

## TECHNICAL BRIEF

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

07/27/2020

## Key Findings

- Given updated information on COVID-19, Droplet and Contact Precautions continue to be recommended for the routine care of patients<sup>1</sup> with suspected or confirmed COVID-19.
- Airborne Precautions should be used when aerosol generating medical procedures (AGMPs) are planned or anticipated to be performed on patients with suspected or confirmed COVID-19.

## Background

After four months of global clinical experience and updated scientific and epidemiological evidence, routes of transmission for COVID-19 reveal the following:

- COVID-19 cases and clusters demonstrate that Droplet/Contact transmission are the routes of transmission. The scientific evidence is summarized in [What We Know So Far About....Routes of Transmission](#).
- The majority of cases are linked to person-to-person transmission through close direct contact with someone who is positive for COVID-19. The mechanism of transmission is likely through direct large aerosol droplets or indirect contact of contaminated surfaces.
- Aerosols are liquid droplets which can travel through the air. COVID-19 forms predominately large aerosol droplets which are unlikely to travel beyond two meters. These aerosols can be generated by coughs and sneezes, however the presence of aerosols does not constitute airborne transmission. There is currently no evidence that COVID-19 is transmitted through the airborne route.
- Experimental data have demonstrated that if a sufficient quantity of small aerosols are generated, COVID-19 can survive as an aerosol under ideal simulated conditions. These experiments do not provide evidence that airborne transmission occurs. However, they do provide a theoretical basis that AGMPs have the potential to generate enough small aerosol droplets to significantly increase transmission risk.

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<sup>1</sup> client/patient/resident

- Some procedures are of short duration such as an intubation (e.g. < 1minute), however other procedures are of a longer duration and may generate more aerosols for a considerable period of time such as ultrasonic scaling in dental settings (e.g. > 30 minutes). This makes the exposure risk for these aerosol generating procedures a potentially higher risk although specific data are lacking.

## 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, dental 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).

The Personal Protective Equipment (PPE) recommendations summarized in the table below are based on the best available evidence 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](#).

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/90001>

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

## 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. Consideration of the local epidemiology should be incorporated in the decisions. Engineering control measures include physical barriers for screening and point of care alcohol-based hand rub (ABHR); administrative controls, such as policies and procedures regarding screening, 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 Care representative, as appropriate.

## Point of Care Risk Assessment

A point of care risk assessment (PCRA) 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, 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 U.S. 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. 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, 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 means in the hierarchy of controls, but are not often feasible or possible to implement, particularly in regard to infectious diseases in health care settings.

## 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 dental dams in dentistry, 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 rooms (AIIR). 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 care 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 (informed by local epidemiology). 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 in the hierarchy of controls, PPE controls 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 surgical masks and N95 respirators) and/or eye protection (including safety glasses, face shields or masks with visor attachments). 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

Patients with suspected or confirmed COVID-19 should be cared for in single rooms. 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. The collection of a nasopharyngeal swab or a throat swab is NOT considered an AGMP. The Provincial Infectious Diseases Advisory Committee (PIDAC) have reviewed the evidence and deemed some additional procedures not to be classified as AGMPs which is available [here](#).

## Aerosol Generating Medical Procedures

### Procedures Considered AGMPs

- Intubation, extubation and related procedures e.g. manual ventilation and open suctioning
- Tracheotomy/tracheostomy procedures (insertion/open suctioning/removal)
- Bronchoscopy
- Surgeries\*using high speed devices in the respiratory tract
- Post-mortem procedures involving high-speed devices
- Certain dental procedures e.g., high-speed drilling and ultrasonic cleaning
- 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 nasal cannula therapy)

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

## 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 of 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** (<https://www.publichealthontario.ca/-/media/documents/B/2014/bp-hand-hygiene.pdf?la=en>).

\* Universal masking for source control (i.e. to protect others from the mask wearer) is a current practice for HCWs in Ontario.

## Health Care Facilities – Inpatient Facilities

Setting	Individual	Activity	Type of PPE or procedure
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 mask</li> <li>Isolation gown</li> <li>Gloves</li> <li>Eye protection (goggles or face shield)</li> </ul>
		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 (goggles or face shield)</li> <li>Negative pressure room, if available</li> </ul>
	Environmental service workers	Entering the room of patients with suspected or confirmed 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>
	Visitors	Entering the room of a patient with suspected or confirmed 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> </ul>

Setting	Individual	Activity	Type of PPE or procedure
		Visitors should be kept to a minimum	<ul style="list-style-type: none"> <li>• Eye protection (goggles or face shield)</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</li> <li>• Eye protection (goggles or face shield)</li> </ul>
	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 surgical/procedure mask if tolerated by patient.</p> <p>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 Facilities

Setting	Individual	Activity	Type of PPE or procedure
Consultation room/area	Health care workers	Physical examination of patients with suspected or confirmed 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>
	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>
	Environmental service Workers	After and between consultations with patients 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>
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	If able to maintain spatial distance of at least 2 m or separation by physical barrier: <ul style="list-style-type: none"> <li>Routine Practices</li> </ul> Otherwise, 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>

