Alberta Health Services

INFECTION PREVENTION AND CONTROL

Health Care Facility Design Guidelines and Preventive Measures for Construction, Renovation and Maintenance Activities

May 2013 (Updated March 2016)

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Preface

The Alberta Health Services (AHS) Infection Prevention and Control (IPC) – Health Care Facility Design Guidelines and Preventive Measures for Construction, Renovation and Maintenance Activities (May 2013, Revised February 2016) was prepared by the IPC Health Care Facility Design and Preventive Measures Working Group, a collaboration between IPC and Capital Management. The AHS Clinical Operations Executive Committee (COEC) approved their use as foundational guidance in September, 2013.

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1. Introduction

This guideline was developed to establish safe environments for patients and staff by reducing the risk of transmission of infections in settings where health care is provided. It is to be used to determine Infection Prevention and Control (IPC) requirements when planning and designing new health care facilities, construction and renovations or functionally changing existing spaces in Alberta Health Services (AHS). Included in this guideline is the Infection Control Risk Assessment (ICRA) and Preventive Measures toolkit that provides standardized tools for establishing levels of risk and the preventive measures required to mitigate these risks during construction, renovation and maintenance activities. Refer to Section 6.

The application of this guideline must take into consideration the intended Health Care Facility (HCF) Class (refer to CSA Z8000 Annex B)[1], level of care and risk to patient populations. The guideline applies to all tertiary, acute, community care and long term care facilities. (Refer to Definitions in this document for area classifications and examples of class of HCF).

In addition to IPC considerations other pertinent guidelines, standards and codes must be included in design, construction and renovation projects. If there is a discrepancy between this document and the CSA Standards, applicable federal, provincial and municipal building codes and regulatory requirements will apply. [CSA:5.1.1.5][1]

Principles

The HCF shall be planned and designed to serve patients, families, staff and visitors in accordance with the following core principles (OASIS):

1. **O**perations that create an operating environment that promotes the efficient and effective delivery of health care services, thereby helping to ensure positive patient outcomes;
2. **A**ccessibility that creates an environment that facilitates the patient's access to receiving care and the caregiver's ability to provide care;
3. **S**afety and security that creates an environment of care that is safe and secure for all occupants patients and their families, staff and visitors);
4. **I**nfection prevention and control practices that create an environment that is safe for all building occupants in terms of the prevention of health care acquired infections and the control of infectious diseases; **and**
5. **S**ustainability taking into account the sustainability of the construction process and the finished building and the sustainable operation of the HCF over time. [CSA:4.1][1]

This document considers all of the OASIS principles but focuses primarily on IPC practices.

Participants

The document was developed by IPC and Capital Management representatives from AHS Zones and Provincial Programs (see participant list).

History of Document Development

The former *Calgary Health Region, Infection Prevention and Control General Design Guidelines for Calgary Health Region Construction/Renovation Projects 2008* was used as a seed document. To update the Calgary document an extensive review of current published relevant standards, guidelines and evidence based information was conducted and included in the guideline.

This guideline supersedes previous AHS legacy IPC health care facility design, construction and maintenance documents.

Reference Citations
Clauses are directly referenced to a specific standard, guideline, or other reference. Each reference is cited in brackets at the end of the clause. When further clarification is required refer to the specific standard identified.

Using the example [CSA: 4.5.1.2][1]

- The first letters, CSA , are the reference source;
- Numbers following the reference source, 4.5.1.2, indicate the exact clause found in the reference document and;
- Number(s) in superscript after the last bracket ,][1] **,** match the numbers found in the *Reference List* at the end of this guideline and corresponds to a specific reference document (e.g. Canadian Standards Association, CSA Z8000-11).

Language

In this document "shall' is used to express a requirement; "should" is used to express a recommendation or that which is advised but not required; "may" is used to express an option or that which is permissible within the limits of the guidelines. [CSA: 1.3][1] When further explanation is required for terms such as, but not limited to, "sufficient", "accessible", "appropriate" or "adequate" (etc.), consult the specific standard referenced.

Future Updates
This guideline is a living document that shall be reviewed regularly and updated tri-annually to ensure the information remains current and in alignment with published IPC standards. The IPC Construction and Design Working Group will be responsible for document control and management of all modifications to the guideline which may include but is not limited to:

- updates from new or revised reference standards;
- repetitive requests for similar information;
- outcome tracking of lessons learned and;
- documentation of issues and resolutions that may require changes or additions to the guidelines.

The updated document will be shared for comment and consultation prior to publication.

Exceptions
Exceptions to these guidelines are addressed as indicated in Section 7.

1.1 IPC General Practice Guidelines for HCF Design

1.1.1 AHS health care facilities shall be planned and designed to be safe for all building occupants. The planning and design process shall include participation with Infection Prevention and Control. [CSA: 4.5.1.2] [1]

1.1.2 The IPC Risk Assessment and Preventative Measures Analysis shall be conducted as part of the planning process for any new construction, addition or renovation. [CSA: 4.5.1.3][1] Refer to Section 6.

1.1.3 The following IPC measures shall be incorporated into the planning, design and construction: [CSA :4.5.1.4][1]

1.1.3.1 Allot sufficient space for patient care to prevent the spread of illnesses;

1.1.3.2 Use materials for construction that are free of contaminants and excessive moisture; and able to withstand regular use and cleaning; (refer to Section 2.3.4)

1.1.3.3 Provide areas for localized waste management [CSA:7.5.6,7.5.7][1];

1.1.3.4 Provide dedicated areas for storage of supplies and equipment;

1.1.3.5 Provide accessible hand hygiene stations designed for health care workers (HCW) and patient hand hygiene. Refer to Section 2.3.2

1.1.4 Planning should facilitate the: [CSA: 7.5.1.3][1]

a) implementation of routine practices for all patients regardless of the diagnosis;

b) appropriate spacing and placement of patients based on mode of transmission of infectious organisms, including assessment of the need for single inpatient bedrooms and airborne isolation rooms;

c) adequate control of patient flow through the HCF;

d) mechanical requirements for proper ventilation;

e) adequate hand hygiene facilities;

f) processes for proper reprocessing of medical devices and equipment;

g) segregation of soiled and clean items; and

h) HCF responses to catastrophic events e.g., pandemic disease.

1.2 General IPC Guidelines for Separation of Patients

1.2.1 The HCF design shall provide for patient separation as needed for IPC purposes. [CSA: 7.5.2.1.1][1]

1.2.2 The HCF design shall provide sufficient space in clinical areas so that the necessary distances can be maintained between patients. [CSA :7.5.2.1.2][1]

1.2.3 All patient treatment spaces (inpatient or outpatient) shall be single occupancy unless the functional program demonstrates the necessity of multi-patient arrangements. [CSA: 7.5.2.4][1]

Note: Single occupancy means that patients have a spatial separation and a physical barrier between them sufficient to provide privacy, protection from the spread of infections, and adequate area to support the clinical function.

1.2.4 If the functional program demonstrates the necessity of multi-patient arrangements, the multi-patient room shall accommodate no more than two patients. [CSA: 7.5.2.3][1]

1.2.5 For multi treatment spaces, there shall be at least 2 m between beds and/or treatment chairs.

1.2.6 Bed clearance space provided for each clinical patient shall be no less than 2 m apart.

2. Patient Care Area Design

2.1 General

2.1.1 An infection control risk assessment with consideration of the facility's patient population and programs shall be included during the planning phase of a project. Based on the risk assessment, the HCF shall be designed to include infection prevention and control measures that minimize the potential for acquisition and transmission of infections in a health care setting. [CSA:7.5.1.2][1]

2.1.2 In units where patients stay over night, each patient shall have their own room with their own washroom that includes a toilet, sink and shower. [CSA: 4.5.3.1][1]

2.2 Unit Design

2.2.1 Inpatient Medical/Surgical Units

Refer to the corresponding section in CSA Z8000;

a. Medical/Surgical [CSA: 8.1][1]
b. Critical Care [CSA: 8.2][1]
c. Maternal and Newborn [CSA: 8.3][1], [FGI:2.2-2.11, 2.2-2.12][2]
d. Mental Health [CSA: 8.4][1], [FGI 2-2.14][2]
e. Pediatric and Adolescent [CSA: 8.5][1]
f. Rehabilitation Care [CSA: 8.6][1]
g. Burn Unit [CSA: 8.7][1]
h. Inpatient Continuing Care [CSA: 8.8][1]

2.2.1.1 Patient rooms other than observation rooms shall be single occupancy. [CSA 4.5.3.1, 4.5.4, 7.5.2.2][1] Refer to 1.2.3

2.2.1.2 In new construction, each patient shall have their own washroom suite which consists of a toilet, sink and shower. [CSA 7.5.7.1][1]

2.2.1.3 For deviation from these recommendations refer to Section 7.

2.2.2 Observation Rooms

For the purpose of this document, observation room will mean a multi-bed patient care area with an expected length of stay from 24 to 48 hours. The intended use is for observation and stabilization of patients needing special care or extra observation. Each patient space in an observation room is described as a cubicle and these spaces may be separated by a curtain, walls on 3 sides or a combination of both. (FGI: Glossary XXIX)[2]

Note: Observation rooms are described and used differently by functional programs. The size of the observation room depends on the patient acuity mix and projected use. [FGI 2.2-3.1.4.3(1)][2]

2.2.2.1 Observation rooms shall be designed to provide a minimum of 2 m of distance between patients.

2.2.2.2 Every effort should be made to adhere to one patient per toilet room.

2.2.2.3 In a location designed to accommodate 3 or more patients at a time: minimum of one hand hygiene sink for every 3 patients, with no more than 6 m distance between any patient station and the nearest sink; [CSA: 7.5.11.2.1, b][1]

2.2.2.4 One shower room shall be provided for each 16 or fewer cubicles. [FGI: 2.2-3.1.4.3(8)][2]

2.2.2.5 Observation rooms require dedicated utility support rooms. Refer to Section 2.4.

2.2.3 Critical Care Units

Note: Critical care services can include medical and surgical intensive care, cardiac care, pediatric intensive care and neonatal intensive care.

2.2.3.1 Cardiac care units are subject to the guidelines found in the previous Section 2.2.1.

2.2.3.2 All patient rooms in critical care units shall be single occupancy. [CSA: 7.5.2.2][1]

2.2.3.3 Open concept units should be avoided.

2.2.3.4 Neonatal intensive care units multi-bed rooms are permitted. [FGI: 2.2-2.10.2.2][2]

2.2.3.5 Airborne Isolation Rooms (AIRs), when present, should be located close to the patient entry and away from the main corridor and other patient cubicles to limit the travel distance into the main unit by immunosuppressed/infectious patients. [CSA:8.2.3.2][1]

2.2.3.6 The design shall allow for access to personal protective equipment (PPE) adjacent to each inpatient bedroom entrance. [CSA: 8.2.3.3][1]

2.2.3.7 Cleaning, testing, and storage facilities for respiratory therapy services shall be readily accessible. If Respiratory Therapy (RT) equipment will be cleaned, decontaminated, or maintained within the unit, the space for these activities shall be designed in accordance with CAN/CSA-Z314.8. [CSA:8.2.3.5][1]

2.2.3.8 Alcoves shall be designed to minimize the need to keep equipment in corridors and reduce staff travel distances for commonly used supplies and equipment. [CSA:8.2.3.8][1]

Note: Commonly used supplies and equipment can include the drug dispensing equipment, non-invasive blood pressure monitoring, supply carts, medical imaging equipment, etc.

2.2.3.9 Toilet facilities and human waste disposal;

2.2.3.9.1 Each critical care patient room shall have direct access to an enclosed toilet room or soiled utility room for disposal of human waste. [CSA: 7.5.7.3] [1]

2.2.3.9.2 In services where patients will not use a toilet, each room with inpatient beds shall have a means for staff to dispose of human waste, comprising either:

a. Separate enclosed toilet room and a hand hygiene sink; or

b. Separate closed human waste management mechanism with an adjacent hand hygiene sink". [FGI: 2.2-2.6.2.6] [2]

2.2.3.9.3 Utility/Support rooms are required. Refer to Section 2.4.

2.2.3.10 Neonatal Intensive Care Unit (NICU).

2.2.3.10.1 Each newborn infant shall have a separate and dedicated station for bassinette [CSA :Table 8.2,5][1], with a minimum clear dimension of 2.44 m between infant care beds. [FGI: 2.2-2.10.2.2][2]

2.2.3.10.2 In a multi-bed room, there should be, at minimum, one hand hygiene sink for every 2 bed positions, located no more than 6.1 m distance. Every bed position shall be within 6.1 m of a hands-free hand washing station. [FGI:2.2-2.10.2.5][2]

2.2.3.10.3 Spaces shall be provided for personal protective equipment and supplies. [CSA :8.2.2.10][1]

2.2.4 Surgical Suite [CSA: 9.5.4][1], [FGI: 2.2-3.3.2][2]

2.2.4.1 Provisions for infection prevention and control in operating rooms and procedure rooms shall include the following:

2.2.4.1.1 For dimensions of stand-alone outpatient surgery suites [FGI:3.7-1][2].

2.2.4.1.2 There shall be no floor drains in operating room (OR). [CSA: 9.5.3.16.1(a)][1]

2.2.4.1.3 Laminar flow diffusers shall be provided over the patient, with low level exhaust in corners of the OR. [CSA: 9.5.3.16.1 (b)][1]

2.2.4.1.4 Laminar flow systems in arthroplasty joint replacement surgery operating rooms shall be provided. [CSA: 9.5.3.16.1 (c)][1]

2.2.4.1.5 The design shall specify the flow of supplies and maintain separation between clean and contaminated equipment. [CSA :9.5.3.16.1 (d)][1]

2.2.4.2 A scrub sink (with two scrub positions) with hands-free operation shall be provided adjacent to the entrance of the OR. [CSA: 9.5.3.16.1(f)][1]

2.2.4.2.1 Two scrub positions may serve two ORs if both positions are adjacent to the entrance of each operating theatre. [CSA: 9.5.3.4.4][1]

2.2.4.2.2 Location of scrub positions shall be as follows: [CSA: 9.5.3.4.4][1]

a. If located in the restricted outside corridor, they shall be recessed into an alcove out of main traffic areas

b. If located in the centre clean core, they shall be beside the entrance door to the OR and separated by a barrier/wall to minimize incidental splatter onto nearby personnel, medical equipment or supply carts in the clean core.

2.2.4.3 Sub-sterile service area may serve one or more ORs and shall include sterile supply area and a hand washing sink. [CSA 9.5.3.4.8][1] Drain may be required if a flash sterilizer is in the sub-sterile room.

2.2.4.4 A restricted access area outside the OR shall be provided for flash sterilization. [CSA 3.4.1][3] This area may serve more than one OR. [CSA :9.5.3.4.9][1]

2.2.4.5 OR ceilings shall meet restricted ceiling standards. The ceilings shall be monolithic, scrubbable, non-porous and should not have any cracks or perforations. The ceiling material shall be able to be cleaned using HCF approved low level disinfectants.[CSA: 12.2.5.4.4][1].

2.2.4.6 If ceiling mounted equipment prevents the ceiling from being free of crevices, then lay-in ceiling panels may be used provided the panels are monolithic, have gaskets and are clipped down. Perforated, serrated, cut or highly textured tiles shall not be used. [CSA: 12.2.5.4.3][1]

2.2.4.7 Ceilings in clean corridors shall meet semi-restricted standards. The ceilings should be smooth, solid surface, non-porous and scrubbable. The ceiling material should be able to be cleaned using routine low level hospital disinfection chemicals. Lay-in ceiling panels shall be sealed using gaskets and clip downs.

2.2.4.8 Support rooms shall be physically distinct from each other and specific to the surgical suite. [CSA: 9.5.3.4.10, 9.5.3.4.11, 9.5.3.4.16] [1]

2.2.4.8.1 Soiled and clean workrooms shall be separate.

2.2.4.8.2 Storage space for clean and sterile supplies shall be moisture and temperature controlled, free from cross traffic and separate from clean and soiled workrooms.

2.2.4.8.3 Clean workroom shall contain a work counter, hand washing station and storage for clean supplies. It shall not be used for food storage. The hand washing station may be omitted if area is used for storage and holding only.

2.2.4.8.4 An enclosed soiled workroom shall be provided for exclusive use by the surgical suite. It shall:

a. be located in a restricted area and not have direct connection to operating rooms or sterile activity rooms.

b. contain a human waste disposal fixture, hand washing station, work counter, waste receptacles and soiled linen receptacles. If applicable, there shall be sufficient space to hold soiled case carts.

2.2.4.8.5 A housekeeping room shall be provided for the exclusive use of the surgical suite.

2.2.5 Post Anaesthetic Recovery Room (PARR)

2.2.5.1 Minimum distance between beds shall be 2 m.

2.2.5.2 There shall be at least one hands-free hand washing station for every four beds uniformly distributed to provide equal access from each bed. [FGI: 2.2-3.3.3.3][2]

2.2.6 Emergency Department (ED) [CSA 9.4][1]

2.2.6.1 The triage area should be designed and ventilated to reduce exposure of staff, patients and families to airborne infectious diseases. [CSA: 9.4.2.2.8][1]

2.2.6.2 The ED shall have the ability to segregate patients according to disease category (e.g. respiratory, gastroenteritis) within the waiting room and then again within the procedure/patient care areas.

2.2.6.3 There shall be a decontamination/biohazard containment area in, or directly adjacent to, the ambulance garage. [CSA: 9.4.2.2.10, 9.4.2.2.11][1]

2.2.6.4 There shall be a waiting room area adjacent to the ED which is used only by ED patients.

2.2.6.5 The waiting room should have public toilets; the number to be decided by the functional program. [CSA:9.4.2.3.3][1]

2.2.6.6 The ED shall have at least one airborne isolation room (AIR). [CSA: 9.4.2.4.8][1]

2.2.6.7 Utility/Support rooms are required. Refer to Section 2.4.

2.2.6.8 In addition to the general list of infection prevention and control requirements, the following shall be provided in this service:

a. partitions or single rooms separating patients from each other;

b. designated waiting areas for patients and their family members presenting with infectious disease symptoms;

c. negative and positive pressure rooms in locations where there is minimal passing traffic and appropriate HVAC according to CAN/CSA-Z317.2; and

d. a design and layout that allows for the movement of patients, suspected or known to have infectious disease, to an isolation room within the unit. [CSA:9.4.3.3][1]

2.2.7 Ambulatory Care Clinics

2.2.7.1 Ambulatory Care Clinics shall have the ability to segregate infectious patients/clients according to disease category (e.g., respiratory vs. gastroenteritis) within the waiting room and then again within the procedure/patient care areas. This principle applies to all waiting rooms in the Ambulatory Clinics including areas such as Day Surgery. [CSA: 9.1.2.2.2, Table 11.1,48] [1]

2.2.7.2 Adequate space shall be provided for waiting, registration, and supplies, so that infection prevention and control principles can be adhered to. [CSA:9.1.2.2.4][1]

Note: Consideration of infection prevention and control is important in the design of this service. Treatment spaces are used for a variety of patients. It is possible that infectious patients will use the same treatment spaces as immunosuppressed patients at different times on the same day.

Note: All patient treatment places whether intended for inpatient or outpatient use shall be single occupancy unless the functional program demonstrates the necessity of multi-patient arrangement.

Note: Single occupancy means that patients have a spatial separation and a physical barrier between them sufficient to provide privacy, protection from the spread of infection, and adequate area to support the clinical functions. [CSA: 7.5.2.4][1]

2.2.7.3 Medical device reprocessing (MDR) should be performed in a centrally located area that is dedicated to MDR. If reprocessing shall take place in the Outpatient/Ambulatory Care Clinic, it shall be performed only in an area that has a dedicated space for these activities that allows for appropriate workflow and complies with CSA standards regarding heating, ventilation and air conditioning (HVAC) [CSA][4] and plumbing design requirements [CSA][5].

2.2.7.4 Utility /Support rooms are required in Ambulatory Care. Refer to Section 2.4.

2.2.8 Protective Isolation Ambulatory Care Clinics

2.2.8.1 Patient populations should be assessed to determine the type of procedures that are carried out in a clinic area. Multi-use clinics shall meet the requirements for the most at-risk patient/procedures performed there. If bronchoscopy or other aerosol generating procedures are performed, a room capable of negative air pressure shall be provided and the air exchanges shall comply with HVAC standards. [CSA: Table 1][4].

