CLINICAL CARE OPTIONS®
INFECTIOUS DISEASE

Covid-19
treatment in pregnancy

Presented by; Dr Hesni

Epidemiology of COVID-19 in Pregnancy

Subsequent data have indicated that while the overall risk of severe illness is low, COVID-19 is associated with more severe disease in pregnant people than in nonpregnant people.

There is also an increased risk of poor obstetric outcomes among pregnant people with COVID-19, such as preterm birth.

In November 2020, the Centers for Disease Control and Prevention (CDC) released surveillance data on outcomes in approximately 400,000 reproductive-aged women with symptomatic, laboratory-confirmed COVID-19. After adjusting for age, race/ethnicity, and underlying medical conditions, pregnant women had significantly higher rates of intensive care unit) (ICU admission (10.5 vs. 3.9 cases per 1,000 cases; adjusted risk ratio [aRR] 3.0; 95% CI, 2.6–3.4), mechanical ventilation (2.9 vs. 1.1 cases per 1,000 cases; aRR 2.9; 95% CI, 2.2–3.8), extracorporeal membrane oxygenation (0.7 vs. 0.3 cases per 1,000 cases; aRR 2.4; 95% CI, 1.5–4.0), and death (1.5 vs. 1.2 cases per 1,000 cases; aRR 1.7; 95% CI, 1.2–2.4). The increased risk for severe disease was most significant in women aged 35 to 44 years, who were almost four times as likely to be mechanically ventilated and twice as likely to die as nonpregnant women of the same age.

- In an ongoing systematic review that includes 192 studies to date, maternal factors that were associated with severe disease included increased maternal age (OR 1.83; 95% CI, 1.27–2.63; 3,561 women from 7 studies); a high body mass index (OR 2.37; 95% CI, 1.83–3.07; 3,367 women from 5 studies); any pre-existing maternal comorbidity, including chronic hypertension and diabetes (OR 1.81; 95% CI, 1.49–2.20; 2,634 women from 3 studies); pre-eclampsia (OR 4.21; 95% CI, 1.27–14.0; 274 women from 4 studies); and pre-existing diabetes (OR 2.12; 95% CI, 1.62–2.78; 3,333 women from 3 studies).5 Compared with pregnant women and recently pregnant women without COVID-19, pregnant women with COVID-19 were at a higher risk of any instance of preterm birth (OR 1.47; 95% CI, 1.14–1.91; 8,549 women from 18 studies) and stillbirth (OR 2.84; 95% CI, 1.25–6.45; 5,794 women from 9 studies).

- An observational cohort study of all pregnant patients at 33 U.S. hospitals with a singleton gestation and a positive result on a SARS-CoV-2 virologic test evaluated maternal characteristics and outcomes across disease severity.6 The data suggested that adverse perinatal outcomes were more common in patients with severe or critical disease than in asymptomatic patients with SARS-CoV-2 infection, including an increased incidence of cesarean delivery (59.6% vs. 34.0% of patients; aRR 1.57; 95% CI, 1.30–1.90), hypertensive disorders of pregnancy (40.4% vs. 18.8%; aRR 1.61; 95% CI, 1.18–2.20), and preterm birth (41.8% vs. 11.9%; aRR 3.53; 95% CI, 2.42–5.14). The perinatal outcomes for those with mild to moderate illness were similar to those observed among asymptomatic patients with SARS-CoV2 infection

Managing COVID-19 in Pregnancy

- Pregnant people should be counseled about the increased risk for severe disease from SARS-CoV-2 and the measures they can take to protect themselves and their families from infection. These measures include practicing physical distancing, washing their hands regularly, and wearing a face covering (if indicated). If the patient is not vaccinated, they should be counseled about wearing a face covering and getting vaccinated against SARS-CoV-2 infection

- Although vertical transmission of SARS-CoV-2 is possible, current data suggest that it is rare.[7] A review of 101 infants born to 100 women with SARS-CoV-2 infection at a single U.S. academic medical center found that 2 infants (2%) had indeterminate SARS-CoV-2 polymerase chain reaction (PCR) results, which were presumed to be positive; however, the infants exhibited no evidence of clinical disease. It is reassuring that the majority of the infants received negative PCR results after rooming with their mothers and breastfeeding directly (the mothers in this study practiced appropriate hand and breast hygiene).

Special Considerations in Pregnancy

- • If hospitalization for COVID-19 is indicated for a pregnant patient, care should be provided in a facility that can conduct maternal and fetal monitoring, when appropriate.
- • Management of COVID-19 in pregnant patients should include:
- • Fetal and uterine contraction monitoring based on gestational age, when appropriate
- • Individualized delivery planning
- • A multispecialty, team-based approach that may include consultation with obstetric, maternal-fetal medicine, infectious disease, pulmonary-critical care, and pediatric specialists, as appropriat
- • In general, the therapeutic management of pregnant patients with COVID-19 should be the same as for nonpregnant patients. The COVID-19 Treatment Guidelines Panel **recommends against** withholding treatment for COVID-19 and SARS-CoV-2 vaccination from pregnant or lactating individuals because of theoretical safety concerns **(AIII)**.

- • Pregnant or lactating patients with COVID-19 and their clinical teams should discuss the use of investigational drugs or drugs that are approved for other indications as treatments for COVID-19. During this shared decision-making process, the patient and the clinical team should consider the safety of the medication for the pregnant or lactating individual and the fetus and the severity of maternal disease
- • The decision to feed the infant breast milk while the patient is receiving therapeutic agents for COVID-19 should be a collaborative effort between the patient and the clinical team, including infant care providers. The patient and the clinical team should discuss the potential benefits of the therapeutic agent and evaluate the potential impact of pausing lactation on the future of breast milk delivery to the infant

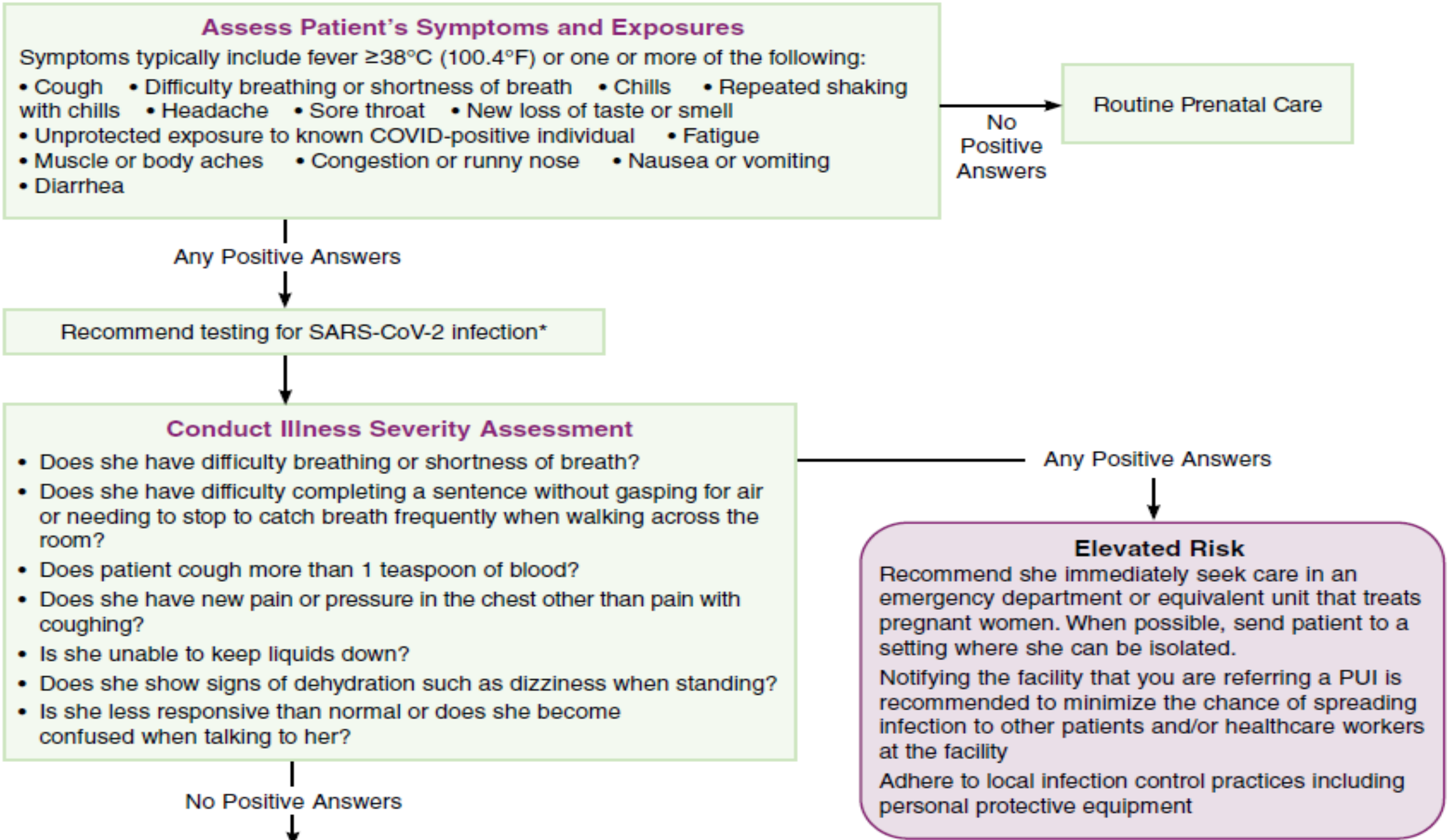
ACOG
The American College of Obstetricians and Gynecologists

