

Repeat COVID-19 infections increase risk of organ failure, death

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Ziyad Al-Aly, MD, a clinical epidemiologist at Washington University School of Medicine in St. Louis and the Veterans Affairs St. Louis Health Care system, examines data from a new study. Researchers led by Al-Aly found that repeat SARS-CoV-2 infections contribute significant additional risk of adverse health conditions in multiple organ systems. Credit: Washington University School of Medicine

Since the COVID-19 pandemic began almost three years ago, scientists have learned that an initial infection can lead to short- and long-term health risks affecting nearly every organ system in the body. They've also determined that people can get COVID-19 a second or a third time, despite acquiring natural antibodies after the first infection and receiving vaccination and booster shots.

Now, a new study from Washington University School of Medicine in St. Louis and the Veterans Affairs St. Louis Health Care system shows the health consequences of reinfection. The researchers found that repeat SARS-CoV-2 infections contribute significant additional risk of adverse health conditions in multiple organ systems.

Such outcomes include hospitalization; disorders affecting the lungs, heart, brain, and the body's blood, musculoskeletal and gastrointestinal systems; and even death. Reinfection also contributes to diabetes, [kidney disease](#) and [mental health issues](#).

The findings are published Nov. 10 in *Nature Medicine*.

"During the past few months, there's been an air of invincibility among people who have had COVID-19 or their vaccinations and boosters, and especially among people who have had an infection and also received vaccines; some people started to referring to these individuals as having a sort of superimmunity to the virus," said senior author Ziyad Al-Aly, MD, a clinical epidemiologist at the School of Medicine. "Without ambiguity, our research showed that getting an infection a second, third or fourth time contributes to additional health risks in the acute phase, meaning the first 30 days after infection, and in the months beyond, meaning the long COVID phase."

Additionally, the study indicated that the risk seems to increase with each infection. "This means that even if you've had two COVID-19

infections, it's better to avoid a third," Al-Aly said. "And if you've had three infections, it's best to avoid the fourth."

Limiting exposure to the virus is especially important as the U.S. heads into the winter months, with new variants emerging, mutating and already causing an upswing in infections in some parts of the country, Al-Aly said. "People should do their best to prevent repeat infections by masking, for example, getting all of their eligible boosters, staying home when sick. Also, get a flu shot to prevent illness. We really need to do our best to reduce the chance we will have a twin-demic of both COVID-19 and the flu this winter season."

For this study, the researchers analyzed about 5.8 million de-identified [medical records](#) in a database maintained by the U.S. Department of Veterans Affairs, the nation's largest integrated health-care system. Patients represented multiple ages, races and sexes.

The researchers created a controlled data set of 5.3 million people who did not test positive for COVID-19 infection from March 1, 2020, through April 6, 2022. Using the same time frame, the researchers also compiled a [control group](#) of more than 443,000 people who had tested positive for one COVID-19 infection, and another group of nearly 41,000 people who had two or more documented infections. Of the latter group, most people had two or three infections, with a small number having had four infections and no one with five or more infections.

Statistical modeling was used to examine the health risks of repeat COVID-19 infections within the first 30 days after contracting the virus and up to six months after.

The study accounted for COVID-19 variants such as delta, omicron and BA.5. Negative outcomes occurred among the unvaccinated as well as those who had received shots prior to reinfection.

Overall, the researchers found that people with COVID-19 reinfections were twice as likely to die and three times more likely to be hospitalized than those with no reinfection.

Additionally, people with repeat infections were 3½ times more likely to develop lung problems, three times more likely to suffer heart conditions and 1.6 times more likely to experience brain conditions than patients who had been infected with the virus once.

"Our findings have broad public health implications as they tell us that strategies to prevent or reduce the risk of reinfection should be implemented," Al-Aly said. "Going into the winter season, people should be aware of the risks and practice vigilance to reduce their risk of [infection](#) or reinfection with SARS-CoV-2."

More information: Acute and post-acute sequelae associated with SARS-CoV-2 reinfection, *Nature Medicine* (2022). [DOI: 10.1038/s41591-022-02051-3](#)

Provided by Washington University in St. Louis

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