



Coronavirus COVID-19

BC Centre for Disease Control | BC Ministry of Health



Management of Severe Respiratory Illness in Pediatric Patients during the COVID-19 Pandemic

May 12, 2021

This guidance is intended for health-care professionals trained to provide pediatric care and are caring for children with acute viral respiratory illness. It is based on known evidence as of March 3, 2021.

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Ministry of Health



BC Centre for Disease Control

If you have fever, a new cough, or are having difficulty breathing, call 8-1-1.



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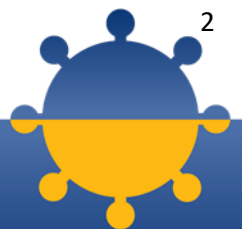
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Introduction

The purpose of this document is to guide pediatric health-care providers in British Columbia on the basic, essential care needs of pediatric patients with known or suspected COVID-19 infection to ensure they receive optimal and consistent care.

Guidance in this document will need to be adapted to the characteristics of each individual unit, department and health authority. In particular, there may be variability in epidemiology across geographic areas, variability over time in COVID-19 testing and infection prevention and control (IPC) recommendations. Therefore, users are encouraged to refer to local up-to-date guidance on these measures.

Disclaimer: This document is intended for use by health-care professionals caring for children with respiratory illness in British Columbia. The content does not constitute and is not in substitution of professional medical advice. This guidance is subject to change as new data becomes available and new developments arise with the SARS-CoV-2 virus. Furthermore, unique situations may require some discretion in adjusting these guidelines, which are meant to be supportive, not prescriptive.

A. Infection Prevention and Control

Please refer to the BCCDC website for the most up-to-date recommendations on [COVID-19 care](#). Providers may also refer to the [BC Children's Hospital-specific recommendations/policies and procedures](#) for COVID-19.

1. COVID-19 Identification

Most children with COVID-19 have mild illness. A minority, particularly those who have complex underlying medical conditions, may present with more severe disease.

Symptoms may include fever, cough, shortness of breath, rhinorrhea, nasal congestion, loss of sense of smell, sore throat, odynophagia, headache, muscle aches, fatigue, loss of appetite, chills, vomiting or diarrhea.

2. Isolation/Personal Protective Equipment (PPE)

Following local infection prevention and control policies, children with symptoms consistent with COVID-19, including new respiratory tract symptoms and/or fever of unknown origin, should be cared for using droplet and contact isolation (see [infection prevention and control guidance for acute care](#))

Put the patient/family in a single room and encourage them to wear masks when safe and tolerated and to keep the door to the patient room closed.

Use droplet and contact precautions including procedure mask, eye protection (shield/visor/goggles), gown and



gloves. For details, see [BCCDC PPE guidance](#) or refer to local policies.

Add airborne precautions if aerosol generating medical procedures (AGMPs) are likely to be required, use an N95 mask and place patient in a negative pressure isolation room, if available.

Applicable essential visitor restrictions should be followed and local policies should address the need for a parent to be present with the child. For ill children, having a parent present is critical to their care. At least one parent should be considered an essential visitor and allowed access to the patient's room

3. Testing

Any child with severe respiratory illness in B.C. should be tested for COVID-19 as well as other respiratory viruses. Public health guidelines for SARS-CoV-2 testing are regularly updated. For the most up-to-date public health testing criteria, refer to the [BCCDC testing guidelines](#).

B. Preparation and Admission of Patient

Use appropriate PPE when caring for patients with suspected COVID-19, regardless of location. Respiratory viruses generally require **droplet and contact precautions**. For more information on droplet and contact precautions, see [BCCDC PPE guidance](#) or refer to local policies. Follow IPC guidelines for [donning](#) and [doffing](#) PPE.

Patients admitted to an inpatient unit who are being investigated for COVID-19 or who have laboratory confirmed COVID-19 will be cared for using droplet and contact precautions. Use N95 respirators for AGMPs. Refer to local health authority guidance for more information on [AGMPs](#), such as air clearance time and keeping doors closed.

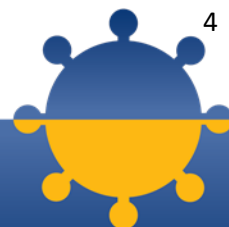
Patients with COVID-19 or other viral respiratory illnesses should be admitted to single patient rooms, if available, regardless of whether AGMPs are anticipated. If single rooms are not available, please follow your hospital's guidance for isolation.

