

Care of the Adult Critically Ill COVID-19 Patient Annex D

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 Communicable Disease Working Group.

Intention for use:

- To guide all providers of critical care in Alberta as to the basic care of adult critically ill patients with known or suspected COVID-19 infection to ensure such patients receive optimal, consistent and equitable care throughout the ICUs of Alberta.
- 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.
- 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.

Revision History

Version	Author	Summary of Updates
March 11, 2020	CCSCN with Provincial Critical Care COVID-19 Working Group	Initial draft
March 14, 2020	Zuege, based on feedback from Provincial Working Group	<ul style="list-style-type: none">• Suspected or confirmed COVID-19 added throughout• Negative pressure rooms preferred if available• Updates to charting for code blue• PPE reminders for visitors• Delete reference to use of airborne isolation rooms if available• Changed guidance on humidity to:<ul style="list-style-type: none">○ “Avoid use of heated humidity systems other than when they are fixed integral systems of a particular ventilator”○ “Humidity should be preferentially provided via in-line HME devices. Active/heated humidity systems should only be used when necessary (e.g., to manage difficult secretions or to provide inhaled epoprostenol) and only when such a system is part of a fixed integral part of a particular ventilator”• Replace prostacyclin with epoprostenol
April 13, 2020	Robertson/Morrissey/Bagshaw/Zuege based on feedback from Provincial Working Group, feedback from the provincial critical care community and updated AHS Guidance documents.	<ul style="list-style-type: none">• 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 LSE for patient care items, equipment and environmental control• Medical care updates• Additions of intubation resources, proning resources and PPE conservation

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.

COVID-19 Screening Criteria:

Given increasing community-based spread of COVID-19 in Alberta, appropriate testing should be considered in any patient presenting to an acute care facility with a suspicious syndrome.

Click link to see the current updated screening criteria for COVID-19:

<https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-ncov-case-def.pdf>

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

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

<https://www.albertahealthservices.ca/ipc/hi-ipc-routine-practices-algorithim-cc.pdf>

3. N95 respirators or approved equivalent protection must be used by all health care workers in any patient care area where aerosol-generating medical procedures (AGMP) are being performed, are frequent or probable, or with any intubated patients.
4. AGMP are defined as:
 - a. Intubation and related procedures (e.g., manual ventilation, open endotracheal suctioning, extubation)
 - b. Cardio-pulmonary resuscitation (CPR)
 - c. Non-invasive ventilation (e.g., Bi-level Positive Airway Pressure [BiPAP], continuous positive airway pressure [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. High frequency oscillatory ventilation

<https://www.albertahealthservices.ca/assets/healthinfo/ipc/hi-ipc-respiratory-additional-precautions-assessment.pdf>

5. Due to the high 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](#)

8. Close room doors with enough of an opening to allow for hearing in-room alarms. Keep doors closed fully during AGMPs.
9. Stock isolation cart with adequate supply of N95 masks (all brands and sizes), goggles, face shields, gloves (all sizes), yellow 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:
<https://www.albertahealthservices.ca/assets/healthinfo/ipc/hi-ipc-emerging-issues-ncov.pdf>
12. Post the AHS Contact and Droplet Isolation Sign:
<http://www.albertahealthservices.ca/ipc/hi-ipc-contact-and-droplet-sign.pdf>
13. Ensure appropriate viral diagnostic tests have been performed prior to admission to ICU (see Section C). If viral diagnostic studies have not been performed – consult with MRHP to order appropriate studies.

C. Admission Laboratory Testing

1. Diagnostic studies:

- I. 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.
 - Patients with a positive result by molecular testing for respiratory viruses including COVID-19 do not require additional respiratory viral testing.
 - For patients without a positive result by molecular testing for respiratory viruses including COVID-19:
 - If a NPS is already collected, do not collect an additional NPS.
 - 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).
 - 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.
- II. 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).
 - Bronchoscopy solely for the purposes of microbial sampling in an otherwise uncomplicated patient is not recommended.
 - 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.

- III. 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.
- IV. 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:

- a. blood cultures
 - b. 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.
 - c. liver function tests and enzymes
 - d. urinalysis
 - e. sampling of pleural fluid if present in significant quantities
- V. Consider performing serum LDH, D-dimer, C-reactive protein, ferritin and troponin if clinically indicated and not already done.
 - VI. CT scans of the thorax are not suggested solely for the assessment of suspected or confirmed viral pneumonia given lack of specificity and added risk and PPE use for transport. CT imaging may be appropriate for other indications.

A. 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 Virus 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](#)

B. 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 Virus Panel for the same sample (only a single sample is required for all respiratory viral testing). Send sample to lab.

C. Bronchoalveolar Lavage (BAL) Fluid:

Collect and send per site Policy and Procedure. Mark sample as STAT. Order both COVID-19 and Respiratory Virus 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.

2. The expected turn-around time for Provincial Laboratory reporting of the full respiratory virus panel including COVID-19 testing is <72 hours. Molecular (PCR-based) tests for COVID-19 are run at both ProvLab sites (Edmonton and Calgary).
3. Sites using Connect Care or Sunrise Clinical Manager (SCM) can order COVID-19 testing directly.
4. Sites not using Connect Care or Sunrise Clinical Manager should request testing manually using the Serology and Molecular Testing Requisition (<https://www.albertahealthservices.ca/frm-20676.pdf>) and writing "COVID-19" and "Respiratory Viral 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 ICU

1. All health care providers involved in transport must use appropriate isolation precautions. For 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. Staff providing direct care during the transport should also don protective eye wear, masks, gown and gloves. Note: personal eye wear is not sufficient.
3. Hand hygiene should be performed before and after patient transport.
4. 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), MRHP, and health care aide (HCA) as appropriate.
6. If patient intubated:
 - a. Transport using an in-line filter, in-line suction catheter and heat moisture exchange filter (HMEF).
 - b. Use of transport ventilators (with filtering systems) is preferred to minimize the need for hand bagging. If use of a transport ventilator is not possible, use a manual bagging unit (with PEEP valve).
 - c. RRT will manage airway and oxygen requirements.
 - d. Clean and disinfect transport ventilator after use and discard breathing circuit.
7. If patient not intubated:
 - a. Transport with non-humidified (dry) oxygen supply - respiratory to identify the most appropriate oxygen delivery mask.
 - b. Patients receiving oxygen by any type of nasal cannula should be given a procedure mask to wear.
8. Clean O₂ cylinder(s) and transport stretcher with disinfectant wipes before returning to general circulation.

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 assignments 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 MRHP, 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 IP&C 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 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](#)

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](#)

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.

9. Discontinuation of Isolation for patients with confirmed COVID-19 infection:

Do not discontinue isolation without consulting IP&C. IP&C will consult with a Medical IP&C officer and the MRHP to evolve a plan for repeat testing if applicable and advise when it is appropriate to discontinue isolation. IP&C is on call 24/7 in all zones to assist in the discontinuation decision and process.

Applying N95 respirators: All health care workers must have been fit tested within the last two years. 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.

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 goggles 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 – do not leave open.

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 ICU 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.
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 nurse/RRT
 - c. All equipment should be kept in the patient's room to avoid transmission via objects. Dedicate equipment to the patient's 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.

4. Visitors

Currently there is a **No Visitor Policy** to any Critical Care Unit. See links for most up to date guidance.

[Visitor Restrictions During COVID-19 Pandemic](#)
[Visitor Alert Poster](#)

Exceptions:

- A. End of Life Situations:
 - Allow one visitor at a time.
 - The attending physician, in consultation with unit manager/charge nurse, determines if the patient condition is considered end-of-life.
- B. Further exceptions to this restriction need to be reviewed and approved by the unit manager/charge nurse/nursing staff on a case-by-case basis.

