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NEWS | 04 March 2022 | Correction [10 March 2022](#)

COVID-19: How Omicron overtook Delta in three charts

Analysis reveals how much faster Omicron spreads and evades the immune system compared with the previous variant.

[Smriti Mallapaty](#)



Vaccination reduces the risk of catching or transmitting the Delta and Omicron variants. But vaccines are less effective against Omicron. Credit: Frederic J. Brown/AFP via Getty

People infected with the Omicron variant of the coronavirus SARS-CoV-2 are almost 50% more likely to infect those they live with than are individuals infected with the Delta variant, a detailed analysis from England shows¹.

Since it was first detected in South Africa in late 2021, Omicron has caused a wave of infections and deaths in countries around the globe, including in places such as Hong Kong that have been largely spared by SARS-CoV-2 until now. Data have been mounting on Omicron's ability to evade vaccines, but a rigorous analysis, posted as a preprint on 17 February, looks at how fast it spreads – even in vaccinated people – compared with the previous variant. The study has not yet been peer reviewed.

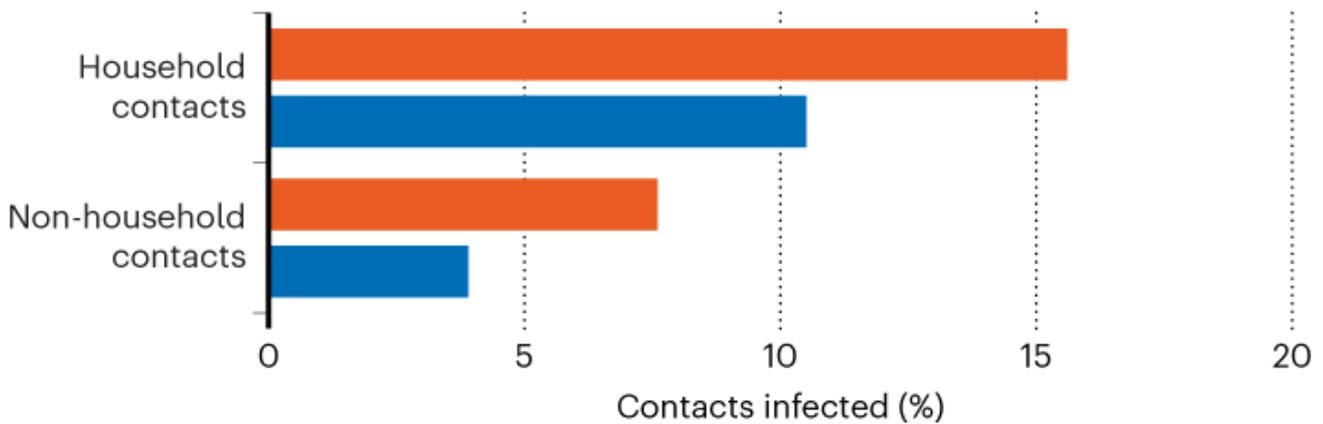
In England, Omicron was first detected in mid-November 2021 and quickly overtook Delta as the dominant variant. Its fast spread was probably driven by its ability to evade immunity generated by vaccines, says Marm Kilpatrick, an infectious-disease researcher at the University of California, Santa Cruz. These types of immune-evasive variants will continue to be selected for, he says – “we can almost count on them arising”.

Researchers at the UK Health Security Agency analysed data on 51,281 people who tested positive for Omicron or Delta between 5 and 11 December 2021 and their 151,592 close contacts.

COMPARING VARIANTS

People infected with the Omicron variant pass it on to more close contacts than people infected with Delta, regardless of their vaccination status.

■ Omicron ■ Delta



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The scientists found that whereas people infected with Delta spread the infection to roughly 11% of their household members, those who had Omicron spread it to almost 16% (see ‘Comparing variants’). That means there is a 48% increased risk of passing on the virus when infected with Omicron than with Delta.

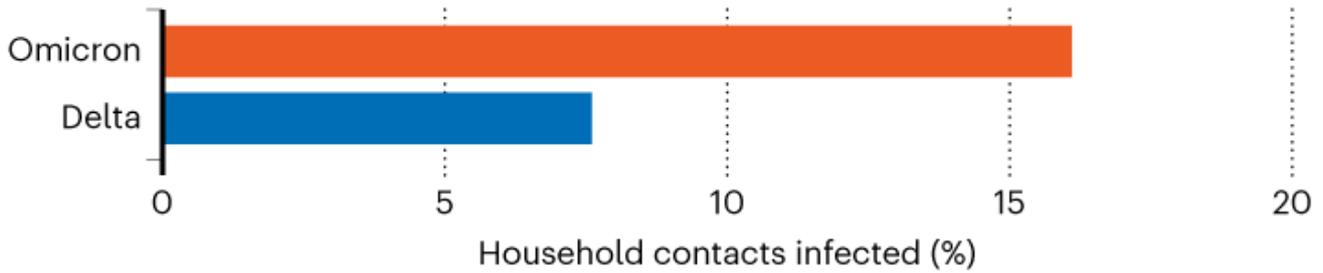
That difference is even more striking outside the home – people infected with Delta spread the infection to roughly 4% of people they came in contact with outside their home, whereas those with Omicron passed it to 8% of people, so the risk more than doubled. Omicron’s transmission advantage is more apparent outside the household because even with fewer opportunities for repeated and prolonged exposure to the virus, the risk of catching it is more than double compared to Delta, says Kilpatrick.

