Care of the Pediatric Critically Ill COVID-19 Patient
Annex E

Provincial Critical Care Communicable Disease Working Group

Critical Care Strategic Clinical Network
Alberta Health Services

Note: This document adapts prior pandemic and ILI guidance to the current COVID-19 crisis. This document has been developed by the Provincial Critical Care Pediatric Communicable Disease Working Group.

Intention for use:
- o To guide all providers of pediatric critical care in Alberta as to the basic care of pediatric critically ill patients with known or suspected COVID-19 infection to ensure such patients receive optimal, consistent and equitable care throughout the PICUs of Alberta.
- o Recognize that the application of the guidance in this document will need to be adapted to the characteristics of each individual unit, zone and department.
- o This guideline is not meant to be applied to patient groups outside of critical care units.

AHS COVID-19 Website

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NOTE: The links in this document are updated regularly and should be periodically reviewed. Access to some information requires AHS Credentials to view.

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Revision History

Version	Author	Summary of Updates
March 17, 2020	CCSCN with Provincial Pediatric Critical Care COVID-19 Sub Group	Initial version
April 13, 2020	Robertson based on feedback from Provincial Pediatric Critical Care COVID-19 Sub Group, updated AHS Guidance documents and alignment with updated Care of the Adult Critically Ill COVID-19 Patient.	• Extubation added to AGMP • Addition of cohort resources from Infection Prevention & Control (IP&C) • Diagnostic imaging considerations and guidance on patient care rounds added to general care section • Updates to IP&C section • Updated lab testing • Updates to visitation policies • Code Blue changes per Provincial working group • Addition of extubation guidelines • Revisions per NFLSE for patient care items, equipment and environmental control • Medical care updates • Additions of intubation resources, proning resources and PPE conservation
April 21, 2020	Feedback from Provincial Pediatric Critical Care COVID-19 Sub Group	• AGMP; item j changed to all mechanical ventilation • Section B (8) changed to align with code blue document – previous statement around hearing alarms • Section C Admission Labs 1. (I) NPS – wording changed
April 29, 2020	Robertson based on site specific documents	• Code blue updated based on site specific documents – consistent general guidance • Intubation guidelines adjusted ,site specific pediatric policies added • Antimicrobial advice for pediatrics added as a hyperlink
July 7, 2020	Robertson/Blythe/Cave	• Updated screening criteria – inclusion of ongoing monitoring • Addition of AGMP guidance tool and updated IP&C COVID-19 Recommendations • Updated visitor policies • Removal of door being left shut for settle time based on updated IP&C guidance • Addition of information on Multisystem Inflammatory Syndrome • Updated medical treatment guidelines – changed recommendations on steroid usage • Updates to extubation section • Code blue changes to charting section

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A. Surveillance

Case Description for COVID-19

COVID-19 is an infectious syndrome caused by SARS-CoV-2, a novel coronavirus that has not been previously detected in humans. Though information is rapidly evolving, at this point it is noted that though the majority of patients have only mild symptoms, a small portion develop critical illness, in particular hypoxemic respiratory failure. COVID-19 is believed to be spread primarily via respiratory droplets (similar to influenza and other coronaviruses such as MERS and SARS) and/or contact (e.g., contaminated hands to mucous membranes). Person to person spread has been identified. In a small proportion of children, COVID-19 may be associated with a severe post viral syndrome (Multisystem Inflammatory Syndrome).

COVID-19 Screening and Monitoring Criteria:

Click links to see the most current updated screening and testing criteria for COVID-19:

AHS Directive: Communicable Diseases (respiratory including COVID-19 and ILI) Screening, Assessment and Monitoring in Acute Care

Patient Screening and Symptom Assessment & Monitoring Recommendations for COVID-19

- All patients are to be assessed initially for symptoms and risk factors associated with respiratory communicable disease using Form 21615: Communicable Disease (Respiratory) Initial Screening Form

- The initial assessment will then inform the use of AHS Acute Care COVID-19 Expanded Testing Algorithm. The AHS Acute Care COVID-19 Expanded Testing Questions is available as a guide to the algorithm.

- Ongoing assessment of admitted patients is to be completed using Form 21616: COVID-19 Symptom Identification and Monitoring.

- All forms may be available in electronic or paper form per site specific guidelines. COVID-19 Testing and Self-Isolation Criteria

B. Preparation and Admission of COVID-19 Patients to PICU

1. Patients who are suspected, presumed or positive COVID-19 status admitted to the PICU will be cared for using contact and droplet precautions.

   Respiratory Illness: Assessing the Need for Additional Precautions (Isolation)

2. A point-of-care risk assessment (PCRA) must be performed before every patient interaction with a suspected, presumed or positive COVID-19 status irrespective of location. The PCRA should include the frequency and probability of routine or emergent aerosol generating medical procedures (AGMP) being required.

   AHS Point of Care Risk Assessment (PCRA)

3. N95 respirators or approved equivalent protection must be used by all heath care workers in the room where aerosol-generating medical procedures (AGMP) are being performed, are frequent or probable, or with any intubated patients.

4. AGMP include:

    a. Intubation and related procedures (e.g., manual ventilation, open endotracheal suctioning, extubation)
    b. Cardio-pulmonary resuscitation (CPR) with Respiratory Support (Bag-Value-Mask ventilation, Intubation)
    c. Bi-level Positive Airway Pressure (e.g. BiPAP, CPAP)
    d. Humidified high flow oxygen systems (e.g., ARVO, Optiflow)
    e. Tracheostomy care
    f. Bronchoscopy
    g. Sputum induction
    h. Nebulized therapy/aerosolized medication administration
    i. Open respiratory/airway suctioning
    j. Invasive mechanical ventilation
    k. Nasopharyngoscopy

For further guidance on AGMP consult Aerosol-Generating Medical Procedure Guidance Tool. When an AGMP is in progress the following poster may be utilized: AGMP Poster

**There is no settle time required after AGMP is complete **

5. Due to the higher risk of aerosol generation, critically ill patients with suspected, presumptive or confirmed COVID-19 should be admitted to single patient rooms when available.

6. Negative pressure (airborne isolation) rooms are not required and should be reserved for patients with disease processes requiring airborne isolation but may be utilized if available.

7. If all single patient rooms are occupied then attempt to cohort COVID-19 patients in one area with a minimum 2 meter separation between patients. IP&C guidance on cohorting of patients should be reviewed.

    IP&C Cohort Resource for COVID-19
    IP&C Cohort Recommendations when on Additional Precautions in Acute Care Facilities

8. When all required personnel and equipment are in the room, and where possible, doors should be closed to minimize the movement of staff and equipment in and out of the room.

9. Stock isolation cart with adequate supply of N95 masks (all brands and sizes), goggles, face shields, gloves (all sizes), disposable isolation gowns, surgical masks and disinfectant wipes. Ensure the entire spectrum of brands and sizes of N95 masks are available and placed on the isolation cart outside of the patient room and at the entry to a COVID-19 cohort area. Ensure canisters of disinfectant wipes inside and outside the patient room and cohort areas are adequately full.

10. Enter order for "Contact and droplet isolation precautions" in the patient record, adding the comment "Use N95 masks for aerosol generating medical procedures, and for all suspected, presumed or confirmed COVID-19 patients receiving heated humidified high flow oxygen delivery non-invasive ventilation or invasive mechanical ventilation" as additional information.

