

Personal Protective Equipment (PPE) use during the COVID-19 Pandemic

Recommendations on the use and conservation of PPE from Ontario Health

Version History

| Release Date | Source | Change Detail |
|----------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| March 25, 2020 | COVID-19 Response: Personal Protective Equipment (PPE) Committee | Initial release. |
| March 30, 2020 | COVID-19 Response: Personal Protective Equipment (PPE) Committee | List of aerosol-generating medical procedures updated (appendix A) Guidelines for use of Powered Air Purifying Respirators (PAPRs) added Extended-use guidelines for surgical masks in all care settings added New guidance on when to begin droplet/contact precautions in Long Term Care Facilities added New guidance on the use of nebulization for medications for Long Term Care residents provided |
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Personal Protective Equipment (PPE) use during the COVID-19 Pandemic

Included are three evidence-based documents produced to support health care organizations and providers be stewards of personal protective equipment.

- 1. Guidelines for Use of N95 Respirators versus Facemasks for Care of Individuals with Suspected or Confirmed COVID-19
- 2. Guidelines for use of Powered Air Purifying Respirators (PAPRs)
- 3. Guidelines on the Allocation and Use of Procedural / Surgical Masks
- 4. General Strategies for Conserving Personal Protective Equipment (PPE)

Acknowledging the fear and anxiety associated with providing healthcare to persons with suspected or confirmed COVID-19, as well as the need to ensure effective personal protective equipment is available for healthcare providers, we encourage you to familiarize yourself with the evidence and recommendations provided here and communicate to your staff on the appropriate and responsible use of PPE. We also acknowledge the important relationship we have with our stakeholders, associations, organized labour and workers in working together to achieve the sustained safety of our workforce.

It is recognized that as community spread increases, this guidance will need to be updated to ensure both that the best available evidence is applied and that we continue to think about longer-term sustainability of PPE.

It is also recognized that PPE has been used and continues to be used in health care delivery across all sectors, independent of COVID-19-related use. The first step in conservation of PPE in these situations has been cancellation or postponement of all elective activity. For activity that is urgent or emergent (or otherwise must continue), all are encouraged to collaborate with their local clinical and IPAC expertise to devise strategies to further maximize PPE conservation.



Guidelines for use of N95 Respirators Versus Facemasks for Care of Individuals with Suspected or Confirmed COVID-19

The appropriate stewardship of our provincial supply of PPE requires consideration of the safety of health care workers combined with 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 healthcare workers in Ontario who need them, a set of recommendations — based on the best available evidence — is provided here.

While we work with health care providers at the front lines on PPE stewardship, we are also working quickly to stabilize the supply chain for all PPE. We will continue to communicate with you on a regular basis as more information becomes available.

Acknowledging the fear and anxiety associated with providing healthcare to persons with suspected or confirmed COVID-19, and the need to ensure effective personal protective equipment is available for healthcare providers, we encourage you to familiarize yourself with the evidence and recommendations provided here and communicate to your staff on responsible use of appropriate PPE for the specific circumstances.

Inpatient Facilities (acute care hospital and complex continuing care)

- When caring for individuals with suspected or confirmed COVID-19, healthcare workers should follow droplet/contact precautions (surgical/procedure mask, isolation gown, gloves and eye protection).
 - A surgical mask can be used over the course of many patients. Conserve your mask for as long as possible, but once wet, damaged, soiled, or removed (e.g., to eat or drink), you should immediately dispose of the mask. 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 facemask, and if you do, immediately perform hand hygiene.
- Use an N95 respirator during aerosol-generating medical procedures (AGMP) performed on suspected or confirmed COVID-19 patients. For an evidence-based list of AGMPs, see Appendix A adapted from the Toronto Region Hospital Operations Committee IPAC Consensus List of Aerosol-Generating Medical Procedures (AGMP).
- The following aerosol-generating medical procedures should be <u>avoided</u> in suspected or confirmed COVID-19 patients. Where these procedures must occur based on clinical judgment, an N95 respirator should be used:
 - Cardio-pulmonary resuscitation (this is considered a high-risk procedure and should only be embarked upon where there is a reasonable prospect of success)
 - Tracheotomy
 - High frequency oscillating ventilation

