

## SARS-CoV-2 (COVID-19) Treatment Guidance (updated: 4-9-2020)

### Disclaimers and additional notes

- There are no antiviral treatments that are FDA approved for COVID-19. The medications listed are considerations based on the best available data.
- The treatment of outpatients and/or pre- and post-exposure prophylaxis of exposed individuals is not recommended at this time
- The routine use of [corticosteroids](#) (systemic and inhaled) are discouraged. Consider risk versus benefit in septic shock and acute respiratory distress syndrome (ARDS).
- Based on available data, [NSAIDs](#) may be continued, if clinically indicated. Consider risk versus benefit of NSAIDs versus acetaminophen for symptomatic relief.
- There are no data to support starting or stopping [ACEI/ARBs](#) on patients with COVID-19. However, please stop if acute kidney injury, hypotension, or other contraindication develops.
- **Penn Medicine Treatment Guideline is available at <http://www.uphs.upenn.edu/antibiotics/COVID19.html> and are developed by all six Penn Medicine entities based on routine review of literature. This document is specific to LGH based on drug availability, restrictions/criteria, and is approved by the Infectious Diseases of Lancaster (ISL) group. Any questions should be directed to Joseph Kontra, M.D. or Aiman Bandali, Pharm.D.**

### Risk Factors and Severity of Disease

Risk Factors	Mild Disease	Moderate Disease	Severe Disease
Age >60, comorbidities (uncontrolled HTN, diabetes, CV diseases, COPD), CKD 4-6, AIDS (uncontrolled HIV), immunocompromised, pregnant women	Fever, cough/cold symptoms without dyspnea or hypoxia. Patient to be discharged or hospitalized for social reasons or medical concerns other than COVID-19.	Dyspnea or hypoxia (O2 sat < 92% on room air) are present without signs of severe pneumonia	Any of the following: RR > 30, O2 sat < 90% on room air, PaO <sub>2</sub> /FiO <sub>2</sub> < 300 mmHg, lung infiltrates > 50% of the lung field within 24 – 48 hours, sepsis, altered consciousness, multi-organ failure, ARDS, D-dimer > 1 mg/L, CRP >100 mg/L, ferritin > 300 ng/mL, LDH > 245 IU/L

### Management of Confirmed COVID-19

Clinical Presentation	Risk Factors	Supportive Care	Treatment
<b>Asymptomatic</b>	N/A	None – surveillance	None
<b>Mild disease – discharged</b>	None	Symptom management	None
	Present	Symptom management	None; close follow-up for worsening symptoms
<b>Mild disease – hospitalized</b>	None	Symptom management	None; close follow-up for worsening symptoms
	Present	Symptom management  Daily CBC/diff, BMP, LFTs, Ferritin, D-Dimer, LDH, CRP, CPK, Procalcitonin, PT-INR, triglycerides, <b>EKG/telemetry (if initiating hydroxychloroquine)</b>	Consider <b>Hydroxychloroquine</b> . ISL consultation required. One – two doses may be administered, pending ISL provider evaluation.
<b>Moderate disease</b>	N/A	Daily CBC/diff, BMP, LFTs, Ferritin, D-Dimer, LDH, CRP, CPK, Procalcitonin, PT-INR, triglycerides, <b>EKG/telemetry</b>  Empiric antibiotics (based on local guidelines), de-escalate based on cultures	<b>Hydroxychloroquine</b> – ISL consultation required. One to two doses may be administered, pending ISL evaluation. <b>+/- Azithromycin</b>  <u>OR</u> <b>Remdesivir</b> – expanded access program (pending approval)

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<p><b>Severe disease</b> – meets criteria for remdesivir compassionate use or expanded access program</p> <p>See <a href="https://rdvcu.gilead.com">https://rdvcu.gilead.com</a> for up to date inclusion/exclusion criteria of compassionate use.</p>	N/A	<p>Daily CBC/diff, BMP, LFTs, Ferritin, D-Dimer, LDH, CRP, CPK, Procalcitonin, PT-INR, triglycerides, <b>EKG/telemetry</b></p> <p>Empiric antibiotics (based on local guidelines), de-escalate based on cultures</p>	<p><b>Hydroxychloroquine</b> – ISL consultation required. One to two doses may be administered, pending ISL evaluation. <b>+/- Azithromycin</b></p> <p><u>OR</u></p> <p><b>Remdesivir</b> – expanded access program (pending approval)</p>
<p><b>Severe disease</b> – does not meet criteria for remdesivir compassionate use or expanded access program</p>	N/A	<p>Daily CBC/diff, BMP, LFTs, Ferritin, D-Dimer, LDH, CRP, CPK, Procalcitonin, PT-INR, triglycerides, <b>EKG/telemetry</b></p>	<p><b>Hydroxychloroquine</b> – ISL consultation required. One to two doses may be administered, pending ISL evaluation. <b>+/- Azithromycin</b></p> <p><u>AND</u></p> <p>Consider <b>Tocilizumab</b> if cytokine storm suspected. Requires ISL consultation. ISL provider must order during day (0700 – 2100) and any attending provider must order overnight (2101 – 0659). Criteria (below) must be met.</p>

