


Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>			
Category:	Infection Control	Policy Number:	IPAC-610	
Sub-Category:	Physical Plant and the Environment	Pages:	Page 1 of 25	
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000	
Owner:	Program Manager	Last Approved:	14-July-2022	

POLICY STATEMENT

Construction and renovation projects in healthcare facilities may pose a health risk to patients, staff and visitors. Policies and standards have been developed to prevent the exposure of patients, staff and visitors to infectious agents (fungal, bacterial and viral) potentially transmitted by air, soil, water sources and dust during construction, maintenance, and renovation projects in patient care areas and patient care–related areas in health care facilities. There are Canadian Standards that address Infection Prevention and Control (IPAC) during construction, maintenance and renovation. IPAC concepts must also be incorporated into design, to facilitate desired practices by the healthcare worker and to provide a safe environment.

APPLICATION

This policy applies to all GBHS staff, physicians, volunteers and contractors.

DEFINITION OF TERMS

Adjacent Areas - All of the areas surrounding an area where construction, renovation, or maintenance work is occurring, include, where applicable, all or part of the floors above and below.

Anteroom - A small room that is immediately adjacent to or within a construction area and is to be used by constructors for purposes such as storage or removal of protective clothing, cleaning of debris-removal containers, and/or removal of contaminants from footwear. Ideally, should be large enough to provide an airlock between construction zone and surrounding areas while delivering/removing construction material to/from construction site.

Bacterial Spores - Resistant cells produced by bacteria to withstand extreme heat, cold or dehydration.


Biomedical Waste - Waste that is limited to human and animal anatomical waste, non-anatomical waste, cytotoxic waste and other waste that requires special handling as determined by the generator.

Constructor - Person who undertakes a project for an owner and includes an owner who undertakes all or part of a project by himself or by more than one employer.

Construction/Renovation/Maintenance - Major and minor facility activities that disturb or modify facility structures and systems. This also includes repair work.

Exposure - Contact with an infected person or infectious agent.

Fungi - A diverse group of organisms that includes yeasts, moulds (fungi capable of producing mould) and mushrooms. They are found in soil, water and air and, lacking chlorophyll, derive nourishment from breaking down organic matter. Many type of fungi reproduce by means of

Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>			
Category:	Infection Control	Policy Number:	IPAC-610	
Sub-Category:	Physical Plant and the Environment	Pages:	Page 2 of 25	
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000	
Owner:	Program Manager	Last Approved:	14-July-2022	

spores that are readily dispersed in the air. Spores may remain dormant but viable for months. E.g. Aspergillus.

High-Efficiency Particulate Air (HEPA) Filter - An air filter with an efficiency of 99.97% in the removal of airborne particles 0.3um or larger in diameter.

HVAC - Heating, ventilation and air conditioning.

Immunocompromised - Immune system that is not capable of a normal, full reaction to pathogens or tissue damage, as the result of a disease.

IPAC - Infection Prevention and Control.

Infection Prevention and Control Professional (ICP): A GBHS Corporate Infection Prevention and Control Practitioner who facilitates communication, guidelines, education, risk assessment, surveillance, evaluation, and documentation to support this policy.

Legionella - A genus of gram-negative bacteria found in soil, water and dust. (Legionnaires' disease - a pneumonia that is caused by Legionella and is usually acquired by inhalation of contaminated aerosols).


Multidisciplinary Infection Control Construction Team (ICCT): A team of representatives brought together to evaluate the risk and suitability of preventive measures utilized on a given project, composed of but not limited to: Project Manager, Unit/Site Manager, Engineering, Environmental Services, Contractor, IPAC, OH&S.

Negative Pressure – term used to denote airflow which is negative in relation to surrounding air pressure that is, air flows away from the surrounding area. A negative pressure of at least 7.5 Pa (0.03 inches of water column) should be maintained within the construction zone.

Owner Representative - for the purpose of this policy, this is the person authorizing the Purchase Order and/or authorizing the work of the contractor and/or internal staff in GBHS facilities. The Owner Representative is responsible to ensure all appropriate resources including a suitable project team, project leader, project manager, have been identified and committed to complete a project successfully and according to GBHS Policy and Procedure.

Project Manager/Designate - handles the logistics of project development and implementation including planning, design, tender process, contracts, project meetings and minutes, site inspections, change orders, progress payments, commissioning, training and close-out documentation.

Walk-Off Mat (Tack Mat) - A specially designed mat that is placed outside a construction area or in an anteroom and is intended for removal of contaminants from the footwear of constructors.

Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>			
Category:	Infection Control	Policy Number:	IPAC-610	
Sub-Category:	Physical Plant and the Environment	Pages:	Page 3 of 25	
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000	
Owner:	Program Manager	Last Approved:	14-July-2022	


PROCEDURE

1. Planning Stage

- a. Projects based on design documents will include infection prevention measures in the bid documents for the duration of the project, including the appropriate selection, design, application, specification and assembly of construction materials; measures to ensure air and water quality covering building ventilation systems, plumbing, dust control and cleaning.
- b. The **Owner Representative** is responsible to ensure an appropriate multidisciplinary team is assembled to assess, develop and complete a project; including naming a project manager/designate as required as well as involving the ICP to ensure appropriate infection prevention and control measures.
- c. A **Multidisciplinary Team** with appropriate expertise shall be established early in the planning stage of every construction project. The team shall be responsible for guiding construction during the planning and execution stages, including determining the location and duration of the work and taking steps to protect occupants who might be affected by the construction.

The Multidisciplinary Team:

- Shall communicate its policies and procedures to the constructor before construction begins
- Should designate a representative to communicate with the constructor and attend construction meetings as necessary
- Team members shall be composed of but not limited to:
 - Infection Prevention and Control (IPAC)
 - Administrators
 - Project Management
 - Environmental Services
 - Health Care (Unit/Site Manager, Nursing Staff)
 - Occupational Health and Safety
 - Design (Architects, Engineers)
 - Engineering and Maintenance
 - Construction leads


Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>			
Category:	Infection Control	Policy Number:	IPAC-610	
Sub-Category:	Physical Plant and the Environment	Pages:	Page 4 of 25	
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000	
Owner:	Program Manager	Last Approved:	14-July-2022	

d. The **Project Manager/Designate:**

- Inform IPAC of any renovation, construction or maintenance
- Include IPAC in the planning team beginning with functional plans, to ensure that the appropriate materials and design concepts related to IPAC are incorporated in the plans
- Review with IPAC all tender documents and prints, to ensure that all IPAC issues are addressed and make all necessary changes to meet hospital requirements
- Ensure that the contract agreement outlines the mandatory IPAC measures as well as contractor accountability in the event that breaches in IPAC practices and related written agreements occur
- Present the proposed IPAC plan to the multidisciplinary team for discussion and comments
- Propose and institute IPAC measures for the duration of the construction project and for ongoing maintenance and operations
- In collaboration with IPAC and/or Engineering Services, ensure that the constructors are aware of the risks that construction poses to patients, staff and visitors and the preventative measures that the workers must adhere to
- Should designate an individual responsible for IPAC to liaise with the multidisciplinary team and monitor and coordinate the constructors IPAC procedures
- Notify Environmental Services when work is complete so the construction area can be thoroughly cleaned before patients are readmitted to the finished area
- Inform appropriate departments when the project is complete

e. The **Infection Prevention and Control (IPAC) Professional:**


- An active member of the multidisciplinary team throughout the life of the construction project.
- Ensure the appropriate preventative measures are initiated and adhered to. (See Appendix A and Tables 1-4).
- Ensure that all affected staff are aware of the risks that the construction/renovation project poses to patients, staff and visitors, and the precautionary measures required to prevent exposure to these risks

Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>		
Category:	Infection Control	Policy Number:	IPAC-610
Sub-Category:	Physical Plant and the Environment	Pages:	Page 5 of 25
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000
Owner:	Program Manager	Last Approved:	14-July-2022

- Perform regular construction site audits to ensure that all appropriate preventive measures are being adhered to
- Keep a record of construction site audits, actions taken and recommendations for actions
- Has the authority to stop construction in consultation with the Project Manager/Designate if there is a significant failure to adhere to the required Preventive Measures
- Comply with all PPE requirements when auditing a construction /renovation zone

f. The **Constructor:**

- Comply with GBHS Infection Prevention and Control policies during the construction, maintenance and renovation project and in accordance with the most current versions of the following standards:
 - Canadian Standards Association (CSA) Z317.13 Infection Control during Construction, Renovation and Maintenance of Health Care Facilities
 - Canadian Standards Association (CSA) Z8000 Canadian Health Care Facilities.
 - Canadian Standards Association (CSA) Z317.2 Special requirements for heating, ventilation and air-conditioning (HVAC) in health care facilities.
 - Canadian Standards Association (CSA) Z317.1 Special requirements for plumbing installations in health care facilities.
- Supply, erect, and maintain the integrity of all barriers between the construction area and adjacent areas of the health care facility
- Maintains the construction site ventilation system and ensures pressure differential of construction site is logged regularly and is within acceptable limits
- Is responsible for housekeeping at the construction site
- Ensure construction materials susceptible to contaminants and moisture damage shall be protected during delivery and construction
- Ensure the on-site team includes at least one person with demonstrated knowledge and experience in IPAC during construction and shall designate an individual who will have primary responsibility for IPAC before, during and after the project. Workers who have not received IPAC orientation shall work with, or be supervised by, a worker who has completed this training

Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>			
Category:	Infection Control	Policy Number:	IPAC-610	
Sub-Category:	Physical Plant and the Environment	Pages:	Page 6 of 25	
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000	
Owner:	Program Manager	Last Approved:	14-July-2022	

g. Preventive Measures Analysis

Prior to all construction, renovation or maintenance projects, the Project Manager/Designate shall complete a **Preventive Measures Analysis** (see Appendix A) to determine the preventive measures required for the project. Appropriate preventative measures must be implemented and adhered to for all construction, renovation and maintenance projects at Grey Bruce Health Services.

