COVID 19 Operational and Clinical Guidelines

Highlighted Updates

Updates contained in this version include

- Information on the reintroduction of non-invasive modes of ventilatory support to frontline operations
- Respiratory protection conservation

Purpose

To provide operational and clinical guidelines for paramedics and operational guidance for pilots and AMEs. The guiding principle of this document is to give guidance to protect frontline staff who will be involved in the Ornge COVID-19 response and to provide information to paramedics that will aid them in the treatment of these unique patients.

While extensive, this document provides you with essential information. It should be reviewed in detail, and fully understood.

Sections specific to fixed-wing and rotor-wing pilots as well as AME's are included in the final sections of this document.

Except in instances where staff shall undertake specific duties or tasks, this document serves as a guideline. Paramedics, pilots and AME's may face situations whereby the information contained in this document may not be applicable. Staff are encouraged to consider options, use professional judgement and to reach out to their respective managers or TMP's for guidance specific to their scenario.

Concept of Operation

The transportation and movement of patients with COVID 19 require additional considerations related to the distance of transport, engineering control limitations, and specific PPE recommendations. Staff need to consider how long they are in PPE for each phase of patient care, which may include Patient Preparation and Packaging, Patient Transport and Transfer of Care. In these phases, crew members will have to consider the donning of PPE, the provision of patient care activities and then periods of rest where they are not in PPE.

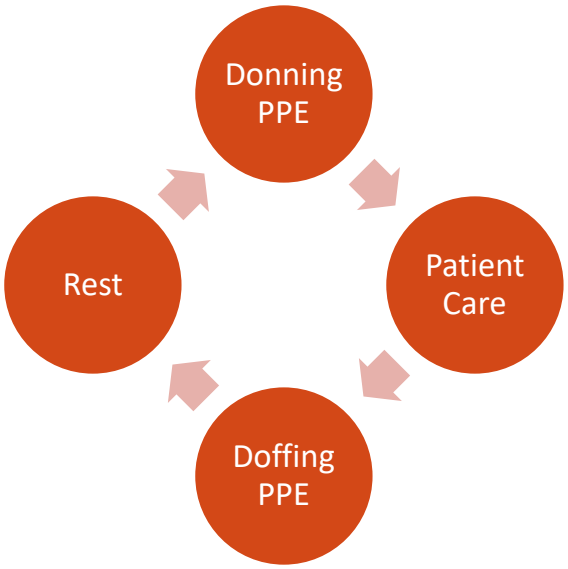

Figure 1 work-rest cycle

Team members directly involved in patient care shall don personal protective equipment. Still, it is recognized that there are limitations as to how long an individual can safely and reliably work in this PPE. The ambient temperature and the workload of caring for a dynamic patient will impact the time an individual can spend in PPE. There is also additional complexity because, unlike working in a hospital within a negative pressure isolation room with an antechamber, there may be delays in getting crew members out of their PPE, and an effective and safe area needs to be set up. Therefore, planning and human resource requirements are more complex (1).

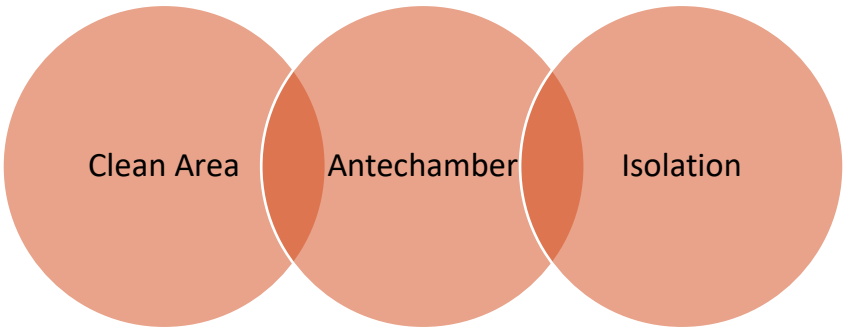

Figure 2 Zones of Work

In an ideal environment, paramedics would be afforded a clean area to rest, an antechamber to don and doff PPE and a specific isolation area where patient care takes place. The realities of transport medicine make maintaining this chain all but impossible. As transport specialists, paramedics at Ornge must optimize and maximize the use of their PPE where possible and practice strict adherence to donning and doffing procedures in unconventional settings.