2.2.8.2 An anteroom is not required.

2.2.8.3 In some outpatient/ambulatory care clinic settings (e.g. a dedicated infectious diseases clinic) consideration should be given to having one negative pressure room built as outlined in CSA Z8000,7.5.5.1.[1] Refer to Appendix 2

2.2.9 Considerations for Acute Care

2.2.9.1 Planters shall not be allowed in patient care areas for immunosuppressed patients. [APIC Text 15-9][6]

2.2.9.2 Decorative fountains and fish tanks should not be allowed in patient care areas. [APIC Text 105-4][6] [CDC: Recommendations Water I E][7] If decorative fountains are placed in public areas of the health care facility, ensure that appropriate standards are followed for disinfection and fountain maintenance; Decorative fountains and fish tanks are contraindicated in cancer treatment/infusion therapy facilities. [FGI 2.2-3.10.9 p. 159][2].

2.2.9.3 A risk assessment should be conducted before art is chosen to ensure the materials and finishes are safe for the healthcare environment and the planned location of the artwork is appropriate. There shall be a written plan for regular cleaning and maintenance. Refer to Appendix 4, *Sample IPC Risk Assessment Matrix for Artworks at South Health Campus*.

2.2.10 Continuing Care Areas

Note: This can be a free standing facility or distinct part of a general hospital or other HCF. [FGI: 4.1-4][2]

Definition of Continuing Care – An integrated range of services supporting the health and well-being of individuals living in their own home or in a supportive living or long term care setting. Continuing care clients are not defined by age, diagnosis, or the length of time they may require services, but by their need for care. [Alberta Health Standards][8, 9]

2.2.10.1 The use of 2-bed rooms maybe considered for use by couples or by others for whom there would be a social benefit. The need for increased socialization opportunities shall be balanced against patient management priorities such as patient privacy and IPC. [CSA:8.8.2.4.4][1]

2.2.10.2 Each patient shall have access to a toilet room without the need to enter the corridor area. [FGI: 4.1-2.2.2.6][2], [CSA:8.8.2.4.8][1] One toilet room shall serve no more than 2 patients in new construction and no more than 2 patient rooms or 4 beds in renovation projects. [FGI:4.1-2.2.2.6,1][2]

2.2.10.3 A hand washing station shall be provided in each patient's room.

Note: Dedicated hand hygiene sinks for staff use in each resident's room is considered best practice; however, in the absence of this dedicated staff hand hygiene sink, the sink in the resident's washroom may be used. [FGI 4.1-2.2.2.5][2]

2.2.10.4 Dining rooms shall have hand washing stations in close proximity. [FGI 4.1-2.3.2.2,2b][2] Toilet facilities shall be readily accessible to dining rooms. [FGI: 4.1-2.3.2.2,2c][2]

2.2.10.5 A minimum of one bathtub or shower shall be provided for every twenty patients or major fraction thereof not otherwise served by bath facilities in patients' rooms. [FGI 4.1-2.2.2.8, 1][2]

2.2.10.6 Patients shall have access to at least one bathtub or shower per floor or unit. [FGI 4.1-2.2.2.8, 2][2]

2.2.10.7 Patient hair care and grooming facilities shall be separate from the patient rooms, shall contain a hand washing station and a patient toilet shall be located in close proximity. [FGI: 4.1-2.3.4][2,10,11]

2.2.11 Mental Health Areas

Definition of Mental Health Area - A facility or area intended for the care and treatment of inpatients that do not require acute medical services. [FGI: 2.5-1.1][2]

2.2.11.1 A minimum of one bathtub or shower shall be provided for every six beds not otherwise served by bathing facilities in patient rooms. [FGI: 2.5- 2.2.2.7][2]

2.3 Patient Care Unit Facilities

2.3.1 General Considerations for Washrooms

2.3.1.1 A three piece washroom contains a toilet, hand washing sink and shower. A two piece washroom contains a toilet and hand washing sink. [CSA Table 11.1, 25][1]

2.3.1.2 There shall be a washroom with a toilet and sink for each inpatient. [CSA: 7.5.7.1][1]

2.3.1.3 Patient Washrooms

2.3.1.3.1 In medical, surgical, cardiac intensive care, mental health, post-partum, pediatric and adolescent units (including observation rooms), 100% of inpatients should have their own 3 piece washroom. If patients are in a two bed room each patient requires their own washroom. [CSA: 7.5.7.1][1]

2.3.1.3.2 In rooms where patients do not use a toilet, e.g. new born nursery, the washrooms may be omitted, but means for disposal of waste shall be provided. [CSA: 7.5.7.1][1]

2.3.1.3.3 Automatic flushing shall not be installed in patient care areas. [CSA: 8.2.7][5]

2.3.1.4 Staff Toilet Room

2.3.1.4.1 One staff toilet room is required per each patient unit. This dedicated staff washroom shall contain a toilet and a hand washing station. [FGI 2.1-2.7.2][2].

2.3.1.5 Ambulatory Care Clinic Toilet Room

2.3.1.5.1 Toilets (2 piece) for patient use shall be provided separate from public use and located to permit access from patient care areas without passing through public areas. [CSA: 9.1.3.3.1] [1] and [FGI 3.1-3.8.1][2]

2.3.1.5.2 One patient toilet room shall be provided at a minimum of one per eight patient stations or fraction thereof. [CSA :9.4.2.4.10][1]

2.3.1.5.3 Showers shall be provided if required by the functional program. [FGI: 4.1-3.1.9.4] [2]

2.3.1.6 Public Toilet Room

2.3.1.6.1 Toilet and sink shall be hands-free operation. [CSA: Table 11.1, 49 (a)] [1] Note: Hands-free operation includes: elbow, knee, foot or electronic operation.

2.3.1.6.2 Dispensers for paper towels shall be hands free (designed so that hands touch only the towel and not the dispenser). [CSA: Table 11.1,49 (b)] [1]

2.3.1.6.3 Hand dryers maybe considered in public toilet rooms provided there is a hands free entrance and exit.

2.3.1.7 Patient Toilet Room

2.3.1.7.1 The toilet room shall contain a toilet and hand washing sink. [FGI: 2.1-2.2.6.3] [2]

2.3.1.7.2 All toilets shall follow CSA: Z317.1-09 ,8.2.[5]

2.3.1.7.3 Toilet shall be hands-free operation (e.g. floor pedal). [CSA Table 11.1, 49 (a)] [1]

Note: Hands-free operation includes: elbow, knee, foot, or electronic operation. It does not mean automatic flushing.

2.3.1.7.4 Flush pressure should be controlled to minimize the risk of aerosolization. [Barker and Jones, 2005][12]:

2.3.1.7.5 Swing out toilets shall not be used.

2.3.1.7.6 There shall be a hand washing station within the same room in close proximity to the toilet. [FGI: 2.1-2.2.6.3][2]

2.3.1.7.7 The toilet located in the inpatient washroom shall not be used to dispose of human waste from bedpans. [CSA Table 11.1, 25(y)][1]

2.3.1.7.8 Toilets with tanks shall not be used. [CSA Table 11.1, 25 (h),49 (d)][1]

2.3.1.7.9 Toilets shall not be installed directly inside the patient bedrooms. [CSA: 7.5.7.1][1] There shall be a private washroom accessible within the patient's cubicle. [CSA Table 11.1, 24(n)][1]

Note: Consideration for an exception to this recommendation as it applies to Coronary Care Unit (CCU) patients may be granted if presentation of strong clinical evidence supports it.

2.3.2 Hand Hygiene

2.3.2.1 General Considerations for Hand Hygiene Stations

2.3.2.1.1 AHS Hand Hygiene Policy[13] states that hand hygiene shall be performed either through the use of alcohol based hand rubs (ABHR) or with soap and water at a hand washing sink. Provision shall be made to allow the use of both.

2.3.2.1.2 For selection of sinks and fixtures refer to Appendix 3, *AHS IPC Best Practice Guidelines for Selection of Sinks and Faucet Fixtures for Dedicated Hand Washing Stations*.

2.3.2.1.3 Dispensers for paper towels shall be hands-free and designed so that hands touch only the towel and not the dispenser. [CSA Table 11.1,49 (b)] [1]

2.3.2.1.4 All sink drains shall have accessible clean-outs and designed so that sewage will not be spilled when maintenance is performed. [CSA :8.3.1.1] [5]

2.3.2.1.5 ABHR shall be placed in accordance with provincial and local restrictions/guidelines. [Government of Alberta Fire Code][14]

2.3.2.1.6 ABHR hand hygiene stations shall be provided in each of the following locations: [CSA:7.5.11.3.1][1]

a. at all entrances and exits to the HCF;

b. immediately adjacent to the entrance to every inpatient bedroom;

c. on a wall immediately adjacent to the entrance to every patient care area (e.g., exam rooms and procedure rooms in out-patient settings, medical imaging procedure rooms, etc.);

d. adjacent to the bedside (point of care) in all situations except where patient safety could be put at risk (e.g. mental health/ addictions unit);

e. where PPE is donned or doffed;

f. where compliance with routine practices is required; and

g. public and staff eating areas.

2.3.2.2 Dedicated Hand Washing Stations for Health Care Workers (HCW)

Note: A dedicated hand washing station includes a sink dedicated exclusively for use by health care workers for the purposes of hand hygiene only.

2.3.2.2.1 Hand washing stations shall be located: [CSA: 7.5.11.2.1][1]

a. inside each inpatient bedroom, adjacent to the entrance;

b. in airborne isolation rooms; one in the anteroom if present and one in the room itself;

c. in any space where treatment is provided or procedures or physical exams are performed, as follows:

- in a location designed for one patient to be present at a time;
- in a location designed to accommodate three or more patients at a time: minimum of one sink for every three patients, with no more than 6 m distance between any patient station and the nearest sink;
- inside a tub room. [CSA: Table 11.1,47][1]

d. inside or adjacent to each diagnostic/MRI room;

e. in each room where medication is prepared;

f. in any room in which food or patient care items are prepared. This includes clean utility rooms, nourishment centres, rooms where infant formula is prepared, etc.;

g. inside each nursing station or within 6 m of the station;

h. inside each staff lounge or within 6 m of the lounge;

i. in each soiled utility or holding room (in addition to sinks or hoppers that are used for contaminated materials);

j. in each room where un-bagged soiled linen is handled;

k. in areas where hands are likely to become contaminated, such as material goods receiving areas, chemical storage, waste disposal and housekeeping supply area.

l. in staff oasis/kitchenette.

2.3.2.2.2 A scrub sink (as distinct from a hand washing station) shall be provided in any area where operative procedures are performed including OR, delivery rooms, endoscopy suites, interventional radiology, cardiac catheterization suites and trauma rooms. [CSA: 7.5.12.][1]

2.3.2.2.3 Except at scrub sinks, hand drying provisions shall be made at each hand washing station. [FGI: 3.1-7.2.2.8 (5)][2]

2.3.2.3 Public Hand Hygiene Stations

2.3.2.3.1 Public hand hygiene stations should be included at the entrances and exits of all health facilities. [CSA: 7.5.11.3.1 (a)] [1]

2.3.2.3.2 Mobile hand hygiene stations shall be placed at the entrance(s) to the health facilities, in a prominent location within the traffic flow, so that visitors stop, take notice, and use them. If wall-mounted hand hygiene stations are used they shall be placed at the entrance to health facilities alongside the traffic flow.

2.3.2.4 Outpatient/Ambulatory Care Clinics Hand Hygiene Stations

2.3.2.4.1 A hand hygiene station shall be provided in all general purpose examination rooms, special purpose examination rooms and treatment rooms. [CSA :9.2.3.5.6, Table 11.1,14 (b)] [1]

2.3.2.4.2 Areas designed to accommodate three or more patients at a time: a minimum of one sink for every three patients, with no more than 6 m distance between any patient station and the nearest sink. [CSA:7.5.11.2.1,b(ii)][1]

2.3.2.5 Sinks, Faucets, and Taps

See:

Appendix 3: AHS IPC Best Practice Guidelines for Selection of Sinks and Faucet Fixtures for Dedicated Hand Washing Stations

2.3.3 Tub and Shower Rooms

2.3.3.1 Showers shall be built to ensure that:

2.3.3.1.1 The shower room flooring is integrally sealed with the shower base so that water cannot penetrate under any section of flooring. Water cannot flow out of the shower area and onto the floor or into the hallway;

2.3.3.1.2 Wall bases shall be integral with the floor, tightly sealed against the wall and constructed without voids. [CSA Table 11.1,47 (j)][1]; and

2.3.3.1.3 Sufficient exhaust to limit water condensate.

2.3.3.2 Where tub rooms are indicated, they shall meet the following: [CSA Z8000 Table 11.1, 47] [1]

2.3.3.2.1 There shall be easy access to hand hygiene sink within the room, located at the entrance/exit;

2.3.3.2.2 Each tub/shower room shall be equipped with non-moisture absorbing emergency staff call cord; and

2.3.3.2.3 Each room shall have storage space for supplies for tub cleaning after each patient use. E.g. personal protective equipment (PPE) and cleaning supplies.

2.3.3.3 Tub/shower rooms shall not be used for any other purpose.

2.3.3.4 Wall bases shall be integral with the floor, tightly sealed against the wall and constructed without voids.

2.3.3.5 Flooring material shall be slip resistant and shall not support growth of mildew or mould.

2.3.3.6 In acute care if individual bathing facilities are not provided in each patient washroom, then the recommendation of 1 tub/shower per 12 patients should be followed [FGI :2.2.-2.2.2.7][2].

2.3.3.7 Tubs with recirculation jets shall not be used.

2.3.4 Surfaces (General, Walls, Ceilings, Floors, Access Points)

2.3.4.1 General

2.3.4.1.1 Surfaces shall have the following characteristics: [CSA: 7.2.2.1)[1]

a. easy to maintain, repair, clean;
b. resistant to microbial spread and growth;
c. non-porous or smooth;
d. durable;
e. seamless;
f. constructed in such a way that they do not soak up or harbour moisture; and
g. water impermeable in areas where water or dampness can occur.

2.3.4.1.2 Materials and finishes shall be moisture impervious and compatible with HCF approved low level disinfectants used for environmental cleaning. Only non-cellulose building materials shall be used. [CSA 7.2.1.2][1]

2.3.4.1.3 Avoid the use of materials that are susceptible to moisture damage, hard to clean or that provide areas where bacteria and mould may grow. Examples of materials to avoid include, but are not restricted to: Refer to [CSA:5.1.2][15]

a. Carpets; if used, should be minimal and approved by IPC. (In these cases, investigate the use of innovative materials that do not support microbial contamination); [CSA: 12.2.5.2.2][1]
b. wallpaper (paper and vinyl) [APIC: 106-9][6]
c. textured surfaces and ledges [APIC :106-9][6]

2.3.4.2 Walls

2.3.4.2.1 Wall finishes shall be washable and able to withstand routine cleaning with HCF approved low level disinfectants. [CSA: 12.2.5.3.1][1]

2.3.4.2.2 Walls in the vicinity of plumbing fixtures, e.g., behind sinks or showers, shall be smooth and water resistant. [CSA: 2.2.5.3.1][1]

2.3.4.2.3 The bottom edge of drywall shall be set a minimum of 1.2 cm above the finish floor level and the gap sealed. [CSA: 12.2.5.3.2][1]

2.3.4.2.4 Wall finishes in the OR, caesarean section rooms, isolation room, sterile processing rooms and sterile storage areas shall be free of fissures, open joints or crevices that may retain or permit passage of dirt particles. [CSA: 12.2.5.3.3][1]

2.3.4.2.5 Moisture resistant drywall shall be used in critical care areas. [CSA: 12.2.5.3.5][1].

2.3.4.2.6 Protective coving shall be used from the floor up the wall in all areas where there will be frequent or constant moisture, e.g. MDR decontamination areas, workrooms where soiled materials are sorted or processed, shower facilities, and change areas. [CSA: 12.2.5.3.7][1].

2.3.4.2.7 Modular walls shall meet the applicable requirements in 2.3.4.1 and 2.3.4.2. In addition, modular walls shall not be used where protective coving is required. Refer to the Algorithm for Use of Modular Wall Systems for further guidance.

2.3.4.3 Ceilings

2.3.4.3.1 Ceilings in clinical care areas should withstand cleaning using HCF approved low level disinfectants. [FGI: 2.1-7.2.3.4][2].

2.3.4.3.2 Solid ceilings shall be installed in airborne isolation rooms (AIR) and anterooms if provided, burn units, 3 piece washrooms, shower rooms and tub rooms. [CSA: 12.2.5.4.2][1]

2.3.4.3.3 Ceilings in semi-restricted areas shall be smooth, non-absorptive, non-porous and scrubbable and without crevices, cracks or fissures. The ceiling material should withstand cleaning with HCF approved low level disinfectants. [CSA:12.2.5.4.3][1].

Note: Semi-restricted areas include but are not limited to airborne isolation rooms, clean and sterile storage areas and minor surgical procedure rooms. [CSA:12.2.5.4.3][1].

2.3.4.3.4 Restricted areas include operating rooms. Ceiling in restricted areas such as operating rooms, shall be monolithic and constructed with drywall or removable ceiling panels that comply with the next clause. [CSA: 12.2.5.4.3][1], [CSA: 12.2.5.4.4][1]

2.3.4.3.5 If a removable ceiling panel system is used, it shall be monolithic, gasketed, and clipped down. [CSA: 12.2.5.4.3][1]

2.3.4.4 Floors

2.3.4.4.1 Floor and wall areas penetrated by pipes, ducts and conduits shall be tightly sealed to minimize penetrations that pass through. A floor shall be properly sleeved to ensure that water cannot pass through the floor penetrations to the floor below. Penetrations shall be properly sealed to prevent the entrance of insects and rodents. [FGI 2.1-7.2.3.2][2].

2.3.4.4.2 Floors in patient care areas subject to frequent wet cleaning methods shall be monolithic and coved; resistant to water penetrations; and resistant to damage by HCF approved low level disinfectants. [CSA: 12.2.5.2.4] [1]

2.3.4.4.3 Flooring shall be coved in all places where the floor is subject to frequent wet cleaning or where water is commonly used, e.g. kitchen, soiled utility rooms, washrooms, hemodialysis, hydrotherapy.

2.3.4.4.4 When coving is used, ensure the sheet goods base is continuous with the floor, using the manufacturer's instructions.

2.3.4.4.5 When using PVC wall covering weld sheet vinyl flooring integral base to PVC wall covering material.

2.3.4.4.6 Floors in all operating rooms, interventional imaging rooms, caesarean delivery rooms, cardiac catheterization labs, endoscopy procedure, cystoscopy and minor surgical procedure rooms shall be monolithic and joint free. [CSA :12.2.5.2.6][1] , [FGI: 2.1-7.2.3.2-12][2]

2.3.4.5 Access Points

2.3.4.5.1 For building or unit access use automated doors to provide less contact with potentially contaminated high touch surfaces.

2.3.4.5.2 The use of fabric privacy curtains shall be permitted if they are washable. A wipeable fabric with a smooth surface is preferable. [FGI 2.2-2.3.9.2][2].

2.3.4.6 Corridors

2.3.4.6.1 Corridors/hallways should take into account patient flow so that the arrangement of patient rooms and corridors minimize spread of infections through patient movement/transfer. [CSA 4.5.2] [1]

2.3.4.6.2 Provide alcoves outside the patient rooms to accommodate isolation carts, personal protective equipment [CSA 8.2.3.8][1] and other clean supplies. Alcoves may not be necessary when the patient room has an anteroom which is equipped with enclosed storage space for clean supplies.

2.3.4.6.3 Hallways should not be used to store clean supply carts. Clean supply carts shall be stored in a designated space or alcove and covered so clean supplies do not become contaminated.

2.3.4.6.4 Coat hooks may be mounted in hallways outside patient rooms to allow garments to be hung up prior to donning PPE.

Note: A patient risk assessment should be done prior to installing coat hooks.

2.4 Utility /Support Areas

All Medical/Surgical units, Critical Care Units, Operating Rooms, Emergency Departments and Outpatient/Ambulatory Care Clinics and Continuing Care require the following utility/support areas. Each support area shall be in a physically distinct room.

2.4.1 Soiled Utility Room [CSA: Table 11.1, 40][1], [FGI: 2.1-2.6.10][2]

2.4.1.1 Soiled utility rooms are required on all patient care areas and should be located and arranged to provide easy access for staff.

2.4.1.2 This should be a separate room with no direct connection with the clean utility room. [FGI: 2.1-2.6.10][2]

2.4.1.3 Each soiled utility room shall have:

a. one sink for cleaning of contaminated equipment and disposal of fluids; and

b. a separate dedicated hand washing station.

2.4.1.4 Soiled utility rooms shall only be used for temporary storage of supplies and equipment that will be removed for cleaning, reprocessing or destruction.

2.4.1.5 Soiled utility rooms shall be designed and equipped to minimize/contain the aerosolization of waste.

2.4.1.6 Easy access shall be provided for closed human waste container cleaning devices or disposable human waste container devices.