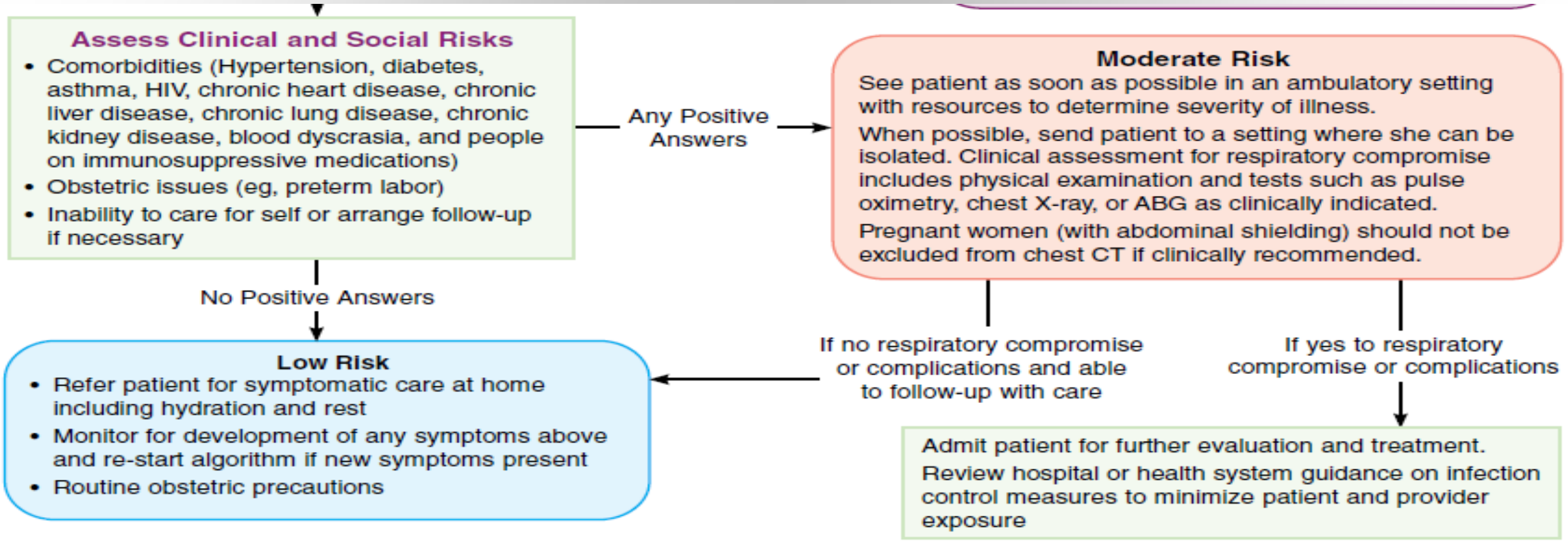
Society for Maternal-Fetal Medicine
High-risk pregnancy experts

Outpatient Assessment and Management for Pregnant Women With Suspected or Confirmed Novel Coronavirus (COVID-19)

This algorithm is designed to aid practitioners in promptly evaluating and treating pregnant persons with known exposure and/or those with symptoms consistent with COVID-19 (persons under investigation [PUI]). If influenza viruses are circulating, influenza may be a cause of respiratory symptoms and practitioners are encouraged to use the ACOG/SMFM influenza algorithm to assess need for influenza treatment or prophylaxis.

Please be advised that COVID-19 is a rapidly evolving situation and this guidance may become out-of-date as new information and data on COVID-19 in pregnant women becomes available. Please refer to the Centers for Disease Control and Prevention (CDC) https://www.cdc.gov/coronavirus/2019-nCoV/index.html and ACOG COVID-19 web pages: https://www.acog.org/topics/covid-19 for comprehensive resources and guidance on COVID-19.


Assess Patient's Symptoms and Exposures
Symptoms typically include fever ≥38°C (100.4°F) or one or more of the following:
• Cough • Difficulty breathing or shortness of breath • Chills • Repeated shaking with chills • Headache • Sore throat • New loss of taste or smell
• Unprotected exposure to known COVID-positive individual • Fatigue
• Muscle or body aches • Congestion or runny nose • Nausea or vomiting
• Diarrhea
No Positive Answers
Routine Prenatal Care
Any Positive Answers
Recommend testing for SARS-CoV-2 infection*
Conduct Illness Severity Assessment
• Does she have difficulty breathing or shortness of breath?
• Does she have difficulty completing a sentence without gasping for air or needing to stop to catch breath frequently when walking across the room?
• Does patient cough more than 1 teaspoon of blood?
• Does she have new pain or pressure in the chest other than pain with coughing?
• Is she unable to keep liquids down?
• Does she show signs of dehydration such as dizziness when standing?
• Is she less responsive than normal or does she become confused when talking to her?
Any Positive Answers
Elevated Risk
Recommend she immediately seek care in an emergency department or equivalent unit that treats pregnant women. When possible, send patient to a setting where she can be isolated.
Notifying the facility that you are referring a PUI is recommended to minimize the chance of spreading infection to other patients and/or healthcare workers at the facility
Adhere to local infection control practices including personal protective equipment
No Positive Answers



Abbreviations: ABG, arterial blood gases; CDC, Centers for Disease Control and Prevention; HIV, human immunodeficiency virus.

**Testing recommendations may vary based on facility and/or local guidance, community spread, and availability of testing*

WHO: Suspect Case Definition

Acute onset of fever and cough OR ≥ 3 of the following: fever, cough, general weakness/fatigue, headache, myalgia, sore throat, coryza, dyspnea, anorexia/nausea/vomiting, diarrhea, altered mental status

And 1 of the following within 14 days of symptom onset:

- Residing or working in an area with high risk of transmission*
- Residing or travel to an area with community transmission
- Working in a healthcare setting

OR:

Patient with severe acute respiratory illness (acute respiratory infection with history of fever or measured fever ≥ 38°C and a cough; onset within last 20 days; requires hospitalization)

*Closed residential settings, humanitarian settings such as camp and camp-like settings for displaced persons.

WHO COVID-19 Case Definition. Updated August 7, 2020. https://www.who.int/publications/i/item/WHO-2019-nCoV-Surveillance_Case_Definition-2020.1

WHO: Probable Case Definition

Acute onset of fever and cough OR ≥ 3 of the following: fever, cough, general weakness/fatigue, headache, myalgia, sore throat, coryza, dyspnea, anorexia/nausea/vomiting, diarrhea, altered mental status

AND:

Contact of probable or confirmed case or epidemiologically linked to a cluster with at least 1 confirmed case

OR:

Suspect case with chest imaging showing findings suggestive of COVID-19 disease*

OR:

Recent onset of loss of smell or taste in the absence of any other identified cause

OR:

Unexplained death in an adult with respiratory distress who was a contact of a probable or confirmed case or epidemiologically linked to a cluster with at least 1 confirmed case

*Hazy opacities with peripheral and lower lung distribution on chest radiography; multiple bilateral ground glass opacities with peripheral and lower lung distribution on chest CT; or thickened pleural lines, B lines, or consolidative patterns on lung ultrasound.

