

 TECHNICAL BRIEF

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

3<sup>rd</sup> Edition: November 2023

## Overview

The recommendations in this technical brief incorporate evidence to date on modes of transmission, effectiveness of personal protective equipment (PPE) in healthcare workers (HCWs) and the undetermined impact of the emergence of variants and their lineages. Recommendations will be updated as needed based on emerging information.

## Key Findings

- HCWs are at risk of infection from both occupational and community exposures. Therefore, protection of HCWs from COVID-19 requires both the application of the hierarchy of controls for infection prevention and control (IPAC) in healthcare settings and public health measures aimed at reducing COVID-19 transmission in the community setting, particularly vaccination.
- The selection and use of appropriate PPE in the healthcare setting is important given the risk associated with healthcare interactions. The body of existing evidence comparing N95 respirators (or equivalent) to medical masks (surgical/procedure) has substantial limitations related to high risk of bias and unmeasured confounding. There is one Randomized Control Trial (RCT) that found medical masks to be non-inferior to N95 respirators (based on a pre-specified margin of 2) at preventing RT-PCR confirmed symptomatic COVID-19 infection when providing care to patients with suspect or confirmed SARS-CoV-2. The remaining evidence is mixed with some large observational studies supporting a protective effect of N95 respirator use over medical masks when caring for patients with suspect or confirmed COVID-19 based on studies conducted prior to September 2021.
- The recommended PPE when providing direct care for patients with suspect or confirmed COVID-19 includes a well-fitted medical mask (surgical/procedure) or a fit-tested, seal-checked N95 respirator (or equivalent), eye protection, gown, and gloves.
- There are estimates of significant increased transmissibility and decreased vaccine effectiveness of the primary series of COVID-19 vaccine against some COVID-19 variants. Uptake of all eligible boosters has demonstrated improved vaccine effectiveness against severity of illness with some known COVID-19 variants and may be of benefit for emerging and future COVID-19 variants and subvariants. It is recommended that HCWs remain up to date with recommended vaccines doses when eligible, with the goal of providing increased protection from COVID-19 and from exposures in both the community and healthcare setting.

## Background

Evidence on the routes of transmission for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) have been summarized elsewhere.<sup>1,2</sup> SARS-CoV-2 is transmitted most frequently and easily at short range through exposure to respiratory particles that range in size from large droplets to smaller aerosols that can be inhaled or deposited on mucous membranes.<sup>1</sup> Infection can also occur by touching mucous membranes with soiled hands contaminated with virus.<sup>2</sup> Evidence also suggests long-range aerosol transmission can occur, particularly where there is inadequate ventilation and/or highly infectious individual(s).<sup>1</sup>

- Evidence has suggested the potential for increased transmissibility of some COVID-19 variants and subvariants.<sup>3</sup> The mechanisms for increased transmissibility are unclear. There has also been relatively lower vaccine effectiveness against some variants and subvariants, hence the utmost need for optimization and adherence to all layers of current IPAC measures including respiratory protection with a good facial fit.<sup>4,5</sup>
- Ontario HCWs have potential risk of occupational exposure, however community exposure has been a significant risk as well.<sup>6</sup> The risk of COVID-19 infection for HCWs is influenced by multiple factors including virus characteristics (i.e. infectious dose), local epidemiology, HCW factors (i.e., immune status, hand hygiene practices), PPE practices (including choice, fit and appropriate donning and doffing), patient factors (i.e., vaccination status, ability to mask for source control), interaction (i.e., close, prolonged contact, procedures associated with higher transmission risk), and environmental factors (i.e., crowding and ventilation). For the best protection, multiple layered preventive measures should be used in combination to help reduce the risk of COVID-19 infection.
- Vaccination, including uptake of all recommended and eligible doses, increases vaccine effectiveness to protect HCWs from community and occupational infection risk.<sup>7,8</sup> HCWs should follow National Advisory Committee on Immunization (NACI) and/or provincial recommendations for appropriate booster doses and updated COVID-19 vaccines.<sup>9</sup>

## Preamble

The protection of HCWs, as well as other staff, in all settings where health care is provided is critical. Health care settings include, but are not exclusive to, acute care, pre-hospital care, long-term care, primary care, ambulatory care clinics, dental care and community care, including home care and other locations in the community where health care is provided (e.g., school settings, residential care or correctional facilities). A hierarchy of hazard controls is used in healthcare settings (and other workplaces) to reduce the risk of infection transmission. This technical brief focuses on recommendations for PPE, however PPE alone is not sufficient to protect HCWs, particularly in the context of substantial community transmission, and recommendations must be implemented along with HCW vaccination and other protective measures within the hierarchy of controls. Recommendations for IPAC best practices incorporate the science of infection 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 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](#).<sup>10,11</sup>

Health care settings should adhere to legislative requirements applicable to their organization/setting.

For the purposes of this document, the individual receiving care will be referred to as a patient regardless of where the care is being provided.

