Emergency Department COVID-19 Management Tool

Fall 2022

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This tool was developed to provide a pragmatic framework to assist with severity classification, risk assessment, diagnostic workup, disposition, and treatment of patients with suspected or confirmed SARS-CoV-2 (COVID-19) in the emergency department.

- It is designed to assist with the management of adult patients (≥18 years old) with symptomatic infection.
- For information on pediatric MIS-C protocols (CHOP, Minnesota, and Yale) and suggestion against Monoclonal Antibodies.
- **This tool is not intended to represent a legal standard of care for emergency physicians. Recommendations offered in this tool are not intended to represent the only diagnostic or management options available to the emergency physician. Individual physicians' judgment and consideration of patient resources/preferences is essential.**
- This tool is not exhaustive in regards to diagnostic and treatment recommendations. Patients may present with particular conditions (MI, PE, stroke) that could be manifestations of severe or critical COVID-19. These conditions may require additional specific diagnostic and therapeutic interventions not discussed in this tool.
- Evidence on this topic (including differences in severity that may occur with evolving variants) is changing quickly and may alter recommendations.

A digitized version of this tool can now be found at MDCalc

Step 1 - Severity Classification

Assess the patient's severity of disease utilizing NIH criteria.

MILD	MODERATE	SEVERE	CRITICAL
Individuals who have various signs and symptoms of COVID-19 (ANY): ☐ Fever ☐ Cough ☐ Sore throat ☐ Malaise ☐ Headache ☐ Muscle pain ☐ Nausea, vomiting, diarrhea ☐ Loss of taste and smell **BUT who do NOT have (ANY):** ☐ Shortness of breath ☐ Dyspnea ☐ Abnormal chest imaging (if obtained)	**Individuals who show evidence of lower respiratory disease during (ANY):** ☐ Clinical assessment ☐ Imaging **AND who have:** ☐ SpO2 ≥94% on room air at sea level (in those with normal baseline SpO2 at rest)	**Individuals who have (ANY):** ☐ SpO2 <94% on room air at sea level (in those with normal baseline SpO2 at rest) ☐ Ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (PaO2/FiO2) <300 mm Hg (if ABG obtained) ☐ RR >30 breaths/min ☐ Lung infiltrates >50%	**Individuals with (ANY):** ☐ Respiratory failure ☐ Septic shock ☐ Multiorgan dysfunction or failure

SEVERE and **CRITICAL** Severity - Skip to Step 4 (**Diagnostic Testing**) on Page 2

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 patient's risk for end organ failure and/or mortality using readily available data on initial presentation to the ED.

The ACEP working group recognizes that there are other risk prognostication calculators that have been published. The PRIEST Score is included here as it offers a pragmatic approach with variables that don't require diagnostic testing and don't overlap with medical conditions that are within the separate risk assessment section.

Variable		1 Point	2 Points	3 Points	4 Points
Respiratory rate (per minute)	☐ 12-20	☐ 9-11	☐ 21-24	☐ <9 or >24	
Oxygen saturation (%) See Footnote	☐ >95	☐ 94-95	☐ 92-93	☐ <92	
Heart rate (per minute)	☐ 51-90	☐ 41-50 or 91-110	☐ 111-130	☐ <41 or >130	
Systolic BP (mmHg)	☐ 111-219	☐ 101-110	☐ 91-100	☐ <91 or >219	
Temperature (°C)	☐ 36.1-38.0	☐ 35.1-36.0 or 38.1-39.0	☐ >39.0	☐ <35.1	
Alertness	☐ Alert			☐ Confused	
Inspired oxygen	☐ Room Air		☐ Supplemental Oxygen		
Sex	☐ Female	☐ Male			
Age (years)	☐ 16-49		☐ 50-65	☐ 66-80	☐ >80
Performance status	☐ Unrestricted Normal Activity	☐ Limited strenuous activity, can do light activity	☐ Limited activity, can self-care	☐ Limited self-care	☐ Bed/chair bound, no self-care
Total number of boxes checked in each column	_____ x 0 =	_____ x 1 =	_____ x 2 =	_____ x 3 =	_____ x 4 =

Add Subtotals	0	+	+	+	+	+

= Total Score																	
Score	0-1	2-3	4	5	6	7	8	9	10	11	12	13	14	15	16	17+
Risk %	1%	2%	3%	9%	15%	18%	22%	26%	29%	34%	38%	47%	48%	50%	55%	66%

Step 3 - Risk Assessment

The CDC maintains a list of underlying medical conditions associated with higher risk of severe COVID-19.

