Pediatric Intubation – COVID-19 Suspected or Confirmed

GUIDELINE

Guidelines are recommended actions allowing for professional judgement

island health

Purpose:	This guideline outlines the principles of emergency intubation in pediatric patients with suspected or confirmed COVID-19. Tools to aid the procedure are provided with the expectation that individual sites/departments will review their own setting in advance and determine which may be helpful.
Scope:	**Intended Audience:** • Physicians, Nurses, Respiratory therapists, and Allied Health care team members • Program Clinical Governance Councils and Working Groups • Operational and Project Teams **Applicable Environments:** • All clinical care areas caring for pediatric patients • Primary, Urgent Care, Critical Care and Rural settings
Outcomes:	Successful intubation of suspected/confirmed COVID-19 patient while limiting heath care team exposure to particles and aerosols.

Principles:

- All aspects of intubation, including Bag Valve Mask (BVM) use, are considered **Aerosol Generating Medical Procedures (AGMPs).**
- All intubation team members should don Personal Protective Equipment (PPE) for AGMPs (droplet, contact and airborne) before entering the room (http://www.bccdc.ca/health-professionals/clinical-resources/covid-19-care/infection-control/personal-protective-equipment).
- Securing the airway, with a definitive Endotracheal Tube (ETT), is an urgent priority recommended to minimize AGMP risks. Ventilation using BVM should be avoided (or minimized where possible).
- Minimize the number of health-care team members to only those involved in intubation of the patient.

Tools included in this document (individual sites/departments to review and determine applicability):

COVID -19 Specific Tools/Links:

- Role Cards for team members (Pediatric Intubation Checklist also on the back of each one)
- Pediatric Intubation Clinical Order Set: COVID-19 Intubation
- Donning and Doffing of PPE *(most recent updates to be found at*: http://www.bccdc.ca/health-professionals/clinical-resources/covid-19-care/infection-control/personal-protective-equipment

General Pediatric Intubation Tools

- Pediatric Intubation Checklist
- Pediatric Intubation Gear Drop
- Pediatric Ventilation Reference Chart

PHASES OF THE PROCEDURE:

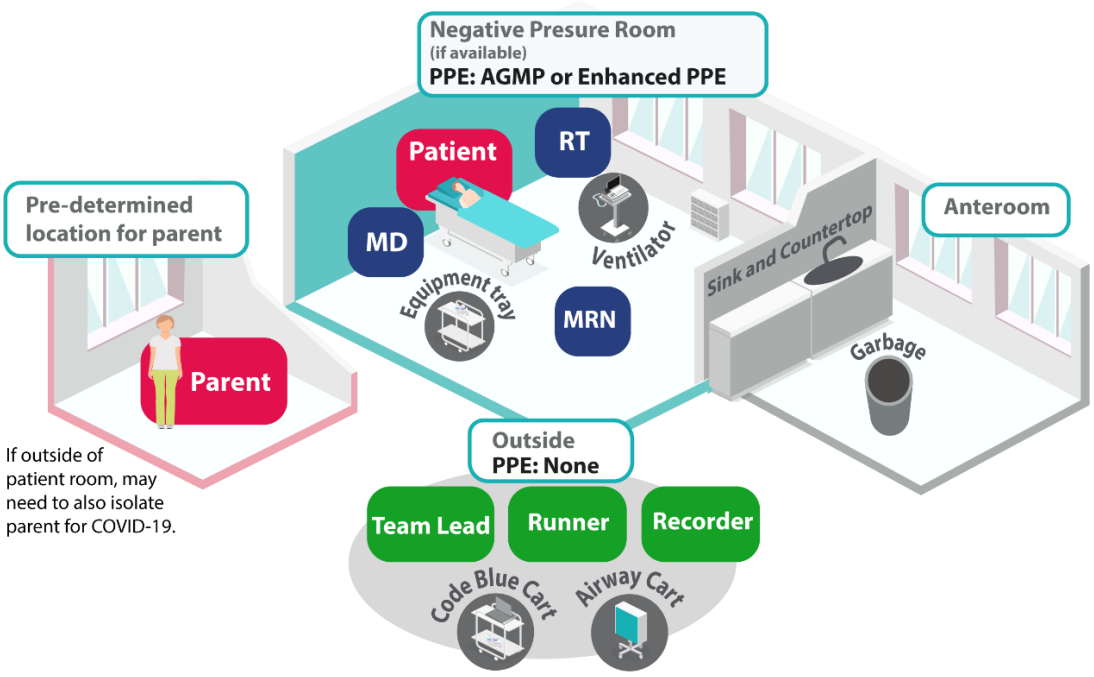
I. **Prepare the patient**
II. **Prepare the team and the environment**
III. **Appropriate medication choices**
IV. **Optimize ventilation and oxygenation parameters**
V. **Plan for post-procedure care**
VI. **Safe transfer to the best care location**