## Recommended Risk Assessments

### Organizational Risk Assessment

A recommended practice is to conduct an Organizational Risk Assessment (ORA). An ORA is a systematic approach to identifying areas of infection risk and assessing the efficacy of control measures that are in place to mitigate the transmission of infections in the health care setting. 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 and any identified gaps and provide guidance around the organizational factors that may affect the selection and use of PPE such as local epidemiology, patient population, and assessment of ventilation in the setting. Organizations also have a responsibility for engagement of the Joint Health and Safety Committees or Health and Safety representatives, as appropriate.<sup>12</sup>

An ORA of the most important control measure, elimination, would include vaccination status of HCWs in the organization and supports for HCWs to stay home when sick. Facilities

Engineering control measures include care and maintenance of heating ventilation air conditioning (HVAC) systems, physical barriers for screening and access to point of care alcohol-based hand rub (ABHR) administrative controls, such as policies and procedures regarding screening, use of private and airborne infection isolation rooms, monitoring the local epidemiology (including implications of newemerging variants) and appropriate selection and use of PPE including the use of a point-of-care risk assessment (PCRA).

An organizational awareness of ventilation / air exchanges in areas in the organization, to identify rooms that do not meet the minimum CSA Group standard can prioritize areas to limit occupancy and facilitate placement of individuals with suspect or confirmed COVID-19. Application of the hierarchy of controls can help to mitigate the risk of transmission when upgrades are not possible or are in process (for example, elimination – not using the room; substitution – only using for screen negative patients; engineering – optimizing ventilation, only using the room for patients able to mask; administration – limiting occupancy, using rooms for only short visits; PPE – use of N95 respirators or equivalent).

### Point of Care Risk Assessment (PCRA)

Performing a risk assessment is the first step in [Routine Practices](#),<sup>13</sup> which are to be used with all patients, for all care and for all interactions. A point of care risk assessment (PCRA) also includes assessing the exposure risk specific to the care intervention being performed and duration of the activity. Education and training is to be provided to the HCW on how to effectively perform a risk assessment, including information on the efficacy of control measures identified in the organizational risk assessment that would be pertinent to the point-of-care risk assessment. Risk assessments are dynamic and should be completed by the HCW before each patient interaction or task to determine whether there is risk of being exposed to an infection and for selection of the correct PPE required to protect the health worker and other staff in their interaction with the patient and patient environment.

Examples of risk factors that may increase transmission and infection risk to the HCW include:

- **HCW:** Not up-to-date on recommended COVID-19 vaccination
- **Patient:** Unable to mask for source control
- **Interaction:** Prolonged, close contact, performing a high-risk procedure (see below)

## Application of the Hierarchy of Hazard Controls

According to the [National Institute for Occupational Safety and Health \(NIOSH\)](#), the fundamental framework for protecting workers is through the application of the hierarchy of hazard controls.<sup>14</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 or mitigation of hazards and is fundamental to an occupational health and safety (OHS) framework. An understanding of the strengths and limitations of each of the controls enables health care organizations to determine how the healthcare environment (e.g., infrastructure, equipment, processes and practices) increases or decreases a HCW's risk of infection from exposure to a pathogen within the healthcare setting.

Collaboration between IPAC, OHS and healthcare building engineers supports the comprehensive evaluation and implementation of measures to reduce the risk of HCWs' exposure to pathogens.

The hierarchy of controls is intended to compliment other public health measures such as physical distancing, hand hygiene and respiratory etiquette.

## 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 as it relates to infection control in health care settings. COVID-19 vaccines are available in Canada and high vaccination coverage (including additional doses as recommended) is an integral component of protecting HCWs from severe disease, reducing the spread of SARS-CoV-2 in the population, and reducing the likelihood of infected patients in health care settings.<sup>15,16</sup> Vaccination will be less effective as an elimination strategy with emerging variants and sub-variants capable of immune escape.<sup>4,5</sup> Additionally, consideration for virtual clinical visits instead of in-person visits where appropriate can reduce overall COVID-19 burden within the clinical setting.

## Engineering and Systems Control Measures

Engineering controls reduce or eliminate exposure by isolating the hazard from the individual and/or by physically directing actions to reduce the opportunity for human error.

Examples include ventilation (e.g., airborne infection isolation room [AIIR], reducing structural barriers to airflow, optimizing fresh air changes in the HVAC system), full-length physical barriers between the patient and the HCWs at reception and triage, point-of-care sharps containers and easily access to ABHR. Other examples include single occupancy room design and ante-chambers for donning and doffing PPE that require additional training (see Administrative Control Measures) to prevent these areas from becoming contaminated with soiled PPE.

## 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, and occur in consultation with HCWs and management through the Joint Health and Safety Committee 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 HCW vaccination policy, sick leave policy, electronic alert system and infectious disease flags for early detection, placement and additional precautions for patients with infectious syndromes. Active screening, passive screening (signage), restricted visitor policies, restricting entrances, cohorting of staff and patients and, audits of practice.

## Personal Protective Equipment (PPE)

The PPE tier refers to the availability, support and appropriate use of protective gear to minimize exposure and prevent transmission. As the last tier in the hierarchy of hazard controls, PPE should not be relied on as a stand-alone primary prevention program. Examples of PPE include gloves, gowns, respiratory protection, including medical or surgical/procedure masks (ASTM level 1-3) and N95 respirators and eye protection (including some types of safety glasses, face shields, goggles).<sup>17,18</sup>

A systematic review on the protective effects of eye protection on transmission of SARS-CoV-2 identified 5 observational studies which demonstrated an overall protective effect, however all of the studies were at high risk of bias and the certainty of the evidence was very low.<sup>19</sup>

Wearing a surgical/procedure mask (henceforth referred to as a medical mask) has been shown to be effective in preventing transmission of acute respiratory infections such as influenza.<sup>20,21</sup> A number of studies have attempted to provide further insight into the use of medical masks and N95 respirators for protection against respiratory viruses including SARS-CoV-2; summaries are included below.