If your patient has one (or especially multiple) risk factors, you may want to consider in the approach taken in subsequent steps for diagnostic testing, disposition, and treatment.

The CDC notes that patient race/ethnicity, socioeconomic status, and healthcare resources may effect clinical outcomes and advise consideration in clinical risk assessment.

Meta-analysis / Systematic reviews:

- ☐ Bronchiectasis
- ☐ Bronchopulmonary dysplasia
- ☐ Pulmonary hypertension
- ☐ Pulmonary embolism
- ☐ Cancer
- ☐ Cerebrovascular disease
- ☐ Chronic kidney disease
- ☐ Chronic liver disease
- ☐ COPD
- ☐ Diabetes mellitus (type 1 and 2)
- ☐ Heart conditions*
- ☐ Interstitial lung disease
- ☐ Smoking (current and former)
- ☐ Tuberculosis
- ☐ Obesity
- ☐ Pregnancy (and recent pregnancy)
- ☐ Mental health disorders*

Cohort / Case-control / Cross-sectional:

- ☐ Children with certain underlying conditions
- ☐ Down syndrome
- ☐ HIV
- ☐ Neurologic conditions
- ☐ Overweight
- ☐ Sickle cell disease
- ☐ Solid organ or blood stem transplantation
- ☐ Substance use disorders
- ☐ Use of corticosteroids
- ☐ Immunosuppressive medications

Case series / Case reports:

- ☐ Cystic fibrosis
- ☐ Thalassemia

Mixed Evidence:

- ☐ Asthma
- ☐ Hypertension (possibly)
- ☐ Immune deficiencies

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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

Based on clinician's judgement, diagnostic testing may not be necessary in patients with (ALL):

- ☐ Mild Severity
- ☐ PRIEST score ≤4
- ☐ 1 or less Risk Factors

Exertional SpO2 may have limited ability to identify adverse outcomes in otherwise well-appearing patients:

- ☐ <3% change in SpO2

MODERATE / SEVERE

Per the NIH...

Imaging: the optimal imaging technique has not yet been defined for people with symptomatic COVID-19. Initial evaluation for these patients may include:

- ☐ Chest X-ray ☐ Pulmonary Ultrasound ☐ CT Chest (if indicated)

ECG: should be performed if indicated

- ☐ ECG

Labs:

- ☐ CBC w/ differential ☐ CMP

CRITICAL

Additional tests to consider include:

- ☐ ABG
- ☐ Coagulation screen
- ☐ Inflammatory markers (procalcitonin / c-reactive protein)
- ☐ Ferritin
- ☐ LDH
- ☐ CK, CK-MB
- ☐ Troponin
- ☐ Blood and sputum cultures

Step 5 - Diagnostic Interpretation

It is recommended that users of this tool consult the ACEP COVID-19 Field Guide section on Laboratory Abnormalities.

Topics maintained there include:

- Laboratory findings at hospital admission
- Laboratory abnormalities in severe disease
  - Associated with severe or critical illness
  - Associated with mortality
- Hypercoagulability and COVID-19

Step 6 - Disposition

The following represents a pragmatic approach for disposition of patients depending on their disease severity. Clinicians 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.

See Step 7 for treatment guidance.

MILD

- ☐ **Discharge Home**
- ☐ Supply patient with educational materials on precautions and items to be monitoring at home

  CDC Patient Educational Materials

  SAEM Patient Toolkit

Consider

- ☐ Home pulse oximetry

In patients with PRIEST Score ≥5 and/or multiple Risk Factors

- ☐ Clinicians should consider early follow-up with primary care physician or other health system access points.
- ☐ Patient should be educated on their increased risk for severe disease and precautions to return to the ED.

MODERATE

- ☐ **Discharge Home, consider if ALL:**
  - ☐ PRIEST Score ≤4
  - ☐ 1 (or less) Risk Factors
  - ☐ No concerning Imaging or Lab results
  - ☐ Capability and resources to care for self at home
  - ☐ No other condition that warrants admission
- ☐ **Admission, consider if ANY:**
  - ☐ PRIEST Score ≥5
  - ☐ Multiple Risk Factors
  - ☐ Concerning Imaging or Lab results
  - ☐ Does NOT have the capability or resources to care for self at home

Admission Location:
Based on clinician's judgement

- ☐ Observation
- ☐ Inpatient Floor
- ☐ Intermediate

SEVERE

Admission Location:
based on clinician's judgement

- ☐ Floor Bed
- ☐ Intermediate
- ☐ ICU

- ☐ **Transfer**
  - ☐ Consider transfer if your facility does not have the resources or capacity to care for a severe COVID patient that could deteriorate.

