COVID-19

How long does SARS-CoV-2 stay in the body?

What happens to SARS-CoV-2 when it enters the body, and how long does it linger? Nearly three years since the virus was first discovered, this is still a mystery. Chris Stokel-Walker asks what science has learnt so far.

Chris Stokel-Walker freelance journalist

How long does SARS-CoV-2 stay in the body?

There is no definitive answer. The reality of 6.2 million deaths with covid-19 means that many people die from the effects of the virus within their body before the virus itself does, so it’s difficult to know how long they would have continued to shed the virus if they’d survived.

Also, different people clear viruses quicker than others, depending on underlying health conditions. For example, says Paul Hunter, professor in medicine at the University of East Anglia, “Even before covid, we’ve known that people who have certain immune deficiencies can struggle to clear viruses.”

What are the longest bouts of covid-19 infection recorded to date?

One patient tested positive for covid-19 for 505 days until they died, according to a case presented at the European Congress of Clinical Microbiology and Infectious Diseases in April 2022.1 Another report by Spanish researchers describes a 52 year old man undergoing chemotherapy who was still shedding virus after 189 days.2 Elsewhere, Chinese researchers reported a 64 year old man shedding the virus for 169 days after infection.3

That’s all recorded through the mouth and nose—which is normal for a respiratory virus. But what’s unusual with SARS-CoV-2 is where else in the body it has been showing up, and for how long.

Two studies4 5 found that the virus was present in a patient’s faeces seven months after diagnosis, indicating that the virus stays in the body longer than first thought. It creates a conundrum for researchers, who are now probing the potential links between SARS-CoV-2 in the gut and long covid.

A meta-analysis6 looking at the amount of time those infected with SARS-CoV-2 continue to shed the virus found that the average person continued to shed for roughly a month. Some people, however, are super shedders, with prolonged release of virus from their bodies. One 22 year old healthcare worker, for example, was continuing to shed the virus 110 days after infection.7

Where does the virus persist?

As indicated above, it doesn’t just stay lodged in the respiratory tract—autopsies have found traces in the appendix,8 eyes, heart, and brain.9 10 However, those traces have not been infectious, says Nathan Bartlett, associate professor in viral immunology at the University of Newcastle, Australia. “No one has actually isolated infectious virus from tissues outside of the respiratory tract,” he says. “There is no evidence—and people have looked very hard for infectious virus persisting outside it.”

Even in the respiratory tract, the virus is often not infectious. One autopsy11 by Italian researchers of an exhumed patient who died from covid found traces of the viral gene targets in her lungs and heart a month after her death, but the virus itself was not alive—which would be expected, as the virus relies on live cells. Maria Grazia Cusi, associate professor in the virology unit of the University of Siena, who conducted the study, says she found the presence of the bionucleic acids in the lung and the heart. “It was interesting to see the organs were still conserved in a good way,” she says, expressing amazement that the viral RNA could exist for so long within a dead body. (That said, traces of avian influenza have been shown to last up to 240 days at room temperature.12)

“The behaviour of SARS-CoV-2 is strange,” says Cusi. “It’s difficult to understand how this virus can stay in the body for so long.”

Does SARS-CoV-2 stay in the body longer than other infections, like the flu and colds?

All three are RNA viruses, but covid-19 appears to stay in the body for longer than either influenza or the common cold. Cusi says SARS-CoV-2 appears to burrow itself in parts of the body that are difficult for the immune system to reach.

Influenza viruses there is the acute phase of the disease, then the clearance of the virus from the body—usually within days or weeks. For SARS-CoV-2, the number of variants makes it more difficult to say definitively how long it lasts, but it appears to persist for far longer.

Does the length of time the virus stays in the body increase the risk of long covid?

“We don’t really understand that link,” says Bartlett. It’s something that has been suggested in academic literature,13 but hasn’t been definitively proven. “It’s conceivable that if there are pockets of viral RNA that are making a little bit of viral protein, that could be triggering localised immune responses,” he says. That could make inflammation which, if it happens in the body’s central nervous system, could develop symptoms like brain fog and fatigue. There is research...
that shows a rise in antibody titres after patients begin symptoms, Bartlett says, however, that the numbers involved are quite low. “One needs to be cautious,” he advises.

Hunter says that while it’s plausible that there’s a link between the length of time the virus stays in the body and the risk of contracting long covid, caution must be taken when talking about post-infection syndromes. After all, long covid is not a single condition but a term encompassing a wide range of symptoms that last for more than 12 weeks after infection and are believed to have been triggered by the novel coronavirus.

For some people who caught covid, there is almost certainly some residual damage to the gas exchange membranes in the lung, or microvascular damage that affects cognition in the brain—both of which have been cited as problems for those with long covid. For others this may not be the case.

Competing interests: I have read and understood BMJ policy on declaration of interests and have no relevant interests to declare.

Provenance and peer review: Commissioned; not externally peer reviewed.