Stock an isolation cart outside of a patient's room with adequate supplies of surgical/procedure masks, N95 respirators, eye protection (goggles and face shields), gloves (all sizes), isolation gowns and hospital-approved disinfectant wipes. Ensure all canisters of disinfectant wipes are adequately full.

Where appropriate, place [signage](#) for droplet and contact precautions. Add additional signage for airborne IF AGMPs are anticipated.

C. Transport Within Hospitals

Refer to local health authority guidance on transport for further details. BC Children's Hospital (BCCH) guidance on



patient transfer is available [here](#).

D. General Care Recommendations

The recommendation below are based on practices at BCCH. Your local hospital may have a different approach and these suggestions may need to be adapted to your local environment.

1. Patient Room Supplies

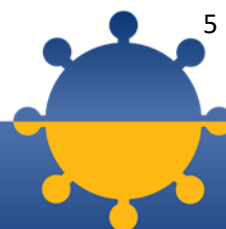
- a. **Use disposable supplies**, wherever possible.
- b. **Additional supplies should be delivered by a clean staff member** to the room at the request of the in-room nurse/registered respiratory therapist (RRT). Whether stethoscopes are assigned to patients or to staff, meticulous cleaning of the stethoscope in-between staff use or patient contact is important.
- c. **All equipment should be kept in the patient's room** to avoid transmission via objects. Dedicate equipment to an isolation room or clean with hospital-grade disinfectant after use and prior to returning to general circulation.
- d. **Avoid overstocking rooms**. Only bring in supplies as required. All items that cannot be surface disinfected should be discarded when the patient is discharged.

2. Charting

- a. **Do not take paper charts into the patient room**. Scan or fax medical history, preferably to a receiving centre to avoid paper copy transfer and HCW contamination.
- b. **Keep mobile computer terminals outside the patient room** unless a dedicated mobile terminal is available to remain in room (e.g., for units where dedicated mobile terminals are available for very sick patients requiring in-room presence of staff a majority of the time).
- c. **Consider virtual interviews with parents** using telephones to encourage physical distancing.

3. Visitors

Visitor restrictions are in place as per the Ministry of Health [Communique 2020-01: Infection Prevention and Control for Novel Coronavirus \(COVID-19\)](#). For ill children, having a parent present is critical to their care. At least one parent should be considered an essential visitor and allowed access to the patient's room. For an example of a pediatric / neonatal care adaptation of the provincial communique please refer to BC Women's Hospital and Health Centre and BC Children's Hospital [policy](#).

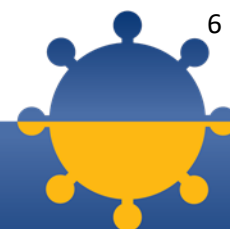


E. Respiratory / Cardiac Arrest Situations (Code Blue or Pink) *

Cardio Pulmonary Resuscitation Protocol for Children Who Have Possible or Confirmed COVID-19

Assessment	
Confirm Code Blue Activation	<ul style="list-style-type: none"> The first person on scene should commence chest compressions wearing their current level of PPE – this PPE should at a minimum include medical mask and eye protection. The remainder of the team should DON airborne PPE (N95 respirator, eye protection, gown, gloves) prior to patient contact. Activate Code Blue call per unit standard. Communicate CODE status and COVID-19 status to code team on arrival.
Code Blue Team	
Team Members/ Role	<ul style="list-style-type: none"> If available, team should include two airway support personnel, two code registered nurses (RNs), physician team leader, airway expert. Airway should be managed by the best possible operator. Code team should don airborne PPE prior to entering room. If available, one additional physician or RN should be available outside of the room donned in PPE as backup, if needed. Minimize code team personnel in the room, if possible (roles outside the room could include recorder, runner, etc.).
Pediatric Advanced Life Support (PALS) Management	
Standard Resuscitation Protocol	<ul style="list-style-type: none"> Follow Heart and Stroke PALS algorithm for suspected or confirmed COVID-19 patients (CAB – compression, airway, breaths). Pediatric cardiac arrest is most commonly secondary to a respiratory cause. Airway management by expert.
Transport/Return of Spontaneous Circulation (ROSC)	
Post ROSC Care	<ul style="list-style-type: none"> Communication with PICU/ICU regarding time of transfer and disposition. Chest X-ray and ECG to be completed in PICU/ICU. Ensure a clear path to PICU/ICU destination. Establish doffing partner system to supervise doffing once no longer caring for the patient. Ensure all contaminated equipment is disposed or cleaned. Give opportunity for health-care workers and code team members to change scrubs and/or shower at the end of shift or at the end of patient handover.

