

## TECHNICAL BRIEF

# IPAC Recommendations for Use of Personal Protective Equipment for Care of Individuals with Suspect or Confirmed COVID-19

6<sup>th</sup> Revision: May 2021

## Introduction

This document summarizes recommendations for infection prevention and control (IPAC) best practices for use of personal protective equipment (PPE) in health care settings. The document was updated to reflect the best available evidence at the time of writing. Updates to the document are noted in the [Summary of Revisions](#).

Please note that the [Ministry of Health's Directive 5](#) is the provincial baseline standard for provision of personal protective equipment for hospitals, long-term care homes and retirement homes during COVID-19.<sup>1</sup>

## Key Findings

- The primary mode of SARS-CoV-2 transmission is at short range through unprotected close contact and exposure to respiratory particles that range in size from large droplets, which fall quickly to the ground, to smaller droplets, also known as aerosols, which can remain suspended in the air. Outbreak case studies describe long-range transmission under the right set of favourable conditions (e.g., prolonged exposure in crowded, poorly ventilated spaces), implicating aerosols in transmission. Several studies demonstrate the effectiveness of current Infection Prevention and Control (IPAC) practices and personal protective equipment (PPE) when applied appropriately and consistently. Droplet and Contact Precautions continue to be recommended for the routine care of patients\* with suspected or confirmed COVID-19.
- Airborne Precautions should be used for aerosol generating medical procedures (AGMPs) planned or anticipated to be performed on patients with suspected or confirmed COVID-19.
- Fully immunized staff should continue to use Droplet and Contact Precautions when caring for patients with suspected or confirmed COVID-19.

\*patient/resident/client

## Background

The evidence on the routes of transmission for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) reveal the following:

- COVID-19 cases and clusters demonstrate that SARS-CoV-2 is predominately transmitted at short range through direct contact with an infected person by both large and small droplets. Respiratory particle size occurs on a spectrum with the relative contribution influenced by contextual factors of source/receptor characteristics (e.g., forceful expulsions such as singing, coughing, sneezing; viral load) and pathway characteristics (e.g., duration of exposure; environmental conditions such as ventilation, temperature, humidity, ultraviolet light; source control; and use of personal protective equipment). The scientific evidence on the role of transmission through large droplets and aerosols is summarized in [COVID-19 Transmission through Large Respiratory Droplets and Aerosols – What We Know So Far](#).<sup>2</sup>
- Aerosols are smaller liquid droplets which can remain suspended in the air over time. Long-range aerosol transmission is not the predominant mode of SARS-CoV-2 transmission, but can occur under certain conditions.<sup>2</sup> Based on this type of conditional aerosol transmission Droplet and Contact Precautions continue to be recommended for the routine care of patients with suspected or confirmed COVID-19.
- New variants of concern (VOC) of the SARS-CoV-2 virus have been circulating in Ontario. Other variants have been identified in various parts of the world. Current evidence points to overall increased transmissibility to varying degrees, but shows no indication that these variants of concern are transmitted in fundamentally different modes from other variants of the virus. At this time there are no changes to current IPAC measures for variants of concern. However, higher transmissibility suggests that for a given exposure there is a greater likelihood of infection, and hence the utmost importance for adherence to current IPAC measures. Guidance may change as evidence evolves.<sup>3</sup>

## Preamble

The protection of health care workers (HCWs), as well as other staff, in all health care settings where health care is provided continues to remain paramount. Health care settings include, but are not exclusive to, acute care, pre-hospital care, long-term care, primary care, ambulatory care clinics and community care, including home care and other locations in the community where health care is provided (e.g., residential care or correctional facilities). A hierarchy of hazard controls is used in healthcare settings to reduce the risk of transmission. Recommendations for Infection Prevention and Control (IPAC) best practices incorporates the science of disease transmission, the effectiveness of measures in isolation and in combination as layered mitigation measures, as well as the effectiveness and the impact of implementation fidelity.

The Personal Protective Equipment (PPE) recommendations summarized in the table below are based on the best available evidence<sup>4-6</sup> and were adapted from the World Health Organization's [Rational Use of Personal Protective Equipment for Coronavirus Disease 2019](#) and Health Protection Scotland's [Standard infection control precautions literature review of AGMPs](#).<sup>7-8</sup>

As additional evidence emerges this document will be updated.

