

# Emergency Department Adult COVID-19 Management Tool

Designed to assist but not replace clinical assessment

**Patient Name** \_\_\_\_\_

**DOB/NHI** \_\_\_\_\_ **NHI STICKER**

**Mobile** \_\_\_\_\_ **Please Confirm Cell Phone**

**Address** \_\_\_\_\_

**Step 1 - Severity Classification**      **Dates:** Onset \_\_\_\_\_ Day# \_\_\_\_\_ Vaccine \_\_\_\_\_ None    PCR \_\_\_\_\_ Neg Pos

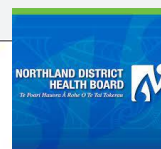
MILD	MODERATE	SEVERE	CRITICAL
<p><b>Individuals who have various signs and symptoms of COVID-19 (ANY):</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Loss of taste and smell</li> <li><input type="checkbox"/> Fever</li> <li><input type="checkbox"/> Cough</li> <li><input type="checkbox"/> Sore throat</li> <li><input type="checkbox"/> Malaise</li> <li><input type="checkbox"/> Headache</li> <li><input type="checkbox"/> Muscle pain</li> <li><input type="checkbox"/> Nausea, vomiting, diarrhea (with URI symptoms)</li> </ul> <p><b>BUT who do NOT have (ANY):</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Shortness of breath/dyspnea</li> <li><input type="checkbox"/> Abnormal chest imaging (if obtained)</li> </ul>	<p><b>Individuals who show evidence of lower respiratory disease during (ANY):</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Clinical assessment</li> <li><input type="checkbox"/> Imaging</li> </ul> <p><b>AND who have:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> SpO2 ≥94% on room air at sea level (in those with normal baseline SpO2 at rest)</li> </ul>	<p><b>Individuals who have (ANY):</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> SpO2 &lt;94% on room air at sea level (in those with normal baseline SpO2 at rest)</li> <li><input type="checkbox"/> Ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (PaO2/FiO2) &lt;300 mm Hg (if ABG obtained)</li> <li><input type="checkbox"/> RR &gt;30 breaths/min</li> <li><input type="checkbox"/> Lung infiltrates &gt;50%</li> </ul>	<p><b>Individuals with (ANY):</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Respiratory failure</li> <li><input type="checkbox"/> Septic shock</li> <li><input type="checkbox"/> Multiorgan dysfunction or failure</li> <li><input type="checkbox"/> HFNC or NIPPV</li> <li><input type="checkbox"/> Mechanical Ventilation</li> <li><input type="checkbox"/> Vasopressors</li> <li><input type="checkbox"/> Consider in Critical Diagnoses: MI/ACS, TIA/CVA, PE/DVT, AKI/Renal failure, Ischaemic limb or bowel</li> </ul>
<p><b>SEVERE and CRITICAL Severity - Skip to Step 4 (Diagnostic Testing) on Page 2</b></p>			

**Step 2 - Risk Prognostication** Patients with **MILD** and **MODERATE** Severity should be further assessed to determine their risk of disease progression. The **PRIEST** Score is a validated tool to predict a patients risk (% progress) to end organ failure and/or mortality at 30 days (available on MDCalc)