CRITICAL

Admission

- ☐ ICU

- ☐ **Transfer**
  - ☐ Consider transfer if your facility does not have the resources or capacity to care for a critically ill COVID patient.
  - ☐ Consider transfer to an ECMO facility for patients who may benefit from this after consultation with receiving facility.

MODERATE / SEVERE

- ☐ **At times of surge and capacity constraints some patient who would normally be admitted to the hospital, may need to be sent home:32-34**
  - ☐ Supply patient with educational materials on precautions and items to be monitoring at home (CDC Patient Educational Materials)
  - ☐ Follow-up visit arranged via PCP or tele-health
  - ☐ Consider home pulse oximetry
  - ☐ Consider home oxygen therapy

Clinicians should coordinate with their hospital administration to identify times of capacity constraint (i.e. this should not be a decision that individual physicians need to make)

AMA

- ☐ Patient wishes to leave Against Medical Advice (AMA) for admission to the hospital and/or additional therapeutic treatment.

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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
☐ Consider home oxygen therapy (for those who may benefit) ☐ Breathing exercises for breathlessness ☐ Progressive ambulation as tolerated (if no contraindication) ☐ Resting in the prone position if dyspneic ☐ Adequate rest/sleep ☐ Balanced diet ☐ Adequate hydration **COVID-19 vaccination is recommended for everyone 6 months of age and older, regardless of a history of symptomatic or asymptomatic SARS-CoV-2 infection.** - Defer vaccination until person has recovered from acute illness and criteria have been met for them to discontinue isolation. - People who recently had SARS-CoV-2 infection may consider delaying their next COVID-19 dose by 3 months from symptom onset or positive test (if infection was asymptomatic). **Additional information HERE.** - Viral testing to assess for acute SARS-CoV-2 infection or serologic testing to assess for prior infection is not recommended for the purpose of vaccine decision-making. - COVID-19 vaccination is not recommended for post-exposure prophylaxis. - More information on vaccination can be found HERE and Vaccination FAQs		☐ Oxygen support-nasal cannula, titrate up to 6L with an oxygenation goal of >92% ☐ High-Flow Nasal Cannula (HFNC) or high-velocity therapy (titrated up to a flow of 60L and FiO2 up to 100%) are recommended over NIPPV ☐ Non-Invasive Postive Pressure Ventilation (NIPPV) if HFNC not available ☐ Consider trial of awake prone positioning if patient can be monitored or can self rescue. Awake proning is contraindicated in patients in respiratory distress.	☐ Intubation is recommended for severe respiratory failure: ☐ Oxygenation goal for ventilated patients should be 92-96%. ☐ Consider low tidal volume (VT) ventilation (VT 4–8 mL/kg of predicted body weight) over higher VT ventilation (VT >8 mL/kg) (AI). ☐ Target plateau pressures of <30 cm H20 (AII). ☐ A higher positive end-expiratory pressure (PEEP) strategy is recommended over a lower PEEP strategy (BII). ☐ For mechanically ventilated adults with refractory hypoxemia despite optimized ventilation, consider prone ventilation for 12 to 16 hours per day over no prone ventilation. ☐ Consider using a conservative fluid strategy over a liberal fluid strategy (BII). ☐ Insufficent Data to recommend for or against ECMO in these patients. ☐ Against the routine use of inhaled nitric oxide (AI).

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 continue to evolve.

- For the latest updates and details visit the NIH or IDSA Guidelines.
- For the latest information on local availability of therapies for COVID, check your State Health Department.
- For tips and tricks on how to talk with patients about COVID treatment options see the SAEM Provider Toolkit.

