TREATMENT GUIDELINE FOR PATIENTS WITH COVID-19

This is a living document that will be updated as more data emerge.

Last updated: 8/9/22

Table 1. Overview of Treatment Recommendations Based on Hospitalization and Severity of Disease

Not Hospitalized – Recommended Treatment	
• Supportive care • Paxlovid (nirmatrelvir/ritonavir) if **within 5 days of symptom onset** for patients who meet EUA criteria (see Table 2) • Consider monoclonal antibody if **within 7 days of symptom onset** and meet eligibility criteria (see Table 2)	
Hospitalized	**Recommended Treatment**

No supplemental oxygen (or if on chronic oxygen therapy, not requiring an increase in baseline oxygen flow rate due to COVID-19)	• Supportive Care, **AND**
	• One of the following for patients who meet criteria (see Table 2):
	  ○ Paxlovid for 5 days (restricted to ID physicians - except for continuation of prior to admission medication), **OR**
	  ○ For patients admitted for reasons not related to COVID-19 **AND** meet all criteria for use:
	  ▪ Remdesivir for 3 days (restricted to ID physicians)
	• Anticoagulation: refer to **COVID-19 Anticoagulation and Coagulopathy Management for Adults**

Low-flow supplemental oxygen (i.e., persistent SpO2 ≤ 94% on room air AND requiring supplemental oxygen)	• Remdesivir (restricted to ID physicians) for 5 days or until discharge, whichever comes first, **AND** • Dexamethasone 6 mg IV/PO daily for up to 10 days or until discharge, whichever comes first, **AND** • Anticoagulation: refer to **COVID-19 Anticoagulation and Coagulopathy Management for Adults**
Non-invasive ventilation or high-flow oxygen devices	• Dexamethasone 6 mg IV/PO daily for up to 10 days or until discharge, whichever comes first (consider higher dose in select patients – refer to Table 2), **AND** • ***Consider*** remdesivir (clinical benefit uncertain - restricted to ID physicians) for 5 days or until discharge, whichever comes first, **AND** • Baricitinib or tocilizumab (restricted to ID physicians), **AND** • Anticoagulation: refer to **COVID-19 Anticoagulation and Coagulopathy Management for Adults**
Mechanical ventilation or ECMO	• Dexamethasone 6 mg IV/PO daily for up to 10 days or until discharge, whichever comes first (consider higher dose in select patients – refer to Table 2), **AND** • If < 48h of mechanical ventilation: tocilizumab or baricitinib (restricted to ID physicians), **AND** • Anticoagulation: refer to **COVID-19 Anticoagulation and Coagulopathy Management for Adults**

SUGGESTED LABORATORY MONITORING

Obtain at baseline and with any sudden decline in oxygenation status

- Complete blood count with differential *(leukopenia and lymphopenia common)*
- Comprehensive metabolic panel *(moderately elevated AST/ALT described)*
- Lactate dehydrogenase *(elevation associated with increased mortality)*
- Ferritin *(extreme elevation associated with severe illness and mortality)*
- C-reactive protein *(extreme elevation associated with severe illness and mortality)*
- Procalcitonin (refer to Table 3)
- D-dimer *(commonly elevated; should NOT be used in isolation to prescribe therapeutic anticoagulation. See Beaumont's COVID-19 Anticoagulation Management for Adults guideline for additional information)*

Table 2. Recommended Agents for Therapeutic Management of COVID-19

Paxlovid (nirmatrelvir/ritonavir) - Restricted to Infectious Disease physicians (except for continuation of PTA medication)

Restricted to Infectious Disease Prescribers for inpatient use. Prescriber must complete all EUA requirements.

The concomitant use of Paxlovid with certain other drugs may result in potentially significant drug interactions. Consult the EUA Fact Sheet and/or a web-based interaction checker for potential drug interactions.

