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The Role of IPAC in Construction, Renovation, Maintenance and Design (CRMD) in Long-term Care Homes

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Objectives

Participants will learn about:

- Importance of managing CRMD activities
- Infection Prevention and Control (IPAC) approaches to CRMD
- Key strategies and consideration for ensuring CRMD projects are carried out safely

What Does CRMD Involve?

- Construction, Renovation, Maintenance and Design has a vast scope but generally involves three phases:
 - Planning
 - Work
 - Commissioning
- Although the active ‘work’ phase may pose the most significant immediate risk as it involves the **demolition and building stages of construction**, all phases can have dire outcomes and lead to infection.

What Does CRMD Have To Do with IPAC?

CRMD in long-term care can pose a significant **infection risk**.

Infectious Agents

- Fungi (Moulds and Yeasts)
 - *Aspergillus, Penicilium, Candida, Zygomycetes, Fusarium*
- Bacteria (*Legionella, Bacillus, Nocardia*, Nontuberculous mycobacteria)

Susceptible Populations and High Risk Setting

- Elderly, immunocompromised
- Medication rooms, kitchens, resident rooms

Potential for Exposures

- Contaminated dust, stagnant water, discovery of mould

IPAC Approaches to CRMD in Long-term Care



Evaluating the Phases of CRMD Projects



At what phase of CRMD is IPAC involved?

IPAC needs to be involved at all phases of CRMD.

- An Infection Control Practitioner (ICP) has numerous responsibilities at each stage - this checklist ensures all are considered.

PHO Resources for [Construction, Renovation, Maintenance and Design \(CRMD\)](#)

[CRMD Checklist: ICP Responsibility](#)¹

CRMD Checklist: ICP responsibility

When to use this checklist:

Planning phase
Work phase
Commissioning phase

As part of the multidisciplinary team (MDT)/project team, the infection control professional (ICP) has an important role in the prevention of infections throughout a construction/renovation, maintenance /facility design project in a health care facility. Use this checklist to help identify key roles and tasks that the ICP needs to support, complete or monitor.

DATE: _____

AREA/UNIT: _____

COMPLETED BY: _____

Phase		Date	Yes	No	N/A	Comments
PLANNING	Establish working relationship with appropriate facility project or program lead prior to the beginning of the project					
	Establish membership on project planning team and functional planning groups					
	Complete patient / client / resident risk assessment in collaboration with care team and facilities lead and or contractor					
	Provide and document ongoing input into functional program					
	Establish dedicated time on IPAC Committee agenda to report progress on and obtain input into key IPAC decisions and activities					
	Review and understand current applicable standards (e.g., Canadian Standards Association, MOHLTC LTCH, Facilities Guidelines Institute).					
	Review all plan and technical drawing(s) and bring issues forward to multidisciplinary team for review					

This checklist is part of Public Health Ontario's Infection Prevention and Control (IPAC) for Construction, Renovation, Maintenance, and Design toolkit. For more information visit www.publichealthontario.ca/CRMD or email ipac@nhpp.ca Page 1 of 4

Source: Public Health Ontario. CRMD checklist: ICP responsibility, 2015¹

IPAC Involvement in CRMD: Planning Phase

- Ensure the proposed project is compliant with current requirements
 - CSA standards
 - MOHLTC Guidance (e.g., LTC Design Manual)
- Perform an Infection Control Risk Assessment (ICRA)
- Provide ongoing input into the functional program
- Ensure contractors and workers have IPAC knowledge
 - ICP to orient incoming workers on IPAC fundamentals (i.e., mask use and hand hygiene, IPAC construction requirements)

IPAC Involvement in CRMD: Work Phase (1/1)

- Participate in scheduled project meetings
- Tour CRMD area daily and audit compliance with IPAC measures

It's critical that any changes to the agreed upon plan be discussed so that both risk and mitigation strategies are revisited and updated accordingly.