WHO COVID-19 Case Definition. Updated August 7, 2020. https://www.who.int/publications/i/item/WHO-2019-nCoV-Surveillance_Case_Definition-2020.1

Clinical Management Summary

- Two main processes are thought to drive the pathogenesis of COVID-19. **Early in the clinical course, the disease is primarily driven by the replication of SARS-CoV-2**. Later in the clinical course, the disease appears to be driven by a dysregulated immune/inflammatory response to SARS-CoV-2 that leads to tissue damage. Based on this understanding, it is anticipated that therapies that directly target SARS-CoV-2 would have the greatest effect early in the course of the disease, while immunosuppressive/anti-inflammatory therapies are likely to be more beneficial in the later stages of COVID-19. The clinical spectrum of SARS-CoV-2 infection includes asymptomatic or presymptomatic infection and mild, moderate, severe, and critical illness.

NIH Guidelines: Defining a COVID-19 Severity Spectrum

Stage	Characteristics
Asymptomatic or presymptomatic infection	▪ Positive test for SARS-CoV-2 but no symptoms
Mild illness	▪ Varied symptoms (eg, fever, cough, sore throat, malaise, headache, muscle pain) but no shortness of breath, dyspnea, abnormal imaging
Moderate illness	▪ $SpO_2 \geq 94\%$ and lower respiratory disease evidenced by clinical assessment or imaging
Severe illness	▪ $SpO_2 < 94\%$, $PaO_2/FiO_2 < 300$, respiratory rate > 30 breaths/min, or lung infiltrates > 50%
Critical illness	▪ Respiratory failure, septic shock, and/or multiorgan dysfunction

NIH COVID-19 Treatment Guidelines. Management of persons with COVID-19. Last updated June 11, 2020.

Slide credit: clinicaloptions.com

Asymptomatic or Presymptomatic Infection

- Asymptomatic SARS-CoV-2 infection can occur, although the percentage of patients who remain truly asymptomatic throughout the course of infection is variable and incompletely defined. It is unclear what percentage of individuals who present with asymptomatic infection progress to clinical disease. Some asymptomatic individuals have been reported to have objective radiographic findings that are consistent with COVID-19 pneumonia.10,11 The availability of widespread virologic testing for SARS-CoV-2 and the development of reliable serologic assays for antibodies to the virus will help determine the true prevalence of asymptomatic and presymptomatic infection

Mild Illness

- Patients with mild illness may exhibit a variety of signs and symptoms (e.g., fever, cough, sore throat, malaise, headache, muscle pain, nausea, vomiting, diarrhea, loss of taste and smell). They do not have shortness of breath, dyspnea on exertion, or abnormal imaging. Most mildly ill patients can be managed in an ambulatory setting or at home through telemedicine or telephone visits. No imaging or specific laboratory evaluations are routinely indicated in otherwise healthy patients with mild COVID-19. Older patients and those with underlying comorbidities are at higher risk of disease progression; therefore, health care providers should monitor these patients closely until clinical recovery is achieved

Moderate Illness

- Moderate illness is defined as evidence of lower respiratory disease during clinical assessment or imaging, with SpO2 ≥94% on room air at sea level. Given that pulmonary disease can progress rapidly in patients with COVID-19, patients with moderate disease should be closely monitored. If bacterial pneumonia or sepsis is suspected, administer empiric antibiotic treatment, re-evaluate the patient daily, and de-escalate or stop antibiotics if there is no evidence of bacterial infection.

Severe Illness

- Patients with COVID-19 are considered to have severe illness if they have SpO2 <94% on room air at sea level, a respiratory rate >30 breaths/min, PaO2/FiO2 <300 mm Hg, or lung infiltrates >50%. These patients may experience rapid clinical deterioration. Oxygen therapy should be administered immediately using a nasal cannula or a high-flow oxygen device

Critical Illness

- Critically ill patients may have acute respiratory distress syndrome, septic shock that may represent virus-induced distributive shock, cardiac dysfunction, an exaggerated inflammatory response, and/or exacerbation of underlying comorbidities. In addition to pulmonary disease, patients with critical illness may also experience cardiac, hepatic, renal, central nervous system, or thrombotic disease. As with any patient in the intensive care unit (ICU), successful clinical management of a patient with COVID-19 includes treating both the medical condition that initially resulted in ICU admission and other comorbidities and nosocomial complications.

سیر بیماری کووید-۱۹

سیر بیماری را می توان به مراحل زیر تقسیم کرد:

۱. مرحله صفر: بی علامت/ قبل از بروز علائم
۲. مرحله یک: مراحل ابتدایی عفونت (Early infection)
۳. مرحله دو: فاز تنفسی
۴. مرحله سه: فاز التهابی شدید (Hyper inflammation)

خاطر نشان می شود که نمی توان مرز دقیقی بین مراحل مختلف بیماری تصور کرد و هم پوشانی ممکن است وجود داشته باشد. از سویی تغییر فاز به ترتیب مراحل نیست و ممکن است فرد از مرحله یک به سرعت و ناگهانی به مرحله پیشرفته برسد.

آنچه اهمیت بسیار دارد، ارزیابی وضعیت بیمار بر اساس روند بیماری است و اساسا با یک بار چک سطح اکسیژن، نمی توان به سادگی مرحله بیماری را تعیین نمود. روند تغییرات بیمار در افت اکسیژن و یافته های رادیولوژیک، در کنار مجموع علائم وی، باید راهنمای تصمیم گیری های درمانی باشد

مرحله صفر (بی علامت/قبل از بروز علائم)

تشخیص بیماری در این مرحله صرفا با تست آزمایشگاهی RT-PCR است که در حین بیماریابی در افراد بی علامت در تماس نزدیک با افراد مبتلا به کووید-۱۹ با تست RT-PCR مثبت و یا حین غربالگری از افراد بی علامت در مکان های تجمعی (نظیر زندان و...) صورت می گیرد. این افراد بعد از مدتی ممکن است علامت دار شوند لذا پایش علامتی آنها لازم است انجام شود.

مرحله یک (مراحل ابتدایی عفونت)

از نظر شدت بیماری این مرحله به عنوان مرحله خفیف در نظر گرفته می شود. علائم خفیف بصورت تب کمتر از ۳۸ درجه، گلودرد با یا بدون سرفه های خشک، لرز، سردرد، از دست دادن حس چشایی و بویایی، تهوع، استفراغ، بی اشتهایی، اسهال، بدن درد، ضعف و خستگی مفرط است. این علائم می تواند در هر فرد متفاوت باشد و بیمار یک یا چندین مورد از علائم را داشته باشد.در این مرحله علائم حیاتی (نبض، فشارخون و تعداد تنفس) پایدار است و $SpO2 \geq ۹۵٪$[۳] (سطح اشباع اکسیژن) می باشد. عموما فرد نیاز به بستری ندارد. بیمارانی که جزو گروههای پر خطر برای کووید-۱۹ عارضه دار محسوب می شوند، باید با دقت بیشتری پیگیری شوند و در صورت بروز علائم تشدید بیماری نظیر تنگی نفس، باید مراجعه کرده و اقدامات بعدی انجام شود.[۵]

مرحله دو (فاز تنفسی)

این مرحله خود به دو قسمت متوسط و شدید تقسیم می شود

فاز تنفسی متوسط (Moderate)

در این مرحله علائم قبلی با شدت بیشتر ممکن است وجود داشته باشد.

ملاک های ورود به این مرحله عبارت است از:

۱. وجود علائم تنفسی (شامل تنگی نفس، احساس درد و فشار در قفسه سینه، ...) با یا بدون تب مساوی/ بیشتر از 38°C
۲. SpO2 بیش از ۹۵ ٪
۳. درگیری ریوی کمتر از ۵۰٪

فاز تنفسی شدید (Severe)

در این مرحله نیز عموما علائم بالینی با شدت بیشتری وجود دارد.

ملاک های ورود به این مرحله عبارتند از :

۱. پیشرفت سریع علائم تنفسی به ویژه تشدید تنگی نفس
۲. تاکی پنه (RR>24)
۳. SpO2<95 % ،$PaO2/FiO2$[۴][۵] < 300 mmHg
۴. افزایش A-a gradient[۶] و نیز افزایش درگیری بیش از ۵۰٪ از ریه در سی تی اسکن

لازم به ذکر است که بروز انواع شدید بیماری در هر زمانی از سیر بیماری ممکن است رخ دهد و بروز آن الزاماً مستلزم طی همه مراحل قبلی نیست.

