Ontario Health

Personal Protective Equipment (PPE) Use During the COVID-19 Pandemic

Recommendations from Ontario Health on the Use and Conservation of PPE

Updated May 10, 2020

Version History

Release Date	Source	Change(s)
March 25, 2020	COVID-19 Response: Personal Protective Equipment (PPE) Committee	• Initial release
March 30, 2020	COVID-19 Response: Personal Protective Equipment (PPE) Committee	• Updated list of aerosol-generating medical procedures (AGMPs) • New guidelines on the use of powered air purifying respirators (PAPRs) • New guidelines on extended use of surgical masks in all care settings • New guidance on when to begin droplet/contact precautions in long-term care facilities • New guidance on the use of nebulization for medications for long-term care residents
May 10, 2020	COVID-19 Response: Personal Protective Equipment (PPE) Committee	• New introduction section with information on performing a point-of-care risk assessment (PCRA) • Updated recommendations on the use of PPE in long-term care facilities (with the addition of retirement homes) and home and community care • Updated considerations for the use of surgical/procedure masks • Updated strategies for PPE conservation • Glossary of terms added • Aerosol-generating medical procedures list updated to include non-AGMPs • Changed the word “guidance” to “recommendation” in section titles • Updated reference list • Updated document format

Personal Protective Equipment (PPE) Use During the COVID-19 Pandemic

This document was developed by the *COVID-19 Response: Personal Protective Equipment Committee*, a team of experts convened to respond to urgent issues surrounding personal protective equipment (PPE) during the novel coronavirus disease (COVID-19 or SARS-CoV-2) pandemic. Chaired by Dr. Chris Simpson, the committee includes expertise from health system leaders in infection prevention and control (IPAC), infectious diseases, occupational health and safety, primary care, long-term care, home and community care, acute care, emergency medicine, and engineering. (See Appendix A for the full list of committee members.)

In this document, *personal protective equipment* refers to N95 respirators, surgical/procedure masks, isolation gowns, gloves, and eye protection (goggles and face shields). (See Appendix B[1,2] for a glossary of terms.)

Appropriate stewardship of our provincial supply of PPE must consider the safety of health care workers as well as strategies to both reduce inappropriate use and conserve supply. In order to best protect our health care workforce, and to ensure the longer-term sustainability of appropriate PPE for all health care workers in Ontario, the following guidance—based on the best available evidence—has been produced to help health care organizations and providers effectively use, conserve, and allocate PPE:

1. **Recommendations on the appropriate use of N95 respirators and surgical/procedure masks for the care of individuals with suspected or confirmed COVID-19**
2. **Considerations for the use of surgical/procedure masks**
3. **Strategies for conserving personal protective equipment**

In addition to supporting appropriate PPE management on the front lines, we are also working quickly to stabilize the supply chain for all PPE. We recognize that PPE has been used, and continues to be used, in health care delivery across all sectors, independent of COVID-19–related use. Several first steps in conserving PPE have been taken, including postponing elective activity and increasing the use of virtual care.

Acknowledging the fear and anxiety associated with providing health care to persons with suspected or confirmed COVID-19, and the need to ensure effective PPE is available for health care providers, we encourage you to familiarize yourself with the evidence and recommendations provided here and communicate the appropriate and responsible use of PPE to your staff. We also acknowledge the importance of working with our stakeholders, associations, and organized labour to achieve the sustained safety of our health care system.

This is a living document. As the evidence evolves in these topic areas, as we move through the phases of the COVID-19 pandemic, and as we continue to think about longer-term sustainability of PPE, the committee will continue to evaluate innovations in a timely way and update this document accordingly.

Introduction

Routine practices are used during every staff-to-patient/resident interaction to prevent and control the transmission of microorganisms in all health care settings. These practices encompass the infection prevention and control measures recommended by the Public Health Agency of Canada.[2] They include administrative and environmental controls (e.g., the use of physical barriers, the use of telemedicine where appropriate, restricting visitors, cohorting patients with COVID-19),[3-6] and a point of care risk assessment (PCRA). Personal protective equipment is the last line of defense.

