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What Do We Know About Long COVID?

COVID-19 is a respiratory disease caused by an infection with the SARS-CoV-2 virus. The disease causes symptoms such as fever, cough, and shortness of breath. Symptoms can feel much like a cold, flu, or pneumonia and can range from mild to severe.

Most people who get COVID-19 recover within a few days or weeks. However, for unknown reasons, some people have symptoms that linger for much longer. Other people seem to recover from the initial infection but experience new or recurring symptoms later. Long-lasting symptoms that continue or develop four weeks or more after having COVID-19 are known as Long COVID.

Doctors and researchers use several different names for Long COVID. You may have also heard it called long-haul COVID, post-acute COVID-19, post-acute sequelae of SARS CoV-2 infection (PASC), post-COVID conditions (PCC), long-term effects of COVID, or chronic COVID.

What are the symptoms of Long COVID?

People with Long COVID may experience a wide range of symptoms. The most common symptoms in older adults include:

- Extreme tiredness or lack of energy (fatigue)
- Trouble breathing or shortness of breath
- Coughing
- Joint pain and weakness
- High blood pressure
- Changes in smell or taste
- Difficulty thinking, concentrating, and remembering (you may see this described as “brain fog”)

Other possible symptoms include heart problems, headaches, dizziness or vertigo, sleep disorders, mental health disorders, and digestive upset.

The health problems associated with Long COVID can be mild or severe. It is not yet known how long symptoms usually last, although it appears they can linger for months or even years. These health issues can significantly affect

a person's quality of life, including their ability to work, care for themselves and others, and participate in their communities.

Because Long COVID has such a wide range of possible symptoms, it's not always easy to diagnose, and few diagnostic tools or tests are currently available. Long COVID can be particularly challenging to recognize in older adults, who are more likely to have existing health problems. It can be difficult to tell whether certain symptoms, such as fatigue and shortness of breath, are related to Long COVID or another health condition. Even in older adults without underlying health conditions, the symptoms of Long COVID can be mistaken for "normal" signs of aging.

In some older people, Long COVID seems to make existing chronic diseases worse. People with disorders such as heart failure, lung disease, or dementia may develop more serious symptoms of those conditions after having COVID-19.

How common is Long COVID, and who is at greatest risk?

As of 2023, more than 650 million people worldwide have had COVID-19. Because the symptoms of Long COVID are so varied, it's difficult to estimate how many of these individuals went on to develop lasting health problems related to the disease. However, it is likely that many millions of people have experienced Long COVID.

Some, but not all, studies have shown that the risk of Long COVID increases with age. Among people who have had COVID-19, about one in four adults over age 65 (compared with one in five younger adults) have developed at least one long-term health issue, according to estimates from the Centers for Disease Control and Prevention (CDC). Another large study found an even higher incidence of Long COVID in older people: Almost one in three people over age 65 with COVID-19 sought medical care for new or ongoing symptoms several weeks after their initial illness. However, other research (such as this survey from the CDC) has suggested that the risk of Long COVID in older adults is the same as or lower than in other age groups.

Factors that increase the risk of Long COVID include:

- Underlying health conditions, such as type 2 diabetes
- Having been hospitalized for COVID-19
- Not being fully vaccinated for COVID-19

The risk of developing Long COVID isn't necessarily related to the severity of a person's COVID-19 symptoms. According to the CDC, Long COVID can occur in people who had mild COVID-19 illness, or even in those who had no symptoms or never knew they were infected. However, Long COVID occurs more often in people who were very sick with COVID-19.

Health inequities increase the chance of developing many health conditions, including Long COVID. Some people are at greater risk based on where they live or work, their social or economic status, or unequal access to needed health care. Scientists are investigating the factors that make certain groups of people more likely than others to develop Long COVID.

Is Long COVID associated with Alzheimer's disease and related dementias?

Many symptoms of Long COVID — fatigue, loss of smell or taste, and difficulty concentrating, among others — result from the effects of the SARS-CoV-2 virus on the brain. Based on these symptoms, scientists suspect that COVID-19 might also increase a person's chance of developing another brain disorder, such as Alzheimer's disease or a related dementia. Infection with SARS-CoV-2 appears to trigger immune system activity and other changes in the brain that cause brain cells to malfunction. Some of these changes are similar to those seen in Alzheimer's and

related dementias. However, not enough information is available to say for certain whether these brain disorders can be caused by COVID-19.

Researchers are also studying the long-term effects of COVID-19 in people who already have Alzheimer's or a related dementia. Studies have shown that, among people who get COVID-19, those with dementia are significantly more likely to be hospitalized and to die within six months than those without dementia. COVID-19 may also lead to new symptoms in people with dementia or make existing symptoms worsen more quickly. Scientists are studying why COVID-19 seems to be particularly harmful for people living with dementia.

What have researchers learned about the causes of Long COVID?

It is unclear why some people develop long-lasting symptoms after having COVID-19, while other people recover completely. Understanding the causes of Long COVID will be critical for finding ways to prevent, detect, and treat its symptoms.

Scientists are studying the long-term effects of SARS-CoV-2 infection in the body. Any of these effects could cause ongoing damage to the body's organs and tissues, even after the initial viral infection is over. These are some of the biological changes that may help explain the symptoms of Long COVID:

- The SARS-CoV-2 virus can continue to damage organs and tissues directly if it remains inside cells and interferes with their function.
- The virus may trigger an aggressive response from the immune system, including a severe reaction called a cytokine storm. While the immune system normally protects the body, an excessive immune reaction can damage cells instead of helping them.
- SARS-CoV-2 might reactivate other disease-causing viruses, such as the Epstein-Barr virus, that were present in the body but not causing any symptoms before the person developed COVID-19.
- The SARS-CoV-2 virus may cause tiny blood clots (called microclots) to form in small blood vessels, which limits the flow of blood and reduces the amount of oxygen that can reach organs and tissues.
- When SARS-CoV-2 damages cells in the lungs, it causes breathing problems that can also reduce the amount of oxygen in the blood.