If the Population Risk Group is Group 4 and the Construction Activity is Type A, IPAC should be consulted to determine the appropriate Preventive Measure (I, II, or III).

Projects that have been determined to require Preventive Measures III and IV involve major work of long duration in high-risk areas and require a copy of the completed **Preventative Measures Analysis** form (Appendix A) to be submitted to the Infection Prevention and Control Department for review and approval prior to commencement of the project.

2. Construction Phase


2.1 Pre-Construction

a. The **IPAC Site Preparation/During Construction Checklist** (Appendix B) shall be used as a tool to ensure all appropriate preventive measures are in place prior to commencement of the construction phase and during periodic site audits throughout the duration of the project.

b. Medical Supplies and Equipment

The Unit/Site Manager to ensure that:

- Supplies and equipment are removed from the area prior to the start of the project. The extent to which this occurs depends on the scope of the project and the assessment performed by Engineering Services or Project Manager/Designate in the planning stage
- Supplies and equipment needed for use in the area but not required to be sterile are covered to prevent contamination by dust and debris
- All sterilized packaged equipment and supplies are removed from the area, prior to the start of construction/renovation
- All waste (including sharps containers) is removed from the project site before the start of construction/renovation or sufficient precautions are in place to minimize risk to patients

Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>			
Category:	Infection Control	Policy Number:	IPAC-610	
Sub-Category:	Physical Plant and the Environment	Pages:	Page 7 of 25	
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000	
Owner:	Program Manager	Last Approved:	14-July-2022	

c. Traffic Control


Project Manager/Designate is to ensure:

- Designated alternate traffic routes for the transportation of equipment and/or supplies and/or patients must be established to prevent exposure to dust and debris from the project site
- Designated traffic routes for transportation of construction equipment and material must be established and maintained free of dust and debris and use only designated elevators
- Post signs to direct any unauthorized traffic away from the project site

d. Barriers

The contractor is responsible to:

- Review the ***Preventive Measure Analysis*** which will have been completed during the planning stages of the project, tender documents, and site visits and review ***Infection Control Precautions by Class*** (Appendix A: Table 4) to determine appropriate barriers.
- Supply, erect, and maintain the integrity of appropriate barriers between the construction area and adjacent areas of the health care facility
- Keep entry doors closed and have door frames with gaskets
- Ensure that tight seals are maintained at the perimeter of walls and wall penetrations
- Use a plastic dust barrier to protect the area during the construction of the rigid impervious barrier
- Clean the area after the barrier is constructed
- Ensure all vacuuming equipment has a HEPA exhaust
- Use an anteroom or entry vestibule when required for the workers to remove dusty clothing and to store tools
- Make every attempt to obtain drawings that show the layout of the ventilation systems that supply air to, or exhaust air from, the work area. It shall be determined whether it is necessary to close outlets, modify performance, shut down systems, or make other changes to the HVAC systems

Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>		
Category:	Infection Control	Policy Number:	IPAC-610
Sub-Category:	Physical Plant and the Environment	Pages:	Page 8 of 25
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000
Owner:	Program Manager	Last Approved:	14-July-2022

e. Dust Control and Plumbing

The constructors shall do the following:


- Windows and doors in areas of the health care facility adjacent to construction areas shall be sealed, especially around buildings that are going to be demolished
- Windows must remain closed at all times
- Personnel shall check for leakage paths between construction areas and adjacent areas of the health care facility
- Windows, doors and air intake and exhaust vents in areas of the health care facility adjacent to construction areas shall be sealed, especially around buildings that are going to be demolished
- Exhaust fans shall run after the completion of construction to remove 99% of airborne contaminants in Preventive Measures I and II areas and 99.9% of airborne contaminants in Preventive Measures III and IV
- Negative pressure differential from all adjacent occupied areas into the construction area shall be maintained at a minimum of 7.5 Pa (0.03 wc) and monitored readings should be logged at least once per day
- Quality, distribution and use pattern associated with the health care facility's source water should be identified and high-risk areas highlighted
- Features conducive to stagnation (e.g., long pipe runs and dead ends) shall be minimized in the design of health care facility plumbing systems

f. Air Quality Testing

If necessary, Air Quality Testing is performed in this stage by qualified personnel.

Engineering/Maintenance Staff/Constructors shall:

With the planning team, ensure that the appropriate environmental monitoring is performed during and at the completion of the construction/renovation project as deemed necessary by IPAC and Occupational Health and Safety.


Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>			
Category:	Infection Control	Policy Number:	IPAC-610	
Sub-Category:	Physical Plant and the Environment	Pages:	Page 9 of 25	
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000	
Owner:	Program Manager	Last Approved:	14-July-2022	

2.2 During Construction

a. Dust and Debris Removal

The contractor is responsible to:

- Remove debris using carts with tight fitting lids or cover the contents with a wet sheet to avoid dispersing dust and dirt
- Remove debris daily according to the schedule and specified routes outlined in the construction plan
- Use enclosed chutes, directed into enclosed dumpsters, to direct debris outside, whenever possible for removing debris from above the ground floors
- Ensure that the chute opening is not placed near air intakes
- HEPA (as defined) - filtered negative air machines are recommended to be used. Filters must be sealed in a plastic bag before removal from the construction area
- Negative pressure differential from all adjacent occupied areas into the construction area shall be maintained at a minimum of 7.5 Pa (0.03 wc) (see Appendix A) Intermittent disruptions may occur under controlled conditions, provided that they are planned for and documented by the multidisciplinary team before construction begins. Levels shall be monitored and logged at least once daily. (Appendix D)
- Check for leakage paths between the construction area and adjacent areas of the health care facility. Wind and stack effects shall be considered, and steps shall be taken to plug holes in spatial separations (e.g. walls, partitions, floors, and floor slabs)
- Exhaust fans shall run after the completion of construction to remove 99% of airborne contaminants in Preventive Measures I and II areas and 99.9% of airborne contaminants in Preventive Measures III and IV areas
- Clean, sweep, wet mop, or HEPA filter vacuum the project site daily or more frequently as necessary to control dust and debris
- Use walk off mats outside the construction area exit(s) to remove dust and debris and to prevent tracking to other areas
- Remove loose soil and debris from their clothing before leaving the project site. Protective clothing when worn must also be removed before leaving the site

Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>		
Category:	Infection Control	Policy Number:	IPAC-610
Sub-Category:	Physical Plant and the Environment	Pages:	Page 10 of 25
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000
Owner:	Program Manager	Last Approved:	14-July-2022

- Provide workers with disposable overalls, and head and shoe coverings for entry into invasive procedure areas
- Wipe all tools and equipment with a damp cloth before entering invasive procedure areas
- Wipe all tools and equipment with a damp cloth or place in sealed plastic bag prior to removal from the construction zone
- Staff should report when there is evidence of dust and debris outside construction zone to maintenance and IPAC

b. Ventilation and Air Handling Controls


Constructor in conjunction with the Project Manager/Designate:

- Shall take special precautions related to ventilation systems in the construction area
- When the population risk group is Group 4 and construction activity is Type A, IPAC shall be consulted
- For high risk population groups the ventilation system should be disabled until the project has been completed. Alternatively, 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

c. Portable Construction HEPA-filtered Air Units

Shall be:

- Certified with documentation; recommended testing conducted on site
- Recertified every 12 months and the recertification shall be documented
- Visually inspected by the constructor at least daily and their conditions shall be documented
- Filters shall be replaced when loaded
- Construction, maintenance, and repair area exhaust air shall not be discharged to areas occupied by Population risk Group 3 or 4
- Air flow rates, distribution, and pressurization of a facility's HVAC system can be affected. Accordingly, the main facility system shall be verified for operation in

Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>			
Category:	Infection Control	Policy Number:	IPAC-610	
Sub-Category:	Physical Plant and the Environment	Pages:	Page 11 of 25	
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000	
Owner:	Program Manager	Last Approved:	14-July-2022	

accordance with design during construction work. The health care facility and constructor shall verify the pressure relationships for critical areas near the construction area. i.e. Population Risk group 4 areas


- 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 an engineering analysis shall be performed by qualified personnel to ensure that exhaust air will not be re-entrained into the occupied building and the multidisciplinary team approves piping to the exhaust system
- In cases where air cannot be exhausted directly outside or piped through the building exhaust system, consult IPAC

d. Plumbing

- Appropriate methods shall be used to ensure water potability during health care facility construction
- Water lines shall be flushed before reuse after new plumbing has been installed.
- Following excavations on health care facility grounds or when the plumbing system has been shut down and then re-pressurized follow facility loss of essential service protocol
- Dead legs that are removed shall be removed as close to the main line as possible.
- Where dead legs cannot be removed, they shall be isolated from the live plumbing system, drained of water, and permanently capped. A tag identifying that the line has been isolated and the date of isolation shall be affixed to each end where the line has been isolated.
- The contractor shall determine what worker protection is required for removal of the dead leg pipe.

