UVMMC QUICK COVID-19 Management Guide
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This document is subject to change.
Note about Hyperlinks
There are multiple links to separate documents pertaining to individual policies in this document; all documents can be found on the UVMMC Sharedrive and can be accessed remotely through this homepage. Links within the text below can be used to directly access the specified document from within the UVMMC hospital.

Infection Control and personal protective equipment (PPE)
1) Follow the UVMMC guidelines on the Sharedrive for healthcare worker PPE: UVM PPE Guidelines
2) Employ strategies to minimize number of contacts for health care worker (HCW) safety
   a. Bundle care and minimize going in and out of the patient room as much as possible.
   b. Face telemetry monitors and ventilator screens towards windows for easy observation from outside the room.
   c. Consider placing IV poles outside of the patient room to minimize entry into the room.
   d. Tighten vent connections daily to avoid accidental disconnections requiring immediate entry into the room.
   e. To minimize spread of infection due to inter-unit patient transfers, some methods of advanced respiratory support and continuous infusions may be implemented on the floor.
3) PPE for procedures
   a. All procedures that produce aerosolized droplets, including intubation, should be performed in a negative pressure room with appropriate PPE and the door closed. Powered air purifying respirator (PAPR) or N95 mask and face shield are mandated to maximize protection of the operator’s and assisting clinicians’ mucosal surfaces from contact with droplets.
   b. Patients on high flow nasal cannula or non-invasive ventilation (HFNC and NIV, respectively) with suspected or proven COVID-19 must be in a negative pressure room with a closed door. Airborne precautions should be maintained in the patient room for no less than 2 hours in a neutral room and no less than one hour in a negative pressure room after HFNC/NIV use or other aerosolizing procedure.

Triage, level of care and patient placement for PUI and confirmed cases
Patient placement
1) Non-ICU
   a) Non-ICU patients requiring hospitalization will be placed in a designated section of McClure 6.
2) ICU
   a) Patients requiring ICU level of care go to the medical ICU on McClure 4; if the MICU reaches maximal occupancy, further patient placement guidelines can be found in the UVM Health Network Critical Care Emergency Response Plan.
3) Discharge and instructions for home care
a) Please incorporate the COVID-19 Patient Instruction SmartPhrase, .COVIDDISCHARGE into patient discharge instructions

**Rapid Response and Emergency Procedures**
UVMMC-specific procedures for code blue, rapid response, MET call and stroke codes can be found in a separate guideline for [Rapid Response and Emergency Procedures](#).

**Critical care exclusion criteria**
Extensive consideration has been given to the *UVMMC Network Plan for the Ethical Allocation of Hospital Beds and Mechanical Ventilators* in the case of regional hospital surge that overwhelms critical care capacity. The plan can be found here:
Recommended labs

<table>
<thead>
<tr>
<th>Recommended labs:</th>
<th>Non-ICU Labs</th>
<th>ICU Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>On admission</td>
<td>Daily</td>
</tr>
<tr>
<td><strong>CBC with differential</strong></td>
<td>✔️</td>
<td>Provider discretion</td>
</tr>
<tr>
<td><strong>BMP, Ca, Mg, Phos</strong></td>
<td>✔️</td>
<td>Provider discretion</td>
</tr>
<tr>
<td><strong>Blood cultures x 2</strong></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td><strong>Coags – PT/INR, aPTT, fibrinogen, d-dimer</strong></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td><strong>HLH screen (CRP, DLH, d-dimer, ferritin, triglycerides)</strong></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td><strong>Procalcitonin</strong></td>
<td>If suspected bacterial infection</td>
<td>If suspected bacterial infection</td>
</tr>
<tr>
<td><strong>NT-pro-BNP</strong></td>
<td>Provider discretion</td>
<td>✔️</td>
</tr>
<tr>
<td><strong>T. bil, AST, ALT, Alk phos</strong></td>
<td>✔️</td>
<td>Provider discretion</td>
</tr>
<tr>
<td><strong>Lactic acid</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Urine pregnancy (for all patients of reproductive potential)</strong></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td><strong>Tracheal aspirate (GS and Cx)</strong></td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td><strong>Urine legionella and pneumococcal antigen</strong></td>
<td>✔️</td>
<td></td>
</tr>
</tbody>
</table>

Recommended imaging

1) Consider chest radiograph on admission with subsequent imaging at the discretion of provider
2) Consider point of care cardiopulmonary ultrasound to assess for associated cardiomyopathy, volume status, pulmonary edema and/or effusions.