Point of Care Risk Assessment

A point-of-care risk assessment (PCRA) must be performed by every health care worker before every patient or resident interaction.[7,8] During the COVID-19 pandemic, the PCRA, along with clinical and professional judgement and evidence-based recommendations, supports the selection of appropriate PPE[2]:

- Droplet/contact precautions are to be used for all interactions with patients/residents with suspected or confirmed COVID-19 (surgical/procedure mask, isolation gown, gloves, and eye protection)[5,9]
- Airborne precautions are used when aerosol-generating medical procedures (AGMPs) are planned or anticipated for patients/residents with suspected or confirmed COVID-19 (N95 respirator, isolation gown, gloves, eye protection)[5]
- For source control in long-term care homes specifically, in addition to the above all staff and essential visitors must wear a surgical/procedure mask at all times[10]

If a health care worker determines that health and safety measures are required to deliver care to the patient or resident, then the public hospital or long-term care home must provide that health care worker with the appropriate health and safety control measures, including an N95 respirator. The hospital or long-term care home will not unreasonably deny access to the appropriate PPE items. Public Health Ontario has provided further information on routine practices applicable to all health care settings.[2]

Health care organizations must always ensure compliance with the *Occupational Health and Safety Act*, specifically the Health Care and Residential Facilities Regulation under the Act. Their responsibilities include establishing policies, procedures, measures, and training, in consultation with their Joint Health and Safety Committee or Health and Safety representative for the protection of workers. In addition, health care workers must be instructed and trained in the care, use, and limitations of PPE before wearing or using it for the first time and at regular intervals thereafter and the worker must participate in such instruction and training.

1. Recommendations on the Appropriate Use of N95 Respirators and Surgical/Procedure Masks for the Care of Individuals with Suspected or Confirmed COVID-19

1.1 Inpatient Facilities (Acute Care, Hospital, and Complex Continuing Care)

- When caring for individuals with suspected or confirmed COVID-19, health care workers should follow droplet/contact precautions (surgical/procedure mask, isolation gown, gloves, and eye protection)
    - A surgical/procedure mask can be used over the course of many patients
    - Extend the use of your mask for as long as possible, but once wet, damaged, soiled, or removed (e.g., to eat or drink), or once you exit the patient care area, you should immediately discard the mask in the appropriate receptacle
    - Take extra care when removing this mask as this is when self-contamination may occur
    - Don a new mask for your next set of patient encounters, extending its use for as long as possible
    - It is safe to wear your mask for multiple patient encounters; in fact, you may reduce the risk of self-contamination by reducing the number of mask changes
    - Take care not to touch your mask. If you do, immediately perform hand hygiene

- Use an N95 respirator during aerosol-generating medical procedures (AGMPs) performed on patients with suspected or confirmed COVID-19. For an evidence-based list of AGMPs, and procedures not considered to be AGMPs, see Appendix C[11-13]

- The AGMPs listed in the table below pose a higher risk to health care providers when performed on patients with COVID-19. When clinical judgement dictates that patients need these procedures, an N95 mask (or equivalent) should be used. Other AGMPs should be avoided. These are summarized in the table below.

AGMPs With Increased Risk*	AGPMs to Avoid

• Cardiopulmonary resuscitation (CPR)
  ○ Chest compressions and cardioversion/defibrillation are not considered AGMP; however, procedures associated with CPR, such as emergent intubation and manual ventilation are
  ○ CPR is considered a high-risk procedure and should only be embarked upon where there is a reasonable prospect of success
• Tracheotomy and tracheostomy insertion
• High-frequency oscillating ventilation
• Bronchoscopy (diagnostic or therapeutic)
	• Sputum induction (diagnostic or therapeutic)
	• Large-volume nebulizers for humidity
	• High-flow oxygen therapy

• Open suctioning (e.g., "deep" insertion for nasopharyngeal or tracheal suctioning not inclusive of oral suctioning) • Noninvasive positive-pressure ventilation (CPAP, BiPAP), including for obstructive sleep apnea	

*Consider other treatments option where available.
AGMP—aerosol generating medical procedures.

- For all other situations, including screening, entering a patient's room, or providing direct care to patients with suspected or confirmed COVID-19, a surgical/procedure mask, isolation gown, gloves, and eye protection are sufficient. **N95 respirators should not** be used by providers caring for patients with suspected or confirmed COVID-19 unless the patient is undergoing an AGMP or if it is deemed necessary as a result of a PCRA

- Visitor restrictions should be in effect to reduce the need for PPE. Visitors that are permitted entry to an inpatient unit under exceptional circumstances (after screening for symptoms of COVID-19) may receive one (1) procedure mask only if the hospital's PPE supply allows. Hand hygiene must be performed before donning the procedure mask, which must remain fully in place for the duration of the visit. Fabric/cloth masks may have some utility for visitors or family members in a health care setting. (Note: fabric/cloth masks are not a suitable alternate source of PPE for health care workers.)

