Management of Inpatients with Suspected SARS-CoV-2 (COVID-19)

All UMMC patients suspected of having COVID-19 should immediately be reported to Mississippi MED-COM at (601) 984-4655.

The backbone of the treatment strategy for COVID-19 is good quality supportive care as in any viral pneumonia. Certain therapies have shown benefit for COVID-19 and are included in the recommendations below, including inpatient (pages 1-3) and outpatient (page 4) treatments. This document will be updated continually as new evidence emerges and based on the availability of treatment regimens.

Patient Admitted on Nasal Cannula		
Disposition: Consider admission to intensive care unit if older than 65 years of age with a new oxygen requirement, D-dimer > 1,000 ng/L, or RR > 22 breaths/min		
Fluids	Conservative fluid management strategy	
Medications	***Evaluate for enrollment in clinical trials*** *(link below)*	
	Antimicrobials	Consider empiric antibiotics for bacterial pneumonia while COVID-19 results are pending
	Corticosteroids	Initiate dexamethasone for patients requiring O_2; do not continue on discharge
	Bronchodilators	If needed, use metered dose inhalers and avoid nebulized therapies
Coagulopathy	Evaluate hematologic abnormalities and treat as appropriate. See "Anticoagulation Dosing Recommendations for COVID-19 Patients" document.	
O_2 Supplement	Target SpO2 >90%. If oxygen requirement increases to 5 L Call primary team and ICU for evaluation.	
	Consider high-flow nasal cannula at 15 – 30 LPM with surgical mask over patient's face.	
Patient Admitted to Intensive Care Unit		
Fluids	Conservative fluid management strategy such as daily net neutral fluid balance in patients without evidence of shock	
Medications	***Evaluate for enrollment in clinical trials*** *(link below)*	
	Antimicrobials	Consider empiric antibiotics for bacterial pneumonia while COVID-19 results are pending
	Corticosteroids	Initiate dexamethasone for patients requiring O_2 or mechanical ventilation
Coagulopathy	Evaluate hematologic abnormalities and treat as appropriate. See "Anticoagulation Dosing Recommendations for COVID-19 Patients" document.	
O_2/Mechanical Ventilation	Target SpO2 >92%. Consider HFNC at 15-30LPM with surgical mask over patients face.	
	Once intubated, maintain plateau pressures < 30cm H_20. Low Vt and high PEEP strategies are controversial.	
	If PaO_2/FiO_2 < 150, consider early proning and use of paralytics	
	If PaO_2/FiO_2 remains < 150 after proning and paralysis, consider cautious use of inhaled vasodilators and ECMO consult	

Information about ongoing or potential clinical trials at UMMC can be found at: https://umc.edu/COVID19Trials

Additional Comments:

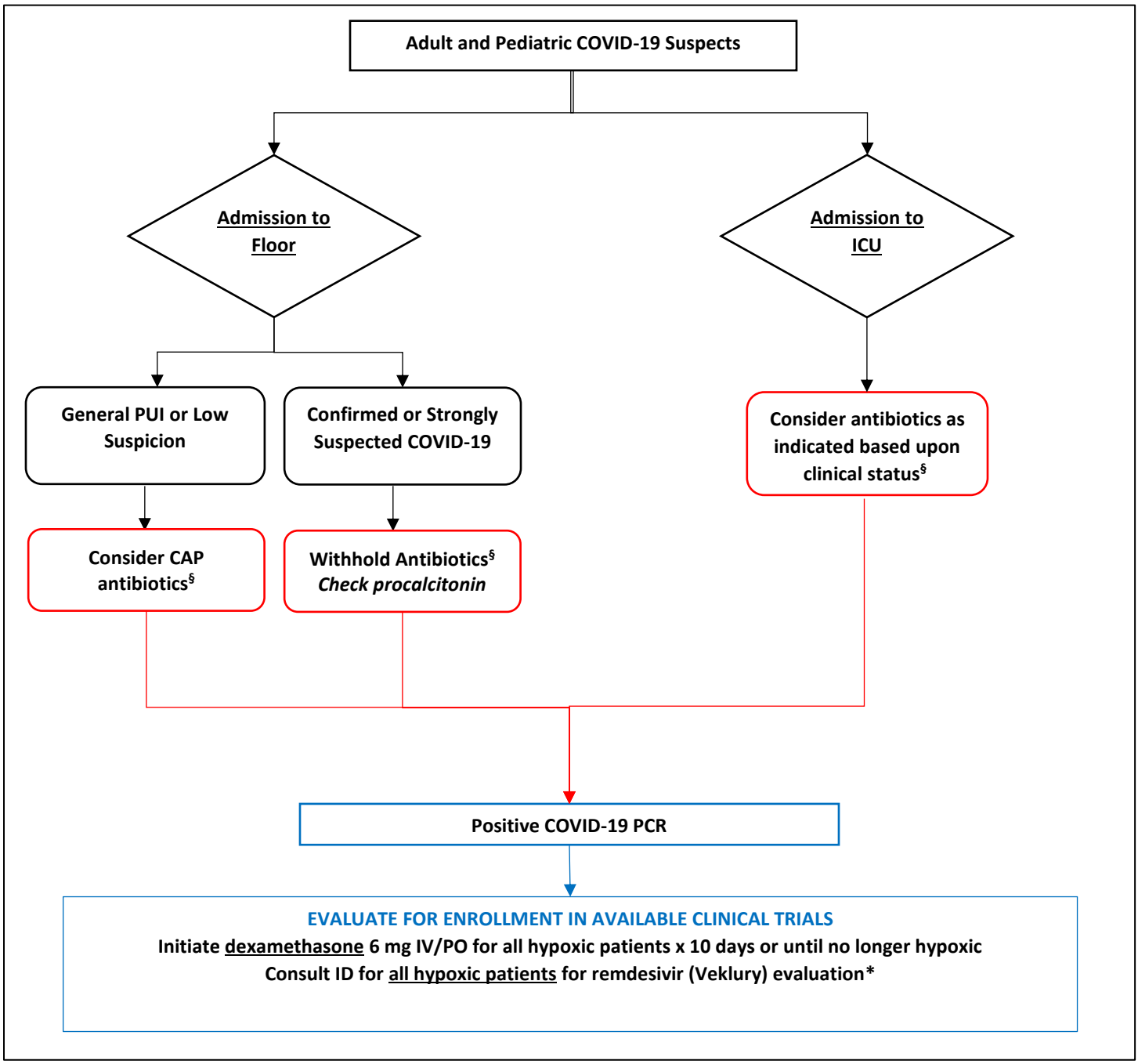
- Early intubation for hypoxemic respiratory failure is no longer required.