11. Review IP&C Contact and Droplet Isolation Precautions and PPE Checklist: Contact and Droplet Precautions.

12. Post the AHS Contact and Droplet Isolation Sign.

13. Review Interim IPC Recommendations COVID-19.

14. Ensure appropriate viral diagnostic tests have been performed prior to admission to PICU (see Section C). If viral diagnostic studies have not been performed – consult with MRHP to order appropriate studies.

C. Admission Laboratory Testing

Diagnostic studies:

Though nasopharyngeal swabs (NPS) are commonly used for screening for infection with respiratory viruses, molecular viral studies on sputum samples (e.g., endotracheal aspirates (ETA) or tracheal aspirates) are more sensitive. Molecular tests for respiratory viruses are highly specific hence repeated/confirmatory testing of patients with positive results is not required.

1. Patients with a positive result by molecular testing for respiratory viruses including COVID-19 do not require additional respiratory viral testing.

2. For patients without a positive result by molecular testing for respiratory viruses including COVID-19:
   i. If a NPS is already collected, do not collect an additional NPS.
   ii. If the patient is intubated, an ETA should be collected as soon as possible and sent for respiratory viral testing (irrespective of whether a NPS has been collected).

3. If the patient is not intubated and has not had a NPS sent for respiratory viral testing then a NPS should be collected as soon as possible

4. If there is a clinical possibility of other more unusual pathogens (e.g., as in an immunosuppressed patient), consideration should be given to performing bronchoalveolar lavage (BAL) recognizing that bronchoscopy is an aerosol generating medical procedure (AGMP).

5. Bronchoscopy solely for the purposes of microbial sampling in an otherwise uncomplicated patient is not recommended.

6. If necessary, bronchoscopy should be performed only on intubated patients and used only exceptionally in non-intubated patients with known or suspected COVID-19 in order to minimize the risk of aerosolization.

7. Some patients infected with COVID-19 may shed virus intermittently and consideration should be given to repeating viral studies if the initial samples are negative in a patient with a high clinical suspicion of COVID-19 or if there was concern that samples may not have been collected appropriately.

8. As viral pathogens are only one diagnostic possibility for most clinical presentations, additional testing should be obtained in the patient presenting with possible but not proven COVID-19 to look for other pathogens.

   At a minimum this would generally include:
   i. blood cultures
   ii. endotracheal or tracheal aspirate for cultures (i.e., bacterial, fungal, PJP etc. as appropriate) (if intubated) or expectorated sputum for culture (if not intubated). Sputum induction is not recommended to reduce aerosol-related infectious risk.
   iii. liver function tests and enzymes
   iv. urinalysis
   v. sampling of pleural fluid if present in significant quantities

9. Consider performing serum LDH, D-dimer, C-reactive protein, ferritin and BNP and/or troponin if clinically indicated and not already done.

10. CT scans of the thorax are not suggested solely for the assessment of suspected or confirmed viral pneumonia given lack of specificity, added risk and PPE use needed for transport. CT imaging may be appropriate for other indications.

Nasopharyngeal Swab (NPS):

Collect NPS according to Alberta Precision Laboratories (APL) and Public Health Laboratory recommendations. Mark sample as STAT. Order both COVID-19 and Respiratory Pathogen Panel for the same sample (only a single sample is required for all respiratory viral testing). Send sample to lab**.**

How to Collect an NPS using a Flocked Swab

How to Collect an NPS using APTIMA Unisex Collection Kit

Endotracheal Tube Aspirate (ETA)/Tracheal Aspirate:

Collect ETA (intubated patients) or tracheal aspirate (for patients with a tracheostomy) and place minimum 0.5-1 ml of secretions into sterile leak proof container. No additional transport medium is required. Mark sample as STAT. Order both COVID-19 and Respiratory Pathogen Panel for the same sample (only a single sample is required for all respiratory viral testing). Send sample to lab.

Bronchoalveolar Lavage (BAL) Fluid:

Collect and send per site Policy and Procedure. Mark sample as STAT. Order both COVID-19 and Respiratory Pathogen Panel for the same sample. No additional transport medium is required. Bronchoscopy is generally to be avoided for the sole purpose of diagnosis of viral pneumonia given higher risk for aerosolization, but may be indicated in immunosuppressed patients who may be at risk for multiple and/or unusual organisms. Clinical specimens should be placed in a separate biohazard bag and sealed with the zip lock closure. Ensure that the outside of the bag remains uncontaminated.

Lab Ordering and Results:

1. Expedited Testing and Turn-around Times

2. Sites using Connect Care or Sunrise Clinical Manager (SCM) can order COVID-19 testing directly.

3. Change in ordering Respiratory Pathogen Panel (RPP) and COVID-19 testing.

4. Sites not using Connect Care or Sunrise Clinical Manager should request testing manually using the Serology and Molecular Testing Requisition and writing "COVID-19" and "Respiratory Pathogen Panel" in the bottom box.

5. Look for the results of viral testing in **Alberta Netcare.** Results will also be reported in Sunrise Clinical Manager and in Connect Care.

6. Physicians caring for suspected or presumed COVID-19 positive patients will generally also be notified of results by the APL-Public Health Lab Virologist on-call (VOC) or the local Medical Officer of Health (MOH).

D. Transport and Admission to PICU

1. All health care providers involved in transport must use appropriate isolation precautions. For suspected, presumed or confirmed COVID-19 intubated patients and those with active AMGP underway (e.g. open suctioning), staff involved in the transport should don N95 respirators. In the absence of the above conditions, surgical masks should be worn.

2. Considerations should be given to donning of clean (non-contaminated) gown and gloves prior to any transport to minimize environmental contamination.

3. Staff providing direct care during the transport should also don protective eye wear, masks, gown and gloves. Note: personal eye wear is not sufficient.

4. Hand hygiene should be performed before and after patient transport.

5. Wipe the handles of the bed before transport with disinfectant wipes. Designate one porter/assistant as 'clean' to open doors and touch elevator buttons.

5. Transport with minimum number of people necessary - registered nurse (RN), registered respiratory therapist (RRT), most responsible health practitioner (MRHP), and health care aide (HCA) as appropriate. Follow site specific policies if family members are present.

6. Avoid starting HHHF or NIV in Emergency Department if possible. Transfer to PICU first, if this therapy will clearly be required urgently.

If patient not intubated:

- Transport with non-humidified (dry) oxygen supply - respiratory to identify the most appropriate oxygen delivery mask.
- Patients should wear a procedure mask if tolerated.
- All nebulizer therapy should be stopped.
- If HF or NIV has been commenced, consider continuing only if full face mask CPAP/BiPAP with HEPA or manual mask CPAP/BiPAP with HME in-line is unavailable or not tolerated.
- Hallways should be cleared of extraneous personnel.
- Clean O_2 cylinder(s) and transport stretcher with disinfectant wipes before returning to general circulation.

If patient intubated:

- Manual bagging units should have filters in place.
- Use of transport ventilators are preferred to minimize the need for manual ventilation. Many critical care ventilators have transport capability if required.
- Ventilators, including transport ventilators, should have filters in place as appropriate to the device and type of ventilation.
- RRT will manage airway and oxygen requirements with consultation with MRHP.
- Clean O_2 cylinder(s) and transport stretcher with disinfectant wipes before returning to general circulation. Clean and disinfect transport ventilator after use and discard breathing circuit.