Look out for your partner and avoid complacency.

Work practice controls

Work practice controls are procedures that affect how tasks and operations are to be performed in all stages of the workflow including: notification; intake; screening; evaluation; treatment; movement and transfer.

Pre-deployment Planning

- Clean set up of PPE in the cab of the truck for the Driver. Prepositioned in case the vehicle has to pull over, and the Driver has to don PPE to assist with patient care.
- Clear garbage bags & Ziplock bags for Conterra bag & gear protection during calls.
- PPE biohazard bag, required cleaning supplies, and ABHR in the back corner of the truck by the IABP bracket.
- Two clean sheets/barrier blankets/disposable linen on the stretcher, remove all non-essential equipment from stretcher such as:
    - Blue Zoll Pockets
    - Zoll Cable/Bundle Shroud
- Ensure the doffing checklist is readily accessible near the rear cabin door for doffing at the receiving facility.

Enroute to Suspected or Confirmed COVID-19 Call

- Communications Officers will collect and document from the sending and receiving facilities information regarding ***access***, ***egress and route security***. En route to the sending facility, the Communications Officer will update the crew regarding information provided as required.
- TMP will contact sending facility
    - Confirm medications running and any PRN meds
    - Pre-patch with crew
    - One paramedic can prepare medications en route to call
- Use Ziplock bags for essential patient care items as you can wipe down zip lock bags with approved cleaning materials. ***For example, all prepared push medications, flushes and replacement infusion bags can be placed in a Ziplock bag. Doing so avoids having to access medication bags or drawers. Prepare as much as you think you'll need to complete the call to minimize the need to enter cabinets, drawers or bags unnecessarily. Keep vials available in ZipLock bag but do not mix. Unmixed medication vials can be decontaminated with approved cleaning agents upon completion of the call. Conservation of all consumable items is essential at this critical time.***

Personal Protective Equipment

- Fit tested N95 or equivalent/higher respirator (N,R,P/95,97,100)
- 3M 6500QL Half Face Mask Respirator
- Fluid resistant gown
- Nitrile gloves and reusable/washable gloves for donning over nitrile gloves in cold weather
- Eye protection (safety glasses OR goggles)
- Face Shield (For AGMP – can be removed following the procedure)
- Bouffant Head Cover (Optional for anticipated AGMP or for over touque)

Preparation & Donning of PPE

- Before entering the patient care area, attend to personal needs and hydrate
- Review plan of access and care with partner
- Prepare to don PPE outside of the patients' room or designated donning area
- Remove watches, jewelry, and dangling items that could interfere with the integrity of PPE
- Secure eyeglasses with tape or tie
- Your partner or a trained observer with checklist should be present
- Indications of (Driver) or (Attendant) are to be used when Ornge CCLA is the primary mode of transportation
- Follow the PPE flow chart for your asset type to ensure the appropriate PPE is donned for each pahse of transport of PPE
- ***Paramedics shall Don and Doff as per the Ornge Donning and Doffing Checklist***

When completing procedures that have high risk for gross contamination (ie. Intubation, ventilator disconnect etc) crew members can wear an additional pair of gloves that can then be removed after completion of the procedure.

Patient Preparation & Packaging – Sending Facility

- All Paramedic Response bags are kept outside of the patient room.
- If the RT is not going to be in the patient care area for change over, **Paramedic 1 (Driver)** should discuss the RT vent settings as well as how to turn off the hospital ventilator before entering the room.
- **Paramedic 1 (Driver)** should complete any IDDC if not already done so.
- **Paramedic 1 (Driver)** will enter the room to work with sending facility staff to prepare and package the patient. **Paramedic 1 (Driver)** will work with hospital staff to switch over medications and get patient onto the stretcher.
    - **Paramedic 1 (Driver)** should bring stretcher into the room with them and position stretcher beside the patient bed in preparation for doing a sheet transfer over.
- Carefully remove any dirty linen

