NEWS · 16 JUNE 2020

# Coronavirus breakthrough: dexamethasone is first drug shown to save lives

In a large trial, a cheap and widely available steroid cut deaths by one-third among patients critically ill with COVID-19.

Heidi Ledford


The steroid dexamethasone was given to thousands of people critically ill with coronavirus in a randomized, controlled trial. Credit: Dr P. Marazzi/Science Photo Library

An inexpensive and commonly used steroid can save the lives of people seriously ill with COVID-19, a randomized, controlled clinical trial in the United Kingdom has found. The drug, called dexamethasone, is the first shown to reduce deaths from the coronavirus that has killed more than 430,000 people globally. In the trial, it cut deaths by about one-third in patients who were on ventilators because of coronavirus infection.

"It's a startling result," says Kenneth Baillie, an intensive-care physician at the University of Edinburgh, UK, who serves on the steering committee of the trial, called RECOVERY. "It will clearly have a massive global impact." The RECOVERY study announced the findings in a press release on 16 June, but its researchers say that they are aiming to publish their results quickly and that they are sharing their findings with regulators in the United Kingdom and internationally.

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The RECOVERY trial, launched in March, is one of the world's biggest randomized, controlled trials for coronavirus treatments; it is testing a range of potential therapies. The study enrolled 2,100 participants who received dexamethasone at a low or moderate dose of six milligrams per day for ten days, and compared how they fared against about 4,300 people who received standard care for coronavirus infection.

The effect of dexamethasone was most striking among critically ill patients on ventilators. Those who were receiving oxygen therapy but were not on ventilators also saw improvement: their risk of dying was reduced by 20%. The steroid had no effect on people with mild cases of COVID-19 — those not receiving oxygen or ventilation.

Shortly after the results were released, the UK government announced that it had immediately authorized use of dexamethasone for patients hospitalized with COVID-19 who required oxygen, including those on ventilators.

## Rigorous study

"It is a major breakthrough," says Peter Horby, an infectious-disease specialist at the University of Oxford, UK, and a chief investigator on the trial. Use of steroids to treat viral respiratory infections such as COVID-19 has been controversial, Horby notes. Data from steroid trials during outbreaks of SARS (severe acute respiratory syndrome) and Middle East respiratory syndrome caused by related coronaviruses were inconclusive, he says. Nevertheless, given dexamethasone's widespread availability, and some promising results from steroid studies in previous outbreaks, Horby says RECOVERY investigators felt it important to test the treatment in a rigorous clinical trial.

Treatment guidelines from the World Health Organization and many countries have cautioned against treating people with coronavirus with steroids, and some investigators were concerned

about anecdotal reports of widespread steroid treatment. The drugs suppress the immune system, which could provide some relief from patients whose lungs are ravaged by an over-active immune response that sometimes manifests in severe cases of COVID-19. But such patients may still need a fully functioning immune system to fend off the virus itself.

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The RECOVERY trial suggests that at the doses tested, the benefits of steroid treatment may outweigh the potential harm. The study found no outstanding adverse events from the treatment, investigators said. "This treatment can be given to pretty much anyone," says Horby.

And the pattern of response — with a greater impact on severe COVID-19 and no effect on mild infections — matches the notion that a hyperactive immune response is more likely to be harmful in long-term, serious infections, says Anthony Fauci, head of the US National Institute of Allergy and Infectious Disease. "When you're so far advanced that you're on a ventilator, it's usually that you have an aberrant or hyperactive inflammatory response that contributes as much to the morbidity and mortality as any direct viral effect."

"Finding effective treatments like this will transform the impact of the COVID-19 pandemic on lives and economies across the world," said Nick Cammack, head of the COVID-19 Therapeutics Accelerator at Wellcome, a UK biomedical research charity in London, in a statement. "While this study suggests dexamethasone only benefits severe cases, countless lives will be saved globally."

## Easy to administer

So far, the only drug shown to benefit COVID-19 patients in a large, randomized, controlled clinical trial is the antiviral drug remdesivir. Although remdesivir[1] was shown to shorten the amount of time that patients may need to spend in the hospital, it did not have a statistically significant effect on deaths.

Remdesivir is also in short supply. Although the drug's maker — Gilead Sciences of Foster City, California — has taken steps to ramp up production of remdesivir, it is currently available only to a limited number of hospitals around the world. And remdesivir is complex to administer: it must be given by injection over the course of several days.

Dexamethasone, by contrast, is a medical staple found on pharmaceutical shelves worldwide and is available as a pill — a particular benefit as coronavirus infections continue to rise in countries with limited access to healthcare. “For less than £50, you can treat 8 patients and save one life,” said Martin Landray, an epidemiologist at the University of Oxford, and another chief investigator on the RECOVERY trial.

The findings could also have implications for other severe respiratory illnesses, Baillie adds. For example, steroid treatments for a condition called acute respiratory distress syndrome are also controversial. “This really gives us a very good reason to look closely at that, because the mortality benefit is so extraordinarily large,” Baillie says. “I think this will affect patients well beyond COVID-19.”

*doi: 10.1038/d41586-020-01824-5*

## References

1. Beigel, J. H. *et al. N. Engl. J. Med.* https://doi.org/10.1056/NEJMoa2007764 (2020).



*Nature* ISSN 1476-4687 (online)

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