E. Staffing Considerations

The principle is to minimize the number of staff involved directly with the patient while providing quality patient care.

1. The nurse in charge and the respiratory therapy supervisor are responsible to determine patient assignment and will coordinate care of all patients in the unit with the principle in mind that the total number of staff caring for a COVID-19 patient should be kept to a minimum. If possible, cohort staff so that RNs and RRTs caring for COVID-19 patients are not caring for non–COVID-19 patients. Geographical cohorting of COVID-19 patients may assist with staff assignments if appropriate to facilitate.

2. All members of the healthcare team, inclusive of physicians, NPs, RNs, RRTs, allied health, and support staff will continue to perform their usual duties. They must review and adhere to all appropriate isolation precautions prior to entering rooms.

3. For students (medical or otherwise) working within an ICU, please check with current educational institution guidelines for any restrictions to practice or exposures.

4. Individuals who are unable to competently adhere to the IPC recommendations for COVID-19 (e.g. skin condition that precludes proper hand hygiene practices) should not provide care to patients who are under investigation for COVID-19, or those who have probable or confirmed COVID-19. Staff who are unable to be "Fit Tested for N95 masks" should not care for suspected or confirmed COVID-19 patients that are intubated or require any AGMP.

F. Infection Prevention Precautions

1. Suspected, presumptive or confirmed COVID-19 cases in the ICU should be managed with contact and droplet precautions. Use N95 respirators for all aerosol generating medical procedures (AGMP, see definitions Section B 2.) and for all suspected, presumptive or confirmed COVID-19 intubated patients.
   Detailed Contact and Droplet Precautions
   Interim IPC Recommendations COVID-19

2. All staff providing care must be successfully N95 fit tested and masks must be seal checked when applying.

3. Prescription glasses do not meet Workplace Health and Safety regulations for eye protection.

4. Remove soiled PPE as soon as possible. Change mask when it becomes moist or soiled.

5. Use of a dedicated reusable stethoscope is preferred. When not available refer to IP&C guidance document.
   IP&C Stethoscope Use Guidance

6. Effective and appropriate use of PPE will keep staff uniforms and clothing clean. Staff should change before leaving healthcare facility, and take soiled clothing home in a bag. Soiled uniforms/clothing do not need any special handling in the laundry.
   Healthcare Attire Information Sheet
   Staff Tips: COVID-19 Personal Clothing and Cleaning Surfaces

7. Hand washing is critical to prevent spread of COVID-19. Special attention to hand hygiene is essential for staff, patients and visitors; wash hands with soap and water or use antiseptic hand rub before and after each and every contact with patients or their environment. Remind colleagues if you see lapses in hand hygiene behavior. Educate patients and visitors about how and when to use hand hygiene products.
   Hand Hygiene Education

8. For patients with suspected or presumed but not confirmed COVID-19 infection, maintain contact and droplet isolation precautions including N95 respirators for AGMP and intubated patients until the COVID-19 and full respiratory viral panel results are confirmed on all respiratory samples sent (ETA, NPS and BAL). If any results are positive – maintain current precautions. If results are negative, check with IP&C before discontinuing isolation as patient may still call for isolation per Public Health Self-Isolation Guidelines.
   Interim IPC Recommendations COVID-19

9. Discontinuation of Isolation for patients with confirmed COVID-19 infection:
   Discontinuation of Contact and Droplet Precautions for Suspected or Confirmed COVID-19

PPE Guidance:
The following link contains all up to date information on PPE and should be reviewed periodically: Personal Protective Equipment (PPE)

Applying N95 respirators: Hold mask in your hand and pull both elastic ties, bottom first, over your hand for ease of putting mask on. Test to ensure that mask is secure and that there are no leaks. Discard immediately outside of room after use. Do not touch the outside of the mask while discarding as it is considered contaminated.

Proper wearing of an N95 respirator includes:
- putting on the respirator before entering the patient's room
- moulding the metal bar over the nose
- ensuring an airtight seal on the face, over top of the nose and under the chin
- donning eye protection after N95 for AGMP
- leaving the room and changing the respirator when it becomes moist
- removing the respirator after leaving the patient's room by touching elastic only
- not wearing respirator around the neck.

Personal Protective Equipment (PPE) Guidance to Help Make Continuous Masking Work for You

Eye protection (disposable face shields/goggles): Face shields or goggles are to be worn upon entering the patient room. Personal eyewear (glasses) is not sufficient. Face shields are single use. Discard face shields outside of the room after use. If googles are re-used they must be fully wiped down with disinfectant wipes prior to re-use.

Gloves: Always perform hand hygiene prior to putting on gloves and after removal.

Gowns: Remove lab coat before donning. Ensure the back of the gown is secured.

Donning: https://www.albertahealthservices.ca/assets/Infofor/hp/if-hp-ipc-donning-ppe-poster.pdf

Doffing: https://www.albertahealthservices.ca/assets/Infofor/hp/if-hp-ipc-doffing-ppe-poster.pdf

Meals: Used meal trays and dishes do not require special handling. Disposable dishes and utensils are not required.

G. General PICU Care

1. Reduce clinically unnecessary entry into the room.
   See **Appendix E** for strategies to conserve personal protective equipment (PPE).

2. Patient care rounds should take place outside of patient room to minimize number of people in patient room and preserve PPE. Attempts should be made to coordinate around times when bedside team is doffed. Other communication modalities (e.g. speakerphone) may be utilized to facilitate communication between the interprofessional teams within and outside the room.

3. 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 staff.
   c. All equipment should be kept in the patient's room to avoid transmission via objects. Dedicate equipment to isolation room or clean with hospital grade disinfectant after use 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.
   e. Ensure proper placement of waste bins, linen hampers and recyclable bins (e.g. goggle recycling) within the immediate proximity of the entrance to the room to allow for proper donning and doffing per IP&C standards.

4. Visitors

   For visitation policies during COVID- 19 access the following links for up-to-date visitation regulations. Follow site specific protocols during family visitation. Many documents and posters are available in multiple languages.
   COVID-19 Essential Visitor and Designated Family/Support Guidance
   COVID-19: Family Support & Visitation of Patients & Residents
   Family Support & Visitation of Patients & Residents
   COVID-19 Visitor Restrictions Poster
   AHS Virtual Visitation - FAQ
   MyHealth.Alberta Visitor Contact & Droplet Guidance

5. Charting

   a. Do not take the patient chart or laboratory results into the patient room.
   b. Mobile computer terminals are to remain outside the patient room at all times 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).

6. Investigation Considerations

   a. All attempts should be made to minimize off unit testing unless clinically required.
   b. Discontinue daily orders for bloodwork, chest x-ray (CXR) or electrocardiograms (ECGs) and only order when clinically required.
   c. All CXRs should be performed portably within the ICU.
   d. Diagnostic testing should be performed portably in the ICU when possible (e.g. ultrasonography).
   e. When possible and where capability exists, utilize bedside RN to perform 12 lead ECG with bedside cables.