Therapeutic Agents and Medication Management

1) See the UVMMC COVID-19 Therapeutic Algorithm for COVID-19 specific therapies on page 10.
2) Drugs that are potentially/theoretically harmful – AVOID the following:
   a. Avoid NSAIDS due to theoretical risk
      i. Thought to upregulate ACE2 receptor, potentially creating additional binding targets for SARS-CoV-2.
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b. Avoid thiazolidinediones (e.g., pioglitazone) due to theoretical risk
   i. Also thought to upregulate ACE2 receptor.
   ii. Use insulin for glycemic management.

3) Steroids: address on case-by case basis
   a. The current recommendation from the World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) is to avoid systemic corticosteroids in patients with COVID-19.
   b. Hydrocortisone 50 mg IV q6h may be implemented for vasopressor refractory septic shock.
   c. Methylprednisolone or prednisone may be used for other standard indications, as in the case of COPD and asthma exacerbation.
   d. The Society of Critical Care Medicine suggests using systemic corticosteroids, such as methylprednisolone (lower doses recommended but not specified), in mechanically ventilated adults with COVID-19 and ARDS (weak recommendation, low quality of evidence).

4) Consider avoiding
   a. Angiotensin converting enzyme inhibitors (ACE-inhibitors) and Angiotensin receptor blockers (ARBs) due to theoretical risk
      i. ACE-inhibitors and ARBs upregulate ACE2 receptor.
      ii. Consensus statements recommend ACE-inhibitors and ARBs NOT be discontinued unless clinically indicated for reasons other than COVID-19. This decision should be based upon clinical consensus of the team providing care to the patient.

Organ-system based approach to care

Neuro

For all COVID-19 patients and PUIs
1) Recommend acetaminophen 650-1000 mg PO/PR q6 hours PRN for fever; consider scheduling in ICU patients or in patients with persistent high-grade fever.
2) Recommend against using NSAIDs for fever.

Non-ICU/non-intubated patients
1) Consider melatonin nightly for sleep

ICU/intubated patients
1) Address pain through intermittent analgesia first, as directed by institutional Guidelines for Management of Pain, Agitation, and Delirium.
2) Recommend propofol a first-line agent sedation as long as hemodynamically tolerated.
3) Consider ketamine infusion for additional analgesia through synergy with opioids.
4) Favor intermittent opioid boluses PRN over continuous infusions – favor longer acting agent such as hydromorphone to minimize health care worker exposure
5) Consider early intermittent neuromuscular blockade for moderate to severe ARDS (see more in Respiratory section).

Respiratory
Respiratory procedures outlined here apply to patients ≥12 years old.