* Some B.C. hospitals call pediatric cardiac / respiratory arrest “code pink” while some call them “code blue.”



Considerations

When possible, a first responder may enter the room in droplet and contact PPE and attach defibrillation PADS. If a shockable rhythm is present, this responder may provide early defibrillation while the code team don airborne (AGMP) PPE as per individual hospital policies.

F. Respiratory Care

The basic principles are to always take the appropriate additional precautions (as [per point-of-care risk assessment](#)) and minimize the use of AGMPs.

For Non-Intubated Patients

1. Provide O₂ as ordered with continuous SpO₂ monitoring as available in your setting.
2. No peak flow monitoring.
3. Nebulization should be avoided, if possible. It is recognized that children will continue to present with typical viral syndromes such as croup and acute exacerbations of asthma. Best clinical judgement should be used in those situations and the child managed using your clinical skills and therapies appropriate for the clinical situation.
4. Bronchodilator delivery via metered dose inhaler (MDI) via spacer is preferred, if available, and the patient can effectively use (using a mask attached to the spacer in under five years of age).
5. If patient is on heated humidified nasal high flow (HHNH) cannula or non-invasive positive pressure ventilation (NIV), aerosolization should be administered via in-line devices, rather than disconnection and delivery of MDI.

Heated Humidified Nasal High Flow Oxygen Therapy Devices (AIRVO/Optiflow)

Similar to adult management trends, the pediatric COVID-19 patient may require HHNH cannula treatment which may prevent unnecessary intubation. High flow heated humidified oxygen therapy devices may be aerosolizing. Limited evidence suggests HFNC has a low risk of causing nosocomial transmission. However, health-care workers should use N95 respirators in addition to other PPE when their patients are using HFNC until further evaluation of safety can be completed. The use of a negative pressure room is preferred, if available, but is not required.

Check with your local IPC experts for additional measures (e.g., clearance time).



Non-Invasive Ventilation (CPAP or BIPAP)

NIV may result in aerosolization of respiratory secretions and, thus, is not recommended for treatment in COVID-19 patients (who are not normally on non-invasive ventilation). If used in adults with Influenza-like illness (COVID-19 or other pathogens) with hypoxemic respiratory failure or acute respiratory distress syndrome (ARDS), NIV has been associated with high failure rates and the need for emergent intubation. It is unclear if this is true for children with COVID-19 infection. Patients with hemodynamic instability, multi-organ failure or abnormal mental status are at very high risk for failure and should not receive NIV. Pro-active intubation under less emergent conditions is the preferred strategy.

If used in patients with suspect or confirmed COVID-19 infection (e.g., in patients with goals of care that limit intubation patients with predominant airway disease or co-existing cardiogenic pulmonary edema) NIV treatment must be performed in a single patient room (preferably negative pressure) with the door closed and with staff using airborne and contact precautions, including N95 respirators. Preferentially, an NIV device with a HEPA filtered expiratory limb should be used (e.g., Servo U ventilator).

Providers caring for patients who are on home NIV who acquire COVID-19 should consult with the BC Children's Hospital home ventilation team for management advice.

Tracheostomy Care and Management in the Non-Ventilated Patient

Patients spontaneously breathing via a tracheostomy and remaining on contact and droplet precautions for COVID-19 should:

1. Continue to be managed in single patient rooms using appropriate PPE.
2. Attach a heat moisture exchanger tracheostomy t-piece and place a regular procedure mask on patient's face. Place a clean tracheostomy dressing under phalange of tracheostomy.
3. Uncuffed tracheostomy tubes should be changed to a cuffed tube by appropriate medical staff if the appropriate tube and staff are available.
4. Provide humidity as indicated and per current practice.

Tracheostomy Care and Management in the Ventilated Patient

Patients ventilated via a tracheostomy remaining on airborne precautions for COVID-19 should:

1. Continue to be managed in single patient rooms using appropriate PPE.
2. Place a procedure mask on patient's face and also place a mask over tracheostomy.
3. Place a clean tracheostomy dressing under phalange.
4. Uncuffed tracheostomy tubes should be changed to a cuffed tube by appropriate medical staff if the appropriate tube and staff are available.



