Emergency Department COVID-19 Severity Classification

This tool was developed to assist in determining the appropriate evaluation and disposition for adult patients with suspected or confirmed COVID-19.

- Other clinical presentations or pre-existing conditions other than the items listed may additionally increase a patient’s risk profile.
- Do not use if the patient is having an acute MI, stroke, or other life-threatening condition.
- Further consideration should be given to patients on immunosuppression and/or have recent steroid usage as this may alter their clinical presentation and severity risk.

### MILD-LOW RISK

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Rate (BPM)</td>
<td>≤ 99</td>
</tr>
<tr>
<td>Blood Pressure (mmHg)</td>
<td>100-120</td>
</tr>
<tr>
<td>SpO2/lowest documented</td>
<td>≥ 93%</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>&lt; 22</td>
</tr>
<tr>
<td>02 Flow Rate (L/min)</td>
<td>None</td>
</tr>
</tbody>
</table>

### MILD-AT RISK

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Rate (BPM)</td>
<td>100-120</td>
</tr>
<tr>
<td>Blood Pressure (mmHg)</td>
<td>≥ 121</td>
</tr>
<tr>
<td>SpO2/lowest documented</td>
<td>89-92%</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>≥ 29</td>
</tr>
<tr>
<td>02 Flow Rate (L/min)</td>
<td>NC02 (1-2)</td>
</tr>
</tbody>
</table>

### MODERATE

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Rate (BPM)</td>
<td>89-92%</td>
</tr>
<tr>
<td>Blood Pressure (mmHg)</td>
<td>≥ 29</td>
</tr>
<tr>
<td>SpO2/lowest documented</td>
<td>NC02 (3-4)</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>≥ 29</td>
</tr>
<tr>
<td>02 Flow Rate (L/min)</td>
<td>NC02 (≥5)</td>
</tr>
</tbody>
</table>

### SEVERE

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Rate (BPM)</td>
<td>SBP &lt; 90</td>
</tr>
</tbody>
</table>

### CRITICAL

<table>
<thead>
<tr>
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<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Heart Rate (BPM)</td>
<td>SBP &lt; 90</td>
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### SUGGESTED LABS

- CMP
- CBC w/ diff
- CRP
- D-Dimer
- Ferritin
- Lactate
- LDH
- Troponin
- Ferritin (>300 µg/L)
- WBC (>10,000/mm³)
- Troponin (>99%)
- D-dimer (≥1µg/mL)
- Lymphopenia (<0.8 x 10⁹/L)
- LDH (>250 U/L)
- CRP (>125 mg/L)
- Creatinine (>133 µmol/L)
- ALT (>40 U/L)
- AST (>40 U/L)
- Neutrophils (>8,000/mm³)
- Thrombocytopenia (<150,000/mm³)
- WBC (>10,000/mm³)
- Ferritin (>300 µg/L)

### SEVERE LABS

- Troponin (>99%)
- D-dimer (>1µg/mL)
- Lymphopenia (<0.8 x 10⁹/L)
- LDH (>250 U/L)
- CRP (>125 mg/L)
- Creatinine (>133 µmol/L)
- ALT (>40 U/L)
- AST (>40 U/L)
- Neutrophils (>8,000/mm³)
- Thrombocytopenia (<150,000/mm³)
- WBC (>10,000/mm³)
- Ferritin (>300 µg/L)

### Diagnostic Testing

- CXR
- POCUS Cardiac Exam
- Obtain Labs

### Imaging Results

- CXR
- POCUS Cardiac Exam
- Obtain Labs

### Lab Results

- CXR Score 2
- CXR Score ≥3
- Bilateral Pneumonia
- RV Enlargement
- Lactate 2-4
- Lactate ≥4

### Disposition

- Observation
  - Discharge Home
  - If pulse oximetry and/or follow-up can be arranged
  - If reduced bed capacity

- Inpatient
  - If your hospital doesn’t have the resources to care for patient

- Intermediate
  - With additional rounding

- Transfer
  - If your hospital doesn’t have the resources to care for patient

### RISK FACTORS

- Demographics
  - Male
  - Age >60
  - Black

- Medical Conditions
  - Cardiovascular Disease
  - Cerebrovascular Disease
  - COPD
  - Diabetes Type II
  - Hypertension
  - Malignancy
  - Obesity (BMI > 30)
  - Renal Disease

### Assess Vital Signs

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### Calculate qCSIA

\[ qCSIA = \begin{cases} 0 & \text{if } 0-1 \\ 1-2 & \text{if } 2-3 \\ 3-5 & \text{if } 4-5 \\ 6-8 & \text{if } 6-8 \\ 9 & \text{if } 9 \\ \end{cases} \]

### Assess Symptoms

<table>
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<tr>
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<tbody>
<tr>
<td>Persistent dyspnea</td>
<td>□</td>
</tr>
<tr>
<td>Hemoptyisis</td>
<td>□</td>
</tr>
<tr>
<td>Altered LOC</td>
<td>□</td>
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</table>

### Discharge Home Criteria

If all else in green above is true, and...