مرحله سه (فاز تشدید التهاب)- بحرانی (Critical)

ملاک های ورود به این مرحله وجود حداقل یکی از موارد زیر است:

۱. بروز علائم نارسایی تنفسی که علیرغم اکسیژن درمانی غیرتهاجمی باشد
۲. بروز نشانه های شوک
۳. بروز نارسایی چند ارگانی

در این مرحله بیمار نیازمند مراقبت های ویژه است. همانطور که اشاره شد، بروز انواع شدید بیماری در هر زمانی از سیر بیماری ممکن است رخ دهد و بروز آن مستلزم طی همه مراحل قبلی نیست.

زنان باردار در مرحله شدید یا بحرانی بیماری و زنان باردار با بیماریهای زمینه ای در هر مرحله ای از بیماری، باید در بالاترین سطح درمانی (سطح ۳ بیمارستانی) واجد بخش حاملگی پرخطر و بخش مراقبت ویژه بستری شوند. در سایر موارد برای تصمیم گیری جهت مراقبت، بایستی مشورت با تیم درمان سلامت مادران دانشگاه انجام پذیرد.

همه مادران باردار هنگام مراجعه ماسک طبی داشته باشند.

علت مراجعه (مشکلات مامایی یا غیرمامایی شامل: تب، سرفه،گلودرد، خستگی، سردرد و تنگی نفس، درد عضلانی، اختلال بویایی و چشایی) سوال شود.

خفیف:

مشکلات غیر مامایی تب، سرفه، گلو درد، خستگی، سردرد **بدون تنگی نفس**، درصد اشباع اکسیژن مساوی یا بیش از ۹۵٪

بدون بیماری زمینه ای

مراقبت در منزل و پیگیری

با بیماری زمینه ای*

**تصمیم گیری برای ارجاع یا مراقبت در منزل

متوسط:

مشکلات غیر مامایی

تب، سرفه، گلو درد، خستگی، سردرد **با تنگی نفس** ، درصد اشباع اکسیژن بیشتر یا مساوی ۹۵٪

ارجاع به بیمارستان جهت بررسی های لازم*** و بستری با نظر تیم چند تخصصی درمان سرپایی

شدید:

مشکلات غیر مامایی

تب، سرفه، گلو درد، خستگی، سردرد **با تنگی نفس، تعداد تنفس مساوی یا بیشتر۲۴،درصد اشباع اکسیژن کمتر از ۹۵٪**

بستری در بیمارستان سطح ۳ فوق تخصصی**** مرجع کرونا

بحرانی:

مشکلات غیر مامایی نارسایی تنفسی، شوک، نارسایی چند ارگان

اعزام و بستری در آی سی یو بیمارستان فوق تخصصی کرونا مرجع کرونا ****

مشکلات مامایی

ارجاع به تریاژ مطابق دستور عمل راهنمای کشوری خدمات مامایی و زایمان*****

*__بیماری زمینه ای شامل:__ فشار خون کنترل نشده، دیابت و دیابت بارداری، بیماری مزمن کلیوی، بیماری قلبی عروقی و ریوی مزمن، ضعف سیستم ایمنی

**تعیین تکلیف بیمار با هماهنگی تیم چند تخصصی درمان سرپایی معین مراکز منتخب کووید انجام شود. بدیهی است در صورت تصمیم گیری به مراقبت در منزل کارشناس رابط پرخطر سلامت مادران در حوزه بهداشت ضمن پیگیری روزانه شرایط مادر، در صورت بروز علایم خطر جهت اعزام مادرهماهنگی های لازم را به عمل آورد.

*** حداقل بررسی شامل CBC و در صورت نیاز بررسی رادیولوژیک بر اساس امکانات بیمارستان و شرایط مادر است.

**** تعیین بیمارستان محل بستری مادر باردار بایستی با توجه به شرایط و با هماهنگی تیم چند تخصصی درمان سرپایی دانشگاه انجام شود. (اعزامهای بدون هماهنگی خصوصا به بیمارستانهای فاقد امکانات مدیریت شرایط مادر باردار منجر به اتلاف وقت، عوارض شدید و بعضا مرگ مادر می شود.)

*****در همه ی مادران مراجعه کننده با شکایت مامایی، ضمن ارزیابی از نظر احتمال ابتلا به بیماری یا تماس نزدیک با فرد مبتلا/مشکوک /محتمل ، مراقبت های لازم در صورت مثبت بودن ارزیابی بعمل آید.

نکته۱: آزمایش PCR برای همه مادران باردار با علامت بیماری کووید یا مادران با سابقه تماس نزدیک مطابق دستور عمل انجام شود.

نکته۲: در مراجعه مادر باردار، علاوه بر بررسی مادر از نظر بیماری کووید -۱۹، حتما سلامت مادر و جنین مطابق دستور عمل ارزیابی شود.

نکته۳: در صورت وجود علایم زیر با یا بدون علایم تنفسی اعزام به بیمارستان الزامی است:

تب ۳۸ درجه یا بیشتر که با سه روز مصرف استامینوفن بهبود نیافته است، عدم تحمل خوراکی مایعات و داروها

درد پایدار قفسه سینه، گیجی، خواب آلودگی، اختلال هوشیاری، سیانوز

➢ اقدامات مراقبت و درمان

موارد سرپایی (گروه خفیف) معمولا فقط نیازمند پیگیری و درمان های نگهدارنده است. و در این موارد درمانی آنتی ویرال توصیه نمی شود.

نکته: در موارد مراقبت در منزل و درمان سرپایی، ضمن اطلاع رسانی به رابط پر خطر بهداشت، پیگیری ها و ارجاع به بیمارستان در صورت نیاز انجام شود. در صورت انتقال زنان باردار با عفونت قطعی یا محتمل به بیمارستان حتما به بیمارستان مقصد اطلاع داده شود.

➢ مراقبت و جدا سازی در منزل

لازم است در منزل مراقبت های درمانی علامتی و تسکینی انجام شود. مراقبت ها شامل:

- درمان علامتی/ تسکینی
- توصیه های بهداشتی، تغذیه ای
- جداسازی (در منزل یا نقاهتگاه)

نکاتی که باید مراقب سلامت به مادر آموزش دهد:

- تعداد مراقب های مادر باردار محدود شود.
- شمارش روزانه حرکات جنین بیشتر یا مساوی ۲۵ هفته بارداری آموزش داده شود. کاهش حرکات جنین در سن بارداری بیشتر یا مساوی ۲۵ هفته باید اطلاع داده شود.
- علائم خطر بیماری و زمان ارجاع به بیمارستان آموزش داده شود:
  - ✓ تنگی نفس
  - ✓ تاکی پنه بیش از ۲۴ بار در دقیقه
  - ✓ تب ۳۸ درجه یا بیشتر که با مصرف استامینوفن بهبود نمی یابد
  - ✓ عدم تحمل خوراکی مایعات و داروها
  - ✓ درد پایدار قفسه سینه
  - ✓ گیجی
  - ✓ خواب آلودگی
  - ✓ اختلال هوشیاری
  - ✓ سیانوز
  - ✓ علایم هشدار مامایی مانند: خونریزی، آبریزش، سر دل درد و ...
- پس از خروج مادر از قرنطینه، سلامت جنین بر اساس دستور عمل کشوری ارزیابی شود.

نحوه پیگیری توسط رابط پر خطر: در موارد ترخیص از بیمارستان یا تصمیم به مراقبت در منزل (بر اساس نظر مرکز سرپایی مراقبت) طرح پیگیری هر فرد بایستی مشخص شود. پیگیری می تواند شامل مراجعه درب منزل برای ارزیابی شرایط مادر (از نظر بروز علامت جدید یا بدتر شدن علائم، پالس اکسی متری، شمارش تعداد تنفس، ...)یا توصیه به مراجعه به مرکز جامع یا تماس تلفنی باشد.

حداقل پی گیری ها توسط کارشناس رابط پرخطر ، ارزیابی تلفنی در ۲۴ ساعت اول و سپس روز های چهارم، هفتم، دهم و قبل از خروج از قرنطینه است. در پی گیری حتما در خصوص علائم تنگی نفس، افزایش تعداد تنفس، دمای بدن، اختلال هوشیاری و گیجی سوال شود.