H. Code Blue Resuscitation of the Suspected, Presumptive or Confirmed COVID-19 Patient

Refer to site specific policies for complete guidelines. Provincial guidance posted to [AHS COVID-19 Website](#) **will supersede guidance below.**

Guiding Principles:
1. Minimize number of participants in the patient room during resuscitation.
2. Minimize equipment in the room wherever possible.
3. Confirm GOC – is resuscitation appropriate.
4. Proper PPE (contact and droplet precautions, including a fit-tested N95 mask) shall be donned prior to initiation of any AGMP by all response team members, even if there is a perceived delay in resuscitation efforts.
5. Procedures should be performed by most experienced practitioner.
6. Routine practices, such as defibrillation and CPR, are otherwise unchanged from non-COVID-19 patients.
7. ECPR will be offered per the *Extracorporeal Life Support (ECLS) Triage Guidelines for COVID-19 in Alberta (March 2020)* – i.e. limited in pandemic stage 3 and not offered in stage 4. Follow site specific guidelines related to ECLS cannulation.

Site specific paging/notification processes should be followed. Clear identification of isolation requirements should be made to the response team on arrival. Upon arrival to the code, team members should quickly clarify roles and which members will be working inside versus outside the room.

Code Team Arrival:

- Donning should be carried out quickly but meticulously, even if there is a perceived delay to resuscitation.
- PPE application should be monitored when there is an available "PPE Observer".

Inside the room:

- Code cart will be brought into the room if required, otherwise may remain outside of room.
- Intubation equipment:
  - ➢ Video laryngoscopy is highly recommended for the first attempt at intubation (where available).
  - ➢ Priority should be placed on intubation and obtaining a secure airway with closed ventilation, especially in an unresponsive patient.

Outside the room:

- RN/HCW "runner", to assist with supply of equipment stored on the unit and the activation of other HCWs, if required.
- "PPE Observer", who should be a senior HCW, to regulate access to the patient's room, monitor proper PPE donning and doffing, ensure that protocols and the opening and closing of doors is followed and communicate with the PICU prior to the initiation of patient transport.

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<u>Modifications to PALS in COVID-19 Patients:</u>

- Intubate patients early and hold CPR during intubation to minimize aerosolization of particles and optimize intubation success.
- During manual BVM use two experienced practitioners to establish an intact seal and minimize the risk of aerosolization.
- Avoid disconnections between the ETT and resuscitation bag. If required due to gas trapping, the plan to disconnect should be announced loudly in advance and the ETT should only be disconnected beyond the HEPA filter.

<u>Post-Arrest:</u>

- PPE Doffing: DO NOT RUSH. BE METHODICAL. Remove PPE slowly and carefully to avoid inadvertent contamination of yourself or others, performing hand hygiene in between each step while doffing.
- "PPE Observer" to monitor member PPE doffing.
- Team to decontaminate specialty equipment as per standard routines and IP&C guidelines.
- Discard any opened supplies or any that cannot be cleaned appropriately.

<u>Charting Considerations</u>:

- Computer code narrator may be utilized with existing computers within the room or immediately outside the resuscitation room
- No portable computer devices should be brought into the room
- All efforts to maintain a clean paper chart should be taken
  - Papers are not means of transmission. Handle all paper with clean hands, clean any shared items (like chart binders, pens or binders) with a low-level disinfectant wipe.
  - Transcribing for purposes of infection prevention will not be required.

I. Respiratory Care

The basic principles are to always use personal protective equipment in addition to appropriate isolation precautions and minimize the use of aerosol-generating procedures.

For Non-Intubated Patients:

1. Provide O_2 as ordered with continuous SpO_2 monitoring.
2. For patients receiving oxygen by any type of nasal cannula outside of single rooms should be given a procedure mask to wear, so to reduce others' exposure to cough/sneeze droplet spread if tolerated.
3. Patients should be cared for with head of bed elevated 30-45 degrees at all times.
4. No peak flow monitoring.
5. Nebulization should be avoided and be used only as an exception.
   Memorandum: Restricted use of Nebulized Treatment for Covid-19
6. Bronchodilator delivery via MDI via spacer is preferred if patients can effectively utilize.
7. If patient is on HHHF or NIV, aerosolization should be administered via in-line devices, rather than disconnection and delivery of MDI.

Heated Humidified High Flow Oxygen therapy devices (ARVO, Optiflow):
- Aerosolization of respiratory secretions may result from high flow heated humidity oxygen therapy devices.
- As such, it is **not recommended** for routine use in adult COVID-19 patients. Pediatric COVID-19 patients will likely require Optiflow treatment to manage patients not sick enough to require intubation and mechanical ventilation.
- Current practice and use of Optilflow will not be restricted in this population.
- If used in pediatric patients with suspected, presumptive or confirmed COVID-19 infection, treatment must be performed in a single patient room with the door closed and with staff using contact and droplet precautions including use of N95 respirators.

Note that HHHF has no HEPA filtration and as such is probably less safe than a well-fitting full face mask NIV via 2 limb circuit with HEPA filter.

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Non-Invasive Ventilation (CPAP or BIPAP):
- Non-invasive positive pressure ventilation (NIV) may result in aerosolization of respiratory secretions and thus is not recommended for routine use in COVID-19 patients.
- If used in adult patients with suspected or confirmed COVID-19 (or other ILI) and hypoxemic respiratory failure or ARDS, selected evidence has suggested NIV is associated with high failure rates and need for emergent intubation.
- 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 suspected, presumptive or confirmed COVID-19 infection NIV treatment must be performed in a single patient room with the door closed and with staff using contact and droplet precautions including use of N95 respirators.

Preferentially an NIV device with a HEPA filtered expiratory limb should be used. (Eg. Servo I)

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. Provide humidity as indicated and per current practice
3. Closed suction systems are recommended for these patients.
4. Trachs will NOT be routinely changed to cuffed trachs upon admission to hospital

If single patient rooms are unavailable patients with COVID-19 may be cohorted.

Intubation guidelines:

Moderate to severe hypoxemic respiratory failure/ARDS usually requires support with endotracheal intubation and mechanical ventilation. NIV and high-flow oxygen therapies frequently fail to adequately support such patients making intubation necessary. Close monitoring is crucial in order to detect failure of non-invasive support means so that intubation can be performed in a timely and controlled manner using all optimal infection prevention strategies.

1. Endotracheal intubation should, ideally, be performed by the most experienced MRHP available.

2. Minimize number of people involved. **Close the room door**. Nursing and RRT support ideally should be provided by the same individuals assigned to patient.

3. In units with adjustable room airflow rates, increase the rate of airflow (or put the room in "bronchoscopy mode") prior to intubation.

4. Don full PPE including N95 respirator, eye protection, gown and gloves. Proper application of PPE should be verified by an independent observer prior to entry into the patient room. If goggles are re-used they must be fully wiped down with disinfectant wipes prior to re-use.

5. The best pharmacotherapy induction and intubation will be determined by the MRHP on a case-by-case basis but in general should include strategies that minimize chances of cough or aerosol generation via use of agents inducing deep sedation and often use of neuromuscular blockade when clinically appropriate (e.g. no signs predicting difficult intubation).

6. Consider use of video-laryngoscope for the initial attempts at intubation (in order to reduce the risk of aerosol contact and reducing the need to look directly down the airway); however, MRHP should use the technique most familiar to them that will ensure the greatest probability of successful intubation.

