

LifeFlight of Maine Airway Management Guidelines for  
Patients with suspected concerns for Covid-19.

December 3, 2020

Adopted from primary sources (additional references noted in specific sections):

- a. Brigham and Women's and Massachusetts General Hospital Departments of Emergency medicine. Updated 10/2020.
- b. Consensus statement: Safe Airway Society: principles of airway management and endotracheal intubation specific to the COVID 19 adult patient group.
- c. Center for Disease Control and Prevention: Interim Guidance for management and treatment of Coronavirus Disease: Covid-19.
- d. American College of Emergency Physicians Covid 19 Field Guide. ICU Care in the Emergency Department. Jamie Allen, DO and Susan R. Wilcox, MD, FACEP
- e. Maine EMS Supplement #2020-11-25-01

**Background:** Initially the severity of the illness Covid-19 Coronavirus led to concerns around the virality of the disease. Approximately 80% of confirmed cases have resulted in mild febrile illness, with 17% of patients requiring hospitalization and less than 3% requiring mechanical ventilation. For those patients who suffer from respiratory failure, the percentage of complications resulting from intubation, sedation, and mechanical ventilation have been adjusted to upwards of 80% mortality. Notably, in the last few months, the level of illness associated with Covid 19 in the United States has been adjusted. 81-91% of patients diagnosed with the illness suffer mild symptoms include a possible mild pneumonia. 9-14% suffer severe symptoms including hypoxemia or the involvement of greater than 50% of the lung parenchyma and lastly < 5% have critical illness including respiratory failure, shock and multi-organ failure. When diagnosing Covid-19 illness, vitals signs and clinical findings have also been adjusted to include not only signs and symptoms of respiratory distress and failure, but also a litany of sequelae that target the multiple organ systems including not only respiratory, but cardiovascular, gastrointestinal, and renal abnormalities among others. This review will address primarily the risk and sequela around the spectrum of illness surrounding the compromise and potential collapse of the respiratory system. As providers who will encounter this population of patients with respiratory compromise, it is imperative that our management matches the recommendations that other inpatient hospitals and critical care transport teams are utilizing. To this end, there have been a variety of sources that have made recommendations around the airway management of these critical patients.

The current literature notes that the transmission of Covid-19 is primarily through droplet spread (with dispersion of approximately six feet). These droplets not only can be aerosolized, but also contaminate surrounding surfaces. There is some concern that the virus travels additional distance and thus airborne precautions are utilized in high risk procedures. Thus, it is the goal of the information below to provide vital information for staff to protect themselves as well as the patient during high-risk encounters. LifeFlight of Maine has developed specific recommendations around personal protective equipment (PPE) and subsequent cleaning procedures. Please refer to these guidelines concurrently for additional information on these specific topics.

When providing airway management or other invasive procedures (including needle decompression, tube thoracostomy or even nebulizer treatments), it is imperative that providers are aware of events that generate contaminated aerosols. Additionally, crews must be aware that contaminants can remain active on surfaces, fomites, and PPE for a prolonged period of time. Lastly, as the critical teams resuscitate critically ill patients with COVID -19, we must be aware of procedures that can further generate conditions that will exacerbate the spread of aerosols (See Table 1. Risks for Healthcare providers (Adopted directly from SAS Consensus statement).

Table 1. Risks for Healthcare providers (Adopted directly from SAS Consensus statement).

<b>Aerosol generating Events</b>	<b>Procedures vulnerable to aerosol generation</b>
Coughing or sneezing	Laryngoscopy
Non-invasive or positive pressure ventilation with inadequate seal	Endotracheal intubation
High flow nasal cannula oxygen (HFNO)	Bronchoscopy/ gastroscopy
Delivery of nebulized medications via simple face mask	Front of neck Airway procedures including tracheostomy and cricothyrotomy
Cardiopulmonary resuscitation (Prior to intubation)	
Tracheal suctioning without a close system	
Tracheal extubation	

Note: The reliability of a seal is greatest with the endotracheal tube > Supraglottic airway > facemask

### Guiding Principles.

**There is no reason to develop new airway protocols around management.** New checklists and procedures cause confusion around a procedure that staff have a familiarity and comfort. Rather, it is appropriate to insert some additional guiding principles that will help minimize contamination of staff while maintaining the safety of the patient. Initially, the LifeFlight of Maine team of medical directors and leadership staff have been working to diligently develop further resources to which crews can refer to enable a safe response. In this packet, three appendices will be included to enhance the respiratory management of these patients. Additionally, it is important to note that there have been over 30,000 articles published since January of 2020 around all aspects of this critical disease. It is nearly impossible to keep up on the literature and thus it is imperative to continually reassess clinical care and revise clinical standards as they change and are updated.