This document is subject to change.
Non-ICU Respiratory Support

1) See UVM Oxygen Therapy Algorithm on page 15.
2) Patients with respiratory symptoms due to COVID-19 may have “silent hypoxemia” – a period in which they appear clinically well without respiratory distress despite relative hypoxemia. Monitor oxygenation closely.
3) Supplemental oxygen will be titrated using the following devices (all acceptable on the floor) to meet a goal SpO2 of 90-96%, in order of preference: **standard nasal cannula, then Oxymizer, then Hudson nasal cannula, then non-rebreather**.
   a. Oxymizer – Acceptable
      - May be used on the floor or for pre-oxygenation prior to intubation.
      - **May not be used for transport.**
   b. Hudson nasal cannula- Acceptable
      - May be used for pre-oxygenation prior to intubation.
      - **May be used for patient transport with a yellow mask.**
   c. Non-rebreather (NRB) – Acceptable
      - NRB can be used with an attached exhalation viral filter, however these may not be available, and their efficacy is not well known.
      - **May be used for transport with a surgical mask.**
   d. High flow nasal cannula (HFNC) – Acceptable if patient has failed the above devices and is in a negative pressure room.
      - HFNC may prevent need for invasive ventilation. However, patients with COVID-19 requiring high flow oxygen are likely to require subsequent intubation. Consider whether intubation may be more appropriate.
      - Patients on high flow nasal cannula will be kept in a negative pressure room.
      - **May not be used for patient transport.**
4) Deciding to intubate
   b. If the patient cannot maintain SpO2 ≥90% on Oxymizer, Hudson nasal cannula, NRB, or HFNC at >50% FiO2 and 40LPM call MICU for evaluation for potential intubation.
   c. **Discuss goals of care, code status and likelihood of benefit prior to intubation.**
5) **Consider** early intubation. Intubation on the floor may be performed at the discretion of the critical care attending that is assuming care of the patient.
   a. This would be appropriate if the patient is not able to tolerate low-flow oxygen supplementation for transport.
6) **Avoid** aerosolizing procedures (venti-mask, HFNC, NIV, and nebulizers) as much as possible due to risk of viral aerosolization. If necessary to use the above, do so in a negative pressure room only.
   - See separate Respiratory Therapy Guidelines for patients needing bronchodilators
7) Non-invasive ventilation (NIV) in COVID-19 is likely limited because of a historically high failure rate in other forms of pneumonia.
   a. May be trialed for acute COPD exacerbation with hypoxemic or hypercapnic respiratory failure.
   b. May be trialed for suspected pulmonary edema from CHF exacerbation.
   c. NIV is considered high-risk for viral aerosolization and if absolutely necessary should take place in a negative pressure environment on airborne precautions with full high-risk procedure PPE.
d. After NIV/HFNC use or other aerosolizing procedure, airborne precautions should be maintained in the patient room for no less than 2 hours in a neutral room and no less than one hour in a negative pressure room.

8) If the patient is rapidly deteriorating from severe hypoxemic respiratory failure, the best option may be early intubation directly from low flow oxygen and pre-oxygenation with a non-rebreather.

9) If there is a desire to avoid intubation (DNR status, uncertain COVID status)
   a. The medical team will readdress likelihood of positive status before escalating to BiPAP or high-flow nasal cannula on the floor.
   b. HFNC and NIV will be offered ONLY in a negative-pressure room.
   c. Currently, avoiding NIV is recommended due to risk of viral aerosolization, but this is subject to change.

ICU Respiratory Support
1) Intubation procedure
   a. See simplified intubation procedure diagram on page 12.
   b. See Critical Care Exclusion Criteria, above on page 2.
   c. PPE
      - Intubation of proven or suspected COVID-19 patients will take place in a negative-pressure environment.
      - All intubation procedures are considered high risk and will require PPE for all staff in attendance as below.
        - Hair cover or hood
        - Eye protection with side shields or full-face shield
        - Fit-tested N95 respirator – PAPR may substitute N95 and face shield, but cause some visual obstruction in the procedure
        - Fluid-resistant gown or full coveralls (though caution with self-contamination with the latter)
        - Footwear should be fluid-impermeable and able to be decontaminated
        - Long (preferably long) gloves; consider double-gloving. Be sure that gloves completely cover the white cuffs of the gown, which are a common source of contamination.
   d. People
      - Intubation should be performed by the most skilled operator available.
      - Minimize the number of people in the room. The operator, one respiratory therapist and one RN should be sufficient.
      - Have a second airway manager available and donned outside the room in case of difficulty.
   e. Equipment
      - Have all needed equipment and minimum necessary number of personnel present in the room prior to starting the intubation procedure to avoid in-and-out traffic.
      - Recommend use of video laryngoscopy to help the operator keep head as far as possible from the patient’s airway.
      - Use a disposable blade when possible.
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- Data suggest more expeditious tube insertion with non-hyper-angulated blade. Non-hyper-angulated disposable blades are available in the MICU.
- Have a reliable backup method available
  1. Consider use of a disposable bronchoscope as first choice for backup or on first attempt if difficult airway is anticipated. This helps keep distance between the operator and the patient.
  2. If disposable bronchoscope is not readily available or familiar, have a bougie or laryngeal mask airway (LMA) on hand.
- Insert viral filters into the ventilator circuit (inspiratory and expiratory)
- Place an expiratory viral filter on the Ambu-bag to fit between the mask/endotracheal tube (see graphic from Brewster, et al) and the bag prior to use.