Dosage regimen (based on renal function):

- eGFR ≥ 60 mL/min: 3 tablets (two 150 mg tablets nirmatrelvir with one 100 mg ritonavir tablet) PO BID for 5 days
- eGFR 30 to < 60 mL/min: 2 tablets (one 150 mg tablet nirmatrelvir with one 100 mg ritonavir tablet) PO BID for 5 days
- eGFR < 30 mL/min: Not recommended

Inclusion Criteria	Exclusion Criteria
• Positive SARS-CoV-2 test (i.e., RT-PCR or antigen, not antibody test), **AND** • Symptom onset within the last 5 days, **AND** • High risk for progression to severe COVID-19 based on CDC risk factors	• Pediatric patients < 12 yo OR < 40 kg, **OR** • Requiring supplemental oxygen (or if on chronic oxygen therapy, requiring an increase in baseline oxygen flow rate due to COVID-19), **OR** • eGFR < 30 mL/min, **OR** • Severe hepatic impairment (Child-Pugh Class C), **OR** • Significant drug interactions (i.e., interactions associated with serious and/or life-threatening reactions or interactions that result in a significant reduction in nirmatrelvir or ritonavir plasma concentrations and may result in the potential for loss of virologic response and possible resistance)

Monoclonal Antibodies for COVID-19

Bebtelovimab

Treatment: Bebtelovimab 175 mg/2 mL IV (administer over at least 30 seconds) x 1 (Cannot be used for post-exposure prophylaxis)

- **For outpatient use only.** Prescriber must complete all EUA requirements.
- Therapeutic Interchange: Pharmacist can interchange sotrovimab to the new FDA recommended monoclonal antibody (mAb), bebtelovimab
  - Patients prescribed sotrovimab will be interchanged to bebtelovimab using the order mode of "Within Scope: No co-sign required". The ordering prescriber will be the authorizing provider.

Treatment Criteria

Inclusion Criteria	Exclusion Criteria
• Outpatient or an inpatient admitted for reasons not related to COVID-19, **AND** • Positive SARS-CoV-2 test (i.e., RT-PCR or antigen, not antibody test), **AND** • Symptom onset within the last 7 days, **AND** • High risk for progression to severe COVID-19 based on CDC risk factors, **AND** • Alternative COVID-19 treatment options approved or authorized by the FDA are not accessible or clinically appropriate.	• Pediatric patients < 12 yo OR < 40 kg, **OR** • Requiring supplemental oxygen (or if on chronic oxygen therapy, requiring an increase in baseline oxygen flow rate due to COVID-19)

Monoclonal Antibodies for COVID-19

Tixagevimab/cilgavimab (Evusheld)

Pre-exposure Prophylaxis: Tixagevimab/cilgavimab (Evusheld) IM x 1 (Cannot be used for treatment or post-exposure prophylaxis)

- Dose: Tixagevimab 300 mg (3 mL)/cilgavimab 300 mg (3 mL) IM x 1
- Repeat dose: Tixagevimab 300 mg (3 mL)/cilgavimab 300 mg (3 mL) IM x 1 every 6 months for patients needing ongoing protection
- Therapeutic Interchange: Pharmacist may adjust the first dose of Evusheld to match the new FDA recommended dose of tixagevimab 300mg/cilgavimab 300mg
  - Patients prescribed first doses of tixagevimab 150 mg /cilgavimab 150 mg will be interchanged to the new FDA recommended dose of tixagevimab 300mg/cilgavimab 300mg
  - Pharmacists may adjust the dose of Evusheld during order verification
  - If a patient is eligible for a dose adjustment, the pharmacist can discontinue the initial order using discontinuation reason of "dose adjustment" and may order the new dose using the order mode of "Within Scope: No co-sign required". The ordering prescriber will be the authorizing provider.