- Place a clean sheet on top of the patient to decrease the potential for viral load transfer.
- Conduct Patient Assessment
    - Paramedics may omit lung auscultation unless questions of ETT placement present themselves.
- Place monitoring equipment (Zoll) on patient
- Remove hospital monitoring equipment
- Switch over any infusion medications
- If the patient is not intubated, they must be issued a surgical mask to wear. If the patient is on a nasal cannula, the surgical mask can be placed over the top of the cannula. In patients requiring higher levels of supplemental oxygen, consider the use of a HiOX mask.
- If the patient is mechanically ventilated ensure that they are adequately sedated and paralyzed before switching ventilator over as well as the following preparations:
    1. Prepare a ventilator circuit by taping all connections longitudinally EXCEPT the junction of the circuit to the HME.
    2. Program ventilator settings ahead of time, ideally outside the patient room and turn LTV 1200 ventilator off.
    3. Clamp endotracheal tube at the **END OF EXHALATION**.
    4. Turn off the hospital ventilator.
    5. Attach the LTV circuit on to the patient,
    6. Turn on the ventilator and select **"SAME PATIENT."**
    7. Connect the ventilator circuit to the endotracheal tube.
    8. Unclamp the endotracheal tube and verify ventilation has commenced.
    9. Unless visibly soiled, leave hospital HME in-situ, changing only the ventilator circuit.

FOLLOWING THESE STEPS WILL LIMIT THE CHANCE OF AEROSOLIZATION WITHIN THE ROOM.

- Carefully remove the protective top blanket, which may be soiled after the ventilator switch over.
- Replace with a clean protective sheet and attempt to "cocoon" patient. Leave IV Push medication port accessible. Priming a 0.9% Normal Saline line to use as a medication administration line is recommended.
- **Paramedic 2 (Attendant)** enters the room in clean PPE to assist in transferring the patient onto the stretcher.
- Stretcher straps are secured over the top of the clean sheet.
- Stretcher arms/wings and frame should now be wiped using approved disinfection agents.
- If paramedics have doubled gloved, outer gloves can be removed now before exiting the room.
- Exit isolation room according to agreed **egress route** previously established with communication through the operations manager, paramedic crew and sending facility.

- Egress route may be accomplished by either a security escort or other hospital staff member ensures that appropriate distancing (1 meter) is maintained. At the same time, the patient is being moved through the hospital out to ambulance or aircraft. TAKE YOUR TIME.

Note: *Consider returning bags back to the back of the ambulance. Place Conterra bags in clear plastic garbage bags before departure. To prevent any cross-contamination, you do not want to enter the bags unless absolutely required. Anticipate any resources you might need for the transport and prep ahead of time. Prepped medications can be placed in clear plastic zip-lock bags. Ziplock bags can be wiped down with approved cleaning agents.*

Transport Phase

1. **Paramedic 2 (Attendant),** who is considered "cleaner," opens the door to ambulance.
2. The patient is loaded into the ambulance
3. **Paramedic 2 (Attendant)** enters back of the truck
4. **Paramedic 1 (Driver)** doffs PPE following the PPE doffing checklist, which is placed on the inside door of the ambulance. PPE is placed in biohazard bags in the back corner of the truck by balloon pump bracket.

Note: With the patient secured in the ambulance, Paramedic 1 (Driver) is greater than 1 m distance from the patient, which follows recommended guidelines of distance.

5. **Paramedic 2 (Attendant)** closes the doors of the ambulance.
6. **Ventilation Setting**
    - When transporting in the CCLA the medical cabin exhaust fan should be set to the maximum setting
    - When transporting the AW139 the cabin fan should be set to high and COND/HEATER should NOT be set to recycle.
7. Paramedic 1 (Driver) enters the Driver cab, turns on the vehicle and turns the fan on to the maximum setting. ENSURE NOT SET TO RECIRCULATE.
8. For CCLA vehicles, the plastic window slide between the front and patient compartment is to be kept closed for the transport. For all other vehicles, the current barriers should be utilized to minimize cross-contamination of compartments
9. In CCLA vehicles, the intercom is used for communication between Paramedic 1 & Paramedic 2.

Note: A clean set of PPE is to be kept in the Driver compartment so that Paramedic 1 can re-don PPE if required during the transport and at the receiving facility.