IPAC Involvement in CRMD: Work Phase (1/2)

- Provide immediate feedback to onsite supervisor
- Raise IPAC gaps or issues to project lead/stakeholder team, re-education may be necessary
- Major breaches may require immediate suspension of activities, pending corrective action

IPAC Involvement in CRMD: Work Phase (1/3)

- ICP to ensure ongoing, active infection surveillance
- Infections identified during or shortly after CRMD work should raise suspicion
- Depending on the infection type and microorganism involved, consideration should be given to the person, time and place in relation to any construction activity
- Identifying certain microorganism (e.g., *Aspergillus*) that are closely linked to CRMD activity, should raise flags as they are a concern

IPAC Involvement in CRMD: Commissioning Phase (1/1)


- Systematic verification, documentation and training process
- Begins at pre-design stage through post-occupancy and operations phases
- Integral part of the design and construction process
- Intended to be undertaken throughout the life of a facility

IPAC Involvement in CRMD: Commissioning Phase (1/2)

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FOCUS ON

Heating, Ventilation and Air Conditioning (HVAC) Systems in Buildings and COVID-19



March, 2021

Introduction

This document replaces and builds upon the previously-published document titled *Frequently Asked Questions (FAQ) on COVID-19: Heating, Ventilation and Air Conditioning (HVAC) Systems in Buildings*. This version incorporates additional evidence and discussion on the role of HVAC systems, humidity, air flow and CO₂ on COVID-19 transmission. New sections have been added, some of which give added detail on particular components of previous questions, to help with readability and accommodate new references.

Background

COVID-19 is primarily transmitted via close (<2 metres) contact with an infected individual.¹ Although close contact is the dominant way COVID-19 is transmitted, it can be transmitted over longer distances by aerosols under favourable conditions. The risk is increased in crowded, inadequately ventilated

Heating, Ventilation and Air Conditioning (HVAC) Systems in Buildings and COVID-19

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AT A GLANCE

The Use of Portable Fans and Portable Air Conditioning Units during COVID-19 in Long-term Care and Retirement Homes

Key Findings

- Careful consideration should be given to the use of portable fans and air conditioning units in long-term care homes or retirement homes.
- Portable fans and portable air conditioning units require routine cleaning and preventative maintenance.
- Portable fans and portable air conditioning units need to be strategically located to minimize risk of potential healthcare-associated infections.
- Alternative cooling methods should be explored in the long-term care setting.

Introduction

Seasonal hot weather including extreme heat events (EHE) can impact our health and well-being, including those residing in long-term care homes (LTCH) and retirement homes (RH) where central air conditioning is unavailable. Several long-term care and retirement homes have old building design with no centralized heating, ventilation, and air conditioning (HVAC) system. Long-term care and retirement homes need to use alternative methods such as portable fans or portable air conditioning (AC) units to improve residents' comfort and reduce the illnesses associated with excessive heat. Health care facilities such as LTCH need to be aware of the potential risk of infection transmission associated with some of the heat relief options. This document provides recommendations for consideration on the use of portable fans and air conditioning units in these facilities.

Background

The risk of heat-related illnesses is higher in elderly people in residential homes due to their frailty.^{1,2} Reports suggest that an indoor air temperature of 26°C is associated with lower mortality rates, and is the most suitable indoor temperature for at-risk groups.³ The Canadian Standards Association recommends that the ambient temperature for resident rooms be kept between 22°C and 24°C, and the relative humidity between 30% and 60%.⁴ There is a regulatory requirement for LTCHs to have written heat preventive measures in place.⁵

A guidance document by Health Canada reports that air conditioning has been shown to be an effective way of preventing adverse health outcomes related to heat events.⁶ Central air conditioning is not mandatory in LTCHs in Ontario, so some facilities have adopted alternative methods to keep residents cool and safe, including the use of portable fans and air conditioning units.

1

Source: Public Health Ontario. Heating, ventilation and air conditioning (HVAC) systems in buildings and COVID-19, 2021²

Source: Public Health Ontario. The use of portable fans and portable air conditioning units during COVID-19 in long-term care and retirement homes, 2020³

Assessing Infection Control Risk



Establishing Mitigation Strategies

How Does IPAC assess Risk?