Pre-exposure Prophylaxis Criteria

Inclusion Criteria	Exclusion Criteria
• Meets MDHHS eligibility criteria (see criteria below)	• Pediatric patients < 12 yo OR < 40 kg, **OR** • COVID vaccine within last 14 days

MDHHS Tier Eligibility Criteria

Tier 1
• Received B-cell depleting therapies (e.g., rituximab, ocrelizumab, ofatumumab, alemtuzumab) within 1 year • Receiving Bruton tyrosine kinase inhibitors • Chimeric antigen receptor T cell recipients • Post-hematopoietic cell transplant recipient with chronic graft versus host disease or receiving immunosuppressive medications for another indication • Patients with hematologic malignancies who are on active therapy • Solid-organ transplant recipients who: 1) are lung transplant recipients, or 2) are within 1 year of receiving a solid-organ transplant (other than lung transplant), or 3) solid-organ transplant recipients with recent treatment for acute rejection with T or B cell depleting agents • Patients with severe combined immunodeficiencies • Patients with untreated HIV who have a CD4 T lymphocyte cell count < 50 cells/mm^3
Tier 2
• Active treatment for solid tumor malignancy • Moderate or severe primary immunodeficiency (e.g., DiGeorge syndrome, Wiskott-Aldrich syndrome) • Advanced or untreated HIV infection (CD4 cell counts of 50-200/mm^3, history of an AIDS-defining illness without immune reconstitution, or clinical manifestations of symptomatic HIV) • Active treatment with high-dose corticosteroids (i.e., ≥ 20 mg prednisone or equivalent per day when administered for ≥ 2 weeks), alkylating agents, antimetabolites, transplant-related immunosuppressive drugs, cancer chemotherapeutic agents classified as severely immunosuppressive that are immunosuppressive or immunomodulatory (e.g., B-cell depleting agents), tumor-necrosis (TNF) blockers, and other biologic agents • Vaccination with any available COVID-19 vaccine, according to the approved or authorized schedule, is not recommended due to a history of severe adverse reaction (e.g., severe allergic reaction) to a COVID-19 vaccine(s)

Remdesivir (Restricted to Infectious Disease physicians. Use will be audited by the Antimicrobial Stewardship Team)

3-day Regimen Criteria	5-day Regimen Criteria

Inclusion:
• Admitted for reasons not related to COVID-19, **AND**
• Symptom onset ≤ 7 days, **AND**
• Positive SARS-CoV-2 test (i.e., RT-PCR or antigen, not antibody test) , **AND**
• Oxygen saturation > 94% on room air, **AND**
• At least 1 risk factor for severe disease, which include the following:
  ○ Older age (e.g., age ≥ 60 years of age)
  ○ BMI ≥ 30
  ○ Pregnancy
  ○ Chronic kidney disease (CKD)
  ○ Chronic liver disease
  ○ Diabetes
  ○ Immunosuppressive disease or immunosuppressive treatment
  ○ Cardiovascular disease (including congenital heart disease) or hypertension
  ○ Cerebrovascular disease
  ○ Chronic lung diseases (e.g., COPD, interstitial lung disease)
  ○ Sickle cell disease
Exclusion:
• Weight < 3.5 kg, **OR**
• Patients being transferred/awaiting transfer
	Inclusion:
	• Positive SARS-CoV-2 test (i.e., RT-PCR or antigen, not antibody test), **AND**
	• Symptom onset ≤ 14 days, **AND**
	• Persistent SpO2 ≤ 94% on room air and requiring supplemental oxygen or on non-invasive ventilation or high-flow oxygen devices
	Exclusion:
	• Mechanical ventilation (MV) or extracorporeal membrane oxygenation (ECMO), **OR**
	• Weight < 3.5 kg, **OR**
	• Patients being transferred/awaiting transfer

Precautions

- eGFR < 30 mL/min: the pharmacokinetics have not been evaluated in patients with eGFR < 30 mL/min. The risk of toxicity in these patients is low and benefit of remdesivir likely outweighs this risk.
- ALT ≥ 5 x ULN at baseline: risk of hepatotoxicity in these patients is not known due to exclusion from clinical trials. Use of remdesivir should be based on potential risk versus benefit considerations.