2.4.1.7 Flooring shall be of seamless impermeable, non-slip material.

2.4.1.8 Splash protection shall be provided on walls near water supply, sinks, or human waste management systems.

2.4.1.9 Counter tops shall be of non-porous material, free from seams and tolerant of routine daily cleaning with HCF approved low level disinfectants.

2.4.1.10 The room shall have a door which should remain closed and access restricted to clinical and support staff. [CSA: Table 11,40,(l)][1]

2.4.1.11 The room shall have the capacity to:

a. segregate waste into health care facility approved containers;

b. hold soiled linen and items for return to Medical Device Reprocessing Department (MDRD);

c. contain a human waste management system (HWMS);

d. contain supplies associated with waste management systems; and

e. provide for cleaning soiled patient equipment that is not returned to MDRD (e.g. IV poles, commode chairs, etc.).

2.4.1.12 Spray wands shall not be used for rinsing of items. Equipment used for removal of gross soiling shall minimize aerosolization of particulates.

2.4.1.13 Space shall be provided for separate mobile carts/containers for soiled linen, general waste, medical/hazardous waste, confidential waste, and recycling, etc.

2.4.1.14 The room shall provide storage for carts that will be used to move the soiled material from the room.

2.4.1.15 Human waste disposal equipment shall be provided in accordance with the functional program needs (e.g., macerator, clinical flushing rim sink, washer disinfector).

2.4.1.16 If clinical flushing rim sinks (hopper) are used, they shall be designed to contain any splash and the controls shall be located so as not to expose staff to contamination. [CSA: 8.3.4][5] Refer to 2.6.

2.4.2 Clean Utility Room [CSA: Table 11.1, 8][1]

2.4.2.1 Clean utility rooms are required on all patient care areas and be located and arranged to provide easy access for staff.

2.4.2.2 Clean utility rooms shall be physically distinct from soiled utility rooms.

2.4.2.3 Clean utility room requires a hand washing station if the room is used for preparation of patient items. E.g. preparation of IV equipment [FGI: 2.1-2.6.9.1][2]

2.4.2.4 All storage of medical and surgical supplies shall be in mobile shelving or automated dispensing cabinets.

2.4.2.5 All storage for linen shall be in mobile shelving and the cart shall be covered when transported to the room.

2.4.2.6 The room shall have a door that is closed with access limited to clinical and support staff.

2.4.2.7 Decontamination or cleaning of supplies shall not be permitted in the clean utility room.

2.4.2.8 Shelving units or cart surfaces shall have cleanable, smooth, and non-porous surfaces tolerant of HCF approved low level disinfectants.

2.4.2.9 Storage of equipment and supplies shall not be exposed to direct airflow from the HVAC system in accordance with CSA Z314.15 and CSA Z314.3.

2.4.2.10 Storage should be away from the windows, due to the risk of condensation.

2.4.2.11 Flooring shall be of seamless impermeable non-slip material.

2.4.2.12 Shelving for clean and sterile supplies shall be at least;

f. 23 cm off the floor;

g. 45 cm from the ceiling; and

h. 5 cm from outside walls.

2.4.2.13 The room shall have designated locations for the types of items being stored, including clean and sterile supplies, clean linen and crash carts.

2.4.3 Clean Linen Storage Area [CSA: Table 11.1 ,8(h)][1]

2.4.3.1 Clean linen storage areas are required in all patient care areas.

2.4.3.2 Clean linen may be stored in a clean utility room or closed closet used specifically for clean linen storage. If clean linen is not stored in a clean utility room/closet then the linen cart shall be stored in an alcove. [FGI:2.1-2.6.11.1][2]

2.4.4 Housekeeping Service Room [CSA: Table 11.1, 22][1]

Note: The sizes and requirements for this room are based on the assumption that major equipment is stored in the service area.

2.4.4.1 A housekeeping service room shall be centrally located between patient care areas and shall be able to accommodate large power equipment and have greater inventory for distribution to the smaller housekeeping closets.

2.4.4.2 The room shall accommodate the following functions: enough space for cleaning products (and dispensers, if used); an eyewash station with tempered water supply; and a floor drain to collect run-off.

2.4.4.3 The room shall have a door that is kept closed and be secure with access restricted to clinical and support staff.

2.4.5 Housekeeping Closet [FGI: 2.1-2.6.12][2], [CSA: Table 11.1. 21][1]

The sizes and requirements for this room are based on the assumption that major equipment is stored elsewhere.

2.4.5.1 A housekeeping closet shall be provided in all major care areas or a minimum of one closet per 650 m^2.

2.4.5.2 Every housekeeping closet shall have a 60 cm × 60 cm floor-based sink. This sink shall be protected by an easily cleanable wall surface up to 1.2 m from the finished floor.

2.4.5.3 The housekeeping closet shall be large enough to store at least one housekeeping cart.

2.4.5.4 Wall protection shall be provided to prevent damage by the carts to a height of 1.2 m.

2.4.5.5 Housekeeping closet shall include;

a. floor sink for dumping of dirty water from pails, etc.;

b. fresh water source (hot and cold) for filling pails, etc.;

c. hand washing station;

d. non-fixed shelving unit for storage of supplies (i.e., paper towels, toilet paper); and

e. fixed shelving for storage of small quantities of cleaning products.

2.4.5.6 The housekeeping closet shall have a door that is kept closed and shall be secure with access restricted to clinical and support staff.

2.5 Waste Management

2.5.1 Waste management practices shall include segregation of waste into an appropriate dedicated holding area in the unit of care or work environment and shall be in compliance with CSA Z317.10. [CSA: 7.5.6][1]

2.6 Disposal of Human Body Waste

2.6.1 Each patient care area shall be equipped with at least one closed waste management system where staff can decant or discard human waste, solid and liquid, and other potentially contaminated fluids. [CSA: 7.5.7.2][1].

Note: Depending on the system, human waste discard can either be accomplished through the use of disposable containers that are discarded with the waste (macerator) or reusable containers that are emptied and reprocessed (i.e. using a washer-disinfector). [CSA: 7.5.7.3][1]. Adequate storage for cardboard supplies should be taken into consideration with design requirements.

2.6.2 The number and location of these systems shall be determined based on the need to maintain proximity to the point of care and the risks and acuity of the patient population. [CSA: 7.5.7.2][1]

2.6.3 The choice of disposal system purchased should be determined by the needs of the end user. The type of unit purchased should be made only after discussion with the end users followed by consultation and discussion with other stakeholders such as Capital Management, Facilities Management and Engineering, and IPC. The disposal system should:

a. not expose the user to contamination;
b. have hands free operation if possible;
c. have mechanisms to prevent backflow; and
d. achieve a minimum of low level disinfection for reusable equipment.

2.6.4 Human waste management systems shall be designed to prevent aerosolization of fluids during the decanting or discarding of waste. [CSA: 7.5.7.3][1]

2.6.5 Spray wands shall not be installed or used for rinsing waste receptacles. [CSA: 7.5.7.3][1]

2.6.6 Hand washing sinks shall not be used for the disposal of human waste or body fluids. [CSA: 7.5.11.1.2.] [1]

2.6.7 The toilet shall not be used to dispose of waste from bedpan. [CSA Table 11.1 (25 y)] [1]

2.7 Equipment Storage

2.7.1 Adequate equipment storage shall be provided in every patient care area. [CSA:7.7.1.6][1]

2.7.2 The storage area shall be determined in accordance with the functional program, but in no case shall the storage be less than 2% of the total area of the service.

2.7.3 Circulation areas (e.g. corridors or hallways) shall not be used for storage.

Note: Improperly stored items, for example in corridors or treatment spaces, can present multiple risks to safety and security, in terms of fire safety, infection prevention and control, theft, and hazards due to sharps or electrical shock.

2.7.4 Sealed lighting units with cleanable lens covers are required in all clinical/patient and equipment/supply storage areas. U-channel lighting and open sconce lighting shall not be used.

3. Ambulatory Care and Support Areas

3.1 General Considerations

Refer to the corresponding section in CSA Z8000;

a. Ambulatory Care - General Table 9.1
b. Ambulatory Care - Dialysis Table 9.2
c. Ambulatory Care - Oncology Table 9.3
d. Emergency Care - Table 9.4
e. Interventional Procedures - Table 9.5
f. Clinical Support Services - Table 9.6
g. Respiratory Services - Table 9.9
h. Medical Imaging - Table 9.10

3.1.1 Waiting rooms and holding areas, where multiple patients occupy the same room, shall comply with the following precautions and minimum distances for separation: [CSA: 7.5.2.7][1]

a. unscreened patients -1 m;
b. screened patients may be less than 1 m; and
c. symptomatic (respiratory) 2 m or physical barrier.

3.1.2 Ventilation standards for waiting areas should provide a minimum of 12 air exchanges per hour, and be negative pressure relative to adjacent areas. [CSA: Table 1][4]

3.1.3 Patient treatment area shall be single occupancy unless the functional program demonstrates the necessity of multi-patient arrangement. Single occupancy means that patients have a spatial separation and a physical barrier between them sufficient to provide privacy and protection. [CSA: 4.5.4.][1]

3.1.4 For sink and faucet design and location criteria, refer to Appendix 3, *AHS IPC Best Practice Guidelines Selection of Sinks and Faucet Fixtures for Dedicated Hand Washing Stations*.

3.1.5 A hand washing station shall be installed in any space where treatment is provided or procedures are performed. [CSA 7.5.11.2.1][1]

3.1.6 Patient Toilet Rooms

3.1.6.1 One patient toilet shall be provided for each two patient rooms and serving no more than four beds. The toilet room shall contain a toilet and hand washing station. [FGI: 2.1-2.2.6.2, 2.1-2.2.6.3][2]

3.1.6.2 Each patient shall have access to a toilet room without having to enter a corridor. Unless located in a toilet room, bedpan washing fixtures shall be installed in dedicated rooms, separate from patient care areas. [FGI: 2.1-2.2.6][2]

3.1.6.3 Bedpan washing fixtures shall be installed in dedicated rooms. [FGI: 2.1-2.2.6.1][2]

3.1.6.4 Human waste disposal equipment shall be located and arranged to provide easy access for staff. [CSA Table 11.1,40][1], [FGI: 3.1-5.4.2.2][2]

3.1.7 Utility/Support Rooms are required for Ambulatory Care. Refer to Section 2.4

3.1.8 Medical device reprocessing shall be performed only in areas that have a dedicated space for these activities and that comply with CSA standards regarding HVAC [CSA 317.2-10][4] and design [CSA 314.8-08][16] requirements.

3.2 Hemodialysis

3.2.1 Reverse osmosis water loop shall be installed in accordance with CAN/CSA-ISO 26722[17]. [CSA: 9.2.2.7][1]

3.2.2 Systems for the disposal of liquid wastes from the dialyzing process shall be designed in compliance with CSA Z317.1[5].

3.2.3 A means shall be provided to dispose of waste chemicals in the soiled utility room. [CSA: 9.2.3.4.2][1]

3.2.4 Hand washing stations shall have a separate water supply and drainage system that does not interfere with Hemodialysis piping. [CSA: 9.2.3.5.1][1]

3.2.5 Capacity shall be provided to separate infectious patients in the area. [CSA :9.2.3.5.3][1]

3.2.6 Hand washing stations shall be directly accessible and uniformly distributed within treatment areas at a minimum ratio of 1:4 stations within all enclosed rooms, convenient to medication carts and within clean supply rooms. [FGI: 2.2-3.9.2.5][2]

3.2.7 ABHR shall be located at the entrance of each treatment room and in each treatment pod and there should be one for each chair or bed. [CSA: 3.2.3.5.6][1]

3.2.8 A separate single room to provide for separation of a patient on airborne isolation precautions should be provided at the rate of one single room for every five treatment bays giving a cluster of 6 treatment spaces. [CSA: 9.2.3.5.12][1]

3.2.9 Utility/Support Space

3.2.9.1 Adequate clean storage space for per patient treatment (i.e. number of scheduled patient treatments in a given time period) and possible treatment delays shall be provided. [CSA: Table 9.2, 12][1]

3.2.9.2 In the soiled utility room, a service sink/hopper for disposal of chemical waste shall be provided. Provision shall be made for very high volumes of biomedical and general wastes. [CSA: Table 9.2 ,11][1]

3.2.9.3 Soiled utility room shall be separate from and have no direct connection with clean work rooms or clean supply rooms. [CSA :Table 11.1,40][1]

3.3 Medical Imaging and Interventional Procedures

Note: Patient care areas used for invasive/interventional procedures may include but not limited to the following areas:

a. electrophysiology [FGI: 2.2-3.5.3][2]
b. cardiac catheterization [FGI: 2.2-3.5.2] [2],
c. GI-endoscopy [FGI : 2.2-3.11] [2]

3.3.1 Sufficient space shall be provided to accommodate the functional use of the room. [CSA: Table 9.10][1]

3.3.2 An area for segregation of patients requiring airborne precautions shall be provided. [CSA: 9.10.3.6][1]

3.3.3 In areas where radioactivity standards are required, stainless steel and hands free operable controls are required for hand hygiene sinks in areas handling radioactive materials. [CSA: 9.10.3.6][1]

3.3.4 Clean and soiled areas shall be physically separate. [CSA: 9.10.3.6][1]

3.3.5 Medical device reprocessing shall take place within the medical device reprocessing department. [CSA :9.10.3.6][1]

3.3.6 Clean supplies on carts shall not be stored in hallways. [CSA: 9.10.3.6][1]

3.3.7 Local access to washrooms and human waste disposal shall be determined in accordance with IPC. [CSA: 9.10.3.6][1]

3.3.8 Patient Toilets

3.3.8.1 A patient toilet shall be provided. It shall be convenient to the procedure room and, if directly accessible to the scan room, arranged so a patient can leave the toilet without having to re-enter the scan room. These areas may include but is not limited to;

a. Computerized tomography [CSA: Table 9.10,6][1];
b. Fluoroscopy [CSA :Table 9.10,4][1]
c. Ultrasound [CSA: Table 9.10,5][1]; and
d. Gastrointestinal endoscopy. [CSA: Table 9.5][1]

3.3.8.2 Each patient shall have access to a toilet room without having to enter a corridor. [CSA:9.1.3.3.2][1]

3.3.8.3 Bedpan washing fixtures shall be installed in dedicated rooms. Refer to Section 2.6

3.3.9 Sinks

3.3.9.1 Sink design and location criteria; refer to Appendix 3, AHS IPC Best Practice Guidelines Selection of Sinks and Faucet Fixtures for Dedicated Hand Washing Stations.

3.3.9.2 A hand washing station shall be installed in any space where treatment is provided or procedures are performed. [CSA:7.5.11.2.1][1]

3.3.9.3 In MRI rooms the hand washing station may be installed immediately outside the room or located in the room if plastic pipes are used through the radiofrequency cage with the trap outside the wall cavity. [CSA:7.5.11.2.1][1]

3.3.9.4 A scrub sink (distinct from a hand washing station) with hands free operable controls shall be provided adjacent to and outside the entrance of endoscopy suites, interventional radiology and cardiac catheterization suites. [FGI 2.2-3.5.6.3][2], [CSA: 7.5.12][1]

3.3.9.5 Human waste disposal equipment shall be located and arranged to provide easy access for staff. [FGI:3.1-5.4.2.2][2], [CSA: Table 11.1,40][1]

3.3.10 Utility/support rooms required. Refer to Section 2.4.

3.4 Rehabilitation Medicine

Note: Rehabilitation Services may be free standing facility or distinct parts of HCF. The services provided by rehabilitation may include:

a. Physical therapy
b. Occupational therapy
c. Speech pathology
d. Audiology
e. Prosthetic and orthotic services
f. Complex wound management/hydrotherapy
g. Chiropody/podiatry

3.4.1 Hand washing stations shall be located at the entrance and within each treatment space. [FGI 2.2-3.7.2.2][2], [CSA: Table 8.6 1 (b), 2(b), 12(n)][1]

3.4.2 Sufficient space shall be provided for storage of returned equipment, separate from the storage of clean equipment for loan. [CSA 8.6.3.1.4][1]

3.4.3 Support Areas for Rehabilitation Therapy.

3.4.3.1 Environmental services room is required, in or near the unit. [FGI:4.1-3.1.6.3][2]

3.4.3.2 Waiting area for outpatients and the public shall be provided in addition to and separate from required resident support and activity areas. Public toilets shall be provided convenient to these waiting areas. [FGI: 4.1-3.1.9.1][2]

3.4.3.3 Facilities shall be provided for dressing and lockers for storing patients' clothing and personal effects. [FGI: 4.1-3.1.9.2][2]

3.4.3.4 Toilet facilities dedicated for patient use shall be provided. [FGI: 4.1-3.1.9.3][2]

3.4.3.5 Showers shall be provided, if required by the functional program. [FGI: 4.1-3.1.9.4][2]

4. Clinical Support Services

4.1 Facility Linen Management

4.1.1 Each facility shall have provisions for separate storing and processing of clean and soiled linen. Areas shall be designed to maintain separation between soiled and clean items. Walls shall separate functional work areas to control traffic flow and contain contaminants generated during the process. [FGI: 2.2-5.2][2], [CSA: Annex A][18]

4.1.2 The floor, walls, ceiling and work surfaces should be constructed of non-porous materials that will withstand frequent cleaning and wet conditions. [CSA: Annex A][18]

4.1.3 Each facility shall have internal linen processing areas and equipment. The following elements shall be provided.[CSA: Annex A][18]

4.1.3.1 Soiled linen holding room – a separate room shall be provided for receiving and holding soiled linen until ready for processing or transport. This room shall be accessible from a service corridor. [FGI 2.2-5.2.2.1][2] , [CSA: Annex A][18].

4.1.3.2 For clean linen storage a central clean linen storage and issuing room(s) shall be provided in addition to the linen storage required at individual patient areas. [FGI: 2.2-5.2.2.2][2]

4.1.3.3 Cart storage area(s) shall be provided for separate parking of clean and soiled linen carts out of traffic. [FGI: 2.2-5.2.2.3][2]

4.1.3.4 If linen is processed within a HCF, a clean linen inspection, repair, folding, assembly and packaging area shall be provided as part of the linen services. A space for tables, shelving, and storage shall be provided. [FGI: 2.2-5.2.2.4][2]

4.1.4 Clean surgical textile inspection, repair assembly and packaging shall be done in a separate enclosed area. There should be sufficient space for clean textile storage (both before and after assembly into packs), an illuminated inspection table and patching equipment.[CSA: Annex A][18]

4.1.5 If linen is processed in a HCF the following shall be provided: [FGI: 2.2-5.2.3][2]

4.1.5.1 Layout of equipment shall be arranged to permit an orderly workflow and minimize cross traffic that might mix clean and soiled operations; [FGI :2.2-5.2.3.1][2]

4.1.5.2 A receiving, holding and sorting room shall be provided for control and distribution of soiled linen. Discharge from soiled linen chutes shall be received in a separate room adjacent to it; [FGI:2.2-5.2.3.2.][2]

4.1.5.3 Central linen holding areas shall be directly adjacent to the receiving dock and the laundry processing area should be co-located with the linen room and shall include areas for cart make-up and back up storage; [CSA: 10.2.2.3.][1] and

4.1.5.4 Laundry processing room – shall have commercial or industrial type equipment that can process at least a seven day supply within the regular scheduled work week. [FGI: 2.2-5.2.3.3][2]

4.1.6 Hand washing stations shall be provided in each room where clean or soiled linen is processed and handled. [FGI: 2.2-5.2.3.4][2], [CSA: Annex A][18]

4.1.7 Laundry chutes should not be used. [CSA:10.5.1.2.][18]

4.1.8 Housekeeping rooms are required for both soiled and clean laundry areas. [CSA: Annex A][18]

4.1.9 For HVAC systems for the laundry area refer to CSA: Table 1[18], Alberta Blue Book: Table 3.2-5 1[19].

4.1.10 For outsourcing of surgical textile processing refer to CSA: Z314.10.2-10 Laundering, maintenance and preparation of multiple use gowns, drapes and wrappers in health care facilities, Annex B[18].

4.1.11 If linen is processed outside the building;

4.1.11.1 provisions shall also be made for a service entrance, protected from inclement weather for loading and unloading of linen [FGI : 2.2-5.2.4.1][2];

4.1.11.2 a control station shall be provided for pick up and receiving [FGI: 2.2-5.2.4.2][2].