1.2 Primary Care, Walk-In Clinics, Outpatient Facilities, and Ambulatory Settings

- When caring for individuals with suspected or confirmed COVID-19, health care workers should follow droplet/contact precautions (surgical/procedure mask, isolation gown, gloves, and eye protection)
    - A surgical/procedure mask can be used over the course of many patients
    - Extend the use of your mask for as long as possible, but once it is wet, damaged, soiled, or removed (e.g., to eat or drink), or you exit the patient care area, you should immediately dispose of the mask in the appropriate receptacle
    - Take extra care when removing this mask as this is when self-contamination may occur
    - Don a new mask for your next set of patient encounters, extending its use for as long as possible
    - It is safe to wear your mask for multiple patient encounters; in fact, you may reduce the risk of self-contamination by reducing the number of mask changes
    - Take care not to touch your mask, and if you do, immediately perform hand hygiene

- Patients with suspected or confirmed COVID-19 who are waiting to be seen should don surgical masks and maintain a 2-metre distance from others
- Refer to Appendix C[11-13] for a list of evidence-based aerosol-generating medical procedures (AGMPs) and a list of procedures not considered to be AGMPs

1.3 COVID-19 Assessment Centres[14]

- Patients who are waiting to be assessed should don surgical masks and maintain a 2-metre distance from others
- Screeners are advised to don a surgical mask if they are less than 2 metres away from those being screened and if they are not behind a partition
- Workers who are assessing (+/- obtaining nasopharyngeal swabs from) staff and patients with COVID-19 symptoms **do not require N95 respirators**
    - A surgical/procedure mask can be used over the course of many patients
    - Extend the use of your mask for as long as possible, but once it is wet, damaged, soiled, or removed (e.g., to eat or drink), or you exit the patient care area, you should immediately dispose of the mask in the appropriate receptacle
    - Take extra care when removing this mask as this is when self-contamination may occur
    - Don a new mask for your next set of patient encounters, extending its use for as long as possible
    - It is safe to wear your mask for multiple patient encounters; in fact, you may reduce the risk of self-contamination by reducing the number of mask changes
    - Take care not to touch your mask, and if you do, immediately perform hand hygiene
- Refer to Appendix C[11-13] for a list of evidence-based AGMPs and procedures not considered to be AGMPs

1.4 Long-Term Care Facilities and Retirement Homes

- These recommendations are aligned with Directive #3[10] and implementation guidance[15] for long-term care homes and retirement homes (April 15, 2020) and Directive #5[8] for hospitals, long-term care homes and retirement homes (April 10, 2020). These directives outline a universal masking strategy[16] for long-term care and retirement homes, which includes surgical/procedure masks used as source control and/or as part as PPE required for the care of residents[8,10]
- *Source control:* All health care workers who interact with residents or who enter a resident area for any reason (e.g., environmental services, dietary aides, recreational staff, etc.) should be provided with a minimum of two (2) surgical masks per day
    - A surgical/procedure mask can be used over the course of many residents who are not in isolation
    - Extend the use of your mask for as long as possible, but once it is wet, damaged, soiled, or removed (e.g., to eat or drink), or you exit the patient care area, you should immediately dispose of the mask in the appropriate receptacle
    - Take extra care when removing this mask as this is when self-contamination may occur
    - Don a new mask for your next set of resident encounters, extending its use for as long as possible
    - It is safe to wear your mask for multiple resident encounters; in fact, you may reduce the risk of self-contamination by reducing the number of mask changes
    - Take care not to touch your mask, and if you do, immediately perform hand hygiene

- *Source control (no patient contact):* All other workers whose functions do not put them into contact with residents or resident areas should be provided with a minimum of one (1) surgical mask per day
    - A surgical/procedure mask can be used over the course of the day
    - Extend the use of your mask for as long as possible, but once it is wet, damaged, soiled, or removed (e.g., to eat or drink), you should immediately dispose of the mask in the appropriate receptacle
    - Take extra care when removing this mask as this is when self-contamination may occur
    - It is safe to wear your mask for an extended period of time; in fact, you may reduce the risk of self-contamination by reducing the number of mask changes
    - Take care not to touch your mask, and if you do, immediately perform hand hygiene

- *Caring for residents with suspected or confirmed COVID-19:* Health care workers should follow droplet/contact precautions (surgical/procedure mask, isolation gown, gloves, and eye protection). Personal protective equipment should be changed as part of routine doffing procedures, except when cohorting measures have been implemented in which case the same PPE can be used across several resident interactions within the cohort
    - A surgical/procedure mask can be used over the course of many patients
    - Extend the use of your mask for as long as possible, but once wet, damaged, soiled, or removed (e.g., to eat or drink), or you exit the patient care area, you should immediately discard the mask in the appropriate receptacle
    - Take extra care when removing this mask as this is when self-contamination may occur
    - Don a new mask for your next set of patient encounters, extending its use for as long as possible
    - It is safe to wear your mask for multiple patient encounters; in fact, you may reduce the risk of self-contamination by reducing the number of mask changes
    - Take care not to touch your mask. If you do, immediately perform hand hygiene