Adult Dosing:	Pediatric Dosing (FDA approved for 12 yo and weighing at least 40 kg):
200 mg IV x 1 on day 1, then 100 mg IV daily for days 2 – 5 or until hospital discharge, whichever comes first. **For 3-day regimen**: if progress to hypoxia, therapy can be extended to a total of 5 days. **For 5-day regimen**: if progress to requiring mechanical ventilation/ECMO, can still complete the 5-day course.	< 40 kg: 5 mg/kg IV load on day 1, then 2.5 mg/kg IV q24hr for days 2-5 ≥ 40 kg: 200 mg IV load on day 1, then 100 mg IV q24hr for days 2-5 **Pediatric patients 3.5 kg to < 40 kg or pediatric patients < 12 yo & weigh at least 3.5 kg:** prescriber must complete all EUA requirements

Laboratory Monitoring

- Prior to initiation: Scr/BUN, hepatic function, prothrombin time
- During therapy: Scr/BUN and prothrombin time should be monitored as clinically appropriate, hepatic function panel should be monitored as follows:
  - 3-day therapy: If baseline ALT is < 2.5 x ULN: no additional monitoring is required, if baseline or follow-up ALT is > 2.5 x ULN: hepatic function panel should be checked daily
  - 5-day therapy: If baseline ALT is < 2.5 x ULN: check on day 3 of therapy, if baseline or follow-up ALT is > 2.5 x ULN: hepatic function panel should be checked daily
- Consider discontinuing if ALT > 10 x ULN; discontinue if ALT elevation accompanied by signs or symptoms of liver inflammation
  - Pharmacists can order necessary labs listed above for patients receiving remdesivir

Infusion-related reactions (e.g., hypotension, hypertension, tachycardia, bradycardia, hypoxia, fever, dyspnea, wheezing, angioedema, rash, nausea, diaphoresis, and shivering): Slow infusion rate, with a maximum infusion time up to 120 minutes, to potentially prevent these signs and symptoms. If clinically significant infusion-related reactions occur, immediately discontinue & initiate appropriate treatment.

Steroids*

Recommended in adult patients with ***persistent*** SpO2 ≤ 94% on room air **AND** requiring supplemental oxygen (i.e., on low- or high-flow nasal oxygen, non-invasive or invasive mechanical ventilation, or ECMO):

- ***Preferred:*** Dexamethasone 6 mg IV/PO q24h ***for up to 10 days (or until discharge if earlier)***
- ***Pregnant Patients:***
    - COVID-19: Dexamethasone 6 mg IV/PO q24h ***for up to 10 days (or until discharge if earlier)***
    - COVID-19 and fetal lung maturity: Dexamethasone 6 mg IV/PO q12h **x 4 doses**, then dexamethasone 6 mg IV/PO q24h to complete a total of 10 days or until discharge (whichever comes first)
- Alternatives if dexamethasone is unavailable:
    - Methylprednisolone 40 mg IV q24h for up to 10 days (or until discharge if earlier)
    - Prednisone 40 mg PO q24h for up to 10 days (or until discharge if earlier
- For ***select*** patients on high-flow nasal oxygen, non-invasive or invasive mechanical ventilation, or ECMO ***(based on physician discretion):***
    - Consider high-dose steroids (maximum recommended dose dexamethasone 20 mg/day or methylprednisolone 80 mg/day):
        - Dexamethasone 20 mg IV/PO q24h x 5 days, then 10 mg IV/PO q24h x 5 days --OR--
        - Methylprednisolone 40 mg IV q12h x 5 days, then 40 mg IV q24h x 5 days
- **Monitor:**
    - Oxygenation status, CRP, ferritin, and LDH. If no improvement, rule out secondary bacterial infection.
    - Blood glucose in high-risk individuals. Consider point-of-care blood glucose monitoring 4 times per day for 24-48 hours to monitor for steroid induced hyperglycemia, hyperglycemic crises, and new onset diabetes or for chronic diabetes management.
- For adult patients with refractory septic shock and COVID-19 the recommendation is to follow surviving sepsis guidelines with consideration for use with hydrocortisone 200 mg IV per day divided.
- Drug-drug interactions: The combination of dexamethasone and direct oral anticoagulants (DOACs: apixaban, rivaroxaban, dabigatran, edoxaban and betrixaban) ***should be avoided***. Dexamethasone is believed to be a combined P-glycoprotein and strong CYP 3A4 inducer. When used in combination with DOACs there is a potential for reduced DOAC drug concentration and increased risk of thrombosis.
- Stress ulcer prophylaxis: Consider in patients also on therapeutic anticoagulation, mechanical ventilation, and/or patients with coagulopathy

