

**OUTPATIENT PROTOCOLS FOR  
POST-COVID SYNDROME**

**ACUTE MANAGEMENT AND LONG-  
TERM SURVEILLANCE**

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## Disclosures

Speaker Bureau:	Consultant:
<ul style="list-style-type: none"> <li>• Sanofi-Pasteur, Merck, Pfizer, Seqirus, Moderna: Vaccines</li> <li>• AbbVie and Biohaven: Migraines</li> <li>• Idorsia: Insomnia</li> </ul>	<ul style="list-style-type: none"> <li>• Sanofi-Pasteur, Merck, Pfizer, Moderna, and Seqirus: Vaccines</li> <li>• GlaxoSmithKline: OA and Pain</li> <li>• Bayer: Chronic Kidney Disease</li> <li>• Idorsia: Insomnia</li> <li>• Shield Therapeutics: Iron Deficiency Anemia</li> </ul>

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## Objectives

- Upon completion of this program, the participant will be able to:
  - Review diagnostic criteria for Post-Covid Syndrome
  - Identify symptoms associated with Post-Covid Syndrome
  - Discuss treatment options for patients with Post-Covid Syndrome

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# SARS-Co-V-2

Initially thought to be an acute respiratory viral infection; but now thought of as a systemic illness

↓

Multiple reports from patients and providers have led to research on Post-covid symptoms

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Multiple names:

Post-Covid syndrome <small>WRIGHT, 2023</small>	Long-hauler syndrome	Long Covid	Long-haul Covid	Post-acute Covid <small>4</small>
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### What happens when exposed?

Gupta, A., Madhavan, M. V., Sehgal, K., Nair, N., Mahajan, S., Sehrawat, T. S., ... & Freedberg, D. E. (2020). Extrapulmonary manifestations of COVID-19. *Nature medicine*, 26(7), 1017-1032.

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### COVID-19: A Multi-system Disease

**Neurologic**  
Headaches  
Dizziness  
Encephalopathy  
Guillain-Barre  
Agnosia  
Myalgia  
Anosmia  
Stroke

**Renal**  
Acute kidney injury  
Proteinuria  
Hematuria

**Hepatic**  
Elevated aminotransferases  
Elevated bilirubin

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

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

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

**Endocrine**  
Hypoglycemia  
Diabetic ketoacidosis

**Dermatological**  
Petechiae  
Livedo reticularis  
Erythematous rash  
Urticaria  
Vesicles  
Pernio-like lesions

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**Similar presentation with other Corona viruses**

- Middle Eastern Respiratory Syndrome (MERS)
- Severe Adult Respiratory Syndrome (SARS)
  - Both are the result of a corona virus
- Patients with these syndrome developed:
  - Fatigue, myalgias, psychiatric conditions
- Present at 4-year follow-ups, as well as 7 and 15-years post-infection

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8146298/> accessed 07-01-2021  
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**What is the cause?**

- Proposed that T-cell dysfunction may promote long COVID pathophysiology similar to what happens with autoimmune diseases
  - 15-20% develop thyroid dysfunction
  - Increased risk of developing Type I diabetes following COVID
- B-cells may also be involved in long COVID autoimmunity
- Other autoantibodies against interferons, neutrophils, connective tissues, cyclic citrullinated peptides, and cell nucleus are present in 10–50% of patients with COVID-19
- Gut microbiome disruption may also play a significant role
- Harbored Viral RNA x months

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8146298/> accessed 07-01-2021

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**Does Epstein-Barr Virus Play a Role?**

- One study showed that the COVID virus may reactivate the Epstein-Barr Virus
  - This virus is associated with mononucleosis and is also that to be the predominant cause of Chronic Fatigue Syndrome
  - Ordering an EBV Serology: 4 different markers to look for acute, recent, past or a reactivation may be the most helpful test to see if this virus is involved
  - EBV viral load is another potentially helpful test to obtain

<https://health.ucdavis.edu/news/headlines/11-things-doctors-have-learned-about-long-haul-covid/2022/02/?msclkid=cc7b54dcb35e11ec9e9cdee73cd750c4> accessed 04-01-2022