Receiving Facility

1. Driver dons PPE
    i. If previously utilizing reusable half face mask – the paramedic shall done an fit tested N-95 for transfer into hospital
2. Confirm agreed **access route** previously established with communication through the operations manager, paramedic crew and receiving facility. **Access route** may be accomplished by either a security escort or other hospital staff member to ensure that appropriate distancing (1 m) is maintained while the patient is moved through the hospital to the appropriate department (i.e. ICU).
3. Confirm stretcher/equipment decontamination location in the receiving department.
4. The extenuating shortage of PPE supply requires paramedics exercise stewardship of our supplies; the following are some guidelines to help maximize our supply:

    i. If personal needs allow, remain in PPE until the completion of decontamination. Paramedics may request to return to their vehicle via the same ingress route. Paramedic 1 (Driver) can take on the task of medical cabin decontamination. Paramedic 2 (Attendant) shall take on the responsibility of stretcher and equipment decontamination. Paramedic 2 (Attendant) may elect to doff PPE and have Paramedic 1 do both depending on the length of time in PPE. TAKE CARE OF EACH OTHER.

    ii. Hospital staff may be resistant to allow travel through the hospital in "contaminated" PPE. Kindly express your intention to return directly to your vehicle via your ingress route in the interest of PPE conservation.

    iii. Use excellent communication and best judgement to balance receiving facility needs and PPE conservation. Kind words and professionalism go a long way.

PPE Conservation

Observing PPE conservation direction is essential for the continued protection of staff. Ornge takes PPE conservation very seriously. All staff are expected to learn, understand and follow instructions related to PPE conservation without exception. Any questions about PPE conservation or reprocessing should be forwarded to the On-Call Base Manager, your Base Manager, Occupational Health & Safety or Paramedic Standards.

Respiratory Protection

Conventional N95 respirators and the 3M 6500QL (HFM) are essential parts of the respiratory protection program. Paramedics must make every reasonable attempt to incorporate the HFM into their practice to conserve N95's for those sitautions that require their use and are not condusive to the HFM.

Gloves

Gloves should be disposed of in biohazard receptacles after use.

High-Risk gloves should be reserved for:

- AGMP's
- Those individuals who have longer arms and require a more extended cuff to protect their skin

High-risk gloves should not be used for routine care and transfer.

Gowns

Disposable gowns should be disposed of in biohazard receptacles after use.

Ornge is in the process of obtaining reusable gowns that will be able to be reprocessed.

Faceshield

Disposable face shields should only be donned for AGPs.

Reusable face shields shall be placed in clear puncture proof bags and returned to your base for reprocessing according to OHS guidelines provided on the LMS.

Protective Eyeware/Goggles

All protective eyewear and goggles shall be placed in clear puncture proof bags and returned to your base for reprocessing according to OHS guidelines provided on the LMS.

Clear Puncture Proof Bag

Post transport

Paramedics should follow their organizations' post-exposure screening as outlined in their Occupational Health and Safety policies

Paramedic Sequencing – Work Rest Cycle

As an example of sequencing assuming that the crew would be kept in PPE for a maximum of 4 hours, the following is an example of how a patient would be moved over a distance of approximately 100 km or 1 hour by land using one ambulance and a team of 2 Paramedics.