Variable	1 Point	2 Points	3 Points	4 Points													
Respiratory rate (per minute)	<input type="checkbox"/> 12-20	<input type="checkbox"/> 9-11	<input type="checkbox"/> 21-24	<input type="checkbox"/> <9 or >24													
Oxygen saturation (%)	<input type="checkbox"/> >95	<input type="checkbox"/> 94-95	<input type="checkbox"/> 92-93	<input type="checkbox"/> <92													
Heart rate (per minute)	<input type="checkbox"/> 51-90	<input type="checkbox"/> 41-50 or 91-110	<input type="checkbox"/> 111-130	<input type="checkbox"/> <41 or >130													
Systolic BP (mmHg)	<input type="checkbox"/> 111-219	<input type="checkbox"/> 101-110	<input type="checkbox"/> 91-100	<input type="checkbox"/> <91 or >129													
Temperature (°C)	<input type="checkbox"/> 36.1-38.0	<input type="checkbox"/> 35.1-36.0 or 38.1-39.0	<input type="checkbox"/> >39.0	<input type="checkbox"/> <35.1													
Alertness	<input type="checkbox"/> Alert			<input type="checkbox"/> Confused													
Inspired oxygen	<input type="checkbox"/> Room Air	<input type="checkbox"/> Supplemental Oxygen															
Sex at birth	<input type="checkbox"/> Female	<input type="checkbox"/> Male															
Age (years)	<input type="checkbox"/> 16-49	<input type="checkbox"/> 50-65	<input type="checkbox"/> 66-80	<input type="checkbox"/> >80													
Performance status	<input type="checkbox"/> Unrestricted, Normal Activity	<input type="checkbox"/> Limited strenuous activity, light activity	<input type="checkbox"/> Limited self-care	<input type="checkbox"/> Bed/chair bound, no self-care													
<b>Total number of boxes checked in each column</b>	<b>x 0 =</b> _____	<b>x 1 =</b> _____	<b>x 2 =</b> _____	<b>x 3 =</b> _____	<b>x 4 =</b> _____												
<b>Add Subtotals</b>	<input type="text" value="0"/>	+	<input type="text"/>	+	<input type="text"/>	+	<input type="text"/>	+	<input type="text"/>	+	<input type="text"/>	+	<input type="text"/>	+	<input type="text"/>	+	<input type="text"/>
<b>= Total Score</b> <input type="text"/>	Score	0-1	2-3	4	5	6	7	8	9	10	11	12	13	14	15	16	17+
<b>Risk %</b>		1%	2%	3%	9%	15%	18%	22%	26%	29%	34%	38%	47%	48%	50%	55%	66%

**Step 3 - Risk Assessment** Assess patient for risk factors correlated to higher risk for severe disease, organ failure, and/or mortality. If your patient has one (or especially multiple) risk factors, this may alter subsequent steps for diagnostic testing, disposition, and treatment.

<p><b>Social Determinants</b></p> <p>Race/ethnicity, socioeconomic status, and healthcare resources effect clinical outcomes and require consideration in clinical risk assessment</p>	<p><b>Medical Risk factors include, but are not limited to:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Cancer: especially those with diagnosis &lt;1 year, actively in treatment, and/or hematologic malignancies</li> <li><input type="checkbox"/> Cardiovascular Disease</li> <li><input type="checkbox"/> Chronic Respiratory Disease (including COPD)</li> <li><input type="checkbox"/> Diabetes Type II</li> <li><input type="checkbox"/> Down's Syndrome</li> <li><input type="checkbox"/> Hypertension</li> <li><input type="checkbox"/> Immunosuppression (including organ transplant and asplenia)</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Neurologic disease (including dementia and previous strokes)</li> <li><input type="checkbox"/> Obesity (BMI ≥35)</li> <li><input type="checkbox"/> Obstructive Sleep Apnea</li> <li><input type="checkbox"/> Pregnancy</li> <li><input type="checkbox"/> Renal Disease (GFR ≤30)</li> <li><input type="checkbox"/> Steroid usage (recent)</li> </ul>
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## Step 4 - Diagnostic Testing

The following imaging and lab tests should be considered based on your patients severity and risk for disease progression.