There is one published randomized control trial (clinicaltrials.gov NCT04296643) which examined whether the effectiveness of medical masks was non-inferior to fit-tested N95 respirators worn by health care workers (HCWs) for the prevention of reverse transcriptase polymerase chain reaction (RT-PCR)-confirmed symptomatic Coronavirus Disease 2019 (COVID19) infection in HCWs providing routine care to patients with suspect or confirmed COVID-19.<sup>22</sup> The study design was a randomized, non-inferiority trial conducted from May 4, 2020 to March 29, 2022 in Canada, Israel, Pakistan and Egypt. HCWs were randomly assigned to wear medical masks (n=497) or N95 respirators (n=507) when providing routine care to patients with suspect or confirmed COVID-19 for 10 weeks (or up to 2 weeks following receipt of an mRNA vaccine). The authors used a pre-specified relative effect size (hazard ratio [HR]) margin of within 2, and found medical masks to be non-inferior to N95 respirators based on this pre-specified margin. While the results indicated non-inferiority, the margin was wide, meaning the results should be interpreted as ruling out a doubling in hazard of confirmed symptomatic COVID-19 for those wearing medical masks compared to N95 respirators. A hazard reduction of less than 2 but greater than 1 could not be determined based on this study's design.<sup>23</sup>

Results of systematic reviews and meta-analyses prior to this RCT show no significant difference between N95 respirators and medical masks when used by HCWs to prevent transmission of acute respiratory infections from patients.<sup>24,25</sup>

An early systematic review and meta-analysis of mask effectiveness for prevention of SARS-CoV-2 infection identified a significant protective effect of mask use in HCWs (adjusted OR 0.18; 95% CI 0.09-0.34), but did not compare different types of masks.<sup>26</sup> A subsequent systematic review did not directly compare N95 respirators and medical masks, but analysis showed an overall protective effect in the use of N95 respirators and medical masks. Sub-analysis of mask type showed a strong protective effect in the use of N95 respirators and a statistically significant protective effect using medical masks, but with lower confidence of the latter due to a low sample size.<sup>27</sup> A systematic review of 12 studies published to June 2021 compared medical mask use to N95 respirators or equivalent among HCWs, and found an overall similar infection rate between the two groups (9.46% and 8.96%, respectively). Notably, many of the included studies were at high risk of bias and used variable measures to determine infection rate and source of acquisition (i.e. community or nosocomial) among infected HCWs.<sup>28</sup>

An observational cohort study from Switzerland analyzed self-reported mask use in context of cumulative SARS-CoV2 exposure among nearly 3,000 HCWs between September 2020 and September 2021, and found HCW SARS-CoV-2 positivity at 21% with respirators and 35% with medical masks (OR, 0.49; 95% CI, 0.39-0.61).<sup>29</sup> Household exposure was associated with the greatest risk of infection in multivariable analysis (OR 7.79; 95%CI 5.98-10.15); respirator use (OR 0.56; 95%CI 0.43-0.74) and vaccination (OR 0.55; 95%CI 0.41-0.74) associated with the lowest risk of infection. While less than 10% of overall participants consistently wore a mask outside of the healthcare setting, there were no data on community and nosocomial sources of acquisition among infected HCWs.

Additional observational studies in jurisdictions that have recommended medical masks for routine care of suspect or confirmed patients with COVID-19 have reported on the general effectiveness of these policies by demonstrating low nosocomial infection rates compared to community exposures.<sup>30-32</sup> However, all of these studies were done during times of earlier variants of SARS-CoV-2.

There is further mixed evidence on the relative effectiveness of N95 respirators (or equivalent) compared to medical masks for SARS-CoV-2. Two survey studies comparing infection rates among HCWs who reported respirator use demonstrated significantly higher seropositivity for SARS-CoV-2 compared to those reporting medical mask use.<sup>33,34</sup> However, in the survey study from France there was an increased odds of seropositivity if HCWs reported universal respirator use (i.e., for care of non-COVID-19 patients) compared to those who wore medical masks.<sup>34</sup> In a case-control study of HCWs in Colombia there was a significant increased infection risk by RT-PCR among those who did not use a respirator.<sup>35</sup> In a cohort study from Switzerland of over 3000 HCWs, 22% preferentially used respirators and was associated with non-statistically significant risk reductions in COVID-19 compared to medical masks (adjusted HR 0.8; 95%CI 0.6-1.0, p=0.052 and 0.7; 95%CI 0.5-1.0, p=0.053 for PCR-confirmed SARS-CoV-2 and seroconversion, respectively).<sup>36</sup> In an ecological study from England that compared COVID-19 outbreaks among orthopedic surgery wards based on respirator policies, fewer outbreaks were reported on units that recommended use of respirators when caring for symptomatic patients (11/13 of medical mask units vs 3/6 respirator units), although this difference was not statistically significant.<sup>37</sup>

A prospective cohort study assessed SARS-CoV-2 seroconversion rates in the context of mask policies based on medical masks or FFP-2 respirators. It found that differences in mask policy did not affect the seroconversion rate and that the most important risk factors for seroconversion were exposure to infected co-workers and household contacts.<sup>38</sup>