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- Bronchoscopy (Diagnostic or Therapeutic)
- Sputum induction (Diagnostic or Therapeutic)
- Open suctioning (e.g. "deep" insertion for nasopharyngeal or tracheal suctioning, not inclusive of oral suction)
- Non-invasive positive pressure ventilation (CPAP, BiPAP)
- CPAP/BiPAP for obstructive sleep apnea
- Large volume nebulizers for humidity
- High flow oxygen therapy
- For all other situations, including screening, entering a patient's room, or providing direct care
 to patients suspected or confirmed to have COVID-19, a surgical mask, isolation gown, gloves
 and eye protection is sufficient. N95 respirators SHOULD NOT be used by providers caring for
 COVID-19 or suspected COVID-19 patients unless the patient is undergoing an aerosolgenerating medical procedure as described above.
- Visitor restriction should be in effect to reduce the need for PPE. Visitors that are permitted
 entry to an inpatient unit under an exception, after screening for symptoms of COVID-19 and
 ensuring there are none (including travel in the last 14 days), may receive allocation of one (1)
 procedure mask and only if the hospital's PPE supply allows. Hand hygiene must be performed
 prior to donning the procedure mask and the visitor instructed that the mask must remain fully
 in place for the duration of the visit.

Primary Care (including walk-in clinics), Outpatient and Ambulatory Settings

- When caring for individuals with suspected or confirmed COVID-19 healthcare workers should follow droplet/contact precautions (surgical/procedure mask, isolation gown, gloves and eye protection).
 - A surgical mask can be used over the course of many patients. Conserve your mask for as long as possible, but once wet, damaged, soiled, or removed (e.g., to eat or drink), you should immediately dispose of the mask. 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 your risk of self-contamination by reducing the number of mask changes. Take care not to touch your facemask, and if you do, immediately perform hand hygiene.
- Patients suspected of, or confirmed to have COVID-19, who are waiting to be seen should don surgical masks and maintain a 2-metre special distance from others.
- Refer to appendix A for a list of evidence-based aerosol generating medical procedures (AGMPs).

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COVID-19 Assessment Centres

- Patients who are waiting to be assessed should don surgical masks and maintain a 2-metre special distance from others.
- Screeners are advised to don a surgical mask if they are less than 2 metres away from those being screened and not behind a partition.
- Workers who are assessing (+/- obtaining nasopharyngeal swabs from) staff and patients with COVID-19 symptoms do not require N-95 respirators.
 - A surgical mask can be used over the course of many patients. Conserve your mask for as long as possible, but once wet, damaged, soiled, or removed (e.g., to eat or drink), you should immediately dispose of the mask. 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 your risk of self-contamination by reducing the number of mask changes. Take care not to touch your facemask, and if you do, immediately perform hand hygiene.
- Refer to appendix A for a list of evidence-based aerosol generating medical procedures (AGMPs).

Long-term Care Facilities

- Once a long-term care facility has confirmed a COVID-19 case, all residents should be cared for using droplet/contact precautions (surgical/procedure mask, isolation gown, gloves and eye protection).
 - A surgical mask can be used over the course of many patients. Conserve your mask for as long as possible, but once wet, damaged, soiled, or removed (e.g., to eat or drink), you should immediately dispose of the mask. 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. In fact, you may reduce your risk of self-contamination by reducing the number of mask changes. It is safe to wear your mask for multiple patient encounters. Take care not to touch your facemask, and if you do, immediately perform hand hygiene.
- Use an N95 respirator during aerosol-generating medical procedures performed on suspected or confirmed COVID-19 patients. For an evidence-based list of aerosol-generating medical procedures, see Appendix A adapted from the Toronto Region Hospital Operations Committee IPAC Consensus List of Aerosol-Generating Medical Procedures (AGMP).
- Note: CPAP and BiPAP (for obstructive sleep apnea) for residents with suspected or confirmed COVID-19 should be avoided if possible. Where these procedures must occur based on clinical judgment, an N95 respirator should be used and patients should be in a private room with the door closed.