4.2 Medical Device Reprocessing Area

4.2.1 There shall be a centralized reprocessing area for collecting, cleaning and decontaminating medical devices. Reprocessing medical devices outside of a centralized reprocessing area shall conform to the requirements for reprocessing space. [Alberta Health][20];[CSA: 10.7.1.1][1]

4.2.2 Design considerations should allow easy access to equipment to minimize the effects of maintenance activities. Access for maintenance using interstitial spaces or external corridors should be considered. Locating the access areas on an outside wall at ground level will facilitate this. [CSA:10.7.4.7,9d)][1]

4.2.3 Provision shall be made to ensure there is adequate space for reprocessing and manual cleaning of equipment when renovations or new construction occurs at an existing site which increases the amount of equipment that will be used. This statement applies to both acute care sites and stand-alone sites.

4.2.4 Work flow design shall facilitate one way work flow (contaminated devices flow one way from the soiled to the clean). If devices need to travel vertically in the facility, separate dedicated elevators shall be provided for soiled and clean device transport. [CSA :10.7.2.1][1]

4.2.5 The decontamination receiving area shall be located at one entrance to the department. The dedicated soiled elevator from the OR or other area shall off load directly into the soiled receiving area. [CSA: 10.7.2.2][1]

4.2.6 Once cleaned and disinfected, items leave the decontamination area and move to the preparation and packaging area. From there, devices either move to a clean storage area or to sterilization. After sterilization, items move to a sterile storage area where they are dispatched to the user or stored until needed. [CSA: 10.7.2.3][1]

4.2.7 The dedicated clean elevator should be located in or near the sterile storage area. [CSA: 10.7.2.4][1]

4.2.8 Staff lockers should be readily accessible to the area [CSA: 10.7.2.5][1]

4.2.9 The space for MDRD shall accommodate the anticipated activities and workload for the service as determined by the following factors [CSA:10.7.3.1][1]

a. service model of the reprocessing service;
b. case carts vs. transport carts;
c. type and number of clinical services supported;
d. volume and type of procedures performed;
e. medical devices used;
f. degree of mechanization and manual reprocessing and
g. type, size and number of reprocessing machines.

4.2.10 For space requirements refer to CSA: Table 10.2[1].

4.2.11 For detailed design of each area within the MDRD refer to CSA: Table 10.1[1] Key Space Requirements and Recommendations – Medical Device Reprocessing.

5. Building Systems

5.1 Plumbing

5.1.1 All plumbing shall meet standards outlined in the most current Alberta Blue Book[19], local regulations and CSA Z317.1 Special Requirements for plumbing installations in health care facilities[5].

5.1.2 All tap water shall meet local potable water standards.

Note: Bacterial and fungal contamination risks are associated with potable (drinking) water and have potential for direct or indirect transmission from faucets and sinks, or through inhalation of aerosols, such as those generated from construction activities or from showerheads. The overall risk of healthcare associated transmission of these pathogens from water is considered relatively low. [APIC: 105-1][6]

5.1.3 Water systems shall be designed to prevent stagnant sections [CSA: 6.7.2(f)][21]

5.1.3.1 Dead leg sections of plumbing pipe shall be avoided [FGI 2.1-8.4.2.5(3)][2], [CSA:6.7.2(f)].[21]

5.1.4 Recirculation lines should return water from a point as close as possible, but not further than 150 cm, from each distal point. [Roles, A., Kadziolka, M.][22]

Note: The reduced length of recirculation lines in combination with other measures will mitigate the risk of *Legionella* contamination. The design goal is to keep hot water flowing in the entire hot water distribution system all of the time. Elimination of dead legs and the 150 cm recirculation line length has been shown to be an effective intervention in preventing *Legionella.* This recommendation should be considered for new HCF designs.

5.1.5 Hot water distribution systems shall be designed to ensure that distribution temperatures are maintained in accordance with CSA Z317.1-09, CSA:6.3.4.10 and 6.3.4.12[5].

5.1.6 Drainage shall comply with local codes, and environmental and health regulations. [Alberta Blue Book: 3.9.1.3.2][19]

5.2 Air Handling

5.2.1 Air handling shall meet standards outlined in the most current Alberta Blue Book[19] and Canadian Standards Association CSA Special requirements for heating, ventilation and air conditioning (HVAC) systems in HCF[4]. It is prudent to allow for expansion in order to effectively deal with emerging infectious diseases. For different air handling requirements refer to CSA: Z317.2-10, Table 1[4].

5.3 Medical Gases

5.3.1 The medical gas pipelines system, supplying medical gases or medical vacuum, that is used for patient care shall not be used for any other purposes. [CSA: 4.3][23]

5.3.2 Medical gas pipelines supplying medical gases used for powering devices unrelated to human respiration shall not be used for patient care. [CSA: 4.4][23]

5.3.3 For medical device reprocessing areas, including endoscopy, drying of instruments should be performed with instrument grade air. [CSA: 5.9][23]

5.3.4 Instrument grade compressed air or compressed dry nitrogen should be used to operate air powered equipment according to the manufacturer's written instructions. [CSA: 4.4][23]

5.4 Airborne Isolation Room (AIR) General

5.4.1 A patient's diagnosis (suspected or proven) determines if the patient needs to be placed in a room that is either a negative pressure room (airborne isolation room) or positive pressure room (protective environment room). In an airborne isolation room (negative pressure room), the principle is to ensure that the transmission of very specific types of infection does not occur from an infected patient to other individuals (staff, visitors or other patients) [CSA: 6.10.5][4].

5.4.2 In an airborne isolation room (negative pressure room), the direction of the air flow is from the corridor into the room. Air becomes infectious after it passes over the patient; the air is then either directly exhausted outside of the building (most common) or forced through a HEPA filter if the air is being re-circulated. Refer to Appendix 2, Diagrams of Airborne Isolation Rooms, Figures A and B. [CSA: 6.10.5][4]

5.4.3 In a protective environment room (positive pressure room), the principle is to protect specific patient populations from acquiring infectious diseases [CSA: 6.10.6][4]. All air entering these rooms shall be HEPA filtered to remove infectious agents. Unfiltered air from the corridor cannot enter the protective environment room. The direction of airflow is from the patient's room into the corridor. The patient populations that require this type of ventilation includes bone marrow transplant recipients and individuals with severe immunodeficiencies.

5.5 Airborne Isolation Room (AIR) for Health Care Facilities

5.5.1 To facilitate management of catastrophic events involving infections transmitted by airborne particles, there is a need to engineer larger areas of acute care facilities so that an entire area can be put under negative pressure (e.g., part of Emergency Department), in addition to individual patient rooms [CSA:6.16][4]

5.5.2 General Medical/Surgical, Pediatric and Adolescent, Post-partum, Psychiatric and Cardiac Intensive Care Units

5.5.2.1 There shall be a minimum of at least one AIR per inpatient unit unless the functional program can demonstrate an AIR will not be required based on a risk assessment. The need for additional AIR shall also be based on a risk assessment [CSA; 7.5.5.2][1]

5.5.2.2 Negative pressure rooms shall have an anteroom. [CSA: Table 11.1 (26)][1].

5.5.3 Intensive Care Unit (ICU)

5.5.3.1 At least one airborne isolation room shall be provided. The need for additional AIR shall be based on a risk assessment [CSA: 7.5.5.2][1] Air exchanges per hour shall meet requirements outlined in CSA: Z317.2 Table 1[4].

5.5.3.2 ICU patient rooms should be able to be switched to negative pressure if bronchoscopies are performed in ICU patient rooms. This is an exception to 5.6.1.3.

5.5.4 Operating Room (OR)

5.5.4.1 Surgical Suites are positive pressurized relative to the corridor to prevent contamination of the patient. All theatres shall have at least 20 ACH HEPA filtered supply (MERV 17). [Alberta Blue Book: Table 3.2-2][19].

5.5.4.2 At least one OR in each surgical suite shall have an anteroom for patients requiring airborne isolation precautions. The anteroom shall be ventilated, and the pressure shall be maintained negative to both the operating room and the contiguous space. Air shall flow from the operating room into the anteroom and from the corridor into the anteroom. The air removed from both the anteroom and operating room shall be exhausted to the outdoors. [CSA: 6.11.3.3][4]

5.5.5 Emergency Department

5.5.5.1 The number of airborne (negative pressure) isolation rooms required can be determined using the Guidelines for Preventing the Transmission of *Tuberculosis* in Canadian Health Care Facilities and Other Institutional Settings PHAC: IV B[24]. This document outlines how to determine the facility risk assessment and indicates the need to build more negative pressure isolation rooms if the population served by the facility has a high rate of tuberculosis.

5.5.5.2 The design of the emergency care HVAC system should allow the isolation of regions so that air containing potentially dangerous chemical or biological agents can be contained within an area. [CSA: 7.9.8.2][1]

5.5.5.3 Twelve air exchanges/hour (ACH) with a negative pressure differential shall be provided throughout the ED, including the waiting room.[CSA: Table 1][4]

5.6 Airborne Isolation Rooms (AIR) for Individual Patient Rooms

Refer to CSA Z317.2-10:6.10.5, 6.10.6

5.6.1 General Principles

5.6.1.1 All AIR shall meet CSA standards which includes an alarm/monitoring system provided just outside the room [CSA:6.10.4.4][4].

5.6.1.2 Each AIR shall have an anteroom. Refer to Appendix 1, Figure B. [CSA: Table 11.1 (26)][1]

5.6.1.3 Do not use switches which allow a room to change from protective (positive pressure) to airborne (negative pressure) isolation. [CSA: 6.10.4.2][4]. See exception in 5.5.3.2.

5.6.1.4 AIR rooms shall have 100% dedicated exhaust. [CSA :6.13.3][4]

5.6.1.5 All anteroom and AIR doors shall have self-closing devices [CSA: Table 11.1 (26)][1]; [FGI 2.1-2.4.2.3 (2)][2]. Room perimeter walls, ceiling, and floor, including penetrations, shall be sealed tightly so that air does not infiltrate the environment from the outside or from other spaces [FGI: 2.1-2.4.2.4 (1a)][2]

5.6.2 Anterooms

Note: Anterooms can act as an airlock, preventing the escape of contaminants from the isolation room into the corridor. It can also provide a space for isolation supplies when it is considered “clean” and a place to remove contaminated personal protective equipment if considered “dirty”. Anterooms will be considered “clean” unless IPC recommends otherwise.

5.6.2.1 All anterooms shall have a hand washing station. [CSA: Table 11.1 (26)][1]

5.6.2.2 In patient care areas, all AIR shall have an anteroom. [CSA: Table 11.1 (26)][1]

5.6.2.3 A ratio of one anteroom per AIR is required [CSA: Table 11.1 (26)][1]. Shared anterooms are not recommended.

5.6.2.4 In ICU patient care areas, the AIR should have an anteroom as designed in Appendix 2, Figure B.

5.6.2.5 Not all ICU rooms need to have an anteroom if the ICU has the required number of negative pressure rooms as determined by the risk assessment.

5.7 Protective Environment Room [FGI 7.2.2]

5.7.1 General Principles

5.7.1.1 All protective environment rooms shall meet CSA Z317.2-10 standards, including an alarm/monitoring system provided just outside the room [CSA: 6.10.6][4].

5.7.1.2 Do not use switches which allow a room to change from protective (positive pressure) to negative pressure. [FGI: 2.2-8.2.2.3,(4)][2]

5.7.2 Hematopoietic Stem Cell Transplant Areas [CSA: 6.10.6][4]; [FGI 2.2-8.2.2.2][2]

5.7.2.1 All rooms shall have:

a. outward directional airflow (positive pressure) from the room to adjacent areas;

b. directional airflow within the room so that the clean air supply flows first to the patient’s breathing zone then to other area of the room; and

c. HEPA filtration capable of MERV 17 and greater than15 ACH. [Alberta Blue Book Table 3.2-1][19]

5.7.3 Combination Airborne Isolation Room/Protective Environment Rooms [FGI 7.2.3]

5.7.3.1 At least one room on each unit that routinely houses hematopoietic stem cell transplant (HSCT) patients shall be negative pressure with an anteroom that is positive with respect to the patient room, creating a pressurized airlock. Refer to Appendix 2. [CSA:7.5.5.2][1]

5.7.3.2 Exhaust air from the combination room and anteroom shall comply with the requirements for airborne isolation rooms. [FGI: 2.2-8.2.2.3 (2)][2]

5.7.3.3 The airflow pattern for the anteroom shall be one of the following [FGI: 2.2-8.2.2.3 (3)][2]:

a. from the anteroom to both the patient room and the corridor; or

b. from both the patient room and the corridor into the anteroom.

5.7.3.4 Rooms with reversible airflow provisions for the purpose of switching between protective environment and airborne infection isolation functions shall not be permitted. [FGI: 2.2-8.2.2.3 (4)] [2]

5.7.3.5 Each combination room shall have two permanently installed visual mechanisms to constantly monitor the pressure status of the room when occupied by patients with an airborne infectious disease and/or requiring a protective environment. One mechanism shall monitor the pressure differential between the patient room and the anteroom. The second mechanism shall monitor the pressure differential between the anteroom and the corridor. [FGI 2.2-8.2.2.3 (5)][2]

5.7.4 Emergency Department

5.7.4.1 If the acute care facility performs bone marrow transplants and if these highly immunodeficient patients are routinely assessed in the Emergency Department rather than being assessed in a special area, one room in the Emergency Department should be designed as a protective environment room and built as per Appendix 2, Figure B.

6. IC Risk Assessment (ICRA) and Preventive Measures Toolkit for Construction, Maintenance and Renovation

Serious health risks for patients, staff and visitors are created during construction, renovation and maintenance activities. At the initial stages of design and planning the completion of an Infection Control Risk Assessment (ICRA) by the construction planning team (including Infection Prevention and Control (IPC), Facilities Maintenance and Engineering, Administration, Project Management, Environmental Services, health care workers (HCWs), Designers and Constructors) is an essential component of all construction, renovation and maintenance projects in a healthcare facility.

The ICRA has been developed by Alberta Health Services with involvement by IPC and Capital Management to provide a standard tool for establishing preventive measures required to minimize the risk of infection for patients, staff and visitors during construction renovation and maintenance activities.

The term “construction activity” is defined as major and minor facility activities that disturb or modify facility structures and systems [CSA:3.1][15]. This includes all renovation, maintenance, and repurposing and remediation activities.

Note: Modification of a facility or area with the intent to change the original functional purpose is considered new construction, and shall necessitate the need to meet current and applicable standards. [CSA, p.11][1]

Risk Factor related to construction renovation and maintenance

Construction, renovation, and maintenance projects in health care facilities pose a potential threat of infection to current and future occupants, particularly those with reduced immunity. Reduced immunity can result from many different illnesses or conditions, for example,

a) bone marrow or solid organ transplantation;
b) receipt of chemotherapy for cancer or other conditions;
c) use of antibiotics to treat fevers or previous infections;
d) HIV and AIDS;
e) immune system defects present at birth;
f) dialysis or kidney failure;
g) diabetes;
h) chronic lung disease;
i) assisted breathing (i.e., being on a ventilator);
j) heart disease;
k) cancer;
l) surgery and other invasive medical procedures; and
m) extremes of age (e.g., newborns or elderly individuals). [CSA:4.2.1][15]

Sources of Infection- Refer to [CSA : 4.3.1][15]

Some of the environmental sources of infection in health care facilities include soil, water, and dust contaminated with fungal spores, bacteria, or other micro-organisms.

The biological agents that can cause construction –related infections or allergic reactions include, but are not limited to;

a) fungi (e.g. forms of the *Aspergillus* species such as *A. fumigatus*, *A. flavus*, *A. niger*, and *A. terreus*; *Candida albicans, Candida tropicalis*, and *Candida parapsilosis; Fusarium, Zygomycetes; Rhizopus indicus; Mucoraceae rhizopus*; and *Scedosporium prolificans*); and
b) bacteria (e.g., *Nocardia asteroides*, mycobacteria, and forms of the *Legionella* species such as *L. Pneumophila and L. bozemanii*).

Contamination can be caused by many factors during construction, including

a) inadequate preparation and quality control;
b) inadequate or uncontrolled ventilation;
c) improper or inadequate containment of construction activities;
d) improper or inadequate storage of construction materials;
e) disturbance of existing contaminated materials (e.g., disturbance of soil during excavation, removal of ceiling tiles, demolition of partitions);
f) penetration of construction materials by water, and resultant stagnation;
g) repairs, modifications or accidental incursions into water supplies;
h) contaminated materials brought to the construction site;
i) standing water on the construction site;
j) entry of vermin (e.g., rodents, insects, birds); and
k) inadequate cleanup and sanitation procedures. [CSA:4.3.2][15]

Examples of health care facility construction, renovation, and maintenance activities with events that have caused contamination producing infections and pseudo-infections include the following:

1) soil excavation
   a) near health care facilities; and
   b) from construction contaminating the water supply;

2) heating, ventilation, and air conditioning system (HVAC):
   a) air intakes or exhaust grilles in patient care rooms that are not covered during construction or demolition work;
   b) changing of air filters in patient care areas or in systems supplying air to patient care areas;
   c) demolition of ducts;
   d) improper ventilation of exhaust systems;
   e) failure to maintain air filters; and
   f) inappropriate use of permanent ducts to move HEPA filtered air during construction.

3) windows:
   a) construction or demolition near open or improperly sealed windows;
   b) improperly maintained or protected window and door opening that allow migration or vermin;
   c) window air conditioners facing road construction activity; and
   d) disturbance of dust while working on window blinds;

4) failure of moisture barriers:
   a) leaking temporary or incomplete roofs;
   b) leaking temporary walls or incomplete wall systems; and
   c) failure at exterior joints; and

5) other activities and occurrences:
   a) carpeting that becomes contaminated during construction;
   b) construction dust that contaminates patient care supplies;
   c) construction dust that enters an elevator shaft;
   d) construction near high-risk patients;
   e) disturbance or removal of ceiling tiles;
   f) disturbance of contaminated wall coverings;
   g) dust barriers not erected before construction;

h) dust from ceiling tiles contaminating microbiological plates, resulting in false diagnoses;
i) nearby construction work contaminates isolation rooms;
j) food or drink left in wall cavities or ceiling spaces;
k) removal of fibrous thermal insulating material (glass fibre); and
l) water supply depressurizes when a valve is opened, causing descaling and release of biofilm organisms such as *Legionella* and *Mycobacteria* sp. [CSA:4.3.3][15]

6.1 Guidelines for ICRA and Preventative Measures

6.1.1 Construction activities shall include IPC personnel in the project planning stages prior to blue print creation, contracting and commencement of activities. [CSA: 6.1.5,6.2.1.1, 6.2.2,6.3.2.2][15], [APIC: 106-1][6], [CSA: 4.5.1.2][1], [FGI: 1.2-1.2][2]

6.1.2 FM&E shall perform an ICRA and the Preventive Measures Analysis (PMA) for maintenance activities. This shall be documented in the maintenance management system or on the ICRA form. [CSA:6.1.3][15]

6.1.3 For new construction and contracted renovations the ICRA and PMA shall be completed by designated members of the construction planning team that shall include IPC, Project Management, FM&E site administration and others as required. [CSA:6.1.3, 6.1.4,6.1.5][15]

6.1.4 Any situation that poses a risk to patients and staff shall be reported immediately. [CSA: 5.3.11][1], [CSA:6.1.11][15]

6.1.5 IPC shall be notified for all work affecting population Risk Group 4 [CSA 6.3.1.1][15].

6.1.6 IPC shall be notified of an ICRA requiring IC Preventive Measures Level 3 and 4 (CSA: 6.5.4][15]

6.1.7 An ICRA shall be documented, and reviewed by the members of the construction planning team. A copy of the ICRA shall be kept by the facility. [APIC: 106-3][6], [CSA:6.1.3, 6.1.4,6.1.5, 6.1.6][15], [FGI: 1.2-3.3.1][2].