7. Place in-line suction catheter. HME devices are recommended unless the issue of extra dead space and risk of small ETT occlusion with HME is significant; then Fisher Paykel heated humidifier will be used in pediatric population.

8. Obtain ETA now while all infection control precautions for AGMP are in place for intubation.

9. If difficult airway cart or other stand-by equipment is brought to the area, do not bring entire cart/equipment into the room – bring in only the necessary equipment as it is needed.

   See Appendix C for site specific guidance.

For Intubated Patients:

1. Critically ill COVID-19 patients frequently require advanced ventilator modes and patient management. The following strategies should be considered to support failing gas exchange in COVID-19 infected patients:

   a. Targeted deep sedation +/- neuromuscular blockade (some medications have known shortages – review pharmacy bulletins when selecting sedatives and paralytics)

   b. Elevation of head of bed to 30-45 degrees

   c. Lung protective ventilator strategies that restrict tidal volumes to 4-8 mL/kg of Ideal Body Weight (IBW).

   d. Limit plateau pressures to ≤ 30 cm H_2O (exceptions include conditions where there is additional pulmonary extra-parenchymal restrictive physiology such as large pleural effusions, severe obesity or abdominal compartment syndrome)

   e. Allowing permissive hypercapnea

   f. Optimal titration of PEEP

   g. Recruitment maneuvers as tolerated

   h. Early consideration for a trial of prone positioning - refer to site specific policy and procedures.

      Educational Resources for Proning During a Pandemic

   i. Minimization of fluid accumulation and extra-vascular lung water in patients without hypovolemia via reduction of non-essential fluid intake and correction of positive fluid balance with diuretic therapy or mechanical fluid removal with CRRT.

2. Nitric oxide can be utilized per current practice standards and guidelines. The above indicated precautions are required should this therapy be delivered with Optiflow.

3. If advanced PICU respiratory care (defined as the use of all of the above measures possible to apply) has failed to improved oxygenation or can only be accomplished by applying mechanical ventilation that is not lung protective, consult ECLS Team.

   To initiate a referral for all pediatric patients consult Stollery PICU Intensivist on-call.

   For patients admitted to the ACH in Calgary, consultation between the PICU Intensivist at ACH and the PICU Intensivist at Stollery will occur. If a decision is made to cannulate the patient for ECLS, the Stollery pediatric transport team will retrieve the patient for transfer and ongoing management in Stollery PICU.

   ECLS Recommendations for COVID-19

4. If a patient is not deemed appropriate for ECLS support and continued care is pursued, consider:

   o Permissive hypoxemia - accept Sa02 85-90%, Pa02 50-60
   o Target Hemoglobin >70 (maximize oxygen carrying capacity)
   o Target temperature <37.5 (reduce oxygen demand)

5. Bronchodilator delivery should only be provided via MDI and spacer. Nebulizers should not be used.

6. Humidity should be preferentially provided via in-line HME devices or via integral ventilator humidification systems. Avoid use of external active/heated humidity systems unless necessary.

7. Use in-line suction only for all ventilated patients. Avoid open suctioning**.**

Extubation Guidelines:

Extubation of patients is considered to be an AGMP. Careful consideration should be given to the safety of HCWs during the extubation procedure and to reduced reintubation rates.

1. Ensure readiness for extubation
    - Extubate from spontaneous or pressure support with low PEEP
    - FiO2 =< .50
    - Patient should be ready for extubation onto low-flow oxygen
    - As is usual practice, ensure cuff leak

2. Apply PPE per AGMP.

3. Two staff members should perform extubation to monitor safety.

4. Strategies should be employed to minimize coughing
    - Oral suctioning may be performed with care taken not to precipitate coughing
    - Medication to minimize coughing may be employed such as use of intravenous opioids, lidocaine or dexmedetomidine.
    - Upon extubation, apply bag-valve-mask to face until any coughing has subsided

5. Once successful, apply procedure mask of mouth and nose over nasal oxygen as tolerated.

6. 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 IPC approved disinfectant wipes

J. Medical Care

Goals of care discussions should occur early in admission consistent with our regular practice.

Streamlined Goals of Care Designation decision-making for COVID-19

Other standard practices of medical care will apply such as nutrition in the ICU, ventilator acquired pneumonia prevention protocols and VTE prophylaxis.

At this time there are no robust evidence-based effective therapies for the treatment of the novel coronavirus, SARS-CoV-2, and supportive care remains the mainstay of therapy for infected individuals. For patients presenting with an ILI where SARS-CoV-2 is one possible etiology, it is important to recognize the possibility of additional common viral and bacterial pathogens to underlie the patients presentation, even in the presence of exposure to COVID-19 infected individuals or relevant travel exposures.

Recommendations for Antimicrobial Management of Pediatric Hospitalized Patients with COVID-19

1. Microbial Testing

Even in patients with proven COVID-19 infection, particularly in patients with severe disease, bacterial and/or other viral co-pathogens often are also present.

All patients evolving severe illness should be tested for the full spectrum of respiratory viruses (including SARS-CoV-2) and bacterial pathogens. This should include:

    i.   In all patients, a NPS and/or ETA for respiratory viruses (including SARS-CoV-2) (see admission testing **Section C** above).

    ii.   In intubated patients, an ETA sample for bacterial culture.

    iii.   For non-intubated patients NPS will be used for diagnosis of SARS-CoV-2, and in those able to produce sputum, expectorated sputum can be sent for bacterial culture. Sputum induction is **not** recommended in non-intubated patients (to reduce exposure risks).

    iv.   Blood cultures x 2 drawn from separate lines/sites.

    v.   Sampling of pleural fluid as appropriate if present is significant quantities.

Bronchoscopy solely for the purposes of microbial sampling in otherwise uncomplicated patients is not recommended (unproven benefit; high risk procedure). If there is a clinical possibility of other more unusual pathogens (e.g., as in an immunosuppressed patient), consideration could be given to performing bronchoalveolar lavage (BAL) recognizing that bronchoscopy is an AGMP. If necessary, bronchoscopy should be performed only in intubated patients and avoided in non-intubated patients with COVID-19 in order to minimize the risk of aerosolization.

2. Empiric Antimicrobial Therapy

Antibiotics will generally have a limited role in managing patients with proven COVID-19 though they are indicated for Initial empiric management of patients with severe pneumonia while COVID-19 is being confirmed and bacterial superinfection is being excluded.

Patients evolving severe illness should be empirically treated with intravenous antibacterials along with consideration for oseltamivir (seasonally depending on circulation of influenza) pending results of initial microbial testing. Appropriate antibacterials should take into consideration patient presentation (isolated respiratory vs more generalized illness), allergies, prior or high risk for colonization with ARO (e.g., MRSA), local microbial resistance patterns and comorbid disease that might influence antibiotic use (e.g., conduction delay). As per current guidelines for community-acquired pneumonia management, initial empiric antibacterial coverage as appropriate for age specific local guidelines. Initial empiric therapy should be de-escalated or discontinued as microbiology results return as appropriate.

3. COVID-19 Specific Antiviral Therapy

As of the date of this guideline, there are no approved or evidence-informed therapies proven in clinical trials directed towards SARS-CoV-2 (the virus that causes COVID-19 infection). There are numerous clinical trials underway in many countries and one expects new treatment information to evolve over time.