MILD	MODERATE	SEVERE	CRITICAL												
<p><b>Based on clinician's judgement, diagnostic testing may not be necessary in patients with (ALL):</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Mild Severity</li> <li><input type="checkbox"/> PRIEST score <math>\leq 4</math></li> <li><input type="checkbox"/> 1 or less Risk Factors</li> </ul> <p><b>Ensure Patient is offered PCR Testing in ED or referred to local Test Center</b></p> <p><b>Exertional SpO2 may have limited ability to identify adverse outcomes in otherwise well-appearing patients:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <math>&lt;3\%</math> change in SpO2</li> </ul>	<p><b>Imaging:</b> the optimal imaging technique has not yet been defined for people with symptomatic COVID-19. Initial evaluation for these patients may include:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Chest X-ray</li> <li><input type="checkbox"/> Pulmonary Ultrasound</li> <li><input type="checkbox"/> CT Chest (if indicated)</li> </ul> <p><b>ECG:</b> should be performed if indicated</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> ECG</li> </ul> <p><b>Labs:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> CBC w/ differential</li> <li><input type="checkbox"/> U &amp; Es</li> <li><input type="checkbox"/> Extended Electrolytes</li> <li><input type="checkbox"/> LFTs</li> <li><input type="checkbox"/> CRP</li> <li><input type="checkbox"/> VBG</li> </ul> <p><b>While not recommended in all cases, the following may have prognostic value:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> CPK</li> <li><input type="checkbox"/> D-dimer, Coags</li> <li><input type="checkbox"/> Ferritin</li> <li><input type="checkbox"/> Troponin</li> <li><input type="checkbox"/> LDH</li> <li><input type="checkbox"/> Procalcitonin (suspected Bacterial infection)</li> </ul>														
	<p><b>Step 5 - Diagnostic Interpretation</b></p> <p>The following lab results (if obtained) have been shown to potentially be indicators of risk of disease progression, more severe disease, and/or mortality.</p> <p>Unfortunately, cutoffs used for abnormal lab values are heterogenous across studies and may need to be adjusted based on reference ranges at your facility.</p> <p><b>Lab Cutoffs:</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"><input type="checkbox"/> ALT (<math>&gt;40</math> U/L)</td> <td style="width: 33%;"><input type="checkbox"/> D-dimer (<math>\geq 1000</math> ng/ml)</td> <td style="width: 33%;"><input type="checkbox"/> Neutrophils (<math>&gt;8,000/mm^3</math>)</td> </tr> <tr> <td><input type="checkbox"/> AST (<math>&gt;40</math> U/L)</td> <td><input type="checkbox"/> Ferritin (<math>&gt;300</math> <math>\mu g/L</math>)</td> <td><input type="checkbox"/> Thrombocytopenia (<math>&lt;150,000/mm^3</math>)</td> </tr> <tr> <td><input type="checkbox"/> Creatinine (<math>&gt;133</math> <math>\mu mol/L</math>)</td> <td><input type="checkbox"/> LDH (<math>&gt;250</math> U/L)</td> <td><input type="checkbox"/> Troponin (<math>&gt;15</math> ng/L)</td> </tr> <tr> <td><input type="checkbox"/> CRP (<math>&gt;125</math> mg/L)</td> <td><input type="checkbox"/> Lymphopenia (<math>&lt;0.8 \times 10^9/L</math>)</td> <td><input type="checkbox"/> WBC (<math>&gt;10,000/mm^3</math>)</td> </tr> </table>			<input type="checkbox"/> ALT ( $>40$ U/L)	<input type="checkbox"/> D-dimer ( $\geq 1000$ ng/ml)	<input type="checkbox"/> Neutrophils ( $>8,000/mm^3$ )	<input type="checkbox"/> AST ( $>40$ U/L)	<input type="checkbox"/> Ferritin ( $>300$ $\mu g/L$ )	<input type="checkbox"/> Thrombocytopenia ( $<150,000/mm^3$ )	<input type="checkbox"/> Creatinine ( $>133$ $\mu mol/L$ )	<input type="checkbox"/> LDH ( $>250$ U/L)	<input type="checkbox"/> Troponin ( $>15$ ng/L)	<input type="checkbox"/> CRP ( $>125$ mg/L)	<input type="checkbox"/> Lymphopenia ( $<0.8 \times 10^9/L$ )	<input type="checkbox"/> WBC ( $>10,000/mm^3$ )
<input type="checkbox"/> ALT ( $>40$ U/L)	<input type="checkbox"/> D-dimer ( $\geq 1000$ ng/ml)	<input type="checkbox"/> Neutrophils ( $>8,000/mm^3$ )													
<input type="checkbox"/> AST ( $>40$ U/L)	<input type="checkbox"/> Ferritin ( $>300$ $\mu g/L$ )	<input type="checkbox"/> Thrombocytopenia ( $<150,000/mm^3$ )													
<input type="checkbox"/> Creatinine ( $>133$ $\mu mol/L$ )	<input type="checkbox"/> LDH ( $>250$ U/L)	<input type="checkbox"/> Troponin ( $>15$ ng/L)													
<input type="checkbox"/> CRP ( $>125$ mg/L)	<input type="checkbox"/> Lymphopenia ( $<0.8 \times 10^9/L$ )	<input type="checkbox"/> WBC ( $>10,000/mm^3$ )													