These include the following appendices:

- a. **Appendix 1. The treatment of patients with COVID 19 experiencing respiratory distress.**
- b. **Appendix 2. Rapid Sequence Intubation Checklist Special Respiratory Precautions.**
- c. **Appendix 3. Ventilatory Management of patients with COVID 19.**
- d. **Appendix 4. Non-invasive oxygen therapies in the suspected or confirmed Covid 19 patient.**

Overall, the principles of managing patients with respiratory compromise can be outlined below to ensure the safety of the critical care transport teams. In the course of providing respiratory care to this population of patients, it is the goal to complete the following:

1. Reduce virus aerosolization.
2. Maximize efficient airway management.
3. Minimize personnel exposure.

I. Reduction of Virus Aerosolization

1. Complete airway management and invasive procedures in a negative pressure room *if available and feasible* and avoid nebulized medications whenever possible.
2. If there is an option to use disposable equipment, this is always preferred over reusable equipment.
3. Early endotracheal Intubation vs. Primary management with BiPAP or High Flow Nasal Cannula (HFNO).
  - a. Initially, emergency medicine literature advocated the use of early intubation as a way to manage patients with respiratory failure associated with Covid-19. However, this recommendation has been revised to aggressively identify those patients at risk for imminent respiratory failure and then provide a definitive airway at that time.
  - b. As noted in Appendix 1 The treatment of patients with COVID 19 experiencing respiratory distress, if patients are experiencing respiratory distress (with concurrent hypoxemia with an SpO<sub>2</sub> of less than 90% despite interventions including high flow nasal cannula (HFNC), or the Sea-Long NIV Helmet or the use of a non-rebreather at 15 Liters/min, then intubation is indicated. HFNO / NIPPV may be used in the facility in a safe closed-circuit manner, however, there remains significant controversy about the use of these therapies in the out-of-hospital environment. Further recommendations are constantly evolving.
  - c. Prior SARS experience showed that BiPAP and manual bag valve mask ventilation both increase the risk of airborne viral particles and a percentage of patients ultimately failed trials of non-invasive positive pressure ventilation. There is some controversy around the aerosolization of particles with the use of HFNO.
  - d. Leadership at LifeFlight of Maine have opted for the most conservative approach in patients suspected of having or known to have COVID-19 that require positive pressure ventilation. Unfortunately, there remains a debate around the use of non-invasive oxygen delivery therapies and thus strategies continue to evolve in the care provided in helicopter, fixed-wing or ground emergency medical transport. Because of the theoretical risk with aerosolization, non-invasive ventilation (NIPPV) and HFNO will only be as a last resort in consultation with medical direction. Other therapies outlined in this protocol should be trialed initially prior to the use of invasive therapies. Currently staff at LifeFlight should be using standard PPE to avoid self-contamination and exposure to Covid 19 virus particles. Refer to Appendix 4. Non-invasive oxygen therapies in the suspected or confirmed Covid 19 patient.
4. **Rapid sequence intubation is the preferred method.** Use awake intubation only when absolutely indicated because of the potential for viral spread due to coughing during application of topical anesthesia and laryngoscopy.
5. The use of heated and / or humidified high flow oxygen is only used with appropriate forms of mitigation due to risk of aerosolization (Refer to **Appendix 1 The treatment of patients with COVID 19 experiencing respiratory distress**).
6. During RSI, use high-dose neuromuscular blocking agents (NMBA) for faster and more complete apnea and no residual cough. Even with high-dose NMBA use, **respect the NMBA onset time**.
  - a. Rocuronium 1.5mg/kg IBW
7. Ambient pressure pre-oxygenation whenever possible
  - a. **Manual bag valve ventilation and PPV only if clinically required.**