f. Oxygenation
- Preoxygenate for at least 5 minutes with either a Hudson nasal cannula, NRB or Oxymizer at 15 LPM or high flow nasal cannula with 100% FiO2, if needed. This is meant to help avoid need for bag-valve mask (BVM) ventilation.
- In cases of refractory hypoxemia during preoxygenation, it may be reasonable to consider using HFNC or NIV; use caution with aerosolization risk.
- Patients with ARDS, pregnant, obese, and patients with underlying lung disease are apt to desaturate quickly.
- Place head of bed upright or semi-upright during preoxygenation; head of bed at 30 degrees to optimize FRC and prevent aspiration during intubation.
- If you need to bag, use a PEEP valve, viral filter, and hold a tight seal (see graphic) and allow oxygen to flow passively without bagging at all (apneic oxygenation). If needing to provide volume, deliver small, frequent volumes. Note that apneic oxygenation may increase viral aerosolization.
- If bagging is required and the EtCO2 waveform appears triangular, consider a mask leak is present and re-adjust.
- Turn the oxygen off prior to removing the mask when getting ready to intubate to reduce aerosolization.

![Circuit Setup Diagram](Figure 1: Use of Viral Filter on Oxycheck Bag)

Brewster et al

g. Hemodynamics
h. Medications
- Have norepinephrine hanging (but not punctured) in case of hypotension.
- Have propofol and fentanyl in the room and ready to be used post-procedure. Can also consider ketamine infusion for sedation.
- Ensure adequate sedation and paralysis to prevent agitation leading to spread of fluids, blood and aerosols.
- Consider using ketamine bolus or propofol for induction.
- Use high-dose neuromuscular blocking agents (NMBA) for faster, more complete apnea and no residual cough.
  1. Consider 1.2 mg/kg IV rocuronium or 2 mg/kg IV succinylcholine.
  2. Honor the time to onset of drug effect.
- RN administering medications should move at least 6 feet from the airway once medications are given.

i. Intubation
- Use rapid sequence intubation, minimizing use of bag-valve mask ventilation to avoid aerosolization.
- **Inflate the endotracheal tube cuff/balloon before lung insufflation with the Ambu-bag or vent following intubation.**
- Check for appropriate ET tube placement by observing chest-rise and end-tidal CO2 – do not use a stethoscope.

2) **Equipment disposal and decontamination**
   a. For non-disposable laryngoscopes
   - Request a red bin be brought to the bedside. This can be made easier by bringing a red bin to the outside of the room prior to the intubation procedure.
   - Red bins can ONLY be stored in the East Side dirty utility room
   - More can be ordered from central supply (CSR).
   - Place equipment in red bin, cover, bring back to dirty utility room
   - **Don PPE: gown, mask w/ shield, gloves.** These are stocked in dirty utility room.
   - Spray down the equipment with pre-cleanser, cover, leave in dirty utility, request the US/LNA to have it sent to CSR.
   - There is a sign in the dirty utility room outlining this procedure.

3) **Ventilator management for intubated patients with COVID-19 pneumonia and/or ARDS**
   a. Minimize ventilator disconnects. If needing to disconnect the ventilator, clamp endotracheal tube. If unable to clamp, disconnect and reconnect quickly at end-expiration.
   b. Tighten vent connections while in the room for other tasks to avoid accidental disconnections and need for urgent entrance into the room.
   c. Use in-line suctioning as opposed to open suctioning.
   d. **Recommend ARDSnet ventilator procedures** as below
      - **Recommend** HIGH PEEP strategy in COVID-19 patients. Note this is **different** than the strategy reflected in the pre-existing UVM ARDS vent protocol.
      - TV 6 cc/kg ideal body weight (IBW)
        - range of 4-8cc/kg IBW acceptable
      - Maintain plateau pressure ≤ 30 cmH₂O
        - Decrease tidal volume by 1 cc/kg IBW increments to achieve plateau pressure ≤30 H₂O
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- Permissive acidosis/hypercapnia
  - Adjust respiratory rate and volume (in that order) to achieve desired pH.
  - ARDSnet ventilator protocol allows for goal pH down to 7.3. However, a pH as low as 7.2 may be tolerable so long as hemodynamics are still stable.
- Aim for oxygenation goal of SpO2 90-96%
- Refer to UVMMC vent-weaning protocol and ARDSnet PEEP table for PEEP weaning guidelines.