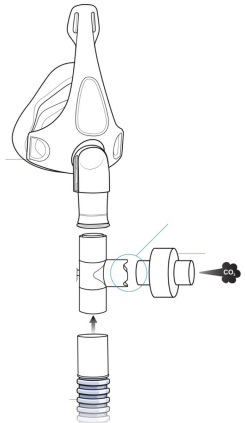
## Step 6 - Disposition

The following represents a pragmatic approach for disposition of patients depending on their disease severity. Clinician's may want to consider a patient's risk for progression of disease based on PRIEST Score, risk factors, imaging, and labs in their disposition decision.

MILD	MODERATE	SEVERE	CRITICAL
<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Discharge Home</b></li> <li><input type="checkbox"/> Supply patient with educational materials on precautions and items to be monitoring at home</li> </ul> <p><b>Consider</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Home pulse oximetry</li> </ul> <p><b>In patients with PRIEST Score <math>\geq 5</math> and/or multiple Risk Factors</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Clinicians should consider early follow-up with GP or other health system access points.</li> <li><input type="checkbox"/> Patient should be educated on their increased risk for severe disease and precautions to return to the ED.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Discharge Home, consider if ALL:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> PRIEST Score <math>\leq 4</math></li> <li><input type="checkbox"/> 1 (or less) Risk Factors</li> <li><input type="checkbox"/> No concerning Imaging or Lab results</li> <li><input type="checkbox"/> Capability and resources to care for self at home</li> <li><input type="checkbox"/> No other condition that warrants admission</li> </ul> </li> <li><input type="checkbox"/> <b>Admission, consider if ANY:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> PRIEST Score <math>\geq 5</math></li> <li><input type="checkbox"/> Multiple Risk Factors</li> <li><input type="checkbox"/> Concerning Imaging or Lab results</li> <li><input type="checkbox"/> Does NOT have the capability or resources to care for self at home</li> </ul> </li> </ul> <p><b>Admission Location:</b> Based on clinician's judgement</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Observation (AU)</li> <li><input type="checkbox"/> Inpatient Ward</li> <li><input type="checkbox"/> Intermediate Level Care</li> </ul> <p><input type="checkbox"/> <b>At times of surge and capacity constraints some patients who would normally be admitted to the hospital, may need to be sent home:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Supply patient with educational materials on precautions and items to be monitoring at home</li> <li><input type="checkbox"/> Follow-up with GP or via tele-health</li> <li><input type="checkbox"/> Consider home pulse oximetry</li> <li><input type="checkbox"/> Consider home oxygen therapy</li> </ul>	<p><b>Admission Location:</b> based on clinician's judgement (Med Reg)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ward</li> <li><input type="checkbox"/> Intermediate Care</li> <li><input type="checkbox"/> ICU</li> </ul> <p><input type="checkbox"/> <b>Transfer:</b> Consider if facility does not have the resources or capacity to care for a critically ill COVID patient</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Consider Ceiling of Care and Palliative Care Options</li> <li><input type="checkbox"/> Consider referral for Social, Spiritual, Cultural Input</li> </ul>	<p><b>Admission</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Intermediate Care</li> <li><input type="checkbox"/> ICU</li> </ul> <p><input type="checkbox"/> <b>Transfer:</b> Consider transfer if your facility does not have the resources or capacity to care for a critically ill COVID patient</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Consider Palliative Care Options</li> <li><input type="checkbox"/> Consider referral for Social, Spiritual, Cultural Input</li> <li><input type="checkbox"/> Critical Care will be provided to all patients requiring critical interventions and treatments</li> </ul>
<p><b>AMA</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Patient wishes to leave Against Medical Advice (AMA) for admission to the hospital and/or additional therapeutic treatment.</li> </ul>			

