

COMBINED POLICY and PROCEDURE: Infection Prevention and Control during Construction, Renovation, and Maintenance

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Approved by: Gail Johnson, VP Patient Care Services and Chief Nursing Executive Rod Carroll, VP HR and Support Services	Signature (s) _____ _____

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Policy Statement

Guelph General Hospital (GGH) will minimize the risk of hospital-acquired infections and/or illness related to construction, renovation, and maintenance by utilizing appropriate preventative measures in accordance with Canadian Safety Association (CSA) Standard Z317.13-17.

Risk

Construction, renovation, and maintenance activities can disperse dust and fungal particulate including spores (e.g., *Aspergillus*). Disruptions to water systems during construction, renovation and maintenance can also create environments for waterborne micro-organisms like *Legionella* to amplify and disperse. Construction-related infections have been reported and can cause serious illness and death even when recognized and properly treated. It is essential that early planning in construction and renovation projects integrate infection prevention and control (IPAC) preventative measures throughout each stage of the project.

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Definitions

Construction or renovation: major and minor facility activities that disturb or modify facility structures and systems.

Maintenance: a type of construction activity conducted to preserve the condition and functionality of a physical element of a health care facility.

New Construction: a project intended to produce a complete health care facility, or a new section of an existing facility, that did not exist prior to the project.

Standards

1. Contractors, physicians, and staff working at GGH are obliged to comply with this policy.
2. The Population Risk Group (Appendix B) and Construction Activity Type (Appendix C) as defined by the hospital will be used to complete the Preventative Measures Analysis (Appendix A) to identify IPAC measures to be followed by the Contractor.

Responsibilities/Accountabilities

GGH requires any contractor, subcontractor, material supplier, vendors, employee, or agents to be bound by the requirements as laid out in CSA Z317.13-17.

The Director of Facilities or designate will notify a member of the IPAC team (i.e., IPAC professional (ICP)), Employee Health Services (EHS), and Health and Safety Officer (HSO) of all new construction and/or renovation projects and ensure that an ICP, and HSO are included as a member of the multidisciplinary team from the early planning of construction, renovation, and maintenance projects, and facility design projects, and throughout the project until completed.

For work facilitated under the control of the Facilities Department, the Director of Facilities or designate and the ICP will collaboratively determine the Infection Control Procedure Classification.

A member of the Facilities Team is responsible for ensuring compliance with IPAC standards throughout construction/renovation/ maintenance activities.

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The ICP will perform periodic auditing and monitoring during construction activities including, where appropriate, final review before the area is commissioned. If conditions indicate a higher than baseline dust/contaminant level and/or the negative pressure of the construction area rises above -7.5 Pascals, the Director of Facilities and the ICP will be notified. The contractor will be notified to correct conditions immediately or a stop work order will be issued.

Directors procuring their own maintenance or renovation activities (e.g., Information Technology) where work required is substantial (e.g., creates dust, vibration, involves removal of ceiling tiles, etc.) are responsible for consulting in advance with an ICP to determine the infection control measures required in accordance with CSA Z317.13-17.

The Director Facilities and/or ICP may modify performance requirements for unforeseen changes in risk categories. Any modifications by GGH's personnel do not relieve the Contractor of compliance with appropriate IPAC procedures.

Procedure

1. Establish the multidisciplinary team (MDT) as indicated by the construction, renovation, or maintenance project. Membership may include, but is not limited to: Facilities, Construction/Architect/Engineer, Environmental Services, Medical Device Reprocessing Department (MDRD), ICP, EHS, HSO, Administration, Clinical Unit staff, and Director(s) of areas impacted.
2. Perform an infection control risk assessment for the intended activity by considering population risk group within or adjacent to the construction area, the type of construction activity, and the likelihood of dust generation, water stagnation, impact on ventilation, disturbance of contaminated materials, incursions to water supply/water repressurization, materials to be used/discarded, entry of vermin, and clean up and sanitation.
3. Using Appendix A, determine the Preventative Measures Class (I, II, III, or IV) by matching the Population Risk Group category (Appendix B) with the Construction Activity Type (Appendix C). Record the classification and develop an infection prevention plan that is consistent with CSA Z317.13-17 that incorporates the appropriate measures required to contain contaminants and potential pathogens. The procedure classification dictates the preventative measures required.