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- Note: Nebulization for medications for residents with suspected or confirmed COVID-19 should be avoided if possible. Where these procedures must occur based on clinical judgement, 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 that are permitted
 entry to an inpatient unit under an exception, after screening for symptoms of COVID-19 and
 ensuring there are none, may receive allocation of one (1) procedure mask and only if the
 facility's PPE supply allows. Hand hygiene must be performed prior to donning the procedure
 mask and the visitor instructed that it must remain fully in place for the duration of the visit.

Home and Community Care

- When caring for individuals with suspected or confirmed COVID-19 healthcare workers should follow droplet/contact precautions (surgical/procedure mask, isolation gown, gloves and eye protection).
 - A surgical mask can be used over the course of many patients including while driving between homes. Conserve your mask for as long as possible, but once wet, damaged, soiled, or removed (e.g., to eat or drink), you should immediately dispose of the mask. 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 your risk of self-contamination by reducing the number of mask changes. Take care not to touch your facemask, and if you do, immediately perform hand hygiene.
- Use an N95 respirator during aerosol-generating medical procedures performed on suspected or confirmed COVID-19 patients. For an evidence-based list of aerosol-generating medical procedures, see Appendix A adapted from the Toronto Region Hospital Operations Committee IPAC Consensus List of Aerosol-Generating Medical Procedures (AGMP).
- For all other situations, including screening, entering a patient's home, or providing direct care to patients suspected or confirmed to have COVID-19, a surgical mask, isolation gown, gloves and eye protection is sufficient. N95 respirators are not required.



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Guidelines for use of Powered Air Purifying Respirators (PAPRs)

PAPRs are meant protect the wearer against airborne hazards. Because they are positive pressure devices, they are generally more comfortable for long-term use than N95 respirators. When donned, the user's head and neck are also well protected against ballistic (non-airborne) droplets. When used in a setting where there is a high number of air exchanges (i.e., an operating room, an airborne isolation room), the relative benefit of using a PAPR versus an N95 respirator in protecting against airborne hazards is negligible because airborne particles are rapidly removed by the ventilation and N95 respirators are efficient at preventing the inhalation of airborne-sized particles.

The challenge with using PAPRs for primarily droplet/contact spread pathogens such as SARS CoV-2 is contamination of the PAPR hood and the possible risk of user hands and mucous membrane contamination upon removal. As a predominantly droplet-contact transmitted disease, the use of PAPRs may paradoxically increase the risk of healthcare worker transmission. This is not a concern for the airborne hazards for which the PAPR was created. Similarly, while contamination of the tubing and HEPA-filtration unit warn with the PAPR hood is typically not a concern with airborne hazards, contamination will occur with droplet/contact transmitted pathogens.

Concerns related to possible user contamination upon removal relate to:

- Bulkiness of the hood.
- Lack of formal training and practice in removing the hood.
- Lack of validated procedures to attempt hood decontamination prior to removal.
- Requirement for repeated donning and doffing of the hood if these are meant to replace an N95 respirator.
- Requirement to handle and decontaminate the accompanying hood and HEPA filtration unit.

For these reasons PAPRs are not generally recommended for the care of COVID-19 patients. In settings where the equipment is donned and doffed once per shift i.e. worn for an entire shift, PAPRs may play a role, provided that the concerns listed above are appropriately addressed.



Guidelines on the Allocation and Use of Procedural / Surgical masks by Healthcare Providers

Mask use for COVID-19 and suspected COVID-19 patients

Health care providers who are caring for COVID-19 and suspected COVID-19 patients should don
a surgical/procedural mask, an isolation gown, protective eyewear and gloves. Masks should be
substituted for N-95 respirators for the specific indications listed in the previous section.

When should we escalate mask use for other or all patient encounters?