### Step 7a - Non-Pharmacologic Treatment

The following treatments should be considered based on your patient's severity and risk of disease progression.

MILD	MODERATE	SEVERE	CRITICAL
<ul style="list-style-type: none"> <li><input type="checkbox"/> Consider home oxygen therapy (for those who may benefit)</li> <li><input type="checkbox"/> Breathing exercises for breathlessness</li> <li><input type="checkbox"/> Progressive ambulation as tolerated (if no contraindication)</li> <li><input type="checkbox"/> Resting in the prone position if dyspneic</li> <li><input type="checkbox"/> Adequate rest/sleep</li> <li><input type="checkbox"/> Balanced diet</li> <li><input type="checkbox"/> Adequate hydration oral fluids (if IV, avoid large boluses)</li> </ul>		<ul style="list-style-type: none"> <li><input type="checkbox"/> Oxygen support-nasal cannula, titrate up to 6L with an oxygenation goal of &gt; 92%</li> <li><input type="checkbox"/> High-Flow Nasal Cannula (HFNC) (titrated up from flow of 20L to 60L and FiO2 up to 100%) are recommended over NIPPV</li> <li><input type="checkbox"/> Non-Invasive Positive Pressure Ventilation (NIPPV) if HFNC not available or for Non-COVID indication (COPD, CHF/SCAPE, Asthma, etc.), using non-vented mask and T-piece side-mounted viral filter</li> <li><input type="checkbox"/> Consider trial of awake prone positioning if patient can be monitored or can self rescue. Ask patient to rotate from their back to either side side or prone for 30 to 120 minutes, assist and support with pillows if necessary</li> <li><input type="checkbox"/> Provide call button.</li> <li><input type="checkbox"/> Awake proning is contraindicated in patients in respiratory distress</li> </ul>	<p><b>Intubation is recommended for severe respiratory failure:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Oxygenation goal for ventilated patients should be 92-96%</li> <li><input type="checkbox"/> Consider low tidal volume (VT) ventilation (VT 4-8 mL/kg of predicted body weight) over higher VT ventilation (VT &gt;8 mL/kg)(A1)</li> <li><input type="checkbox"/> Target plateau pressures of &lt;30 cm H2O (A1)</li> <li><input type="checkbox"/> A higher positive end-expiratory pressure (PEEP) strategy is recommended over a lower PEEP strategy (B1)</li> <li><input type="checkbox"/> For mechanically ventilated adults with refractory hypoxemia despite optimised ventilation, consider prone ventilation for 12 to 16 hours per day over no prone ventilation</li> <li><input type="checkbox"/> Consider using a conservative fluid strategy over a liberal fluid strategy (B1)</li> </ul>

### Step 7b - Pharmacologic Treatment

The following medications should be considered for treatment based on the patient's severity and risk of disease progression.