- If a long-term care facility or retirement home is unable to cohort patients with COVID-19, all residents should be cared for using droplet/contact precautions (surgical/procedure mask, isolation gown, gloves and eye protection) once a COVID-19 case has been confirmed

- Use an N95 respirator during AGMPs performed on patients with suspected or confirmed COVID-19 or as required following a PCRA. For an evidence-based list of AGMPs, and procedures not considered AGMPs, see Appendix C[11-13]

    - **Note:** CPAP and BiPAP (for obstructive sleep apnea) for residents with suspected or confirmed COVID-19 should be avoided if possible. If these procedures must occur (use clinical judgment), an N95 respirator should be used and patients should be in a private room with the door closed
    - **Note:** Nebulization for medications for residents with suspected or confirmed COVID-19 should be avoided if possible. If these procedures must occur (use clinical judgment), an N95 respirator should be used and patients should be in a private room with the door closed

- Visitor restriction should be in effect to reduce the need for PPE. Visitors (including external medical service providers) who are permitted entry to an inpatient unit under exceptional

circumstances (after screening for symptoms of COVID-19) may receive one (1) surgical/procedure mask
    - The essential visitor must wear a surgical/procedure when visiting a resident that does not have COVID-19
    - The essential visitor must wear PPE for droplet/contract precautions (surgical/procedure mask, isolation gown, gloves and eye protection) when visiting a resident who has confirmed COVID-19
    - Essential visitors and external medical providers should bring their own surgical masks if possible

1.5 Home and Community Care

- These recommendations are aligned with the Ministry of Health's "COVID-19 Guidance for Home and Community Care Providers" (version 4; May 4, 2020).[17] This guidance document outlines a universal masking strategy[16] for home and community care providers, in which surgical/procedure masks are used as source control and/or as part as PPE required for the care of patients

- *Source control:* All health care workers should wear a surgical/procedure mask for the duration of the home visit
    - Under extreme PPE supply limitations, a single mask can be worn for an extended period, as long as it is not visibly soiled, damp, damaged, or difficult to breathe through
    - If a mask is to be reused, keep it from being contaminated by storing it in a clean paper bag or in a cleanable container with a lid
    - Take extra care when removing your mask as this is when self-contamination may occur
    - Take care not to touch your mask, and if you do, immediately perform hand hygiene

- *Caring for patients with suspected or confirmed COVID-19*: Health care workers should follow droplet/contact precautions (surgical/procedure mask, isolation gown, gloves, and eye protection). The client should be instructed to wear a procedure mask (if tolerated) while the health care worker is providing care
    - Conserve your mask for as long as possible, but once it is wet, damaged, soiled, or removed (e.g., to eat or drink), and once you exit the patient's home, you should immediately dispose of the mask in the appropriate receptacle
    - Take extra care when removing this mask as this is when self-contamination may occur
    - Take care not to touch your mask, and if you do, immediately perform hand hygiene

- Use an N95 respirator during AGMPs performed on patients with suspected or confirmed COVID-19. For an evidence-based list of AGMPs and procedures not considered AGMPs see Appendix C[11-13]

2. Considerations for the Use of Surgical/Procedure Masks

2.1 Use of surgical/procedure masks when caring for patients/residents with suspected or confirmed COVID-19

Health care providers who are caring for patients with confirmed or suspected COVID-19 should don a surgical/procedure mask, an isolation gown, protective eyewear, and gloves.

2.2 Surgical/procedure mask use for all other patient/resident encounters

Assessing the risk posed to health care workers who are caring for the general public (i.e., patients who do not have confirmed or suspected COVID-19) can be challenging. Risks vary, depending on care setting, type of care provided, prevalence of asymptomatic infection in the population presenting for care, and the extent to which the virus sheds from asymptomatic individuals. In addition, there are increasing reports of patients with COVID-19 who present with atypical symptoms, allowing them to pass through screening undetected.

In addition to the requirement to perform individual PCRAs, consider the following when using masks to care for patients who do not have suspected or confirmed COVID-19:

- Some organizations have made the decision to provide two (2) surgical/procedure masks per shift to all patient-facing health care workers
- Staff and essential visitors in long-term care and retirement homes are required to wear surgical/procedure masks at all times (regardless of whether the home is experiencing an outbreak or not)
- Extend the use of your surgical/procedure mask for as long as possible, but once it is wet, damaged, soiled, or removed (e.g., to eat or drink), or you exit the patient/resident care area, you should immediately dispose of the mask. In some circumstances more than two masks per shift may be necessary

This kind of risk stratification is necessary and appropriate if we are to protect our health care workforce while conserving the supply of masks. Using masks injudiciously in low-risk environments could contribute to a shortage later when risks everywhere are higher.