All Visitors in acute care or outpatient facilities must:

- Be feeling well on the date/time of visit.

- Complete health screening prior to entering the facility, including a temperature check for fever over 38 degrees Celsius and a questionnaire.
- Wear a mask or face covering while inside the facility.
- Be escorted at all times, by the staff of the health care facility, except when with the patient in their room.
- Perform hand hygiene (hand washing and/or use of hand sanitizer) when entering and leaving the facility and when entering and leaving the patient's room.

5. Charting

- Do not take the paper chart or laboratory results into the patient room.
- 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

- All attempts should be made to minimize off unit testing unless clinically required.
- Discontinue daily orders for bloodwork, chest x-ray (CXR) or electrocardiograms (ECGs) and only order when clinically required.
- All CXRs should be performed portably within the ICU.
- Diagnostic testing should be performed portably in the ICU when possible (e.g. ultrasonography).
- 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 Positive COVID-19 Patient

(Summary per Provincial COVID-19 Code Blue Working Group)

Guiding Principles:

1. Minimize number of participants in the patient room during resuscitation
2. Minimize equipment in the room wherever possible.
3. Proper PPE (contact and droplet precautions, including a fit-tested N95 mask) shall be donned prior to initiating resuscitation by all response team members, even if there is a perceived delay in resuscitation efforts.
4. Assume patient is COVID-19 positive, unless otherwise identified/known.
5. Routine practices, such as defibrillation and CPR, are otherwise unchanged from non-COVID-19 patients.

Current paging/notification processes should be followed. Clear identification of isolation requirements should be made to the response team on arrival. Clear communication of GOC to responding resuscitation team members, where available/known. Upon arrival to the code, team members should quickly clarify roles and which members will be working inside versus outside the room.

- Ensure that PPE is readily available for responding team members and that there is an available "safety/logistics officer" to monitor donning/doffing. Since the availability of suitable PPE in sufficient quantities at the site of the arrest may not be guaranteed, the use of PPE pre-made kits should be considered, to travel with the response team or to be stored with code carts (where possible).
- CPR is an aerosol generating medical procedure. Staff should adhere to contact and droplet precautions with a fit tested N95 mask before commencing chest compressions.
- Donning should be carried out quickly but meticulously, even if there is a perceived delay to resuscitation. If multiple individuals arrive at the same time, priority for donning and entering the room should be given to the Code Blue team leader and/or airway expert physician, and to the ICU RN (assumes compressors are already in place with appropriate PPE)

Inside the room:

- Code cart with defibrillator and arrest drugs. If feasible and if sufficient clean carts are available on site, the code cart may be left just outside the patient's door and the defibrillator

and medication drawer may be removed and passed into the patient's room upon the resuscitation team's arrival.

- 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.
 - If the patient has a LMA in situ, it should be swapped to a cuffed endotracheal tube as soon as possible.
 - Manual resuscitation bag with a HEPA filter, capnography and inline suction placed between the mask/endotracheal tube and the bag
- Suggested response team members:
 - Code Blue Team Leader
 - Airway expert physician (if available)
 - RRT to assist with intubation and ventilation
 - RN to administer medications, cardioversion/defibrillation and update code blue team leader regarding changes in cardiac rhythm (ICU RN)
 - HCW to do CPR (1) – Usually first responder
 - HCW to do CPR (2)
 - RN for documentation and time-keeping

Outside the room:

- RN/HCW “runner”, to assist with supply of equipment stored on the unit and the activation of other HCWs, if required.
- “Logistic/Safety Officer”, 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 ICU prior to the initiation of patient transport.

Modifications to ACLS in COVID-19 Patients:

- Intubate patients early and hold CPR during intubation to minimize aerosolization of particles and optimize intubation success.
- Manual BVM should be avoided if possible. If necessary because of unsuccessful initial intubation, 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.

Post-Arrest:

- 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.
- Logistic/safety officer 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.