## Legislation

Health care workplaces must adhere to requirements under the *Occupational Health and Safety Act* (OHSA) and its Regulations, and this applies to measures needed to protect workers from the risk of COVID-19. Employers, supervisors and workers have rights, duties and obligations under the OHSA. Specific requirements under the OHSA and its regulations are available at:

*Occupational Health and Safety Act*: <https://www.ontario.ca/laws/statute/90o01><sup>9</sup>

Ontario Regulation 67/93 Health care and Residential Facilities:  
<https://www.ontario.ca/laws/regulation/930067><sup>10</sup>

## Recommended Risk Assessments

### Organizational Risk Assessment

A recommended practice is to conduct an Organizational Risk Assessment (ORA). An ORA is a systematic approach to assessing the efficacy of control measures that are in place to mitigate the transmission of infections in the health care setting. Engineering control measures include care and maintenance of HVAC systems, physical barriers for screening and point of care alcohol-based hand rub (ABHR); administrative controls, such as policies and procedures regarding screening, monitoring the local epidemiology and appropriate selection and use of PPE.

The ORA is central to any health care organization's preparation and planning to protect HCWs. Organizations have a responsibility to provide education and training to HCWs regarding the organization's ORA, including guidance around the use of PPE and engagement of the Joint Health and Safety Committees or Health and Safety representative, as appropriate.<sup>11</sup>

### Personal Risk Assessment

A point of care risk assessment (PCRA) or a personal risk assessment assesses the task, the patient and the environment. A PCRA is a dynamic risk assessment completed by the HCW before every patient interaction in order to determine whether there is risk of being exposed to an infection.

Performing a PCRA is the first step in Routine Practices<sup>12</sup>, which are to be used with all patients, for all care and for all interactions. A PCRA will help determine the correct PPE required to protect the health care worker in their interaction with the patient and patient environment.

## Application of the Hierarchy of Hazard Controls

According to the United States Centers for Disease Control and Prevention's [National Institute for Occupational Safety and Health](#) (NIOSH), the fundamental method for protecting workers is through the application of the hierarchy of hazard controls.<sup>13</sup> The levels of control range from the highest levels considered most effective at reducing the risk of exposure (i.e., elimination and substitution) to the lowest or last level of control between the worker and the hazard (i.e., PPE).

The application of the hierarchy of hazard controls is a recognized approach to containment of hazards and is fundamental to an occupational health and safety framework. An understanding of the strengths and

limitations of each of the controls enables health care organizations to determine how the health care environment (e.g., infrastructure, equipment, processes and practices) increases or decreases a HCWs risk of infection from exposure to a pathogen within the health care setting.

Collaboration between IPAC, Occupational Health and Safety (OHS) and health care building engineers supports the comprehensive evaluation and implementation of measures to reduce the risk of HCWs exposure to pathogens.

## Elimination and Substitution

Elimination and substitution are considered to be the most effective measures in the hierarchy of controls, but are not often feasible or possible to implement fully, particularly in regard to infectious diseases in health care settings. Highly effective COVID-19 vaccines are available in Canada and high vaccination coverage is an integral component of protecting healthcare workers, reducing the spread of SARS-CoV-2 in the population, and reducing the likelihood of infected patients in health care settings.<sup>14</sup>

## Engineering and Systems Control Measures

Engineering control measures reduce the risk of exposure to a pathogen or infected source hazard by implementing methods of isolation or ventilation. Engineering controls reduce or eliminate exposure by isolating the hazard from the employee and by physically directing actions to reduce the opportunity for human error.

Examples include rigid barriers at the interface between the patient and the HCWs at reception and triage and point of care sharps containers and alcohol-based hand rub. Ventilation examples include airborne infection isolation room (AIIR) and optimizing the fresh air changes in the heating ventilation and air conditioning (HVAC) system. Other examples include ante-chambers for donning and doffing PPE, but these must include reinforced training measures, as these areas can become contaminated.

## Administrative Control Measures

Administrative controls are measures to reduce the risk of transmission of infections to HCWs and patients through the implementation of policies, procedures, training and education.

Effective administrative control measures to prevent the transmission of infection require the support of leadership in the health care organization, in consultation with management and HCWs through the Joint Health and Safety Committees or Health and Safety representative to provide the necessary organizational procedures, resources, education and training to effectively apply the controls and the commitment of HCWs and other users to comply with their application.

