

COVID-19 PEDIATRIC CRITICAL CARE AND VENTILATORY SUPPORT RECOMMENDATIONS

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Objectives

- Develop consistent clinical screening and practices for pediatric patients requiring life supportive interventions that reduce the risk of staff exposure to COVID-19.
- Unify all sites of care in a single fashion so that risk can be mitigated on a system level.

Important Note

- In pediatric care, there is often an absence of evidence specifically related to SARS-CoV-2
- In the absence of clinical evidence, these guidelines are based on expert opinion

General Considerations

- Early identification and categorization of patients admitted with acute respiratory failure is essential. This process should be reviewed daily as clinical and laboratory indicators become available
- If respiratory support is indicated, then planning ahead may avoid the need for rescue interventions (e.g., crash intubations), which have greater potential for infectious transmission due to mishaps during the use of barrier protections.
- In pediatric patients with acute respiratory failure with confirmed or highly suspected COVID 19 illness, current experience is insufficient to change use of HFNC. It may be prudent to proceed to endotracheal intubation if patient is failing HFNC rather than a trial of NIPPV (e.g. CPAP or BIPAP).
- When possible, perform procedures in an airborne infection isolation room rather than in non-negative pressure rooms. An airborne isolation room has a negative-pressure relative to the surrounding area
- If a procedure must be performed emergently, then limit the number of healthcare workers present in and around the procedure room.
- Seek collaboration with local infection control expertise as early as possible.

Definitions

- **High Risk Aerosolizing Procedures** – *Airborne Precautions required*
 - Tracheal intubation and Extubation
 - Bronchoscopy
 - Suctioning of open ET tubes, open tracheostomies and open tracheostomy tubes*
 - Placing a nasogastric (or NJ) tube in awake non-intubated patients
 - High Flow Nasal Oxygen systems
 - Non-invasive positive pressure ventilation systems
 - Hand held nebulizers in spontaneously breathing patients
- **Low risk Aerosolizing Procedures** – *Modified droplet precautions required*
 - Closed circuit mechanical ventilation
 - Suctioning of ET tubes and tracheostomy tubes connected to a closed ventilator circuit with in-line suctioning
 - Vibrating mesh nebulizer for ventilated patients
 - Nasopharyngeal and oropharyngeal suctioning in both non-intubated and intubated patients
 - Placing a nasogastric (or NJ) tube in intubated and sedated patients if on a closed-system
 - Metered Dose Inhaler (MDI) administration

* an open tracheostomy, open tracheostomy tube and open ET tube refers to a tube that is not connected to a closed ventilator circuit with in-line suction

Reduced Aerosolization Protocol for Respiratory Support and Mechanical Ventilation

- Oxygen Supplementation for Patients in Respiratory Failure
 - Use low flow oxygen systems without humidification when possible to reduce risk of aerosolization.
 - pediatric patients, especially smaller children (less than 30 kg) are at higher risk of drying out mucous membranes with unhumidified oxygen.
 - For children over 30 kgs, may use O₂ (low flow) by nasal cannula up to 6 LPM
 - Use non-rebreathing mask running at the minimum flow to completely inflate the reservoir bag.
 - Use of High Flow Nasal Cannula Systems will likely be necessary as this is a standard therapy in pediatric viral respiratory illness, despite risk of aerosolization.
 - Use of Non-Invasive Positive Pressure Ventilation (BiPAP, CPAP) is discouraged in those pediatric patients who are failing HFNC. If considered clinically warranted, close clinical and infection control monitoring should take place

Reduced Aerosolization Protocol for Respiratory Support and Mechanical Ventilation (continued)

- Endotracheal Intubation for Patients Requiring Mechanical Ventilation
 - Double gloves will enable one to shed the outer gloves after intubation and minimize subsequent environmental contamination.
 - Designate the most experienced care provider available to perform intubation, if possible.
 - Avoid awake fiberoptic intubation unless specifically indicated. Droplets containing viral pathogens may become aerosolized during this procedure. Aerosolization generates smaller liquid particles that may become suspended in air currents, traverse filtration barriers, and inspired.
 - Consider a rapid sequence induction (RSI) in order to avoid manual ventilation of patient's lungs and potential aerosolization. If manual ventilation is required, apply small tidal volumes.
 - After removing protective equipment, avoid touching your hair or face and perform hand hygiene.

Reduced Aerosolization Protocol for Respiratory Support and Mechanical Ventilation (continued)

- Respiratory Care Equipment Requirements:
 - Mechanical Ventilators should have a HEPA filter installed per standard practice.
 - Always use a closed suction system during airway suctioning
 - Intubated or manually bagged patients should have a HEPA filter placed on the exhalation port of the BVM. Do not transport with anesthesia bags
 - After the airway procedure is completed, clean and disinfect high-touch surfaces mechanical ventilator, reusable equipment, including video-assisted scopes and work area with an EPA-approved hospital disinfectant.
 - ICU Ventilators will have HEPA rated filters , active humidification, dual limb heated circuits and deliver medications via a vibrating mesh system
 - Inhaled medications should be dispensed in the form of meter dose inhalers when mesh delivery systems are not available. In-line nebulization will be used when MDI adaptors are not available.

Reduced Aerosolization Protocol for Respiratory Support and Mechanical Ventilation (continued)

- Special Considerations:
 - Strong recommendation to avoid bronchoscopies in this patients.
 - Code situations will proceed with the preparation of getting into proper PPE before entering the patient's room.
 - If nebulizer is used and care provider is required to stand at the bedside to deliver the treatment (i.e. child is too young to administer nebulizer by themselves), then recommend care provider should employ PAPRs or fit-tested N95 mask with eye-protection *during the time of nebulizer administration*.
 - ETT Cuff pressure should be maintained between 25-30 CWP when possible.
 - Pressure support ventilation is recommended for implementing spontaneous breathing trial (SBT), avoid using T-piece to do SBT. When tracheotomy patients are weaned from ventilator, HME should be used, avoid using T-piece or tracheostomy mask.
 - If HFOV is used, recommend care providers should employ PAPRs or fit-tested N95 mask with eye-protection when in the room as ETT is often required to be deflated to allow for ventilation.
 - If devices such as point-of-care ultrasound are used:
 - A long sheath cover of the ultrasound unit and cable should be used to minimize contamination of the equipment.
 - Non-essential parts of the ultrasound cart may best be covered with drapes to minimize droplet exposure.
- Modifications to these guidelines will require approval by the medical director of Pediatric Critical Care and the director of Pediatric Respiratory Therapy.

Transporting Patients

- Transport patients only for procedures and studies deemed essential for patient care.
- Consult local infection control expertise prior to transport.
- Intubated or manually bagged patients should have a HEPA rated Medical Exhalation filter on the exhalation port. Anesthesia bags should be avoided
- Patients who are not ventilated should wear a surgical mask.
- Health care professionals transporting the patient should not routinely wear gowns and gloves, unless direct contact with the patient or contaminated equipment is anticipated during transport. In this case, one person should wear the appropriate PPE per CDC COVID-19 guidance, and, ideally, be accompanied by an additional member of the transport team who is not wearing a gown and gloves. The person without gloves and gown can interact with the environment. Prior to transport, the PPE clad person should perform hand hygiene and don a fresh gown and gloves to reduce potential contamination of environmental surfaces.