



COVID-19 Respiratory Care Management for Intubation and Mechanical Ventilation
BCH SF and BCHO Pediatric Addendum, v2: 3/19/20

Principles of Respiratory Care for COVID-19 Positive or Suspected (PUI) Patients:

- **Vigilant clinical monitoring of patients to anticipate the need for mechanical ventilation early and avoid emergent intubations is strongly recommended.**
- All practitioners must strictly adhere to infection control guidelines and PPE recommendations appropriate for the patient's level of respiratory support.
- Any COVID-19 Positive or Suspected PUI patients requiring High Flow Nasal Cannula (HFNC), Non-Invasive Ventilation (NIV – either CPAP or BiPAP), or mechanical ventilation require airborne precautions.
- All practitioners should review appropriate donning and doffing protocols.
- Only essential providers in the room at all times, particularly during intubation or other aerosol-generating procedures.
- Aerosol-generating procedures (HFNC, NIV, intubation and mechanical ventilation) should be performed in an Airborne Infection Isolation Room (AIIR), when at all possible.
- During an active CODE (Blue or White) response, PAPR's should be prioritized for practitioners directly involved with airway management and those practitioners in closest proximity to the airway. All others should use N-95 plus eye protection at a minimum (see updated COVID-19 Code Blue and Code White protocols).

Pre-Intubation Recommendations – Patients Supported with HFNC and NIV

- High Flow Nasal Oxygen (HFNC) can be considered in selected hypoxemic patients. HFNC should be considered an aerosol-generating procedure and airborne precautions are required.
- NIV can be used based on clinical judgement. NIV is an aerosol-generating procedure and airborne precautions are required. Whenever possible, the NIV should be delivered using a device that has a dual limb circuit and HEPA filter to reduce aerosol generation.
- Patients receiving either HFNC or NIV should be cared for in a monitored setting by personnel capable of performing endotracheal intubation. Short trials of therapy are recommended with frequent clinical re-evaluation. Proceed directly to endotracheal intubation in patients with no evidence of improvement.

Endotracheal Intubation of COVID-19 Positive or Suspected PUI Patient

- **Emergent intubations when possible are to be avoided given the time needed to apply PPE and increased risk to the person performing the intubation.**
- Practitioners should anticipate the time needed to apply recommended PPE.
- Personal items (stethoscope, phone, patient list, pager) should be removed prior to donning PPE.
- **PERSONNEL INSIDE THE ROOM (4) in appropriate PPE:**
 1. Laryngoscopist – should be most experienced airway practitioner (ICU, ED or anesthesia attending physician or experienced clinical fellow)
 2. One Respiratory Therapist (RT) to assist with intubation and ventilation
 3. A second qualified MD to assist with airway and/or resuscitation
 4. One Registered Nurse (RN) to deliver medications
- **RECOMMENDED PPE for PRACTITIONERS CLOSEST TO THE AIRWAY:**
 - PPE should include: Gown, **double gloves** and a **PAPR** before entering patient room.
 - If limited availability, PAPRs should be prioritized for the practitioners closest to the airway. This includes the laryngoscopist, RT and second MD holding cricoid or assisting.

- **PERSONNEL OUTSIDE THE ROOM (3):**
 1. RN in PPE available to monitor PPE compliance, assist in case a provider has to leave the room, or obtain additional equipment or medications
 2. Physician or APP to assist with logistics/flow coordination
 3. Second RT to assist with emergency airway equipment and ventilator

- **EQUIPMENT:**
 - Manual resuscitation bag with **appropriate filter** placed between the mask and the bag (must be in all rooms of confirmed or suspected COVID-19 patients)
 - Capnograph or colorimetric end tidal CO2 detector
 - Video laryngoscope (CMAC or Glide) based on laryngoscopist's preference
 - Standard laryngoscope handles and blades as back up
 - Endotracheal tubes, with back up sizes
 - Medications for induction, hemodynamic support and maintenance of sedation/analgesia
 - Ventilator or anesthesia machine for the patient equipped with appropriate filters on the expiratory and inspiratory circuits. Capnography tubing should also be filtered.
 - Equipment for in-line endotracheal tube suctioning

- **INTUBATION PROCEDURE:**
 - Based on clinical scenario, consider Rapid Sequence Intubation (RSI) technique with appropriate pre-oxygenation to minimize manual ventilation of patient's lungs and potential aerosolization of virus. Ensure a skilled assistant is able to perform cricoid pressure for RSI.
 - If manual ventilation is needed, small tidal volumes preferred. Consider two-handed mask ventilation to ensure good mask seal.
 - Ensure that an appropriate hydrophobic filter is between the mask and the Ambu bag or Jackson-Reese bag for all manual ventilation.
 - Once intubated, minimize circuit disconnects and use in-line suction.

- **POST INTUBATION:**
 - Careful attention to doffing procedure and disinfecting all PAPR's worn for the procedure.
 - If patient requires transport to ICU or another location, the use of a ventilator with inspiratory and expiratory filters is required.
 - Once intubated, minimize circuit disconnects and use in-line suction.
 - Video laryngoscope tower and blade should be wiped down with disinfectant wipes before removing from the room. Blade should be placed in a biohazard bag and standard pre-cleaning procedure should be followed.
 - Debrief with staff to identify any potential lessons for future procedures.
 - Any concerns about contamination should be reported immediately to provider's supervisor and infection control.

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References:

1. Caputo KM, Byrick R, Chapman MG, Orser BJ, Orser BA. Intubation of SARS patients: infection and perspectives of healthcare workers. *Can J Anesth* 2006;53(2):122-9
2. American Society of Anesthesiologists. Coronavirus (2019-nCoV): Information for Health Care Professionals. Recommendations. 2/23/20.
3. World Health Organization. Clinical Management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected. Interim Guidance. WHO/2019-nCoV/clinical/2020.4.
4. Centers for Disease Control. Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings. https://www.cdc.gov/coronavirus/2019-ncov/infection-control/control-recommendations.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fhcp%2Finfection-control.html (accessed online 3/17/20).