Examples of administrative controls include electronic alert systems with infectious disease flags for hospitals for early detection of respiratory illness. Active screening, passive screening (signage) and restricted visitor policies are other examples of administrative control measures used in health care settings. In addition, administrative controls include policies regarding restricting entrances, cohorting of staff and patients and designated centres for screening or treating patients.

## Personal Protective Equipment (PPE)

Although the use of PPE controls are the most visible of the hierarchy of controls, PPE is the last tier in the hierarchy and should not be relied on as a stand-alone primary prevention program. The PPE tier refers to

the availability, support and appropriate use of physical barriers between the HCWs and an infectious agent/infected source to minimize exposure and prevent transmission. Examples of PPE barriers include gloves, gowns, facial protection (including medical or surgical/procedure masks (ASTM level 1) and N95 respirators) and eye protection (including some types of safety glasses, face shields, goggles).<sup>15,16</sup> Wearing a surgical/procedure mask has been shown to be effective in preventing transmission of acute respiratory infections such as influenza.<sup>17,18</sup> Results of a systematic review and meta-analysis shows no significant difference between N95 respirators and surgical masks when used by health care workers to prevent transmission of acute respiratory infections from patients.<sup>4</sup> Any other apparel (e.g. foot covers and hair bonnets) are not required unless identified through the personal risk assessment. The health care organization plays a critical role in ensuring HCWs have access to appropriate PPE for the task to be performed and the necessary education and training to ensure competency on the appropriate selection, use and disposal of PPE to prevent exposure to infection.

## Patient Accommodation

Based on our experience to date, patients with suspected or confirmed COVID-19 should be cared for ideally in single rooms with access to their own toileting facility. Droplet and Contact Precautions should be implemented. The use of an AIIR is the recommended standard of care when performing an AGMP (see below). If an AIIR is not available, a single room with the door closed should be used for the procedure.

## Aerosol Generating Medical Procedures

The medical procedures that are listed as AGMPs are supported by epidemiological data that indicate these procedures may significantly increase risk of infection to health care workers within close range of the procedure and thus N95 respirators are required as a minimum level of respiratory protective equipment (as well as eye protection).<sup>19</sup> The Provincial Infectious Diseases Advisory Committee (PIDAC) have reviewed the evidence and deemed some additional procedures not to be classified as AGMPs known for risk of infection transmission, which is available [here](#).<sup>12,19, 20</sup> The collection of a nasopharyngeal swab or a throat swab is NOT considered an AGMP.<sup>21</sup>

### Procedures Considered AGMPs

- Intubation, extubation and related procedures e.g. manual ventilation and open deep suctioning
- Tracheotomy/tracheostomy procedures (insertion/open suctioning/removal)
- Bronchoscopy
- \*Only surgery using high speed devices in the respiratory tract confers increased risk of transmission of SARS-CoV-2.
- Some dental procedures (e.g., high-speed drilling and ultrasonic scalers)
- Non-invasive ventilation (NIV) e.g. Bi-level Positive Airway Pressure (BiPAP) and Continuous Positive Airway Pressure ventilation (CPAP)
- High-Frequency Oscillating Ventilation (HFOV)
- Induction of sputum with nebulized saline
- High flow nasal oxygen (high flow therapy via nasal cannula)

\*Specifically for acute respiratory infections this pertains to surgery involving high speed devices in the respiratory tract.

## Procedures Considered AGMPs

Note: The evidence and recommendations behind settle times prior to re-entering a room (after an infectious source has been removed) stem from TB literature, and is not reflective of respiratory viruses such as COVID-19. The duration of time required to wear a N95 respirator post procedure is often based on prolonged exposure in a poorly ventilated space. In a well-ventilated space, when re-entering the room after the completion of an AGMP, the HCW can return to wearing a medical mask, eye protection and any other additional PPE required for the task at hand.