Accordingly, a thoughtful, risk-based approach to mask distribution is recommended. At any given moment in time, this will result in different mask distribution protocols across organizations in all health care sectors. Individual organizations may need to change or escalate their distribution policies as risks change. This approach entails the following:

- All surgical/procedure masks in the organization should be immediately secured (i.e., treated like narcotics supply: take stock of supplies, steward judiciously, and track usage); ensure health care workers have access to PPE according to guidelines issued by Ontario Health and as a result of a PCRA
- All organizations (including acute care, COVID-19 assessment centres, primary care, outpatient and ambulatory care, long-term care, and home and community care) **should establish a defined, phased approach to mask distribution** based on **risk assessment**, with Phase 1

representing high-risk areas and Phase 4 representing lower-risk environments. As an example, one potential example of risk stratification (from acute care) is as follows:

  - PHASE 1: Unplanned urgent and emergent care (e.g., emergency department)
  - PHASE 2: Planned urgent or emergent care (e.g., dialysis, endoscopy)
  - PHASE 3: Other remaining clinical areas (e.g., inpatient units)
  - PHASE 4: Non-clinical areas (e.g., administrative office areas)

- Organizations in all care sectors should escalate through levels of precaution (i.e., surgical/procedure mask distribution) as risk escalates. As the pandemic begins to recede, early de-escalation through the phases should be considered
- Estimates of risk should be made on an organization-by-organization basis, depending on local prevalence of disease, evidence of community spread, and advice from local IPAC experts
- Importantly, in a future scenario of scarce resources, these risk categories allow organizations to determine mask distribution in a rational fashion

The recommendations in this section are up to date as of the most recent release of this document, and will be updated as new information becomes available. The extent of community spread is variable across Ontario. Regions that are currently experiencing large-scale community spread may alter these approaches to meet their current needs based on local epidemiology and infection control advice.

3. Strategies for Conserving Personal Protective Equipment[18-20]

a) Assess your existing supply of N95 respirators and other PPE

- Gather and secure supplies from across your organization, including:
    - Visitor and public areas
    - Clinics or surgical areas not in use

b) Centralize distribution of N95 respirators and other PPE and manage them as you would narcotics

- Take stock of supplies, steward judiciously, and track usage. Hospitals and long-term care homes must assess their available supply of PPE on an ongoing basis[8]
- Ensure health care workers have access to PPE according to guidelines issued by Ontario Health and as a result of a PCRA

c) Where appropriate, limit the number of patients going to hospital for non-urgent care

- Maximize virtual consults. Any patient who does not require a physical presence in a health care institution should not be there
- Use drive-thru or virtual COVID-19 screening as much as possible

d) Minimize contact with patients/residents suspected or confirmed to have COVID-19

- Restrict health care workers entering patient/resident rooms to only those involved in their direct care (e.g., no learners)
- Assess what other staff/allied health professionals could be restricted. Minimize inpatient consults. Consider virtual inpatient consult options
- Maximize cross-disciplinary work (e.g., a caregiver who already has to enter the room can deliver a food tray)
- Caregivers should cluster their tasks to reduce the number of times they need to enter the room
- Consider other changes to minimize use of PPE (e.g., moving infusion pumps outside patient rooms so alarms can be addressed without donning PPE or moving to a dial-flow nonpump system to reduce the number of alarms)

e) Alter care processes to limit possible contact with patients/residents with COVID-19 to as few providers as possible, with as little time in the hospital as possible

- When low-risk patients arrive at the emergency room, for example, consider taking vitals and history at triage then sending patients back to their cars to have a phone consult with the doctor, with re-entry only required if diagnosis is not clear or further investigation is needed

f) Cohort patients with confirmed COVID-19 in the same room and on the same unit

- As required by Directive #3,[10] long-term care homes must use resident cohorting. In smaller long-term care homes or in homes where it is not possible to maintain physical distancing between staff and residents, all residents should be managed as though they are potentially infected, and staff should use droplet/contact precautions when in an area affected by COVID-19

g) Assign a specialized team to care for a cohort of patients/residents with suspect or confirmed COVID-19