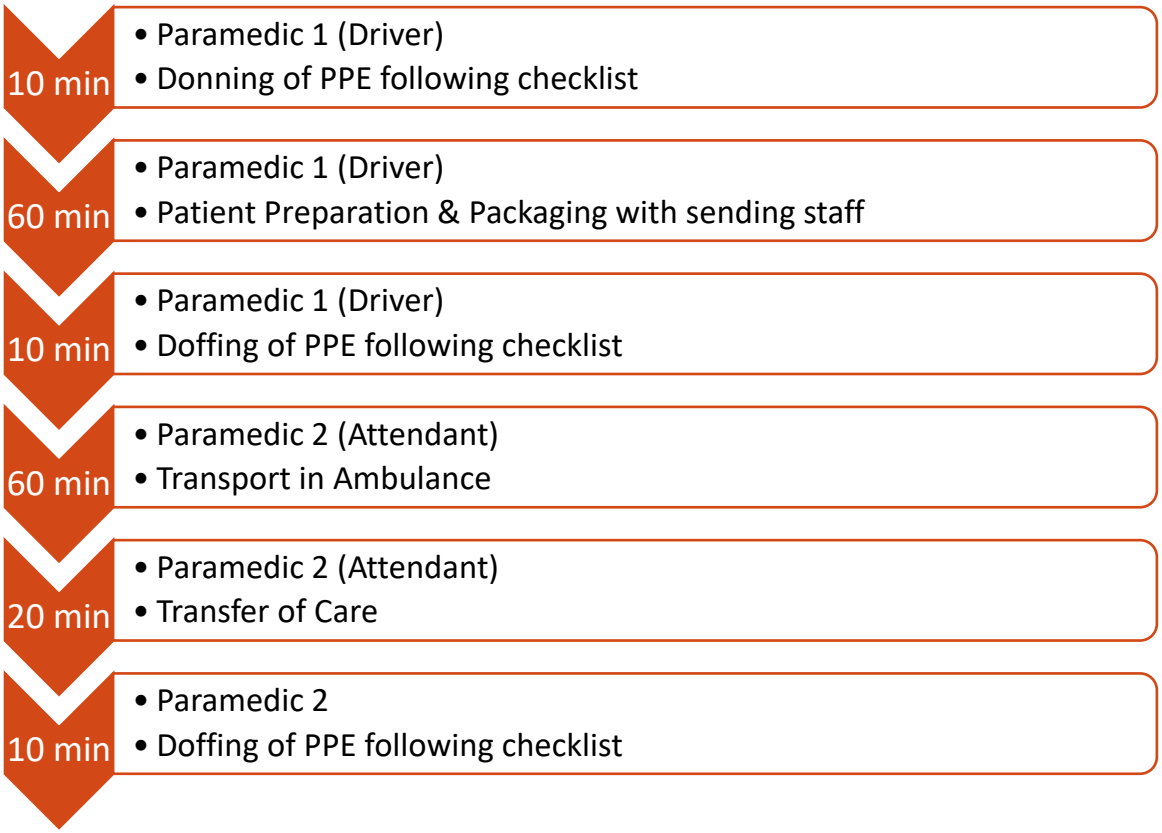

Figure 3 Crew Sequencing Example (Land)

It is essential to factor in safety in the operational planning of these types of calls. For example, it could take longer than 60 minutes to prepare and package a patient if stabilization is required. It could take additional time to clean and wipe down equipment before leaving the isolation room. Traffic and weather could be factors that increase the length of the transport time. So it is essential to build a safety margin while planning transports.

Clinical Guidance

General Principles

- Pre-patch with the Ornge TMP to discuss treatment considerations. Patching while in PPE is challenging
- Prepare adequate analgesia and sedation infusions for the duration of the trip with a sufficient margin for time delays
- Prepare Rocuronium syringes with 100mg each to ensure the maintenance of paralysis throughout transport
- Have required medication amounts pre-drawn and mixed – any additional/extra medication should be removed from the medication bag but left in the vial/ampule so that it can be put back into circulation if not utilized

Aerosol Generating Medical Procedures (AGMPs)

Aerosol Generating Medical Procedures (AGMPs)
Non-invasive or positive pressure ventilation with inadequate seal
High Flow Nasal Cannula oxygenation (HFNC)
Delivery of nebulized or atomized medications via simple face mask
Cardiac Arrest Management – Note PHO does not consider CPR as an AGMP but the procedures associated with it including intubation, BVM are considered AGMPs
Tracheal extubation
Tracheal/endotracheal tube/tracheostomy tube suctioning without a closed system

Procedures Vulnerable to Aerosol Generation
Laryngoscopy
Tracheal Intubation
SGA placement
Front of Neck Access(FONA)/Cricothyrotomy
Needle Decompression of pneumothorax

Laryngoscopy, tracheal intubation and supraglottic airway placement will only cause aerosolisation if coughing is precipitated or another aerosol generating procedure is performed. FONA may generate aerosol if the patient receives concurrent positive pressure ventilation from above. Many of these precipitating events can therefore be prevented by adequate neuromuscular blockade and avoiding concurrent aerosol generating procedures, such that, if performed properly and without complications, they may not be aerosol generating.[1]