Pediatric patients: Methylprednisolone IV (at an appropriate weight-based dose) may be initiated in pediatric ICU patients by the Pediatric Intensivist on a case-by-case basis. As literature evolves, recommendations and dosing in pediatric patients will be updated.

**for patients with a contraindication to steroids, consult Infectious Diseases to determine possible alternatives*

Baricitinib (Restricted to Infectious Disease physicians)

Inclusion Criteria:

- Positive SARS-CoV-2 test (i.e., RT-PCR or antigen, not antibody test), **AND**
- Receiving high-flow oxygen or noninvasive ventilation or < 48h of mechanical ventilation if administering with steroids. Baricitinib may also be administered as a steroid alternative in those patients with a contraindication to steroids, **AND**
- Age ≥ 2 years old (prescriber must complete EUA requirements for patients 2- 17 yo)

Exclusion Criteria:

- Mechanical ventilation > 48 hours, **OR**
- Absolute neutrophil count (ANC) < 0.5 bil/L, **OR**
- Absolute lymphocyte count (ALC) < 0.2 bil/L, **OR**
- Age 9 yo and older: eGFR < 15 ml/min/1.73 m^2 or on dialysis, **OR**
- Age 2 to < 9 yo: eGFR < 30 ml/min /1.73 m^2 or on dialysis, **OR**
- Received tocilizumab, **OR**
- Active tuberculosis, **OR**
- Receipt of live vaccine within the past 14 days

Precautions (prescribers will have to discuss risk vs benefit with patient)

- Active serious infections other than COVID-19
- Suspected or confirmed DVT/PE
- Patients at risk for GI perforations
- Severe hepatic impairment
- Pregnancy

Dosage Adjustments based on Age and eGFR

eGFR (mL/min/1.73 m^2)	Recommendation	Duration
≥ 60	• 9 yo and older: 4 mg once daily • 2 to < 9 yo: 2 mg once daily	14 days or until discharge, whichever comes first
30 to < 60	• 9 yo and older: 2 mg once daily • 2 to < 9 yo: 1 mg once daily	
15 to < 30	• 9 yo and older: 1 mg once daily • 2 to < 9 yo: Not recommended	
< 15, on dialysis or ESRD	Not recommended	

Required Laboratory Monitoring

A pharmacist may order the appropriate laboratory tests using the order mode of "Within Scope: No co-sign required" if not ordered by the prescriber.