6.1.8 ICRA and PMA shall be included in tendering documents. [APIC: 106-1, 106-2, 106-3][6], [CSA: 4.5.1.3, 4.5.5, 5.3.1.1][1], [CSA: 6.1.6][15], [FGI: 1.2-1.2, 1.2-3.1.2][2]

6.1.9 A documented plan for meeting the required PMA shall be completed and reviewed by the construction planning team including the contractors.[CSA:6.1.5][15], [FGI: 1.2-3.1.4, 1.2-3.3.2, 1.2-3.4.1][2]

6.1.10 PMA identified shall be implemented, monitored and updated as required. [APIC: 106-4][6], [CSA: 6.1.7][15]. If the scope of the construction activity changes, a new ICRA shall be required [FGI; 1.2-3.1.2][2], [CSA: 6.1.7] [15]

6.1.11 Monitoring of construction activity is a shared responsibility between the construction planning team members (e.g. IPC, FM&E, Project Management, and staff. A documented monitoring plan shall be developed, reviewed and implemented. [CSA: 6.18][15], [FGI: 1.2-3.3.3][2]

6.1.12 Written protocol for a stop work order shall be identified prior to beginning work. A stop work plan will include lines of authority, communication, investigation and remediation prior to restarting activity. [CSA: 5.3.11][1],[CSA:6.3.2.3, 6.1.12][15] [APIC:106-4][6], [FGI: 1.2-3.3.3][2]

6.1.13 The facility shall have an IPC education plan for staff and external contractors regarding construction related potential risks and preventive measures. [CSA:6.3.1.5][15], [FGI: 1.2-3.4.1.5][2], [APIC: 106-4][6]

6.2 Infection Control Risk Assessment (ICRA) Tool Kit

6.2.1 Contents of ICRA Tool Kit:

Form1: Infection Control Risk Assessment (ICRA)

Form 2: Construction Activity Type (detailed)

Form 3: Population Risk Group (detailed)

Form 4: Infection Prevention & Control Construction Site Monitoring Tool

Form 5: Infection Control Post Construction Checklist

Form 6: Infection Control Preventive Measures Level 1

Form 7: Infection Control Preventive Measures Level 2

Form 8: Infection Control Preventive Measures Level 3

Form 9: Infection Control Preventive Measures Level 4

6.2.2 Instructions:

1. Complete the ICRA Form 1 using the following instructions:
    a. Collect and record project information from Construction Planning Team.
    b. Identify and record construction activity type. (Refer to Form 2, Construction Activity Type)
    c. Identify and record the population risk group. (Refer to Form 3, Population Risk Group)
    d. Using the Risk Analysis and Preventive Measures Class Matrix identify the IC Preventive Measures required and record on Form 1.
    e. Include any additional ICP recommendations or comments.
    f. Obtain all necessary signatures from the Construction Planning Team,
    g. Circulate copies of Form 1 to the Construction Planning Team.
2. There are four IC Preventive Measure Levels: 1, 2, 3, 4. (Refer to Form, 6, 7, 8, 9 respectively).
    a. Each IC Preventive Measures (PM) form is a stand alone document which contains the preceding PM Level information.
    b. Form 6: Infection Control Preventive Measures Level 1 may be filled out by FM&E or Infection Control Professional or their Designate to identify the required preventive measures for the activity described in Form 1" Infection Control Risk Assessment and Preventive Measures Analysis". Identify the appropriate measures by marking X in the check boxes.
    c. Form 7, 8, 9: Infection Control Preventive Measures Level 2,3,4 is filled out by the construction planning team or designated person(s) to identify the required preventive measures for the activity described in Form 1" Infection Control Risk Assessment and Preventive Measures Analysis". Identify the appropriate measures by marking X the check boxes.

3. Form 4 Construction Site Monitoring Tool may be used for compliance and quality monitoring, at the discretion of the Infection Control Professional, their Designate or member of the construction planning team to monitor preventive measures required during construction/renovation activities.
4. Form 5 Post Construction Checklist should be completed prior to area occupancy. This form is used by Infection Control Professional or their Designate to ensure the post construction area is ready for patient/ staff occupancy.

Form 1: Infection Control Risk Assessment (ICRA) Form

This form shall be completed by FM&E and /or designated members of the construction planning team that may include IPC, Project Management, FM&E and site administration for all maintenance, design planning, construction, renovation or remediation activities. Refer to Section 6.1, Guidelines for ICRA and Preventative Measures.

Project Number	**Project Name and Description:**
Project start date:	**Estimated Duration:**

Construction Activity Types (these categories are not limited to the examples provided; refer to Form 2 for details) [CSA: Table 3]	
Type A:	**Inspection and non-invasive activities such as**: a single controlled opening in a wall or removal of one ceiling tile or wall panel for inspection, painting (no sanding), wall covering, electrical trim work, activities that do not generate dust or require cutting of walls, or work in ceiling, minor plumbing limited to 1 patient care room/area that does not disrupt water for more than 15 minutes.
Type B:	**Small scale, short duration, creates minimal dust activities such as:** access to chase spaces, where dust can be controlled, cutting of walls/ceilings for cabling, wiring, minor electrical, ventilation or plumbing. Minor sanding & repair of surfaces, plumbing work in 1 or more patient care rooms that does not disrupt water for more than 30 minutes.
Type C:	**Moderate to high levels dust, requires demolition or removal of fixed components. May include:** major sanding, removal of flooring, ceiling tiles, casework, new wall construction, minor duct or electrical work in ceilings, major cabling, plumbing work in 2 or more patient care rooms not disrupting water more than 1 hour. Activities cannot be completed in a single work shift.
Type D:	**High levels of dust, major demolition & construction, includes:** complete removal of cabling, demolition of wall(s), plumbing that disrupts water in 2 or more patient care rooms for more than 1 hour, requires consecutive shifts to complete

Population Risk Group

(these groups are not limited to the examples provided descriptions; refer to Form C for details)

Group 1	***Group 2***	***Group 3***	***Group 4***
• Office areas • Unoccupied wards • Public areas • Laundry, soiled linen	• Patient care areas not listed in Group 3 &4 • Outpatients (except oncology & surgery) • Admission, discharge, waiting areas	• E.R (except trauma rooms) • DI, nuclear medicine, MRI • Labour, delivery and nursery • Pediatrics • General med/Surg, units • Respiratory therapy	• Operating Rooms • Trauma rooms • Oncology • ICU, CCU, NICU • Bronchoscopy/Endoscopy • MDRD and sterile storage

Risk Analysis & Preventive Measures Class Matrix: ***IPC must be notified when Risk Level indicates Class 3 &4**					
Population Risk Group (circle)	***Construction Activity Type (Circle)***				***Preventive Measures Determined***
	Type A	**Type B**	**Type C**	**Type D**	
Group 1	1	**2**	**2**	**3/4***	
Group 2	1	**2**	**3**	**4***	
Group 3	1	**3***	**3/4***	**4***	
Group 4	**1-3***	**3/4***	**3/4***	**4***	

Additional Recommendations

Names & Signatures of Responsible Construction Planning Team	**(Print Name)**	**Date**
Project Manager:		
Facilities Maintenance & Engineering:		
Contractor:		
ICP:		
Clinical Representative:		
Administration:		
Other:		

Form 2: Construction Activity Type

Construction activity type	Description [Refer to CSA Z317.13-12 Table 3][15]
Type A	Inspection and non-invasive activities. These include, but are not limited to: a. activities that require removal of no more than one ceiling tile or require wall or ceiling panels to be opened; 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 for visual inspection.
Type B	Small-scale, short-duration (e.g. less than 2 hours) activities that create minimal dust. These include, but are not limited to: a. activities that require access to chase spaces; b. where dust migration can be controlled, cutting of walls or ceilings 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 more than one patient care area (i.e., two or more rooms) for less than 30 min.
Type C	Activities that generate a moderate to high level of dust; cause a moderate service disruption, require demolition; require removal of a fixed building component (i.e., sink) or assembly (e.g., countertop, cupboard); or cannot be completed in a single work shift. These include, but are 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; and g. plumbing work that disrupts the water supply of more than one patient care area (i.e., two or more rooms) for more than 30 min but less than 1 h.
Type D	Activities that generate high levels of dust, activities that necessitate significant service disruption, require , and demolition and construction activities requiring consecutive work shifts to complete. These include, but are not limited to: a. activities that involve heavy demolition or removal of a complete cabling system; b. new construction that requires consecutive work shifts to complete; and c. plumbing work that disrupts the water supply of more than one patient care area (i.e., two or more rooms) for more than 1 h.

Form 3: Population Risk Group

Refer to CSA Z317.13-12[15]		
Group 1 Lowest Risk	• Office areas • Unoccupied wards • Public areas	• Laundry and Soiled Linen cleaning areas • Physical plant workshops • House keeping areas
Group 2 Medium Risk	• Patient care areas (unless listed in Group 3 or 4) • Outpatient clinics (except for oncology and surgery) • Admission and discharge units • Autopsy and Morgue • Occupational therapy areas remote from patient care areas	• Ambulatory Care (Non- Invasive) i.e. Cardiac • Rehabilitation • Office Area Adjacent to Patient Care Areas • Waiting rooms • Physical therapy areas remote from patient care areas
Group 3 Medium to High Risk	• Emergency (except Trauma room) • Diagnostic imaging • Radiology/MRI • Labour and delivery (without OR capacity) • Nurseries for healthy newborns • Day surgery • Nuclear medicine • Hydrotherapy • Food preparation, serving, and dining areas • Respiratory therapy • General Med/Surgical wards other than those listed in Group 4	• Pediatrics • Geriatrics • Long-term care • Resident Areas in Continuing Care • Echocardiography • Laboratories • Surgical outpatient clinics • Clean linen handling and storage areas
Group 4 Highest Risk	• All ICUs, PICUs, NICU, etc. • All Operating rooms (ORs) (including prep, induction, post-aesthesia care unit (PACU), and scrub areas) • Obstetrical operating rooms • Anesthesia storage areas and workrooms • Burn Care units • Trauma care rooms • Oncology inpatient units and outpatient clinics • Transplant units and related outpatient clinics • Inpatient and outpatient clinics for AIDS patients or other immunodeficiency diseases • Interventional Radiology • Dialysis units • Diagnostic Imaging areas	• Protective isolation rooms • All cardiac catheterization & angiography areas • Cardiovascular/cardiology patients areas • All Endoscopy areas • Bronchoscopy, • Cystoscopy • Dental procedure rooms • Pacemaker insertion rooms • Pharmacy admixture rooms • Tissue culture laboratories • Clean and sterile storage • Medical device reprocessing areas (wherever located) • Central Sterile supply areas

Form 4: Infection Prevention & Control Construction Site Monitoring Tool

This form may be used for compliance and quality monitoring and is used by the Infection Control Professional, their designate, or member of the construction planning team to monitor preventive measures required during construction/renovation activities.

Project _____

Date: _____ **Time:** _____ **Time:** _____

Barriers		
ICRA is posted for the area	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Construction signs posted for the area	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Doors properly closed and sealed	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Floor area clean, no dust tracked	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Walk off mats moist/sticky	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Tape adhering to surface	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Hoarding Intact	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Air Handling		
All windows closed behind barrier	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Negative air monitored at entrance (7.5 Pascal)	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Construction Air Handling Unit running	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Current maintenance label visible	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No
Air exhausted to appropriate area/outside	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Project Area		
HEPA-filtered Vacuum on job site	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Debris removed in covered container daily	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Designated construction route/map posted	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Trash in appropriate container	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Routine cleaning done on job site	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Air vents sealed/duct work capped	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Traffic Control		
Restricted to construction workers and necessary staff only	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
All doors and exits free of debris	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Dress Code		
Is appropriate for the area (OR, MDRD, L&D, etc.)	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Required to enter	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Required to leave	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A

Protective clothing required in work space	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A
Workers clothing clean on exiting work space	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A

Comments_____

_____

_____

_____

Reported Deficiencies to_____ **Date** _____

Signature: _____

N/A: Means not applicable or not observed

Form 5: Infection Control Post Construction Checklist

This form is used by Infection Control Professional or their Designate to ensure the post construction area is ready for patient/ staff occupancy.

Project Name: _____ Date: _____

Project Location: _____ Preventive Measure Required: _____

Item/Action	All work is completed: Yes	No	N/A	List deficiencies or comments if present:	Date Completed
Post Construction Cleaning					
Before hoarding removal, job site is clear of dust, construction debris/equipment. Area had been cleaned—including HEPA vacuuming and wipe down of surfaces including hoarding to remove dust.					
Facility based cleaning (e.g. environmental services) performed prior to hording removal (if required).					
After removal of hoarding, contractor completes final construction cleaning followed by facility based preoccupancy terminal cleaning.					
Where required, HVAC ductwork cleaning has been performed					
Other:					
Finishes					
Area is dust free (all horizontal surfaces, headwalls, ledges, inside of cabinets, drawers, tops of clocks etc.).					
Hand hygiene dispensers filled and functioning and properly located.					
Hand drying paper towels available and properly located.					
Provisions for sharps and proper personal protective equipment supplies					
Integrity of walls/ceiling tiles are maintained e.g. not stained or damaged.					
Surfaces in patient care/procedure/service areas are appropriate (e.g. smooth, nonporous, water resistant)					
Area surfaces are free of fissures or open joints and crevices that retain or permit collection of debris or facilitate bacterial and fungal growth.					
Other:					

Infrastructure					
If plumbing has been affected/shutdown plumbing has been flushed. Verified by _____ **(name and position, required if applicable)**					
Plumbing if affected has been checked for leaks. Verified by _____ **(name and position, required if applicable)**					
Correct hand washing sinks and faucets present, properly located and functioning					
Faucet aerators are NOT present in patient care areas.					
Ceiling tiles are in place, well approximated and not stained.					
HVAC systems are clean, function restored, balanced and verified. Verified by _____ **(name and position required if applicable)**					
Correct room pressurization (negative or positive) Verified by: _____ **(name and position required if applicable)**					
All mechanical spaces, including ceiling space should be cleaned of dust and debris.					
Other:					

Form 6: Infection Control Preventive Measures Level 1

This form is filled out by FM&E or Infection Control Professional or their Designate to identify the required preventive measures for the activity described in the corresponding Form 1" Infection Control Risk Assessment and Preventive Measures Analysis". All CSA standards identified below refer to CSA Z317.13-12 Infection control during construction, renovation and maintenance of health care facilities. This is not an exhaustive list of preventative measures for complete details refer to CSA Z317.13-12.

Identify the appropriate measures by marking X in the check boxes☐.

Project Name :	**Location:**	
Form completed by:	**Signature:**	**Date :**

Preventive Measures Level 1
Facilities Maintenance & Engineering/Contractors/Project Management

Before Construction

☐ The Project Manager/Facility Maintenance & Engineering designate (PM/FME) shall identify essential services (e.g., water supply, electricity, and ventilation systems) that could be disrupted and appropriate measures to address the disruption. [CSA: 7.1.2.1][15]

During Construction

Dust Control [CSA:7.2.1.1][15]

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

☐ Clean the work area with a HEPA filter-equipped vacuum cleaner

Plumbing [CSA:7.2.1.2][15]

☐ Ensure gaskets materials are smooth and replace if worn or rough;

☐ Ensure faucet aerators are not installed or used;

☐ Maintain a dry work environment; and

☐ Schedule water interruptions during periods of low user activity (e.g., evenings), receive approval for disruption before starting.

After Construction

☐ The construction planning team shall review the preventative measures that were undertaken and access their effectiveness. [CSA:7.3.1][15]

Additional Comments:

Preventive Measures Level 1
Environmental Services/Infection Control/Healthcare Staff

Before Construction

☐ The health care staff, in conjunction with infection prevention and control personnel, shall collaborate to minimize occupant exposure by identifying high-risk patients who might need to be temporarily moved away from the construction area. [CSA:7.1.2.2][15]

During Construction [CSA:7.2.1.4][15]

☐ Report discoloured water and water leaks to the maintenance and infection prevention and control departments; and

☐ Ensure that patient care equipment and supplies are protected from dust exposure.

After Construction [CSA:7.3.1][15]

☐ The construction planning team shall review the preventative measures that were undertaken and assess their effectiveness.

Additional Comments:

Form 7: Infection Control Preventive Measures Level 2

This form is filled out by the construction planning team or designated person(s) to identify the required preventive measures for the activity described in Form 1" Infection Control Risk Assessment and Preventive Measures Analysis". All CSA standards identified below refer to CSA Z317.13-12 Infection control during construction, renovation and maintenance of health care facilities. This is not an exhaustive list of preventative measures for complete details refer to CSA Z317.13-12.

Identify the appropriate measures by marking X in the check boxes☐.

Project Name :	**Location:**	
Form completed by:	**Signature:**	**Date :**
Approved by:		**Date:**
Copy Received by **Signature and Title**		**Date:**
Copy Received by **Signature and Title**		**Date:**
Copy Received by **Signature and Title**		**Date:**
Comments:		

Preventive Measures Level 2

Facilities Maintenance & Engineering/Contractors/Project Management

Before Construction

☐ The Project Manager shall identify essential services (e.g., water supply, electricity, and ventilation systems) that could be disrupted and appropriate measures to address the disruption. [CSA:7.1.2.1][15]

Refer to [CSA:7.1.3.1][15]

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

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

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

☐ Drawings shall be obtained that show the layout of the ventilation systems that supply air to, or exhaust air from, the work area. The project plan shall state whether it is necessary to close outlets, modify performance, shut down systems. [CSA:7.1.3.4][15]

☐ Establish water temperature standards for the health care facility (Refer to CSA-Z317.1-09).

☐ Determine whether domestic cold, hot, and recirculation water lines will be affected by the construction. This assessment shall include: Refer to [CSA:7.1.3.2][15]

1. Identifying plumbing lines that will need to be
   - ☐ Shut off or interrupted using existing valves; or
   - ☐ Isolated by additional valves
2. Determining the method to be used to sanitize the water lines before occupancy
3. Drafting the procedure to be used to sanitize the water system, including identifying the required equipment
4. Determining the flow path to be used to hyperchlorinate and flush water lines affected by the construction

Preventive Measures Level 2

Facilities Maintenance & Engineering/Contractors/Project Management

During Construction

Dust Control

☐ Immediately after Type A activity (e.g., visual inspection) has been completed, close access panels and replace displaced tiles[CSA:7.2.1.1][15]

Refer to[CSA:7.2.2.2][15]

☐ Clean the work area with a HEPA filter-equipped vacuum cleaner

☐ Use drop sheets to control dust

☐ Control dust by water-misting work surfaces while cutting

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

☐ Seal windows and unused doors

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

☐ Seal air vents in the construction area

☐ Place a walk-off mat outside the entrance to the construction area to trap dust from the equipment and shoes of personnel leaving the area, and vacuum the mat daily with a HEPA filter-equipped vacuum cleaner, as well as when the mat is visibly soiled. Walk-off mats shall be of sufficient size to ensure that constructors have to place both feet on the mat at least once on exiting the construction area. [CSA: Figure A.5, A.6][15]

Ventilation

☐ If possible, the ventilation system should be disabled until the project has been completed. An engineering analysis shall be performed to ensure that the fan systems continue to perform their intended function and that the operation of the HVAC system is not compromised. [CSA:7.2.2.3][15]

Plumbing

Refer to[CSA:7.2.1.2, 7.2.2.4][15]

☐ Ensure gaskets materials are smooth and replace if worn or rough;

☐ Ensure that faucet aerators are not installed or used;

☐ Maintain a dry work environment; and

☐ Schedule water interruptions during periods of low user activity (e.g., evenings); receive approval for disruption before starting

☐ Avoid using collection tanks and long pipes (which allow water to stagnate).

☐ Maintain a dry work environment and report any water leaks through walls or substructures.

☐ Hyperchlorinate (to a minimum of 50 parts per million) or superheat (to a minimum of 70^{0}C) stagnant domestic water (especially if *Legionella* is already present in the domestic water supply). The water lines in the construction area and adjacent patient care areas shall be flushed before reuse.

☐ Be aware of the impact of techniques to remove bacterial growth and choose the approach that minimizes the risks associated with such work.

Site maintenance

Refer to [CSA:7.2.2.5][15]

☐ Place debris in covered containers or cover it with a moistened sheet before transporting it for disposal.

☐ Clean the construction area with a HEPA filter-equipped vacuum cleaner, a wet mop, or both, as necessary.

☐ Place supplies and equipment in covered containers during transportation through the health care facility to prevent contamination in other areas.

☐ Remove debris in the evening when patients are in their rooms and visitors have left. If this is not possible, debris should be removed at the end of the workday. Exposure of the occupants of the health care facility to debris shall be minimized.