In a small case-control study, there was no significant association with respirator use and infection.<sup>39</sup> In a cross-sectional survey study of emergency departments (ED) in the Netherlands, 13/45 (29%) had policies for respirator use (and eye protection) for all contacts with suspect or confirmed COVID-19 patients, and there was no difference in ED staff infections in these units compared to EDs that

recommended medical masks for the care of patients with suspect or confirmed COVID-19.<sup>40</sup> In a large retrospective cohort study from the United States of HCWs providing non-AGMP routine care of patients with COVID-19, there was no association in PCR-positive SARS-CoV-2 status between medical mask and respirator use.<sup>41</sup>

The body of existing evidence is mixed regarding a protective effect of respirator use compared to medical masks and has substantial limitations related to high risk for bias and unmeasured confounding. The degree of protection for HCWs from other infection prevention measures (i.e., up-to-date vaccination status) is important to protect against exposures from community sources and in other occupational settings (i.e., staff eating areas, unrecognized patient or staff cases). A strong recommendation in favor of the use of a medical mask versus a respirator cannot be made based on existing evidence and further research is required. For routine care, of a patient with suspect or confirmed COVID-19, mask choice is best decided by PCRA.

## Patient Accommodation

Patients with suspect or confirmed COVID-19 should be cared for in single rooms, whenever possible. The use of an AIIR is the recommended 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. In one study the universal use of AIIR for care of patients with suspect or confirmed COVID-19 did not reduce HCW infection rates.<sup>42</sup> There is no evidence to suggest that a fallow time is required after a patient with suspect or confirmed COVID-19 leaves the room or following a high risk procedure (i.e., AGMP). The evidence and recommendations supporting fallow times prior to re-entering a room (after an infectious source leaves) stem from Tuberculosis (TB) literature, and are not reflective of, nor translatable to respiratory viruses such as SARS-CoV-2. Therefore, there are no recommendations on the use of fallow time for SARS-CoV-2 in any setting.

## Procedures with Increased Transmission Risk

The procedures that are listed as aerosol-generating medical procedures (AGMPs) are those procedures/encounters that have epidemiological data that indicate they may significantly increase risk of infection to HCWs within close range of the procedure and thus fit-tested N95 respirators (or equivalent) may provide a higher level of protection, but a well-fitted medical mask (surgical/procedure) is recommended as a minimum level of respiratory protective equipment, in addition to eye protection.<sup>43</sup>

The presence of aerosols is not sufficient to consider a procedure/encounter as having increased risk of transmission. However, it is acknowledged that other procedures may have high-risk features similar to an AGMP, including close, prolonged contact with the airway). The risk associated with these procedures will depend on other factors such the likelihood of infectious SARS-CoV-2 virus, community infection rates, duration of procedure, presence of symptoms of SARS-CoV-2 and the distance from the patient. While these procedures share similar high-risk features to AGMPs, they currently lack clear evidence on differences in risk to HCWs who use a medical mask versus an N95 respirator based on their PCRA.

The collection of a nasopharyngeal swab or throat swab is not considered a procedure with increased risk of transmission.<sup>32</sup>

**Table 1: Procedures Considered AGMPs**

Procedures Considered AGMPs
<ul style="list-style-type: none"><li>• Intubation, extubation and related procedures e.g., manual ventilation and open deep suctioning</li><li>• Tracheotomy/tracheostomy procedures (insertion/open suctioning/removal)</li><li>• Bronchoscopy</li><li>• Surgery using high speed devices in the respiratory tract</li><li>• Some dental procedures (e.g., high-speed drilling and ultrasonic scalers)</li><li>• Non-invasive ventilation (NIV) e.g., Bi-level Positive Airway Pressure (BiPAP) and Continuous Positive Airway Pressure ventilation (CPAP)</li><li>• High-Frequency Oscillating Ventilation (HFOV)</li><li>• Induction of sputum with nebulized saline</li><li>• High flow nasal oxygen (high flow therapy via nasal cannula)</li></ul>

## Summary of PPE Recommendations

This guidance is intended to inform recommended and other appropriate PPE for the care of patients with suspect or confirmed COVID-19. In light of evidence of COVID-19 variants having varying relative transmissibility,<sup>7</sup> varying mechanisms and variables for increased transmissibility and potential reduced vaccine effectiveness, the recommended PPE for direct care of patients with suspect or confirmed COVID-19, includes a well fitted medical mask (surgical/procedure) or a fit-tested, seal-checked N95 respirator (or equivalent), eye protection, gown and gloves.

Selection of appropriate PPE should include point-of-care risk assessment, fit, and tolerability of the mask and equipment. HCWs should follow their local organizational guidance.

**Note:** For every patient and/or patient environment encounter, perform a point-of-care risk assessment and apply the [Four Moments for Hand Hygiene](#).<sup>44</sup>

Universal masking with well-fitted medical masks for source control (i.e., to protect others from the mask wearer) and routine use of eye protection for all clinical encounters are additional IPAC practices that have been implemented during the course of the pandemic and can be considered based on varying periods of transmission risk as outlined in the PHO's [Interim IPAC Measures Based on Respiratory Virus Transmission Risk in Health Care Settings](#).<sup>45</sup>



## Health Care Settings – Inpatient Settings

**Table 2: Health Care Settings – Inpatient Settings**

Setting	Individual	Activity	Recommended PPE
Patient room	Health care workers	Providing direct care to patients with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• Medical mask* or N95 respirator (fit-tested, seal-checked)</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Patient room	Health care workers	Medical procedures with increased transmission risk (e.g., AGMP) performed on patients with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• N95 respirator (fit-tested, seal-checked) or medical mask*</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Patient room	Environmental service workers	Entering and cleaning in the room of patients with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• Medical mask* or N95 respirator (fit-tested, seal-checked)</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Patient room	Visitors	Entering the room of a patient with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• Medical mask*</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Patient Room	Transient activities (e.g., Food service delivery, laundry pick-up/drop-off)	Entering the room of a patient with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• Medical mask*</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>