## Summary of PPE Recommendations

This guidance is intended to inform minimum expectations for PPE; however, HCWs should refer to and follow their own institutional or organizational infection prevention and control policies and procedures on PPE, as well as consider their local epidemiology to help inform their decision on a suspect case. HCWs should perform a PCRA for patient encounters. **For every patient and/or patient environment encounter, apply the [Four Moments for Hand Hygiene](#).**<sup>22</sup>

**Note: Universal masking for source control (i.e. to protect others from the mask wearer) and eye protection are current practices for HCWs in Ontario. Eye protection includes goggles and face shields.**<sup>15</sup>

### Health Care Facilities – Inpatient Facilities

Setting	Individual	Activity	Type of PPE or measure
Patient room	Health care workers	Providing direct care to patients with suspect or confirmed COVID-19, including nasopharyngeal and oropharyngeal swab collection	Droplet and Contact Precautions, including: <ul style="list-style-type: none"> <li>• Surgical/procedure (medical) mask</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Patient room	Health care workers	Aerosol-generating medical procedures performed on suspect or confirmed COVID-19 patients	Airborne, Droplet and Contact Precautions, including: <ul style="list-style-type: none"> <li>• N95 respirator (fit-tested, seal-checked)</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> <li>• Negative pressure room, if available</li> </ul>
Patient room	Environmental service workers	Entering the room of patients with suspected or	Droplet and Contact Precautions, including: <ul style="list-style-type: none"> <li>• Surgical/procedure mask</li> <li>• Isolation gown</li> <li>• Gloves</li> </ul>

Setting	Individual	Activity	Type of PPE or measure
		confirmed COVID-19	<ul style="list-style-type: none"> <li>• Eye protection</li> </ul>
Patient room	Visitors	<p>Entering the room of a patient with suspected or confirmed COVID-19</p> <p>Visitors should be kept to a minimum</p>	<p>Droplet and Contact Precautions, including:</p> <ul style="list-style-type: none"> <li>• Surgical/procedure mask</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Other areas of patient transit (e.g., wards, corridors)	All staff, including health care workers	Any activity that does not involve contact with patient suspected or confirmed COVID-19	Routine Practices and Additional Precautions based on risk assessment.
Triage	Health care workers	Preliminary screening not involving direct contact	<p>If able to maintain spatial distance of at least 2 m or separation by physical barrier:</p> <ul style="list-style-type: none"> <li>• Routine Practices</li> </ul> <p>Otherwise, Droplet and Contact Precautions, including:</p> <ul style="list-style-type: none"> <li>• Surgical/procedure mask</li> <li>• Isolation gown</li> <li>• Gloves, Eye protection</li> </ul>
Triage	Patients suspected or confirmed to have COVID-19	Any	<p>Maintain spatial distance of at least 2 m or separation by physical barrier</p> <p>Provide patient with surgical/procedure mask if tolerated. Patient to perform hand hygiene.</p>
Administrative areas	All staff, including health care workers	Administrative tasks that do not involve contact with patients	<ul style="list-style-type: none"> <li>• Routine Practices</li> </ul>

## Health Care Facilities – Ambulatory and Outpatient Settings/Clinics

Setting	Individual	Activity	Type of PPE or measure
Consultation or exam room/area	Health care workers	Physical examination of patients with suspected or confirmed COVID-19 including nasopharyngeal and oropharyngeal swab collection	<p>Droplet and Contact Precautions, including:</p> <ul style="list-style-type: none"> <li>• Surgical/procedure mask</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Consultation or exam room/area	Patients suspected or confirmed to have COVID-19	Any	<ul style="list-style-type: none"> <li>• Provide surgical/procedure mask if tolerated.</li> <li>• Perform hand hygiene</li> </ul>
Consultation or exam room/area	Environmental service Workers	After and between consultations with patients suspected or confirmed to have COVID-19	<p>Droplet and Contact Precautions, including:</p> <ul style="list-style-type: none"> <li>• Surgical/procedure mask</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Waiting room	Patients suspected or confirmed to have COVID-19	Any	<ul style="list-style-type: none"> <li>• Provide surgical/procedure mask if tolerated.</li> <li>• Immediately move the patient to a single patient room or separate area away from others; if this is not feasible, ensure spatial distance of at least 2 m from other patients.</li> </ul>
Administrative areas	All staff, including health care workers	Administrative tasks that do not involve contact with patients	<ul style="list-style-type: none"> <li>• Routine Practices</li> </ul>
Triage/Reception	Health care workers	Preliminary screening not involving direct contact	<p>If able to maintain spatial distance of at least 2 m or separation by physical barrier:</p> <ul style="list-style-type: none"> <li>• Routine Practices</li> </ul> <p>Otherwise, Droplet and Contact precautions, including:</p> <ul style="list-style-type: none"> <li>• Surgical/procedure mask</li> <li>• Isolation gown</li> <li>• Gloves</li> </ul>