  e. **Recommend** conservative fluid management: reduces mortality in ARDS.
  f. **Recommend** prone positioning for severe ARDS (P/F ratio <150).
  - Prone for 12-16 hours at a time, NMB not required.
  - Capacity for multi-patient prone positioning may depend on resource availability.
  g. **Recommend** early, intermittent neuromuscular blockade for moderate-severe ARDS.
  h. **Consider** airway pressure release ventilation (APRV)
  - APRV may be beneficial in COVID-19 patients with ARDS given primary pathophysiology related to alveolar filling, surfactant dysfunction and alveolar collapse/atelectasis.
  - Clinicians should only attempt using APRV if they’re well-familiarized with titrating and weaning of APRV. If not, stick with low volume ventilation strategy described above.
  - If using APRV, ensure that T-low is appropriately truncated, such that expiratory flow never drops below 70% of peak expiratory flow rate before switching back to P-high.
  i. **Consider** using inhaled pulmonary vasodilators such as epoprostanol (Flolan) for refractory hypoxemia.
  j. **Avoid** the use of inhaled nitric oxide.

4) **Extubation**
   a. Extubation is a high-risk procedure for viral spread and requires appropriate PPE including N95/face shield or PAPR as above under Intubation Procedure.
   b. **Recommend** trying to avoid extubation to HFNC O2 or non-invasive ventilation
      - Do not extubate to HFNCO2 or non-invasive ventilation in a non-negative pressure (AKA “neutral”) room.
      - Patients with COVID-19 should be totally optimized, as possible, prior to extubation to avoid high flow, BiPAP and reintubation.

5) **Mechanically ventilated pregnant patients**
   a. Maternal Fetal Medicine should be consulted on all COVID-19 patients who are pregnant.
   b. If mechanically ventilated, consider placing pregnant patient on her left side to maximize uterine blood flow.

6) **Extracorporeal Membrane Oxygenation (ECMO)**
   a. Veno-venous (VV) ECMO may be performed on a case by case basis.
   b. UVMMC COVID-19 specific guidelines for VV ECMO are currently in progress and will be available soon.
   c. Veno-arterial (VA) ECMO is **not** available at UVM.

**Cardiac/Hemodynamic Support**
Non-ICU patients
1) Conservative fluid management is recommended
   a. Avoid excessive fluid administration for hypotension, favor early utilization of low dose
      vasoactive agents to avoid non-cardiogenic pulmonary edema.
2) Non-titratable and titratable drips appropriate for step-down level of care include:
   a. Heparin, diltiazem, amiodarone, and nitroglycerine.
   b. Inquire with the floor’s charge nurse about other acceptable drips.

ICU patients
1) Consider periodic volume assessment with ultrasound; consider using pulse pressure variability or
   waveform analysis in patients with arterial lines.
2) Recommend early utilization of low dose vasoactive to avoid excessive volume administration.
   a. Goal MAP ≥ 60-65 mmHg
   b. Consider the following succession of vasopressor therapy as indicated by hypotension and/or
      perfusion markers:
      - 1st line: Norepinephrine
      - 2nd line: Vasopressin
      - Dobutamine or epinephrine if cardiac dysfunction is seen
      - Do not use dopamine
3) Obtain point of care echo, EKG and consider troponin level for increasing vasopressor requirements
4) For vasopressor refractory shock, recommend starting 50 mg IV hydrocortisone q6h.
   a. Taper steroids once patient is weaned down to one vasopressor or off vasopressors.
5) For patients requiring central venous access, suggest placing CVC in the left inferior jugular to spare the
   right side for a hemodialysis catheter or introducer if needed.
6) Consider viral myocarditis, stress cardiomyopathy, and acute coronary syndrome in patients with signs of
   cardiogenic shock.

Infectious Disease

COVID-19 Specific Therapies

Critical document: See the UVMMC COVID-19 Therapeutic Algorithm for COVID-19 specific therapies through
the link and on page 13. It includes criteria for ID consult with regard to treatment plan.

Antibiotics
1) Empiric antibiotics are indicated in patients with pneumonia and ARDS of unknown etiology.
   a. Refer to pages 31-33 of the UVMMC Green Book for further guidance.
   b.
2) De-escalate antimicrobials as appropriate depending on confirmatory clinical and laboratory data.

