

# Moderna vaccine gives bigger antibody boost than Pfizer in elderly, say researchers

17 August 2021, by Amanda Ferguson



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Early results from a new study led by researchers from the University of Toronto and Sinai Health reveals subtle differences between the immune responses of long-term care residents receiving the Pfizer-BioNTech and Moderna vaccines.

The research, which has not yet been peer-reviewed, suggests that long-term care residents in Ontario who received the Pfizer vaccine had lower antibody responses to Alpha, Beta and Gamma variants of COVID-19 than those vaccinated with the Moderna vaccine.

The researchers did not assess the Delta variant.

"Our study does raise concerns about the response to vaccination in some residents of long-term care homes in Ontario who overall responded more weakly to vaccination," said Anne-Claude Gingras, a professor of molecular genetics in U of T's Temerty Faculty of Medicine and a senior scientist at the Lunenfeld-Tanenbaum Research Institute (LTI), Sinai Health.

"In this population, the Moderna vaccine permitted

more residents to generate an antibody response capable of neutralizing several SARS-CoV-2 variants," added Gingras, who led study with LTRI Senior Scientist Allison McGeer, a professor in U of T's department of laboratory medicine and pathobiology and at the Dalla Lana School of Public Health.

The study, funded by the Government of Canada through the COVID-19 Immunity Task Force, was posted last week on medRxiv, the pre-print server for health sciences. It examined the total and neutralizing antibodies produced before and after vaccination, comparing 198 long-term care residents to 78 caregivers and long-term care staff. All vaccines were given three to four weeks apart and samples were taken 14 to 28 days after the second dose of vaccine.

It showed that the differences between resident responses to the two vaccines were more common against variants of concern. Neutralizing antibodies against the Beta variant were undetectable in nearly 38 percent of residents vaccinated with the Pfizer vaccine, compared to 11.5 percent of residents vaccinated with the Moderna vaccine.

When it came to the Gamma variant, 29 percent of those vaccinated with Pfizer did not neutralize the variant, whereas only five percent of those vaccinated with Moderna were unable to neutralize Gamma.

It is unknown how these laboratory assays compare to real-life protection from COVID-19.

The study also showed that caregivers and staff, with a median age of 47, produced more neutralizing antibodies compared to residents, whose median age was 89. This is consistent with what is known about immune responses and age.

The scientists note that they only looked at one facet of the immune response—the production of

antibodies—adding residents who do not mount strong neutralizing antibody responses may still be protected by other facets of their immune system, such as their T cells.

The levels of antibody needed to protect against COVID-19 infection, severe disease or hospitalization are also unknown.

"The first two waves of the pandemic had a devastating impact on LTC home residents, staff and families," said McGeer. "As we may face a fourth wave of the pandemic, we need to be sure that we are using all the tools we have to ensure that we protect residents and staff from further harm. This includes considering whether a third vaccine dose should be offered to residents."

McGeer said this study is timely given recent reports of several COVID-19 outbreaks due to variants of concern in Ontario long-term care homes.

Catherine Hankins, a co-chair of the COVID-19 Immunity Task Force, said the findings were valuable.

"The question of booster strategies for vulnerable people who may not mount as strong an immune response and who have had a suboptimal reaction to two doses of mRNA vaccines is drawing lots of attention and debate," said Hankins. "The effect of the higher antigen dose in Moderna is clearly part of the puzzle."

Hankins added that the task force is organizing a meta-analysis of data from seven studies that they have supported in long-term care settings, and they expect to have additional insights in the near future.

**More information:** Kento T. Abe et al, Neutralizing antibody responses to SARS-CoV-2 variants in vaccinated Ontario long-term care home residents and workers, (2021). [DOI: 10.1101/2021.08.06.21261721](https://doi.org/10.1101/2021.08.06.21261721)

APA citation: Moderna vaccine gives bigger antibody boost than Pfizer in elderly, say researchers (2021, August 17) retrieved 8 December 2021 from <https://medicalxpress.com/news/2021-08-moderna-vaccine-bigger-antibody-boost.html>

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