Setting	Individual	Activity	Recommended PPE
Triage	Health care workers	Preliminary screening not involving direct contact	<ul style="list-style-type: none"> <li>• If able to maintain spatial distance of at least 2 m or separation by physical barrier, use Routine Practices.</li> <li>• If unable to maintain spatial distance of at least 2 m or separation by physical barrier wear a medical mask.*</li> </ul>
Triage	Patient with suspect or confirmed 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 patient and accompanying caregivers with medical mask* if tolerated and not contraindicated. Patient to perform hand hygiene.</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>

\*A non-fit tested N95respirator (or equivalent) is considered an alternative to a medical mask.

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

**Table 3: Health Care Settings – Ambulatory and Outpatient Settings/Clinics**

Setting	Individual	Activity	Recommended PPE
Consultation or exam room/area	Health care workers	Providing direct care to patients with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• Medical mask* or N95 respirator (fit-tested, seal-checked)</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Consultation or exam room/area	Patients with suspect or confirmed COVID-19	Any	<ul style="list-style-type: none"> <li>• Provide medical mask* to patient and accompanying caregivers if tolerated and not contraindicated.</li> <li>• Perform hand hygiene</li> </ul>
Consultation or exam room/area	Environmental service Workers	After and between consultations with patients with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• Medical mask*</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Waiting room	Patient with suspect or confirmed COVID-19	Any	<ul style="list-style-type: none"> <li>• Provide medical mask* to patient and accompanying care giver if tolerated and not contraindicated.</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>

Setting	Individual	Activity	Recommended PPE
Triage/Reception	Health care workers	Preliminary screening not involving direct contact	<ul style="list-style-type: none"> <li>• If able to maintain spatial distance of at least 2 m or separation by physical barrier use Routine Practices</li> <li>• If unable to maintain spatial distance of at least 2 m or separation by physical barrier wear a medical mask.*</li> </ul>
Triage/Reception	Patients with suspect or confirmed 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 medical mask* to patient and accompanying caregiver if tolerated and not contraindicated.</li> </ul>

---

\*A non-fit tested N95 respirator (or equivalent) is considered an alternative to a medical mask.

## Other Settings

**Table 4: Other Settings**

Setting	Individual	Activity	Recommended PPE
Home Care	Health care workers	Providing direct care to clients/patients with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• Medical mask * or N95 respirator (fit-tested, seal-checked)</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Home Care	Health care workers	Medical procedures with increased transmission risk (e.g., AGMP) performed on clients/patients with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• N95 respirator (fit-tested, seal-checked) or medical mask.*</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Long-term care home/retirement home	Health care workers	Providing direct care to residents with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• Medical mask* or N95 respirator (fit-tested, seal-checked)</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Long-term care home/retirement home	Health care workers	Performing medical procedures with increased transmission risk (e.g., AGMP, CPAP and/or open suctioning) on residents with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• N95 respirator (fit-tested, seal-checked) or medical mask.*</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>

Setting	Individual	Activity	Recommended PPE
Long-term care home/retirement home	Environmental service workers	Entering and cleaning in the room of residents with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• Medical mask* or N95 respirator (fit-tested, seal-checked)</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>
Long-term care home/retirement home	Administrative areas	Administrative tasks that do not involve contact with resident with suspect or confirmed 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 resident with suspect or confirmed COVID-19	<ul style="list-style-type: none"> <li>• Medical mask*</li> <li>• Isolation gown</li> <li>• Gloves</li> <li>• Eye protection</li> </ul>

\*A non-fit tested N95 respirator(or equivalent) is considered an alternative to a medical mask.