Renal
1) Avoid nephrotoxins, particularly NSAIDs.
2) Target a net even to negative fluid balance goal.
   a) Balanced/buffered crystalloids should be used.
   b) Do not use colloids, gelatins, dextrans or hydroxyethyl starches.
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3) Anticipate need for renal replacement therapy in critically ill patients.

GI
1) Enteral nutrition and H2 blocker/PPI for intubated patients.

Heme
1) DVT PPX: only hold for plt <30
2) Transfusion goal of hemoglobin ≥7 mg/dL
   a) May consider goal ≥8 for patients with cardiomyopathy
   b) Consider giving furosemide with transfusions to avoid volume overload

Endocrine
1) Daily glucose screening for non-diabetics, do not order q6 POC blood glucose levels unless clinically indicated
2) Insulin infusions are acceptable for non-ICU patients with COVID-19 and PUIs on McClure 6.
3) Initiation of Insulin Infusions can follow standard hospital guidelines for insulin drips in critically ill patients and will be directed by parameters outlined in the hospital policy, Adult Insulin Infusion Protocol.

OB/GYN: Special considerations for pregnant patients with COVID-19
1) Consult Maternal Fetal Medicine
   a) Although descriptions of COVID-19 in pregnant women report mild disease in most patients, it is unknown whether pregnant women are at higher risk for severe disease.
   b) Current, limited data suggest severity of disease in pregnant women is similar as in nonpregnant adults.
2) Manage critical illness by following the same recommendations for adults as described above.
3) Contact Incident Command for procedure plan for labor and delivery in a pregnant patient with confirmed or suspected COVID-19.
4) Consider safety profile of experimental and compassionate use agents in pregnant women prior to implementation or enrollment in clinical trials.
5) Refer to the UVMMC COVID-19 Labor and Delivery Workflow for related information.
UVMMC COVID-19 Therapeutic Algorithm

This document is subject to change. Updated on 3/26/2020.
### Table 1. COVID-19 Risk Factors for Severe Disease

<table>
<thead>
<tr>
<th>Category 1: Epidemiological risk factors</th>
<th>Category 2: Vital Signs</th>
<th>Category 3: Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-existing pulmonary disease</td>
<td>Respiratory rate &gt;24 breaths/min</td>
<td>D-dimer &gt;1000 ng/mL</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>Heart rate &gt; 125 beats/min</td>
<td>Creatine kinase &gt; 2x upper limit of normal</td>
</tr>
<tr>
<td>Diabetes with HbA1C &gt;7.6%</td>
<td>SpO2&lt;90% on ambient air</td>
<td>CRP &gt;100 mg/dL</td>
</tr>
<tr>
<td>History of hypertension</td>
<td></td>
<td>LDH &gt;245 U/L</td>
</tr>
<tr>
<td>Use of biologics</td>
<td></td>
<td>Elevated troponin</td>
</tr>
<tr>
<td>History of transplant or other immunosuppression</td>
<td></td>
<td>Admission absolute lymphocyte count &lt;0.8 k/dL</td>
</tr>
<tr>
<td>All patients with HIV (regardless of CD4 count)</td>
<td></td>
<td>Ferritin &gt;300 μg/L</td>
</tr>
</tbody>
</table>

This document is subject to change. Updated by the UVMCC COVID-19 Therapeutics Working Group on 3/24/2020. Adapted from the Massachusetts General Hospital COVID-19 Treatment Guidance Version 1.0 3/17/2020.

### Table 2. Potential agents and dosing

(Off-label unless otherwise indicated)

<table>
<thead>
<tr>
<th>Strongly consider</th>
<th>Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydroxychloroquine</td>
<td>400 mg PO BID x 2 doses, then 200 mg PO BID for 5 days*</td>
</tr>
<tr>
<td>Remdesivir (compassionate use available only for children and pregnant women)</td>
<td>200 mg IV on day one, then 100 mg IV daily for up to 10 days</td>
</tr>
<tr>
<td>Tocilizumab</td>
<td>Consider 400mg IV x1, dose escalation or re-dose 12 hours later by rheumatology consult</td>
</tr>
<tr>
<td>Other biologics</td>
<td>Anti-IL-6, anti-IL-1, JAK inhibitors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>May also consider</th>
<th></th>
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<tbody>
<tr>
<td>Interferon beta-81</td>
<td>Dosing for progressive COVID-19 TBD</td>
</tr>
</tbody>
</table>