5. Provide humidity as indicated and per current practice.
6. Closed suction systems are recommended for these patients.

For Intubated Patients

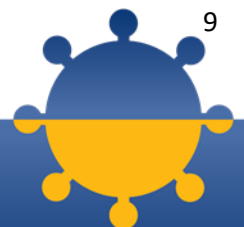
1. The following strategies should be considered to support children who have been intubated and awaiting the arrival of the transport team:
 - a. Deep sedation and paralysis may be required to reduce the chances of endotracheal dislodgement. Otherwise, follow usual sedation assessment and management practices.
 - b. Elevation of head of bed to 30 degrees (to reduce risk of ventilator associated pneumonia, as per standards of care for ventilated children and youth in B.C.).
 - c. Humidified gases as per usual practice.
2. Bronchodilator delivery should only be provided via MDI and spacer. Nebulizers should not be used.
3. Use in-line suction only for all ventilated patients, if available. Avoid open suctioning.
4. Post ventilation handling of ventilator: Strip ventilator of all disposable parts and place waste in biohazard bag and discard in room. Send reusable components for processing and mark as isolation. Clean the surfaces of unit with hospital grade disinfectant wipes.
5. Follow Section C: Transport Within Hospital.

To initiate a referral for all pediatric patients outside of BCCH, consult BC Patient Transfer Network (PTN). Phone: 604-215-5911 Toll Free: 1-866-233-2337.

Intubation Guidelines

NIV and high-flow oxygen therapies may not adequately support children with COVID-19 infection, making intubation necessary. Close monitoring is crucial to detect failure of non-invasive support means so that intubation can be performed in a timely and controlled manner using all optimal IPC strategies.

1. Endotracheal intubation should ideally be performed by the most experienced physician available: attending intensivist, anesthesiologist or critical care resident/fellow.
2. Recommend the use of an intubation checklist ([see COVID-19 pediatric intubation procedure](#)).
3. Minimize number of people involved. **Close the room door.** Nursing and RRT support ideally should be provided by the same individuals assigned to a patient. Follow local IPC guidance regarding AGMPs.
4. In units with adjustable room airflow rates, increase the rate of airflow prior to intubation.



5. Don full PPE as per IPC guidance (including N-95 respiratory or equivalent, eye protection, gown and gloves).
6. Pre-oxygenate as much as possible using non-invasive oxygen. Reserve use of bag-valve mask ventilation via a facemask to situations where non-invasive oxygen delivery is failing, to reduce aerosolization risks.
7. The best pharmacotherapy will be determined by the physicians on a case-by-case basis. In general this should include strategies that minimize chances of cough or aerosol generation through the use of agents inducing deep sedation and paralytics when clinically appropriate (e.g., no signs predicting difficult intubation).
8. Consider the use of video-laryngoscope for the initial attempts at intubation to reduce the risk of aerosol contact and reducing the need to look directly down the airway.
9. Place in-line suction catheter.
10. Heated humidification should be used in the pediatric population.
11. If sputum samples have not already been collected, collect now while all additional precautions for AGMP are in place for intubation.
12. If difficult airway cart or other stand-by equipment is brought to the area, do not bring the entire cart/equipment into the room. Bring in only the necessary equipment as it is needed.

Door is to remain closed until appropriate amount of time has passed based on room exchange rate as per facility guidelines.

G. Medical Care

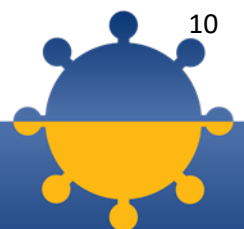
For patients with confirmed COVID-19, see [pediatric clinical guidance for COVID-19](#) for detailed guidance.

H. Environmental Control

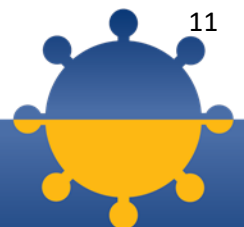
Refer to your local housekeeping or environmental services for specific policies in your health authority.