Charting Considerations:

- 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
 - If any paper record is taken into the room it is deemed to be contaminated and shall be transcribed onto a new clean record
 - Crash cart rhythm strips that are contaminated should be placed in a biohazard bag and label as contaminated
 - Recorder should not participate in any patient care delivery during a resuscitation
 - Recorder shall attempt to maintain a distance of two meters from the patient

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 O₂ as ordered with continuous SpO₂ 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. Minimize use of sedative and analgesic therapies (other than for palliative care).
5. No peak flow monitoring.
6. Nebulization should be avoided and be used only as an exception.
<https://insite.albertahealthservices.ca/main/assets/tls/ep/tls-ep-2019-covid-nebulizer-memo.pdf>
7. Bronchodilator delivery via MDI via spacer is preferred if patients can effectively utilize.
8. 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 and use of this therapy is considered a continuous AGMP.
- As such it is **not recommended** for routine use in patients with suspected or confirmed COVID-19 infection.
- If used in patients with suspected or confirmed COVID-19 infection, treatment must be performed in a single patient room with the door closed and with staff using appropriate contact and droplet precautions, including use of N95 respirators.

Non-Invasive Ventilation (CPAP or BIPAP):

- Non-invasive positive pressure ventilation (NIV) may result in aerosolization of respiratory secretions and is considered a continuous AGMP and thus is **not recommended** for routine use in suspected or confirmed COVID-19 patients.
- If used in patients with suspected or confirmed COVID-19 (or other ILI) and hypoxemic respiratory failure or ARDS, 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 should be considered.
- If NIV is used in patients with suspected or confirmed COVID-19 infection, NIV treatment must be performed in a single patient room with the door closed and with staff using appropriate contact and droplet precautions, including use of N95 respirators.
- During the COVID pandemic, nocturnal CPAP will not be routinely used for hospitalized patients with OSA due to the fact that it is an AGMP. Pulmonary consultation is advised if there is concern that the therapy is essential to medical care.

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 with use of appropriate PPE.
2. Provide humidity as indicated and per current practice.
3. Closed suction systems are recommended for these patients.

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

Intubation Guidelines:

Moderate to severe hypoxemic respiratory failure/ARDS usually requires 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, face shield, gown and gloves. Proper application of PPE should be verified by an independent observer prior to entry into the patient room.
5. Consider the additional use of goggles given the potential for expectorated secretions to flow around front-covering face shields and contact ocular mucus membranes with coughing and during head turns of the intubator. If goggles are re-used they must be fully wiped down with disinfectant wipes prior to re-use.
6. Patients with hypoxemic respiratory failure usually have poor oxygenation reserves. Pre-oxygenate as much as possible using non-invasive oxygen. Reserve use of bag-valve-mask ventilation via facemask to situations where non-invasive oxygen delivery is failing (to reduce aerosolization risks).
7. 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 paralytics when clinically appropriate (e.g. no signs predicting difficult intubation).
8. Consider use of visual technological devices (e.g. video laryngoscope) for the initial attempts at intubation (in order to reduce the risk of aerosol contact by reducing the need to look directly down the airway).
9. Place in-line suction catheter on in all patients. Use either HMEF or heated humidity systems (if they are fixed integral system of a particular ventilator).
10. In patients not already diagnosed with COVID-19, if sputum samples have not already been collected, collect ETA while all infection control precautions are already in place for intubation.
11. 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.
12. Door to remain closed until appropriate amount of time has passed based on room exchange rate as per facility guidelines.

See additional intubation guidance and tools in Appendix C.