**Pharmacologic recommendations for patients with COVID-19 are evolving quickly. Not all currently available in NZ**

MILD	MODERATE	SEVERE	CRITICAL
<ul style="list-style-type: none"> <li><input type="checkbox"/> Antipyretic/pain: paracetamol (preferred) may use NSAIDs (Ibuprofen) in the lowest effective dose to minimize common adverse effects</li> <li><input type="checkbox"/> Pleuritic/moderate pain: consider codeine</li> <li><input type="checkbox"/> Angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs): should continue if there is no reason for discontinuation (eg, hypotension, acute kidney injury)</li> <li><input type="checkbox"/> Aspirin, statins, metformin should continue</li> <li><input type="checkbox"/> Immunomodulatory agents — Use of immunosuppressing agents has been associated with increased risk for severe disease with other respiratory viruses, and the decision to discontinue prednisone, biologics, or other immunosuppressive drugs in the setting of COVID-19 must be determined on a case-by-case basis</li> </ul>		<p><b>Steroids and/or Remdesivir*</b></p> <p><b>One of the following options is recommended for these patients:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Dexamethasone</b> 6 mg daily for 10 days or until discharge, whichever is shorter. <i>If Dexamethasone unavailable:</i> Alternative corticosteroids such as daily prednisone (40 mg), methylprednisolone (32 mg), hydrocortisone (150 mg) can be used (B1)</li> <li><input type="checkbox"/> <b>Remdesivir*</b> alone (e.g., for patients who require minimal supplemental oxygen) (B1a). 200 mg IV on day 1 then 100 mg daily for 5 days total or discharge, caution in Renal/Liver disease</li> <li><input type="checkbox"/> <b>Dexamethasone PLUS Remdesivir*</b> (e.g., for patients who require increasing amounts of oxygen) (B1)</li> </ul> <p><b>Remdesivir should be used only in patients requiring supplemental O2 but not O2 through a high-flow device, noninvasive ventilation, invasive mechanical ventilation, or ECMO</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <b>Tocilizumab*</b>, either in combination with dexamethasone is recommended in select hospitalized patients who are exhibiting rapid respiratory decompensation due to COVID-19 (B1a). Full details and dosage is available from ID Consultant.</li> </ul> <p><b>(*Remdesivir or Tocilizumab by Infectious Disease Consultant Approval).</b></p>	
		<p><b>Anticoagulation:</b> Admitted non-pregnant adults should receive prophylactic dose anticoagulation (A1). Enoxaparin 40 mg SQ daily if eGFR&gt;15ml/min) for all patients admitted to hospital in the absence of contraindications. Give BD prophylaxis in ICU/ILC patients</p>	
<p><b>Insufficient Evidence</b></p> <p>At this time there is insufficient data to recommend either for or against the following medications for SARS-CoV-2 (COVID-19):</p> <ul style="list-style-type: none"> <li style="width: 25%;">- Budesonide</li> <li style="width: 25%;">- Famotidine</li> <li style="width: 25%;">- Herbal medications</li> <li style="width: 25%;">- Nitazoxanide</li> <li style="width: 25%;">- Vitamin D</li> <li style="width: 25%;">- Colchicine (OutPt)</li> <li style="width: 25%;">- Fluvoxamine</li> <li style="width: 25%;">- Ivermectin</li> <li style="width: 25%;">- Vitamin C</li> </ul>			
<p><b>DO NOT USE</b></p> <p>The following are recommended AGAINST for the treatment of SARS-CoV-2 (COVID-19) at the time of publication of this tool:</p> <ul style="list-style-type: none"> <li>- Anti-interleukin-6 receptor monoclonal antibodies (except tocilizumab) or anti-IL-6 monoclonal antibody (siltuximab), except in a clinical trial (B1).</li> <li>- Lopinavir/ritonavir (A1) or other HIV protease inhibitors (A1) except in a clinical trial</li> <li>- Nitazoxanide (B1a)</li> <li>- Azithromycin alone (A1)</li> <li>- Zinc supplementation above the recommended daily dietary allowance for the prevention of COVID-19, except in a clinical trial (B1)</li> <li>- Chloroquine or hydroxychloroquine with or without azithromycin (A1)</li> <li>- Colchicine (InPt) (A1)</li> </ul>			

## FOOTNOTES

### Step 1 - Severity

- All severity classifications are outlined by the NIH. The [NIH COVID-19 Treatment Guidelines Panel](#) is a multi-disciplinary team of experts that meets routinely to discuss the impact of new evidence on best practices in addition to providing a standardized system for classifying clinical severity.<sup>6</sup>

### Step 2 - Risk Prognostication

- The [PRIEST Score](#): is a validated tool to predict a patient's risk for end organ failure and/or mortality.<sup>14,35</sup>
- The PRIEST Score can be accessed on [MDCalc](#).

