

# Study finds a lower dose of COVID-19 drug is effective, and allows treatment for more patients

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Many countries around the world are experiencing shortages of tocilizumab, an immunosuppressive drug that has become the standard

of care for treating severe cases of COVID-19. A new study co-led by researchers at Yale and the University of British Columbia, however, finds that using a lower dose of tocilizumab than has been standard is also effective in treating severe cases, and allows up to twice as many patients to be treated. Lower dosages, they found, are also the cost-effective approach in the context of low supply.

Tocilizumab is a monoclonal antibody typically used for [rheumatoid arthritis](#) that blocks one of the key [cytokines](#), a group of small proteins, that drive respiratory failure and death in COVID-19. It has been widely adopted as a treatment, but surging demand and limitations on drug production led to widespread shortages beginning in spring of 2021.

Canada is among the countries experiencing shortages of [tocilizumab](#), and in order to treat more patients, British Columbia opted to switch from a weight-based dosage (8 milligrams per kilogram of body weight), which is protocol, to a lower, fixed dose of 400 milligrams. That is about half the typical total dosage for adults, on average.

In the new study, published March 23 in *The Lancet Regional Health—Americas*, researchers compared health outcomes across three groups: 40 patients who received the weight-based dose, 59 patients who received the fixed dose, and 53 patients who were not treated with tocilizumab and served as a control group.

Patients who received either dose of tocilizumab showed dramatic reductions in inflammation. For both of these groups, measures of [inflammation](#) dropped by over 90% within five days, reductions that were significantly larger than those of patients not treated with tocilizumab. Additionally, the death rates over 28 days were similar across the three groups.

The paper was co-led by George Goshua of Yale School of Medicine.

"What was really significant was the lack of significance," said Sophie Stukas, an associate research scientist at the University of British Columbia and co-first author of the study. "Between the two doses, we also didn't see any differences in terms of how many patients needed ventilation, how many needed life-sustaining therapies, or length of stay in the intensive care unit."

The research team also conducted a cost-effectiveness analysis.

"It's an expensive medication," said Luke Chen, a clinical associate professor at the University of British Columbia and senior author of the study. Tocilizumab does not cure patients, it only helps treat them, he explained. "They're still very sick for a long time. And with lots of people in the hospital, is tocilizumab making enough of an impact that it's cost-effective?"

One goal of cost-effectiveness analyses can be to maximize population health, said Goshua, a classical hematology fellow at Yale School of Medicine and co-first author of the study. "Here, the specific problem was not having enough tocilizumab to continue treating everybody with the higher dose," he said.

The research team compared two strategies for addressing Canada's limited supply of tocilizumab: Treating half of the patients with the weight-based dose, and after supply runs out, the other half with no tocilizumab, or treating all patients with the fixed dose. Taking into account average expected death rates, the length of hospital stays, and treatment costs for each strategy, both strategies were found to be similarly beneficial. And the reduced, fixed dose of tocilizumab was the cost-effective strategy.

Goshua noted that the analysis did not take health equity into account, and that taking this important factor into account would have further

avored the fixed dose strategy. "Because, with the higher dose, you're talking about being able to treat about half the patients you would otherwise be able to treat," he said.

Together, the findings show that in the context of ongoing [drug shortages](#), the fixed dose of tocilizumab is a practical, feasible, and economical option that benefits a larger number of patients, said the researchers.

"An important thing to keep in mind is that this study was done out of necessity. We just didn't have enough medication," said Chen. "If you have enough medication, you should use it the way it's been studied. But this strategy was able to tide us through the worst times of the pandemic and the worst part of the drug shortages."

**More information:** Sophie Stukas et al, Reduced fixed dose tocilizumab 400 mg IV compared to weight-based dosing in critically ill patients with COVID-19: A before-after cohort study, *The Lancet Regional Health - Americas* (2022). [DOI: 10.1016/j.lana.2022.100228](https://doi.org/10.1016/j.lana.2022.100228)

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