Immune evasion

The researchers also assessed how vaccination affected people’s chances of catching the two variants, and found that unvaccinated household members were 23% more likely to get infected with Omicron than with Delta.

THE VACCINE EFFECT

Someone who has received three vaccination doses is more likely to catch Omicron than Delta from someone in their household.



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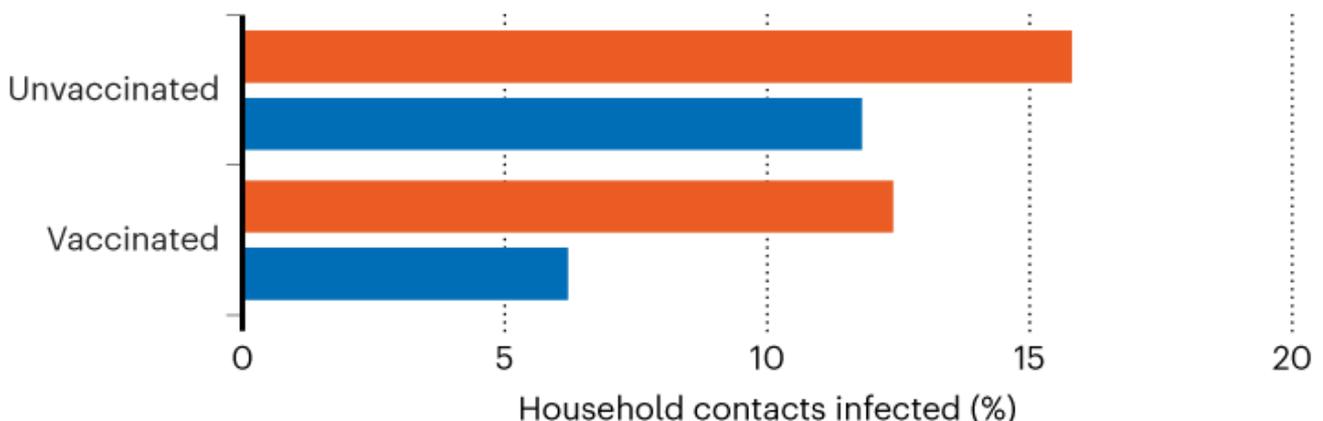
But that gap widened in people who have been vaccinated, revealing Omicron's edge at evading vaccine-triggered immunity. Household members who had received three doses of a SARS-CoV-2 vaccine were more than twice as likely to be infected with Omicron than with Delta (see 'The vaccine effect').

If someone had received three vaccine doses, they were also about twice as likely to pass Omicron on to another household member than they were Delta (see 'Blocking transmission').

BLOCKING TRANSMISSION

Someone who has received three vaccination doses is less likely to spread the Delta or Omicron variant to household members than an unvaccinated person. But vaccines are not as efficient at blocking transmission of Omicron.

■ Omicron ■ Delta



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Three is better than two

The data also show that a third vaccine dose had a marginal beneficial effect on transmission of both variants compared to only two doses, although this effect was larger for Delta than it was for Omicron. After a third dose, household members were about 32% less likely to get infected with Delta and 12% less likely to become infected with Omicron than if they had received just two doses. People who had received a booster shot were 38% less likely to spread a Delta infection to their household members, and 22% less likely to pass on an Omicron infection than were those who had had just two shots.

Although this study suggests that existing SARS-CoV-2 vaccines offer limited protection against infection with Omicron, other research has shown that they are effective at preventing severe disease caused by both variants, says Leo Poon, a virologist at the University of Hong Kong. But he points out that the work was done at a time when the BA.1 subvariant of Omicron was circulating, and that now that another subvariant, BA.2, is rapidly **gaining steam**, this variant will need to be investigated, too. Nevertheless, vaccination is still one of the most effective measures to “protect ourselves” against severe disease, hospitalization and death, he says.

doi: <https://doi.org/10.1038/d41586-022-00632-3>

UPDATES & CORRECTIONS

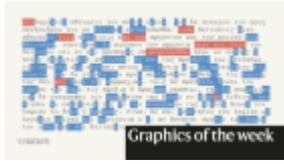
Correction 10 March 2022: In a previous version of this story, the x-axis label of the chart ‘Comparing variants’ was incorrect. This has been corrected.

References

1. Allen, H. *et al.* Preprint at medRxiv <https://doi.org/10.1101/2022.02.15.22271001> (2022).

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Nature (*Nature*) | ISSN 1476-4687 (online) | ISSN 0028-0836 (print)

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