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 +/- paralysis (some medications have known shortages – review pharmacy bulletins when selecting sedatives and paralytics)
[Medication Supply Bulletin](#)
 - 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 H₂O (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. Selective use of recruitment maneuvers, as tolerated
 - h. Early consideration for a trial of prone positioning - refer to site specific policy and procedures. **See Appendix D for proning summary document.**
[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. In patients with refractory hypoxemia (e.g., PaO₂/FiO₂ ratio < 150 after attempting all of the above strategies), consider the following additional strategies:

- a. Non-conventional modes of ventilation, such as Airway Pressure Release Ventilation (APRV)
- b. Inhaled epoprostenol:
 - i. Provided per local policy. Dosing 10 – 50 ng/kg/min. An active humidification system is required to use this therapy.
 - ii. Use only in intubated patients.
 - iii. Patients who do not demonstrate a physiological response (increase in PaO₂ of ≥20% from baseline) after 30 minutes should be discontinued from inhaled epoprostenol therapy.
 - iv. A daily assessment should be performed in an attempt to discontinue inhaled epoprostenol therapy.
3. If advanced ICU respiratory care (defined as the use of all of the above measures possible to apply) has failed to improve oxygenation or can only be accomplished by applying mechanical ventilation that is not lung protective, consider consulting the ECLS Team (Edmonton for Northern Alberta, Calgary for Southern Alberta).

To initiate a referral:

- a. For Calgary, Central and South Zones, page the on-call CVICU Intensivist at the Foothills Medical Centre (403) 944-1110
- b. For Edmonton (sites other than UAH) and North Zones, page the on-call Intensivist for the UAH General Systems ICU
- c. For the UAH site, page the on-call Mazankowski CVICU Intensivist

An early consultative process is recommended as ideally potential ECLS candidates should be first transferred to the ECLS referral centre and then, if deemed suitable candidates, cannulated.

Consider referral to ECLS team when the following criteria are met:

- PaO₂:FiO₂ ratio < 120 mm Hg for > 3 hours **with inability to maintain lung protective ventilation (LPV)** as defined in section 1 above
- PaO₂:FiO₂ < 100 mm Hg for > 6 hours **even with maintenance of lung protective ventilation**
- An arterial blood pH of < 7.25 with a partial pressure of arterial carbon dioxide [PaCO₂] of ≥ 60 mm Hg for > 6 hours
- Endotracheal intubation and high pressure mechanical ventilation for **less** than 7 days
- Near maximization of conventional therapies
- No severe life-limiting chronic illnesses. Expected life expectancy of at least 2 years of independent functioning, should the patient survive

[ECLS Recommendations for COVID-19](#)

4. If a patient is not deemed a suitable candidate for ECLS support and continued care is pursued, consider:
 - Permissive hypoxemia - accept SpO₂ 85-90%, PaO₂ 50-60
 - Target Hemoglobin >85 g/L (maximize oxygen carrying capacity)
 - Target temperature <37.5 C (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.
- 5. 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.

1. Microbial Testing

Even in patients with proven COVID-19 infection, particularly in patients with severe disease, bacterial and/or other viral co-pathogens may be 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 in 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 should include an agent to cover atypical microbes (e.g., macrolide, respiratory quinolone or tetracycline) and typical bacterial species. Initial empiric therapy should be de-escalated or discontinued as microbiology results return as appropriate.

[Recommendations for Antimicrobial Management of Adult Hospitalized COVID-19 Patients](#)

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. It is important to check the current status of directed anti-viral therapies via AHS guidance:

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

- PHAC - <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals.html>
- WHO - <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/patient-management>
- CDC - <https://www.cdc.gov/coronavirus/2019-ncov/hcp/index.html>

Consultation with the local infectious disease service is recommended and suitability for participation in a clinical trial should be considered

4. Systemic Corticosteroids

Systemic corticosteroids for the treatment of viral pneumonia is currently not recommended. Studies thus far in patients with viral pneumonia not complicated by septic shock (i.e., severe influenza, SARS, and MERS) have shown either no benefit or signal of harm. Systemic steroids may be of value for other clinical indications such as severe septic shock or ILI triggered asthmatic exacerbation.