Constructors performing plumbing works shall:

- Avoid using collection tanks and long pipes (which allow water to stagnate).
- Maintain a dry work environment.
- Report any water leaks that may have contacted building supplies and materials
- Report any water leaks through walls or substructures

Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>			
Category:	Infection Control	Policy Number:	IPAC-610	
Sub-Category:	Physical Plant and the Environment	Pages:	Page 12 of 25	
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000	
Owner:	Program Manager	Last Approved:	14-July-2022	

- Staff should report discoloured water and water leaks to maintenance and IPAC

e. Infection Control Monitoring

Infection Prevention and Control Professional is responsible to:

- Perform active surveillance to monitor infections caused by organisms thought to be associated with construction activities
- Assess infections and identify any risk factors and the interventions required preventing a re-occurrence
- Perform appropriate environmental monitoring for evidence of non-compliance
- Perform regular walkthrough inspections of construction sites, renovation projects to ensure that precautionary measures are being followed appropriately
- Stop work if precautionary measures are not being followed and notify Engineering Services immediately

Health Care Workers (HCW's) are responsible to:

- Report evidence of non-compliance to IPAC.


f. Mould Abatement

- Mould Abatement procedures shall be performed by qualified abatement contractor or by engineering services staff trained in abatement procedures
- Project Manager/Designate shall inform OH&S and IPAC of abatement operations.

Staff should notify Engineering Services, OH&S and IPAC when they suspect or identify mould in their work area.

3. Post Construction Phase

- IPAC together with the constructor shall do a final walk-through inspection of the area and complete the **Infection Control Completion of Construction/Renovation Checklist** (Appendix C)
- IPAC shall ensure that the construction area has been thoroughly cleaned before building occupants are readmitted to the completed construction area
- The multidisciplinary team shall review the preventative measures that were undertaken for the construction project and assess their effectiveness

Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>			
Category:	Infection Control	Policy Number:	IPAC-610	
Sub-Category:	Physical Plant and the Environment	Pages:	Page 13 of 25	
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000	
Owner:	Program Manager	Last Approved:	14-July-2022	

4. Department Specific Provisions

Engineering Services

- Periodic review of the Engineering Project Report with the IPAC department will provide a more proactive approach to communication and determining the preventive measures category for each project.
- Standard procedure for plumbing work on the water supply system is to ensure the section worked on is clean to prevent contamination of the water supply, only clean materials and parts are installed, isolation and flushing of the system for sufficient time to ensure cleanliness of the water supply before returning the isolated section back to normal service.
- Standard procedure for dust control includes wearing appropriate PPE, use of HEPA vacuum cleaners, damp wipes or mop to gather residual dust. Dust containment measures including but not limited to use of work isolation tents, plastic and/or drywall barriers as required through the assessment procedure in this policy. Environmental Services shall be notified of any work area requiring additional cleaning or disinfecting after the initial clean up.
- Engineering services staff shall document dust or plumbing infection control activities on routine maintenance work orders through the work order response close out menu.

Other Departments

- Consult with the ICP on a project-by-project basis or dust creating procedure until standard procedures developed.

RELATED DOCUMENTS


VIII-20 Mould Management

REFERENCES

CAN/CSA-Z317.13-17 Infection Control during construction renovation and maintenance of health care facilities

CAN/CSA-Z317.1-16 Special Requirements for Plumbing Installations in Healthcare Facilities

CAN/CSA-Z317.2-19 Special Requirements for Heating, Ventilation, and Air Conditioning (HVAC) Systems in Health Care Facilities

Title:	<i>Infection Control Measures During Construction, Renovation and Maintenance Projects</i>		
Category:	Infection Control	Policy Number:	IPAC-610
Sub-Category:	Physical Plant and the Environment	Pages:	Page 14 of 25
Issued by:	Infection Control Committee	Issue Date:	30-Apr-2000
Owner:	Program Manager	Last Approved:	14-July-2022

Construction – related Nosocomial Infections in Patients in Health care Facilities –
Decreasing the Risk of Aspergillus, Legionella and other Infections. Canada Communicable Diseases Report: vol. 2752, July 2001.

Hamilton Hospitals Infection Prevention and Control: Infection Prevention and Control – Guidelines during Construction, Renovation and Maintenance in Healthcare Facilities.

APPENDIX

Appendix A: Preventive Measures Analysis

Table 1: Matrix: Class Precautions for Construction Projects by Patient Risk

Table 2: Type of Construction Activity

Table 3: Patient Population Risk Group and Geographical Areas

Table 4: Infection Control Precautions by Class

Appendix B: Site Preparation/During Construction Checklist

Appendix C: Infection Control Completion of Construction/Renovation checklist

Appendix D: Daily Differential Pressure and Hoarding Monitoring Log

Appendix E: Infection Control Dust Barrier Signage

APPENDIX A: Preventive Measures Analysis

**To be completed during planning stages on construction/renovation/maintenance projects

Project:	
Work Order #:	
Proposed start date and length of project:	
Project Location:	
Brief Description of Project (including activities involved):	
Type of Construction Activity (Table 2) Type A, B, C or D:	
Patient Population Risk Group and Geographical Area (Table 3) Group 1,2,3 or 4	
Construction area:	
Area Above Construction Space:	
Area Below Construction Space:	
Area laterally adjacent to construction space:	
Preventive Measure Classification (Table 1) Class I, II, III, or IV:	
Contractor:	
Contact Person:	
Phone #:	Email:
Project Manager/Designate:	
Phone #:	Email:
Infection Control Professional:	
Phone #:	Email:
Additional requirements:	
Infection Control Professional:	Date:
Project Manager/Designate:	Date:

Table 1: Matrix: Class Precautions for Construction Projects by Patient Risk

- a. Use Table 2 to identify the Type of Construction Activity.
- b. Use Table 3 to identify the Patient Risk Groups and Geographical areas affected by the construction activity.
- c. Use Table 1 to find the Class of Precautions by matching the Patient Risk Group with the Type of Construction Activity.
- d. After following the previous 3 steps, refer to Table 4 for a brief description of the infection control precautions required by class. Refer to the main body of the policy for additional Preventive Measures that must be followed during construction and renovation procedures.
- e. When the preventive measure states I-III (Patient Risk Group 4, Construction Activity Type A), IPAC shall be consulted to determine the appropriate preventive measure (I, II, or III)
- f. When the preventive measure is shown as III/IV, the multidisciplinary team shall determine the appropriate class.

Class Precautions for Construction Projects by Patient Risk (Class I, II, III, IV)

Patient Risk Group (Table 3)	Construction Activity Type (Table 2)			
	Type A	Type B	Type C	Type D
Group 1	I	II	III	III/IV
Group 2	I	II	III	IV
Group 3	I	III	III/IV	IV
Group 4	I - III	III/IV	III/IV	IV

Note: Infection Prevention and Control must be consulted when the preventive measure analysis indicates that Class III or IV control measures are required.

Table 2: Type of Construction Activity

Construction Activity Type	Description
Type A	Inspection and non-invasive activities including, but not limited to: <ul style="list-style-type: none"> • Activities that involve a single controlled opening in a wall or ceiling for minor work or visual inspection accessed by removing no more than one ceiling tile or opening of an access panel on a wall or ceiling • Painting (not sanding) or wall covering • Electrical trim work • Minor plumbing (disrupts water supply for less than 15 min. in localized areas) • Other maintenance 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, minimal dust activities includes but not limited to: <ul style="list-style-type: none"> • Activities that require access to and use of chase spaces • Cutting a small opening in a contained space where dust mitigation can be controlled such as cutting walls or ceilings for installing or repairing minor electrical work, ventilation components, telephone wires or computer cables

	<ul style="list-style-type: none"> Sanding or repair of a small area of wall Plumbing work that disrupts 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, or assembly, or cannot be completed in a single work shift.</p> <p>These include but are not limited to:</p> <ul style="list-style-type: none"> Sanding of walls in preparation for painting or wall covering Removal of floor coverings, ceiling tiles and casework New wall construction or Minor duct work Electrical work above ceilings or major cabling activities Plumbing work that disrupts water supply for more than 1 patient care area for 1 hour or more
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"> Activities requiring heavy demolition or removal of a complete cabling system New construction that requires consecutive work shifts Plumbing work that disrupts water supply for more than one patient care area for 1 hour or more Soil excavation

Table 3: Patient Population Risk Group and Geographical Areas

Patient Population Risk Group	Typical Areas
Group 1 Lowest Risk	<ul style="list-style-type: none"> Office areas Unoccupied wards Public areas not intersecting a patient care area Laundry and soiled linen sorting or storage areas Physical plant workshops and housekeeping rooms/closets
Group 2 Medium Risk	<ul style="list-style-type: none"> 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 and physical therapy areas remote from patient care areas
Group 3 Medium to High Risk	<ul style="list-style-type: none"> Emergency (except trauma rooms) Diagnostic imaging Labour and birthing rooms (non-operating) Nurseries for healthy newborns Nuclear medicine Echocardiography Laboratories General medical and surgical wards Pediatric units

	<ul style="list-style-type: none"> • Geriatric units • Food preparation, serving, and dining areas • Respiratory therapy • Clean linen handling and storage areas
Group 4 Highest Risk	<ul style="list-style-type: none"> • Intensive care units (ICUs) • Operating rooms (including prep, induction, post-anesthetic care unit (PACU), and scrub areas) • Anaesthesia storage areas and workrooms • Oncology units and outpatient clinics for cancer patients • Dialysis units • Critical care nurseries (NICU) • Labour and delivery operating rooms • Interventional or high-risk diagnostic imaging: <ul style="list-style-type: none"> ○ Cardiac catheterization and angiography ○ Endoscopy, Bronchoscopy, Cystoscopy • Cardiovascular and cardiology patient areas • Pharmacy admixture rooms • Medical Device Reprocessing areas (wherever located) • Central sterile supply or other sterile supply areas • Trauma rooms • Pacemaker insertion rooms