## References

1. Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 transmission through short and long-range respiratory particles [Internet]. Toronto, ON: Queen's Printer for Ontario; 2022 [cited 2023 Oct 5]. Available from: [https://www.publichealthontario.ca/-/media/Documents/nCoV/phm/2022/01/covid-19-respiratory-transmission-range.pdf?sc\\_lang=en](https://www.publichealthontario.ca/-/media/Documents/nCoV/phm/2022/01/covid-19-respiratory-transmission-range.pdf?sc_lang=en)
2. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Additional routes of COVID-19 transmission – what we know so far [Internet]. Toronto, ON: Queen's Printer for Ontario; 2021 [cited 2023 Oct 5]. Available from: [https://www.publichealthontario.ca/-/media/documents/ncov/covid-wwksf/2020/12/routes-transmission-covid-19.pdf?sc\\_lang=en](https://www.publichealthontario.ca/-/media/documents/ncov/covid-wwksf/2020/12/routes-transmission-covid-19.pdf?sc_lang=en)
3. Ontario Agency for Health Protection and Promotion (Public Health Ontario). SARS-CoV-2 Omicron variant BA.2 and sub-lineages of BA.2: evidence and risk assessment (up to date as of June 14, 2022) [Internet]. Toronto, ON: Queen's Printer for Ontario; 2022 [cited 2023 Oct 5]. Available from: [https://www.publichealthontario.ca/-/media/Documents/nCoV/voc/covid-19-omicron-risk-assessment.pdf?sc\\_lang=en](https://www.publichealthontario.ca/-/media/Documents/nCoV/voc/covid-19-omicron-risk-assessment.pdf?sc_lang=en)
4. Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 variant of concern Omicron (B.1.1.529): risk assessment, January 26, 2022 [Internet]. Toronto, ON: Queen's Printer for Ontario; 2022 [cited 2023 Oct 5]. Available from: <https://www.publichealthontario.ca/-/media/Documents/nCoV/voc/2022/01/covid-19-omicron-b11529-risk-assessment-jan-26.pdf>
5. Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 Delta: risk assessment and implications for practice (September 20, 2021 update) [Internet]. Toronto, ON: Queen's Printer for Ontario; 2021 [cited 2023 Oct 5]. Available from: [https://www.publichealthontario.ca/-/media/documents/ncov/voc/2021/10/covid-19-delta-variant-risk-assessment-update.pdf?sc\\_lang=en](https://www.publichealthontario.ca/-/media/documents/ncov/voc/2021/10/covid-19-delta-variant-risk-assessment-update.pdf?sc_lang=en)
6. Science M, Bolotin S, Silverman M, Nadarajah J, Maguire B, Parekh RS, et al. SARS-CoV-2 antibodies in Ontario health care workers during and after the first wave of the pandemic: a cohort study. *CMAJ Open*. 2021;9(4):E929-39. Available from: <https://doi.org/10.9778/cmajo.20210044>
7. UK Health Security Agency. SARS-CoV-2 variants of concern and variants under investigation in England: technical briefing 31 [Internet]. London: Crown Copyright; 2021 [cited 2023 Oct 5]. Available from: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1040076/Technical\\_Briefing\\_31.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1040076/Technical_Briefing_31.pdf)
8. Arbel R, Hammerman A, Sergienko R, Friger M, Peretz A, Netzer D, et al. BNT162b2 vaccine booster and mortality due to Covid-19. *N Engl J Med*. 2021;385(26):2413-20. Available from: <https://doi.org/10.1056/NEJMoa2115624>
9. Public Health Agency of Canada; National Advisory Committee on Immunization; Committee to Advise on Tropical Medicine and Travel. Canadian immunization guide [Internet]. Evergreen ed. Ottawa, ON: Government of Canada; 2023 [modified 2023 Sept 18; cited 2023 Oct 5]. Part 4, Active vaccines COVID-19 vaccine. Available from: <https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-26-covid-19-vaccine.html>

10. World Health Organization (WHO). Rational use of personal protective equipment for Coronavirus disease 2019 (COVID-19) and considerations during severe shortages: interim guidance [Internet]. 4<sup>th</sup> ed. Geneva: WHO; 2020 [cited 2023 Oct 5]. Available from: [https://apps.who.int/iris/bitstream/handle/10665/338033/WHO-2019-nCoV-IPC\\_PPE\\_use-2020.4-eng.pdf?sequence=1&isAllowed=y](https://apps.who.int/iris/bitstream/handle/10665/338033/WHO-2019-nCoV-IPC_PPE_use-2020.4-eng.pdf?sequence=1&isAllowed=y)
11. Health Protection Scotland. Aerosol generating procedures (AGPs) [Internet]. Version 1.6. Glasgow: Public Health Scotland; 2021 [cited 2023 Oct 5]. 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)
12. Public Services Health and Safety Association (PSHSA). Infectious disease threats risk assessment tool for acute care [Internet]. Toronto, ON: PSHSA; 2020 [cited 2023 Oct 5]. Available from: <https://www.pshsa.ca/resources/infectious-disease-threats-risk-assessment-tool-for-acute-care>
13. 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>
14. National Institute for Occupational Safety and Health (NIOSH). Hierarchy of controls [Internet]. Atlanta, GA: Centers for Disease Control and Prevention; 2023 [modified 2023 Jan 17; cited 2023 Oct 5]. Available from: <https://www.cdc.gov/niosh/topics/hierarchy/>
15. Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 real-world vaccine effectiveness – what we know so far [Internet]. Toronto, ON: Queen’s Printer for Ontario; 2021 [cited 2023 Oct 5]. Available from: [https://www.publichealthontario.ca/-/media/documents/ncov/covid-wwksf/2021/04/wwksf-vaccine-effectiveness.pdf?sc\\_lang=en](https://www.publichealthontario.ca/-/media/documents/ncov/covid-wwksf/2021/04/wwksf-vaccine-effectiveness.pdf?sc_lang=en)
16. Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 vaccine effectiveness over time – what we know so far [Internet]. Toronto, ON: Queen’s Printer for Ontario; 2021 [cited 2023 Oct 5]. Available from: [https://www.publichealthontario.ca/-/media/documents/ncov/covid-wwksf/2021/11/wwksf-vaccine-effectiveness-over-time.pdf?sc\\_lang=en](https://www.publichealthontario.ca/-/media/documents/ncov/covid-wwksf/2021/11/wwksf-vaccine-effectiveness-over-time.pdf?sc_lang=en)
17. Health Canada. Personal protective equipment (COVID-19): overview [Internet]. Ottawa, ON: Government of Canada; 2023 [modified 2023 Feb 22; cited 2023 Oct 5]. Available from: <https://www.canada.ca/en/health-canada/services/drugs-health-products/covid19-industry/medical-devices/personal-protective-equipment/overview.html>
18. Shah VP, Breeher LE, Hainy CM, Swift MD. Evaluation of healthcare personnel exposures to patients with SARS-CoV-2 associated with personal protective equipment use. *Infect Control Hosp Epidemiol.* 2022;43(6):770-4 . Available from: <https://doi.org/10.1017/ice.2021.219>
19. Byambasuren O, Beller E, Clark J, Collignon P, Glasziou P. The effect of eye protection on SARS-CoV-2 transmission: a systematic review. *Antimicrob Resist Infect Control.* 2021;10(1):1-7. Available from: <https://doi.org/10.1186/s13756-021-01025-3>
20. Loeb M, Dafoe N, Mahony J, John M, Sarabia A, Glavin V, et al. Surgical mask vs N95 respirator for preventing influenza among health care workers: a randomized trial. *JAMA.* 2009;302(17):1865-71. Available from: <https://doi.org/10.1001/jama.2009.1466>
21. Radonovich LJ, Simberkoff MS, Bessesen MT, Brown AC, Cummings DA, Gaydos CA, et al. N95 respirators vs medical masks for preventing influenza among health care personnel: a randomized clinical trial. *JAMA.* 2019;322(9):824-33. Available from: <https://doi.org/10.1001/jama.2019.11645>