*PUI – Person under Investigation

*See table 1

*ID (Infectious Disease) approval required

§ Stop hydroxychloroquine if COVID-19 test is negative

* See table 2, rheumatology consult

* Monitor QTc daily and discontinue if QTc>500. Check for other drug-drug interactions.
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UVMMC COVID-19 Oxygen Support Plan

Covid 19 Positive/PUI (Rule Out) Patient: O2 Support

- Nasal Cannula use at 1-6 L/min

- Is Target SpO2 reached?  
  - No: Escalate to:  
    - Oxygen (1-12 L/min) OR  
    - Hudson (1-13 L/min)

- Maintain current support (consider weaning as tolerated)

- Is Target SpO2 reached?  
  - Yes: Escalate to NRB at 15 L/min (minimum flowrate)

- Is Target SpO2 reached?  
  - No: Team Collaboration: discuss potential best intervention  
    - *consider risk of internal transport (to ICU bed or other area)*

- Intubate, then transport to ICU

- Less Preferred:
  - Consider potential for HPNC or NIV (CPAP/BiPAP)  
    - *Only negative pressure rooms*

- Is the patient stable?

This document is subject to change.  
UVMMC QUICK COVID-19 Management Guide
3/26/20

UVMMC COVID-19 Intubation Procedure Mini-Guide
See full intubation procedure guidelines starting on page 6 for more details.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>• COVID-19 Patient or PUI with respiratory failure requiring intubation</td>
<td>• Ideally procedure will take place in a negative pressure room with the door closed</td>
</tr>
<tr>
<td>• Discuss goals of care and code status</td>
<td>• Intubation may take place on the floor at the critical care attending’s discretion.</td>
</tr>
<tr>
<td>• Assess likelihood of benefit</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PPE</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hair cover or hood</td>
<td>• Minimal number of staff in the room - operator, RT, RN</td>
</tr>
<tr>
<td>• Eye protection with side shields, goggles, full-face shield or PAPR</td>
<td>• Have a second airway manager available and donned outside the room in case of difficulty</td>
</tr>
<tr>
<td>• Fit-tested N95 respiratory or PAPR</td>
<td>• Intubation should be performed by the most skilled operator available</td>
</tr>
<tr>
<td>• Fluid-resistant gown or full coveralls</td>
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</tr>
<tr>
<td>• Gloves that cover cuffs of gown</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Have all needed equipment in the room prior to starting the intubation procedure including backups</td>
<td>• Use a Hudson nasal cannula, Oxymizer or NRB (with surgical mask) with 15LPM flow to pre-oxygenate at least 5 minutes to avoid needing BVM ventilation</td>
</tr>
<tr>
<td>• Use video laryngoscopy and disposable blades (non-hyperangulated are available and may facilitate quicker tube insertion)</td>
<td>• May cautiously consider NIV for preoxygenation in refractory hypoxemia</td>
</tr>
<tr>
<td>• Favor bronchoscopic intubation if difficult airway is anticipated; bougie or LMA acceptable.</td>
<td>• If you need to bag, hold a tight seal and allow oxygen to flow passively without bagging at all; otherwise deliver small, frequent volumes</td>
</tr>
<tr>
<td>• Insert viral filters into the vent circuits and bag-valve mask (see graphic below)</td>
<td>• Patients with ARDS, pregnant and obese patients will desaturate quickly</td>
</tr>
<tr>
<td>• Ensure PEEP valve is on Ambu-bag</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hemodynamics</th>
<th>Meds</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Have norepinephrine hanging and ready in case of hypotension</td>
<td>• Ensure adequate sedation – consider ketamine bolus or propofol</td>
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<table>
<thead>
<tr>
<th>Intubate</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>• Use RSI, minimizing use of the BVM</td>
<td>• Inflated endotracheal tube cuff before insufflation of lungs by Ambu-bag or ventilator</td>
</tr>
<tr>
<td></td>
<td>• Check for appropriate ET tube placement by observing chest-rise and end-tidal CO2 - do not use a stethoscope</td>
</tr>
</tbody>
</table>