DISCHARGED FROM EMERGENCY DEPARTMENT	ADMITTED TO HOSPITAL
All patients should be offered symptom management (AIII). Based upon the emergence of the Omicron Variant of Concern (VOC), and its subvariants, the following are the current recommendations for treatment of patients with a HIGH risk of disease progression. **Preferred Therapies:** Use 1 of the following (listed in order of preference). 1. **Nirmatrelvir 300 mg with ritonavir 100 mg (Paxlovid)** orally twice daily for 5 days, initiated as soon as possible and within 5 days of symptom onset in those aged ≥12 years and weighing ≥40 kg (AIIa). **See Caution note, below and in the Footnote Section before prescribing.** 2. **Remdesivir 200 mg** IV on Day 1, followed by remdesivir 100 mg IV daily on Days 2 and 3, initiated as soon as possible and within 7 days of symptom onset in those aged ≥12 years and weighing ≥40 kg (BIIa). (off label use) **Alternative therapy -** For use when neither of the preferred therapies are available, feasible to use, or clinically appropriate: • **Molnupiravir 800 mg** orally twice daily for 5 days, initiated as soon as possible and within 5 days of symptom onset in those aged ≥18 years ONLY when none of the above options can be used (CIIa). Molnupiravir is not recommended for pregnant or lactating females. Women who could become pregnant should use contraception during treatment and for 4 days after the last dose. Men should use contraception during treatment and for at least 3 months after the last dose. See molnupiravir-us.com/patients/ • **Bevtelovimap** no longer authorized by the FDA (See Footnote) Providers should have **CAUTION** when prescribing Paxlovid due to the ritonavir component, which has significant and complex drug-drug interactions. Please see the Footnotes section for links to more information on these. - See the Footnotes page for links to the EUA FDA fact sheets for these drugs	**Hospitalized but does not require supplemental O2:** ☐ Do not use dexamethasone (AIIa) or other corticosteroids (AIII) ☐ For patients at high risk of disease progression: Remdesivir (BIII) or Nirmatrelvir/ritonavir (Paxlovid) (CIII) **Hospitalized and requires supplemental O2:** ☐ For pts only requiring minimal supplemental O2: Remdesivir (BIIa) ☐ For most patients: Dexamethasone plus remdesivir (BIIa) ☐ If remdesivir is not available: Dexamethasone (BIIa) ☐ For patients on dexamethasone with rapidly increasing oxygen needs and systemic inflammation: Add baricitinib or tocilizumab to one of the above 3 options (BIIa) **Hospitalized and requires O2 through hi-flow device or noninvasive ventilation:** ☐ For most patients: One of the following: Dexamethasone plus baricitinib (AI) or dexamethasone plus tocilizumab (BIIa) ☐ If neither baricitinib/tofacitinib nor tocilizumab/sarilumab can be procured: Dexamethasone (AI) ☐ Optional: Add remdesivir to any 1 of the above selections (CIIa) **Hospitalized and requires mechanical ventilation or ECMO:** ☐ Upon initiation of MV or ECMO, if not already initiated: One of the following: Dexamethasone plus baricitinib (BIIa) or dexamethasone plus tocilizumab (BIIa) ☐ If neither baricitinib/tofacitinib nor tocilizumab/sarilumab can be procured: Dexamethasone (AI) PO tofacitinib can be used instead of PO baricitinib (BIIa) and IV sarilumab can be used instead of IV tocilizumab (BIIa). If dexamethasone is NOT available: Alternative corticosteroids such as prednisone, methylprednisolone, or hydrocortisone can be used (BIII). Additional details on these options can be found at the NIH Inpt Treatment Page
Steroids: Dexamethasone (or other corticosteroids) should NOT be initiated in these patients in the absence of another indication. (AIIbs)	☐ **Anticoagulation:** Unless contraindicated, anticoagulation is recommended for admitted COVID-19 patients. The recommendations and evidence for therapeutic vs. prophylactic anticoagulation are rapidly evolving. The latest information can be found at the NIH Anticoagulation Page
Insufficient Evidence: At this time there is insufficient data to recommend either for or against the following medications for SARS-CoV-2 (COVID-19):	- Herbal medications - Vitamin C - Vitamin D
DO NOT USE - The following are recommended AGAINST for the treatment of SARS-CoV-2 (COVID-19) at the time of publication of this tool: - Anti-interluken-6 receptor monoclonal antibodies (except tocilizumab) or anti-IL-6 monoclonal antibody (siltuximab), except in a clinical trial (BIII). - Azithromycin alone (AI) - Budesonide - Chloroquine or hydroxychloroquine with or without azithromycin (AI) - Colchicine (InPt-AI) (OutPt-BIIa) - Famotidine, except in a clinical trial	- Fluvoxamine - Interferons: None in hon-hospitalized patients (AIIa); in hospitalized: do not use beta (AI), alpha (AIIa), or lambda (AIIa) - Ivermectin - Lopinavir/ritonavir (AI) or other HIV protease inhibitors (AIII) except in a clinical trial - Nitazoxanide (BIIa), except in a clinical trial - Zinc supplementation above the recommended daily dietary allowance for the prevention of COVID-19, except in a clinical trial (BIII)