Drug Name	Dosing/Administration (Adult)	Notes	How to Obtain
<b>Hydroxychloroquine</b>	400 mg PO BID x 2 doses (1 day) <i>Followed by</i> 400 mg PO daily x 4 doses (4 days)  <b>Use “Hydroxychloroquine for COVID-19 Treatment” medication panel</b>	Check EKG/telemetry prior to initiation given risk of QTc prolongation. Risk is increased in patients receiving other QTc-prolonging agents.  Most toxicities associated with long-term use. Avoid in known G6PD deficiency.  Risks include but are not limited to arrhythmia, cardiomyopathy, bone marrow suppression, LFT abnormalities, and hypoglycemia.  Pregnancy: safe	Formulary  Supply monitored daily by pharmacy  Restricted to ISL. One to two doses can be administered prior to ISL evaluation.
<b>Azithromycin</b>	500 mg PO/IV daily x 3 days	Check EKG/telemetry prior to initiation given risk of QTc prolongation. Risk is increased in patients receiving other QTc-prolonging agents.  Risks include but are not limited to QTc prolongation, gastrointestinal (nausea, vomiting, diarrhea), and LFT abnormalities.	Formulary  Supply monitored daily by pharmacy.
<b>Remdesivir (RDV)</b>	200 mg IV on day 1, then 100 mg daily until stabilization/discharge, up to 10 days	Investigational agent; not FDA approved. <u>We are awaiting approval for enrollment into expanded access program through Gilead.</u>  <b>COMPASSIONATE USE:</b> <ul style="list-style-type: none"> <li>▪ Pregnancy</li> <li>▪ Children &lt; 18 years</li> </ul> Go to <a href="https://rdvcu.gilead.com">https://rdvcu.gilead.com</a> . Follow prompts and request access to drug.  <b>EXPANDED ACCESS:</b> <i>Inclusion Criteria</i> <ol style="list-style-type: none"> <li>1. Age ≥ 18 years</li> <li>2. Hospitalization</li> <li>3. SARS-CoV-2 by PCR or known contact of confirmed case with syndrome consistent with COVID-19 with PCR pending</li> <li>4. Mechanical ventilation</li> <li>5. eGFR ≥ 30 ml/ml/min</li> <li>6. ALT ≤ 5 x ULN</li> </ol>	Investigational drug  Consult with ISL to initiate process to obtain  <u>Notify pharmacy of request</u>

		<p><i>Exclusion Criteria</i></p> <ol style="list-style-type: none"> <li>1. Multi-organ failure</li> <li>2. Vasopressor requirement</li> <li>3. ALT &gt;5 x ULN</li> <li>4. eGFR &lt; 30 ml/min, dialysis, or CVVH</li> <li>5. Pregnancy</li> </ol>	
<p><b>Tocilizumab</b></p>	<p>400 mg IV x 1 dose. A second dose may be given after 12 hours, upon evaluation of clinical status.</p> <p>Consider ordering an <b>IL-6 level</b> prior to administration.</p> <p><b>Use “Tocilizumab for COVID-19 Treatment” medication panel</b></p>	<p>Tocilizumab may improve oxygenation and time to symptom resolution in patients with cytokine storm. Criteria below <b>MUST</b> be met.</p> <p><b><i>Inclusion Criteria</i></b></p> <p><u>The patient <b>MUST</b> meet ALL FIVE of these criteria:</u></p> <ol style="list-style-type: none"> <li>1. SARS-CoV-2 positive by PCR</li> <li>2. Mechanical ventilation</li> <li>3. PaO<sub>2</sub>/FiO<sub>2</sub> &lt; 150 mmHg</li> <li>4. Worsening hypoxemia 24 hours after intubation, despite optimal supportive care</li> <li>5. Received hydroxychloroquine loading dose (400 mg PO BID x 2 doses)</li> </ol> <p><b>AND</b></p> <p><u>The patient <b>MUST</b> have evidence of increased inflammatory response as defined by AT LEAST ONE of the following:</u></p> <ol style="list-style-type: none"> <li>1. Ferritin &gt; 1000 ng/mL</li> <li>2. D-dimer &gt; 1 mg/L</li> <li>3. LDH &gt; 275 IU/L</li> <li>4. CRP &gt; 100 mg/L</li> </ol> <p><b><i>Exclusion Criteria</i></b></p> <p><u>If <b>any one</b> of the following criteria are met, patient will <b>NOT</b> receive drug.</u></p> <ol style="list-style-type: none"> <li>1. AST ≥ 200 OR ALT ≥ 260 (These values reflect ≥ 5x ULN)</li> <li>2. Platelets &lt; 50 x 10<sup>3</sup>/μL</li> <li>3. Absolute neutrophil count (ANC) &lt; 0.5 x 10<sup>3</sup>/μL</li> </ol>	<p>Non-formulary</p> <p>Supply monitored daily by pharmacy. <b><i>Extremely limited supply.</i></b></p> <p>ISL provider must order during day (0700 – 2100) and any attending provider must order overnight (2101 – 0659). Pharmacists will be confirming patients have met criteria prior to dispensing.</p>

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