Additional Resources

- Donning (putting on) & doffing personal protective equipment procedure
 - [Donning \(putting on\) PPE poster](#)
 - [Doffing \(taking off\) PPE poster](#)
- [COVID-19 guideline for AGMPs only: Personal protective equipment donning & doffing](#)



- Intubation checklists:
 - [Adults](#)
 - [Children \(BC Children's Hospital\)](#); please see regional checklist for children below.





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Pediatric Intubation Procedure

MOST EXPERIENCED PRACTITIONER TO PERFORM PROCEDURE

Team ready?

- **Inside team**
 - MD
 - RT
 - +/- RN
- **Outside team**
 - Observer for PPE
 - Recorder
 - Runner
 - +/- second MD
 - Family support
- **PPE for team (airborne precautions)**
- **Observer to supervise DONNING /DOFFING of PPE**

Any AGMP (PPV, NG insertion, HHNFHC, nebs etc)
= Airborne precautions

Equipment ready?

- **Suction**
 - Rigid suction catheter turned onto max
- **Oxygen**
 - Mask
 - Viral filter
 - Bag valve mask + PEEP valve (use 2 person technique if needed)
- **Airway equipment**
 - Working laryngoscope and blade (video preferred)
 - Cuffed ETT plus extra 0.5 smaller size
 - Lubricated stylet
 - Syringe to fill cuff
 - Tube securement device
 - Tape
 - Scissors
 - Clamp (& gauze) for ETT
 - Oral airways
 - LMA
- **Pharmacologic agents**
 - Induction/paralytic drugs
 - Bring extra doses
 - Fluids / vasopressor
- **Monitoring Equipment**
 - SaO2, ECG, BP
 - ETCO2 (in-line preferred)
- **Ventilator set up**
NG or OG ready to place
In-line suction ready to place
'IV Start Kit'/'IO Set' PRN

Patient prepared?

- **Negative pressure room (if available)**
- **Functioning IV/IO**
2 if possible
- **Optimize patient position**
- **Pre-oxygenate patient**
face mask, 2 hands, 5 minutes
- **Optimize physiology**
fluid bolus or vasopressors?
- **Expose patient**
- **Failed intubation backup plan?**

Abbreviations:
HHNFHC – Heated Humidified Nasal High Flow Cannula
NIV – non-invasive positive pressure ventilation
NG – nasogastric

Nebs- nebulization
PPV – positive pressure ventilation

Plan for consequences?

- **Successful intubation**
 - Secure ETT
 - NG or OG tube
 - Continuous ETCO2
- **Ongoing sedation / paralysis**
- **Ventilation parameters set**
- **Failed intubation backup plan utilized?**
- **CXR**
- **Team to follow DOFFING procedure**
- **Document procedure**

Team may need to remain in room to allow droplet clearance. Clarify with Infection Control at your hospital.



Contributors

This guidance was developed by the Guideline Working Group and updated by the Guideline Working Group and the Pediatric Subcommittee of the Clinical Reference Group. Guidance was initially adapted from Alberta Health Services' Critical Care Strategic Clinical Network Guideline on Care of the Pediatric Critically Ill COVID-19 Patient developed by the Provincial Critical Care Communicable Disease Working Group.

About the Guideline Working Group

The Guideline Working Group was composed of members representing pediatric critical care, hospital medicine, emergency medicine, infectious disease, hospital infection prevention and control practitioners, public health, medical microbiology and acute care response professionals.

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About the Clinical Reference Group Pediatric Subcommittee

The Clinical Reference Group (CRG) is made up of senior individuals from relevant health-care areas (including critical care, epidemiology, infectious disease, microbiology, emergency medicine, public health, primary care and clinical specialties) acting as a collective resource for current COVID-19 knowledge. They provide clinical advice and guidance to support the overall work being done by the BC Centre for Disease Control, the Office of the Provincial Health Officer and the Ministry of Health. The CRG includes representation from the provincial health authorities and works with the other ministry areas to provide input on all COVID-19 content.

The pediatric subcommittee of the CRG is made up of pediatricians with expertise in the following areas: Complex care, general pediatrics, infectious diseases, intensive care, social pediatrics, rheumatology and immunology. The subcommittee also includes a representative from Child Health BC who facilitates, as regional coordinator at Interior Health, the review and gathering of feedback from all B.C. health authorities and ensuring inclusiveness of CRG documents as well as representatives from B.C.'s MIS-C Working Group.



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Feedback

To provide feedback on this document, please email CRG@bccdc.ca and include the document title in the subject line.



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