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SMART PHRASES

This page represents a list of phrases that clinicians may want to utilize within their EMR documentation. It is broken down based on the steps that are outlined on the prior pages of this tool. EMR and IT vendors may want to utilize these phrases, along with specific data that is selected by clinicians as they utilize electronic versions of this tool.

☐ **The ACEP Emergency Department COVID-19 Management Tool** was utilized to assist in the decision process on how to best manage this patient. This tool is a pragmatic approach to management of patient's with suspected or confirmed SARS-CoV-2 in the emergency department. It is based on guidelines from the CDC, NIH, and additional published studies. COVID-19 is a novel pandemic and as such evidence is rapidly evolving on the best way to manage patients with this condition.

Step 1- Severity	☐ **Severity Classification** was determined based on NIH criteria.
MILD	☐ Based on the criteria present at the time of evaluation, the patient was determined to have MILD Severity.
MODERATE	☐ Based on the criteria present at the time of evaluation, the patient was determined to have MODERATE Severity.
SEVERE	☐ Based on the criteria present at the time of evaluation, the patient was determined to have SEVERE Severity.
CRITICAL	☐ Based on the criteria present at the time of evaluation, the patient was determined to have CRITICAL Severity.

Step 2 - Risk Prognostication	☐ The **PRIEST Score**, a validated tool to determine the risk of mortality and/or end-organ failure, was utilized to assess the patient's risk of disease progression.
PRIEST Score	☐ Based on a PRIEST Score of _____ the patient is estimated to have a _____% risk.

Step 3 - Risk Assessment	☐ A **Risk Assessment** was performed that considers additional factors that have been shown in published studies to increase a patient's risk for disease progression.
0 Risk Factors	☐ Patient did not have any additional risk factors based on those included within this tool.
1 Risk Factor	☐ Patient was noted to have an additional risk factor.
2 (or more) Risk Factors	☐ Patient was noted to have 2 (or more) additional risk factors.

Step 4 - Diagnostic Testing	☐ Appropriate **Diagnostic Testing** was performed on the patient based on their severity and risk of disease progression.	
MILD... no additional testing obtained	☐ No diagnostic testing was obtained, because the patient was noted to have MILD severity, ≤4 on the PRIEST Score, and ≤1 additional risk factors.	
Exertional O2	Negative	☐ An O2 saturation was obtained after the patient exerted themselves for >1 minute. Their SpO2 stayed stable.
	Positive	☐ An O2 saturation was obtained after the patient exerted themselves for >1 minute. Their SpO2 dropped >3%.
Imaging / Labs Obtained	☐ Appropriate imaging and labs were obtained in the emergency department based on clinical assessment of the patient.	

Step 5 - Diagnostic Interpretation	☐ The **Diagnostic Interpretation** of imaging and labs that were obtained was as follows:
NO Concerning Imaging/Labs	☐ There was no concern on imaging or labs.
Concerning Imaging	☐ There was a concerning finding discovered on imaging that may prognosticate an increase in the patient's risk of disease progression.
Concerning Lab	☐ There was a concerning finding discovered on lab testing that may prognosticate an increase in the patient's risk of disease progression.
Multiple Concerning Imaging/ Labs	☐ There were multiple imaging and/or lab testing results that may prognosticate an increase in the patient's risk of disease progression.

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SMART PHRASES (continued)

Step 6 - Disposition

☐ The most appropriate **Disposition** for the patient was determined based on the patient's severity classification and risk for disease progression.

