



LONG COVID

Fact Sheets
& Resources

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LONG COVID

What Is Long COVID?

After a COVID infection, people may experience ongoing or new symptoms due to the damage that the virus has done to the body. This occurs even in those who have mild or asymptomatic infections and in young and healthy adults and children. The damage affects the heart, brain, kidney, immune system, and other organs.

How many people are affected?

Early estimates varied widely, especially since early studies often looked at only a few of the many long COVID symptoms. However, recent large meta-analyses and systematic reviews report similar prevalence figures of around 1 in 3 of those with registered COVID-19 overall, and around 50% of those hospitalized. Since many symptomatic studies don't include a control group, estimates based upon symptoms are still somewhat uncertain. This uncertainty generally doesn't apply to organ damage studies where many show higher than 50% prevalence. For example, impacts on cognitive function (IQ) happen even for those who have mild disease and do not report that they have long COVID symptoms.

Do children get long COVID?

Yes, many studies report that children have about a 10-20% rate of long COVID symptoms. Notably, a review of 21 studies, corresponding to more than 80,000 children and adolescents, show that the prevalence of long COVID is 25%. While the general conclusions are converging—i.e., children can experience the wide range of debilitating symptoms that are found in adults—the exact nature of the studies' results depend on which symptoms are measured.

What are the symptoms?

There are many symptoms, the most common of which include severe tiredness, shortness of breath, worsening of symptoms after activities, memory problems, "brain fog," heart palpitations, chest pain, headaches, mood and sleep disturbances, muscle weakness, and loss or change of smell and taste. Blood clotting is a common problem.

What are the consequences?

There is a wide range of severity with some having mild symptoms, while others are unable to continue regular activities such as walking or climbing stairs, or returning to their previous work. Normal life is often disrupted.

What does the organ damage lead to?

The organ damage can lead to strokes, heart attacks or heart failure, pulmonary embolism, kidney failure, or liver injury, to mention some. The immune system itself is harmed, affecting multiple cell types and impairing immune function over time as well as causing signs of several different auto-immune diseases. This dramatically increases the impact of COVID on those who were infected. Excess burden of death from all causes in the first 6 months after the acute phase of a COVID infection have been reported to be 2.0% in non-vaccinated and 1.3% in those vaccinated (breakthrough cases).

How is it related to other chronic diseases?

Connections have been found to the biology of autoimmune diseases, multiple sclerosis, Alzheimer's, Parkinson's, and harmful effects similar to the impacts of chemotherapy for cancer.



For detailed citations and additional information and resources:

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ADDITIONAL RESOURCES

For links to references, resources and community support:

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How long does it last?

Symptoms often last for months and there are many people who have had long COVID symptoms since the beginning of the pandemic 2 years ago. For many, the symptoms improve over time, but for others they can come and go, and for some they even get worse. Among patients with symptoms 2 months after the acute illness, 85% still reported symptoms after one year. Experience with SARS1, the most closely related disease, indicates debilitating symptoms can last for many years [24].

What causes long COVID?

The virus that causes COVID enters cells that have a certain receptor (ACE2) and often damages those cells. The cells around blood vessels have many such receptors. In many ways, COVID is a vascular disease more than a respiratory (lung) disease (we think about it as a lung disease because it often starts there). The virus can also enter other cells in different organs and cause damage, as can the process of inflammation itself.

What have scientists learned about the mechanisms of long COVID?

Researchers are identifying the multiple specific ways that long COVID symptoms and organ damage arise. These include: persistent viral replication, direct organ damage, auto-immune disease, reactivation of “zombie” virus fragments from ancestral infections with other viruses, and others. For example, the virus (SARS-CoV-2) has been found in the gut in patients with long COVID symptoms 10 months after the acute illness.

Do vaccines prevent long COVID?

Vaccines may provide some but limited prevention. While some studies have found that vaccination reduces the risk of getting long COVID after breakthrough infections by about 50%, a new, large study found only 15% protection, and others find that it has little effect on many consequences of the disease.

Is it possible to have long COVID without realizing it?

Since long COVID may start after an initial recovery from acute COVID-19, which may be asymptomatic, and testing is scarce in many regions, people may suffer from long COVID without being aware of the link to a previous COVID-19 illness.

What can we do about long COVID?

Our actions can make a great difference, helping individuals recognize when their symptoms may be due to long COVID, recognizing and supporting those who have long COVID—enabling them to support themselves by work flexibility and supporting them in other daily activities, supporting the study of potential approaches to prevention and treatments, and preventing infections and reinfections in ourselves and others that lead to more cases of long COVID.

TOGETHER WE HAVE THE POWER TO MAKE A DIFFERENCE

The WHN is a global community devoted to protecting health and minimizing harm to individuals and society in the face of the COVID-19 pandemic. We are a people’s task force promoting safety and support for everyone. We are committed to ending the pandemic and promoting a healthier, more resilient world.



