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.

<table>
<thead>
<tr>
<th>MILD-LOW RISK</th>
<th>MILD-AT RISK</th>
<th>MODERATE</th>
<th>SEVERE</th>
<th>CRITICAL</th>
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<tbody>
<tr>
<td>Requires ALL in column</td>
<td>Fulfilled with ANY ONE in column</td>
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</tbody>
</table>

1. Assess Vital Signs
   - Heart Rate (BPM)
   - Blood Pressure (mmHg)
   - SpO2 (lowest documented)
   - Respiratory Rate
   - 02 Flow Rate (L/min)

2. Calculate qCSCI

3. Assess Symptoms
   - 0-1 Risk Factors
   - ≥2 Risk Factors
   - LT Care Resident

4. Discharge Home Criteria
   - Exertional O2 Saturation
   - Clinical Gestalt
   - Work of Breathing
   - Blood Pressure
   - Any concern for other conditions or reasons to admit

5. Diagnostic Testing
   - Recommend
   - Consider

6. Imaging Results
   - CXR
   - POCUS Cardiac Exam
   - Obtain Labs

7. Disposition
   - Observation
   - Inpatient
   - Intermediate
   - Transfer
   - ICU

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 (>1µg/mL)
- Lymphopenia (<0.8 x 10^9/L)
- LDH (<250 U/L)
- CRP (>10 mg/L)
- Creatinine (>133 µmol/L)
- ALT (>40 U/L)
- AST (>40 U/L)
- Neutrophils (>8000/mmc³)
- Thrombocytopenia (<150,000/mm³)
- WBC (<4000/mm³ or >10,000/mm³)

Lab Results

- Observation
  - 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

- ICU

Imaging Results

- CXR Score ≥3
- Bilateral Pneumonia
- RV Enlargement

- ≥1 Severe Lab
  - (see chart)
  - Lactate 2-4
  - Lactate ≥4

Diagnostic Testing

- CXR
- POCUS Cardiac Exam
- Obtain Labs

Disposition

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

- Inpatient
- Intermediate
- Transfer
- ICU

Last Updated: July 2020

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

**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 care2, 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 mortality1, 1.8-2.1 higher level of care3-1, 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 care2, 2.2 disease severity
- Obesity (BMI > 30) - 3 mortality2, 4 higher level of care1
- 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-standing 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**

- XR 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)17
  - ≥ 3: A score of ≥ 3 is a predictor of need for intubation (OR 4.7)17

**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 mortality3, 1.1-3 higher level of care4, 4.2 disease severity2
- LDH (>250 U/L) - 3.2 mortality1, 1 higher level of care, 5.5 disease severity2
- CRP (>10 mg/L) - 4.5 mortality, 6.5 disease severity2
- Creatinine (>133μmol/L) - 2.8 mortality
- AST (>40 U/L) - 3.3 mortality, 3.6 disease severity
- ALT (>40 U/L) - 2.1 mortality, 2 disease severity2
- Neutrophils (>8,000/mm^3) - 5.6 mortality
- Thrombocytopenia (<150,000/mm^3) - 7.3 mortality, 1.1 higher level of care2, 1.8 disease severity
- WBC (<4,000/mm^3) - 0.3 mortality, 0.9 higher level of care, 2.8-10,000/mm^3 - 4.3 mortality3, 3.4 disease severity
- 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 ng/mL) - 9.1 mortality

**Citations**

5. Argulian E., Right Ventricular Dilation in Hospitalized Patients With COVID-19 Infection, JACC: Cardiovascular Imaging, May 2020. https://www.ajc.org/content/early/2020/05/13/jcaic.2020.05.010
6. Hoffman K., Predicting the need for invasive mechanical ventilation in patients with COVID-19, Weill Cornell Medical College.
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