### Step 3 - Risk Assessment

The CDC maintains a [reference](#) for medical conditions associated with high risk for severe COVID-19.

- Race/Ethnicity and access to healthcare**: the [CDC](#) has more information on how race, ethnicity, and access to health care resources may affect outcomes<sup>7</sup>
- Economic Disparity**: has been shown to be an independent variable of risk<sup>11</sup>
- Cancer**<sup>8</sup>: especially those with recent diagnosis <1 year (OR 1.72) and/or hematologic malignancies (OR 2.8)<sup>11</sup>
- Cardiovascular**: OR 3.4 mortality, 3.4 higher level of care<sup>2</sup>
- Chronic Respiratory Disease**: OR 1.6<sup>11</sup> - 3.7<sup>2</sup> mortality
- Diabetes**: OR 1.9 mortality<sup>2</sup>, 1.8-2.1 higher level of care<sup>2-3</sup>
- Down's Syndrome**: OR 10.4 mortality (independent of other variables)<sup>15</sup>
- Hypertension**: OR 2.5 mortality<sup>2</sup>, 3 higher level of care<sup>2</sup>
- Immunosuppression / Asplenia**: OR 1.3 (asplenia) - 3.5 (immunosuppression) mortality<sup>11</sup>
- Neurologic disease / Stroke / Dementia**: OR 2.2 (stroke / dementia) - 2.6 (other neurologic disease) mortality<sup>2</sup>
- Obesity (BMI ≥35)**: FDA EUAs for AB use ≥35 for BMI cutoff
  - One study showed increased risk for mortality in those with BMI 40-44 (OR 2.7) and ≥45 kg (OR 4.2)<sup>12</sup>
- Obstructive Sleep Apnea**: OR 2.9 hospitalization, 2.4 severe disease<sup>10</sup>
- Pregnancy**: has been shown to have increased hospitalization (OR 3.5).<sup>2</sup>
  - Severe cases have been shown to have pre-term labor 45.4% compared to 6.9% of mild and recovered cases.<sup>9</sup>
  - [ACOG](#) has published a guideline to assist with risk stratification of pregnant patients
- Renal Disease (GFR ≤30)**: OR 2.5<sup>11</sup> - 4.3 mortality<sup>2</sup>

### Step 4 - Diagnostic Testing

- Exertional SpO2**: post-exertional SpO2 may provide modest prognostic information of adverse outcome at 30 days<sup>5, 13, 21</sup>
  - Optimal time interval is not established.
  - Some have suggested 1-2 minutes and a sit-stand option in the patient's room (due to COVID restrictions)<sup>5</sup>
  - A 3% drop has been used in several studies<sup>21, 13</sup>
  - Another study used a quick walk test of 6 minutes. Decrease in ≥3% or ≥5% (conservative cutoff or postexercise ≤90% suggest poor outcome (need for mechanical ventilation) with LR+=3.5 and LR-=0.22<sup>21</sup>
- Diagnostic Testing**: labs and imaging may be of assistance in determining patients risk for disease progression and mortality (Zhou F; Cummings MJ; Wynants L; Galloway JB; Zhao Z)
  - The [NIH](#) maintains recommendations for appropriate diagnostic testing.
  - The following represents a practical imaging approach<sup>22</sup> and a consensus guideline.<sup>23</sup>

### Step 5 - Diagnostic Interruption

#### Imaging Interpretation

- Pulmonary US (POCUS) is appropriate as a COVID rule-in test (with diagnostic accuracy similar to CT) but has not been used for risk classification.<sup>24</sup>
- Models to prognostic risk based on CXR<sup>4</sup> results have been published.