Preventive Measures Level 2
Facilities Maintenance & Engineering/Contractors/Project Management

Use of permanent exhaust Refer to [CSA:7.2.2.6][15]
The permanent air handling system shall be used for exhausting air from the construction zone via a portable negative air unit only under the following conditions:

- ☐ The air handling system is an exhaust system that leads directly to the outdoors
- ☐ An engineering analysis is performed to ensure that the exhaust system continues to perform its intended function and that the operation of the HVAC system is not compromised
- ☐ The operation of the exhaust fan shall be monitored and alarmed to building operations staff and alarmed in the construction zone
- ☐ If the conditions outlined in the above three (3) items cannot be satisfied, then the steps outlined in Preventative Measure III shall be followed. Refer to PM Level 3 **Construction air handling** CSA: 7.2.3.6[15]

After Construction

- ☐ The construction planning team shall review the preventative measures that were undertaken and access their effectiveness. [CSA:7.3.2.1][15]

Additional Comments:

Preventive Measures Level 2
Environmental Services/Infection Control/Healthcare Staff

Before Construction

- ☐ The health care staff, in conjunction with infection prevention and control personnel, shall collaborate to minimize occupant exposure by identifying high-risk patients who might need to be temporarily moved away from the construction area. [CSA:7.1.2.2][15]

During Construction Refer to [CSA:7.1.2.4][15]

- ☐ Report discoloured water and water leaks to the maintenance and IPC departments; and
- ☐ Ensure that patient care equipment and supplies are protected from dust exposure

After Construction

- ☐ The construction planning team shall review the preventative measures that were undertaken and access their effectiveness. [CSA:7.3.2.1][15]
- ☐ The construction planning team shall conduct a final inspection to ensure that the ventilation system is functioning properly in the construction area and adjacent areas. [CSA:7.3.2.1][15]
- ☐ Infection prevention and control personnel shall ensure that the construction area has been terminally cleaned before building occupants are readmitted to the completed construction area. [CSA:7.3.2.3][15]
- ☐ Environmental Services and health care staff shall ensure that the construction area has been cleaned with a HEPA filtered-equipped vacuum cleaner, a wet mop, or both, as necessary, and that horizontal work surfaces have been wiped with a disinfectant. [CSA:7.3.2.2][15]
- ☐ Environmental Services and health care staff shall report discoloured water and water leaks to the maintenance and infection prevention and control departments

Additional Comments:

Form 8: Infection Control Preventive Measures Level 3

This form is filled out by the construction planning team or designated person(s) to identify the required preventive measures for the activity described in Form 1" Infection Control Risk Assessment and Preventive Measures Analysis". All CSA standards identified below refer to CSA Z317.13-12 Infection control during construction, renovation and maintenance of health care facilities. This is not an exhaustive list of preventative measures for complete details refer to CSA Z317.13-12.

Identify the appropriate measures by marking X in the check boxes☐.

Project Name :	**Location:**	
Form completed by:	**Signature:**	**Date :**
Approved by:		**Date:**
Copy Received by **Signature and Title**		**Date:**
Copy Received by **Signature and Title**		**Date:**
Copy Received by **Signature and Title**		**Date:**
Comments:		

Preventive Measures Level 3

Facilities Maintenance & Engineering/Contractors/Project Management

Before Construction

☐ The Project Manager shall identify essential services (e.g., water supply, electricity, and ventilation systems) that could be disrupted and appropriate measures to address the disruption. [CSA:7.1.2.1][15]

Refer to [CSA:7.1.3.2][15]

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

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

☐ Drawings shall be obtained that show the layout of the ventilation systems that supply air to, or exhaust air from, the work area. The project plan shall state whether it is necessary to close outlets, modify performance, shut down systems. [CSA:7.1.3.4][15]

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

☐ Establish water temperature standards for the health care facility .(Refer to CAN/CSA-Z317.1-09)

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

This assessment shall include:

1. Identifying plumbing lines that will need to be
   - ☐ Shut off or interrupted using existing valves; or
   - ☐ Isolated by additional valves
2. Determining the method to be used to sanitize the water lines before occupancy
3. Drafting the procedure to be used to sanitize the water system, including identifying the required equipment
4. Determining the flow path to be used to hyperchlorinate and flush water lines affected by the construction

Preventive Measures Level 3

Facilities Maintenance & Engineering/Contractors/Project Management

During Construction

Dust Control

Refer to [CSA:7.2.1.1][15]

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

☐ Clean the work area with a HEPA filter-equipped vacuum cleaner, wet mop or both as necessary.

Refer to [CSA:7.2.2.2][15]

☐ Using drop sheets;

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

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

☐ Seal windows and unused doors;

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

☐ Seal air supply in the construction area; and

☐ Place walk-off mats outside and inside the entrance to the construction area to trap dust from the equipment and shoes of personnel leaving the area, and vacuum the mat daily with a HEPA filter-equipped vacuum cleaner, as well as when the mat is visibly soiled. Walk-off mats shall be of sufficient size to ensure that constructors have to place both feet on the mat at least once on exiting the construction area. Refer to[CSA: Figure A5 and A6][15].

Refer to [CSA:7.2.3.2][15]

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

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

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

☐ Remove protective clothing (e.g. hardhat, coveralls, etc.) before entering patient care areas.

Ventilation

☐ If possible, the ventilation system should be disabled until the project has been completed. An engineering analysis shall be performed to ensure that the fan systems continue to perform their intended function and that the operation of the HVAC system is not compromised. [CSA:7.2.2.3][15]

Refer to [CSA:7.2.3.3][15]

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

☐ Maintain negative pressure within the construction area by using portable CAHUs units that include pressure gauges and an alarm. Filters shall be monitored and replaced if clogged or functioning below the manufacturer's specifications.

Preventive Measures Level 3

Facilities Maintenance & Engineering/Contractors/Project Management

- ☐ Ensure that the air is exhausted directly outside and away from intake vents and filtered through a HEPA filter. Ensure that the HCF's permanent ventilation system is functioning and free of contamination before restarting. In conditions that prohibit exhausting the exhaust outside, air may be re-circulated in accordance CSA Z317.13-12; Clauses 6.6 and 7.2.3.6.
- ☐ Ensure that the ventilation system is functioning properly and is cleaned if contaminated by soil or dust after the construction project is complete.

Portable construction air handling units (CAHUs) Refer to [CSA:6.6.3, 6.6.4,6.6.5, 7.2.3.4][15]

- ☐ Air exhausted from construction areas shall be HEPA filtered. Hepa filter's used shall have a collection efficiency of 99.97% at 3µm.
- ☐ CAHUs shall be visually inspected by the constructor at least daily and their condition shall be documented.
- ☐ Filters shall be replaced when loaded, when change indicators light comes on or in accordance with the manufacturer's instructions. [CSA;6.6.4.3][15]
- ☐ At the beginning of any Preventative Measure 3 or 4 construction activity, CAHUs shall be leak tested and performance verified. They shall be recertified at least every 12 months and the recertification shall be documented.[6.6.4.2][15]
- ☐ Construction, maintenance, and repair area exhaust air shall not be discharged to areas occupied by Population Risk Group 3 or 4.
- ☐ Measures related to re-circulated air shall require approval from the construction planning team.
- ☐ The relative space pressures between areas occupied by Population Risk Group 3 or 4 shall be continuously monitored and alarmed.[CSA:6.6.2.3][15]
- ☐ Where the failure of either the portable negative air unit or the exhaust fan would compromise the relative pressurization of a Population Risk Group 4 area, the systems shall be interlocked.

Impact on the facility HVAC system [Refer to CSA:7.2.3.5][15]

- ☐ The main facility system shall be verified for operation in accordance with design during construction work.
- ☐ The health care facility and constructor shall verify the pressure relationships for critical areas near the construction area (e.g., Population Risk Group 4 areas).

Construction air handling [Refer to CSA: 7.2.3.6][15]

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

Preventive Measures Level 3

Facilities Maintenance & Engineering/Contractors/Project Management

Plumbing

Refer to[CSA:7.2.1.2][15]

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

Refer to[CSA:7.2.2.4][15]

- ☐ Avoid using collection tanks and long pipes (which allow water to stagnate).
- ☐ Hyperchlorinate (to a minimum of 50 parts per million) or superheat (to a minimum of 70º C) stagnant domestic water (especially if *Legionella* is already present in the domestic water supply). The water lines in the construction area and adjacent patient care areas shall be flushed before reuse.
- ☐ Be aware of the impact of techniques to remove bacterial growth and choose the approach that minimizes the risks associated with such work.

Site maintenance

Refer to [CSA:7.2.2.5][15]

- ☐ Place debris in covered containers or cover it with a moistened sheet before transporting it for disposal.
- ☐ Clean the construction area with a HEPA filter-equipped vacuum cleaner, a wet mop, or both, as necessary
- ☐ Place supplies and equipment in covered containers during transportation through the health care facility to prevent contamination in other areas
- ☐ Remove the debris in the evening when patients are in their rooms and visitors have left. If this is not possible, debris should be removed at the end of the workday. Exposure of the occupants of the health care facility to debris shall be minimized
- ☐ Engineering or operations and maintenance staff in the construction area shall clean outside the work area with a HEPA filter-equipped vacuum cleaner every day or more frequently if necessary. [CSA:7.2.3.7.1][15]

Use of permanent exhaust Refer to[CSA:7.2.2.6][15]

- ☐ The permanent air handling system shall be used for exhausting air from the construction zone via a portable negative air unit only under the following conditions:
- ☐ The air handling system is an exhaust system that leads directly to the outdoors.
- ☐ An engineering analysis is performed to ensure that the exhaust system continues to perform its intended function and that the operation of the HVAC system is not compromised.
- ☐ The operation of the exhaust fan shall be monitored and alarmed to building operations staff and alarmed in the construction zone.
- ☐ If the conditions outlined in the above three (3) items cannot be satisfied, then the steps outlined in [CSA: 7.2.3.6].[15]

After Construction

- ☐ The construction planning team shall review the preventative measures that were undertaken and access their effectiveness. [CSA:7.3.2.1][15]
- ☐ After construction has been completed, the dust barrier shall be removed in such a manner to prevent the spread of dust and other debris particles adhering to the barrier.
- ☐ The construction planning team shall conduct a final inspection to ensure that the ventilation system is functioning properly in the construction area and adjacent areas. [CSA:7.3.2.1][15]

Preventive Measures Level 3
Facilities Maintenance & Engineering/Contractors/Project Management
Refer to [CSA:7.3.2.3][15] ☐ The construction planning team will ensure that the construction area has been cleaned with a HEPA filtered-equipped vacuum cleaner, a wet mop, or both, as necessary, and that horizontal work surfaces have been wiped with a disinfectant before building occupants are readmitted to area. ☐ Environmental Services and health care staff shall report discoloured water and water leaks to the maintenance and infection prevention and control departments.
Additional Comments:

Preventive Measures Level 3
Environmental Services/Infection Control/Healthcare Staff
Before Construction ☐ The health care staff, in conjunction with infection prevention and control personnel, shall collaborate to minimize occupant exposure by identifying high-risk patients who might need to be temporarily moved away from the construction area. [CSA:7.1.2.2][15] ***During Construction*** **Environmental Services (ES) Staff** Refer to [CSA:7.2.3.7.2][15] Environmental services staff shall; ☐ increase the frequency of cleaning in areas adjacent to the construction area while the project is underway. ☐ wet mop and vacuum the area with a HEPA filter-equipped vacuum cleaner as necessary and when the work is complete; ☐ wipe exposed surfaces with a hospital-grade disinfectant; ☐ report discoloured water and water leaks to maintenance and infection prevention and control personnel. **Infection Prevention and Control Personnel** Refer to [CSA:7.2.3.8][15] IPC shall be responsible for; ☐ collaboration with the environmental services staff to ensure that the construction area is thoroughly cleaned when work is complete; ☐ inspecting and auditing the program for assuring the integrity of the dust barriers; ☐ in collaboration with the facility project manager, designating a traffic pattern for constructors that avoids patient care areas and a traffic pattern for clean or sterile supplies and equipment that avoids the construction area. **Healthcare staff** Refer to [CSA:7.2.3.9][15] Health care staff shall: ☐ ensure that patient care equipment and supplies are protected from dust exposure ☐ ensure that patients do not go near the construction area ☐ ensure that staff do not visit the construction area ☐ immediately report discoloured water and water leaks to maintenance and IPC
Additional Comments:

Form 9: Infection Control Preventive Measures Level 4

This form is filled out by the construction planning team or designated person(s) to identify the required preventive measures for the activity described in Form 1" Infection Control Risk Assessment and Preventive Measures Analysis". All CSA standards identified below refer to CSA Z317.13-07 Infection control during construction, renovation and maintenance of health care facilities. This is not an exhaustive list of preventative measures for complete details refer to CSA Z317.13-12.*-

Identify the appropriate measures by marking X in the check boxes☐.

Project Name :	**Location:**	
Form completed by:	**Signature:**	**Date :**
Approved by:		**Date:**
Copy Received by **Signature and Title**		**Date:**
Copy Received by **Signature and Title**		**Date:**
Copy Received by **Signature and Title**		**Date:**
Comments:		

Preventive Measures Level 4

Facilities Maintenance and Engineering/Contractors/Project Management

Before Construction

☐ The Project Manager shall identify essential services (e.g., water supply, electricity, and ventilation systems) that could be disrupted and appropriate measures to address the disruption. [CSA:7.1.2.1][15]

Refer to [CSA:7.1.3.2][15]

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

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

☐ Drawings shall be obtained that show the layout of the ventilation systems that supply air to, or exhaust air from, the work area. The project plan shall state whether it is necessary to close outlets, modify performance, shut down systems. [CSA:7.1.3.4][15]

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

☐ Establish water temperature standards for the health care facility. (see CAN/CSA-Z317.1-09)

☐ Determine whether domestic cold, hot, and recirculation water lines will be affected by the construction. This assessment shall include:

1. Identifying plumbing lines that will need to be
   - ☐ Shut off or interrupted using existing valves; or
   - ☐ Isolated by additional valves.
2. Determining the method to be used to sanitize the water lines before occupancy.
3. Drafting the procedure to be used to sanitize the water system, including identifying the required equipment.
4. Determining the flow path to be used to hyper chlorinate and flush water lines affected by the construction.

☐ The construction planning team shall meet to determine appropriate infection prevention measures in accordance with ICRA. [CSA:7.1.4.2][15]

Preventive Measures Level 4

Facilities Maintenance and Engineering/Contractors/Project Management

During Construction

Dust Control

Refer to[CSA:7.2.1.1][15]

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

☐ Clean the construction area with a HEPA filter-equipped vacuum cleaner, a wet mop, or both, as necessary.

Refer to[CSA:7.2.2.2][15]

☐ Using drop sheets;

☐ Control dust by water-misting work surfaces while cutting.
Note: Caution should be exercised when such techniques are used on cellulose or fibre-based materials that are intended to stay in place following construction work.

☐ Seal windows and unused doors.

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

☐ Seal air supply in the construction area

☐ Place a walk-off mat outside the entrance to the construction area to trap dust from the equipment and shoes of personnel leaving the area, and vacuum the mat daily with a HEPA filter-equipped vacuum cleaner, as well as when the mat is visibly soiled. Walk-off mats shall be of sufficient size to ensure that constructors have to place both feet on the mat at least once on exiting the construction area. [CSA: Figure A5 and A6][15]

Refer to [CSA:7.2.3.2][15]

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

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

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

☐ Remove protective clothing before entering patient care areas.

Ventilation

☐ If possible, the ventilation system should be disabled until the project has been completed. An engineering analysis shall be performed to ensure that the fan systems continue to perform their intended function and that the operation of the HVAC system is not compromised. [CSA:7.2.2.3][15]

Refer to[CSA:7.2.3.3][15]

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

☐ Maintain negative pressure within the construction area by using portable HEPA filter-equipped CAHUs that include pressure gauges and an alarm. Filters shall be monitored and replaced if clogged or functioning below the manufacturer's specifications.

Preventive Measures Level 4

Facilities Maintenance and Engineering/Contractors/Project Management

- ☐ Ensure that the air is exhausted directly outside and away from intake vents and filtered through a HEPA filter. In conditions that prohibit exhausting the exhaust outside, air may be re-circulated in accordance with CSA:6.6, 7.2.3.6[15] .
- ☐ Ensure that the ventilation system is functioning properly and is cleaned if contaminated by soil or dust after the construction project is complete.

Portable construction air handling units (CAHUs) Refer to [CSA:6.6.3, 6.6.4, 6.6.7, 7.2.3.4][15]

- ☐ Air exhausted from construction areas shall be HEPA filtered.
- ☐ HEPA filters and pre-filters for construction air handling units shall be visually inspected by the constructor at least daily and their condition shall be documented.
- ☐ Filters shall be replaced when loaded, when change indicators lights comes on, or in accordance with manufacturer's instructions. [CSA: 6.6.4.3][15]
- ☐ At the beginning of any Preventative Measure Level 3 or 4 construction activity, CAHUs shall be certified. They shall be recertified at least every 12 months and the recertification shall be documented.
- ☐ The negative air pressure of 7.5Pa that is created using CAHUs exhausted to the outside of a construction zone shall be monitored by the contractor using a differential pressure gauge and be continuously recorded daily. In the event the pressures have be below the required negative pressure the contracted will take immediate corrective actions.[CSA:7.2.4.4, 7.2.4.5][15]
- ☐ The construction committee planning team will assign a team member to regularly visit the construction area to confirm the preventive measures are being followed and document findings. (Refer to Form 4) [CSA:7.2.4.6][15]
- ☐ Construction, maintenance, and repair area exhaust air shall not be discharged to areas occupied by Population Risk Group 3 or 4.
- ☐ Measures related to re-circulated air shall require approval from the construction planning team.
- ☐ The relative space pressures between areas occupied by Population Risk Group 3 or 4 shall be continuously monitored and alarmed.
- ☐ Where the failure of either the portable negative air unit or the exhaust fan would compromise the relative pressurization of a Population Risk Group 4 area, the systems shall be interlocked.

Impact on the facility HVAC system Refer to [CSA :7.2.3.5][15]

- ☐ The main facility system shall be verified for operation in accordance with design during construction work.
- ☐ The health care facility and constructor shall verify the pressure relationships for critical areas near the construction area (e.g., Population Risk Group 4 areas).

Construction air handling Refer to [CSA :7.2.3.6][15]

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

Preventive Measures Level 4

Facilities Maintenance and Engineering/Contractors/Project Management

Plumbing

Refer to [CSA:7.2.1.2][15]

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

Refer to [CSA :7.2.2.4][15]

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

Site maintenance

Refer to [CSA :7.2.2.5][15]

- ☐ Place debris in covered containers or cover it with a moistened sheet before transporting it for disposal.
- ☐ Clean the construction area with a HEPA filter-equipped vacuum cleaner, a wet mop, or both, as necessary.
- ☐ Place supplies and equipment in covered containers during transportation through the health care facility to prevent contamination in other areas.
- ☐ Remove the debris in the evening when patients are in their rooms and visitors have left. If this is not possible, debris should be removed at the end of the workday. Exposure of the occupants of the health care facility to debris shall be minimized.
- ☐ Engineering or operations and maintenance staff in the construction area shall clean outside the work area with a HEPA filter-equipped vacuum cleaner every day or more frequently if necessary. [CSA :7.2.3.7.1][15]

Use of permanent exhaust Refer to [CSA:7.2.2.6][15]

The permanent air handling system shall be used for exhausting air from the construction zone via a portable negative air unit only under the following conditions:

- ☐ The air handling system is an exhaust system that leads directly to the outdoors.
- ☐ An engineering analysis is performed to ensure that the exhaust system continues to perform its intended function and that the operation of the HVAC system is not compromised.
- ☐ The operation of the exhaust fan shall be monitored and alarmed to building operations staff and alarmed in the construction zone.
- ☐ If the conditions outlined in the above three (3) items cannot be satisfied, then the steps outlined in CSA 7.2.3.6[15] shall be followed.

Refer to [CSA: 7.2.4.2,7.2.4.3][15]

In addition to the above specifications, engineering or operations and maintenance staff or constructors shall:

- ☐ Ensure that all access be from outside the occupied areas of the health care facility, or construct anterooms at access points to the construction area if access is from within the health care facility.
- ☐ Place a walk-off mat outside and inside the anteroom to trap dust from equipment, debris, and the shoes of personnel leaving the construction area. Walk-off mats shall be of sufficient size to ensure that constructors have to place both feet on the mat at least once on exiting the construction area.