Table 4: Infection Control Precautions by Class

Preventive Measures	Description
Class I	<ul style="list-style-type: none"> • Review infection control construction agreement before work begins. • Avoid moving patients through work areas. • Project Manager/Designate should identify essential services that could be disrupted and take appropriate measures to address disruption. <p>Constructors shall be responsible for:</p> <p><u>Dust and control and cleaning of area following activity</u></p> <ul style="list-style-type: none"> • Use methods to minimize raising dust from construction activities • Immediately replace ceiling tiles when removed for visual inspection • Ensuring transportation route for clean supplies is not near contaminated materials <p><u>Plumbing</u></p> <ul style="list-style-type: none"> • Schedule water interruptions during low user activity • Ensure faucet aerators are not used or installed • Maintain a dry work environment • Ensure gaskets and items made of materials that support the growth of legionella are not used
Class II	<p>In addition to Preventative Measures Class I</p> <ul style="list-style-type: none"> • Determine a safe route for the transportation of clean or sterile supplies and equipment away from the construction area • Establish traffic patterns for constructions workers that avoid, or at the minimum reduce, adverse impacts on patient care areas

	<p>Constructors shall be responsible for:</p> <p><u>Dust Control</u></p> <ul style="list-style-type: none"> • Provide active means to prevent airborne dust from dispersing into the atmosphere • Sealing windows and unused doors • Water mist work surfaces to control dust while cutting • Remove and replace wet porous ceiling tiles; nonporous tiles can be removed, cleaned with an acceptable hospital disinfectant and replaced when dry • Construction waster should be tightly covered during transport with a hard cover or dampened tarp • Vacuum the area with a HEPA-filtered vacuum and wet mop daily with a hospital grade low-level disinfectant • Place dust mat at the entrance and exit of the work area <p><u>HVAC</u></p> <ul style="list-style-type: none"> • Remove or isolate HVAC system in areas where work is being performed to prevent contamination of the duct system • Block and seal air vents before starting • Monitor the change or clean filters during construction, as required <ul style="list-style-type: none"> • Flush potable water lines in the construction area and adjacent areas before use • Housekeeping must increase area cleaning around the construction site along with adjacent rooms and a terminal clean must be performed prior to patient occupancy
<p>Class III</p>	<p>In addition to Preventative Measures Class I and Class II Constructors shall be responsible for:</p> <ul style="list-style-type: none"> • Notify Infection Prevention and Control to review and complete <i>Site Prep and During Construction check list</i> (Appendix B) <p><u>Dust Control</u></p> <ul style="list-style-type: none"> • Install impermeable dust barriers sealed from floor to ceiling including the areas above false ceilings • The barriers must be two layers of 0.15 mm (6ml) fire retardant polyethylene or and equivalent barrier and gypsum wall board protective layer approved by the multidisciplinary team • The surface closest to the hospital zone shall be wipe able • Debris chutes for removal of construction materials, must be enclosed down to an enclosed waste container. The Chute room must have a negative pressure compared to non-construction area • Seal openings from removed tiles in the ceilings until replaced • Vacuum mechanical and electrical systems and spaces above drop or false ceilings, if necessary • Remove protective clothing before entering patient care area • 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 sufficient size to ensure that the constructors have to place both feet on the mat at least once on exiting the construction area. • Dust barrier shall remain in place until the project is complete and the area has been thoroughly cleaned and inspected <p><u>HVAC</u></p> <ul style="list-style-type: none"> • Permanent air handling systems should not be used for exhausting air from construction or renovation areas

	<ul style="list-style-type: none"> • Maintain negative pressure within the construction area by using portable HEPA-filtered air units that include pressure gauges and an alarm. Filters shall be monitored and replaced if clogged or functioning below the manufacturer’s specifications • Negative pressure differential from all adjacent occupied areas into the construction area shall be maintained at a minimum of 7.5 Pa (0.03 wc) and monitored readings should be logged at least once per day • Ensure that the air is exhausted directly outside and away from intake vents and filtered through a HEPA filter. In conditions that prohibit exhausting outside, consult IPAC. • Disable the ventilation system and seal duct openings in the construction area until the project is completed • Ventilation system should be cleaned and balanced after completion of construction <p><u>Plumbing</u></p> <ul style="list-style-type: none"> • Flush water lines at the site and in adjacent areas before patient occupation for ½ hour • Check water temperatures before patient occupation
<p>Class IV</p>	<p>In addition to Preventative Measures Class I, Class II and Class III Constructors shall be responsible for:</p> <ul style="list-style-type: none"> • Notify Infection Prevention and Control to review and complete <i>Site Prep and During Construction check list</i> (Appendix B) <p><u>Dust Control</u></p> <ul style="list-style-type: none"> • Entry to the construction area shall either <ol style="list-style-type: none"> a. outside the occupied areas of the health care facility b. though an anteroom if access is from within the health care facility • Ensure constructors leave the construction area through an 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 before entering patient care areas • Repair holes on walls or breaches in the polyethylene containment system immediately when found, and complete permanent repair within 2 hours. • Carefully remove barrier walls and use short term protection to minimize environmental contamination <p><u>HVAC</u></p> <ul style="list-style-type: none"> • Ensure that ventilation systems are working properly in adjacent areas • The Infection Control Professional and Project Manager/Designate shall complete an <i>Infection Control Completion of Construction/Renovation Checklist</i> (Appendix C) before patient or staff occupancy of the construction project work area is permitted