For a list of long COVID organizations/advocacy groups:

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World Health Network **LONG COVID** Clinician Resources

Key Points

- Clinicians need access to high quality resources for information on how to evaluate and treat this new but suddenly very prevalent condition.
- There are good reasons to take long-haulers' complaints seriously. COVID-19 is a complex, systemic, multiorgan disease that starts in the respiratory system.
- We have collected links to quality resources on how to best handle the needs of people suffering from lingering symptoms after COVID-19 infections.

We begin by reminding clinicians that, as repeated by the leading scientists and clinicians in the field, there are good reasons to take long-haulers' complaints seriously.

COVID-19 is a complex, systemic, multiorgan disease that starts in the respiratory system. This understanding is essential when we as clinicians meet patients reporting some of the over 200 different symptoms from nine different organ systems that have been registered as associated with long COVID.

Long COVID is not only a challenge for the long-haulers themselves: Clinicians tasked with assessing and managing long COVID need access to high quality resources for information on how to evaluate and treat this new but suddenly very prevalent condition. Unfortunately, although efforts are underway, both research and development of clinical guidelines take time that the patients and clinicians don't have.

This is a field in constant development. The World Health Network website is updated regularly as new resources become available. Please do not hesitate to contact us if you have information that you think we should add.

Post-COVID Syndrome

From the American Academy of Family Physicians:

"Post-COVID is an umbrella term used by the CDC and others to classify the wide range of health consequences that are present four or more weeks after infection with SARS-CoV-2. It is also called several different names in the media and research articles such as long COVID, long-haul COVID, chronic COVID, and others. **Note that documentation of a positive COVID-19 test is not needed as patients can develop Post-COVID Syndrome following an asymptomatic infection.**"



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RESOURCES

The NICE guideline on long COVID: COVID-19 rapid guideline: managing the long-term effects of COVID-19

[This guideline covers identifying, assessing, and managing the long-term effects of COVID-19.](#)

It makes recommendations about care in all healthcare settings for adults, children, and young people who have new or ongoing symptoms 4 weeks or more after the start of acute COVID-19. It also includes advice on organizing services for long COVID. The National Institute for Clinical Excellence, updated Nov. 2021.

Societat Catalana de Medicina Familiar i Comunitaria Assoc. (CAMFIC) long COVID-19 Study Group: Long Covid-19: Proposed Primary Care Clinical Guidelines for Diagnosis and Disease Management (April 2021).

The main objective of these clinical practice [guidelines is to identify patients with signs and symptoms of long COVID in primary care through a protocolized diagnostic process](#) that studies possible etiologies and establishes an accurate differential diagnosis. The guidelines have been developed pragmatically by compiling early reports and studies, including the few more comprehensive studies published so far on long COVID—a wide mix of editorials and expert opinions, press releases, and the contributors' clinical experience.

UpToDate

[COVID-19: Evaluation and management of adults with persistent symptoms following acute illness](#) ("Long COVID"), UpToDate is an evidence-based clinical decision support resource.

CDC

[Interim Guidance on Evaluating and Caring for Patients with Post-COVID Conditions.](#) Detailed interim guidance for healthcare providers. Centers for Disease Control and Prevention (CDC), June 2021.

2022 ACC Expert Consensus Decision Pathway on Cardiovascular Sequelae of COVID-19 in Adults

Myocarditis and Other Myocardial Involvement, Post-Acute Sequelae of SARS-CoV-2 Infection, and Return to Play: [A Report of the American College of Cardiology Solution Set Oversight Committee.](#) Evaluation of cardiovascular symptoms

ADDITIONAL RESOURCES

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after SARS-CoV-2 infection is imperative, and this document focuses on conditions that clinicians may struggle to diagnose and manage—myocarditis and PASC—while providing guidance on return to play (RTP). Guidance based on scientific evidence and expert opinion after the ACC's Cardiovascular Conundrums in the COVID-19 Era Roundtable, May 2021. The American College of Cardiology (ACC), 2022.

AAPM&R Long COVID Cardiovascular Complications Guidance Statement Released

[Guidance for diagnosing and treating long COVID cardiovascular complications.](#) The statement was developed by the The American Academy of Physical Medicine and Rehabilitation (AAPM&R) PASC Collaborative, a multidisciplinary group of physicians, clinicians, and patient advocates convened to address the pressing need for guidance in caring for patients with long COVID.

National Comprehensive Guidelines For Management Of Post-Covid Sequelae

[Document](#) to guide doctors on managing post-COVID complications affecting cardiovascular, gastrointestinal, nephrological, neurological and respiratory systems. Ministry of Health and Family Welfare, Government of India.