اندیکاسیون بستری

بستری بیماران مشکوک/مبتلا به بیماری کووید در بیمارستان شامل موارد زیر است:

۱. تب بیش از 39درجه علیرغم درمان دارویی
۲. وجود یک بیماری زمینه ای (فشار خون یا دیابت کنترل نشده و اورژانسهای مامایی مانند: پره اکلامپسی، پارگی زودرس کیسه آب، خونریزی رحمی و...)
۳. علایم و نشانه بیماری متوسط یا شدید (سطح اشباع اکسیژن کمتر از ۹۵٪ ، تعداد تنفس بیشتر از ۲۴، نیاز به حمایت تنفسی شامل اکسیژن درمانی)
۴. بیماری بحرانی (نارسایی تنفسی، افت فشار خون علیرغم هیدریشن مناسب ، اختلالات هوشیاری، اختلالات کبدی یا کلیوی، اختلالات قلبی)

جدول شماره ۱: آزمایشات بیماران بستری در بیمارستان

آزمایش های روتین	
	روز اول بستری (درخواست این آزمایشات و تکرار آن می تواند بر اساس نیاز فرد و به صلاحدید پزشک و متناسب با بیماری زمینه ای فرد نیز باشد): • CBC • ESR • Quantitative CRP • BUN/Cr. ALP. SGPT. CPK .SGOT • P. K. Na. Mg. Ca.BS • LDH • Ferritin (در صورت دسترسی) • ECG (اولیه به عنوان پایه تا در مورد ادامه سیر بیماری یا عوارض دارویی بتوان قضاوت کرد-اندازهQT در پرونده بیمار ثبت شود)

آزمایشات زیر بر اساس شرایط بالینی بیمار (شدت بیماری) ممکن است درخواست و/یا تکرار شود:
• D-dimer ،LDH ،Ferritin ،ABG برای تمام مادران با درصد اشباع اکسیژن کمتر از ۹۵ درصد
در صورت بروز علائم نارسایی حاد کلیوی (**افزایش کراتینین سرم بیش از 0.3 از حد پایه**)
• U/A • BUN/Cr • Pr/Cr ادرار
آزمایشات زیر در صورت صلاحدید پزشک و امکان دسترسی ممکن است درخواست شود:
• Fibrinogen • NT-proBNP • INR،PTT،PT
درصورت الزام بالینی
• کشت خون در صورت شک به عفونت باکتریال • Procalcitonin (شک به عفونت ثانویه باکتریال) • تست های تشخیصی HBV،HCV

that is suitable for telehealth. If patients are discharged while they are still receiving oxygen supplementation, they should receive oximetry monitoring and close follow-up soon after discharge.

PATIENT DISPOSITION	PANEL'S RECOMMENDATIONS
Not Requiring Hospitalization or Supplemental Oxygen, As Determined by a Health Care Provider in ED or an In-Person or Telehealth Visit	Anti-SARS-CoV-2 monoclonal antibody products are recommended for outpatients with mild to moderate COVID-19 who are at high risk of disease progression, as defined by the EUA criteria (treatments are listed in alphabetical order):[a] • **Bamlanivimab plus etesevimab**; *or* • **Casirivimab plus imdevimab**; *or* • **Sotrovimab** The Panel **recommends against** the use of **dexamethasone** or **other systemic glucocorticoids** in the absence of another indication **(AIII)**.[b]
Discharged From Hospital Inpatient Setting in Stable Condition and Does Not Require Supplemental Oxygen	The Panel **recommends against** continuing the use of **remdesivir (AIIa)**, **dexamethasone (AIIa)**, or **baricitinib (AIIa)** after hospital discharge.
Discharged From Hospital Inpatient Setting and Requires Supplemental Oxygen *For those who are stable enough for discharge but who still require oxygen*[c]	There is insufficient evidence to recommend either for or against the continued use of remdesivir, dexamethasone, and/or baricitinib. Review the text below when considering the use of any of these agents after hospital discharge.
Discharged From ED Despite New or Increasing Need for Supplemental Oxygen *When hospital resources are limited, inpatient admission is not possible, and close follow-up is ensured*[d]	The Panel recommends using **dexamethasone** 6 mg PO once daily for the duration of supplemental oxygen (dexamethasone use should not exceed 10 days) with careful monitoring for adverse events **(BIII)**. There is insufficient evidence to recommend either for or against the use of remdesivir. When considering the use of remdesivir, review the text below for further discussion. The Panel **recommends against** the use of **baricitinib** in this setting, except in a clinical trial **(AIII)**.

Rating of Recommendations: A = Strong; B = Moderate; C = Optional

General Management of Nonhospitalized Patients With Acute COVID-19

• Management of nonhospitalized patients with acute COVID-19 should include providing supportive care, taking steps to reduce the risk of SARS-CoV-2 transmission (including isolating the patient), and advising patients on when to contact a health care provider and seek an in-person evaluation **(AIII)**. •

When possible, patients with symptoms of COVID-19 should be triaged via telehealth visits before receiving in-person care. Patients with dyspnea should be referred for an in-person evaluation by a health care provider and should be followed closely during the initial days after the onset of dyspnea to assess for worsening respiratory status **(AIII)**.

• Management plans should be based on a patient's vital signs, physical exam findings, risk factors for progression to severe illness, and the availability of health care resources **(AIII)**.

- The COVID-19 Treatment Guidelines Panel recommends using one of the following anti-SARS-CoV-2 monoclonal antibody
- • **Bamlanivimab plus etesevimab**; *or*
- • **Casirivimab plus imdevimab**; *or*
- • **Sotrovimab 500 mg intravenous (IV) infusion**
- • **Casirivimab 600 mg plus imdevimab 600 mg IV infusion (AIIa)** • If IV infusions are not feasible or would cause a delay in treatment, **casirivimab 600 mg plus imdevimab 600 mg** administered by four subcutaneous (SQ) injections (2.5 mL per injection) can be used as an alternative **(BIII)**.

Medical Conditions or Other Factors That Were Represented in Clinical Trials That Evaluated Anti-SARS-CoV-2 Monoclonal Antibodies

- • Aged ≥65 years **(AIIa)** •
- Obesity (BMI >30) **(AIIa)**
- • Diabetes **(AIIa)**
- • Cardiovascular disease (including congenital heart disease) or hypertension **(AIIa)**
- • Chronic lung diseases (e.g., chronic obstructive pulmonary disease, moderate-to-severe asthma, interstitial lung disease, cystic fibrosis, pulmonary hypertension) **(AIIa)**

Conditions or Factors That Had Limited Representation in Clinical Trials but Are Considered Risk Factors for POtherrogression to Severe COVID-19 by the Centers for Disease Control and Prevention

- • An immunocompromising condition or immunosuppressive treatment **(AIII)**. Many experts strongly recommend therapy for patients with these conditions, despite their limited representation in clinical trials.
- • Being overweight (BMI 25–30) as the sole risk factor **(BIII)** • Chronic kidney disease **(BIII)**
- • Pregnancy **(BIII)**
- • Sickle cell disease **(BIII)**
- • Neurodevelopmental disorders (e.g., cerebral palsy) or other conditions that confer medical complexity (e.g., genetic or metabolic syndromes and severe congenital anomalies) **(BIII)**
- • Medical-related technological dependence (e.g., tracheostomy, gastrostomy, or positive pressure ventilation that is not related to COVID-19) **(BIII)**

Other Agents That Have Been Studied or Are Under Investigation for Use in the Outpatient Management of COVID-19

- • The Panel **recommends against** the use of **chloroquine** or **hydroxychloroquine** with or without **azithromycin (AI)**, **lopinavir/ritonavir**, and **other HIV protease inhibitors (AIII)** for outpatient treatment of COVID-19.
- • The Panel **recommends against** the use of **antibacterial therapy** (e.g., **azithromycin**, **doxycycline**) for outpatient treatment of COVID-19 in the absence of another indication **(AIII)**.
- • Antiviral agents, such as **ivermectin** and **nitazoxanide**
- • Convalescent plasma
- • Immunomodulators, such as **colchicine** and **fluvoxamine**
- • Supplements, such as **vitamin C**, **vitamin D**, and **zinc**
- • **Anticoagulants and antiplatelet therapy** should not be initiated in the outpatient setting for the prevention of venous thromboembolism or arterial thrombosis unless the patient has other indications for the therapy or is participating in a clinical trial **(AIII)**.