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**Autopsy Studies**

- Lungs: diffuse alveolar damage similar to ARDS, end-stage pulmonary fibrosis, microthrombi, endothelial damage: all worse than that with influenza
- Heart: virus genome in cardiac tissue, intramyocardial inflammation, increased macrophages, T lymphocytes in the tissue
- Brain: acute hypoxic damage in the cerebrum and cerebellum
- Renal: acute tubular necrosis

<https://www.ncbi.nlm.nih.gov/books/NBK570608/?msclkid=b420b179b35a11eca2962546f297f8cd>

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**Differentiation (Terminology)**

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Subacute or persistent COVID symptoms: up to 12 weeks from the initial infection

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Chronic or Post acute Covid 19 syndrome: 12 weeks or longer of symptoms not attributable to other conditions

<https://www.ncbi.nlm.nih.gov/books/NBK570608/?msclkid=b420b179b35a11eca2962546f297f8cd>

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**October 2021:  
World Health Organization Definition**

- Term: Post Covid-19 Condition
- *“Post COVID-19 condition occurs in individuals with a history of probable or confirmed SARS CoV-2 infection, usually 3 months from the onset of COVID-19 with symptoms and that last for at least 2 months and cannot be explained by an alternative diagnosis.”*

[https://www.who.int/publications/i/item/WHO-2019-nCoV-Post\\_COVID-19\\_condition-Clinical\\_case\\_definition-2021.1](https://www.who.int/publications/i/item/WHO-2019-nCoV-Post_COVID-19_condition-Clinical_case_definition-2021.1) accessed 10-10-2021

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**October 2021**

- ICD – 10 Diagnosis
  - Post COVID-19 condition, unspecified (U09.9)

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**Post Acute Coronavirus (COVID 19) Syndrome**

- Characteristics:
  - New, recurring, or ongoing symptoms 12 weeks or more after the initial infection
  - Can occur after initial recovery
  - Severity ranges from mild – severe
  - Can affect those who had asymptomatic, or mild – severe acute infections
  - Can affect all ages

<https://www.ncbi.nlm.nih.gov/books/NBK570608/?msclkid=b420b179b35a11eca2962546f297f8cd>

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**OTHER TERMINOLOGY:**

**Post-Acute Sequelae of SARS-CoV-2 (PASC) infection**

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**Who is at greatest risk?**

- Hospitalized patients, particularly those requiring ventilatory support
- Patients with respiratory and systemic comorbidities such as obesity, diabetes, cardiovascular disease
- Older adults
- Women > Men more likely to develop mental health symptoms/conditions
- Racial/ethnic disparities (42.1% Black Asian Ethnic Minority vs. 25% White)

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**And...Unvaccinated or Undervaccinated**

- Unvaccinated individuals
  - People with COVID-19 who received 2 doses of the Pfizer, AstraZeneca, or Moderna vaccines or one dose of the Janssen vaccine, were about fifty percent less likely as people who received one dose or were unvaccinated to develop long COVID symptoms lasting more than 28 days
  - Vaccine effectiveness against most post-COVID symptoms in adults was highest in people aged 60 years and over, and lowest for younger participants (19 to 35 years)

<https://www.gov.uk/government/news/ukhsa-review-shows-vaccinated-less-likely-to-have-long-covid-than-unvaccinated>  
Accessed 07-24-2022

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# PROPOSED SYMPTOMS AND RISK FACTORS

WRIGHT, 2023  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8146298/> accessed 07-01-2021

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## How Common is Post Acute Covid Syndrome?

- In this cohort of individuals with COVID-19 who were followed up to 9 months after illness, approximately 30% reported persistent symptoms.
- Majority of the patients were managed outpatient with mild disease.
- Consistent with other studies and publications.

Logue JK, Franko NM, McCulloch DJ, et al. Sequelae in Adults at 6 Months After COVID-19 Infection. JAMA Netw Open. 2021;4(2):e210830. doi:10.1001/jamanetworkopen.2021.0830  
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## May 2022

- Global presence of long-COVID symptoms
  - Among patients with long-Covid, 37% had symptoms 30 days post-infection, 25% at 60 days, 32% at 90 days and 49% at 120 days
  - Data from evaluation of 41 studies
  - Estimated that about 200 million people worldwide are dealing with long-COVID symptoms

Chen C, et al. J Infect Dis. 2022;doi:10.1093/infdis/jiac136.  
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**Hospitalized Patients**

- One half of people hospitalized with COVID-19 suffer at least one symptom 1 year after discharge
  - Most common symptoms: fatigue and muscle weakness
- Approximately 1/3 have persistent shortness of breath
- Increased rates of depression, anxiety, mobility issues

[https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(21\)01755-4/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)01755-4/fulltext) accessed 09-02-2021

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**More than 200 symptoms reported**

• Dyspnea on exertion	• Abdominal pain
• Post-exertional fatigue	• Diarrhea
• Brain fog	• Sleep difficulties
• Autonomic dysfunction	• Fevers
• Cough	• Lightheadedness
• Chest pain	• Pain
• Headache	• Mood disorders
• Palpitations	• Anosmia or dysgeusia
• Arthralgias/Myalgias	• Menstrual cycle irregularities
• Paresthesia	

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**Most Common Symptom:**

**Fatigue or Post-exertional malaise**

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**New Study**

- Moderate to severe sleep disturbances and severe fatigue affect up to 40% of patients with long COVID, or post-acute sequelae of SARS-CoV-2 infection (PASC).
- These disturbances are particularly common among individuals of color (3x greater rate)

Dr. Pena, Annual meeting of the Associated Professional Sleep Societies; Sleep 2022  
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**Conditions reported after acute Covid-19 infection (even asymptomatic infection)**

- CV: myocarditis, CHF, POTS
- Pulmonary: interstitial lung disease, asthma
- Renal: acute and chronic kidney disease
- Autoimmune: fibromyalgia, connective tissue disease, reactive arthritis
- Dermatologic: urticaria, alopecia
- Endocrine: diabetes, hypothyroidism
- Neuro: CVA, TIA, sensory abnormalities, cognitive changes, weakness, neuropathy
- Psychiatric: Depression, anxiety, PTSD
- Hematologic: DVT, arterial thrombosis

<https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-clinical-eval.html> accessed 07-15-2021

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**Must consider Covid-19 infection**

**In individuals presenting with these symptoms or conditions**

- 10-20% of all Covid infections are asymptomatic
- May have not been tested
- 10-20% of individuals with Covid will have negative antibodies
- Even if tested, antibodies may be absent

**Do not need to have positive test or positive antibody test to diagnose patient with Post-COVID syndrome**

<https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-clinical-eval.html> accessed 07-15-2021

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**Guidance on management of non-hospitalized patients**

Treatment focused on most problematic symptoms	Comprehensive, coordinated care by primary care is essential	Limited benefit from laboratory or diagnostic testing
Consider follow-up in 2-4 months after acute infection to ensure that the patient is doing well and without issues		AAP has released guidance on return to sports after COVID-19

<https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-clinical-eval.html> accessed 07-15-2021  
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**Guidance on the management of hospitalized patients**

- See within 1 -2 weeks for TIC visit
- Approximately 9–15% of patients who were hospitalized with COVID-19 are readmitted within two months of discharge.
- Approximately 30% are readmitted within six months of discharge.
- Magnitude of their symptoms are often greater
  - PTSD, vocal cord dysfunction, weakness

<https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-clinical-eval.html> accessed 07-15-2021  
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**COMPREHENSIVE HISTORY AND PHYSICAL EXAMINATION ARE ESSENTIAL!**



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### Laboratory testing

- Dependent upon patient and symptoms:
  - CBC with differential
  - CMP (glucose, liver, kidney, electrolytes)
  - D-dimer
  - BNP
  - TSH
  - A1C
  - Sed rate and CRP
  - ANA, RF, anti-CCP
  - Coagulation panel
  - Epstein Barr Virus Panel and viral load
  - Lyme
  - Vitamin D
  - CRP
  - Ferritin

<https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-clinical-eval.html> accessed 07-15-2021  
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### Diagnostic tests and procedures

- Dependent upon patient and symptoms
  - Chest X-ray
  - CT scan of chest
  - Spirometry
  - Lower-extremity ultrasound
  - MRI-Brain
  - Tilt table test (POTS)
  - ECG
  - 24 hour or King of Hearts Monitor
  - Patient monitors O2 sats (> 96% reassuring)
- Screening tools
  - GAD-7
  - PHQ-2, PHQ-4
  - 6-minute walk test
  - MMSE

<https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-clinical-eval.html> accessed 07-15-2021  
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### Assessment tools for evaluating people with post-covid conditions

The Post-Covid 19 Functional Status Scale (PCFS)

• Klook FA, Boon GJAM, Barco S, Endres M, Geelhoed JJM, Knauss S, Rezek SA, Spruit MA, Veltreschild J, Siegerink B. The Post-COVID-19 Functional Status scale: a tool to measure functional status over time after COVID-19. Eur Respir J. 2020 Jul 2;56(1):2001494. doi: 10.1183/13993003.01494-2020. PMID: 32398306; PMCID: PMC7236834.

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**Non-Pharmacologic Treatment Options**

- Healthy diet
- Exercise plan: 30 minutes 5 days per week
  - This has not been shown to worsen the symptoms/situation
- Acupuncture, Yoga, Tai Chi, Meditation (all being investigated)

<https://health.ucdavis.edu/news/headlines/11-things-doctors-have-learned-about-long-haul-covid/2022/02?msclkid=cc7b54dcb35e11ec9e9cdee73cd750c4>

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**Can Getting the COVID Vaccine Help?**

- There are emerging data that getting the COVID vaccine may be beneficial to those with PASC
  - Data are still emerging
- Reports that 10% - 15% may feel worse

<https://health.ucdavis.edu/news/headlines/11-things-doctors-have-learned-about-long-haul-covid/2022/02?msclkid=cc7b54dcb35e11ec9e9cdee73cd750c4>

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### What About Antihistamines?

- In a recent paper published in Journal of Nurse Practitioners, two patient case studies showed significant improvement in fatigue and improved ability to concentrate after taking diphenhydramine 50 mg. Patient took daily x 6 months and then transitioned to hydroxyzine 25 mg – with titration up to 150 mg daily.
  - Patient maintained on 50 mg of hydroxyzine daily with elimination of fatigue, chest pain, recurrent rashes, brain fog and exercise intolerance

[https://www.npjjournal.org/article/S1555-4155\(21\)00547-X/fulltext](https://www.npjjournal.org/article/S1555-4155(21)00547-X/fulltext)  
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### What About Antihistamines?

- Case 2:
  - Patient self treated with diphenhydramine 25 mg daily for COVID fingers/toes 13 months after acute COVID infection
  - After starting this medication, her fatigue and brain fog resolved the next day
  - Within days, she noted improvement in her anosmia and dysgeusia
  - Currently, she is managing on fexofenadine 180 mg in the am and 25 mg of diphenhydramine in the pm
- Studies are needed

[https://www.npjjournal.org/article/S1555-4155\(21\)00547-X/fulltext](https://www.npjjournal.org/article/S1555-4155(21)00547-X/fulltext)  
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### Treatment: Dependent Upon Symptoms

- Olfactory/gustatory symptoms
  - Olfactory training. These programs are available online for patients to follow
  - Referral to specialty (ENT)

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**Dyspnea**

- Dyspnea:
  - Must consider: pulmonary embolism
  - Consider pulmonology referral
  - Refer to: Pulmonary rehabilitation
  - Vaccinate against influenza and pneumococcal infections
  - Pulmonary function testing
  - Steroids: mixed evidence
  - Post acute COVID 19 specialty clinic

<https://www.ncbi.nlm.nih.gov/books/NBK570608/?msclkid=b420b179b35a11eca2962546f297f8cd>

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**Emerging Data**

- Most have normal Chest Xray and CT scan
- However, using SPECT CT – microemboli are detected; able to visualize using a radiotracer which parts of the lungs are not receive adequate blood supply
- Unfortunately, many don't meet criteria for anticoagulant treatment but should that change?

<https://www.science.org/content/article/what-causes-long-covid-three-leading-theories> accessed 07-27-2022

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**Cough**

- Largely aimed at symptoms
- Limited data to suggest benefit from steroids or albuterol
- OTC cough suppressants i.e. guaifenesin or dextromethorphan may be helpful

<https://www.uptodate.com/contents/covid-19-evaluation-and-management-of-adults-following-acute-viral-illness>

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### Mental Health

- SSRIs are likely to help many with Post Acute Covid 19 mental health symptoms i.e. anxiety/depression
  - SSRIs such as fluoxetine which tends to be more energizing may be beneficial
- If pain is an issue along with depression/anxiety, consider SNRI for treatment

<https://health.ucdavis.edu/news/headlines/11-things-doctors-have-learned-about-long-haul-covid/2022/02?msclkid=cc7b54dc35e11ec9e9cdee73cd750c4> accessed 04-01-2022

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### Autonomic Dysregulation (POTS)

- POTS (orthostatic intolerance)
- Tilt Table Test
- Salt tablets 1 pill up to three times daily (3000-10000 mg daily)
- Fludrocortisone 0.1 mg – 0.2 mg daily; max 1 mg daily
- Pyridostigmine 60 mg – 120 mg every 8 hours (Myasthenia Gravis)
- Midodrine 10 mg three times daily (Pressor)
- Beta blocker (Metoprolol ER 25 mg once daily)
- Compression stockings

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### Other Treatments Being Looked At...

- Blood washing also known as apheresis
  - Little evidence to support; anecdotal evidence at best
  - Not covered by insurance
  - Procedure: blood removed through large needle from one arm, filtered to remove inflammatory proteins and lipids and returned to the other arm
  - Hypothesis behind this is that COVID causes microclots, which are clogging capillaries and reducing oxygen
  - Some are also turning to anticoagulants

<https://www.bmj.com/content/378/bmj.o1671> accessed 07-27-2022

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**Other Treatments Being Looked At...**

- Ritonavir boosted nirmatrelvir
- Anecdotal reports from individuals who have taken this
- At present, only indicated for those infected with acute COVID within 5 days of onset and at increased risk
- Pfizer has being pushed to investigate further; study has been started
- Concern re: rebound after completing treatment

<https://www.medscape.com/viewarticle/973538> accessed 07-27-2022

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**Ritonavir-boosted nirmatrelvir**

- EUA approval: The treatment of mild-to-moderate COVID-19 in adults and children (12 years of age and older weighing at least 88 pounds [40 kg]) with a positive test for the virus that causes COVID-19, and who are at high risk for progression to severe COVID-19, including hospitalization or death.

<https://www.covid19oralrx-hcp.com/> accessed 01-19-2022

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**Ritonavir-boosted nirmatrelvir**

- Class:
  - Nirmatrelvir is a SARS-CoV-2 main protease (Mpro) inhibitor
    - Inhibits viral replication
  - Ritonavir is an HIV-1 protease inhibitor
- Study:
  - Phase 2/3, randomized, double-blind, placebo-controlled study in non-hospitalized symptomatic adult subjects with a laboratory confirmed diagnosis of SARS-CoV-2 infection

<https://www.covid19oralrx-hcp.com/> accessed 01-19-2022

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**Covid-related death or hospitalization within 28 days**

• Efficacy:

Placebo (n=1046)	Drug (n=1039)
66	8

<https://www.covid19oralrx-hcp.com/> accessed 01-19-2022

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**Ritonavir-boosted nirmatrelvir**

• Dosing:

- Initiate as soon as possible after COVID-19 diagnosis and within 5 days of symptom onset
- Dosed with or without food
- 300 mg nirmatrelvir (two 150 mg tablets) with 100 mg ritonavir (one 100 mg tablet), with all three tablets taken together twice daily for 5 days
- If the patient misses a dose within 8 hours of the time it is usually taken, the patient should take it as soon as possible and resume the normal dosing schedule

<https://www.covid19oralrx-hcp.com/> accessed 01-19-2022

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**Ritonavir-boosted nirmatrelvir**

• Warnings and precautions:

- Dose reduction for moderate renal impairment (eGFR  $\geq$ 30 to 60 mL/min)
  - 150 mg nirmatrelvir (one 150 mg tablet) with 100 mg ritonavir (one 100 mg tablet), with both tablets taken together twice daily for 5 days
- Not recommended for patients with eGFR < 30 mL/min
- Not recommended for those with severe liver disease

<https://www.covid19oralrx-hcp.com/> accessed 01-19-2022

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### Numerous Drug Interactions

- Avoid with the following medications (CY3A cleared):
  - Alpha1-adrenoreceptor antagonist: alfuzosin
  - Analgesics: pethidine, piroxicam, propoxyphene
  - Antianginal: ranolazine
  - Antiarrhythmic: amiodarone, dronedarone, flecainide, propafenone, quinidine
  - Anti-gout: colchicine
  - Antipsychotics: lurasidone, pimozide, clozapine
  - Ergot derivatives: dihydroergotamine, ergotamine, methylergonovine
  - HMG-CoA reductase inhibitors: lovastatin, simvastatin
  - PDE5 inhibitor: sildenafil (Revatio®) when used for pulmonary arterial hypertension (PAH)
  - Sedative/hypnotics: triazolam, oral midazolam

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### CYP 3A Inducers

- Will result in decrease in levels and can result in reduced efficacy and drug failure
  - Anticancer drugs: apalutamide
  - Anticonvulsant: carbamazepine, phenobarbital, phenytoin
  - Antimycobacterials: rifampin
  - Herbal products: St. John's Wort (*hypericum perforatum*)

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### Ritonavir-boosted nirmatrelvir

- Adverse events (drug vs. placebo):
  - Dysgeusia (6% vs. <1%)
  - Diarrhea (3% vs. 2%)
  - Hypertension (1% vs. < 1%)
  - Myalgias (1% vs. < 1%)
  - 2% in the treatment group discontinued due to an adverse event; 4% in the placebo arm

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**NIH Studies**

- Recover Studies
  - Slow to enroll
- If you have patients who have PASC and are interested in participating, you can refer them to:
  - <https://recovercovid.org/>
  - <https://med.stanford.edu/news/all-news/2021/11/long-covid-research-initiative.html> (Stanford Medicine is enrolling 900 people in this NIH funded study)

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**Most common referrals**

- Physical therapy
- Occupational therapy
- Pulmonary rehabilitation
- Mental health services
- Cardiology
- Pulmonology

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**Physiatrist may be very helpful**

- Provide recommendations for increasing activity
- Coordination of care
- Goal of rehab and reintroduction to work-force or activities

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### Evidence-based interventions

- Graduated return to exercise/activity
- Pulmonary rehab to improve breathing and strengthen respiratory muscles
- Psychological support/interventions

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8146298/> accessed 07-01-2021  
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### Return to sports guidance

- Asymptomatic or mildly symptomatic COVID-19 illness**
  - Phone/telehealth visit should be performed
  - Myocarditis risk in this group: 0.5%-3%
  - Ask about: chest pain, SOB, palpitations, syncope; if any positive – office visit with consideration of an ECG
- Moderate symptoms and no multisystem inflammatory syndrome in children (MIS-C)**
  - In-person visit; comprehensive history and PE, review AHA 14-element screening evaluation for cardiac conditions, and ECG
- Severe symptoms or MIS-C**
  - No exercise x 3 – 6 months
  - Cardiology to clear

<https://www.aappublications.org/news/2021/06/10/sportsguidance061021> accessed 07-01-2021  
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### Follow-up Visits

- Recommended every 2-3 months until stable or resolution
- Evidence-based vitamin supplementation may be beneficial i.e. vitamin D, vitamin B12, if needed
- Manage insomnia and sleep deficits
- Mental health concerns must be addressed
- SDOH are important:
  - May have been out of work
  - Unable to afford home, food, utilities

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**Post Acute Covid Clinics**

- Numerous clinics are being developed across the country
- Multi-disciplinary clinicians/specialty
  - NPs, PAs, MDs, Pulmonology, Cardiology, Physical Medicine, Psychiatry, Neurology, Physical Therapy, Occupational Therapy
- Many are closely studying their population and outcomes
- Expect significant amount of data over the next 1-2 years

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**Resources**

Long Covid Alliance  
(<https://longcovidalliance.org/>)

Long Covid Kids  
(<https://www.longcovidkids.org/>)

Center for Disease Control  
([www.cdc.gov](http://www.cdc.gov))

American Academy of Pediatrics  
([www.aap.org](http://www.aap.org))

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**THANK YOU FOR  
YOUR TIME AND  
ATTENTION!**



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