[COVID-19 Scientific Advisory Group Rapid Response Brief: Remdesivir](#)

In addition, the following agencies may provide up to date guidance on anti-viral therapies:

- o   PHAC - https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals.html

- o   WHO - https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/patient-management

- o   CDC - https://www.cdc.gov/coronavirus/2019-ncov/hcp/index.html

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4. Systemic Corticosteroids

Systemic corticosteroids for the treatment of viral pneumonia was previously not recommended. The RECOVERY trial has provided new rigorous evidence to support use of treatment with dexamethasone 6 mg intravenously once daily for up to 10 days to reduce 28-day mortality in patients with COVID-19 who are receiving respiratory support. This recommendation is limited to patients who are receiving respiratory support (i.e., supplemental oxygen and/or invasive mechanical ventilation).

Systemic steroids may also be of value for other clinical indications such as severe septic shock or ILI triggered asthmatic exacerbation.

Effect of Dexamethasone in Hospitalized Patients with COVID-19 – Preliminary Report

5. Fluid Management

Following initiation resuscitation, use conservative fluid management in patients with COVID-19 when there is no evidence of shock or overt hypovolemia. Patients with COVID-19 should be treated cautiously with intravenous fluids, because aggressive fluid resuscitation and fluid accumulation may worsen oxygenation. Hypotonic fluids, starches and albumin should generally be avoided. Minimization of fluid accumulation and extra-vascular lung water via reduction of non-essential fluid intake and mitigation of fluid accumulation with diuretic therapy or mechanical fluid removal with CRRT should be applied, as applicable.

6. Immune Modulating Therapies

Though ARDS and cytokine release syndrome (CRS) are important manifestations of severe disease, there is no evidence from clinical trials to support the routine use of any immune modulator therapies in patients with COVID-19 and empiric therapies are not recommended outside of clinical trials.
.

7. Clinical Trials

Consideration should be given to enrollment in any locally active clinical trials (epidemiologic or treatment related) if available. Contact the local research coordinator or MRHP as appropriate.

8. Multisystem Inflammatory Syndrome (MIS-C) in Children with COVID-19

Clusters of children and adolescents have been admitted to hospitals (including many in PICUs) in Europe and North America with features similar to Kawasaki Disease (KD) and Toxic Shock Syndrome (TSS) far above historic expected case numbers. These patients presented with an acute febrile illness accompanied by a hyper-inflammatory syndrome and often suffered multi-organ failure, particularly acute heart failure, some weeks after an acute COVID-19 infection or exposure to COVID-19.

Early recognition and appropriate transfer and management of these patients is critical. Children may present with clinical features of shock and may be sensitive to large volume fluid resuscitation. These patients should be managed at a tertiary pediatric centre. Extracorporeal life support (ECLS) has been required for cardiac support. Deaths have been reported (personal communication Dr. S Riphagen, London UK). There is an urgent need for co-operative collection of data concerning these cases.

World Health Organization Platform Multisystem inflammatory syndrome in children and adolescents with COVID-19

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Multisystem Inflammatory Syndrome in Children (MIS-C) Key Messages

❖ Children and adolescents with fever of 3 or more days, with or without a past history of acute COVID infection OR known COVID contact, may have MIS-C
❖ Febrile children with abdominal pain or significant vomiting/diarrhea may have MIS-C 3. Febrile children with shock may have MIS-C
❖ MIS-C mimics Kawasaki Disease and Toxic Shock Syndrome (TSS) (see Appendix)
❖ Do not delay anti-microbial therapy because you suspect MIS-C—as it is a diagnosis of exclusion
❖ If suspected (even if clinically well), consult with Stollery or ACH ED and/or PICU via RAAPID

Guidance Document: Multisystem Inflammatory Syndrome in Children (MIS-C): Care Guide for Children and Adolescents in Alberta

Multisystem Inflammatory Syndrome in Children (MIS-C) Associated with COVID Poster

K. Handling of Patient Care Item and Equipment

1. Use disposable patient equipment when possible.
2. Dedicate re-useable equipment for single-patient use only and until discharge.
3. If reusable equipment cannot be dedicated for a single patient use, clean and disinfect it between patients.
4. Additional precaution rooms should contain a dedicated linen bag; double bag only if leaking.
5. Do not share items that cannot be cleaned and disinfected.
6. Special handling of linen or waste is not required. General waste from patients on additional precautions is not biomedical waste.

L. Environmental Cleaning

1. Cleaning & disinfection are a shared responsibility by both healthcare workers and Environmental Services. Consider assigning designated staff to complete enhanced environmental cleaning.
2. Routine practices, which include cleaning and disinfection of surfaces, is important to control the spread of COVID-19.
3. High-touch surfaces, those which are frequently touched, are most likely to be contaminated.
    • Any high-touch surfaces that are visibly soiled should be immediately cleaned and disinfected.
    • Remove curtains that are not necessary from patient areas.
4. Apply document available on Insite: Enhanced Environmental Cleaning during COVID-19
5. AHS provided disinfection products are effective against COVID-19.
6. After discharge, transfer or discontinuation of contact and droplet precautions apply discharge/transfer isolation cleaning protocol including changing curtains on discharge/transfer.
7. Additional precaution signs should not be removed until both patient's personal hygiene and environmental cleaning have been completed.

Staff Tips: COVID-19 Personal Clothing and Cleaning Surfaces
Bedside Computers and Electronic Devices
Key Points for Ready-to-Use Disinfectant Wipes
Cleaning and disinfecting the iPad Patient-Family Virtual Visitation

APPENDIX A

Infection Prevention and Control

Putting on (Donning) Personal Protective Equipment (PPE)

1 HAND HYGIENE

A Using an alcohol-based hand rub is the preferred way to clean your hands.

B If your hands look or feel dirty, soap and water must be used to wash your hands.

2 Gown

A Make sure the gown covers from neck to knees to wrist.

B Tie at the back of neck and waist.

3a Procedure/Surgical mask

♦ Secure the ties or elastic around your head so the mask stays in place.

♦ Fit the moldable band to the nose bridge. Fit snugly to your face and below chin.

3b N95 respirator

There are different styles of N95 respirators (pictured below). They include: a) molded cup, b) duckbill, c) flat-fold and d) v-fold

a b c d

All styles have the same basic steps for donning; molded cup and duckbill are pictured below. Refer to the manufacturer for specific donning instructions.

A Pre-stretch both top and bottom straps before placing the respirator on your face.

B Cup the N95 respirator in your hand.

C Position the N95 respirator under your chin with the nose piece up. Secure the elastic band around your head so the N95 respirator stays in place.

D Use both hands to mold the metal band of the N95 respirator around the bridge of your nose.

E Fit check the N95 respirator.

4 Eye protection or face shields

♦ Place over the eyes (or face).

♦ Adjust to fit.

5 Gloves

♦ Pull the cuffs of the gloves over the cuffs of the gown.