- This may be designated units or areas in inpatient settings
- As required by Directive #3,[10] long-term care homes must use staff cohorting. In smaller long-term care homes or in homes where it is not possible to maintain physical distancing of staff or residents from each other, all residents or staff should be managed as if they are potentially infected, and staff should use droplet/contact precautions in areas affected by COVID-19

h) Severely limit visitors of patients with suspected of confirmed COVID-19

i) Discontinue droplet/contact precautions as quickly as appropriately possible when they are no longer required (work closely with local IPAC specialists)

- COVID-19 results may be available on Connecting Ontario or OLIS before our laboratories receive notification
- Contact infection control in a timely manner and before discontinuing precautions

j) Use expired N95 respirators for mask fit-testing

- Use qualitative fit-testing rather than quantitative fit-testing so that staff can use their testing mask for patient care[21]

k) Offer education on the indications for use of N95 respirators in the care of patients with suspected or confirmed COVID-19

l) Audit the use of PPE in your organization

- Conduct leadership rounds to deliver key messages and address variability observed in practice
- Charge managers and directors with enforcing and reporting on appropriate PPE use on each unit

Additional information on the items listed below is available in Ontario Health's guidance document "Optimizing the Supply of Personal Protective Equipment (PPE) during the COVID-19 Pandemic."

m) Choose reusable PPE options

- To help extend the supply of PPE, switch to reusable PPE options wherever they can be safely implemented (e.g., reusable elastomeric respirators [half-mask or full facepiece], reusable isolation gowns, reusable goggles and face shields, and powered air purifying respirators [PAPRs] in specific circumstances)

n) Reclaim and use certified PPE from other sources

- Use certified PPE from other medical settings and non-medical settings
- Obtain and use certified PPE products from other medical settings that no longer need them and certified products from commercial, non-medical settings (e.g., industry-related settings). This includes disposable and reusable N95 respirators and other types of National Institute of Occupational Safety and Health (NIOSH) certifications that provide protection from SARS-CoV-2, including the following: N99, N100, R95, R99, R100, P95, P99, P100

o) Use 3D-printed face shields for eye protection

- 3D-printed face shields are an appropriate alternative to traditional face shields for eye protection
- Ensure they meet the standards[22] set out by Health Canada

p) Extended the use of existing PPE (N95 respirators (if not worn for an AGMP), surgical/procedure mask, gown, gloves, eye protection)

- Ensure that health care workers caring for cohorted patients with suspected or confirmed COVID-19 are following extended-use recommendations for PPE as appropriate for their setting
- Extend the use of PPE for as long as possible, but once it is wet, damaged, soiled, or removed, or once you exit the patient care area, the PPE should be discarded in the appropriate receptacle

q) Use expired PPE (N95 respirators, surgical/procedure mask, gown, gloves, eye protection)

- When supplies of PPE are low or depleted, expired PPE from existing stockpiles can be used
- Expired N95 respirators (disposable) and other PPE that have been stored in accordance with manufacturers' storage conditions require inspection to ensure they are not damaged and may be used when regular supplies are depleted

r) Follow limited reuse recommendations for PPE (N95 respirators (when not worn for an AGMP), surgical/procedure masks, cloth isolation gown, eye protection)

- Limited reuse refers to the practice of using the same PPE for multiple encounters with patients, but carefully removing it ("doffing") after each encounter, storing it safely, then putting it back on ("donning") without disinfecting
- Ensure that health care workers are following limited reuse recommendations as appropriate for their setting

s) Use non–NIOSH certified PPE with caution

- Take caution when using non-NIOSH certified PPE
- Verify the authenticity of, and fit-test any, PPE products that may not meet NIOSH certification

t) Decontaminate PPE using validated sterilization and disinfection methods

- Collect and store used N95 respirators (disposable) for reprocessing with evidence-based sterilization and decontamination methods
- Reprocess goggles and face shields with appropriate cleaning and disinfection
- Reprocess cloth gowns with appropriate laundering
- Reprocessing disposable isolation gowns is **not** recommended
- Reprocessing gloves is **not** recommended

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Appendix A: COVID-19 Response: Personal Protective Equipment (PPE) Committee