	Frequency of Laboratory Test	Action Required
Baseline	Prior to first dose of baricitinib: • Hepatic function panel • SCr and BUN • CBC with differential	• Prescriber should make any necessary renal dose adjustments based on GFR • Limited information regarding use in patients with any of the following findings: ○ ANC < 1 bil/L ○ ALC < 0.2 bil/L ○ Hemoglobin < 8 g/dL
Monitoring while on Treatment	Hepatic function panel • Every 2-3 days or daily if AST/ALT elevated SCr and BUN • Every 2-3 days or daily if unstable renal function CBC with differential • Every 2-3 days or daily if ALC/ANC low	• Prescriber should make any necessary renal dose adjustments based on GFR • It is recommended to discontinue if: ○ ALC < 0.2 bil/L or ANC < 0.5 bil/L. Can restart once above these thresholds. ○ AST or ALT ≥ 10 x ULN or if drug-induced liver injury (DILI) is suspected, then hold therapy until DILI is excluded

Tocilizumab (Restricted to Infectious Disease physicians - *Prescriber must complete all EUA requirements*)

Inclusion Criteria:

- Positive SARS-CoV-2 test (i.e., RT-PCR or antigen, not antibody test), **AND**
- Receiving high-flow oxygen or noninvasive ventilation or < 48h of mechanical ventilation, **AND**
- Receiving systemic corticosteroids, **AND**
- Age ≥ 2 years old

Exclusion Criteria:

- Mechanical ventilation > 48 hours, **OR**
- ALT/AST > 10 x upper limit of normal, **OR**
- ANC < 1000 cells/mm^3, **OR**
- Platelet count < 50,000 cells/mm^3, **OR**
- Active tuberculosis (see precaution section for LTBI) , **OR**
- Receiving baricitinib, **OR**
- Previously received an IL-6 inhibitor during hospitalization or is on long-term therapy with an IL-6 inhibitor, **OR**
- Patient has already received any dose of one or more of any form of tocilizumab, or sarilumab during this hospitalization or is on long-term therapy with any of these agents prior to this hospital admission, **OR**
- Receipt of live vaccine within the past 14 days
- For solid organ transplant patients, ID prescriber can consult Dr. Dilip Samarapungavan regarding risk of administration (Pager: 248-992-8057)

Precautions (prescribers will have to discuss risk vs benefit with patient)

- Active serious infections other than COVID-19
- Patients at risk for GI perforations
- Latent tuberculosis (LTBI)
- Pregnancy
- Not studied in patients CrCl < 30 mL/min (but unlikely to be significantly renally eliminated)

Patients at or above 30 kg: 8 mg/kg/dose (max: 800 mg) x 1 dose

Patients < 30 kg: 12 mg/kg/dose x 1

- A second dose of tocilizumab is not recommended due to increased risk of possible secondary infection and lack of proven benefit
- For patients >40 kg, doses should be rounded as follows:
  - > 90 kg: 800 mg
  - > 65 to 90 kg: 600 mg
  - > 40 to 65 kg: 400 mg

Laboratory Monitoring: LFTs and CBC

Pediatric patient: tocilizumab has not been studied in children with COVID-19; EUA granted for ≥ 2 yo based on extensive safety and dosing information for approved indications and adult efficacy data for COVID-19

Pregnancy and Nursing Mothers: Discussion of risk versus benefit with the patient's care team, OB/GYN and Infectious Disease physicians should occur prior to administration in a pregnant patient

Adverse Reactions: Headache, hypertension, infusion reactions (rash, pruritus, nausea, hyper- or hypotension), LFT elevations, cytopenias, diarrhea, and allergic reaction (rare), and secondary bacterial and fungal infections

Table 3. Bacterial Co-infections and Other Treatment Considerations

Bacterial Co-Infections with COVID-19

Bacterial co-infections are uncommon in patients presenting with COVID-19 infection. A meta-analysis by Langford *et al* and Michigan cohort study (n = 1705 patients) found only 3.5% of hospitalized patients had community-onset bacterial co-infection and risk was slightly higher in patients admitted directly to the ICU at 11%.[7,8] Secondary bacterial infections occurred in about 14% of COVID-19 patients.[7] A study by Zhou and colleagues found the median duration of fever to be 12 days (8-13 days) and cough persisted for 19 days in survivors.[1]