May 2014

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APPENDIX B

Taking off (Doffing) Personal Protective Equipment (PPE)

1 Gloves
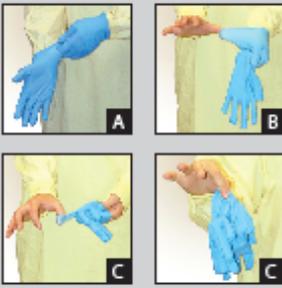
A Grasp the outside edge of the glove near the wrist and peel away from the hand, turning the glove inside-out.

♦ Hold the glove in the opposite gloved hand.

B Slide an ungloved finger or thumb under the wrist of the remaining glove.

C Peel the glove off and over the first glove, making a bag for both gloves.

♦ Put the gloves in the garbage.

2 HAND HYGIENE

A Using an alcohol-based hand rub is the preferred way to clean your hands.

B If your hands look or feel dirty, soap and water must be used to wash your hands.

3 Gown

A Carefully unfasten ties.

B Grasp the outside of the gown at the back of the shoulders and pull the gown down over the arms.

C Turn the gown inside out during removal.

♦ Put in hamper or, if disposable, put in garbage.

4 HAND HYGIENE

♦ Clean your hands. (See No. 2)

♦ Exit the patient room, close the door and clean your hands again.

5 Eye protection or face shield

♦ Handle only by headband or ear pieces.

♦ Carefully pull away from face.

♦ Put reusable items in appropriate area for cleaning.

♦ Put disposable items into garbage.

6 Mask or N95 respirator
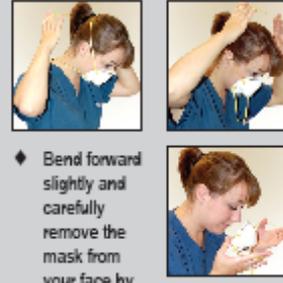
♦ Bend forward slightly and carefully remove the mask from your face by touching only the ties or elastic bands.

♦ Start with the bottom tie, then remove the top tie.

♦ Throw the mask in the garbage.

There are different styles of N95 respirators but all styles have the same basic steps for doffing.

7 HAND HYGIENE

♦ Clean your hands. (See No. 2)

May 2014

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APPENDIX C

Alberta Children's Hospital Intubation Guidelines:

ACH Sitewide ILI/COVID-19 Intubation Guidelines	April 16, 2020

Goals:
1. Minimize staff exposure
2. Minimize/ reduce AGMP's
3. Optimize 1st attempt Success

- ☐ **Minimize # of Staff in room**
    - ☐ Most experienced intubator
    - ☐ RN
    - ☐ RRT
    - ☐ Additional staff as required/immediately available
- ☐ **Wear PPE for AGMP**
    - ☐ N95, gown, gloves, eye protection
    - ☐ Use buddy check for all donning and doffing
- ☐ **Close the door during AGMP's, use negative pressure if available**
- ☐ **Use videolaryngoscope, indirect technique**
- ☐ **Use drugs for RSI**
    - ☐ Use paralytic to ↓ coughing: consider higher end dose
- ☐ **Pre-oxygenate well**
    - ☐ NRB mask > 15 LPM for spontaneously breathing patients
      OR free flow via Jackson Rees or neopuff- preferred once all staff ready
    - ☐ Manual ventilation only if required
        - ☐ Use filter
        - ☐ 2-person technique
        - ☐ Low volume
        - ☐ Low pressure
    - ☐ Apneic oxygenation, NIV, HHFNC are not recommended
- ☐ **Cuffed ETT for all pt ≥ 2 kg**
- ☐ **Prior to commencing ventilation:**
    - ☐ Inflate ETT cuff
    - ☐ Place inline suction
    - ☐ Place EtCO2
- ☐ **Clamp ETT for any disconnects. Place ventilator in standby**
- ☐ **Manual ventilation via full face mask if 1st intubation attempt unsuccessful**
    - ☐ LMA readily available if unable to oxygenate
- ☐ **Transport with minimum # staff required**
    - ☐ Staff should doff and newly don PPE-use buddy check
- ☐ **Use usual Pre-intubation Checklist**

Shared with permission. Alberta Children's Hospital, Sitewide ILI/COVID-19 Intubation Guidelines (April 16, 2020)

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Stollery Children's Hospital Intubation Guidelines:

COVID-19 PEDIATRIC CRITICAL CARE

Intubation Checklist

INTUBATION RISK ASSESSMENT (Physician Assessment)

- ☐ Difficult airway based on history or physical findings? Y ☐ N ☐
- ☐ At risk for:
  Rapid desaturation during intubation? Y ☐   N ☐
  Increased ICP, PHTN therefore avoid hypercarbia Y ☐   N ☐
  Unstable hemodynamics (hypovolemia, vasopressors, CPR) Y ☐ N ☐

Consider Anaesthesia consult/assistance prior to intubation if any concerns

PLAN & PREPARE

- ☐ Mandatory PPE (gloves/gown/ Appropriate size N95 mask/eye protection face shield) for all interventions. Utilize PPE coach to quickly verify donning correct and complete. Consider double gloves for intubator and RT #1 (airway assistant)
- ☐ Roles Assigned
  - ☐ In room: MD Intubator (most experienced), RT #1, RN #1, RN #2 (optional)
  - ☐ Outside room: PPE Coach, RN #3, RT #2, Ped aide, MD Lead (assistance, crowd control)
    * Minimize number of staff in room and how often items are passed into the room
    * Avoid switching out personnel unless absolutely necessary
- ☐ Identify ECLS, Anesthesia, ENT backup
- ☐ Pre-intubation airway assessment
- ☐ Verbalize plan and backup plan, exit and emergency plans. RSI (apneic intubation) appropriate? When to PPV if necessary? Use PPV **with filter,** if clinically indicated
- ☐ Video Laryngoscopy recommended (confirm CMAC or Glidescope)
- ☐ Pacemaker attached and checked with appropriate mode
- ☐ Monitor - QRS volume on, cycle NIBP q 1 mins
- ☐ Patient position optimized (+/- shoulder roll, height of bed, location on bed).
- ☐ Pre-oxygenation (per plan above)
  - ➤ Bagger/mask held directly to face with filter in place.
  - ➤ If PPV required use two person technique to minimize leak.
  - ➤ If patient on HHHF, or NIV, turn off device before removing from patient
- ☐ Read out current Vital signs

DRUGS

- ☐ State patient weight
- ☐ IV/IO functional
- ☐ Pretreatment (fluid bolus, inotropes/pressors, push dose epinephrine, epinephrine infusion)
- ☐ Medication doses stated
  - ☐ Pre-treatment (atropine, epi 1mcg/kg)
  - ☐ Anesthetic
  - ☐ Neuromuscular blocker

If difficult airway please remember to put an ALERT in EPIC and a sign at bedside

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Shared with permission. Stollery Children's Hospital, COVID-19 Pediatric Critical Care – Intubation Checklist, (April 22, 2020).