Review

Tripathi AK, Pinto LM. Long COVID: "[And the fire rages on](#)". Lung India 2021;38:564-70. (Written Feb 2021)

Post-COVID Syndrome

[Supporting family physicians as they see patients with health issues after infection with COVID-19.](#) Information and support for the clinician. Contains links to resources including education programs with webinar and video series. From The American Academy of Family Physicians Foundation, 2022.



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LONG COVID Societal Implications

Key Points

- Long COVID affects a considerable proportion of COVID survivors, many are strongly impacted or even disabled in their day-to-day activities.
- The large array of long-term bodily, psychiatric, and neurologic symptoms are of a kind that impact both the individual's and society's functioning.
- The societal and economic impact of long COVID may be one of modern society's major challenges in the years to come.

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It has become clear that long COVID affects a considerable proportion of COVID survivors. While people who have ongoing symptoms of long COVID may adjust their expectations of their own health and abilities, a significant proportion find day-to-day activities are strongly impacted, and many are disabled at work and in home activities.

Several recent, large studies report around one in three who have been infected experience long COVID symptoms, including people with mild or asymptomatic acute infections [1]. Given that an estimated 60% of the US population [2] have been infected, and similarly high proportions in other countries [3], a large number of people around the world are experiencing some degree of long COVID symptoms.

The severity of an individual's symptoms and its impact on their work and home lives vary. Studies that focus on more severe long COVID cases still find a substantial percentage are impacted. By early July 2022, data from the Office of National Statistics reported that long COVID symptoms adversely affected the day-to-day activities of 1.3 million people in the UK. Of these, 369,000 (21%) reported that their abilities had been "limited a lot" [4]. All aspects of a person's life may be affected, and many are so profoundly disabled that they can no longer return to work or school, care for their families, or perform basic self-care.

Some people are at increased risk for long COVID or its effects because of where they live or work, or because they don't have access to healthcare. Health inequities may put people from racial or ethnic minority groups and with prior conditions or disabilities at greater risk for developing post-COVID



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conditions or being unable to support themselves or obtain care for their conditions once they have them.

Unfortunately, it is also clear that neither vaccination nor infection generates lasting immunity so that reinfections are occurring much more rapidly and having a more severe impact than many expected [5]. With new, increasingly transmissible and immunity evading variants, the number of COVID survivors and the number of people who have been infected multiple times is increasing. Vaccines give some, but far from full protection against long COVID [6], and although some reports show a smaller percentage of people get long COVID from Omicron than earlier variants [7], the sheer number of people infected and reinfected means a lot more people will experience long COVID going forward. Over time, some long COVID patients recover, but a large study reported that in those still experiencing symptoms two months after the acute illness, 85% were still not well after one year [4]. One study finds that half of those hospitalized still have at least one symptom two years later [8].

The large array of long-term bodily, psychiatric, and neurologic symptoms [9,10] are of a kind that impact both the individual's and society's functioning. In the following sections on family, healthcare, workplace, and the economy we discuss the implications of long COVID for society.

Family Systems

In addition to the consequences from the staggering COVID death toll, many families are disrupted by the consequences of the long-term disabilities and burden of long COVID. Although long COVID can affect anyone, studies imply that it disproportionately affects women, and those already socially and economically at risk, groups that often are unable to work remotely during the pandemic [11]. With long-term illness comes also the need for carers for those ill. This will often fall on family members; most countries have not had the resources to give families support, socially, emotionally, or financially, amid an ongoing pandemic.

Healthcare Systems

The pandemic has had dire effects on many health care workers after their lengthy efforts on the front line. Many were infected in the early days and many are now suffering from symptoms of long COVID and organ damage from the acute infection. In addition, many have been absent with acute COVID infections, especially during surges [12], adding to the burden of those still at work — in a workplace with massively increased workload. Consequently, burnout [13] has become a serious issue.

All of this has taken its toll on health care workers. Many countries have seen substantial reductions in the number of available health care workers, and more may be seen in the future. In the US, a study found that 40% of the nurses and 24% of the physicians had an intention to leave their practice within 2 years. In addition to long COVID disability, burnout, fear of exposure and its consequences, COVID-19-related anxiety/depression, and workload were predictors of intent to leave [14]. Projections made by the Association of American Medical Colleges (AAMC) have found that within a dozen years, the US will face a shortage of physicians by between 37,800 and 124,000 doctors [15]. Similar gaps are to be expected in other countries where COVID has been allowed to spread. This will have even greater consequences given the massive backlogs of unaddressed care in many countries after the first two years of pandemic, including implications for non-COVID patients as they may not be able to access timely, quality, and safe healthcare resources.

Into this scenario, the new and complex disease of long COVID makes its entry, with more than 200 identified symptoms [10]. Many symptoms related to long COVID are of a kind that requires advanced, non-routine diagnostics that until now most often have been handled by specialist centers and clinicians working with rare, systemic diseases; clinicians who often have had long wait lists even before the pandemic.

