> Group 3	<ul style="list-style-type: none"> • Emergency (except trauma rooms) • Diagnostic Imaging • Labour and birthing rooms (without OR capability) • Nurseries for healthy newborns • Respiratory therapy 	<ul style="list-style-type: none"> • Nuclear medicine • Hydrotherapy • Echocardiography • Laboratories • Clean linen handling and storage areas • Food preparation, serving and dining areas 	<ul style="list-style-type: none"> • General medical and surgical wards (includes all areas including soiled and clean utility rooms) • Pediatric units • Geriatric units • Long-term care units
<input type="checkbox"/> Group 4	<ul style="list-style-type: none"> • Intensive care units (ICU, PICU, NICU, etc.) • Operating rooms (including prep, induction, PACU and scrub areas) • Anesthesia storage areas and workrooms • Oncology units and outpatient clinics • Transplant units and outpatient clinics • Inpatient units and outpatient clinics for patients with AIDS or other immunodeficiency diseases 	<ul style="list-style-type: none"> • Dialysis units • Critical care nurseries • Labour and delivery operating rooms • Cardiac catheterization and angiography • Interventional radiology • Cardiovascular and cardiology patient areas • Endoscopy • Pharmacy admixture rooms • Medical device reprocessing areas (wherever located) • Central sterile supply 	<ul style="list-style-type: none"> • Clean and sterile storage • Bum care units • Animal rooms • Trauma rooms • Protective isolation rooms • Tissue culture laboratories • Bronchoscopy • Cystoscopy • Pacemaker insertion rooms • Dental procedure rooms

Appendix 2

Infection Control Work Plan (Template)

To be Completed by Constructor	MDT Sign Off/Date
1. Provide a description of work being performed	
2. Provide specific plans for containment utilizing Z317.13-17 (describe and/ or provide diagram) <ul style="list-style-type: none"> a. Construction Air Handling Unit. Negative pressure to be maintained at 7.5Pa/0.03wc b. Method used to continuously monitor air flow (magnehelic gauge or electronic monitor) c. Dust containment (hoarding) wall composition and locations d. Sticky mat location(s) e. Anteroom (if required) 	
3. Provide specific plans for traffic flow and debris removal (in consultation with MDT)	
4. Determine education requirements for workers (resources are IH Infection Control, CSA Z317.13.17,PHSA online education module Infection Control during Construction, Renovation and Maintenance)	
5. Provide a daily preventative measures monitoring plan (may use Appendix 3)	
6. Provide a cleaning plan (daily and post construction)	

Submit IC Work Plan to the MDT for Approval

Appendix 3

Daily Preventative Measures Checklist (Sample Template)

To be used by Constructor

Date:	Time checked #1	Initial	Time checked #2	Initial	Time checked #3	Initial	Time checked #4	Initial	Time checked #5	Initial
Sticky Mat										
Negative air Record reading										
Hoarding										
Cleaning										
Date:	Time checked #1	Initial	Time checked #2	Initial	Time checked #3	Initial	Time checked #4	Initial	Time checked #5	Initial
Sticky Mat										
Negative air record reading										
Hoarding										
Cleaning										
Date:	Time checked #1	Initial	Time checked #2	Initial	Time checked #3	Initial	Time checked #4	Initial	Time checked #5	Initial
Sticky Mat										
Negative air record reading										
Hoarding										
Cleaning										
Date:	Time checked #1	Initial	Time checked #2	Initial	Time checked #3	Initial	Time checked #4	Initial	Time checked #5	Initial
Sticky Mat										
Negative air record reading										
Hoarding										
Cleaning										

Post at Construction Site

Appendix 4



HAND HYGIENE:

FOR CONSTRUCTION, RENOVATION AND MAINTENANCE ACTIVITIES

Last Reviewed August 2016

Why?

- Interior Health recognizes that hand hygiene is considered the most important and effective infection prevention and control measure to prevent the spread of Healthcare Associated Infections (HAIs).
- In Canada, 8,000 to 12,000 people die every year from HAIs. Global research indicates that hand hygiene improvements could potentially reduce HAI rates by 30 – 50%.
- 80% of common infections are spread by dirty hands. You can pick up and spread germs! Think about the things you have touched today....germs can stay alive on surfaces a long period of time.

When?

Before:

- Entering a facility, ward, patient room, or service room
- Glove use
- Eating

After:

- Exiting a facility, ward, patient room, or service room
- Glove use
- Contact with soiled equipment (toilet, hopper, Deko, Vernacare, etc.)
- Using the toilet
- Any time your hands are visibly dirty (dry wall dust, paint, grime, etc.)

How?

Alcohol Based Hand Rub (Quick and Easy)

- Press one full pump in the palm of your hand
- Rub hands together—don't forget the back of hands, between fingers, thumbs and wrist
- Rub until dry

Soap and Water (Visibly dirty hands)

- Wet hand with warm water
- Apply soap (1-2 squirts)
- Lather for 15 seconds—don't forget the back of hands, between fingers, thumbs and wrist
- Rinse well
- Pat hands dry with paper towel
- Turn tap off and open door with paper towel
- Use lotion to prevent dryness

YOU WILL TOUCH SOMEONE'S LIFE TODAY... DO IT WITH CLEAN HANDS!