Agents not recommended for COVID-19 treatment

The agents listed below have no evidence supporting the use for treatment of COVID-19 but can be used for alternative diagnoses or in the context of clinical trials. * = drugs with low supply (recent shortage or currently on allocation) – contact pharmacy with questions.

- HIV protease inhibitors (more on lopinavir/ritonavir on page 4): darunavir, atazanavir
- H2-receptor blockers: famotidine*, cimetidine
- Supplements: zinc*, ascorbic acid*, vitamin D
- Miscellaneous: hydroxychloroquine, IVIG*, interferon, azithromycin, colchicine, cetirizine

Algorithm for Management of Hospitalized Patients with Suspected COVID-19



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*ID consult is not required for patients who are asymptomatic or not requiring oxygen. For patients who are readmitted, please contact infection prevention for questions regarding isolation.

§Multiple studies have shown low rate of bacterial co-infection in patients with COVID-19; therefore, antibiotics can be withheld in most patients. Use of procalcitonin can aid in decision making. Procalcitonin can be falsely elevated due to trauma, shock, renal dysfunction (ESKD or AKI), some forms of vasculitis, acute graft vs. host disease, and paraneoplastic syndromes due to medullary thyroid and small cell lung cancer.

Treatment Information

Drug	Dose and Duration	Comments
Approved Therapies		
Remdesivir (Veklury) • Direct acting antiviral • FDA approved emergency use authorization • Supply limited • Enrollment and allocation decisions made on an individual basis	**Adult** 200 mg IV x 1 followed by 100 mg IV q24h **Pediatric** • <40 kg: 5 mg/kg IV load followed by 2.5 mg/kg IV q24h • ≥40kg: Refer to adult dosing Duration: 5 days or until no longer hypoxic	FDA approved for patients >12 years old weighing ≥40 kg. Available through emergency use authorization for pediatric patients <12 years old and/or <40 kg. **Additional assessment** • Requires O2 sat < 95% or oxygen supplementation • Requires baseline eGFR and ALT • Contraindicated with ALT > 10x UNL **A/E:** Increased ALT/AST.
Corticosteroids *Dexamethasone* • Initiate in patients requiring mechanical ventilation or oxygen • Do not start in patients not requiring oxygen	**Adult** Preferred: Dexamethasone 6-10 mg IV/PO* daily Duration: 10 days or until no longer hypoxic	Decreased mortality shown in the RECOVERY trial Not recommended for the treatment of non-hospitalized or non-hypoxic patients at this time **Additional assessment** • Monitor blood sugar • Elevations in WBC can occur with corticosteroid use
Not Recommended		
Azithromycin • No intrinsic activity for SARS-COV-2 • No benefit demonstrated for COVID-19	**Adult** 500 mg IV/PO on day 1, followed by 250 mg IV/PO daily x 4 days **+ HCQ** **Pediatric - >3 months** • 10 mg/kg IV/PO on day 1 (max 500 mg), followed by 5 mg/kg IV/PO daily x 4 days (max 250 mg)	**Additional assessment** • Assess for serious drug-drug interactions (DDI) • Assess baseline QTc and Mg^{2+} with follow-up QTc in 24-48 hours **Contraindications** • QTc >500
Hydroxychloroquine (HCQ) • No benefit in multiple RCT for COVID-19	**Adult** 400 mg PO BID x2 doses followed by 200 mg PO BID x4 days **Pediatric** 6.5 mg/kg (max: 400 mg/dose) q12h PO x2 doses followed by 3.5 mg/kg (max: 200 mg/dose) PO q12h x 4 days	**Additional assessment** • Assess QTc prior to initiation • Assess for serious drug-drug interactions (DDI) **Contraindications** • QTc >500 (see QTc monitoring table on page 2) **A/E:** retinopathy, rash, nausea, glucose fluctuations