I. Patient Preparation

- Confirm need for intubation - can patient be supported with high flow or BiPAP?
- Assess airway difficulty/IV access - is intraosseous access needed?
- Plan for transfer post procedure to higher level of care
- Single-patient isolation room; negative pressure room preferred
- Have intubation team begin PPE donning prior to procedure
- Optimize physiology — consider fluid bolus and/or early use of vasopressors

II. Team Preparation

- Recommend 2 teams if possible (one inside room and one outside room)
- Most Qualified Physician (MQP) to perform intubation
- Consider having an additional Team Leader (RN or MD) outside of the room
- Have all needed equipment and medications ready to be brought into the room (for procedure and for possible resuscitation)
- Use the method of intubation most likely to result in first pass success (video laryngoscope may reduce team exposure if operator has expertise in its use)
- Share intubation strategy with the team; review Pediatric Intubation Checklist during "Time Out" prior to entering the patient room
- Ensure all team members are aware of plans and contingencies
- Oral intubation, preferably cuffed endotracheal tube (ETT)
- In adults it is recommended to avoid positive pressure ventilation (bagging) if at all possible to reduce aerosolization of viral particles. While also preferred in children, children desaturate rapidly once sedated/paralyzed; some pediatric patients may need positive pressure ventilation (PPV) prior to intubation.
- If bagging is required, use 2-person face mask technique with gentle pressure.
- Ensure an expiratory limb HME/viral filter is in place for all methods of ventilation, including self-inflating baggers, flow inflating circuits (e.g., neopuff or Jackson Rees) and ventilator circuits.



III. Medication Suggestions (experienced practicioners may use different choices)

Premedications to Consider

- Fluid bolus (20 ml/kg crystalloid). Administer only if needed (hypotension, hypovolemia).
- Consider early initiation of vasopressors (epinephrine) if any hemodynamic instability. Epinephrine range 0.05 to 2 mcg/kg/min. Discuss with PICU.
- Atropine 0.02 mg/kg (most likely to be needed in patients less than 1 year or demonstrated vagal response with coughing). *Routine administration is not recommended.*
- If cardiac arrest, use epinephrine 0.01 mg/kg.

Sedation/ Analgesia

- Ketamine 1-2 mg/kg

Paralysis

- Rocuronium 1 mg/kg (preferred)
- Succinylcholine 2 mg/kg

Approximate Pediatric MAP Goals
5th % 'ile = age x 1.5 + 40mmHg
50th %'ile = age x 1.5 + 55mmHg

Post Intubation Ongoing Sedation/ Paralysis

- Morphine infusion (range 10-40 mcg/kg/hour) plus bolus of 50 mcg/kg prn
- Midazolam infusion (range 1-4 mcg/kg/min) plus bolus of 50 mcg/kg prn
- Rocuronium 1 mg/kg q45 min prn (if unable to establish ventilator synchrony or oxygenation with spontaneous breathing)

IV. Ventilation

- Tidal Volume: Protective lung strategies. TV targets of 5-8 mls/kg (Ideal Body Weight).
- Tolerate 3-6 mls/kg if compliance is poor.
- Inspiratory Time (Ti): refer to the chart for Ti ranges. A common error made in pediatric ventilation is neonatal Ti settings dialed into the ventilator.
- Circuit choice (Ventilator dependent. Clarify what your center has):

Patient Weight	Circuit Choice
< 10 kg	Neonatal circuit in Neonatal mode
10 to 15 kg	Adult circuit but put the ventilator in Pediatric Mode
> 15 kg	Adult circuit in Adult Mode

V. Post Procedure

- Team to remain in room until clearance of particles from the air if not using negative pressure room. Clarify the timing in your hospital.
- Portable Chest X-Ray (CXR) - protect staff using appropriate precautions during the CXR.
- Titrate FiO2 for sats 90-95%/ETCO2 40-50.
- Establish ongoing sedation (see medication suggestions).
- Obtain blood gas (capillary or venous is adequate) once patient stabilized, tube secured, ventilator settings stabilized.
- Complete other procedures as needed (gastric tube placement, urinary catheter placement, etc.)
- Doffing of PPE observed and guided by PPE supervisor (preferably in anteroom).
- Document procedure.
  - Update PICU in receiving hospital – request advice on ventilator settings (see Intubation/ Ventilation Reference Chart.