Preventive Measures Level 4
Facilities Maintenance and Engineering/Contractors/Project Management

- ☐ Ensure that the constructors leave the construction area through the anteroom so that they can be vacuumed with a HEPA filter-equipped vacuum cleaner before leaving; or
- ☐ Wear protective clothing that is to be removed each time they leave the construction area and before going into patient care areas.
- ☐ Repair holes in walls immediately when found.
- ☐ Ensure that ventilation systems are working properly in adjacent areas.
- ☐ Carefully remove barrier walls and use short term protection to minimize environmental contamination during removal.
- ☐ During construction, events that can present infection risks occur; intervention procedures shall be implemented immediately to resolve the problems. [CSA: 7.2.4.8][15]

After Construction

- ☐ Before patient or staff occupancy of the construction project work area is permitted, a project infection control work plan completion audit shall be completed. If the commissioning process identifies any uncompleted work from the infection control plan, this shall be listed as a project deficiency. [CSA: 7.2.4.10][15]
- ☐ After construction has been completed, the dust barrier shall be removed in such a manner to prevent the spread of dust and other debris particles adhering to the barrier.
- ☐ The construction planning team shall review the preventative measures that were undertaken and access their effectiveness. [CSA: 7.3.1][15]
- ☐ The engineering or operations and maintenance staff or constructors shall ensure that the construction area is free of equipment and debris.
- ☐ The construction planning team shall conduct a final inspection to ensure that the ventilation system is functioning properly in the construction area and adjacent areas. [CSA: 7.3.2.1][15]
- ☐ Before the completed construction area is occupied, any portions of the infection control plan still in effect shall be reviewed by the construction planning team. If necessary, such portions shall be incorporated into the health care facility's ongoing operating policies and procedures. [CSA: 7.3.3][15]

Additional Comments:

Preventive Measures Level 4
Environmental Services/Infection Control/Healthcare Staff

Before Construction

- ☐ The health care staff, in conjunction with infection prevention and control personnel, shall collaborate to minimize occupant exposure by identifying high-risk patients who might need to be temporarily moved away from the construction area. [CSA: 7.1.2.2][15]

During Construction

Environmental Services

Refer to [CSA:7.2.3.7.2][15]

Environmental services staff shall:

- ☐ increase the frequency of cleaning in areas adjacent to the construction area while the project is underway.
- ☐ wet mop and vacuum the area with a HEPA filter-equipped vacuum cleaner as necessary and when the work is complete;

Preventive Measures Level 4

Environmental Services/Infection Control/Healthcare Staff

☐ wipe exposed surfaces with a hospital-grade disinfectant;

☐ report discoloured water and water leaks to maintenance and infection prevention and control personnel.

Infection Prevention and Control Personnel

☐ Infection prevention and control personnel shall be responsible for collaboration with the environmental services staff to ensure that the construction area is thoroughly cleaned when work is complete.

☐ Infection prevention and control personnel shall be responsible for inspecting the integrity of the dust barriers.

☐ Infection prevention and control personnel shall, in collaboration with the facility project manager, be responsible for designating a traffic pattern for constructors that avoids patient care areas and a traffic pattern for clean or sterile supplies and equipment that avoids the construction area.

☐ Infection prevention and control personnel or member of the construction planning team shall regularly visit the construction area to ensure that preventative measures are followed. The frequency of their visits shall be determined by the construction planning team. [CSA: 7.2.4.6][15]

☐ Infection prevention and control measures shall be constantly monitored and shall be reviewed at every construction and project management meeting. [CSA: 7.2.4.7][15]

Health Care Staff Refer to [CSA: 7.2.3.9][15]

Health care staff shall ensure;

☐ patient care equipment and supplies are protected from dust exposure;

☐ patients do not go near the construction area;

☐ staff and visitors do not visit the construction area; and

☐ report discoloured water and water leaks to maintenance and infection prevention and control personnel.

After Construction
Refer to [CSA: 7.3.2.3][15]

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

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

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

☐ IPC shall ensure that the construction area has been terminally cleaned before building occupants are allowed to occupy the new space. The terminal clean shall be performed by the health care facilities environmental services department or designated alternative cleaning contractor using a terminal cleaning procedure approved by the IPC department or the construction planning team. [CSA:7.3.2.3][15]

Additional Comments*:*

7. Exceptions to the Guidelines

During planning, design, and construction/renovations, a Construction Planning Team may encounter challenges in meeting the requirements and recommendations of the design sections of these guidelines and an exception may be considered necessary. Challenges that may lead to exception consideration include:

- Clinical request
- Constraints of an existing footprint/infrastructure
- Financial resources

Exceptions may be minor, such as a modifications, additions, or variations not deviating significantly from the plans and specifications or the requirements of these guidelines. Examples may include:

- minor construction changes not impacting overall design, cost, or IPC principles
- substituting comparable products

More major exceptions that significantly deviate from the plans, specifications, or requirements of these guidelines may also be considered and may include:

- use of multi-patient care rooms vs. single patient rooms design
- decreasing the number of required hand hygiene sinks
- requirements posing major impacts to fiscal resources

The exception process described below is intended for consideration of exceptions to the design sections of these guidelines, not the ICRA and Preventive Measures Section.

Any member of the Construction Planning Team may bring forward a potential exception for consideration. Where an exception to a requirement or recommendation within this guideline is perceived as necessary, the process outlined in this section shall be followed. The extent of the process depends upon the magnitude of the exception being considered and level of leadership required for resolution.

7.1 Exception Consideration Process

The Exception Consideration Process shall be managed by the Construction Planning Team, led by the Construction Planning Team chair (who is chosen by the team and is responsible for ensuring the Exception Consideration Process is followed). The Construction Planning Team chair shall use the "Exception to Guideline Decision Algorithm" in Appendix 1a to guide the exceptions process, which includes escalation levels when resolution cannot be reached at previous levels.

7.1.1 Level 0

Potential exceptions are discussed at the Construction Planning Team level through consultation between Infection Prevention and Control (IPC), the project manager (either AHS/Covenant or Alberta Infrastructure), clinical and administrative staff, and other stakeholders, as appropriate. Most exceptions should be resolved at this level, as escalation to Levels I and II could result in delays to the project and subsequent additional operational and cost implications.

A formal risk assessment using the Exceptions Tracking and Risk Assessment (ETRA) Tool will guide decision-making and is in the form of an Excel spreadsheet (see Appendix 1b for a sample), which is provided electronically on the webpage housing the full Guidelines.

Exceptions approved at the Construction Planning Team level shall be documented on the ETRA Tool by the Construction Planning Team. Also, the Exceptions Approval Form ("Form 10" sample in Appendix 1c and found on the webpage housing the full Guidelines) shall be completed with

signatures of the Construction Planning Team members. The ETRA Tool and approval form shall be held with the Construction Planning Team and reported to the "Exceptions Tracker". The ETRA Tool contains a command button that, when clicked, will open an email to the "Exceptions Tracker" Distribution List, with an electronic copy of the spreadsheet attached. An electronic copy of the signed Exceptions Approval Form should also be attached to this same email, facilitating the reporting process for exceptions.

7.1.2 Escalation Level I

Any exception not resolved at the Construction Planning Team level shall be escalated to this level (as indicated in the Exception to Guideline Decision Algorithm) and requires consultation between those in leadership over staff on the Construction Planning Team (Zone Level) to seek an acceptable compromise. Participants at this level may include:

- Project Steering Committee (for capital projects involving Alberta Infrastructure)
- Clinical Team
- Site Administration
- Senior Project Manager/Senior PM Director
- IPC Clinical Practice Coordinator/IPC Director
- IPC Executive Director

Participants in Escalation Level I shall review the ETRA Tool completed by the Construction Planning Team in Level 0 and attempt resolution.

Exceptions approved at Escalation Level I shall be documented on the ETRA Tool by the Construction Planning Team. Also, the Exceptions Approval Form shall be completed with signatures from the above list of participants. The ETRA Tool and approval form shall be held with the Construction Planning Team and reported to the "Exceptions Tracker". The ETRA Tool contains a command button that, when clicked, will open an email to the "Exceptions Tracker" Distribution List, with an electronic copy of the spreadsheet attached. An electronic copy of the signed Exceptions Approval Form should also be attached to this same email, facilitating the reporting process for exceptions.

7.1.3 Escalation Level II

Any exception not resolved in Level I shall be escalated to this level (as indicated in the Exception to Guideline Decision Algorithm) and requires consultation between those in leadership at the provincial level to seek resolution. Participants at this level may include:

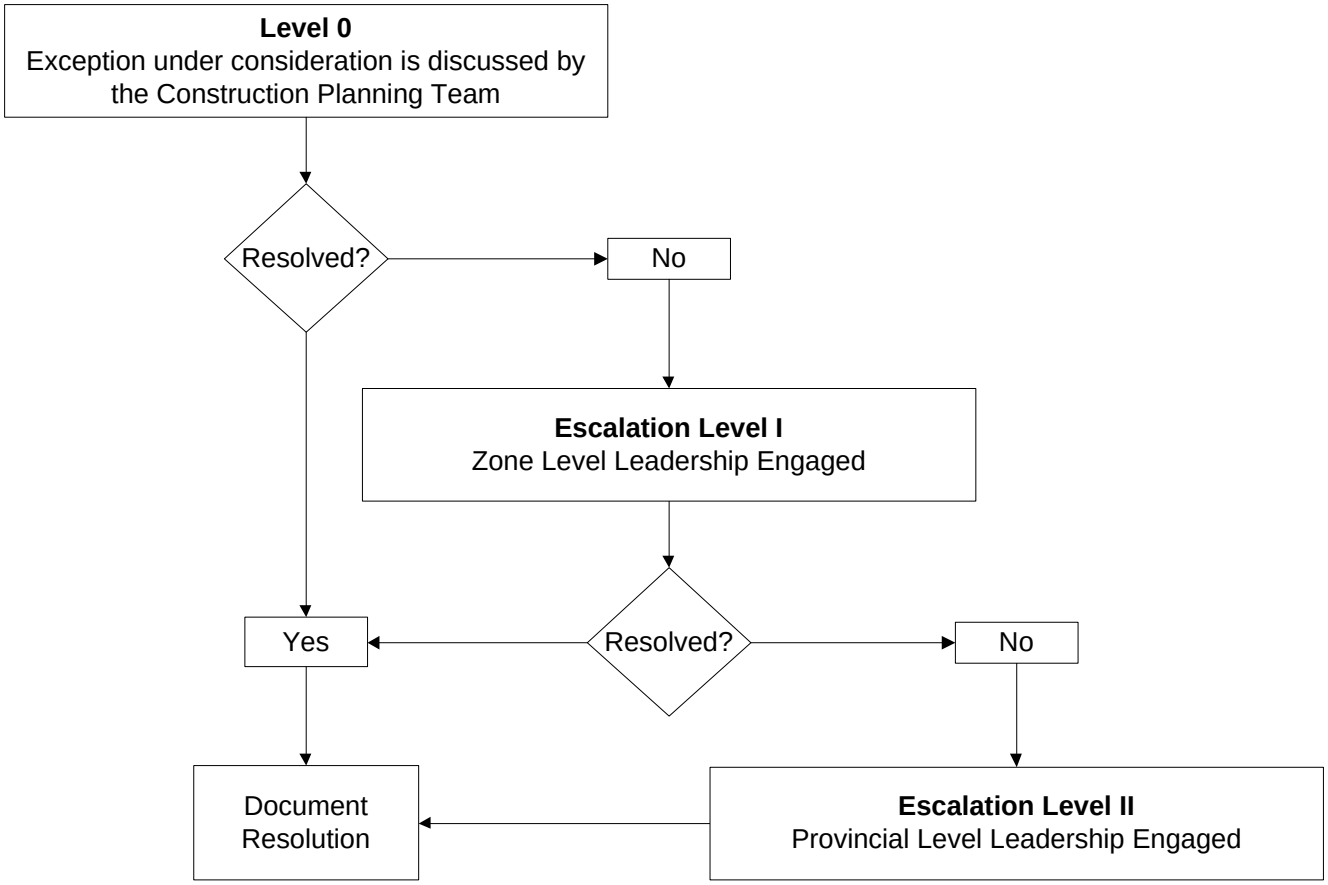
- Operational Zone Lead
- Medical Directors (Operations, IPC, etc.)
- Capital Management Zone Directors
- AHS/Covenant Senior Executives
- Alberta Infrastructure Senior Executives

The ETRA Spreadsheet reviewed in Level I shall be reviewed again and a final decision made.

Exceptions approved at Escalation Level II shall be documented on the ETRA Tool by the Construction Planning Team. Also, the Exceptions Approval Form shall be completed with signatures of the above list of participants. The ETRA Tool and approval form shall be held with the Construction Planning Team and reported to the "Exceptions Tracker". The ETRA Tool contains a command button that, when clicked, will open an email to the "Exceptions Tracker" Distribution List, with an electronic copy of the spreadsheet attached. An electronic copy of the signed Exceptions Approval Form should also be attached to this same email, facilitating the reporting process for exceptions.

Appendix 1a

Exception to Guidelines Decision Algorithm



Approvers and Roles by Escalation Level		
Escalation Level	Approvers	Role
0	Construction Planning Team Members • Clinical User • Facilities, Maintenance, & Engineering • Project Manager (either AHS/Covenant or Alberta Infrastructure) • Infection Control Professional	• Review conditions on site and define issue • Explore options using Exceptions Tracking & Risk Assessment (ETRA) tool • If an exception is made, document resolution using the Exceptions Approval Form, and • Construction Planning Team Chair reports resolution to the Exceptions Tracker
I	May include: • Project Steering Committee • Clinical Team • Site Administration • Senior Project Manager/Senior PM Director • IPC Clinical Practice Coordinator/IPC Director • IPC Executive Director	• Review ETRA Tool (completed by Construction Planning Team) • Provide a zone view • Construction Planning Team Chair documents resolution using the Exceptions Approval Form • Construction Planning Team Chair reports resolution to the Exceptions Tracker
II	May include: • Operational Zone Lead • Medical Directors (Operations, IPC) • Capital Management Zone Directors • AHS Senior Executives • Alberta Infrastructure Senior Executives	• Review ETRA Tool • Provide provincial view and consider impact on organization • Construction Planning Team Chair documents resolution using the Exceptions Approval Form • Construction Planning Team Chair reports resolution to the Exceptions Tracker

Appendix 1b

Exceptions Tracking and Risk Assessment (ETRA) Tool

The tool below is a sample of the Exceptions Tracking and Risk Assessment (ETRA) Tool to guide decision-making regarding exceptions. Use the electronic version, which can be downloaded from the webpage housing the full Guidelines. The electronic version comes with tutorial pop-up notes on various cells that provide instructions on how to complete the tool.

Exceptions to the Guidelines Worksheet

Date	*Requester and Contact Information (Project Team Chair)*	*Zone*	*Facility*	*Area*	*Project*	*Guidelines Section Number*	*General Description of the Issue*

	OPTIONS FOR RESOLVING ISSUES FOR THE EXCEPTION UNDER CONSIDERATION			*Final Decision*	
	Risk Assessment				
	Assessment of Current Guidelines Requirements	OPTION 1	OPTION 2		
	Description:	Description of Option:	Description of Option:	*Indicate if the Exception was approved and which option was chosen.*	Click here to email to the Exceptions Tracker. Remember to attach Approval Form
	In the cells below, describe in detail potential risks for each OASIS Principle, budget implications, and any other considerations. Use format painter to fill the cell with the corresponding color on the heat map legend below to categorize risk.	*In the cells below, describe in detail potential risks for each OASIS Principle, budget implications, and any other considerations. Use format painter to fill the cell with the corresponding color on the heat map legend below to categorize risk.*	*In the cells below, describe in detail potential risks for each OASIS Principle, budget implications, and any other considerations. Use format painter to fill the cell with the corresponding color on the heat map legend below to categorize risk.*	*Approval Form Signed and Scanned?*	
	Low	*Low*	*Low*		
	Medium	*Medium*	*Medium*		
OASIS Principles	*High*	*High*	*High*		
O Operations: creating an operating environment that promotes the efficient and effective delivery of health care services, thereby helping to ensure positive patient outcomes					
A Accessibility: creating an environment that facilitates the patient's access to receiving care and the caregiver's ability to provide care					
S Safety & Security: creating an environment of care that is safe and secure for all occupants (patients and their families, staff and visitors)					
I IPC: creating an environment that is safe for all building occupants in terms of the prevention of health care acquired infections & the control of infectious diseases					
S Sustainability: taking into account the sustainability of the construction process and the finished building, and the sustainable operation of the HCF over time					
Budget Implications					
Other Considerations					

Appendix 1c

Approval of Exceptions to the Design and Construction Guideline

This form shall be completed by the construction planning team, which may include Infection Prevention and Control (IPC), Project Management, Facilities Maintenance & Engineering, clinical user, and site administration, for any exceptions to the Design and Construction guidelines, based on Section 7 of the Guidelines ("Exceptions to the Guidelines").

Once signed, scan and send a copy along with the ETRA Tool to The Exceptions Tracker. Keep the original with the project team records.

Project Number	**Zone and Project Name**
Date	**Project Team Contact**
Guideline Section Affected	**Escalation Level**
General description of issues for exception consideration	
Summarize the chosen option and provide rationale	
Approvals **(Who approves exceptions is determined by Escalation Level, refer to Section 7 of the Guidelines)**	
Name and Title (print)	**Signature**
Name and Title (print)	**Signature**
Name and Title (print)	**Signature**
Name and Title (print)	**Signature**
Name and Title (print)	**Signature**

Appendix 2: Diagrams of Airborne Isolation Rooms

Figure A

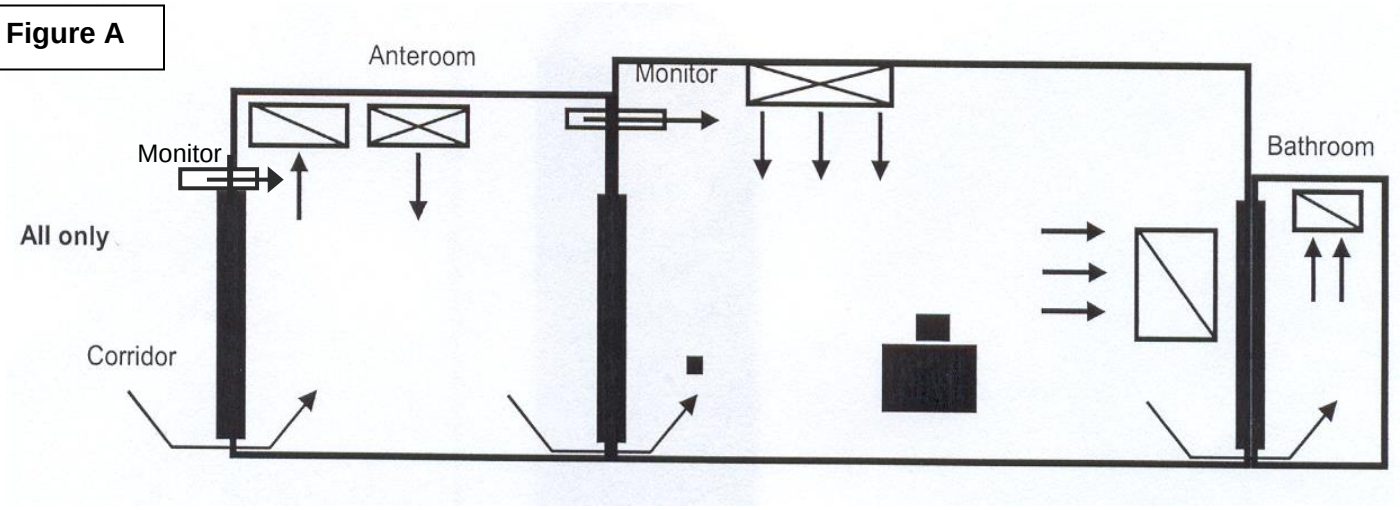
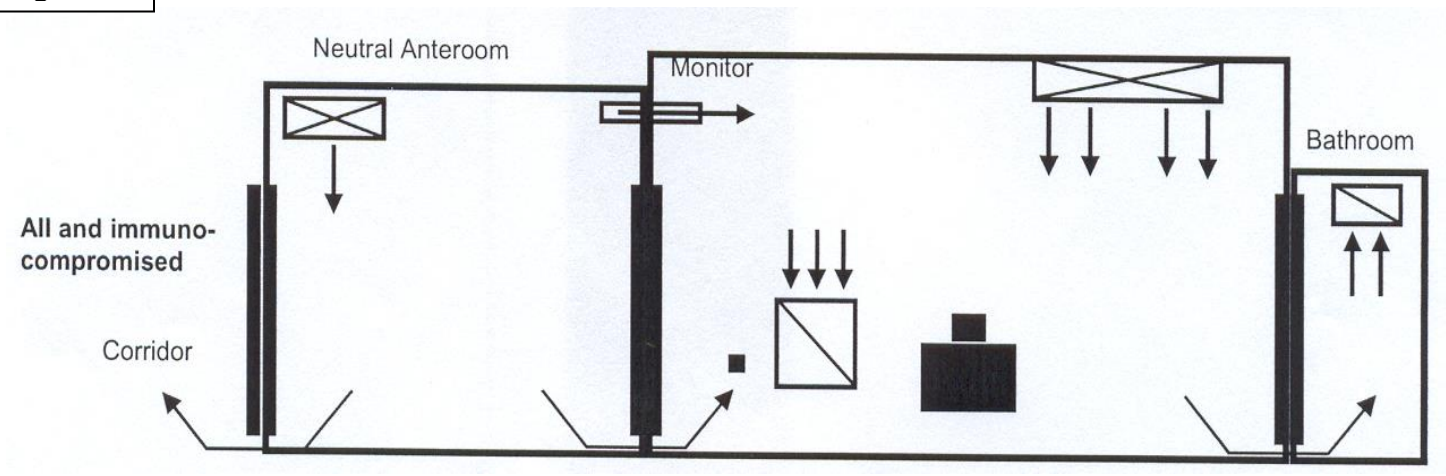


Figure B



Used with permission of A. Streifel, University of Minnesota (Guidelines for Environmental Infection Control in Health-Care Facilities, CDC, 2003). Adapted for this guideline.