Lopinavir-Ritonavir (Kaletra®) • No benefit in RCT for COVID-19	**Adult** 400mg-100mg PO BID **Pediatric** *14 days to 6 months:* 16 mg/kg PO BID (lopinavir component) *6 months to 18 years:* • 15-25 kg: 200 mg-50 mg PO BID • 26-35 kg: 300 mg-75 mg PO BID • >35 kg: 400 mg-100 mg PO BID	**Additional assessment** • Check HIV antigen/antibody prior to first dose • Assess for serious DDI (CYP3A4 substrate/inhibitor) **A/E:** hepatotoxicity, pancreatitis, QTc prolongation, diarrhea Combination with ribavirin has been suggested based on synergistic action with lopinavir/ritonavir. Additional studies are needed before recommending this combination.
Tocilizumab (Actemra) • Adjunctive agent that targets IL-6 • No benefit in RCT (COVACTA) for COVID-19	**Adult** 400 mg IV x1 dose **Pediatric – 2 Years of Age and Older** • <30 kg: 12 mg/g IV x1 dose (max 400 mg) • ≥30kg: 8 mg/kg IV x1 dose (max 400 mg) Duration: 1 dose	**Additional assessment** • Consider checking inflammatory markers (CRP, ferritin, LDH, fibrinogen, D-dimer) **A/E:** Increased ALT/AST, infusion related reactions, hematologic dyscrasias, increased LDL

Information on drug interactions and administration for patients who cannot swallows can be found at: http://www.covid19-druginteractions.org/

Management of Non-Hospitalized Patients with Mild-Moderate COVID-19

The FDA has approved two monoclonal antibodies for the use in outpatients who are at high risk of disease progression:

1. **Bamlanivimab** (Eli Lilly)
2. **Casirivimab/imdevimab** (Regeneron)

The criteria defined by the EUA for both monoclonal antibodies are below and can easily be accessed using the SmartPhrase ".COVIDABINFSCREENING":

☐ Within 10 days from symptom-onset
☐ ≥12 years of age
☐ Weighs ≥40kgs /88lbs.

Patient must meet the 3 criteria above **PLUS** 1 of the following risk factors for disease progression:

☐ **≥65 years of age**

12-64 years of age AND have
☐ Body mass index (BMI) ≥35 or
☐ Chronic kidney disease or
☐ Diabetes or
☐ Immunosuppressive disease* or
☐ Currently receiving immunosuppressive treatment (chemotherapy, transplant immunosuppressants, immune modulators such as Rituximab, etc.)

≥55 years of age AND have
☐ Cardiovascular disease, OR
☐ Hypertension, OR
☐ Chronic obstructive pulmonary disease/other chronic respiratory disease.

12 – 17 years of age AND have
☐ BMI ≥85th percentile for their age and gender based on CDC growth charts, https://www.cdc.gov/growthcharts/clinical_charts.htm , OR
☐ Sickle cell disease, OR
☐ Congenital or acquired heart disease, OR
☐ Neurodevelopmental disorders, for example, cerebral palsy, OR
☐ Medical-related technological dependence, for example, tracheostomy, gastrostomy, or positive pressure ventilation (not related to COVID-19),OR
☐ Asthma, reactive airway or other chronic respiratory disease that requires daily medication for control.

*AIDS or CD4 count < 200, Complement deficiency, Grafts-Vs-Host disease (GVHD), HIV infection, Immunoglobulin deficiency/ Immunodeficiency, Immunosuppressive therapy (within the last 12 months), Leukemia, Lymphoma (Hodgkin's/ Non-Hodgkin's (NHL)), Metastatic cancer, Multiple Myeloma, Solid organ malignancy, Steroid therapy (within past 2 weeks), Bone marrow transplant (BMT) or peripheral stem cell transplant (PSCT), Solid organ transplant

The monoclonal antibodies **should not** be used for patients who are hospitalized with COVID-19, require oxygen therapy for COVID-19, or have an increase in baseline oxygen flow rate due to COVID-19.

Currently UMMC only has access to bamlanivimab. If you are a UMMC provider and have a patient who you think may qualify for bamlanivimab, please fill out the screening form (.COVIDABINFSCREENING) in Epic and send it to "P COVID-19 MONOCLONAL ANTIBODIES REQUEST". Prior to sending the requests, please ensure the positive COVID-19 test is available to review in the chart.