Medical Xpress

Coronavirus reinfections are real. Here's what that means for controlling the pandemic

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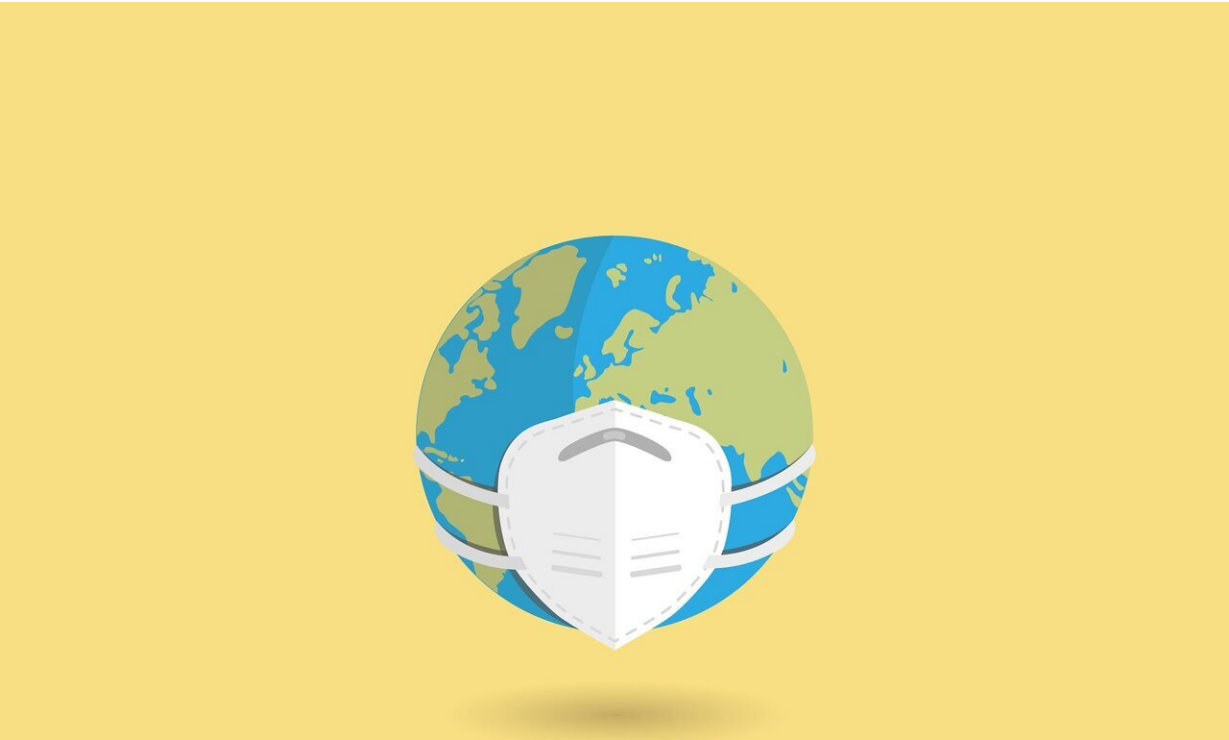

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The first confirmed case of an American who got COVID-19 twice adds to scant but mounting evidence that people can be reinfected with the coronavirus—and get sicker than during the initial bout.

The 25-year-old Nevada man, who had no known immune problems, got

a mild case of COVID-19 in April. About a month later, he was diagnosed again and needed hospitalization and oxygen, according to the report published Monday in *Lancet Infectious Diseases*.

The authors say at least three other confirmed cases have been published worldwide, including the first in Hong Kong barely two months ago. But the COVID-19 Reinfection Tracker of BNO News, an international news agency headquartered in the Netherlands, lists the Nevada case and 22 others, including one death.

To confirm reinfection, DNA sequencing of respiratory samples must reveal two slightly different variants of the virus, indicating the second infection was not just a remnant or reactivation of the first. That kind of analysis rarely occurs, partly because of the cost, but mostly because respiratory samples used for diagnosis are rarely preserved for later genetic analysis.

Although it is hard to say how rare reinfection may be, it complicates questions about the strength and length of natural protective immunity; the role of vaccines in strengthening immunity; and hopes for "herd immunity." Community-wide, or herd, protection happens when enough people become immune, either through infection or vaccination, to make disease spread unlikely.

"Reinfection cases tell us that we cannot rely on immunity acquired by natural infection to confer herd immunity," Akiko Iwasaki, an immunologist at Yale University School of Medicine, wrote in a commentary accompanying the new study. "Herd immunity requires safe and effective vaccines and robust vaccination implementation."

But the study authors, led by University of Nevada biostatistician Richard L. Tillett, point out that we may not be able to rely on vaccines for complete protection, either, "with influenza regularly showing the

challenges of effective vaccine design." Recent studies show that the seasonal flu shot reduces the risk of illness by 40% to 60%.

Infection with certain viruses, such as the measles, causes lifelong immunity. In contrast, seasonal coronaviruses that cause common colds confer only short-lived protection, perhaps three or four months. Then, the disease-fighting antibodies made by the immune system to fight the invader fade away.

If the new coronavirus, which emerged 10 months ago in China, confers only limited immunity, then a vaccine might strengthen this protection by revving up other parts of the immune system. Some vaccines now in development have been shown to activate T cells, a more complex line of defense than antibodies.

Since the new coronavirus has mutated to have slightly different variations that can cause reinfection, does that mean we need a vaccine for each variant?

Iwasaki believes the answer is no because, at least so far, reinfected people have had an immune response to the second infection, suggesting the virus has not developed a way around immune defenses.

"There is currently no evidence that a variant has emerged as a result of immune evasion," she wrote. "For now, one vaccine will be sufficient to confer protection against all circulating variants."

The authors conclude with a sobering observation: Without "comprehensive genomic sequencing" of positive cases around the world, detection of cases of reinfection will be very limited. That, in turn, will "exacerbate the poor surveillance efforts ... not only to diagnose COVID-19, but also to" track genetic changes in the virus.