Appendix 3: AHS IPC Best Practice Guidelines for Selection of Sinks and Faucet Fixtures for Dedicated Hand Washing Stations

Appropriate sink and faucet size, composition, and design will help to prevent contamination of surrounding areas—due to splash or aerosolization—and re-contamination of hands during hand hygiene through inadvertent touching of components.

1. Product Evaluation

AHS and Covenant staff responsible for purchasing new sinks and faucets—for hand washing—should follow these guidelines. Infection Prevention and Control should be consulted when evaluating and purchasing new sinks and faucets. This will ensure that products purchased do not increase the potential for transmission of infectious agents to patients or staff. If additional guidance or clarification is required, IPC personnel in the applicable facility or zone should be contacted.

2. Selection Criteria for Sinks

Specifications for dedicated hand washing sinks include the following:

- The sink shall have a deep basin of at least 7.5 inches[1] (19 centimetres) in depth to prevent splashing of surrounding areas,[2]
- The area of the sink basin shall not be less than 144 square inches (929 square centimetres),[2]
- The sink basin shall be made of solid, non-porous materials, (e.g. Porcelain, enamel, vitreous china, or a minimum thickness of 18/8 gauge, grade 304 stainless steel),[2,3,5,8]
- Granite or marble shall not be used,[3,5,8]
- When water falls from the faucet it shall hit the sink basin surface; it shall not flow directly into drain,[2,7,8]
- Basin shall be designed to prevent pooling of water,
- Seamless, integral backsplashes are recommended to reduce microbial growth and facilitate cleaning,
- Sink basin shall not have an overflow,[3,5,8]
- Sink drain shall not be able to take a plug.[3,8]

3. Installation/Location of Sinks

- Hand washing sinks should be installed at least 3 feet (1 metre) from sources of extrinsic contamination such as clinical rim flushing sinks or hoppers.
- Due to the risk of splash, sinks should be located at least 3 feet (1 metre) from patients, clean supplies and adjacent counters [5] and,
- Hand wash sinks should be free standing and not inserted into or immediately adjacent to a counter.[5]

4. Selection Criteria for Faucet Fixtures

Proper fixtures for dedicated hand hygiene sinks, when combined with an acceptable basin design, minimize contamination of surrounding area through splash and aerosolization. Adequate clearance for hand washing mitigates the risk of contaminating the hands through inadvertent touching of sink and fixtures.

Criteria for selection of faucets include the following:

- The faucet shall have a gooseneck spout with a minimum height of 10 inches/25 centimetres.[1,7]
- The faucet radius shall be sufficient to avoid inadvertent touching of the sink basin during hand hygiene and ensure water does not fall directly into drain.[1,2,7]

- A minimum gooseneck radius of 4 inches (10 centimetres) is recommended,
- Once the faucet has been attached to the sink basin, there shall be a minimum of 10 inches (25 centimetres) clearance from discharge point of faucet to the bottom of the basin.[2]
- Faucets shall be stationary and not swivel. [5]
- Laminar flow regulation is recommended.
  - Aerators shall not be used.[2,3,5]
  - Plumbing lines connecting the valve and water outlet should be as short as possible.[6]
- Hands free controllers should be used [2,3,5,8] and the following specifications apply:
- Electronic sensor regulated faucets (electronic eye)[5]are preferred,
  - If electronic sensor is used, faucet shall be capable of operation during power failures,[2]
- Foot pedal operated sinks are acceptable,[5]
- Faucet blade controls may be used if there is a determined need for water temperature regulation,
  - If faucet blade controls are used, blades handles shall be no less than 4 inches (10 centimetres) in length,[1, 2]

5. Selection Criteria for Hand Drying Fixtures

- A dispenser for single use towels incorporating a “no touch” design is preferred and should operate so that dispensing requires that only the towel be touched.[1,3,8]
- Hot air dryers shall not be used in clinical areas as warm air currents dry hands slowly and can be used by only one individual at a time.[3]
- In non clinical areas paper towel dispensers will continue to be needed until such time as all sinks are equipped with automatic faucets, and all bathrooms are a walk in style (no door).

6. Cleaning and Disinfection of Sink and Faucet Fixtures

The sink basin and faucet fixtures shall be able to withstand frequent cleaning with low level disinfectants currently approved and used in AHS and Covenant Health facilities.

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   http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_hh_20080501.pdf
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7. Hota, S, Zahir, H, Stockton, K, et al. Outbreak of Multidrug-Resistant *Pseudomonas aeruginosa* Colonization and Infection Secondary to Imperfect Intensive Care Unit Room Design. Infect Control and Hosp Epidemiol 2009; 30:25-33.
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Appendix 4 Sample IPC Risk Assessment Matrix for Artworks

IPC Risk Assessment Matrix for Artworks at South Health Campus

Infection Prevention and Control supports the art experience in healthcare facilities. A risk assessment should be conducted before art is chosen to ensure the materials and finishes are safe for the healthcare environment and the planned location of the artwork is appropriate. There must be a written plan for regular cleaning and maintenance.

Proposed installation space	**Art medium**		
	Easy to clean and disinfect	**Can be cleaned but not disinfected**	**Difficult to clean, damp dust only**
Administration and non-clinical offices	✓	✓	✓
Public space (artwork is placed out of reach)	✓	✓	Consult with FME and ES
Public space (artwork is placed within reach)	✓	✓	Consult with IPC and ES
Clinical area	✓	Consult with IPC and ES	×
Point of care	Consult with IPC and ES	×	×

Key
✓ Does not require IPC, ES or FME approval
X Not recommended

Assumptions:

- Water features, open fish tanks, tapestries and materials that promote growth of bacteria or fungi shall not be installed.
- Materials that require regular vacuuming should not be installed.
- Cleaning is done with soap and water. Disinfection involves the use of a low-level disinfectant (hospital grade germicide).
- Art that is visibly soiled and cannot be clean shall be removed.

Definitions

- Public spaces are defined as spaces where patients rarely/sometimes spend time (e.g. executive offices, elevator foyers, food courts, front of house spaces, parking lots, and staff meeting rooms).
- Clinical areas are defined as spaces where patients usually/often spend time (e.g. clinic waiting rooms, nursing unit hallways, interview/consult rooms, physician offices where patients are seen, patient lounges and nourishment areas, nursing stations).
- Point of care spaces are defined as areas where patients receive examinations, diagnostics or treatment (e.g. in-patient rooms, clinic exam rooms, procedure rooms, diagnostic imaging rooms).

Glossary

Adjacent areas: all of the areas surrounding an area where construction, renovation, or maintenance work is occurring, including, 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 intended 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.

AIR anteroom: a small room or space at the entrance to an AIR that is separated by doors from both the outside and the main space in the AIR.
Note: *The AIR anteroom provides an airlock between the adjacent space and the patient and allows for storage of supplies e.g. PPE.*

Airborne isolation room (AIR): a room that is designed, constructed, and ventilated to limit the spread of airborne micro-organisms from an infected occupant to the surrounding areas of the HCF.
Notes:
(1) *These rooms are designed for use when caring for patients requiring airborne precautions; for example, patients with known or suspected tuberculosis, varicella zoster, or measles.*
(2) *AIRs are designed to maintain negative pressurization relative to adjacent areas.*

Ambulatory care: a mode of delivering health care services on a same-day basis, not requiring overnight hospitalization.

Area Classification- a designation applied to an area in a health care facility to distinguish between varying levels of risk.

Type I — a patient care area where the invasiveness of procedures, the level of risk of morbidity and mortality to the patient, and the level of risk of adverse outcomes to the care providers dictate that more stringent HVAC and environmental parameters be met.

Type II — a patient care area or an area that is intended for the provision of services that provide direct support to patient care services (e.g., labs, central supply).

Type III — all other support services not designated as Type I or II.

Automatic Flushing: flushing electronically by using a sensor that provides a touch-free system.

Biomedical waste: waste generated within a health care that requires special handling and disposal because it presents a particular risk of disease transmission.

Central tub/shower room: a room not associated with a single inpatient bedroom, containing a tub or shower for the bathing of patients.

Commissioning (commissioning process) - a systematic verification, documentation, and training process applied to all activities during the design, construction, static verification, start-up, and functional performance testing of equipment and systems in a facility to ensure that the facility operates in conformity with the owner's project requirements and the basis of design in accordance with the contract documents.

Construction: major and minor facility activities that disturb or modify facility structures and systems, the term includes not only construction but also renovation, maintenance, and repair work.

New construction: construction to produce all or part of an HCF that did not exist prior to the project.

Renovation: construction to modify or upgrade an existing HCF to be used for similar purposes.

Construction air handling unit (CAHU) — a machine used to move HEPA-filtered air into or out of a construction site.

Construction clean -cleaning performed at the end of a workday by construction workers that removes gross soil and dirt, construction materials, and workplace hazards.
Note: Cleaning to the "construction clean" level may include sweeping and vacuuming, but usually does not address horizontal surfaces or areas adjacent to the job site.

Constructor: a person who undertakes a construction or renovation project for an owner. A constructor can be a contractor, subcontractor, construction manager, construction worker, or tradesperson. The term also includes an owner who personally undertakes all or part of a construction or renovation project.

Critical care area: a patient care area where the induction and maintenance of general anaesthesia routinely occurs in connection with the examination or treatment of patients, or where contact between patients and medical electrical equipment is frequent or normal.

Environmental services: HCF services (e.g., general housekeeping, waste management, pest control, and hazardous material cleanup).

Functional area: an area within the HCF that is described by its function within the facility or by the activities that take place there as part of the operation of the facility (e.g., inpatient bedrooms, critical care units, ambulatory care areas).

Functional program: a planning document that defines the desired outcome for a building project, informing both operating and capital cost estimates and providing the functional and spatial specifications that provide the primary guide for the subsequent architectural design of a building.

Hands-free operation: includes elbow, knee, foot, or electronic operation.

Hand washing station: an area dedicated exclusively for use by health care workers for the purposes of hand hygiene only. Includes a hand hygiene sink, soap dispenser, paper towel dispenser and waste receptacle.

Health care facility (HCF): a set of physical infrastructure elements supporting the delivery of health-related services.[refer to CSA: Definitions][1]

(1) For examples of different HCFs by class, (see Annex B).

(2) Within any given building, there may be more than one class of HCF (see Annex B).

Class A-1 HCF — an HCF in which patients are

(a) accommodated on the basis of medical need;

(b) provided with continuing medical care; and

(c) provided with supporting diagnostic and therapeutic services that can extend beyond 12 h.

Note: Class A-1 HCFs typically provide trauma and emergency services, have surgical operating rooms, and are referred to as "active treatment" or "acute care" institutions.

Class A-1 HCFs fall into one of the following categories:

Category 1 — HCFs designated by the authority having jurisdiction as a mission critical facility including those HCFs designated as essential in infectious diseases outbreak management.

Category 2 — HCFs that meet two of the following conditions:

(a) the HCF is an academic centre providing tertiary or quaternary services such as

transplantation, oncology, or trauma services;

(b) the HCF provides regional programs such as oncological, trauma, cardiac, dialysis, pediatric, maternal, or newborn services;

(c) the expected travel time to a Class A-2 facility exceeds 1.0 h under normal driving conditions; or

(d) the HCF is the sole provider of acute care health services to populations in excess of 500 000 people.

Category 3 — HCFs that meet one of the requirements listed in Category 2 and

(a) provide programs or services that are not generally provided by other nearby HCFs; and

(b) include at least one of the following:

(i) rehabilitation hospital;

(ii) chronic patient care for hospitals with at least 200 licensed beds;

(iii) mental health facilities;

(iv) special rehabilitation services for persons with a disability;

(v) transplantation centres; or

(vi) continuing care centres for management of chronic diseases.

Class A-2 HCF — an HCF

(a) in which patients are

(i) accommodated on the basis of medical need;

(ii) provided with continuing medical care; and

(iii) provided with supporting diagnostic and therapeutic services that can extend beyond 12 h; and

(b) that does not meet the Category 1, 2, or 3 requirements for a Class A-1 facility.

Notes:

(1) Class A-2 HCFs include facilities for patients rendered incapable of self-preservation as a result of their medical condition.

(2) Class A-2 HCFs typically provide trauma and emergency services, have surgical operating rooms, and are generally referred to as “active treatment” or “acute care” institutions.

Class B HCF — an HCF in which patients, as a result of physical or mental disabilities, are unable to function independently and are accommodated on the basis of medical need for constant care by health care professionals or the need for intensive therapies that require supervision by health care professionals, but where interventional and other invasive procedures are not performed.

Notes:

(1) Class B HCFs include facilities for patients rendered incapable of self-preservation as a result of their medical condition.

(2) Class B HCFs include extended care, intermediate care, multi-level care, hospice, mental health, and rehabilitation facilities.

Class C HCF — an HCF in which ambulatory patients

(a) are accommodated on the basis of medical need;

(b) are provided with non-invasive medical services for diagnosis, treatment, or therapy; and

(c) stay for no more than 12 h (except for residential facilities in which occasional care is provided).

Notes:

(1) Class C HCFs include facilities for patients who remain capable of self-preservation.

(2) Class C HCFs include outpatient clinics, dentists' offices, doctors' clinics, group homes, and privately run residences.

HEPA (high-efficiency particulate air) filter - an air filter with an efficiency of 99.97% in the removal of airborne particles 0.3 µm or larger in diameter.

Hopper: A clinical rim flushing sink or a large floor-standing or wall-hung sink equipped with a flush valve and handle, for use in disposing of body fluids and other substances that cannot be safely disposed of in a conventional sink or toilet.

Infection control risk assessment (ICRA): a process used to identify design elements that increase the risk of microbial transmission in the environment.

Note: *An ICRA considers the facility's patient population and clinical programs, and the potential effects of disruptions to essential services (e.g., water, ventilation, electricity) that could affect patient placement or necessitate relocation of patients.*

Inpatient: an HCF patient who occupies a bed for at least one night in the course of treatment, examination, or observation.

Inpatient area: an area in the HCF specifically intended for the accommodation of inpatients.

Note: *Examples of inpatient areas: critical care, maternal and newborn, medical-surgical inpatient, mental health services, pediatric and adolescent inpatient, and rehabilitation care.*

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

Notes:

1) Maintenance can be performed by an equipment supplier, contractor, or facility-based operation and maintenance staff.

2) The term "maintenance" also covers repairs.

Monolithic ceiling: a ceiling constructed with a surface free of fissures, cracks, and crevices.

Notes:

(1) Seals or gaskets are used to maintain ceiling integrity at penetrations such as lights, diffusers, and access panels.

(2) Ceilings using "lay-in" panels are not monolithic.

Multidisciplinary team (MDT) – (**AHS Construction Planning Team**) a group comprising representatives from various disciplines in the health care facility that works with the project management team and others to ensure that the appropriate infection prevention and control measures are followed during construction activities.

Net area: the horizontal area of space assignable to a specific function.

Notes:

(1) The net area of rooms is measured to the inside face of wall surfaces.

(2) Spaces such as corridors, un-programmed or unassigned storage, mechanical and electrical service space, and other areas that are determined as a result of design are not considered assignable net areas.

(3) *Also referred to as "net square metres".*

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.

Plumbing dead leg - a pipe or other plumbing component or system that has contained, contains, or likely will contain stagnant water.

Preventive measure - a system involving precautionary actions, equipment, and barriers at each phase of a project to decrease the spread of contaminants during construction, renovation, or maintenance of a health care facility.

Preventive measures analysis - the process of evaluating construction-related risks to patients and staff and determining the preventive measures that will be necessary to mitigate those risks.

Observation Room: For the purpose of this document, observation room will mean a multi bed patient care area with an expected length of stay from 24 to 48 hours. The intended use is for observation and stabilization of patients needing special care or extra observation. Each patient space in an observation room is described as a cubicle and these spaces may be separated by a curtain, walls on 3 sides or a combination of both.

Operating Room: a restricted room within a surgical suite designated and equipped for the purposes for performing a surgical operation. May also be caller OR theatre or OR.

Patient: a person who is waiting for or undergoing medical investigation, care, or treatment.
Note: This Standard uses “patient” as a global term applying to all HCFs. Some HCFs prefer to use alternative terms such as client, resident, or occupant.

Patient care area: an area used primarily for the provision of diagnosis, therapy, or treatment.

Personal protective equipment (PPE): items that when worn correctly form a barrier or shield against hazardous materials.

Procedure room: A room where inpatient and outpatient surgical or non surgical procedures are conducted. Procedures may include but are not limited to:

(a) endoscopy;
(b) cystoscopy;
(c) bronchoscopy;
(d) minor surgical procedures under local or heavy sedation or general anaesthesia (e.g., plastics, orthopedics, ENT, gynecology, general surgery, and ophthalmology);
(e) major surgical procedures requiring general or regional anaesthesia, such as plastics, orthopedics, cardiac surgery, neurosurgery, ENT, gynecology, general surgery, urology, and ophthalmology;
(f) interventional medical imaging;
(g) interventional cardiology (cardiac catheterization/electrophysiology);
(h) pacemakers/ICD;
(i) lithotripsy;
(j) pain management procedures, diagnostic and regional blocks, implantable spinal stimulators;
(k) urodynamics;
(l) manometry; and
(m) medical day care procedures (e.g., infusions, IV therapy, PIC lines, etc.).

Procedure: a course of action, treatment, or care process.
Note: Procedures are often characterized as diagnostic, therapeutic, or surgical, and can be further categorized in terms of the type of electrical contact between the patient and the medical electrical equipment when such equipment is used.

Renovation: see **Construction**.

Routine infection prevention and control practices: the approach to infection prevention and control in which all human blood and body fluids are treated as if known to be infectious.

Scrub sink: a sink that is specifically intended for use by medical personnel prior to a procedure.

Single occupancy: means that patients have a spatial separation and a physical barrier between them sufficient to provide privacy, protection from the spread of infection, and adequate area to support the clinical functions.

Sink: a bowl and faucet permanently installed and connected to a water supply and drainpipe.

Surgical day care: an area where patients undergo same-day diagnostic and/or surgical procedures, which may include services for admission and post-operative care until discharge.

Surgical Suite: An area including the operating room(s), post anesthesia recovery room and support facilities.

Terminal Cleaning - the thorough cleaning of a clinical space following construction and before the space is used for patient care, medical equipment, or the storage of clean or sterile supplies, in order to remove contaminating micro-organisms that could be acquired by subsequent occupants or staff.

Toilet room: contains a toilet and hand washing sink.

User: person occupying or performing an activity in a building, area, or room intended for that purpose (e.g., diagnosis, treatment, waiting, dining, etc.).

Walk-off 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 workers.
Note: Walk-off mats include, for example,
a) mats for removal of sand and winter road salt;
b) mats with a sticky surface;
c) sections of carpet made with synthetic fibers; or
d) antibacterial mats that include a frame allowing for placement of antibacterial solutions.

Washroom suite: contains a toilet, hand washing sink and shower.

Waterless hand hygiene station: a location that is equipped with a waterless (e.g., alcohol-based) hand sanitizer dispenser.

Abbreviations

AAMI - Association for the Advancement of Medical Instrumentation
ABHR- Alcohol based hand rub
AIR - airborne isolation room
ANSI - American National Standards Institute
ASHE - American Society for Healthcare Engineering
ASHRAE - American Society of Heating, Refrigerating, and Air-Conditioning Engineers
CAHU- a machine used to move HEPA-filtered air into or out of a construction site
CCU- Critical Care Unit
CDC - U.S. Centers for Disease Control and Prevention
CSA - Canadian Standards Association
DI - diagnostic imaging
ES - Environmental Services
ETO - ethylene oxide
FGI - Facility Guidelines Institute
FME - Facility Maintenance and Engineering
HCF - health care facility
HCW - health care worker
HEPA - high-efficiency particulate air
HVAC - heating, ventilation, and air conditioning
ICP - Infection Control Professional
IPC - Infection Prevention and Control
ICRA - infection control risk assessment
ICU -intensive care unit
LBR -labour/birthing room
LBRP -labour/birthing/recovery/postpartum
MERV- minimum efficiency reporting value
MDR - medical device reprocessing
MDRD - medical device reprocessing department
NICU - neonatal intensive care unit
OR - operating room
PACU - post-anaesthetic care unit
PICU - pediatric intensive care unit
PE - protective environment
PPE - personal protective equipment

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