Thus, at this time, we are seeing an increasing need coupled with diminishing resources. The demand for highly specialized medical care from several medical specialties is increasing dramatically, at a point in time where the supply is lower.



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The discrepancy between the need for health care and the services that are offered and available is adding to the burden for those struggling with long-term symptoms. Many of the symptoms from long COVID are debilitating, but invisible from the outside. Similar to patients with ME/Chronic Fatigue Syndrome, many long COVID sufferers have had an experience of being ignored or minimized when seeking help. Long-haulers also face barriers to prove their illness to access disability benefits [16]. We hope that as science progresses, more knowledge is disseminated, and the effects of the symptoms from COVID are recognized, this will change.

Workplaces

Long COVID is also having an impact on the workforce [17,18] outside the healthcare system due to disabilities and sick leave. This is affecting a wide range of occupations and business sectors. During the pandemic, teachers have been especially at risk for COVID infections. Now, the prevalence of long COVID is among the greatest in those working in childcare, teaching and education, in addition to those working in social care and health care [19]. Both long COVID and burnout are consequences that can lead to a reduction in the number of available teachers going forward.

“Brain fog”, reduced memory, and impaired concentration are among symptoms that frequently persist after COVID infections. This may lead to loss of function in ways that are especially harmful for many activities in modern workplaces, including abilities to make plans and synthesize information. Of those still able to work, many will have an increased need for flexibility and adaptability at work for long periods to come, and some will need training and re-certifications to be able to stay in the workforce. According to a study from Mount Sinai Hospital in New York, those affected suffer from memory loss, inability to form new memories, and difficulty with speaking [20]. Dr. David Putrino, the Director of Rehabilitation Innovation at Mount Sinai, describes long COVID as “a very debilitating condition with serious cognitive conditions” [21].

This again may lead to loss of key employees or loss of trust in their capabilities. Many businesses and organizations face uncertainty as to who of their key employees and other workers will be available in the future. For knowledge-based organizations, this may severely impact production. For organizations such as the military, the loss in reliability of individual capability may lead to crucial strategic issues, if the affected are key personnel that are difficult to replace. In addition, the military may be impacted directly through a reduction in the number of individuals in the armed forces [22]. This may, consequently, affect the safety and security of nations.

Economy

In many countries, employers in different sectors are struggling to find workers, and long COVID plays an important role. The Brookings Institution has found that long COVID could account for 15% of unfilled jobs in the US [23], and in a recent survey, a quarter of UK employers cited long COVID as driving absences [24]. These effects may pose a threat to economic activity and its stability, adding to the otherwise uncertain economic climate. After work participation in the UK has fallen by 450,000 (1.3% of the labor force) due to a persistent rise in long-term sickness of around 320,000 people linked to the pandemic, the Bank of England now sees long COVID and the effects on public health and work participation as a very serious issue and notes that this problem cannot be addressed by economic interventions: “It is just not one that monetary policy is well designed to tackle” [25].

Long COVID impacts the economy in a wide range of ways. There are direct costs such as health care costs, medication costs, and social welfare costs to support the ill and disabled [26]. Whether these costs are borne by public or subsidized corporate insurance (as in the US), the drag they will produce on economic activity is substantial. But society will also see costs in the form of reduced productivity and tax revenue from those no longer working. Reduced spending from people who have seen a reduction in income means reduced consumption on a macro level, which in itself leads to reduced economic growth.



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During the pandemic, the world has seen disruptions to supply chains, both on a local and global level. The pandemic has affected shipping, trucking, ports, and warehouses, and in some cases led to shortages of food and other goods. The many workers affected by long COVID have become a significant part of the impact on these sectors. With the war in Ukraine, the challenges in some sectors, including food supply, have increased in magnitude.

What lies ahead depends on measures taken to prevent infections, and the frequency and severity of long COVID symptoms over time. Recent findings that vaccines do not provide strong protection against long COVID undermine the hope of relief brought on by vaccinations. Especially noteworthy are the scientific findings that may predict an increased risk of developing neurodegenerative disorders such as Alzheimer's dementia [27] or Parkinson's disease [28] over years to come. It is also worth remembering that survivors of the SARS outbreak in 2003 often experienced debilitating and sometimes increasing symptom burden over many years, and the most serious long-term effects after polio were first visible decades after the acute infection.

Conclusion

Although much is still uncertain, it is evident that long COVID is and will be a problem of unprecedented magnitude. The societal and economic impact of long COVID may be one of modern society's major challenges in the years to come. At present, the only way to be sure to avoid getting long COVID is to avoid being infected. Acting to reduce transmission on the local, national, and global level, is essential to protecting individuals and society from the adverse long-term effects of COVID. Improving the understanding of care and treatments is essential for those who already are suffering from long COVID.

Resources

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