These factors may also contribute to the symptoms of Long COVID:

- Having COVID-19 can bring to light existing health problems that might not have been noticeable before or worsen the symptoms of a known health condition.
- People who require intensive care for any serious illness, including COVID-19, are more likely to develop weakness, brain and mental health disorders, and other long-term health issues after they leave the hospital.
- Social challenges related to COVID-19, such as isolation and limited access to regular health care, may also underlie some aspects of Long COVID.

To learn more about the latest scientific studies about Long COVID, explore this search of the biomedical literature via PubMed.gov.

Can Long COVID be prevented?

The best way to prevent Long COVID is to avoid getting COVID-19 in the first place. And the most effective way to reduce your risk is to stay up to date with your COVID-19 vaccines, including boosters. People who experience a COVID-19 infection despite being vaccinated are less likely to develop symptoms of Long COVID, compared with people who are not fully vaccinated. And if they do get Long COVID, their symptoms may be milder.

Currently, COVID-19 vaccines and boosters are free and widely available for most people. Visit Vaccines.gov to find a vaccine location near you.

Are there treatments for Long COVID?

Because Long COVID encompasses a variety of symptoms affecting many parts of the body, there is no single treatment approach that works best for everyone. Health care professionals develop personalized treatment plans based on each patient's symptoms and overall health. The CDC provides a list of tips for people with Long COVID to help them prepare for an appointment with a health care provider.

Some symptoms of Long COVID, such as fatigue and shortness of breath, can be frustrating to live with and difficult to treat. It may take more than one appointment, possibly with multiple health care providers, to evaluate symptoms and find effective ways to manage them.

Find out from your health care provider which treatments they recommend. Potential approaches to treating and managing Long COVID may include:

- Medications, such as steroids or anti-inflammatory drugs, for specific symptoms
- Breathing exercises
- Physical and occupational therapy
- Plans for a gradual return to exercise
- Changes in diet or nutritional supplements
- Recommendations for improving sleep
- Psychological support, such as mental health counseling

Health care providers can also help connect people with Long COVID to resources in their community, including support groups, financial assistance, and help for caregivers.

Is NIH conducting and funding research on Long COVID?

NIH launched the RECOVER (Researching COVID to Enhance Recovery) initiative to better understand the long-term effects of Long COVID. The goal is to learn better ways to prevent, test for, and treat Long COVID in the future.

RECOVER is designed to answer questions including:

- What are the possible new or ongoing health problems that can occur after COVID-19, and how long do these conditions last?
- How common is Long COVID? Why does it affect some people and not others?
- What factors increase the risk of developing Long COVID? Are there particular molecules (called biomarkers) in the blood or other tissues that can be used to determine a person's risk?
- What are the underlying biological causes of Long COVID?
- Can infection with the SARS-CoV-2 virus trigger changes in the body that increase the risk of other conditions, such as Alzheimer's or a related dementia?

NIA, as part of NIH, is also funding research on the effects of Long COVID in older adults. These studies are investigating aspects of the disease such as:

- The long-lasting effects of COVID-19 on the brain
- How Long COVID affects people living with Alzheimer's
- The impact of Long COVID on the management of other chronic diseases
- Whether certain medications work to treat Long COVID in older adults

- Risk factors and biological causes of Long COVID in specific populations

The National Research Action Plan on Long COVID summarizes the federal government's priorities for research in this area. You can also explore NIA's clinical trials information and visit ClinicalTrials.gov to learn more about ongoing research.

How can I participate in Long COVID research?

To understand how Long COVID affects different groups, scientists need people from all races and ethnic groups, genders, and ages to participate in research. As of 2023, more than 10,000 adults have already enrolled in NIH RECOVER study sites across the United States. Visit the RECOVER website to learn more about participating and use the searchable map to find a study site near you.

Many additional research studies are underway to learn more about Long COVID. On ClinicalTrials.gov, you can find a list of government-funded studies of Long COVID that are currently enrolling older adults. Visit NIA's Clinical Trials page for general information about participating in research studies.

Help for people with Long COVID

Additional support, resources, and services may be available to help people with Long COVID. These are provided by federal, state, and local governments, as well as community-based organizations. Explore the websites below to learn more about these services:

- Services and Supports for Longer-Term Effects of COVID-19 (PDF, 261K): A catalog developed by the U.S. Department of Health and Human Services (HHS) listing programs that can help individuals with Long COVID and their families and caregivers
- How ACL's Disability and Aging Networks Can Help People With Long COVID (PDF, 959K): A guide to community-based resources for people with Long COVID from the HHS Administration for Community Living (ACL)
- COVID-19 Resources for Older Adults and Caregivers: A list of COVID-19 resources and services from the federal government

You may also be interested in

- Finding COVID-19 resources for older adults and caregivers
- Reading about vaccinations and older adults
- Learning more about clinical trials and studies

For more information about COVID-19 and Long COVID

NIA Information Resource Center
800-222-2225
niaic@nia.nih.gov
www.nia.nih.gov

Centers for Disease Control and Prevention (CDC)
COVID-19
800-232-4636
www.cdc.gov/coronavirus/2019-nCoV/

Vaccines.gov
800-232-0233
888-720-7489 (TTY)
www.vaccines.gov

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Return to top