VI. Safe transport to the best care location

Patient Tranfer Network: 1.866.233.2337 *(whenever possible, all calls should go through PTN)*
PICU at VGH: 1.250.727.4186
Pediatric Intensivist on call: 1.250.727.4212 (paging)
Island Health Transport procedure: https://intranet.viha.ca/pnp/pnpdocs/pediatric-covid-19-hloc-transport-cohort-procedure.pdf

2.0 Definitions

- **Evidence-Guided:** The conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. Evidence-guided clinical practice requires integration of individual clinical expertise and patient preferences with the best available external clinical evidence from high-quality systematic research.
- **Primary Stakeholders:** Those disciplines having a major involvement in the use and therefore development of order sets e.g. physicians, nurses, and pharmacists.
- **Supporting Stakeholders:** Those disciplines having an important, but not major involvement in the use and therefore development of order sets e.g. antibiotic review subcommittee (IMAC), laboratory medicine, medical imaging, nutrition services, respiratory, rehabilitation services and other physicians/medical specialties.

3.0 Related Island Health Standards

- Covid-19 Pediatric Resources: https://intranet.viha.ca/departments/children/paediatrics/Pages/COVID-19-Pediatric-Resources.aspx
- Covid-19 Medical Staff information: https://medicalstaff.islandhealth.ca/maternity-care
- Covid-19 transport guidelines: https://intranet.viha.ca/pnp/pnpdocs/pediatric-covid-19-hloc-transport-cohort-procedure.pdf
- BCCDC PPE Guideline: http://www.bccdc.ca/health-professionals/clinical-resources/covid-19-care/infection-control/personal-protective-equipment
- Island Health Medication reference: https://intranet.viha.ca/DEPARTMENTS/PHARMACY/PARENTERAL_THERAPY/Pages/pediatric.aspx

4.0 References

- Interim Guidance for Basic and Advanced Life Support in Adults, Children, and Neonates With Suspected or Confirmed COVID-19: From the Emergency Cardiovascular Care Committee and Get With the Guidelines®-Resuscitation Adult and Pediatric Task Forces of the American Heart Association in Collaboration with the American Academy of Pediatrics, American Association for Respiratory Care, American College of Emergency Physicians, The Society of Critical Care Anesthesiologists, and American Society of Anesthesiologists: Supporting Organizations: American Association of Critical Care Nurses and National EMS Physicians https://doi.org/10.1161/CIRCULATIONAHA.120.047463
- Miller K, & Nagler J. Advances in Emergent Airway Management in Pediatrics. Emergency Medicine Clinics of North America. 37 (2019) 473–491
- Pediatric Drug Doses Guidelines, 7th Edition, Editor: Roberta Esau BSc (Pharm), under the direction of the C & W Pharmacy, Therapeutics and Nutrition Committee http://www.pedmed.org/DrugApp/index.html
- Public Health Agency of Canada, COVID-19 Clinical Care Guidance Working Group. Fowler R, Hatchette T, Salvadori M, Ofner M, Poliquin G, Yeung T & Brooks J. Clinical Management of Patients with Moderate to Severe COVID-19 – Interim Guidance. April 2, 2020. Accessed April 6, 2020. https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/clinical-management-covid-19.html
- Zaritsky A, Chernow B. Use of catecholamines in pediatrics. Journal of Pediatrics. 1984;105:341–350

Contributors:
Amanda Barclay MD
Allon Beck MD
Jeff Bishop MD
Robyn Candell RN
Tricia Chevalier RN
Paul Colella MD
Kyle Collins PharmD
Zachary Hilberry RRT
Melissa Holland, RN
Logan Lee MD
Heather May MD
Greg McKelvie PharmD
Alex McLean MD
Angela Morehouse RN
Jennifer Morgan RN
Peter Skippen MD