- The assessment of risk posed to health care workers who are caring for the general public who
 have not been diagnosed with COVID-19 or suspected COVID-19 can be challenging as the risk
 varies based on care setting, type of care being 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 COVID-19 patients
 presenting with atypical symptoms, allowing them to pass through screening undetected.
- In some areas of the province where community spread is felt to be likely, some organizations, particularly hospitals, have taken the decision to provide two (2) masks per shift to all health care workers who are patient-facing. This action has been taken to show an abundance of caution in areas where the risk to health care workers posed by the general patient population is felt to be elevated. Conserve your mask for as long as possible, but once wet, damaged, soiled, or removed (e.g., to eat or drink), you should immediately dispose of the mask. In some circumstances more than more than 2 masks/shift may be necessary.
- Other areas have not yet seen community spread and are comfortable maintaining a
 recommendation for health care workers to only use masks when treating COVID-19 or
 suspected COVID-19 patients. It is acknowledged that not all communities have implemented
 broad testing.
- This kind of risk stratification is necessary and appropriate if we are to protect our health care workforce while at the same time conserving the supply of masks. Using masks injudiciously in low-risk environments could contribute to an undersupply later when risk everywhere is higher.
- Accordingly, a thoughtful, risk-based approach to mask allocation is recommended. It is
 recognized that, at any given moment in time, this will result in different mask allocation
 protocols across organizations in all sectors in health care. It is also recognized that individual
 organizations will need to change or escalate their allocation policies as risks change.
 - All surgical masks in the organization should be immediately secured (treated like narcotic supply)
 - 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 allocation based on risk assessment with Phase 1 representing mask use for the highest risk scenarios, and Phase 4 representing the lowest risk scenarios.

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- One potential risk stratification scheme (from acute care, to serve as an example):
 - PHASE 1: Unplanned urgent and emergent care (e.g. EDs staff)
 - PHASE 2: Planned urgent or emergent care (e.g. dialysis, endoscopy, labour and delivery)
 - PHASE 3: All remaining clinical areas and inpatient units
 - PHASE 4: Non-clinical spaces
- Organizations in all care sectors should escalate through phases of mask allocation 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 restricted masks, these risk categories allow organizations to roll back mask allocation in a rational fashion.

General guidelines when using surgical/procedural masks:

- A surgical mask can be used over the course of many patients. Conserve your mask for as long as possible, but once wet, damaged, soiled, or removed, you should immediately dispose of the mask. 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 your risk of self-contamination by reducing the number of mask changes. Take care not to touch your facemask, and if you do, immediately perform hand hygiene.
- Leave the patient care area to remove the facemask and perform hand hygiene afterwards.
- Take care not to touch your facemask, and if you do perform hand hygiene.

This guidance is current as of the release date noted. It will be updated from time to time. In regions where there is no community spread, this guidance will be most applicable. Regions that are currently experiencing large scale community spread may alter this approach to meet their current needs based on local epidemiology and infection control advice.



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Strategies for Conserving Personal Protective Equipment (PPE)

1. Assess your existing supply of N95 respirators and other PPE

- a) Gather and secure supplies from across your organization, including:
 - i. From visitor and public areas.
 - ii. Clinics or surgical areas not in use.

2. Centralize distribution of N95 respirators, manage them as you would narcotics

a) Take stock of supplies, steward judiciously and track usage. Distribute only according to guidelines issued by Ontario Health.

3. Where appropriate, limit number of patients going to hospital, outpatient and homecare settings for non-urgent care

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

4. Minimize contact with patients suspected or confirmed to have COVID-19

- a) Restrict healthcare workers entering rooms to only those involved in direct care (e.g. no learners).
- b) Assess what other staff/allied health professionals could be restricted. Minimize inpatient consults. Consider virtual inpatient consult options.
- c) Maximize trans-disciplinary (e.g. caregiver who has to enter the room anyway for other reason can deliver a food tray).
- d) Caregivers should cluster their tasks to reduce the number of times they need to enter the room.
- e) 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 going to a dial flow non pump system to reduce the number of alarms.