5. Fluid Management

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 correction of positive fluid balance with diuretic therapy or mechanical fluid removal with CRRT

6. Immune Modulating Therapies

Though ARDS and cytokine release syndrome (CRS) are important manifestations of severe disease, there is thus far little evidence to support the use of immune modulators in patients with COVID-19 and empiric therapies are not recommended outside of clinical trials.

<https://www.albertahealthservices.ca/assets/info/ppih/if-ppih-covid-19-recommendations.pdf>

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.

K. Handling of Patient Care Items 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. Room surfaces and equipment cleaning/disinfection is required on a daily basis or more frequently if directed by IPC using AHS approved products and procedures.
2. AHS approved disinfection products are effective against COVID-19.
3. After discharge, transfer or discontinuation of contact and droplet precautions, clean room as per existing facility cleaning practices.
4. Replace privacy curtains.
5. Additional precaution signs should not be removed until both patient's personal hygiene and environmental cleaning have been completed.

[Enhanced Environmental Cleaning during COVID-19](#)

Appendices

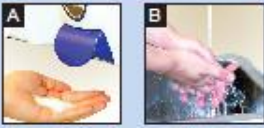
APPENDIX A



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



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

www.albertahealthservices.ca

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.

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.

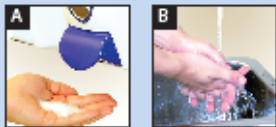
- ◆ Put in hamper or, if disposable, put in garbage.

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.


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.

4 HAND HYGIENE



- ◆ **Clean your hands.** (See No. 2)
- ◆ Exit the patient room, close the door and **clean your hands** again.

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)