- Normal
- Well/Healthy
- Normal/Comfortable
- Normal for Patient

- Other condition that warrants further workup
- Other condition that warrants admission

### Inpatient

- If your hospital doesn’t have the resources to care for patient

### Intermediate

- With additional rounding

### Transfer

- If your hospital doesn’t have the resources to care for patient

### ANY CRITICAL INTERVENTION

- HFNC or NIPPV
- Mechanical Ventilation
- Vasopressors
A. qCSI - The qCSI is a predictive model of early hospital respiratory decompensation among patients with COVID-19. Eight hospitals were used for development and internal validation (n = 932) and 1 hospital for model external validation (n = 240). Prediction of critical respiratory disease within 24-hours was defined by high oxygen requirements, non-invasive ventilation, invasive ventilation, or death.

• Components of qCSI include: nasal cannula flow rate, respiratory rate, and minimum documented pulse oximetry

• qCSI scoring
  I. qCSI score of ≤2: Low-risk (4%)
  II. qCSI score 3-5: Low-intermediate risk (19%)
  III. qCSI score 6-8: High-intermediate risk (40%)
  IV. qCSI score >9: High risk (73%)

• Results - During the study period, 1172 patients qualified for the final cohort. Of these patients, 144 (12.3%) met the composite endpoint within the first 24 hours. The qCSI had a high AUC (0.90) that exceeded the qSOFA (0.76).

B. Symptoms

• Persistent Dyspnea - 3 mortality, 1.9 higher level of care, 8.3 disease severity

• Hemoptysis - 4.5 higher level of care, 7 disease severity

• Altered LOC - 4.7 higher level of care, 6.3 disease severity

C. Risk Factors

• Male - 1.8 mortality, 1.9-2 higher level of care, 1.5 disease severity

• Age > 60 - 3.6 mortality, 4.1 disease severity

• African-American - 2.1 higher level of care, 2.1 severity

• Cardiovascular Disease (including CHF) - 3.4 mortality, 3.4 higher level of care, 3.5 disease severity

• Cerebrovascular Disease - 3 mortality, 2.8 disease severity

• COPD - 3.7 mortality, 4.4 disease severity

• Diabetes - 1.9 mortality, 1.8-2.1 higher level of care2, 2 disease severity

• Hypertension - 2.5 mortality, 3 higher level of care, 2.8 disease severity

• Malignancy - 1.9 mortality, 3-4.1 higher level of care, 2.2 disease severity

• Obesity (BMI > 30) - 3 mortality, 2 higher level of care

• Renal Disease - 4.3 mortality, 1.2 higher level of care, 2.2 disease severity

D. Long Term Care Resident - these patients will often need admission due to the risk of them transmitting COVID to other nursing home residents.

E. Exertional O2 Saturation - a 1-minute sit-to-stand test can be performed within the patient's room. With this, they sit and stand as many as they can over the course of 1 minute.

• A 3% drop in pulse oximeter reading is considered a positive test

F. Blood Pressure - "normal for patient" means that the patient's BP is normal for them in consideration of past medical history of HTN and whether they are on antihypertensive medications.

G. Imaging Results

• CXR Score - A scoring system devised to calculate a severity score based on the presence or absence of opacities on chest x-ray. The score is computed by dividing each lung into 3 zones. A severity score is assigned based on the presence or absence of opacity in each zone.

  • ≥2 - A score of ≥2 indicates a higher likelihood of hospital admission (OR 6.2)\(^1\).
  • ≥3 - A score of ≥3 is a predictor of need for intubation (OR 4.7)\(^1\).

  • Bilateral Pneumonia - 1.6 mortality, 2.4 disease severity2

  • RV Enlargement - 4.5 mortality2

H. Lab Results

• Troponin (>99th % per test) - 13.7 mortality2

• D-dimer (>1 μg/mL) - 6 mortality2

• Lymphopenia (< 0.8 × 10^9/L) - 2.2 mortality2, 1.1-3 higher level of care2, 4.2 disease severity2

• LDH (>250 U/L) - 3.2 mortality2, 1 higher level of care, 5.5 disease severity2

• CRP (>125 mg/L) - 4.5 mortality2, 6.5 disease severity2

• Creatinine (>133 μmol/L) - 2.8 mortality2

• AST (>40 U/L) - 3.3 mortality, 3.6 disease severity

• ALT (>40 U/L) - 2.1 mortality, 2 disease severity2

• Neutrophils (>8,000/μL) - 5.6 mortality

• Thrombocytopenia (< 150,000/μL) - 7.3 mortality, 1.1 higher level of care, 1.8 disease severity

• WBC (>10,000/mm^3) - 4.3 mortality2, 3.4 disease severity2

• Lactate (≥2) - a lactate ≥2 has been demonstrated in other disease processes to be associated with poor outcomes and mortality. If the lactate is ≥4, an assessment should be performed for severe sepsis.

• Ferritin (>300 μg/mL) - 9.1 mortality2

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Citations


6. Hoffman K., Predicting the need for invasive mechanical ventilation in patients with COVID-19, Well Cornell Medical College.


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