5. Alter care processes to minimize possible COVID-19 patient contact to as few providers as possible, with as little time in the hospital as possible.

- a) For example, for low risk patients arriving to the emergency room, consider taking vitals at triage and history, then sending patients back to their cars to have a phone consult with the doctor, with re-entry only if diagnosis is not clear or more investigation is needed.
- 6. Cohort patients with confirmed COVID-19 in the same room and on the same unit.
- 7. Assign a specialized team to care for a cohort of patients with suspect or confirmed COVID-19
- 8. Severely limit visitors to rooms/areas with patients suspected or confirmed to have COVID-19

9. Remove droplet/contact precautions as quickly as appropriately possible

- a) COVID-19 results may be available on Connecting Ontario or OLIS prior to our laboratories receiving notification.
- b) Contact infection control in a timely manner and prior to discontinuing precautions.

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10. N95 Respirator Testing

- a) Use N95 respirators beyond the manufacturer-designated shelf life for fit testing if necessary in the context of inadequate supply of non-expired product.
- b) Limit the use of N95 respirators during mask fit testing to key staff.
- c) Use your testing mask for patient care.

11. N95 Respirator Education

a) Offer education on the indications for use of N95 respirators in the care of patients with suspect or confirmed COVID-19 (see Guidelines for Use of N95 Respirators for Care of Individuals with Suspected or Confirmed COVID-19 in the previous section).

12. Audit the use of PPE in your organization

 a) Either conduct leadership rounds to deliver key messages and address variability observed in practice, or charge managers and directors with enforcing and reporting on appropriate PPE use on each unit.

13. Extend use of facemasks by wearing the same facemask for repeated close contact encounters with several patients without removing in between

- a) The facemask should be removed and discarded if soiled, damaged or hard to breathe through.
- b) Take care not to touch your facemask, and if you do perform hand hygiene.
- c) Leave the patient care area to remove the facemask and perform hand hygiene afterwards.
- d) Once the facemask has been removed dispose of in a bin for possible reprocessing.
- 14. Extended use of eye protection by wearing the same eye protection for repeated encounters with different patients without removing in between.
- 15. Extend the use of isolation gowns (disposable or cloth) by wearing the same gown for repeated encounters with different patients with COVID-19 without removing in between. Re-use of cloth isolation gowns (without washing in between). Remove after last patient encounter and do not reuse without reprocessing.

16. Reprocess PPE

- a) Collect used masks for potential future reprocessing; early work suggests N95 masks could be irradiated and potentially used weeks later (current thought is that virus can survive on surfaces for 3 days) (Note: not recommended by 3M).
- b) Consider moving from visors to goggles which can be cleaned.
- c) Strongly consider moving to washable gowns. One hospital tested washing blue isolation gowns in-house and reported they laundered well.

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17. Prepare for last-resort scenario:

- a) Use of respirators approved under standards used in <u>other countries</u> that are similar to NIOSH-approved respirators (e.g.: N100, P100, R100, N99, P99, R99, N95, P95, R95).
- b) Limited re-use of N95 respirators for patients with COVID-19 (implemented according the <u>CDC guidance</u>).
- c) Use of N95 respirators beyond the manufacturer-designated shelf life for delivering patient care it is important to ensure a seal check is completed prior to providing patient care.
- d) Save expired N95 masks for last resort back-up or low-risk settings.
- e) Consider use of non-approved NIOSH masks for low-risk settings; Use of respirators from other countries (that are similar to NIOSH approved N95 respirators).