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4. Agree on meeting schedule/frequency for the MDT as determined by the nature and/or scope of the construction, renovation, or maintenance project. The MDT will need to discuss and include in the plan: construction materials and timelines, routes for bringing in construction materials and removing construction waste.
5. The Contractor/Facilities is responsible for completing an initial *construction clean* once the construction or renovation project is complete. That includes, but is not limited to, removing debris, vacuuming, and an initial removal of environmental soiling such as dust. Environmental Services (ES) must complete a *hospital clean* before the area can be commissioned for use. In cases of a maintenance project, depending on the nature of the maintenance, ES may be required to clean the area.
6. The hospital has the authority to issue a stop work order in the event the ICP has a concern(s) or for non-compliance with agreed-upon plans. Deviation from the plan for any reason requires ICP consultation. Remediation must be complete before activity restarts.

Limits/Special Considerations

Due to the possible variations in nature and scope of potential construction, renovation, or maintenance projects, it is not possible for this document to be all inclusive. This document addresses fundamental principles related to construction, renovation, and maintenance. For further direction, refer to CSA Standard Z317.13-17, available on the GGH IPAC Intranet webpage or can be accessed on the hospital-wide shared drive, Interdepartmental Shared in the folder entitled "Planning Renos_Check Here First."

Remedial Measures

1. Leaks and flooding
 - a. Report all water losses to the Director of the affected area(s) immediately.
 - b. Report the appearance of all discoloured water.
 - c. Facilities are to investigate water damage; define, locate, and control the source of the leak, record the extent of the water damage, implement and monitor remedial measures.

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- d. Multidisciplinary Team onsite are responsible for classifying mould remediation level and managing infection risks, and provide guidance on remedial measures as applicable.

The level of remediation required depends on the source (category) of the water loss, type of surfaces impacted and the location. Use moisture meters or infrared camera to determine the extent of impacts or damage to porous and semi-porous surfaces. Air sampling may be required to determine impacts to air quality associated with mould amplification.

Materials need to be removed or decontaminated/structurally dried within 48 hours of water damage. Surfaces should be retested with a moisture meter to determine that drying has been achieved.

Saturated areas require removal and disposal of a minimum of 30 centimeters beyond the perimeter of the water/moisture impacts if structural drying is not achieved within 48 hours. Similarly, furnishings that contain particleboard, presswood, or chipboard should be disposed of if they are saturated.

Chlorine-based misting or 1:9 dilution of copper-8-quiolinolate or use of an effective alternative disinfectant may be indicated. Effectively seal the area and initiate negative pressure containment as indicated.

Construction air-handling units (CAHU) with HEPA filters may be needed during remediation and repair work to control dust migration and reduce airborne fungal contaminants. Any HEPA filtered CAHUs or vacuums used shall be seal-checked and certified by a qualified third party provider prior to use.

Additional Environmental Services cleaning measures may be required. Following extensive damage, clean up should include 1:200 trisodium phosphate detergent followed by 1:10 bleach or effective alternative disinfectant. Only HEPA filtered vacuums and/or damp wiping techniques should be used during clean up. No dry wiping or sweeping is to be conducted.

2. Containment of contaminants

Conduct all investigations, removal, and remedial procedures in a manner that does not disperse dust/spores or generate aerosols.

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Identify materials that contain asbestos, lead, mercury or other Designated Substances as listed in Ontario Regulation 490/09 prior to removal.

Use misting or other dust suppression methods before contaminated materials are removed or disturbed.

Contaminated areas must be isolated from non-contaminated areas. Effectively seal/isolate ductwork and other openings to be dust-tight.

Area should be enclosed and under negative pressure. Portable exhausts or HEPA filter equipped air cleaners may be required. CAHU exhaust venting locations shall be reviewed by the multidisciplinary team prior to initiation.

Equip staff with appropriate personal protective equipment (PPE) and health and safety apparatus; staff shall follow decontamination measures regarding their tools, equipment, waste materials and PPE when leaving the contaminated area to prevent contaminants from dispersing.

3. Corrective measures

When moisture damage has occurred and mold or bacterial growth is not detected, immediate action must be taken to prevent further damage.