Antiviral Drugs That Are Approved or Under Evaluation for the Treatment of COVID-19

Last Updated: July 8, 2021

Summary Recommendations
Remdesivir is the only Food and Drug Administration-approved drug for the treatment of COVID-19. In this section, the COVID-19 Treatment Guidelines Panel (the Panel) provides recommendations for using antiviral drugs to treat COVID-19 based on the available data. **As in the management of any disease, treatment decisions ultimately reside with the patient and their health care provider.** For more information on these antiviral agents, see Table 2e. **Remdesivir** • See Therapeutic Management of Hospitalized Adults with COVID-19 for recommendations on using remdesivir with or without dexamethasone. **Ivermectin** • There is insufficient evidence for the Panel to recommend either for or against the use of ivermectin for the treatment of COVID-19. Results from adequately powered, well-designed, and well-conducted clinical trials are needed to provide more specific, evidence-based guidance on the role of ivermectin in the treatment of COVID-19. **Nitazoxanide** • The Panel **recommends against** the use of **nitazoxanide** for the treatment of COVID-19, except in a clinical trial **(BIIa)**. **Hydroxychloroquine or Chloroquine and/or Azithromycin** • The Panel **recommends against** the use of **chloroquine** or **hydroxychloroquine** and/or **azithromycin** for the treatment of COVID-19 in hospitalized patients **(AI)** and in nonhospitalized patients **(AIIa)**. **Lopinavir/Ritonavir and Other HIV Protease Inhibitors** • The Panel **recommends against** the use of **lopinavir/ritonavir** and **other HIV protease inhibitors** for the treatment of COVID-19 in hospitalized patients **(AI)** and in nonhospitalized patients **(AIII)**.
Rating of Recommendations: A = Strong; B = Moderate; C = Optional

- • The COVID-19 Treatment Guidelines Panel (the Panel) **recommends against** the use of **low-titer COVID-19 convalescent plasma** for the treatment of COVID-19 **(AIIb)**.
- • Low-titer COVID-19 convalescent plasma is no longer authorized through the convalescent plasma EUA. ***For Hospitalized Patients With COVID-19 Who Do Not Have Impaired Immunity***
- • The Panel **recommends against** the use of COVID-19 **convalescent plasma** for the treatment of COVID-19 in mechanically ventilated patients **(AI)**.
- • The Panel **recommends against** the use of **high-titer COVID-19 convalescent plasma** for the treatment of COVID-19 in hospitalized patients who do not require mechanical ventilation, except in a clinical trial **(AI)**.

- Immunoglobulins: SARS-CoV-2 Specific
- Recommendation
- • There is insufficient evidence for the COVID-19 Treatment Guidelines Panel to recommend either for or against **severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) immunoglobulins** for the treatment of COVID-19.

Immunoglobulins: Non-SARS-CoV-2 Specific

- • The COVID-19 Treatment Guidelines Panel **recommends against** the use of non-severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)-specific **intravenous immunoglobulin (IVIG)** for the treatment of COVID-19, except in a clinical trial **(AIII)**. This recommendation **should not preclude** the use of IVIG when otherwise indicated for the treatment of complications that arise during the course of COVID-19

- • The COVID-19 Treatment Guidelines Panel **recommends against** the use of **mesenchymal stem cells** for the treatment of COVID-19, except in a clinical trial **(AIIb)**.
- • There is insufficient evidence for the COVID-19 Treatment Guidelines Panel (the Panel) to recommend either for or against the use of colchicine for the treatment of nonhospitalized patients with COVID-19.
- • The Panel **recommends against** the use of colchicine for the treatment of hospitalized patients with COVID-19 **(AI)**.
- There is insufficient evidence for the COVID-19 Treatment Guidelines Panel to recommend either for or against the use of fluvoxamine for the treatment of COVID-19. Results from adequately powered, well-designed, and well-conducted clinical trials are needed to provide more specific, evidence-based guidance on the role of fluvoxamine for the treatment of COVID-19

Interferons (Alfa, Beta)

- The COVID-19 Treatment Guidelines Panel **recommends against** the use of interferons for the treatment of patients with severe or critical COVID-19, except in a clinical trial **(AIII)**.
- There is insufficient evidence to recommend either for or against the use of **interferon beta** for the treatment of early (i.e., <7 days from symptom onset) mild and moderate COVID-19.

Supplements

- **Vitamin C** • There is insufficient evidence for the COVID-19 Treatment Guidelines Panel (the Panel) to recommend either for or against the use of vitamin C for the treatment of COVID-19.
- **Vitamin D** • There is insufficient evidence for the Panel to recommend either for or against the use of vitamin D for the treatment of COVID-19.
- **Zinc** • There is insufficient evidence for the Panel to recommend either for or against the use of zinc for the treatment of COVID-19. • The Panel **recommends against** using zinc supplementation above the recommended dietary allowance for the prevention of COVID-19, except in a clinical trial **(BIII)**.

Figure 2. Therapeutic Management of Hospitalized Adults With COVID-19 Based on Disease Severity

DISEASE SEVERITY	PANEL'S RECOMMENDATIONS
Hospitalized but Does Not Require Supplemental Oxygen	The Panel **recommends against** the use of **dexamethasone (AIIa)** or **other corticosteroids (AIII)**.[a] There is insufficient evidence to recommend either for or against the routine use of remdesivir. For patients at high risk of disease progression, remdesivir may be appropriate.
Hospitalized and Requires Supplemental Oxygen	Use one of the following options: • **Remdesivir**[b] (e.g., for patients who require minimal supplemental oxygen) **(BIIa)** • **Dexamethasone plus remdesivir**[b] (e.g., for patients who require increasing amounts of supplemental oxygen) **(BIII)** • **Dexamethasone** (when combination with remdesivir cannot be used or is not available) **(BI)**
Hospitalized and Requires Oxygen Delivery Through a High-Flow Device or Noninvasive Ventilation	Use one of the following options: • **Dexamethasone (AI)** • **Dexamethasone plus remdesivir**[b] **(BIII)** For recently hospitalized[c] patients with rapidly increasing oxygen needs and systemic inflammation: • Add either **baricitinib (BIIa)** or **IV tocilizumab (BIIa)** to one of the two options above[d] • If neither baricitinib nor IV tocilizumab is available or feasible to use, **tofacitinib** can be used instead of baricitinib **(BIIa)** or **IV sarilumab** can be used instead of IV tocilizumab **(BIIa)**.
Hospitalized and Requires IMV or ECMO	• **Dexamethasone (AI)** For patients who are within 24 hours of admission to the ICU: • **Dexamethasone plus IV tocilizumab (BIIa)** • If IV tocilizumab is not available or not feasible to use, **IV sarilumab** can be used **(BIIa)**.

Table A. Dosing Regimens and Comments for the Drugs Recommended in Figure 2

Drug Name	Dosing Regimen	Comments
Remdesivir	Remdesivir 200 mg IV once, then remdesivir 100 mg IV once daily for 4 days or until hospital discharge	• Treatment may be extended for up to 10 days if there is no substantial clinical improvement by Day 5. • If the patient progresses to more severe illness, complete the course of remdesivir. • eGFR <30 mL/min/1.73 m^2: Remdesivir **is not recommended**.
Dexamethasone	Dexamethasone 6 mg IV or PO once daily for up to 10 days or until hospital discharge	• If dexamethasone is not available, an equivalent dose of another corticosteroid may be used. • See the Corticosteroids section for more information.
Baricitinib	Baricitinib dose is dependent on eGFR; duration of therapy is up to 14 days or until hospital discharge.	• eGFR ≥60 mL/min/1.73 m^2: Baricitinib 4 mg PO once daily • eGFR 30 to <60 mL/min/1.73 m^2: Baricitinib 2 mg PO once daily • eGFR 15 to <30 mL/min/1.73 m^2: Baricitinib 1 mg PO once daily • eGFR <15 mL/min/1.73 m^2: Baricitinib **is not recommended**.
Tofacitinib	Tofacitinib 10 mg PO twice daily for up to 14 days or until hospital discharge	• Use as an alternative if baricitinib is not available or not feasible to use **(BIIa)**. • eGFR <60 mL/min/1.73 m^2: Tofacitinib 5 mg PO twice daily
Tocilizumab	Tocilizumab 8 mg/kg actual body weight (up to 800 mg) administered as a single IV dose	• In clinical trials, a third of the participants received a second dose of tocilizumab 8 hours after the first dose if no clinical improvement was observed.
Sarilumab	Use the single-dose, pre-filled syringe (not the pre-filled pen) for SQ injection. Reconstitute sarilumab 400 mg in 100 cc 0.9% NaCl and administer as an IV infusion over 1 hour.	• Use as an alternative if tocilizumab is not available or not feasible to use **(BIIa)**. • In the United States, the currently approved route of administration for sarilumab is SQ injection. In the REMAP-CAP trial, the SQ formulation was used to prepare the IV infusion.