Appendix B: Site Preparation during Construction/Renovation checklist

Project:
Work Order #:
Project Location:
Contractor: Contact Person:
Project Manager/Designate:
Infection Control Professional:

Infection Control Measures	Yes	No	N/A	Notes
1. High risk patients have been identified and have been relocated away from the work area or otherwise protected.				
2. All medical waste has been removed by hospital personnel				
3. All sterilized packaged equipment and supplies are removed from the work area				
4. Supplies and equipment needed for use in the area but not required to be sterile are covered to prevent contamination				
5. Proper directional signage is posted for pedestrians				
6. Designated alternate traffic routes for the transportation of medical equipment, supplies and/or patients have been established				
7. Designated traffic routes for transportation of construction equipment and material have been established				
8. Designated elevators and times for use are defined for workers				
9. Carts with lids/wet sheets are available for debris removal				
10. Proper debris removal procedures have been defined for workers				
11. Chutes (if used) are sealed when not in use				
12. Workers are using only the designated traffic routes at the specified times				
13. Entry/exit paths are free of obstruction/debris				
14. Daily cleaning procedures are defined for workers (clean, sweep, vacuum, wet mop)				
15. General cleanliness on entry/exit areas is maintained to control dust				
16. Tack mats are in place at exits				
17. Disposable PPE are available for workers entering invasive procedure areas (e.g. OR)				
18. Workers are aware of special precautions required for invasive procedure areas (e.g. wiping off tools and equipment, PPE, etc.)				
19. Barriers	Yes	No	N/A	Notes
a) Minor projects (<24 hours, generating minimal dust)				
• Fire rated plastic sheeting in place				
b) Major projects (producing high levels of dust)				
• Barriers are rigid, dust proof and fire rated (e.g. drywall)				
• Drywall barrier seams are caulked				
• Entry doors have gasketed frames				
• Wall perimeters/penetrations are sealed				

• Infection control dust barrier signage has been posted (Appendix E)				
• Anteroom present, if required				
• Anteroom is large enough to enable materials to be moved through without having to both doors are the same time				
• Anteroom pressure differential is monitored, logged and maintained at a least 2.5 Pa (0.01 wc) relative to the hospital zone				
• Exterior windows are closed and sealed				
• Doors to entry/exit areas are closed				
• Proper barriers are in place and maintained				
19. HEPA-filter vacuum is available for cleaning				
20. Air flows from clean to dirty areas				
21. All air from the construction site is either vented outside or HEPA-filtered for re-circulation. Testing is completed				
22. Pressure differential monitoring device is in place and data logged.				
23. Minimum 7.5 Pa (0.03 wc) pressure differential maintained between work area and occupied area				
24. HEPA-filter air handling units are certified with documentation				
25. Verify the sealed penetrations and ceilings are intact in areas adjacent to the construction areas				
26. The constructor has been provided a copy of the GBHS Infection Control Measures During Construction, Renovation and Maintenance Projects policy				
27. Only authorized personnel are present in designated areas				
28. GBHS Staff have been instructed to look for evidence of non-compliance by construction workers and report to IPAC or Unit/Site manager				

Project Manager/Designate: _____

Date: _____

Infection Control Professional: _____

Date: _____

Appendix C: Infection Control Completion of Construction/Renovation checklist

Project:
Work Order #:
Project Location:
Contractor: Contact Person:
Project Manager/Designate:
Infection Control Professional:

Infection Control Measures	Yes	No	N/A
19. Water lines are flushed before reusing for a min. of 10 min			
20. Work area is vacuumed with HEPA filtered vacuum			
21. Area has been wet mopped with hospital-grade disinfecting cleaning agent (as per environmental services procedure)			
22. Barrier materials thoroughly cleaned before dismantling			
23. Dust barriers/anterooms removed carefully to minimize dust migration			
24. Air filters changed/cleaned as necessary in work areas			
25. Ventilation systems functioning properly and are cleaned if contaminated during work activities			
26. Final visual inspection of the work area and terminal clean conditions achieved before patients are re-admitted to area			
27. Review is conducted after completion to assess the effectiveness of the preventive measures and identify possible improvements			
28. Other:			
29. Other:			

Comments:

Project Manager/Designate: _____

Date: _____

Infection Control Professional: _____

Date: _____

ATTENTION

Infection Control Barrier

**KEEP DOOR SECURELY CLOSED AT ALL TIMES
DO NOT PROP OPEN**