MILD	Discharge Home	PRIEST ≤4 AND ≤1 Risk Factors	☐ Patients with MILD Severity, a low PRIEST Score, and ≤1 risk factors are appropriate for Discharge Home.
		PRIEST ≥5 OR ≥2 Risk Factors	☐ Patients with MILD Severity who have an elevated PRIEST Score (≥5) and/or multiple risk factors, may still be discharged home. These patients should receive information on their elevated risk for Severe disease and should connected with early follow-up.
MODERATE	Discharge Home		☐ Patients with MODERATE Severity, a low PRIEST Score, and ≤1 risk factors may be Discharged Home based on an emergency physician's clinical judgement.
	Admission		☐ Patients with MODERATE Severity and an elevated PRIEST Score or the presence of risk factors for disease progression meet criteria for Hospital Admission.
	Reduced Capacity		☐ At times of COVID volume surges or reductions in hospital bed capacity, some patients who would normally meet criteria to hospital admission, may need to be Discharged Home.
SEVERE	Admission		☐ Patients with SEVERE Severity meet criteria for admission the hospital.
	Transfer		☐ Transfer should be considered if you are at a facility that does not have the resources or capacity to care for a patient with SEVERE Severity.
CRITICAL	Admission		☐ Patients with CRITICAL Severity meet criteria for admission to an ICU setting.
	Transfer		☐ Transfer should be considered if you are at a facility that does not have the ICU resources or capacity to care for a patient with CRITICAL Severity.
	ECMO		☐ Transfer may be considered to an ECMO facility if, based on clinical judgement, it is determined that the patient may benefit from this procedure.
AMA			☐ The patient signed out Against Medical Advice, despite the offer of admission to the hospital and treatment due to the severity of their COVID manifestation. The patient is of normal mentation and has the capacity to make this decision, while understanding the consequences to their health.

Step 7a - Non-Pharmacologic Treatment

☐ The following **Non-Pharmacologic Treatments** were ordered on the patient, based on best practice guidelines at the time of publication of this tool.

MILD / MODERATE	Discharged Home	☐ The patient was supplied with discharge instructions that includes activities (breathing exercises, balanced diet, etc.) they should consider at home.
	Home O2	☐ The patient was given a prescription for supplemental O2 at home.
	Home Pulse Oximetry	☐ The patient was given instructions for how to use a pulse oximeter at home to measure periodically their oxygen levels. They were given clear instructions on what measurements would warrant a return to the emergency department.
	Vaccination	☐ The patient was given information about the benefits of vaccination for COVID.
SEVERE	O2 via NC	☐ Supplemental oxygen was administered to the patient via nasal cannula. The patient was monitored for response to therapy.
	HFNC	☐ Additional oxygen was delivered via High-Flow Nasal Cannula (HFNC) per institutional protocol.
	NIPPV	☐ Additional oxygen was delivered via Non-Invasive Positive Pressure Ventilation (NIPPV) per institutional protocol.
	Awake Proning	☐ The patient was trialed on awake proning per institutioanl protocol.
CRITICAL	Intubation	☐ Due to the patient's CRITICAL Severity and compromised respiratory status, they were intubated.
	Prone Ventilation	☐ Prone ventilation was utilized per insitutional protocol.
	Conservative Fluids	☐ Per NIH recommendatins, a conservative fluid strategy was utilized.

Step 7b - Pharmacologic Treatment

☐ The following **Pharmacologic Treatments** were administered to the patient, based on NIH recommendations at the time of publication of this tool.

Patients Discharged from the Emergency Department	Nirmatrelvir WITH Ritonavir	☐ Initiated as soon as possible and within 5 days of symptom onset in those aged ≥12 years and weighing ≥40 kg. The patient's medications were REVIEWED to assure no drug-drug interactions.
	Sotrovimab	☐ Administered as soon as possible and within 10 days of symptom onset in those aged ≥12 years and weighing ≥40 kg.
	Remdesivir	☐ Initiated as soon as possible and within 7 days of symptom onset in those aged ≥12 years and weighing ≥40 kg.
	Molnupiravir	☐ Initiated as soon as possible and within 5 days of symptom onset in those aged ≥18 years ONLY when none of the other options are available.
	Steroids	☐ Steroids are not recommended for patients with MILD or MODERATE Severity.
Patients Admitted to the Hospital	Hospitalized but does not require supplemental O2	☐ Dexamethasone or other corticosteroids are not recommended. Remdesivir may be appropriate if the patient is at high risk of disease progression.
	Hospitalized and requires supplemental O2	☐ ONE of the following is indicated: Remdesivir (for pts requiring minimal supplemental O2), dexamethasone plus remdesivir, or dexamethasone alone.
	Hospitalized and requires O2 through hi-flow device or noninvasive ventilation	☐ ONE of the following is indicated: dexamethasone or dexamethasone PLUS remdesivir.
	Hospitalized and requires mechanical ventilation or ECMO	☐ Dexamethasone PLUS tocilizumab
	Patients with rapidly increasing O2 needs and systemic inflammation	☐ It is appropriate to add either baricitinib or tocilizumab.
	Anticoagulation	☐ Anticoagulation is recommended for admitted COVID-19 patients. Based on the patient severity and co-morbidities, prophylactic or therapeutic anticoagulation will be administered.