Antithrombotic Therapy in Patients with COVID-19

- **Laboratory Testing** • In nonhospitalized patients with COVID-19, there are currently no data to support the measurement of coagulation markers (e.g., D-dimers, prothrombin time, platelet count, fibrinogen) **(AIII)**.
- • In hospitalized patients with COVID-19, hematologic and coagulation parameters are commonly measured, although there is currently insufficient evidence to recommend either for or against using this data to guide management decisions. **Chronic Anticoagulant and Antiplatelet Therapy**
- • Patients who are receiving anticoagulant or antiplatelet therapies for underlying conditions should continue these medications if they receive a diagnosis of COVID-19 **(AIII)**.

- **Venous Thromboembolism Prophylaxis and Screening**

- • For nonhospitalized patients with COVID-19, anticoagulants and antiplatelet therapy should not be initiated for the prevention of venous thromboembolism (VTE) or arterial thrombosis unless the patient has other indications for the therapy or is participating in a clinical trial **(AIII)**.

- • Hospitalized nonpregnant adults with COVID-19 should receive prophylactic dose anticoagulation **(AIII)** (see the recommendations for pregnant individuals below). Anticoagulant or antiplatelet therapy should not be used to prevent arterial thrombosis outside of the usual standard of care for patients without COVID-19 **(AIII)**.

- • There is currently insufficient evidence to recommend either for or against the use of thrombolytics or higher than the prophylactic dose of anticoagulation for VTE prophylaxis in hospitalized COVID-19 patients outside of a clinical trial.

- • Hospitalized patients with COVID-19 should not routinely be discharged from the hospital while on VTE prophylaxis **(AIII)**. Continuing anticoagulation with a Food and Drug Administration-approved regimen for extended VTE prophylaxis after hospital discharge can be considered for patients who are at low risk for bleeding and high risk for VTE, as per the protocols for patients without COVID-19 (see details on defining at-risk patients below) **(BI)**.

- • There is currently insufficient evidence to recommend either for or against routine deep vein thrombosis screening in COVID-19 patients without signs or symptoms of VTE, regardless of the status of their coagulation markers.

- • For hospitalized COVID-19 patients who experience rapid deterioration of pulmonary, cardiac, or neurological function, or of sudden, localized loss of peripheral perfusion, the possibility of thromboembolic disease should be evaluated **(AIII)**.

- *Patients With COVID-19 Who Are Discharged from the Hospital*
- VTE prophylaxis after hospital discharge **is not recommended** for patients with COVID-19 **(AIII)**. For certain high-VTE risk patients without COVID-19, post-discharge prophylaxis has been shown to be beneficial. The Food and Drug Administration approved the use of rivaroxaban 10 mg daily for 31 to 39 days in these patients.
- Inclusion criteria for the trials that studied post-discharge VTE prophylaxis included:
- • Modified International Medical Prevention Registry on Venous Thromboembolism (IMPROVE) VTE risk score ≥4; *or*
- • Modified IMPROVE VTE risk score ≥2 and D-dimer level >2 times the upper limit of normal.32 Any decision to use post-discharge VTE prophylaxis for patients with COVID-19 should include consideration of the individual patient's risk factors for VTE, including reduced mobility, bleeding risks, and feasibility. Participation in clinical trials is encouraged.

Systemic Corticosteroids Other Than Dexamethasone

- • If dexamethasone is not available, alternative glucocorticoids (e.g., prednisone, methylprednisolone, hydrocortisone) can be used.
- • For these drugs, the total daily dose equivalencies to dexamethasone 6 mg (oral or intravenous)24 are:
- • Prednisone 40 mg
- • Methylprednisolone 32 mg
- • Hydrocortisone 160 mg

Care of Critically Ill Adult Patients With COVID-19

Infection Control

- For health care workers who are performing aerosol-generating procedures on patients with COVID-19, the COVID-19 Treatment Guidelines Panel (the Panel) recommends using an N95 respirator (or equivalent or higher-level respirator) rather than surgical masks, in addition to other personal protective equipment (PPE) (i.e., gloves, gown, and eye protection such as a face shield or safety goggles) **(AIII)**.

- The Panel recommends minimizing the use of aerosol-generating procedures on intensive care unit patients with COVID-19 and carrying out any necessary aerosol-generating procedures in a negative-pressure room, also known as an airborne infection isolation room, when available **(AIII)**.

- For health care workers who are providing usual care for nonventilated patients with COVID-19, the Panel recommends using an N95 respirator (or equivalent or higher-level respirator) or a surgical mask in addition to other PPE (i.e., gloves, gown, and eye protection such as a face shield or safety goggles) **(AIIa)**.

- For health care workers who are performing non-aerosol-generating procedures on patients with COVID-19 who are on closed-circuit mechanical ventilation, the Panel recommends using an N95 respirator (or equivalent or higher-level respirator) in addition to other PPE (i.e., gloves, gown, and eye protection such as a face shield or safety goggles) because ventilator circuits may become disrupted unexpectedly **(BIII)**.

- The Panel recommends that endotracheal intubation in patients with COVID-19 be performed by health care providers with extensive airway management experience, if possible **(AIII)**.

- The Panel recommends that intubation be performed using video laryngoscopy, if possible **(CIIa)**.

- **Hemodynamics**

- For adults with COVID-19 and shock, the Panel recommends using dynamic parameters, skin temperature, capillary refilling time, and/or lactate levels over static parameters to assess fluid responsiveness **(BIIa)**.

- For the acute resuscitation of adults with COVID-19 and shock, the Panel recommends using buffered/balanced crystalloids over unbalanced crystalloids **(BIIa)**.

- For the acute resuscitation of adults with COVID-19 and shock, the Panel **recommends against** the initial use of **albumin** for resuscitation **(BI)**.

- For adults with COVID-19 and shock, the Panel recommends **norepinephrine** as the first-choice vasopressor **(AI)**.

- For adults with COVID-19 and shock, the Panel recommends titrating vasoactive agents to target a mean arterial pressure (MAP) of 60 to 65 mm Hg over higher MAP targets **(BI)**.

- The Panel **recommends against** using **hydroxyethyl starches** for intravascular volume replacement in patients with sepsis or septic shock **(AI)**.

- When norepinephrine is available, the Panel **recommends against** using **dopamine** for patients with COVID-19 and shock **(AI)**.

- As a second line vasopressor, the Panel recommends adding either **vasopressin** (up to 0.03 units/min) **(BIIa)** or **epinephrine (BIIb)** to norepinephrine to raise MAP to target or adding **vasopressin** (up to 0.03 units/min) **(BIIa**) to decrease norepinephrine dosage.

- The Panel **recommends against** using **low-dose dopamine** for renal protection **(AI)**.

- The Panel recommends using **dobutamine** in patients who show evidence of cardiac dysfunction and persistent hypoperfusion despite adequate fluid loading and the use of vasopressor agents **(BIII)**.

- The Panel recommends that all patients who require vasopressors have an arterial catheter placed as soon as practical, if resources are available **(BIII)**.

- For adults with refractory septic shock who have completed a course of corticosteroids to treat their COVID-19, the Panel recommends using low-dose corticosteroid therapy (“shock-reversal”) over no corticosteroid therapy **(BIIa**

- **Oxygenation and Ventilation**
- For adults with COVID-19 and acute hypoxemic respiratory failure despite conventional oxygen therapy, the Panel recommends high-flow nasal cannula (HFNC) oxygen over noninvasive positive pressure ventilation (NIPPV) **(BIIa)**.
- In the absence of an indication for endotracheal intubation, the Panel recommends a closely monitored trial of NIPPV
- for adults with COVID-19 and acute hypoxemic respiratory failure and for whom HFNC is not available **(BIIa)**.
- • For patients with persistent hypoxemia despite increasing supplemental oxygen requirements in whom endotracheal intubation is not otherwise indicated, the Panel recommends considering a trial of awake prone positioning to improve oxygenation **(CIIa)**.
- • The Panel **recommends against** using awake prone positioning as a rescue therapy for refractory hypoxemia to avoid intubation in patients who otherwise meet the indications for intubation and mechanical ventilation **(AIII)**.
- • If intubation becomes necessary, the procedure should be performed by an experienced practitioner in a controlled setting due to the enhanced risk of exposing health care practitioners to SARS-CoV-2 during intubation **(AIII)**.
-