Name	Title(s) and Institutions(s)
Joe Cafazzo, PhD, PEng	Executive Director, Biomedical Engineering, Healthcare Human Factors, Centre for Global eHealth Innovation, University Health Network Wolfond Chair in Digital Health Associate Professor, University of Toronto
Zain Chagla, MSc, MD, FRCPC	Co-Medical Director of Infection Control, St. Joseph's Healthcare Hamilton and Niagara Health System Associate Professor, Department of Medicine, McMaster University
Connie Clerici, RN, BScN	Executive Chair, Closing the Gap Healthcare Adjunct Lecturer, IHPME, University of Toronto
Jennifer Everson, BScN, MD, CCFP, FCFP	Vice President, Clinical, Ontario Health (West) Associate Professor, Faculty of Medicine, Department of Family Medicine, McMaster University
Michael Gardam, MSc, MD, CM, MSc, FRCPC	Chief of Staff, Humber River Hospital Associate Professor, Department of Medicine, University of Toronto
Frank Gu, PhD	NSERC Senior Industrial Research Chair and Professor, Department of Chemical Engineering and Applied Chemistry, University of Toronto
Tarek Loubani, BSc (Hon), MD, CCFP (EM)	Consultant, Division of Emergency Medicine, London Health Sciences Centre Associate Professor, Department of Medicine, Faculty of Medicine and Dentistry, University of Western Ontario
Derek McNally, RN, MM	Executive Vice President, Clinical Services, and Chief Nursing Executive, Niagara Health Adjunct Professor, Department of Nursing, Brock University
Howard Ovens, MD, FCFP(EM)	Chief Medical Strategy Officer, Sinai Health System Professor, Department of Family and Community Medicine, University of Toronto and Sr. Fellow, IHPME Ontario Provincial Lead for Emergency Medicine
Paul Preston, MD, CCFP, CCPE, CHE	Vice President, Clinical, Ontario Health (North)
Amit Shah, MD, CCFP(EM), FCFP	Emergency Department Lead, South West Region Emergency Physician, London Health Sciences Centre/St. Thomas-Elgin General Hospital Associate Professor, Division of Emergency Medicine, Western University
Chris Simpson (Chair), BSc, MD, FRCPC, FACC, FHRS, FCCS, FCAHS	Vice Dean (Clinical), School of Medicine, Queen's University Medical Director, Southeastern Ontario Academic Medical Organization

	Professor, Division of Cardiology, Queen's University Affiliate Scientist, Institute for Clinical Evaluative Sciences
Henrietta Van hulle, RN, BN, MHSM, COHN, CRSP, CDMP	Vice President, Client Outreach, Public Services, Health and Safety Association
Tamara Wallington, MD, FRCPC	Program Chief and Medical Director, Trillium Health Partners Academic Lead, Family Medicine Teaching Unit FMTU
Dick Zoutman, MD, FRCPC, CCPE, C.Dir	Chief of Staff, Scarborough Health Network Professor, Faculty of Medicine, University of Toronto Professor, Faculty of Health Sciences, Queen's University Infectious Disease and Medical Microbiology Specialist

Appendix B: Glossary of Terms

Term	Definition
Extended use	*Extended use* refers to the practice of keeping an item of personal protective equipment on for extended periods of time without removing ("doffing").
Eye protection (goggles/face shield)	There is wide variety of types of protective eyewear used by health care workers. Goggles and face shields provide a barrier to protect health care workers' eyes and face from expelled splashes, sprays, and bodily fluids by a contaminated person. A face shield is a device that has a transparent window or supported visor in front of the face to shield the eyes and face.
Disposable	*Disposable* refers to an item of personal protective equipment that is intended to be used only once then thrown away. Also referred to as "one-time use" or "single-use."
Gloves	Single-use, nonsterile medical gloves are used by all medical personnel and many auxiliary workers in health care settings as a universal contact and droplet precaution to minimize skin contamination and transmission of pathogens. Gloves can be made of different types of material (e.g., natural rubber latex, nitrile, polyvinyl chloride).
Isolation gown	*Isolation gown* refers to a type of long-sleeved medical cover that offers a barrier to protect health care workers against the transmission of micro-organisms contained in substances such as bodily fluids, secretions, and excretions, including respiratory droplets. Gowns distributed and sold in Canada are grouped by category and level of risk. There are two types of medical gowns: *isolation gowns* and *surgical gowns*.[1]
N95 respirators	An N95 respirator, also known as a filtering facepiece respirator, is a respiratory protective device designed to achieve a very close facial fit and very efficient filtration of airborne particles. The "N95" designation means that when subjected to careful testing the respirator blocks at least 95% of very small test particles. These respirators are medical devices authorized by Health Canada.
Personal protective equipment (PPE)	*Personal protective equipment* refers to specialized clothing and equipment worn by health care workers for protection against hazards and to prevent injury or infection. In this document, PPE refers to N95 respirators, surgical/procedure masks, isolation gowns, gloves, and eye protection (goggles and face shields).
Reprocessing	*Reprocessing* refers to the cleaning, sanitization, disinfection, decontamination, and/or sterilization of devices and equipment in health care settings.