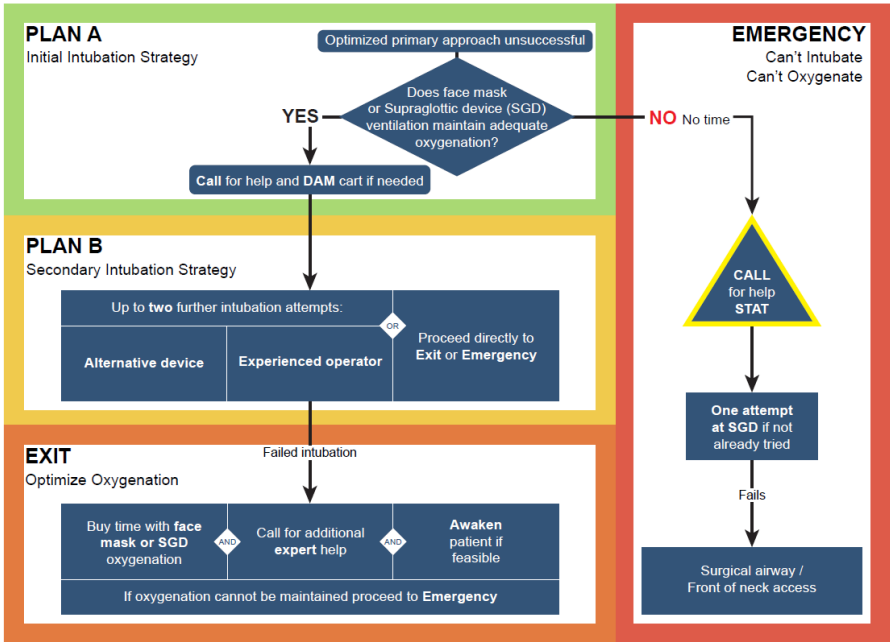
May 2014

Appendix C

ILI / COVID-19 Best Practice Considerations	V1. March 18, 2020
Preparation	
<div><div>1. PPE: Don full PPE including N95 respirator, goggles, face shield, gown and gloves. Proper application of PPE should be verified by an observer prior to patient contact</div><div>2. Early airway assessment for predictors of difficulty and consultation as necessary</div><div>3. Consider early, controlled intubation and avoid NIV, HHHFO and other AGMP</div><div>4. Minimize staff exposure<div><div>a. Minimize personnel in the room as able</div><div>b. Negative pressure room with anteroom if available (or neutral pressure room with door closed)</div><div>c. Ensure HMEF is between the mask/ETT and BVM at all times</div></div></div><div>5. Intubation should ideally be performed by most experienced practitioner to optimize first pass success</div><div>6. Prepare necessary equipment and drugs outside of room</div></div>	
Suggested Roles and Organization	
<div><div><div><div><div>Monitor</div><div>MD Intubator</div><div>Airway Equipment</div><div>Ventilator</div></div><div><div>Nurse</div><div>RT 1</div></div><div><div>Anteroom</div><div>Backup Intubator / Runner</div></div></div><div><div>Recorder/PPE monitor</div><div>DAM Cart</div><div>RT 2 / Runner</div></div></div></div>	
Intubation Plan	
<div><div>✓ Optimize pre-oxygenation using non-invasive techniques, reserving BVM to situations where non-invasive O₂ delivery is failing</div><div>✓ Video laryngoscopy recommended as Plan A</div><div>✓ Best pharmacotherapy determined by MRHP on case-by-case basis to minimize chance of cough and aerosol generation</div><div>✓ If no contraindications, Modified RSI (avoid coughing and facilitate first pass success):<div><div>○ Use higher mg/kg dose of muscle relaxants to ensure rapid onset of optimal intubating conditions (Allow 1 minute for adequate muscle relaxation):<div><div>▪ Rocuronium 1.2-1.6 mg/kg (IBW)</div><div>▪ Succinylcholine 1.5-2 mg/kg (TBW)</div></div></div><div>○ Avoid BVM during apneic period unless life threatening hypoxemia</div></div><div>✓ Wait until cuff up post-intubation to ventilate</div></div></div>	
Post-Intubation	
<div><div>□ Confirm ETT position with ETCO₂ and CXR</div><div>□ Closed suction system; avoid circuit disconnections and clamp ETT for planned disconnections</div><div>□ Lung protective ventilation strategy (6-8 mL/kg Vt IBW; Pplat < 30 cm H₂O; Optimal PEEP)</div><div>□ Strategies for failing gas exchange: deep sedation and paralysis; permissive hypercapnia; prone positioning</div><div>□ Maintain AGMP + Droplet + Contact Isolation as per IP&C</div></div>	

NIV = non-invasive ventilation (CPAP or BiPAP); HHHFO = heated humidified high flow oxygen (AIRVO, Optiflo); AGMP = aerosol generating medical procedures; RSI = rapid sequence intubation; IBW = ideal body weight; TBW = total body weight

Difficult Airway Management in an Unconscious Patient



Appendix D

Provincial Guidance: Prone Positioning for Adult COVID-19 Patients

Background

- SARS-CoV-2 infection can result in Coronavirus Disease–19 (COVID-19).^{1,2} While the majority of patients are asymptomatic or have mild disease,³ approximately 14% develop more severe disease and/or Acute Respiratory Distress Syndrome (ARDS).³
- Mechanical ventilation in the prone position for patients with ARDS is a technique to improve oxygenation and lung recruitment. Findings from clinical trials have shown this can improve V/Q matching, reduce ventilator induced lung injury and improved survival.^{4,5}
- As part of the management of critically ill COVID-19 patients with ARDS, the WHO guidelines recommend those patients receiving mechanical ventilation should be considered for a trial of prone positioning.⁶
- Patients with moderate to severe ARDS (as per the Berlin definition) who are placed in the prone position may need to be maintained in this position on average for 14-16 hours per day and often for 4-6 days to derive clinical benefit.