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.[6]

Step 2 - Risk Prognostication

- The PRIEST Score: is a validated tool to predict a patient's risk for end organ failure and/or mortality.[14,35]
- The PRIEST Score can be accessed on MDCalc.
- See notes about pulse oximetry within Section 7a footnotes.

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[7]
- **Economic Disparity**: has been shown to be an independent variable of risk[11]
- **Pregnancy**: has been shown to have increased hospitalization (OR 3.5).[2]
  - Severe cases have been shown to have pre-term labor 45.4% compared to 6.9% of mild and recovered cases.[9]

Step 4 - Diagnostic Testing

- **Exertional SpO2**: post-exertional SpO2 may provide modest prognostic information of adverse outcome at 30 days[5, 13, 21]
  - 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)[5]
  - A 3% drop has been used in several studies[21, 13]
  - 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[21]
- **Diagnostic Testing**: ACEP maintains a section on Laboratory Abnormalities in the COVID-19 Field Guide.

Step 5 - Diagnostic Interpretation

Imaging Interpretation

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

Lab Interpretation

- Reference the ACEP COVID-19 Field Guide section on Laboratory Abnormalities for a review of common lab results at hospital admission, lab findings associated with severe disease, and those associated with mortality.

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.[32,33,34]

The CDC maintains Patient Educational Materials.

SAEM Patient Toolkit has materials for patients to understand more about COVID.

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[32]

Studies in COVID and other viral illnesses[20], have shown the benefit of:

- Rest[16]
- Healthy diet[17]
- Adequate sleep[18]
- Exercise[19]

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.[26]
- Although pulse oximetry is useful for estimating blood oxygen levels, pulse oximeters may not accurately detect hypoxemia under certain circumstances. Pulse oximetry results can be affected by skin pigmentation, thickness, or temperature. In fact, an SpO2 reading of 90% may represent a range of SaO2 from 86% to 94%. Clinicians should keep this limitation in mind when making patient decisions.[25]

Vaccination

- Additional information on current vaccinations recommendations, can be found HERE and Vaccination FAQs
  - SMART Phrases from ACEP for patients can be found HERE

Treatment of Severe and Critical patients

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

Step 7b - Pharmacologic Treatment

Medications - recommendations are maintained by the NIH and IDSA.

Recommendations for the treatment of patients discharged home, but who have a HIGH risk for disease progression is evolving quickly due to the Omicron Variant of Concern (VOC).

- Guidance can be found on the NIH Outpatient Treatment Page
- Paxlovid EU A Fact Sheet: www.fda.gov/media/155050/download
- Molnupiravir EUA Fact Sheet: www.fda.gov/media/155054/download
- The SAEM Provider Toolkit offers tip and tricks on how to communicate with patients about COVID treatment options.
- Bevtelovimap no longer authorized by the FDA due to high prevalence of BQ1, BQ.1.1 and XBB variants: www.fda.gov/drugs/drug-safety-and-availability/fda-announces-bebtelovimab-not-currently-authorized-any-us-region

CAUTION with prescribing Paxlovid

- Ritonavir-boosted nirmatrelvir (Paxlovid) has significant and complex drug-drug interactions, primarily due to the ritonavir component of the combination. Before prescribing, clinicians should carefully review the patient's concomitant medications, including over-the-counter medications and herbal supplements, to evaluate potential drug-drug interactions.
  - Clinicians who are not experienced in prescribing ritonavir-boosted drugs should refer to resources such as the NIH Paxlovid Drug-Drug Interactions page, the Ontario COVID-19 Science Advisory Table, the EUA fact sheet for ritonavir-boosted nirmatrelvir (Paxlovid) or the Liverpool COVID-19 Drug Interactions website for additional guidance.
  - Consultation with an expert (e.g., clinical pharmacist, HIV specialist, and/or the patient's specialist provider[s], if applicable) should also be considered.

NIH

Rating of Recommendations

- A = Strong
- B = Moderate
- C = Weak

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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