Reuse/Limited reuse	*Reuse* refers to the practice of using an item of PPE for multiple patient encounters with but removing it ("doffing") between encounters without disinfecting.
Reusable	*Reusable* refers to the ability for a product to be used repeatedly with validated methods for cleaning and/or disinfection between uses.
Surgical/procedure mask	A *mask* is a device that covers the nose and mouth, is secured in the back and is used to protect the mucous membranes of the nose and mouth. *Procedure masks*, also known as a *standard face mask*, are not fluid or water resistant, and they are designed to protect for minimal exposure to infectious droplets and tasks that do not involve exposure to blood/body fluids. *Surgical masks* are fluid and water resistant, thus they protect from exposure to infection droplets or blood/body fluids and are suitable for long duration tasks.[2] *Surgical and procedure masks* do not fit tightly to the face.

Appendix C: Aerosol-Generating Medical Procedures

Below is a list of aerosol-generating medical procedures (AGMP), adapted from the Toronto Region Hospital Operations Committee's "IPAC Consensus List of Aerosol-Generating Medical Procedures (AGMP)"[11]:

- Intubation
- Extubation
- Cardiopulmonary resuscitation (note: chest compressions and cardioversion/defibrillation are not considered AGMP; however, procedures associated with CPR, such as emergent intubation and manual ventilation are)
- Noninvasive positive-pressure ventilation (e.g., CPAP, BiPAP)
- Manual ventilation
- High-flow oxygen (i.e., AIRVO, Optiflow, not 5L oxygen by nasal prongs)
- Open suctioning (e.g., "deep" insertion for nasopharyngeal or tracheal suctioning, not inclusive of oral suction)
- Bronchoscopy
- Induced sputum (e.g., inhalation of nebulized saline solution to liquify and produce airway secretions, not natural coughing to bring up sputum)
- Large-volume nebulizers for humidity
- Autopsy
- Nasopharyngoscopy
- Oral, pharyngeal, transphenoidal, and airway surgeries (including thoracic surgery and tracheostomy insertion)
- High-frequency oscillation ventilation
- Needle thoracostomy

The AGMPs listed in the table below pose a higher risk to health care providers when performed on patients with COVID-19. When clinical judgement dictates that patients need these procedures, an N95 mask (or equivalent) should be used. Other AGMPs should be avoided. These are summarized in the table below.

AGMPs With Increased Risk*	**AGPMs to Avoid**

• Cardiopulmonary resuscitation (CPR)
  ○ Chest compressions and cardioversion/defibrillation are not considered AGMP; however, procedures associated with CPR, such as emergent intubation and manual ventilation are
  ○ CPR is considered a high-risk procedure and should only be embarked upon where there is a reasonable prospect of success
• Tracheotomy and tracheostomy insertion
	• Sputum induction (diagnostic or therapeutic)
	• Large-volume nebulizers for humidity
	• High-flow oxygen therapy

• High-frequency oscillating ventilation • Bronchoscopy (diagnostic or therapeutic) • Open suctioning (e.g., "deep" insertion for nasopharyngeal or tracheal suctioning not inclusive of oral suctioning) • Noninvasive positive-pressure ventilation (CPAP, BiPAP), including for obstructive sleep apnea	

*Consider other treatments option where available.
AGMP—aerosol generating medical procedures.

The following are NOT considered AGMPs. This list has been adapted from Public Health Ontario's guidance related to aerosol generation from coughs and sneezes (April 14, 2020)[12]:

- Collection of nasopharyngeal or throat swab
- Ventilator circuit disconnect
- Chest compressions (Note: Cardiopulmonary resuscitation is considered a high-risk procedure and should only be embarked upon where there is a reasonable prospect of success)
- Chest-tube removal or insertion (unless in a setting of emergent insertion for ruptured lung/pneumothorax)
- Coughing, expectorated sputum
- Oral suctioning
- Oral hygiene
- Gastroscopy or colonoscopy
- Laparoscopy (gastrointestinal/pelvic)
- Endoscopic retrograde cholangiopancreatography
- Cardiac stress tests
- Caesarian section or vaginal delivery of baby using regional anesthesia
- Any procedure performed using regional anesthesia
- Electroconvulsive therapy
- Transesophageal echocardiogram
- Nasogastric/nasojejunal/gastrostomy/gastrojejunostomy/jejunostomy tube insertion
- Bronchial artery embolization
- Chest physiotherapy (outside of breath stacking)
- Oxygen delivered at less than or equal to 6 litres per minute by nasal prongs and less than or equal to 15 litres per minute by Venturi masks and non-rebreather masks
- Intranasal medication administration, such as naloxone

For additional information, please see Public Health Ontario's Frequently Asked Questions on AGMPs.[13]