Procalcitonin*:* Low procalcitonin can be used to help rule-out bacterial co-infection (PCT < 0.25), but PCT > 0.25 ***should not be used as the only reason*** to initiate or continue antibiotic therapy. PCT > 0.25 is common in patients with COVID-19 pneumonia, especially in patients with more severe disease (possibly due to systemic inflammation); therefore, it appears to be an unreliable marker of bacterial superinfection. Also, patients with CKD and AKI have falsely elevated PCT levels, and as such PCT is not reliable in these patients.[8,9]

Strongly Suspected or Confirmed MRSA pneumonia:

For patients with moderate to severe COVID-19 with suspected MRSA pneumonia:

- Anti-staphylococcal therapy is generally unnecessary, since concomitant bacterial infection appears to be uncommon
- For sites using AUC-guided dosing for vancomycin (i.e., RYO, TRY, GRP):
    - For any infection in which a vancomycin AUC goal of 400 – 600 is currently recommended switch to trough monitoring with a goal ~15 mg/L for patients with COVID-19
- If MRSA pneumonia is suspected: suggest oral linezolid instead of vancomycin to help decrease fluid volume and required blood draws
    - Check MRSA nasal swab and discontinue if negative
    - Check for drug-drug interactions prior to starting linezolid
    - Caution in patients with pre-existing myelosuppression
- For pediatric patients: linezolid is restricted to Infectious Diseases physicians
    - Infants & children < 12 years old: linezolid 10 mg/kg/dose (max: 600 mg/dose) PO every 8 hours
    - Children & adolescents ≥ 12 years: linezolid 600 mg PO every 12 hours or as recommended by Infectious Diseases

Current evidence does not support use of the agents below for treatment of hospitalized patients with COVID-19 (due to lack of efficacy and/or potential toxicity)

- Hydroxychloroquine ± azithromycin
- Lopinavir/ritonavir (Kaletra)
- Oseltamivir
- Baloxavir
- Ribavirin

- Immune globulin (IVIG)
- Interferon
- Ivermectin *(current clinical and pharmacokinetic data does not support use for prevention or treatment; last reviewed 2.16.22)*
- Oral Vitamin C
- Colchicine *(insufficient data at this time; last reviewed 2.15.21)*
- Vitamin D *(insufficient data at this time; last reviewed 5.3.21)*
- Fluvoxamine *(insufficient data for hospitalized patients; last reviewed 11.4.21)*

Other Treatment Considerations
ACEi/ARBs therapy: Patients chronically taking ACEi/ARBS should continue therapy. It is unclear if ACEi/ARBS will worsen or improve outcomes in patients with COVID-19.
Oral Vitamin C: Oral vitamin C does not achieve high enough concentrations in the serum for any potential therapeutic benefit due to saturable absorption. Also, oral vitamin C has the potential to cause harm, specifically AKI and/or kidney stones secondary to the accumulation of oxalate. Therefore, we do not recommend the use of oral vitamin C as adjuvant therapy for the treatment of COVID-19
Statins: Due to the lack of data, we do not recommend COVID-19 be the sole indication for statin therapy.
Other Treatment Considerations *(continued)*
Stress ulcer prophylaxis: Consider in patients on steroids and therapeutic anticoagulation, mechanical ventilation, and/or patients with coagulopathy

Table 4. BH Investigational Studies

COVID-19 Investigational Studies at Beaumont Health			
Study Agent	**Location**	**Study Coordinator**	**Study Details**
ACTIV-4 ACUTE Trial	RYO	Coleen Tessmar	Standard of Care Anticoagulation with or without a PGY12 inhibitor (ticagrelor) Inclusion Criteria: • ≥ 18 years of age • Hospitalized for COVID-19 • Enrolled within 72 hours of hospital admittance or 72 hours of positive COVID test • Expected to require hospitalization for > 72 hours Exclusion Criteria: • Requirement for chronic mechanical ventilation via tracheostomy prior to hospitalization • Pregnancy

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