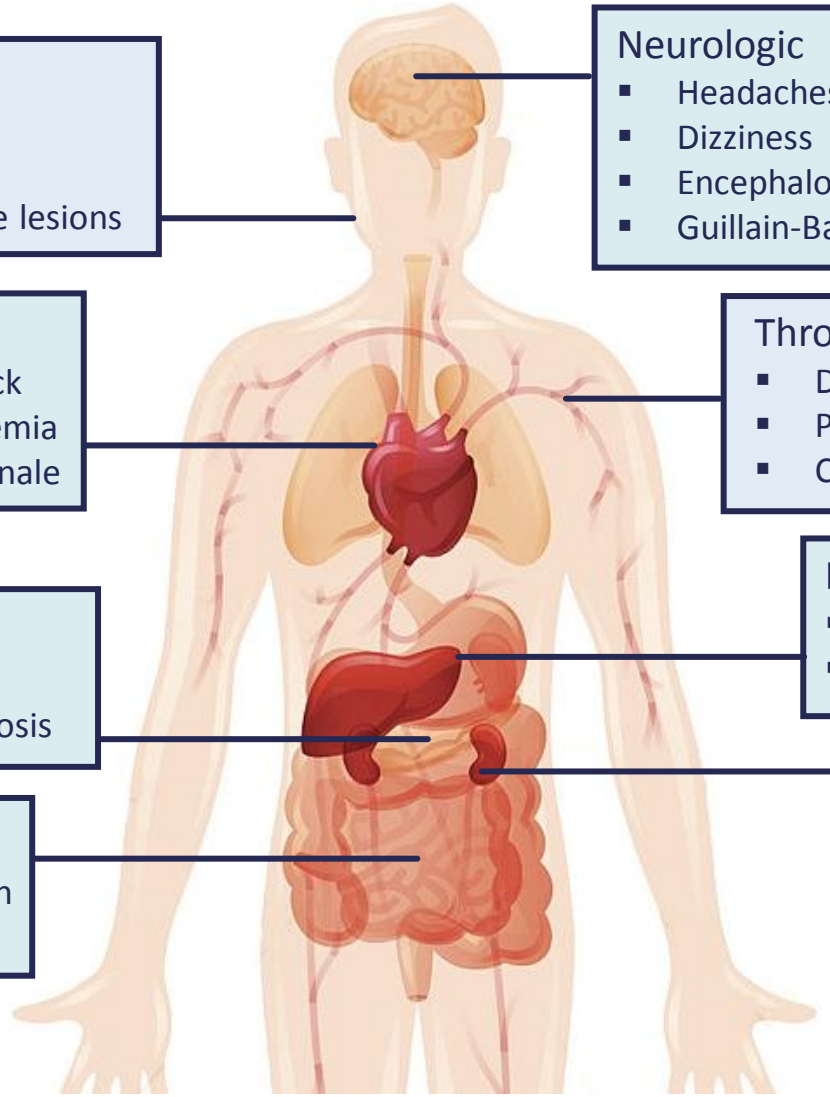
- • If intubation becomes necessary, the procedure should be performed by an experienced practitioner in a controlled setting due to the enhanced risk of exposing health care practitioners to SARS-CoV-2 during intubation **(AIII)**
- • For mechanically ventilated adults with COVID-19 and acute respiratory distress syndrome (ARDS):
- • The Panel recommends using low tidal volume (VT) ventilation (VT 4–8 mL/kg of predicted body weight) over higher VT ventilation (VT >8 mL/kg) **(AI)**.
- • The Panel recommends targeting plateau pressures of <30 cm H2O **(AIIa)**.
- • The Panel recommends using a conservative fluid strategy over a liberal fluid strategy **(BIIa)**.
- • The Panel **recommends against** the routine use of **inhaled nitric oxide (AIIa)**.
- • For mechanically ventilated adults with COVID-19 and moderate-to-severe ARDS:
- • The Panel recommends using a higher positive end-expiratory pressure (PEEP) strategy over a lower PEEP strategy

- • For mechanically ventilated adults with COVID-19 and refractory hypoxemia despite optimized ventilation, the Panel recommends prone ventilation for 12 to 16 hours per day over no prone ventilation **(BIIa)**.
- • The Panel recommends using, as needed, intermittent boluses of neuromuscular blocking agents (NMBA) or continuous NMBA infusion to facilitate protective lung ventilation **(BIIa)**.
- • In the event of persistent patient-ventilator dyssynchrony, or in cases where a patient requires ongoing deep sedation, prone ventilation, or persistently high plateau pressures, the Panel recommends using a continuous NMBA infusion for up to 48 hours as long as patient anxiety and pain can be adequately monitored and controlled **(BIII)**.
- • For mechanically ventilated adults with COVID-19, severe ARDS, and hypoxemia despite optimized ventilation and other rescue strategies:
- • The Panel recommends using recruitment maneuvers rather than not using recruitment maneuvers **(CIIa)**.
- • If recruitment maneuvers are used, the Panel **recommends against** using staircase (incremental PEEP) recruitment maneuvers **(AIIa)**.
- • The Panel recommends using an inhaled pulmonary vasodilator as a rescue therapy; if no rapid improvement in oxygenation is observed, the treatment should be tapered off **(CIII)**.

- **Pharmacologic Interventions** • In patients with COVID-19 and severe or critical illness, there is insufficient evidence for the Panel to recommend either for or against empiric broad-spectrum antimicrobial therapy in the absence of another indication.
- • If antimicrobials are initiated, the Panel recommends that their use should be reassessed daily to minimize the adverse consequences of unnecessary antimicrobial therapy **(AIII)**.
- **Extracorporeal Membrane Oxygenation**
- • There is insufficient evidence for the Panel to recommend either for or against the use of extracorporeal membrane oxygenation for patients with COVID-19 and refractory hypoxemia

- COVID-19-Induced Cardiac Dysfunction, Including Myocarditis
- Thromboembolic Events and COVID-19
- Renal and Hepatic Dysfunction Due to COVID-19

Extrapulmonary Manifestations



Dermatologic
- Petechaie
- Livedo reticularis
- Erythematous rash
- Urticaria
- Vesicles
- Pernio-like lesions

Neurologic
- Headaches
- Dizziness
- Encephalopathy
- Guillain-Barré
- Ageusia
- Myalgia
- Anosmia
- Stroke

Cardiac
- Takotsubo cardiomyopathy
- Myocardial injury/myocarditis
- Cardiac arrhythmias
- Cardiogenic shock
- Myocardial ischemia
- Acute cor pulmonale

Thromboembolism
- Deep vein thrombosis
- Pulmonary embolism
- Catheter-related thrombosis

Hepatic
- Elevated ALT/AST
- Elevated bilirubin

Endocrine
- Hyperglycemia
- Diabetic ketoacidosis

Renal
- Acute kidney injury
- Proteinuria
- Hematuria

Gastrointestinal
- Diarrhea
- Nausea/vomiting
- Abdominal pain
- Anorexia

Gupta. Nat Med. 2020;26:1017.

Slide credit: clinicaloptions.com

Oxygenation and Ventilation

- ***Goal of Oxygenation*** The optimal oxygen saturation (SpO2) in adults with COVID-19 is uncertain. However, a target SpO2 of 92% to 96% seems logical considering that indirect evidence from experience in patients without COVID-19 suggests that an SpO2 <92% or >96% may be harmful. Regarding the potential harm of maintaining an SpO2 <92%, a trial randomly assigned ARDS patients without COVID-19 to either a conservative oxygen strategy (target SpO2 of 88% to 92%) or a liberal oxygen strategy (target SpO2 ≥96%). The trial was stopped early due to futility after enrolling 205 patients, but in the conservative oxygen group there was increased mortality at 90 days (between-group risk difference of 14%; 95% CI, 0.7% to 27%) and a trend toward increased mortality at 28-days (between-group risk difference of 8%; 95% CI, -5% to 21%).1 Regarding the potential harm of maintaining an SpO2 >96%, a meta-analysis of 25 randomized trials involving patients without COVID-19 found that a liberal oxygen strategy (median SpO2 of 96%) was associated with an increased risk of in-hospital mortality compared to a lower SpO2 comparator

Timing of Delivery

- In most cases, the timing of delivery should be dictated by obstetric indications rather than maternal diagnosis of COVID-19. For women who had suspected or confirmed COVID-19 early in pregnancy who recover, no alteration to the usual timing of delivery is indicated
- breastfeeding is not contraindicated for people with laboratory-confirmed or suspected SARS-CoV-2 infection.8 Precautions should be taken to avoid transmission to the infant, including practicing good hand hygiene, wearing face coverings, and performing proper pump cleaning before and after breast milk expression.

thanks your Attention