#### Lab Interpretation

- ALT (>40 U/L)** is associated with increased mortality.<sup>2</sup>
- AST (>40 U/L)** is associated with increased mortality.<sup>2</sup>
- Creatinine (>133 μmol/L)** is associated with increased mortality.<sup>2</sup>
- CRP (>125 mg/L)** is associated with increased mortality<sup>27</sup> and intubation within 48-hours.<sup>31</sup>
- D-dimer (≥1μg/mL)** is associated with increased mortality.<sup>2</sup>
- Ferritin (>300 μg/L)** is associated with increased mortality and worsening oxygenation within 48-hours.<sup>27, 28</sup>
- LDH (>250 U/L)** is associated with increased mortality<sup>27</sup> and worsening oxygenation<sup>29</sup> or intubation within 48-hours.<sup>30</sup>
- Lymphopenia (<0.8 x10<sup>9</sup>/L)** is associated with increased mortality and higher level of care.<sup>2</sup>
- Neutrophils (>8,000/mm<sup>3</sup>)** is associated with increased mortality.<sup>2</sup>
- Thrombocytopenia (<150,000/mm<sup>3</sup>)** is associated within increased mortality and higher level of care.<sup>2</sup>
- Troponin (>99%)** is associated with increased mortality.<sup>2</sup>
- WBC (>10,000/ mm<sup>3</sup>)** is associated with increased mortality.<sup>2</sup>

### Step 6 - Disposition

Discharge of select COVID patients with Home Oxygen has been shown to be associated with low rates of mortality and return admission.<sup>32,33,34</sup>

#### Helpful links from JAMA include:

- What does this mean for families?
  - <https://jamanetwork.com/journals/jamapediatrics/fullarticle/2763176>
- Masks
  - <https://jamanetwork.com/journals/jama/fullarticle/2764955>
- Stopping the spread
  - <https://jamanetwork.com/journals/jama/fullarticle/2763533>
- What is herd immunity?
  - <https://jamanetwork.com/journals/jama/fullarticle/2772168>

### Step 7a - Non-Pharmacologic Treatment

#### Home Supplemental O2

Discharge of select COVID patients with Home Oxygen has been shown to be associated with low rates of mortality and return admission<sup>32</sup>

#### Studies in COVID and other viral illnesses<sup>20</sup>, have shown the benefit of:

- Rest<sup>16</sup>
- Healthy diet<sup>17</sup>
- Adequate sleep<sup>18</sup>
- Exercise<sup>19</sup>

#### Issues with SpO2 measurements

- If sending patients home with instructions for pulse oximetry, be mindful that SpO2 readings should always be considered an estimate of oxygen saturation. The FDA has just issued precautions on SpO2 devices.<sup>26</sup>
- If an FDA-cleared pulse oximeter reads 90%, then the true oxygen saturation in the blood is generally between 86-94%. Pulse oximeter accuracy is highest at saturations of 90-100%, intermediate at 80-90%, and lowest below 80%.
- Additionally, SpO2 measurements have been shown not be as reliable in patients with pigmentation of their skin<sup>25</sup>

#### Treatment of Severe and Critical patients

- Recommendations for respiratory support, IV fluids, and other interventions are maintained by the NIH.

### Step 7b - Pharmacologic Treatment

**Medications** - recommendations are maintained by the [NIH](#) and [IDSA](#).

#### Monoclonal Antibodies

Please read [this advisory](#) on the use of Monoclonal Antibodies

- FDA Fact sheet for healthcare providers: emergency use authorization (EUA) of casirivimab and imdevimab. 2020. Available at: <https://www.fda.gov/media/143892/download>. Accessed February 16, 2021.
- FDA Fact sheet for healthcare providers: emergency use authorization (EUA) of sotrovimab. 2021. Available at: <https://www.fda.gov/media/149534/download>. Accessed July 11, 2021

#### NIH

#### Rating of Recommendations

- A = Strong
- B = Moderate
- C = Optional

#### Rating of Evidence

- I = One or more randomized trials without major limitations
- IIa = Other randomized trials or subgroup analyses of randomized trials
- IIb = Nonrandomized trials or observational cohort studies
- III = expert opinion

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