Perform risk assessment to determine level of damage and action indicated. Assess porous and semi-porous materials; remove and dry if moist or discard if material will support mold growth.

The underlying cause of the water loss/moisture intrusion must be corrected to prevent future/potential mould amplification.

4. Abatement measures

Work should always be conducted by a trained and qualified abatement contractor in a manner consistent with CSA Z317.13-17.

Contaminated materials should be removed in a manner that limits dust generation and the release of mould spores. Similarly wastewater or items impacted by contaminated water should be handled in a manner that limits the transference of bacteria and prevents it from becoming airborne.

Air quality testing should be performed when indicated by the ICP or EHS.

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Wrap removed materials in 0.15 mm (6 mil) of polyethylene and sealed with tape, or placed in an appropriate sealed dust-tight waste container. All waste containers are to be cleaned by damp wiping and or HEPA equipped vacuum prior to leaving the work area. Non removable materials should be vacuumed with a HEPA filtered vacuum and/or wet wiped with a neutral disinfectant (as appropriate).

If there is a risk of contamination in the ductwork to and from the affected area, the ductwork shall be cleaned using a HEPA filtered vacuum and/or wet wiped. All downline filters should be replaced prior to re-occupancy.

All areas including concealed areas shall be inspected before being recommissioned.

5. Plumbing

The water system should be flushed, disinfected or superheated following construction or after a significant water system shutdown.

Water lines in construction areas and adjacent areas will be flushed before reuse. It is recommended that potable and critical systems be flushed for a minimum of ten minutes at each distal site.

Surveillance for *Legionella* or other waterborne micro-organisms shall be undertaken before, during and after construction if a clinical need has been established by the infection prevention and control professional.

*Note: major disruption is defined as:

“Plumbing work that disrupts the water supply of more than one patient care area (2 or more rooms) for one hour or more.”

Construction Materials

The link between contamination of the environment and acquisition of infections requires that selection of materials is based on their ability to resist or prevent microbial growth and spread.

Materials should be smooth and non-porous, and able to withstand frequent cleaning and disinfection with a hospital-grade disinfectant, and high humidity levels.

Materials should be durable, scale, and corrosion resistant, and not be subject to moisture damage.

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Wall surfaces should be smooth and painted. Vinyl wall coverings should not be used.

Operating rooms, MDRD, and procedure rooms require smooth finishes free of fissures, crevices, and open joints.

Smooth tile can be used with an epoxy-based grout.

Avoid carpeting in clinical spaces.

Reference/Supporting Materials

Infection control during construction, renovation, and maintenance of health care facilities, CAN/CSA-Z317.13-17, CSA Group, January 2017.

St. Mary's General Hospital (2015). Policy: Infection prevention and control in construction, renovation, and maintenance.

Keywords

Construction, renovation, maintenance, infection prevention and control, *legionella*,

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Appendix A
Preventative Measures Analysis

CONSTRUCTION ACTIVITY				
Risk Group	Type A	Type B	Type C	Type D
Lowest	I	II*	II	III / IV
Medium	I	II*	III	IV
Medium High	I	III*	III / IV	IV
High	I-III	LII / IV*	III / IV	IV

*Denotes where a lower level of preventative measures may be permitted in accordance with clause 7.4 of CSA Standard Z317.13-17

To determine the procedure classification, the construction activity type (Appendix C) is matched with the infection control risk group (Appendix B) in the matrix above.

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Appendix B
Population Risk Groups

Population risk group	Typical areas
Group 1 Lowest risk	Office areas Unoccupied wards Public areas Laundry and soiled linen sorting or storage areas Physical plant workshops Housekeeping rooms and closets
Group 2 Medium risk	Patient care areas, unless listed in Group 3 or Group 4 Outpatient clinics (except oncology and surgery) Admission and discharge units Waiting rooms Autopsy and morgue Occupational therapy and physical therapy areas remote from patient care areas
Group 3 Medium to high risk	Emergency (except trauma rooms) Diagnostic imaging Labour and birthing rooms (without OR capability) Nurseries for healthy newborns Nuclear medicine Hydrotherapy Echocardiography Laboratories General medical and surgical wards or units (includes all areas including soiled and clean utility rooms) Pediatric units Geriatric units Long-term care units Food preparation, serving, and dining areas Respiratory therapy Clean linen handling and storage areas