[1] Brewster, D.J., Chrimes, N.C. Thy, BT. D. et. Al. (2020). Consensus statement: Safe Airway Society principles of airway management and tracheal intubation specific to the COVID-19 adult patient group. *The Medical Journal of Australia*. Advanced online publication. https://www.mja.com.au/journal/2020/consensus-statement-safe-airway-society-principles-airway-management-and-tracheal

Oxygen Therapy

- Attempt to maintain Sats 90-96%
- Nasal Prongs up to 6LPM can be maintained under patient mask
- If higher O2 requirements utilize HiOX mask and discuss need for intubation
- Avoid use of nebulized medications

HFNC and NIV Ventilation

- Transportation of patients on CPAP and BIPAP is authorized for use for all patients in all system assets.
- High flow nasal cannula (HFNC) oxygen therapy via the AirVo2 remains restricted to CCLA/CCTU assets and is not available for use in aircraft until the required aviation testing for securing and utilization during critical flight phases is completed..
- Transport HFNC patients can be complete if the patient meets the following requirements:
    - If the patient has been newly started on HFNC an assessment of improvement and stability should be completed and discussed with the TMP prior to departure.
    - If the patient patient has been on HFNC for more than 2h before transport the crew should calculate a ROX index to assess improvement/clinical stability
    - ROX index is calculated to be > 4.88
        - ROX Index (Sa02/Fi02) / RR
        - ROX An Index Combining Respiratory Rate and Oxygenation to Predict Outcome of Nasal High-Flow Therapy
    - Risk/Benefit review of intubation vs. transport with HFNC favours HFNC, i.e. significant morbidity with intubation
    - Trial all patients on an alternate form of oxygen delivery (NRB, NP, BiPAP) prior to transport, to ensure that the patient can tolerate HFNC interuptions during transition phases as well as indentify an alternate means of oxygenation if the battery pack is not available for phases of transport without power
- A well fitting surgical mask should be placed on the patient over the HFNC before transport

Intubation & Advanced Airway Management

Intubation is a high-risk AGMP procedure and consultation with the TMP and sending staff is required.

Before intubation, receiving facilities should be contacted to ensure the patient can be accommodated.

- Most experienced intubator is required to complete the intubation
- If Ornge crew required to intubate, utilize most experienced intubator using Ornge standardized approach
- Intubated in a Negative Pressure Room when available with appropriate PPE
- Limit staff in the room to 3 if possible – additional supporting team members outside room
- Gather equipment, most likely to be used during the intubation (according to Ornge Intubation Checklist) Airway Bag, should be left outside of the room and accessible by a "clean" assistant who can pass rescue devices if required.
- Ensure adequate pre-oxygenation - two hand BVM seal and O2 for 5 minutes to limit aerosolization
- No ventilation (if required – use small tidal volumes)
- Utilize drop sheet in-room or airway ready bag
- RSI – no ventilation before intubation unless refractory hypoxemia
- **Ensure induction agents and muscle relaxation agents have taken full effect**
- Paramedics shall utilize video laryngoscope (CMAC) device
- Immediately inflate ETT cuff before PPV
- Close circuit with filter

If unable to intubate, ***do not*** BVM ventilate patient - proceed early to iGel insertion and ventilation through iGel with a filter attached

- Place soiled equipment in a sealed biohazard bag
- Utilize post-intubation analgosedation and paralysis

Ventilation

- Tape joints in vent circuit to prevent inadvertent disconnect
    i. Joins should be taped longitudinally along the circuit such that the at least some part of the join remains visible
    ii. The join between the HME filter and the vent circuit should be left un-taped as a single point of weakness and easy disconnect for BVM
        - If an accidental disconnect occurs at this site, both sides of the circuit are protected from potential aerosolized spread
- Ventilate utilizing lung protective strategies and ARDS net parameters
    i. Patients often require higher PEEP's but not higher driving pressures
    ii. Target Plateau Pressures < 30 cm H20
- Target SP02 88-92%
- Permissive hypercapnia is acceptable
- Utilize adequate (deep) sedation along with intermittent neuromuscular blocking agents (NMBA) to facilitate lung-protective ventilation

- Ensure adequate sedation and paralysis before any ventilator disconnect
- Clamp tube at end-expiration before any disconnect
- Ensure ventilator is off before disconnect
- Cover end of the used ventilator circuit
- Utilize inline catheters only for airway suctioning

Simulated Patients

Cardiac Arrest

Note: Some elements below pertain specifically to CCLA deployment. In FW and RW, paramedics should abide by the principles of good CRM.