Appendix 5

Standard Permit for T-Bar/Hard Ceiling Lift Installation

Section 1: (To be completed by MDT)	
Project name/location	Project Manager/phone
Project start date	Estimated completion date
Constructor performing work	Clinical Representative
Preventative Measures	
For Population Risk Groups 2, 3 or 4 follow preventative measures below;	
Section 2: Infection Control Work Plan for Constructor	
<ul style="list-style-type: none"> <input type="checkbox"/> Constructor to determine traffic route for construction material, workers and debris (in consultation with MDT) <input type="checkbox"/> Empty room of patients, equipment and supplies <input type="checkbox"/> Equipment and supplies that cannot be removed should be covered with polyurethane <input type="checkbox"/> Seal area with 2 layers 6 ml fire retardant polyurethane. If walls do not extend to true ceiling, hoarding shall go to underside of the deck/true ceiling <input type="checkbox"/> All intake and exhaust ducts in work zone to be sealed with polyurethane <input type="checkbox"/> Negative pressure (7.5 Pa) with HEPA unit vented directly outdoors. Use of a dedicated existing exhaust must be approved by Plant Services and must not be part of a plenary system. <i>*Under certain circumstances MDT may approve venting of air into an area of the building occupied only by Risk group 1 or 2</i> <input type="checkbox"/> Place one sticky mat at the entrance and exit to the construction area <input type="checkbox"/> All workers must enter and exit work site clean and free of debris – utilize HEPA vacuum and/or coveralls <input type="checkbox"/> Constructor must maintain clean worksite <input type="checkbox"/> All supplies shall be clean and covered prior to entering the work site <input type="checkbox"/> Debris to be removed in a clean covered cart <i>* Cart wheels must be clean prior to entering and upon exiting work site</i> <input type="checkbox"/> Constructor is responsible for completing the Daily Preventative Checklist (Appendix 3) and posting it at the construction site entrance <input type="checkbox"/> Do not remove dust barriers until project is complete, inspected by MDT member and cleaned by housekeeping <input type="checkbox"/> Remove dust barrier carefully by; vacuuming surfaces with a HEPA filtered vacuum, roll up poly (construction side in) <input type="checkbox"/> Once hoarding is removed housekeeping should clean floor where hoarding was located 	
Signature of person responsible for ensuring plan is followed as above:	Date:
Section 3: (To be completed by ICP/MDT)	
<input type="checkbox"/> Visual inspection of hoarding if feasible (photos may be acceptable)	
ICP/MDT signature/electronic signature:	Date

Signed permit must be posted at the construction site entrance

Appendix 6

Standard Permit for Cable Pulls

Section 1 (To be completed by MDT)	
Project name/location	Project Manager/phone
Project start date	Estimated completion date
Constructor performing work	Clinical Representative
Preventative Measures – Modified III	

Section 2: Infection Control Work Plan for Constructor	
For Population Risk Groups 2, 3, and 4 – the Preventative Measure is a Modified III (negative pressure is not routinely required)	
<ul style="list-style-type: none"> <input type="checkbox"/> All materials/equipment entering the facility will be clean and dry <input type="checkbox"/> There shall be no patients in the room <input type="checkbox"/> Move patient/clinical equipment and supplies away from the ECU <input type="checkbox"/> The area under each open tile must be contained using a clean ECU (environmental containment unit) or alternative (e.g. poly with frame) - Be sure that containment unit is snug to ceiling; if using alternative ensure sealed at base and ceiling <input type="checkbox"/> HEPA vacuum shall be applied continuously at the point of removal of ceiling tile or hatch <input type="checkbox"/> HEPA vacuum the tile then remove one ceiling tile at a time <input type="checkbox"/> HEPA vacuum area in ceiling where work is to be done <input type="checkbox"/> Complete line/cable pulls <input type="checkbox"/> Replace ceiling tile then HEPA vacuum ceiling tile <input type="checkbox"/> HEPA vacuum floor beneath work area <input type="checkbox"/> Constructors clothes shall be HEPA vacuumed before exiting the containment unit <input type="checkbox"/> Any debris to be removed from work area is placed in a clean covered bin <input type="checkbox"/> ECU shall be cleaned by the constructor prior to moving on to the next job <input type="checkbox"/> Housekeeping to clean area once work is complete – project manager to coordinator with Housekeeping 	
Signature of person responsible for ensuring plan is followed as above:	Date:

Section 3 (To be completed by ICP/MDT)	
<input type="checkbox"/> Visual inspection of hoarding if feasible (photos may be acceptable)	
ICP/MDT signature/electronic signature	Date:

Signed permit must be posted at the construction site entrance