Setting	Individual	Activity	Type of PPE or procedure
	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 procedure
Home Care	Health care worker	Visiting clients/patients with suspected or confirmed 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	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 (goggles or face shield)</li> </ul>
	Health care worker	Providing CPAP and/or open suctioning to suspect or confirmed COVID-19 resident.	Droplet and Contact Precautions using a N95 respirator when providing CPAP. Manage in single room with door closed. Keep the number of people in the room during the procedure to a minimum.
	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>



Setting	Individual	Activity	Type of PPE or procedure
	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>
	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>

## References

1. World Health Organization. Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19) and considerations during severe shortages. Interim guidance 6 April 2020. Geneva: World Health Organization; 2020. Available from: [https://www.who.int/publications-detail/rational-use-of-personal-protective-equipment-for-coronavirus-disease-\(covid-19\)-and-considerations-during-severe-shortages](https://www.who.int/publications-detail/rational-use-of-personal-protective-equipment-for-coronavirus-disease-(covid-19)-and-considerations-during-severe-shortages)
2. Health Protection Scotland, Infection Control Team. Standard infection control precautions literature review: aerosol generating procedures (AGPs). Version 1.5 [Internet]. Glasgow, UK: Health Protection Scotland; 2020 [cited 2020 Jul 27]. Available from: [https://hpspubsrepo.blob.core.windows.net/hps-website/nss/2893/documents/1\\_tbp-lr-agp.pdf](https://hpspubsrepo.blob.core.windows.net/hps-website/nss/2893/documents/1_tbp-lr-agp.pdf)
3. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Focus on: Aerosol generation from coughs and sneezes. Toronto, ON: Queen's Printer for Ontario; 2020. Available from: <https://www.publichealthontario.ca/-/media/documents/ncov/ipac/report-covid-19-aerosol-generation-coughs-sneezes.pdf?la=en>
4. Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 – What We Know So Far About Routes of Transmission. Toronto, ON: Queen's Printer for Ontario; 2020. Available from: <https://www.publichealthontario.ca/-/media/documents/ncov/wwksf-routes-transmission-mar-06-2020.pdf?la=en>
5. Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Disease Advisory Committee. Annex B: best practices for prevention of transmission of acute respiratory infection. Annexed to: Routine Practices and Additional Precautions in all health care settings. Toronto, ON: Queen's Printer for Ontario; 2013. Available from: <https://www.publichealthontario.ca/-/media/documents/bp-prevention-transmission-ari.pdf?la=en>.
6. Smith JD, MacDougall CC, Johnstone J, Copes RA, Schwartz B, Garber GE. Effectiveness of N95 respirators versus surgical masks in protecting health care workers from acute respiratory infection: a systematic review and meta-analysis. CMAJ. 2016;188(8):567-74.
7. Bartoszko JJ, Farooqi MA, Alhazzani W, Loeb M. Medical masks vs N95 respirators for preventing COVID-19 in health care workers a systematic review and meta-analysis of randomized trials. Influenza Other Respir Viruses. 2020 Apr 4 [Epub ahead of print]. Available from: <https://doi.org/10.1111/irv.12745>
8. Tran K, Cimon K, Severn M, Pessoa-Silva CL, Conly J. Aerosol generating procedures and risk of transmission of acute respiratory infections to healthcare workers: a systematic review. PLoS One. 2012;7(4):e35797.
9. Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. Routine Practices and Additional Precautions in all health care settings. 3<sup>rd</sup> ed. Toronto, ON: Queen's Printer for Ontario; 2012. Available from: <https://www.publichealthontario.ca/-/media/documents/bp-rpap-healthcare-settings.pdf?la=en>
10. *Health Care and Residential Facilities*, O Reg 67/93. Available from: <https://www.ontario.ca/laws/regulation/930067>

11. National Institute for Occupational Safety and Health (NIOSH). Hierarchy of controls [Internet]. Washington, DC: U.S. Department of Health & Human Services; 13 January 2015 [cited 2020 Apr 2]. Available from: <https://www.cdc.gov/niosh/topics/hierarchy/>

## Summary of Revisions

This document is current to May 2020. New material in this revision is highlighted in the table below.

Page	Revision	Implementation Date
1	Added link to COVID-19 – What We Know So Far About...Routes of Transmission.	April 28, 2020
1	Clarification on aerosols and experimental data on COVID-19 aerosols as it relates to transmission.	April 28, 2020
2	Link to <i>PIDAC's Routine Practices and Additional Precautions</i> document replaced with <i>Health Protection Scotland's Standard Infection Control Precautions Literature Review: Aerosol Generating Procedures</i> .	April 28, 2020
4	Added a link to the Focus On: Aerosol Generation from Coughs and Sneezes	April 28, 2020
5	Added a line about universal masking as source control is a current Routine Practice in Ontario.	April 28, 2020
5	Replaced "No PPE required" with "Routine Practices"	April 28, 2020
4	Updated table on AGMPs procedures to include additional information on surgery and dentistry.	July 4, 2020

## Publication History

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

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

4<sup>th</sup> Revision: July 27, 2020

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