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Appendix A:

Aerosol-Generating Medical Procedures, adapted from the Toronto Region Hospital Operations Committee IPAC Consensus List of Aerosol-Generating Medical Procedures (AGMP)

Aerosol-Generating Medical Procedures

- Intubation
- Extubation
- Cardio Pulmonary Resuscitation (NB chest compressions and cardioversion/defibrillation are not considered AGMP; however, procedures associated with CPR, such as emergent intubation and manual ventilation are AGMP)
- Non-invasive ventilation (e.g., CPAP, BiPAP) (suggest avoid where possible)
- Manual ventilation
- High-flow oxygen (i.e., AIRVO, Optiflow, not 5L oxygen by nasal prongs) (suggest avoid where possible)
- Open suctioning (e.g. "deep" insertion for naso-pharyngeal or tracheal suctioning, not inclusive of oral suction) (suggest avoid where possible)
- Bronchoscopy (suggest avoid where possible)
- Induced sputum (e.g. inhalation of nebulized saline solution to liquify and produce airway secretions, not natural coughing to bring up sputum) (suggest avoid where possible)
- Large volume nebulizers for humidity (suggest avoid where possible)
- Autopsy
- Nasopharyngoscopy
- Oral, pharyngeal, transphenoidal and airway surgeries (including thoracic surgery and tracheostomy insertion) (tracheostomy should be avoided if possible).
- High frequency oscillation ventilation (suggest avoid where possible)
- Needle thoracostomy

Not Considered Aerosol-Generating Medical Procedures

- Collection of nasopharyngeal or throat swab
- Ventilator circuit disconnect
- Chest tube removal
- Coughing
- Oral suctioning
- Oral hygiene
- Gastroscopy
- ERCP
- Colonoscopy
- Cardiac stress tests
- Caesarian section or vaginal delivery of baby done with epidural
- Any procedure done with regional anesthesia
- Electroconvulsive Therapy (ECT)
- Transesophageal Echocardiogram (TEE)
- NG tube insertion
- Chest physiotherapy



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Toronto Region Hospital Operations Committee IPAC Consensus List of Aerosol-Generating Medical Procedures (AGMP) (version date: March 25, 2020).



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

| Name | Title(s) and Institutions(s) |
|---------------------------|--------------------------------------------------------------------------------|
| Dr Zain Chagla, MSc MD | Co-Medical Director of Infection Control, St. Joseph's Healthcare Hamilton and |
| FRCPC | Niagara Health System |
| | Associate Professor, Department of Medicine, McMaster University |
| Connie Clerici, RN | Executive Chair, Closing the Gap Healthcare |
| BHsc(N) | Adjunct Lecturer, IHPME, University of Toronto |
| Dr Jennifer Everson, | Vice-President, Clinical, Ontario Health (West) |
| BscN MD CCFP FCFP | Associate Professor McMaster University, Faculty of Medicine, Department of |
| | Family Medicine |
| Dr Michael Gardam, | Chief of Staff, Humber River Hospital |
| MSc, MD, CM, FRCPC | Associate Professor, Department of Medicine, University of Toronto |
| Derek McNally, RN MM | Executive VP Clinical Services & Chief Nursing Executive, Niagara Health |
| | Adjunct Professor, Department of Nursing, Brock University |
| Dr Howard Ovens, MD, | Chief Medical Strategy Officer, Sinai Health System |
| FCFP(EM) | Professor, Dept. of Family and Comm. Med., University of Toronto and Sr. |
| | Fellow, IHPME |
| | Ontario Provincial Lead for Emergency Medicine |
| Dr Paul Preston, MD | Vice President, Clinical, Ontario Health (North) |
| CCFP CCPE CHE | |
| Dr. Amit Shah, MD | Emergency Department Lead, South West Region |
| CCFP(EM) FCFP | Emergency Physician, London Health Sciences Centre/St. Thomas-Elgin General |
| | Hospital |
| | Associate Professor, Division of Emergency Medicine, Western University |
| Dr Chris Simpson (chair), | Vice-Dean (Clinical), School of Medicine, Queen's University |
| BSc, MD, FRCPC, FACC, | Medical Director, Southeastern Ontario Academic Medical Organization |
| FHRS, FCCS, FCAHS | Professor, Division of Cardiology, Queen's University |
| | Affiliate Scientist, Institute for Clinical Evaluative Sciences |
| Dr Tamara Wallington, | Program Chief and Medical Director, Trillium Health Partners |
| MD FRCPC | Academic Lead, Family Medicine Teaching Unit FMTU |