22. Loeb M, Bartholomew A, Hashmi M, Tarhuni W, Hassany M, Youngster I, et al. Medical masks versus N95 respirators for preventing COVID-19 among health care workers : a randomized trial. *Ann Intern Med.* 2022 Dec;175(12):1629-38. Erratum in: *Ann Intern Med.* 2023 Jun;176(6):884. Available from: <https://doi.org/10.7326/m22-1966>
23. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Review of “Medical masks versus N95 respirators for preventing COVID-19 among health care workers: a randomized trial” [Internet]. Toronto, ON: King’s Printer for Ontario; 2022 [cited 2023 Oct 5]. Available from: <https://www.publichealthontario.ca/media/Documents/nCoV/Research/2022/12/synopsis-medical-masks-versus-n95.pdf>
24. Alberta Health Services. COVID-19 Scientific Advisory Group rapid evidence report interim update: masking guidance for healthcare workers [Internet]. Edmonton, AB: Alberta Health Services; 2021 [cited 2023 Oct5]. Available from: <https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-sag-rapid-evidence-report-masking-guidance-healthcare-workers.pdf>
25. 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. Available from: <https://doi.org/10.1503/cmaj.150835>
26. Li Y, Liang M, Gao L, Ayaz Ahmed M, Uy JP, Cheng C, et al. Face masks to prevent transmission of COVID-19: a systematic review and meta-analysis. *Am J Infect Control.* 2021;49(7):900-6. Available from: <https://doi.org/10.1016/j.ajic.2020.12.007>
27. Schoberer D, Osmancevic S, Reiter L, Thonhofer N, Hoedl M. Rapid review and meta-analysis of the effectiveness of personal protective equipment for healthcare workers during the COVID-19 pandemic. *Public Health Pract.* 2022 Jun 13 [Epub ahead of print]. Available from: <https://doi.org/10.1016/j.puhip.2022.100280>
28. Kunstler B, Newton S, Hill H, Ferguson J, Hore P, Mitchell BG, et al. P2/N95 respirators & surgical masks to prevent SARS-CoV-2 infection: effectiveness & adverse effects. *Infect Dis Health.* 2022;27(2):81-95. Available from: <https://doi.org/10.1016%2Fj.idh.2022.01.001>
29. Dörr T, Haller S, Müller MF, Friedl A, Vuichard D, Kahlert CR, et al. Risk of SARS-CoV-2 acquisition in health care workers according to cumulative patient exposure and preferred mask type. *JAMA Netw Open.* 2022;5(8):e2226816. Available from: <https://doi.org/10.1001/jamanetworkopen.2022.26816>
30. Gohil SK, Quan KA, Madey KM, King-Adelsohn S, Tjoa T, Tifrea D, et al. Infection prevention strategies are highly protective in COVID-19 units while main risks to healthcare professionals come from coworkers and the community. *Antimicrob Resist Infect Control.* 2021;10(1):163. Available from: <https://doi.org/10.1186/s13756-021-01031-5>