Indications

- Patients should be considered for prone positioning if
 - Patient is adequately sedated and paralyzed AND
 - Lung protective ventilation strategies are being applied AND
 - Evidence of bilateral airspace disease suggestive of ARDS AND
 - Persistent PF ratio ≤ 150 with $\text{FiO}_2 \geq 0.60$ for > 4 hours (**suggest** prone position)
 - Persistent PF ratio ≤ 100 with $\text{FiO}_2 \geq 0.60$ for > 4 hours (**recommend** prone position)

Contraindications

- There are very few absolute contraindications:
 - Pregnancy – third trimester
 - Spinal cord injury – unstable
 - Open abdomen (fascia not closed) or open chest
- Patients with whom extra caution should be exercised prior to prone positioning:
 - Recent tracheostomy
 - Unstable extra-axial fractures
 - Ventricular assist devices or intra-aortic balloon pump

Timing

- Prone positioning of a patient should always occur in a planned fashion
 - Patients benefit most from prone positioning when used for 14- 16 consecutive hours per day
 - The initial decision to prone should be made early, in consideration of clinical indicators and staff availability
 - Efforts should be made to plan subsequent prone and supine (unproning) positioning to occur during daytime hours (or when staffing is maximal)
- Unplanned prone positioning may be done when a patient acutely deteriorates. This may be more common in the first 24 hours of patient admission to the intensive care unit.

Requirements

- Team size will be determined by each site and guided by the size of the patient and members of the prone positioning team
- The attending physician or assigned delegate must be present for the initial prone positioning procedure.
- The attending physician or assigned delegate must always be aware of any subsequent prone/supine positioning maneuvers, and available for support as needed. Follow local processes.
- At a minimum prone positioning of a patient can be accomplished by 5 team members
 - One respiratory therapist – primary responsibility is management of the airway
 - One registered ICU nurse – primary responsibilities are the lines, catheters, tubes and drips
 - Three additional healthcare workers
 - Can be ICU or non ICU staff including RRT/RN/HCA/allied health workers/physicians.

Equipment

- 2 – Flat sheets
- 1 – Proning head cushion and one pillow case to cover cushion/plastic bag

- 1 – Absorbent pad
- 3 – pillows
- Skin protection dressing (duoderm, mefix, etc.)
- Proning checklist

Care of the Proned Patient

- Refer to existing local policy and procedure for detailed information
- Patients may be in prone position for up to 20 hours per day (of which at least 14-16 hours should be continuous, as directed by attending physicians' orders)
- Continue with regular clinical, physiologic and laboratory assessments:
 - Follow oxygenation and hemodynamic status closely to monitor for deterioration – as patient's can experience transient deterioration in gas-exchange shortly after proning prior to improvement
 - Chest and heart sounds can be assessed by slipping stethoscope under patient's chest (if using a special care bed this will be easier if air pressure is decreased in the area to be assessed)
- Minimize sedation and paralytics as patient condition allows, as ordered by the attending physician
- Head turns and arm repositioning are done q2h to prevent skin break down, contractures, and nerve compression
- Use a support under the patients face (e.g., gel horseshoe, foam cushion, or folded pillow) to ensure the downward eye is free from pressure. Apply eye lubrication q2h to prevent eye damage.
- Keep the bed in reverse Trendelenburg whenever possible to prevent venous congestion of the head and neck.
- Avoid over extension of the neck with positioning. Facilitate PT/PROM exercises as tolerated.

FAQs

- *CRRT* – Can be run while in prone position. The patient should have an easily visible line (jugular).
- *CPR* – CPR can be performed while in the prone position while awaiting team to flip.
- *Paralysis* – Neuromuscular blockade is strongly suggested prior to a trial of prone positioning.
- *Femoral lines* – Caution needs to be exercised if patients have venous or arterial femoral lines as these are not visualized while patients are in prone position.

Appendix E

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.
 - 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:
 - Patients' physical assessment.
 - Vital Signs, neuro vitals & glucometers,
 - Ins and outs
 - Foley and Flexi seal usage
 - RASS goals
 - Bloodwork and ABGs.
 - Minimize the frequency of blood draws and review at rounds each day
 - Bundle order times of required bloodwork
 - 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.
- MRI tubing must be primed with all medications prior to connection