

# 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.



**ANY CRITICAL INTERVENTION**

- HFNC or NIPPV
- Mechanical Ventilation
- Vasopressors

- 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	MILD-AT RISK	MODERATE	SEVERE	CRITICAL
	Requires ALL in column		Fulfilled with ANY ONE in column		
<b>1 Assess Vital Signs</b>	<input type="checkbox"/> Heart Rate (BPM) < 100 <input type="checkbox"/> Blood Pressure (mmHg) ≥ 93% <input type="checkbox"/> SpO2 (lowest documented) ≥ 93% <input type="checkbox"/> Respiratory Rate < 22 <input type="checkbox"/> O2 Flow Rate (L/min) None	<input type="checkbox"/> 101 - 120 <input type="checkbox"/> 23 - 28 <input type="checkbox"/> NC O2 (1-2)	<input type="checkbox"/> ≥ 121 <input type="checkbox"/> 89 - 92% <input type="checkbox"/> ≥ 29 <input type="checkbox"/> NC O2 (3-4)	<input type="checkbox"/> SBP < 90 <input type="checkbox"/> < 88% <input type="checkbox"/> NC O2 (≥ 5)	
<b>2 Calculate qCSI<sup>A</sup></b>	_____ + _____ + _____ + _____ = _____				
	<input type="checkbox"/> 0	<input type="checkbox"/> 1-2	<input type="checkbox"/> 3-5	<input type="checkbox"/> 6-8	<input type="checkbox"/> ≥ 9
<b>3 Assess Symptoms<sup>B</sup></b>			<input type="checkbox"/> Persistent dyspnea	<input type="checkbox"/> Hemoptysis	<input type="checkbox"/> Altered LOC
<b>Ask About Risk Factors<sup>C</sup></b>	<input type="checkbox"/> 0-1 Risk Factors	<input type="checkbox"/> ≥ 2 Risk Factors	<input type="checkbox"/> LT Care Resident <sup>D</sup>		
<b>4 Discharge Home Criteria</b>	If all else in green above is true, and...				
<input type="checkbox"/> Exertional O2 <sup>E</sup> Saturation <input type="checkbox"/> Clinical Gestalt <input type="checkbox"/> Work of Breathing <input type="checkbox"/> Blood Pressure <input type="checkbox"/> Any concern for other conditions or reasons to admit	<input type="checkbox"/> Normal <input type="checkbox"/> Well/Healthy <input type="checkbox"/> Normal/Comfortable <input type="checkbox"/> Normal for Patient <sup>F</sup> <input type="checkbox"/> None				
		<input type="checkbox"/> < 90% or 3% drop	<input type="checkbox"/> Other condition that warrants further workup	<input type="checkbox"/> Other condition that warrants admission	
<b>5 Diagnostic Testing</b>	Recommend / Consider				
		CXR Obtain Labs	CXR POCUS Cardiac Exam Obtain Labs	CXR POCUS Cardiac Exam Obtain Labs	CXR POCUS Cardiac Exam Obtain Labs
<b>6 Imaging Results<sup>G</sup></b>	CXR				
CXR		<input type="checkbox"/> CXR Score 2	<input type="checkbox"/> CXR Score ≥ 3 <input type="checkbox"/> Bilateral Pneumonia <input type="checkbox"/> RV Enlargement		
POCUS Cardiac Exam			<input type="checkbox"/> ≥ 1 Severe Lab (see chart) <input type="checkbox"/> Lactate 2-4		<input type="checkbox"/> Lactate ≥ 4
<b>Lab Results<sup>H</sup></b>					
<b>7 Disposition</b>	Discharge Home / Observation / Discharge Home / Inpatient / Intermediate / Inpatient / ICU				
<input type="checkbox"/> Troponin (>99%) <input type="checkbox"/> D-dimer (≥ 1 μg/mL) <input type="checkbox"/> Lymphopenia (< 0.8 x 10 <sup>9</sup> /L) <input type="checkbox"/> LDH (< 250 U/L) <input type="checkbox"/> CRP (≥ 10 mg/L) <input type="checkbox"/> Creatinine (> 133 μmol/L) <input type="checkbox"/> ALT (> 40 U/L) <input type="checkbox"/> AST (> 40 U/L) <input type="checkbox"/> Neutrophils (8,000/mm <sup>3</sup> ) <input type="checkbox"/> Thrombocytopenia (< 150,000/mm <sup>3</sup> ) <input type="checkbox"/> WBC (< 4,000/mm <sup>3</sup> or > 10,000/mm <sup>3</sup> )	<input type="checkbox"/> If pulse oximetry and/or follow-up can be arranged <input type="checkbox"/> If reduced bed capacity <input type="checkbox"/> With additional rounding <input type="checkbox"/> 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

- SUGGESTED LABS**
- CMP
  - CBC w/ diff
  - CRP
  - D-Dimer
  - Ferritin
  - Lactate
  - LDH
  - Troponin