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Population risk group	Typical areas
<p>Group 4 Highest risk</p>	<p>Intensive care units (ICU, PICU, NICU, etc.)</p> <p>Operating rooms (including prep, induction, post-anaesthetic care unit (PACU), and scrub areas)</p> <p>Anaesthesia storage areas and workrooms</p> <p>Oncology units and outpatient clinics</p> <p>Transplant units and outpatient clinics</p> <p>Inpatient units and outpatient clinics for patients with AIDS or other immunodeficiency diseases</p> <p>Dialysis units</p> <p>Critical care nurseries</p> <p>Labour and delivery operating rooms</p> <p>Cardiac catheterization and angiography</p> <p>Interventional radiology</p> <p>Diagnostic Imaging</p> <p>Cardiovascular and cardiology patient areas</p> <p>Endoscopy</p> <p>Pharmacy admixture rooms</p> <p>Medical device reprocessing areas (wherever located)</p> <p>Central sterile supply</p> <p>Clean and sterile storage</p> <p>Burn care units</p> <p>Animal rooms</p> <p>Trauma rooms</p> <p>Protective isolation rooms</p> <p>Tissue culture laboratories</p> <p>Bronchoscopy</p> <p>Cystoscopy</p> <p>Pacemaker insertion rooms</p> <p>Dental procedure rooms</p>

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Appendix C
Construction Activity Type

Construction activity type	Description
Type A	<p>Inspection and non-invasive activities. These include, but are not limited to,</p> <ul style="list-style-type: none"> a) activities that involve a single controlled opening in a wall or ceiling for minor work or visual inspection, that is accessed by <ul style="list-style-type: none"> i) removing no more than one ceiling tile; or ii) 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 disrupts the water supply to a localized patient care area (i.e., one room) for less than 15 min; and e) other maintenance activities that do not generate dust or require cutting of walls or access to ceilings (other than as specified in item (a) above).
Type B	<p>Small-scale, short-duration (e.g., less than 2 h) activities that create minimal dust. These include, but are not limited to,</p> <ul style="list-style-type: none"> 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; and d) plumbing work that disrupts the water supply of one or more patient care areas for less than 30 min.
Type C	<p>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., a countertop or cupboard), or cannot be completed in a single work shift. These include, but are not limited to,</p> <ul style="list-style-type: none"> 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; and g) plumbing work that disrupts the water supply of one or more patient care areas for more than 30 min, but less than 1 h.
Type D	<p>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. These include, but are not limited to,</p> <ul style="list-style-type: none"> 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; or 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.



Infection Prevention and Control during Construction, Renovation, and Maintenance
Policy and Procedure

STATEMENT OF UNDERSTANDING

I, _____ representing _____

Contractor have reviewed and understand the Guelph General Hospital's Construction Policy/Procedure and agree to abide by the requirements of the policy.

Non-compliance with any or all of these procedures or regulations will result in immediate work stoppage. Work will not commence until a resolution has been determined by the Directors, Engineering & Infection Prevention Control or designate(s).

Signature: _____
(Contractor)

Signature: _____
(Hospital)

Date: _____



**Infection Prevention and Control
Preventative Measures Analysis Form CSA Z317.13-12
for Hospital Construction and Renovation Projects**

Project Information:

Project Name:	
Project Location:	
Project Start:	
Project Completion:	
Project Manager:	
IPAC Representative:	

Brief description of construction or renovation project:

Preventative Measures Analysis:

Population Risk Group (1,2,3, or 4):	
Construction Area:	
Area above construction space:	
Area below construction Space:	
Area(s) laterally adjacent to construction space:	
Other areas potentially impacted (connected by ducts, conduits, etc):	
Construction Activity Type (A,B,C, or D)	
PREVENTATIVE MEASURE (I,II,III, or IV):	

Approvals:

Multidisciplinary Team Members	Name	Signature	Date
Project Manager			
Contractor:			
IPAC Representative			
Engineering Representative			

Drawings Attached? Yes / No

Any Additional Information