- A systematic tool called the Infection Control Risk Assessment (ICRA) supports risk assessment
- ICRA considers two factors in assessing risk:
 - Population involved
 - Type of CRMD activity
- Based on these factors, the ICRA matrix generates a list of one of 4 Categories of Preventative Measures

Population Risk Groups

- Housekeeping areas
- Physical plant
Workshops
- Office areas
- Unoccupied wards
- Public areas
- Laundry

Risk Group 1
Low

- Patient care areas
(not in groups 3 and 4)
- Outpatient clinics
(not oncology or surgery)
- Physiotherapy
- Occupational
- Admission/Discharge
Units
- Morgue
- Autopsy
- Waiting room

Risk Group 2
Moderate

- Geriatrics
- Paediatrics
- Labour and birthing
- Diagnostic imaging
- ER (except trauma)
- LTC
- Surgical units
- Respiratory therapy
- Nuclear med and lab
- Food
prep/serving/dining
- Medical units
- Hydrotherapy
- Echocardiography

Risk Group 3
Moderate/High

- ICU
- ORU, PACU, Anaes
- Oncology – IP & OP
- Sterile reprocessing
- Transplant – IP & OP
- Pharmacy Admixing
Rms
- Dialysis
- Immune Deficient pts.
- Trauma rooms
- Pacemaker
- Dental procedures
- Bronchoscopy,
Cystoscopy &
Endoscopy

Risk Group 4
High

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Type of CRMD Activity

Type A

- Inspection activities
- Non-invasive activities

Type B

- Small scale activities
- Minimal dust generated

Type C

- High-level of dust
- Requires demolition
- Removal of fixed component or assembly or can't be completed in one week-shift

Type D

- High-levels of dust
- Major demolition
- Major construction
- More than one-week shift

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Preventive Measures Analysis

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

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ICRA PM Measures

- Preventative measures describe various strategies to mitigate risk to the residents, staff and visitors,
- Examples of measures can be found in the Public Health Agency of Canada (PHAC) document: [Construction-related Nosocomial Infections in Patients in Health Care Facilities](#)⁴

Class III	The following specifications are to be considered in addition to Class I and II
Date:	Engineer/Maintenance Staff & Contractors
Initials:	<p><i>a) Construction/Renovation Activities</i></p> <p>1) Risk Reduction</p> <ul style="list-style-type: none"> • Ensure that ICP consultation has been completed and infection prevention and control measures have been approved <p>2) Dust Control</p> <ul style="list-style-type: none"> • Erect an impermeable dust barrier from true ceiling (includes area above false ceilings) to the floor consisting of 2 layers of 6 mil polyethylene or Sheetrock • Ensure that windows, doors, plumbing penetrations, electrical outlets and intake and exhaust vents are properly sealed with plastic and duct taped within the construction/renovation area • Vacuum air ducts and spaces above ceilings if necessary • Ensure that construction workers wear protective clothing that is removed each time they leave the construction site before going into patient care areas • Do not remove dust barrier until the project is complete and the area has been cleaned thoroughly and inspected • Remove dust barrier carefully to minimize spreading dust and other debris particles associated with the construction project <p>3) Ventilation</p> <ul style="list-style-type: none"> • Maintain negative pressure within construction zone by using portable HEPA equipped air filtration units • Ensure air is exhausted directly outside and away from intake vents or filtered through a HEPA filter before being recirculated • Ensure ventilation system is functioning properly and is cleaned if contaminated by soil or dust after construction or renovation project is complete <p>4) Debris Removal & Cleanup</p> <ul style="list-style-type: none"> • Remove debris at the end of the work day • Erect an external chute if the construction is not taking place on ground level • Vacuum work area with HEPA filtered vacuums daily or more frequently if needed <p><i>b) Plumbing Activities</i></p> <ul style="list-style-type: none"> • Flush water lines at construction or renovation site and adjacent patient care areas before patients are readmitted <p>Environmental Services</p> <p><i>a) Construction/Renovation Activities</i></p> <ul style="list-style-type: none"> • Increase frequency of cleaning in areas adjacent to the construction zone while the project is under way • In collaboration with ICP ensure that construction zone is thoroughly cleaned when work is complete <p>Infection Prevention and Control Personnel</p> <p><i>a) Construction/Renovation Activities</i></p> <p>1) Risk Reduction</p> <ul style="list-style-type: none"> • Move high risk patients who are in or adjacent to the construction area • In collaboration with environmental services ensure that construction zone is thoroughly cleaned when work is complete • Inspect dust barriers <p>2) Traffic Control</p> <ul style="list-style-type: none"> • In collaboration with the facility project manager designate a traffic pattern for construction workers that avoids patient care areas and a traffic pattern for clean or sterile supplies and equipment that avoids the construction area