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COVID-19 PEDIATRIC CRITICAL CARE
Intubation Checklist

IN ROOM EQUIPMENT

- ☐ Filtered JR Bagger (O$_2$ attached); add filter to self-inflating bagger
- ☐ Cuffed ETT appropriate size and one size smaller (leave one size smaller on cart outside room).
  - ☐ Syringe
  - ☐ Cuff tested & stylet inserted.
- ☐ Mask/OPA
- ☐ C-MAC/Glidescope monitor with cable _removed from cart_
- ☐ Appropriate C-Mac/Glidescope blades (tested)
- ☐ ETCO$_2$ (attached to monitor, working)
- ☐ ETT tapes
- ☐ Oral and Inline suction system. (Yankauer, Mini Sucker)

OUTSIDE ROOM EQUIPMENT

- ☐ Airway and C-MAC/Glidescope carts
- ☐ Conventional laryngoscope & blades
- ☐ Spare filters, Pedi-cap, extra EtCO2 line
- ☐ Appropriate size LMA (+ syringe for LMA)

Air Q LMA	
Size	Kg
1	< 7
1.5	7-17
2	17-30
2.5	30-50
3.5	50-70
4.5	70-100

CMAC Blade	Size	Age	Weight
Miller	0	Preterm/Neo	< 3 to 5 kg
	1	6m-2y	>3
Mac	0	Preterm/Neo	<3-5 kg
	2	7-12 y	22-40
	3	Medium adult	

POST INTUBATION MANAGEMENT

- ☐ Post intubation, inflate cuff, bag to check seal, and **communicate airway seal is intact**
- ☐ Use Physician or RN to assist with securing ETT: if double gloved, remove outer pair
- ☐ Place on ventilator ASAP, unless E-CPR
- ☐ Have clamp available to clamp ETT for all circuit disconnects
- ☐ Place ventilator in standby prior to disconnects
- ☐ Sedation, paralytic (?)
- ☐ Chest x-ray
- ☐ Ventilation strategy: lung protective ventilation (Vt 6-8mL/kg), P plat <30 cmH2O, optimal PEEP, permissive hypercapnia as required, consider prone positioning)
- ☐ Maintain Contact/Droplet precautions + N-95 mask per IPC guideline
- ☐ After use, equipment is to be wiped down using standard wipes/solutions **within** the room, **and after** removing from room. Send for cleaning per usual practices.

Notes for COVID Code Response:

- ➤ If CPR required, **do not do compressions** unless patient's face is covered by procedure mask, oxygen or resuscitation mask. Compressions are aerosol generating
- ➤ **Hold compressions** during intubation attempts
- ➤ Wait **until ETT seal verified** before re-starting compressions
- ➤ Wait for **ROSC before moving ventilator** into patient room

Age	Kg	Cuff	Uncuff	ATI
Prem	<0.7		2	5
Prem	<1.0		2.5+	5.5
Prem	1 - 2		3.0+	6 - 7
Term	3.5	3	3.5	9
3 mo	6	3	3.5	10
6 mo	7.5	3	3.5	10.5
1	10	3.5	4	12
2	12	4	4.5	13
3	14	4	4.5	13.5
4	16	4.5	5	14
5	18	4.5	5	14.5
6	20	5	5.5	15
7	22	5	5.5	15.5
8	24	5.5		16
9	27	5.5		16.5
10	30	6		17
11	34	6		17.5
12	38	6.5		18
13	44	6.5		18.5
14	50	7		19
adult	60	8		20
adult	70	9		21

Age >1-16: Uncuffed ETT: size mm = age/4 + 4
Cuffed ETT: size mm = age/4 + 3.5
Depth of insertion: age/2 +12 (ATL), +15(ATN)
≤ 12 years old: ID x 3
Prem-term: 6 + kg

If difficult airway please remember to put an ALERT in EPIC and a sign at bedside

Appendix D

Conservation of Personal Protective Equipment (PPE) in Critical Care Areas.

Goal: To conserve use and reduce wastage of PPE in Critical Care areas while maintaining safety for all members of the health care team.

- PPE conservation strategies are to be initiated immediately.

- PPE usage should be restricted to direct patient care use only.

- PPE should not be used for simulation, orientation and education purpose unless it is expired.

Considerations to maximize time spent in isolation room

1. Reduce doffing of PPE and leaving room to collect supplies.

    - Keep stock in rooms that is not excessive.

    - RN and RRT to discuss patient care supply requirements during shift handover.

    - Staff to determine required supplies before going into room for care and procedures.

    - Use call bell for supply runners rather than leaving isolation.

    - Utilize supply runners as 'clean staff' to assist isolation staff to fetch required supplies. This could be staff that has been redeployed to critical care including students.

2. Group documentation together.

    - Utilize existing computers in room for charting.

    - Charting does not need to be completed in real time.

    - Utilize whiteboards or glass doors for interim documentation with a dry erase marker for later translation into the health record.

    - If staffing allows, utilize a staff to transcribe outside the room while care provider remains in the room.

3. Adjust room temperature to accommodate staff comfort levels.

Considerations to Minimize staff entering isolation room

1. Minimize staff entering the room

    - Reconfigure patient room to improve the line of vision to patient, ventilator, drainage systems, monitor and other pertinent equipment.

    - RRT & RN to share tasks and responsibilities and determine if it is necessary for 2 staff members to enter patient room.

    - Staff already in isolation should be utilized to complete ECG and blood draws vs a lab tech entering.

    - Adjust alarm parameters to reduce non relevant alarms.

    - Utilize bed functions such as turn assist, rotation, percussion and vibration.

    - Utilize the function of overhead lifts and repositioning slings to reduce the number of staff for repositioning. Single person techniques should be reviewed and utilized in possible.

    - During prone positioning only team members directly involved in the turn need to be in the room.

    - Minimize patient washes and linen changes if appropriate.

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- RN & RRT to remove garbage when full to reduce frequency of housekeeping entering the room. Garbage must be properly disposed of.

2. During daily multidisciplinary rounds have the team determine the most appropriate minimum assessment/interventions required to deliver care for stable patients.
    - Areas of frequent RRT & RN assessment that should be evaluated are:
        o Patients' physical assessment.
        o Vital Signs, neuro vitals & glucometers,
        o Ins and outs
        o Foley and Flexi seal usage
        o RASS goals
    - Bloodwork and ABGs.
        o Minimize the frequency of blood draws and review at rounds each day
        o Bundle order times of required bloodwork
        o Before redraw determine if required order can be added to previously drawn bloodwork.
    - Do not order routine CXR or ECG – order only as needed when clinically indicated.
    - Minimize off unit procedures or interventions. Review the need for off – unit care with the care team. Deliver care at the bedside as much as possible.
    - Nursing in collaboration with pharmacy to adjust medication administration times so that regularly scheduled medications can be administered in a cluster vs staggered administration. Suggest alignment with feeding tube water flushes.
    - Physician assessments should be kept to one per 24 hours unless clinical indication requires further assessment. This includes Residents, Fellows and Attending Physicians.
3. To reduce the frequency of entry into isolation room consider utilizing MRI tubing as an extension to regular IV tubing and have IV pumps located outside of the patient room.

Caution and Guidelines
- ACLS and critical medication bolus cannot be infused via extension tubing.
- Patients who are highly dependent on the infusion to achieve set RASS and hemodynamic goals should have infusions in the room.
- Lines must be marked with color tabs to make them visible.
- Lines should be located in areas that are not going to result in injury to staff or dislodgment of line.
- Extension tubing can only be connected to central line.
- Line cannot be touching the floor.
- MRI tubing must be labeled with all medications infusion through it.
- Ensure that lines are positioned to reduce risk of occlusion.
- Use triple lumens or manifolds to connect medications before attaching to MRI tubing.