Setting	Individual	Activity	Type of PPE or measure
			<ul style="list-style-type: none"> <li>• Eye protection</li> </ul>
Triage/Reception	Patients suspected or confirmed to have COVID-19	Any	<ul style="list-style-type: none"> <li>• Maintain spatial distance of at least 2 m or separation by physical barrier.</li> <li>• Provide surgical/procedure mask if tolerated.</li> </ul>

## Other Settings

Setting	Individual	Activity	Type of PPE or measure
Home Care	Health care worker	Visiting clients/patients or household members present with suspected or confirmed COVID-19	Droplet and Contact Precautions at all times in home, including: <ul style="list-style-type: none"> <li>• Surgical/procedure mask</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Home Care	Health care worker	Aerosol-generating medical procedures performed on suspect or confirmed COVID-19 patients	Droplet and Contact Precautions but using a N95 respirator during AGMP. Keep door closed and open window if possible. Keep the number of people in the room during the procedure to a minimum.
Long-term care home/retirement home	Health care worker	Providing direct care to suspect or confirmed COVID-19 residents, including nasopharyngeal and oropharyngeal swab collection	Droplet and Contact Precautions, including: <ul style="list-style-type: none"> <li>• Surgical/procedure mask</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Long-term care home/retirement home	Health care worker	Providing CPAP and/or open suctioning to suspect or	Droplet and Contact Precautions using a N95 respirator during CPAP or other AGMP.

Setting	Individual	Activity	Type of PPE or measure
		confirmed COVID-19 resident.	Manage in single room with door closed. Keep the number of people in the room during the procedure to a minimum.
Long-term care home/retirement home	Environmental service workers	When entering the room of a resident suspected or confirmed to have COVID-19	Droplet and Contact Precautions, including: <ul style="list-style-type: none"> <li>• Surgical/ procedure mask</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection (goggles or face shield)</li> </ul>
Long-term care home/retirement home	Administrative areas	Administrative tasks that do not involve contact with resident suspected or confirmed to have COVID-19	<ul style="list-style-type: none"> <li>• Routine Practices</li> </ul>
Long-term care home/retirement home	Visitors	Entering the room of a suspect or confirmed COVID-19 resident  Should be kept to a minimum	Droplet and Contact Precautions, including: <ul style="list-style-type: none"> <li>• Surgical/procedure mask</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection (goggles or face shield)</li> </ul>

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## Summary of Revisions

First published: May 2020

This document is current to May 2021. New material in this revision is highlighted in the table below.

### Summary of amendments in 6<sup>th</sup> revision:

Revision number	Date of Implementation	Description of Major Changes	Page
6	May 17, 2021	Added a brief introduction and bookmarked the summary of Revisions.	1
6	May 17, 2021	Added link to Ministry of Health Directive 5 as the provincial baseline standard for provision of PPE in healthcare settings	1
6	May 17, 2021	Added sub-section 'Key Findings' which summarizes evidence on primary mode of COVID -19 transmission; suggested PPE for known or suspected COVID-19 patients with and AGMP and without	1
6	May 17, 2021	Updated and revised 'Background' section on Covid transmission, aerosols and variants of concern	1-2
6	May 17, 2021	Added details on hierarchy of controls to the 'Preamble' section	3
6	May 17, 2021	Added line on maintenance of HVAC in section on 'Organizational Risk Assessment'	3
6	May 17, 2021	Added details on available vaccines in Canada in the section 'Elimination and Substitution'	4
6	May 17, 2021	Added evidence on surgical/procedural masks vs N95 in the section 'Personal Protective Equipment'	5
6	May 17, 2021	Added a note regarding settle times	6
6	May 17, 2021	Updated note on universal masking to include eye protection	6
6	May 17, 2021	Added 'exam room' to settings column and nasopharyngeal and oropharyngeal swab collection to the activity column and deleted contact precautions from triage row in 'Health Care Facilities- Ambulatory and Outpatient' table	8
6	May 17, 2021	Added AGMP to activity column for home care row in the 'Other Settings' table	9

## Publication History

Published: March 12, 2020

1<sup>st</sup> Revision: March 25, 2020

2<sup>nd</sup> Revision: April 6, 2020

3<sup>rd</sup> Revision: May 3, 2020

4<sup>th</sup> Revision: May 30, 2020

5<sup>th</sup> Revision: Jan 22, 2021

6<sup>th</sup> Revision: May 20, 2021

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