31. Yassi A, Grant JM, Lockhart K, Barker S, Sprague S, Okpani AI, et al. Infection control, occupational and public health measures including mRNA-based vaccination against SARS-CoV-2 infections to protect healthcare workers from variants of concern: a 14-month observational study using surveillance data. *PLoS One*. 2021;16(7):e0254920. Available from: <https://doi.org/10.1371/journal.pone.0254920>
32. Schwartz KL, Muller MP, Williams V, Harry R, Booker S, Katz K, et al. Coronavirus disease 2019 (COVID-19) risk among healthcare workers performing nasopharyngeal testing. *Infect Control Hosp Epidemiol*. 2021;43(3):395-7. Available from: <https://doi.org/10.1017/ice.2021.354>
33. Sims MD, Maine GN, Childers KL, Podolsky RH, Voss DR, Berkiw-Scenna N, et al. Coronavirus disease 2019 (COVID-19) seropositivity and asymptomatic rates in healthcare workers are associated with job function and masking. *Clin Infect Dis*. 2021;73(Suppl 2):S154-62. Available from: <https://doi.org/10.1093/cid/ciaa1684>
34. Wilson S, Mouet A, Jeanne-Leroyer C, Borgey F, Odinet-Raulin E, Humbert X, et al. Professional practice for COVID-19 risk reduction among health care workers: a cross-sectional study with matched case-control comparison. *PLoS One*. 2022;17(3):e0264232. Available from: <https://doi.org/10.1371/journal.pone.0264232>
35. Rodriguez-Lopez M, Parra B, Vergara E, Rey L, Salcedo M, Arturo G, et al. A case-control study of factors associated with SARS-CoV-2 infection among healthcare workers in Colombia. *BMC Infect Dis*. 2021;21(1):878. Available from: <https://doi.org/10.1186/s12879-021-06581-y>
36. Haller S, Güsewell S, Egger T, Scanferla G, Thoma R, Leal-Neto OB, et al. Impact of respirator versus surgical masks on SARS-CoV-2 acquisition in healthcare workers: a prospective multicentre cohort. *Antimicrob Resist Infect Control*. 2022;11(1):27. Available from: <https://doi.org/10.1186/s13756-022-01070-6>
37. Mastan S, Malik RA, Charalambous CP, Abdulla M, Alonge J, Chelva R, et al. COVID-19 infection is related to differences in the use of personal protective equipment by orthopaedic specialist trainees caring for hip fracture patients during the second surge of COVID-19 in the North West of England. *Eur J Orthop Surg Traumatol*. 2021;31(5):989-93. Available from: <https://doi.org/10.1007/s00590-021-03006-z>
38. Szajek K, Fleisch F, Hutter S, Risch M, Bechmann T, Luyckx VA, et al; AMICO Study Group. Healthcare institutions' recommendation regarding the use of FFP-2 masks and SARS-CoV-2 seropositivity among healthcare workers: a multicenter longitudinal cohort study. *Antimicrob Resist Infect Control*. 2022;11(1):6. Available from: <https://doi.org/10.1186/s13756-021-01047-x>
39. Rosser JI, Tayyar R, Giardina R, Kolonoski P, Kenski D, Shen P, et al. Case-control study evaluating risk factors for SARS-CoV-2 outbreak amongst healthcare personnel at a tertiary care center. *Am J Infect Control*. 2021;49(12):1457-63. Available from: <https://doi.org/10.1016/j.ajic.2021.09.004>
40. Schmitz D, Vos M, Stolmeijer R, Lameijer H, Schönberger T, Gaakeer MI, et al. Association between personal protective equipment and SARS-CoV-2 infection risk in emergency department healthcare workers. *Eur J Emerg Med*. 2021;28(3):202-9. Available from: <https://doi.org/10.1097/mej.0000000000000766>
41. Li A, Slezak J, Maldonado AM, Concepcion J, Maier CV, Rieg G. SARS-CoV-2 positivity and mask utilization among health care workers. *JAMA Netw Open*. 2021;4(6):e2114325. Available from: <https://doi.org/10.1001/jamanetworkopen.2021.14325>

42. Klompas M, Ye S, Vaidya V, Ochoa A, Baker MA, Hopcia K, et al. Association between airborne infection isolation room utilization rates and healthcare worker COVID-19 infections in two academic hospitals. *Clin Infect Dis*. 2022;74(12):2230-3. Available from: <https://doi.org/10.1093/cid/ciab849>
43. Chan VW, Ng HH, Rahman L, Tang A, Tang KP, Mok A, et al. Transmission of severe acute respiratory syndrome Coronavirus 1 and severe acute respiratory syndrome Coronavirus 2 during aerosol-generating procedures in critical care: a systematic review and meta-analysis of observational studies. *Crit Care Med*. 2021;49(7):1159-68. Available from: <https://doi.org/10.1097/ccm.0000000000004965>
44. Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. Best practices for hand hygiene in all health care settings. 4<sup>th</sup> ed. Toronto, ON: Queen's Printer for Ontario; 2014. Available from: <https://www.publichealthontario.ca/-/media/documents/B/2014/bp-hand-hygiene.pdf?la=en>
45. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Interim infection prevention and control measures based on respiratory virus transmission risk in health care settings [Internet]. Toronto, ON: King's Printer for Ontario; 2023 [cited 2023 Oct 5]. Available from: <https://www.publichealthontario.ca/-/media/Documents/I/2023/ipac-measures-transmission-risks-technical-brief.pdf>

## Citation

Ontario Agency for Health Protection and Promotion (Public Health Ontario). IPAC recommendations for use of personal protective equipment for care of individuals with suspect or confirmed COVID-19. 3<sup>rd</sup> ed. Toronto, ON: King's Printer for Ontario; 2023.

## Disclaimer

This document was developed by Public Health Ontario (PHO). PHO provides scientific and technical advice to Ontario's government, public health organizations and health care providers. PHO's work is guided by the current best available evidence at the time of publication. The application and use of this document is the responsibility of the user. PHO assumes no liability resulting from any such application or use. This document may be reproduced without permission for non-commercial purposes only and provided that appropriate credit is given to PHO. No changes and/or modifications may be made to this document without express written permission from PHO.

## Publication History

Published: 2020

2<sup>nd</sup> Edition: October 2022

3<sup>rd</sup> Edition: November 2023

## Public Health Ontario

Public Health Ontario is an agency of the Government of Ontario dedicated to protecting and promoting the health of all Ontarians and reducing inequities in health. Public Health Ontario links public health practitioners, front-line health workers and researchers to the best scientific intelligence and knowledge from around the world.

For more information about PHO, visit [publichealthontario.ca](https://publichealthontario.ca).

© King's Printer for Ontario, 2023

Ontario 