- b. Use a low volume and higher frequency approach if manual ventilation is required. Ensure a well-sealed mask in place. A PEEP valve should also be used.
  - c. **Place a HEPA filter** between the ETT and BVM (this can be with the same filter used on the ventilator).
  - d. Expect transient precipitous drops in oxygen saturations during intubations.
8. Limit ventilator disconnects
- a. If working with sending and receiving staff, communicate often with Respiratory Therapist (RT) regarding need for ventilator checks and disconnects.
  - b. If disconnects are required (i.e. transition from room to portable ventilator) do so quickly and at **end-expiration**.
  - c. **Place a HEPA filter** between ETT and ventilator.
  - d. Consider clamping the endotracheal tube during transfer of ventilators to maintain recruitment and limit aerosolized exposure.
- II. Maximize efficient airway management – This will reduce the need for bag valve mask ventilation between attempts.
1. The most experienced and proficient available clinician should manage the airway first.
  2. **Focus on robust pre-oxygenation.**
    - a. Oxygen can be administered via nasal cannula with the general principle that the higher the flow, the higher the risk for aerosolization (Typical NC flow is less than 6L/min).
    - b. This will provide more time for a first-attempt intubation success. Benefits of pre-oxygenation must be weighed against the risk of aerosolized viral particles however patient safety is paramount. Intubating a hypoxic patient who will desaturate rapidly after RSI meds are given puts them at risk of death during the procedure.
    - c. Preoxygenate with 3-5 minutes of tidal breathing on NRB mask at 15 L/min flow with upright positioning **AND Place low flow nasal cannula at 5 L/min** to be left in place for apneic oxygenation. A surgical mask on top may reduce aerosolization.
    - d. We are not recommending *starting* with “flush-flow” rate facemask pre-oxygenation for these patients. This might result in excess L/min flow which would leak out of the mask margin.
    - e. In a facility, Intubate in a negative pressure room if available and ensure all providers pay extreme attention to personal protective equipment (PPE). As noted above, precipitous drops in oxygen saturations have occurred with many patients with COVID 19.
    - f. If staff are placing a definitive airway in a patient in the field, ensure that ventilation is optimized in the environment in which the procedure is being done (i.e. exhaust fans are on high, etc.)
  3. **The video laryngoscope allows for safer provider / patient distancing** by using the screen and not looking directly in the oropharynx.
    - a. There is increased first attempt success with video laryngoscopy (VL) compared to direct laryngoscopy (DL)

4. **Have all required *disposable* airway equipment at the bedside.**
  - a. ETTs, bougie (use pre-loaded or have as an adjunct), syringe (with immediate balloon-up after tube placement), lube, ETCO<sub>2</sub>, VL with multiple blade sizes/shapes, single-use Mac/Miller set-up, cric kit.
5. If staff are in a facility with multiple resources including providers and respiratory therapists, then NIPPV with an exceptional seal can be considered for the intubation if there is significant hypoxia prior to the intubation. However, there is currently debate in this maneuver's effectiveness and safety. **Ensure a tight-fitting mask to minimize aerosolization.** Providers may have to hold the mask manually to ensure a tight seal and reduce leakage around the margin of the mask.
  - a. Continue positive pressure ventilation until the patient is apneic and then **suspend** the ventilator before removing mask as intubation proceeds.
  - e. There is a limited role for NIPPV in the out-of-hospital setting. Please refer to Appendix 4. Non-invasive oxygen therapies in the suspected or confirmed Covid 19 patient, for additional information
6. **The other LifeFlight of Maine donned provider should be in the room if there is an anticipated difficulty or need for complex airway maneuver.**

### III. Minimize Personnel Exposure

1. Enhanced droplet and airborne PPE
  - a. Please refer to the LifeFlight of Maine Covid-19 SOP for further details about appropriate PPE. At minimum, for airway management and invasive procedures
    - i. PAPR or N-95 mask with surgical mask on top
    - ii. Gown, Tyvek suit or equivalent
    - iii. Face Shield and/ or Goggles
    - iv. Double gloves
2. Follow all **donning and doffing procedures with observer-ensured compliance and hand hygiene.**
3. Minimize number of clinicians in the room needed to complete the airway management or invasive procedure situation.
  - a. SARS experience revealed that cross contamination was highest when > 3 people were in the room.
4. Complete all procedures that the patient requires sequentially to avoid additional staff exposures (i.e. IV access, airway management, OG/ NG tube placement, Foley catheter, etc)
5. Wash hands **IMMEDIATELY** before and after completing the necessary procedures.
6. Consider debriefing with the care team after each resuscitation.
7. Follow LifeFlight of Maine SOP for post-flight cleaning procedures of aircraft, ambulance and equipment.

## Summary:

In an effort to minimize exposures to healthcare staff and ensure quality resuscitation of patients with suspected or confirmed COVID-19 coronavirus disease, it is essential to follow these three pillars of care:

- I. Minimize virus aerosolization.**
- II. Maximize efficient airway management.**
- III. Minimize personnel exposure by wearing appropriate personal protective equipment and following infection control procedures.**

## References

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