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Key Strategies and Considerations



Ensuring CRMD projects are carried out safely

Common Issues and Considerations (1/1)

Scope creep

- Projects often get bigger, become more involved than anticipated

Containment

- With time, barriers fall apart and dust is no longer contained

Working outside designated spaces

- Contractors may need to access other spaces to get work done, ensure this is considered during the planning phase (i.e., tracing a wire, or pulling cable may need to be done through vulnerable spaces like PPE stock pile or medication rooms)

Common Issues and Considerations (1/2)

Traffic

- How will contractors enter and leave, what route will waste be taken out of
- Which route will be used for waste/debris removal

Cleaning

- Who is responsible for daily cleaning?
- Sticky mat placement
- Are contractors cleaning off dust/debris off their clothes prior to existing work zone

Downtime procedures

- Plan for shutdowns of areas or services (e.g., dining areas, water, HVAC)
- This may require after hours work or identifying safe alternative (e.g., bath in a bag products)

Resident and Staff Safety

- Containment setup (e.g., dry run a bed or wheel chair around proposed containment to ensure adequate space remains)
- Appropriate signage/notification (e.g., danger, restricted access, mould remediation, notification about noise levels)
- Self closing, secure construction entrance doors (e.g., wandering residents)
- Thoughtful placement of necessary equipment (e.g., sticky mat placed in a manner that doesn't make it a trip hazard)

Key Strategies for Success

- Onsite IPAC involvement is paramount in ensuring ongoing compliance
- Clearly outline expectations with contractors and provide immediate feedback if there are issues
- Ensure oversight is an assigned responsibility
- Raise expectations with staff, welcome feedback
 - Frontline staff are your eyes and ears on the ground
 - Liaise with cleaning staff (i.e., have cleaning requirements increased due to poor containment?)

Considerations at a Time of COVID-19 (1/1)

Access

- How will contractors enter the facility, is direct entry to the worksite from the outside feasible?
- If contractors are given access to a loading dock, how will you ensure other trades do not avoid screening/established processes
 - Don't forget about sub-contractors, who may be onsite without having gone through the IPAC orientation session

Mask and hand hygiene compliance

- Ensure contractors are aware of IPAC requirements
- Compliance critical, auditing results should be a standing item for reporting during routine stakeholder meetings for the duration of the project

Considerations at a Time of COVID-19 (1/2)

Plan for potential snags

- Will work occur in rooms where residents are on Additional Precautions?
- How will the work accommodate a unit on outbreak?

Lunch and break

- Will contractors be provided a bathroom? Will it be designated?
- Where will contractors eat their lunch?

Storage

- Where will contractors store their belongings and supplies (e.g., staging areas)

CRMD Project Examples



Example 1: Air Conditioning System Upgrading (1/1)

- What spaces will need to be accessed? Will residents be displaced?
- Based on the above considerations, what is the **actual scope of work**?
- Determining scope of work, will guide the extent of the Preventative measures required such as type of containment needed for the work being done.

Example 1: Air Conditioning System Upgrading (1/2)

- What is the proposed work? Upgrading a centralized system or installing supplemental, single room or zoned systems?
- Are infrastructure upgrades necessary? Can existing window opening support such units? Is the electrical service adequate? Will walls/ceilings need to be accessed?
- Will there be shut downs?

Example 2: Elimination of 3 and 4 bed rooms

- As per the [Ministry's Directive #3](#), 3 and 4 bed rooms are not permitted to be populated once those occupying those beds leave permanently⁵
- What is the proposed approach to dealing with this requirement?
- Can we work within the existing space, what are our options?
- Does the square footage of adjacent rooms allow for partitioning, the creation of rooms within rooms or reconfiguring?

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