

# Long COVID

## *What have we learned so far?*

**Many questions remain about Long COVID, but research continues to help us learn more:**

### **Long COVID is not just one thing.**

There have been over 200 symptoms associated with Long COVID. A RECOVER Initiative study<sup>3</sup> looked at these symptoms and found 12 symptoms that could best identify people with Long COVID including common symptoms like brain fog and fatigue. We also learned that having COVID before the Omicron variant (before Dec. 2021), having COVID more than once, and being unvaccinated made developing Long COVID more likely. This study was an important step in defining Long COVID to better study and diagnose the condition. Other studies are starting to notice different “clusters” or types of Long COVID cases. Researchers will continue to investigate different clusters of Long COVID symptoms.

*For more information read the research summary: [“Identifying Long COVID Based on Symptoms Reported by Adults in the RECOVER Study”](#) or the NIH news release: [“Large study provides scientists with deeper insight into long COVID symptoms.”](#)*

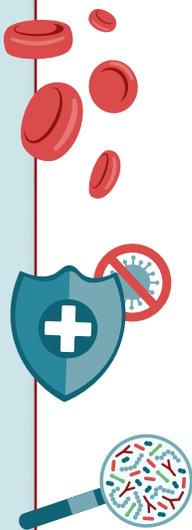


### **Long COVID could have many causes and recovery rates can vary.**

Researchers have a few ideas about what might cause Long COVID. These include the COVID-19 virus lingering in the body, problems with the body’s immune system, and micro (very tiny) blood clots. Researchers also found evidence of changes in the bacteria and other microbes that are naturally found in the human body caused by COVID leading to Long COVID symptoms. Another thought is that the COVID-19 virus can reactivate other dormant viruses in the body like the Epstein-Barr virus. Researchers are getting closer to uncovering the causes of Long COVID.

Wondering how many people will recover? One study<sup>2</sup> found that for adults who caught covid before vaccines were available about 23% still had symptoms at 6 months. This number only dropped slightly. At one year 19% of people still had symptoms. At two years 17% still had symptoms. Other studies have found different results. We know some people do recover but others may have lifelong impacts.

*Read more about Long COVID recovery in the article, [“Long COVID: answers emerge on how many people get better”](#).*



## Biomarkers could help doctors diagnose Long COVID and develop treatments.

Biomarkers could help doctors diagnose Long COVID and develop treatments. Researchers are searching for biomarkers of Long COVID. Biomarkers are changes that doctors and scientists can find in lab tests (such as blood tests or stool samples). A recent study<sup>1</sup> looked at the blood of people with Long COVID and found signs that their immune systems continued to damage healthy cells even after their initial COVID infections, causing tissue damage and micro-clotting. More research is needed, but eventually doctors may be able to diagnose Long COVID with blood tests and better treat and monitor the condition.

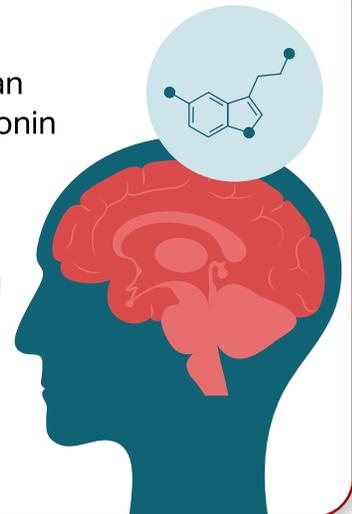
*Read more about the study in "[Long COVID Study Suggests Immune System Response at Root of Persistent Symptoms.](#)"*



## Lowered serotonin may play a role in Long COVID.

New evidence<sup>4</sup> suggests the COVID-19 virus may remain in the gut after an infection, leading to reduced serotonin levels. These lower levels of serotonin may cause Long COVID symptoms like brain fog and memory difficulties. Serotonin is a chemical messenger found in the brain and gut. It plays a role in memory, sleep, healing, and other important body functions. This finding could point researchers to potential treatments, including existing drugs like serotonin-reuptake inhibitors (SSRIs).

*For more information read "[Viral Persistence and Serotonin Reduction can Cause Long COVID symptoms, Penn Medicine Research Finds](#)" or the "[Scientists Offer a New explanation for Long COVID](#)".*



Research into the causes of Long COVID and the treatments for it will continue. Clinical trials by the NIH RECOVER Initiative and other researchers across the country are ongoing. We will learn continue to learn more about Long COVID in the coming months and years.

### Want to read more about what we've learned about Long COVID?

*Read "[Four years on, long covid still confounds us. Here's what we now know.](#)"*

## Sources

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2. Davis, H.E., McCorkell, L., Vogel, J.M. et al. Long COVID: major findings, mechanisms and recommendations. *Nat Rev Microbiol* 21, 133–146 (2023). <https://doi.org/10.1038/s41579-022-00846-2>
3. Thaweethai T, Jolley SE, Karlson EW, et al. Development of a definition of postacute sequelae of SARS-CoV-2 infection. *JAMA*. 2023;329(22):1934–1946. doi:10.1001/jama.2023.8823
4. Wong, Andrea C. et al. Serotonin reduction in post-acute sequelae of viral infection. *Cell*. 2023; 186(22): P4851-4867.E20, doi: <https://doi.org/10.1016/j.cell.2023.09.013>



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