### Risk Factors for Severe COVID-19 Disease

<table>
<thead>
<tr>
<th>Epidemiological</th>
<th>Vital Signs</th>
<th>Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &gt; 55 (^a)</td>
<td>Respiratory rate &gt; 24 breaths/min (^i)</td>
<td>D-dimer &gt; 1000 ng/mL (^m)</td>
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<tr>
<td>Pre-existing pulmonary disease (^b)</td>
<td>Heart rate &gt; 125 beats/min (^k)</td>
<td>CPK &gt; twice upper limit of normal (^n)</td>
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<tr>
<td>Chronic kidney disease (^c)</td>
<td>SpO2 &lt; 90% on ambient air (^l)</td>
<td>CRP &gt; 100 (^o)</td>
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<tr>
<td>Diabetes with A1c &gt; 7.6% (^d)</td>
<td></td>
<td>Admission absolute lymphocyte count &lt; 0.8 (^p)</td>
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<tr>
<td>History of hypertension (^e)</td>
<td></td>
<td>LDH &gt; 245 U/L (^q)</td>
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<tr>
<td>History of cardiovascular disease (^f)</td>
<td></td>
<td>Elevated troponin (^r)</td>
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<tr>
<td>Use of biologics (^g)</td>
<td></td>
<td>Ferritin &gt; 300 ug/L (^s)</td>
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<td>History of transplant or other immunosuppression (^h)</td>
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<tr>
<td>Uncontrolled HIV (viremic or CD4 &lt;200) (^i)</td>
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*Note abnormalities on chest radiographs are common in both severe and non-severe cases for hospitalized patients with COVID-19. Patients without severe disease may be more likely to have normal radiographs.* \((1-3)\)

\(^a\): Most studies to date have identified age as one of the main risk factors for severe disease \((1, 3-5)\)

\(^b\): Pre-existing pulmonary disease is a risk factor for severe disease with increased mortality \((3, 5)\)

\(^c\): Chronic kidney disease is reported in more patients with severe disease \((3)\)

\(^d\): Diabetes is a risk factor for severe disease according to multiple studies \((3-5)\)

\(^e\): Baseline hypertension seems to be one of the major risk factors predicting worse disease \((3-5)\)

\(^f\): Pre-existing cardiovascular disease is thought to be a major risk factor for worse disease severity \((3, 4, 6)\)

\(^g\): Predicted worse disease severity, existing data are limited

\(^h\): Predicted worse disease severity, existing data are limited

\(^i\): Possible worse disease outcome, existing data are limited

\(^j\): Expected based on physiology and available data \((3)\)

\(^k\): Expected based on physiology and available data \((3)\)

\(^l\): Expected based on physiology

\(^m\): Multiple studies have shown that elevated D-dimer compared to normal is either associated with ICU versus non-ICU or non-surviving versus surviving outcomes. \((2, 3)\)

\(^n\): CPK may be elevated in patients with severe disease \((3)\)
o: CRP is commonly elevated above normal for hospitalized patients with COVID-19.(1) Available data suggests it is often higher in patients with worse outcomes (> 100 versus around 50-75 for patients with less severe outcomes).(6)
p: Multiple studies have shown a low absolute lymphocyte count on admission can be associated with worse outcomes.(1, 3, 4) Patients may with worse outcomes may also have an elevated total white blood cell count driven by neutrophilia on admission.
q: Elevated LDH is more likely to be seen in patients with severe presentations according to multiple studies (3, 4)
r: Elevated troponin is a marker of severe disease (3)
s: Ferritin > 300 ug/L may be a marker of severe disease (3)
References: