

# Understanding Post-COVID Syndrome

Having COVID-19 can cause long-term health effects.

## Introduction

One of the biggest challenges from a SARS-CoV-2 (COVID-19) infection are the long-term health effects, called post-COVID syndrome.<sup>1,2</sup>

Most recover from COVID-19 in a couple of weeks. However, unlike the common cold or flu, many people continue to experience symptoms or develop new ones long after the initial infection.<sup>3</sup> These symptoms can be continuous or come and go.<sup>4</sup> After an initial diagnosis with SARS-CoV-2, if symptoms persist for longer than 4 weeks, the culprit could be post-COVID syndrome.<sup>5</sup>

This document provides a summary of the post-COVID syndrome condition, based on current clinical research findings, including symptoms, testing, and patient resources.

### Other Names for Post-COVID Syndrome<sup>6</sup>

- Long COVID
- Long-haul COVID
- Long-term effects of COVID
- Post-acute COVID-19
- Post-acute COVID syndrome
- PASC, or post-acute sequelae of SARS-CoV-2 infection
- Late sequelae
- Chronic COVID

## What do scientists know about Post-COVID Syndrome?

Clinicians and researchers are still learning about post-COVID syndrome, including what causes it and how often it occurs. Public health officials around the world are trying to figure out what is causing post-COVID syndrome. Several leading theories about how post-COVID syndrome works include:<sup>6,7</sup>

- Organ damage arising from the initial infection
- Immune system dysfunction, resulting in increased and unresolved inflammation
- Activation of new or exacerbation of existing autoimmune disease
- Reactivation of dormant, normally harmless viruses contracted years earlier, like Epstein-Barr virus

Researchers are actively studying how often post-COVID syndrome occurs, causes, risk factors, duration, and severity of symptoms after a SARS-CoV-2 infection. Future studies are needed to understand each symptom individually and together with others.

## What does Post-COVID Syndrome look like?

### ● Symptoms

Post-COVID syndrome is a term that describes illness in people who report lasting effects of a SARS-CoV-2 infection. The ongoing nature of this illness can negatively impact the quality of life for the affected individual.<sup>8</sup>

Post-COVID syndrome looks different from person to person, but the most prevalent symptom is chronic fatigue.<sup>7</sup> Often mistaken for tiredness, fatigue in the context of post-COVID syndrome can be described as utter exhaustion that affects daily living. Post-COVID fatigue can be accompanied by cognitive

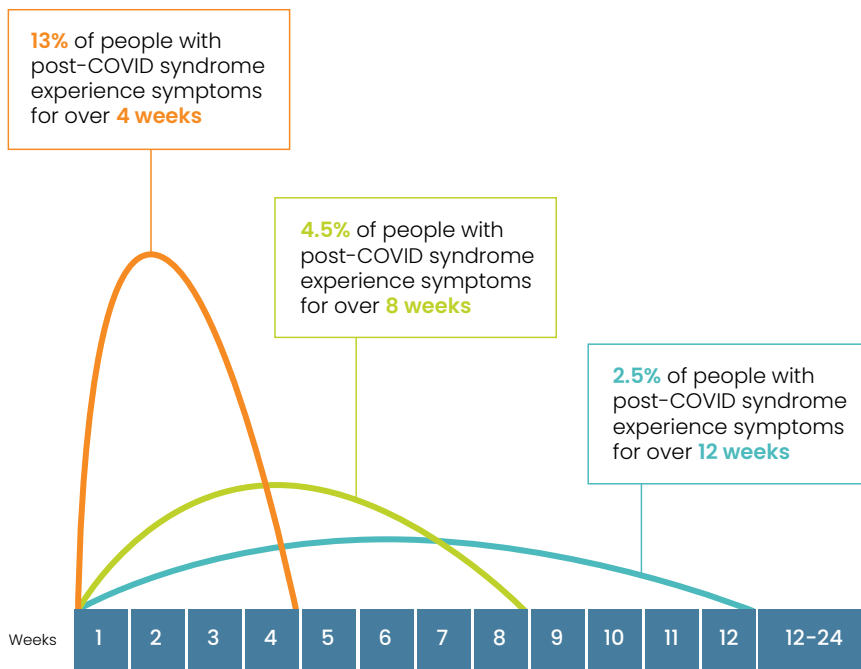


dysfunction symptoms, such as poor memory, difficulty concentrating, anxiety, depression, and/or overall “brain fog.”<sup>9</sup> In addition, chest pains, breathlessness, and muscle aches/weakness are also common.<sup>9</sup>

### ● Population

Post-COVID syndrome can affect COVID-19 survivors at all levels of disease severity, including younger adults, children, and those individuals who have not been hospitalized.<sup>6</sup>

Reportedly, 10–30% of individuals who had COVID-19, had at least one persistent symptom present 6 months after their infection was cleared.<sup>9</sup> Of these individuals, symptoms can last for varying amounts of time, as indicated in the chart below:<sup>10</sup>



Patients with post-COVID syndrome are not infectious. However, a person with post-COVID syndrome can have a secondary infection, like RSV or influenza. Therefore, it is important to continue to exercise care in preventive measures like wearing a mask, staying up-to-date on vaccines, and social distancing.

### A Checklist of Post-COVID Syndrome Symptoms<sup>5,8,10,11</sup>

- Fatigue
- Headaches
- Attention difficulties
- Depression
- Anxiety
- Brain fog
- Cognitive issues
- Memory loss
- Sleep apnea
- Hair loss
- Difficulty breathing
- Loss of smell
- Loss of taste
- Cough
- Rapid breathing/panting
- Chest pain/discomfort
- Nausea
- Hearing loss or tinnitus
- Joint pain
- Fever
- Dizziness
- Resting heart rate increase
- Chills
- Musculoskeletal pain
- Weight loss
- Hypertension
- Digestive disorders
- Limb swelling
- Numbness/tingling
- Post-exertional fatigue
- Muscle weakness

## Who gets post-COVID syndrome?

Although post-COVID syndrome is poorly understood, clinical research suggests that having more than 5 symptoms in the first week of COVID-19 is a strong risk factor for developing post-COVID syndrome.<sup>10</sup>







Post-COVID syndrome can affect:

- Asymptomatic or mildly symptomatic people
- People with preexisting conditions
- Healthy people without previously known health conditions
- Communities where access to quality healthcare is limited<sup>12</sup>
- Although rare, post-COVID syndrome has been documented in children<sup>13</sup>
- People who experience higher instances of post-COVID syndrome include:
  - Vulnerable groups characterized by racial/ethnic disparities<sup>14</sup>
  - Healthcare workers

The potentially long-lasting problems from COVID-19 make it even more important to reduce the spread of COVID-19. Anecdotal evidence suggests that the COVID-19 vaccine may help lessen lingering COVID symptoms. Be sure to follow precautions, such as wearing masks, social distancing, avoiding crowds, getting a vaccine when available, and washing your hands.

## Testing for post-COVID syndrome

There is currently no diagnostic test for post-COVID syndrome. However, COVID-19 tests can determine an active or past infection. A positive COVID-19 test is not required to diagnosis post-COVID syndrome. Testing for a reinfection of COVID-19 should be considered for a person with new or worsening symptoms.<sup>15</sup>

	 <b>MOLECULAR TEST</b>	 <b>ANTIBODY TEST</b>
Purpose of test	 To determine active infection	 To determine an immune response to COVID-19
Additional names	<ul style="list-style-type: none"> <li>• Nucleic acid amplification test (NAAT)</li> <li>• Polymerase chain reaction (PCR) test</li> <li>• Transcription Mediated Amplification (TMA) Test</li> </ul>	<ul style="list-style-type: none"> <li>• Serology test</li> </ul>
Specimen type	 <b>Nasopharyngeal swab</b>	 <b>Blood test</b>
What do results mean?	<ul style="list-style-type: none"> <li>• Majority of people with post-COVID syndrome test negative with a molecular test, indicating microbiological recovery (there is no active infection taking place)</li> <li>• A positive test may indicate the need to quarantine in order to prevent infecting others</li> </ul>	<ul style="list-style-type: none"> <li>• Should be collected at least 14-21 days after the onset of symptoms or known exposure</li> <li>• Two types of antibody tests:           <ul style="list-style-type: none"> <li>• <b>Spike Protein Antibody Test:</b> If positive, may indicate prior infection, or an immune response to COVID-19 vaccination. There are no FDA authorized tests for individuals who have received a COVID-19 vaccination, and performance characteristics or clinical significance of authorized antibody tests have not been established.</li> <li>• <b>Nucleocapsid Protein Antibody Test:</b> If positive, indicates a prior or recent infection.</li> </ul> </li> </ul>

## What tests can be done to help evaluate post-COVID syndrome?

The CDC has provided interim guidance on caring for patients with post-COVID conditions, including patient-centered care to improve the quality of life in affected individuals. For example, healthcare professionals and patients are encouraged to set achievable goals through shared decision-making and by focusing on specific symptoms and conditions. Guidance for healthcare professionals will likely evolve over time as clinical research continues to make advances in our understanding of COVID-19. These guidelines are to evaluate patients for any non-COVID conditions that are treatable and manageable.

### Basic diagnostic lab testing:

- CBC, electrolytes, renal function
- Liver function
- Inflammatory markers
- Thyroids
- Vitamin deficiencies

### Specialized diagnostic lab testing:

- Rheumatological conditions
- Coagulation disorder
- Myocardial injury
- Differentiate symptoms – cardiac or pulmonary
- Vitamin deficiencies

### Advanced testing:

- Pulmonary imaging
- Echocardiogram & electrocardiogram

## Conclusion

This document presents the current understanding of post-COVID syndrome, a new and puzzling condition that affects COVID-19 survivors, regardless of initial disease severity or age. While symptoms vary from person to person, the hallmark of post-COVID syndrome are the lingering symptoms that last more than 4 weeks after a COVID-19 infection.

### ● Additional resources & support

It can be scary navigating a disease that even the medical community is still researching. If you or your loved ones are experiencing the long-term health effects of COVID-19, the resources below may be helpful in understanding and navigating the condition.

ORGANIZATION	LOCATION
<b>Survivor Corps</b>	Global
<b>Long COVID Alliance</b>	Global
<b>RECOVER, an initiative from the National Institutes of Health (NIH)</b>	National
<b>George Washington University: Covid-19 Recovery Center</b>	DC
<b>Emory Executive Park Post-COVID Clinic and Grady Memorial Hospital Post-COVID Clinic</b>	GA
<b>Johns Hopkins Post-Acute COVID-19 Team (PACT)</b>	Maryland
<b>Kennedy Krieger Institute – Pediatric Post COVID-19 Rehabilitation Clinic</b>	Maryland
<b>Beth Israel Deaconess Medical Center Critical Illness and COVID-19 Survivorship Program</b>	Massachusetts
<b>Boston Children’s Hospital – Post-COVID clinic</b>	Massachusetts
<b>Brigham and Women’s Hospital COVID Recovery Center</b>	Massachusetts
<b>CS Mott Children’s Hospital – University of Michigan Health – Pediatric Post-COVID Syndrome Clinic</b>	Michigan
<b>University of Michigan Health – Multidisciplinary Post COVID-19 Clinic (COVID-19 Long Haul Clinic)</b>	Michigan
<b>Virtua Health Care After COVID Program</b>	New Jersey & National via telehealth
<b>Mount Sinai – Center for Post-COVID Care</b>	New York

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