Intubated patient

- Patient Care paramedic – turn off vent - disconnect the patient from the vent – close circuit with BVM and filter
- Patient Care paramedic begins CPR +/- electrical modalities until driving paramedic appropriately don's PPE and enters the rear cabin
- Continue with ACLS management - Patch once situation is stabilized – ROSC or sustained PEA/asystole

Non-intubated patient

- Patient Care paramedic – begin CPR +/- electrical modalities
- Leave passive O2 with NP under mask on the patient
- NO BVM Ventilation
- An ETT or iGel SGA with HME filter should be inserted as soon as feasible
    - Should be attempted as a crash intubation utilizing CMAC - close ventilation circuit with BVM and filter
- Consider withholding chest compressions during insertion of ETT/SGA.
- For CCLA - Once driving paramedic appropriately donned and enters the rear cabin the most experienced intubator should set up for intubation once deemed safe

- The other paramedic continues CPR and electrical modalities
- Continue with ACLS management - Patch once situation is stabilized – ROSC or sustained PEA/asystole

Intubated Prone Patient

- Electrical therapy for malignant and lethal rhythms
- NO CPR

Hemodynamic support

- Patients rarely have a septic shock picture (<5%)
- Limit volume resuscitation to avoid worsening of potential ARDS picture
- Target MAPs 60-65
- Utilize vasopressors in fluid refractory shock – NE is considered the first-line agent
- Consider the addition of vasopressin as opposed to continued norepinephrine titration

Prone Positioning

See specific Prone positioning Guidance Document for the transport of patients in the prone positionAviation Staff Guidance

Aviation PPE recommendations

RW Pilots PPE

When transporting COVID-19 suspected/confirmed patients, RW pilots will be required to don a N95 Respirator for respiratory protection.

Pilots shall don a surgical mask for all transport phases of patients who are not suspected or confirmed COVID-19 cases

FW Pilots PPE

When transporting COVID-19 suspected/confirmed patients, during patient loading, FW pilots will be required to don an N95 mask for respiratory protection along with standard droplet contact precautions (gown, gloves, goggles) as per the standard donning protocol. Once the patient has been loaded into the aircraft and no further direct patient contact is anticipated, the pilots shall doff their PPE except for their N95 respirator as per the Ornge doffing protocol. The pilots will wear their N95 respirators for the duration of transport. Once at the destination, the FW pilots will don additional gown, gloves and eye protection to aid in unloading the patient.

Pilots shall don a surgical mask for all transport phases patients who are not suspected or confirmed COVID-19 cases.

Expired or non-fit tested N95's may be used in place of a surgical mask. If none of these options exist, an N95 may be used as a last resort. Each of these resources is precious and diligent stewardship is essential for everyone.

Aircraft Matinence Engineers

Aircraft with signs indicating Out of Service for Decontamination posted should not be entered.

If you see a sign that indicates a contaminated aircraft or if you are unsure about the decontamination status of an aircraft, please approach a paramedic or your Base Manager for advice on how to proceed.

Please refer to the Ornge Infection Prevention and Control Resource Manual for further information and guidance regarding best practices related to infection prevention and control.

Conclusion

The majority of COVID-19 patients are not "time-sensitive". Take your time, be deliberate and use professional judgement with your actions and movements.

This document serves as a guideline for care practitioners who may transport patients with confirmed or suspected cases of COVID-19. Circumstances may call for deviations from the guidance provided in this document. This document is subject to change based on feedback from the frontline and recommendations from across the globe.

Suggestions for modification to this document can be made to Paramedic Standards