- SEVERE LABS**
- Troponin (> 99%)
  - D-dimer (≥ 1 μg/mL)
  - Lymphopenia (< 0.8 x 10<sup>9</sup>/L)
  - LDH (< 250 U/L)
  - CRP (≥ 10 mg/L)
  - Creatinine (> 133 μmol/L)
  - ALT (> 40 U/L)
  - AST (> 40 U/L)
  - Neutrophils (8,000/mm<sup>3</sup>)
  - Thrombocytopenia (< 150,000/mm<sup>3</sup>)
  - WBC (< 4,000/mm<sup>3</sup> or > 10,000/mm<sup>3</sup>)

- 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  $\leq 2$ : 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<sup>2</sup>, 1.9 higher level of care<sup>4</sup>, 8.3 disease severity<sup>2</sup>
  - Hemoptysis - 4.5 higher level of care<sup>4</sup>, 7 disease severity<sup>2</sup>
  - Altered LOC - 4.7 higher level of care<sup>4</sup>, 6.3 disease severity<sup>2</sup>
- C. Risk Factors**
- Male - 1.8 mortality<sup>2</sup>, 1.9-2 higher level of care<sup>2-3</sup>, 1.5 disease severity<sup>2</sup>
  - Age  $\geq 60$  - 3.8 mortality<sup>2</sup>, 4.1 disease severity<sup>2</sup>
  - African-American - 2.1 higher level of care<sup>3</sup>, 2.1 severity<sup>3</sup>
  - Cardiovascular Disease (including CHF) - 3.4 mortality<sup>2</sup>, 3.4 higher level of care<sup>2</sup>, 3.5 disease severity<sup>2</sup>
  - Cerebrovascular Disease - 3 mortality<sup>2</sup>, 2.8 disease severity<sup>2</sup>
  - COPD - 3.7 mortality<sup>2</sup>, 4.4 disease severity<sup>2</sup>
  - Diabetes - 1.9 mortality<sup>2</sup>, 1.8-2.1 higher level of care<sup>3-2</sup>, 2 disease severity<sup>2</sup>
  - Hypertension - 2.5 mortality<sup>2</sup>, 3 higher level of care<sup>2</sup>, 2.8 disease severity<sup>2</sup>
  - Malignancy - 1.9 mortality<sup>2</sup>, 3-4.1 higher level of care<sup>2,4</sup>, 2.2 disease severity<sup>2</sup>
  - Obesity (BMI  $> 30$ ) - 3 mortality<sup>1-2</sup>, 2 higher level of care<sup>3</sup>
  - Renal Disease - 4.3 mortality<sup>2</sup>, 1.2 higher level of care<sup>2</sup>, 2.2 disease severity<sup>2</sup>
- 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.
    - $\geq 2$  - A score of  $\geq 2$  indicates a higher likelihood of hospital admission (OR 6.2)<sup>17</sup>.
    - $\geq 3$  - A score of  $\geq 3$  is a predictor of need for intubation (OR 4.7)<sup>17</sup>.
  - Bilateral Pneumonia - 1.6 mortality<sup>2</sup>, 2.4 disease severity<sup>2</sup>
  - RV Enlargement - 4.5 mortality<sup>5</sup>
- H. Lab Results**
- Troponin ( $> 99$ th % per test) - 13.7 mortality<sup>2</sup>
  - D-dimer ( $> 1\mu\text{g/mL}$ ) - 6 mortality<sup>2</sup>, 3.4 disease severity<sup>2</sup>
  - Lymphopenia ( $< 0.8 \times 10^9/\text{L}$ ) - 2.2 mortality<sup>2</sup>, 1.1-3 higher level of care<sup>2,4</sup>, 4.2 disease severity<sup>2</sup>
  - LDH ( $> 250 \text{ U/L}$ ) - 3.2 mortality<sup>2</sup>, 1 higher level of care<sup>4</sup>, 5.5 disease severity<sup>2</sup>
  - CRP ( $\geq 10 \text{ mg/L}$ ) - 4.5 mortality<sup>2</sup>, 6.5 disease severity<sup>2</sup>
  - Creatinine ( $> 133\mu\text{mol/L}$ ) - 2.8 mortality<sup>2</sup>
  - AST ( $> 40 \text{ U/L}$ ) - 3.3 mortality<sup>2</sup>, 3.6 disease severity<sup>2</sup>
  - ALT ( $> 40 \text{ U/L}$ ) - 2.1 mortality<sup>2</sup>, 2.1 disease severity<sup>2</sup>
  - Neutrophils ( $> 8,000/\text{mm}^3$ ) - 5.6 mortality<sup>2</sup>
  - Thrombocytopenia ( $< 150,000/\text{mm}^3$ ) - 7.3 mortality<sup>2</sup>, 1.1 higher level of care<sup>2</sup>, 1.8 disease severity<sup>2</sup>
  - WBC ( $< 4,000/\text{mm}^3$ ) - 0.3 mortality<sup>2</sup>, 0.9 higher level of care<sup>2</sup>. ( $> 10,000/\text{mm}^3$ ) - 4.3 mortality<sup>2</sup>, 3.4 disease severity<sup>2</sup>
  - Lactate ( $\geq 2$ ) - a lactate  $\geq 2$  has been demonstrated in other disease processes to be associated with poor outcomes and mortality. If the lactate is  $\geq 4$ , an assessment should be performed for severe sepsis.
  - Ferritin ( $> 300 \text{ ng/ml}$ ) - 9.1 mortality<sup>7</sup>

## Citations

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