



Researchers are increasingly concerned about 'breakthrough' infections driven by Delta.

HOW DO VACCINATED PEOPLE SPREAD DELTA? WHAT THE SCIENCE SAYS

Delta spreads more readily than other coronavirus variants among vaccinated people, data suggest.

By Nidhi Subbaraman

When early field data showed that vaccinating people cuts transmission of the SARS-CoV-2 virus, researchers were cautiously optimistic. But they warned that many of those studies, although promising, took place before the fast-spreading Delta variant proliferated worldwide. Now, reports from various countries seem to confirm what scientists feared after the variant tore through India with alarming speed in April and May: Delta is more likely than other variants to spread through vaccinated people.

Data from COVID-19 tests in the United States, the United Kingdom and Singapore are showing that vaccinated people who become infected with Delta SARS-CoV-2 can carry as much virus in their nose as do unvaccinated people. This means that despite the protection offered by vaccines, a proportion of vaccinated people can pass on Delta, possibly aiding its rise.

"People who have a Delta virus and happen to have 'breakthrough' infections can carry these really high levels of virus, and can unwittingly spread the virus to others," says David

O'Connor, a virologist at the University of Wisconsin–Madison.

The findings underscore the importance of measures such as wearing masks indoors to reduce transmission. Researchers stress that COVID-19 vaccines are protective against serious illness and death, but the data show that "people who are vaccinated still need to take precautions", O'Connor says.

Testing transmissibility

O'Connor and his colleagues at the Madison and Dane County health department looked at infections in Wisconsin in June and July.

The team used PCR tests, which are widely used to confirm COVID-19 infections, to estimate the concentration of virus in nasal-fluid samples. The tests detect the virus's genetic material by amplifying DNA until it is detectable as a fluorescent signal. The number of amplification cycles needed to get a signal – a measure called the cycle threshold value, or Ct – serves as a proxy for viral concentration in the sample. The lower a sample's Ct, the more viral genetic material present.

In a preprint study published on medRxiv on 11 August (ref. 1), the researchers compared Ct values for 719 people between 29 June and

31 July, during which 90% of the 122 coronavirus samples they sequenced were the Delta variant. Of the 311 vaccinated people who tested positive for SARS-CoV-2 in that group, most had Ct values of less than 25, a level at which researchers expect the presence of infectious SARS-CoV-2. To confirm this, the team cultured 55 samples that had Ct values less than 25, from vaccinated and unvaccinated people, and detected infectious virus in nearly every one. Most unvaccinated people also had Ct values below this level.

"The bottom line is, this can happen – it can be true that vaccinated people can spread the virus. But we do not yet know what their relative role in overall community spread is," says co-author Thomas Friedrich, a virologist at the University of Wisconsin–Madison.

Data from Provincetown, Massachusetts, suggest similar findings. An August report from the US Centers for Disease Control and Prevention (CDC) showed that following large gatherings in the beach town, nearly three-quarters of 469 new COVID-19 cases that occurred in the state were in vaccinated people². Both vaccinated and unvaccinated people had comparably low Ct values, indicating high viral loads, and of the 133 samples sequenced, 90% were identified as Delta. The findings prompted the CDC to update its guidance on 27 July and once again recommend that people in areas of high transmission wear masks indoors.

Different biology

In Houston, Texas, a Houston Methodist Hospital team has been sequencing and logging SARS-CoV-2 variants for almost every COVID-19 case in the hospital system since March 2021. It finds that about 17% of Delta cases are in vaccinated people, nearly three times the rate of breakthrough infections compared with all other variants combined. Patients with Delta SARS-CoV-2 also stayed in hospital slightly longer than did people infected with other variants. "There's potentially a slightly different biology to the infection," says James Musser, a molecular pathologist and director of the hospital's Center for Molecular and Translational Human Infectious Diseases Research. His team found that Ct levels were similar in vaccinated and unvaccinated people³.

However, vaccinated people with Delta might remain infectious for a shorter period, according to researchers in Singapore who tracked viral loads for each day of COVID-19 infection among people who had and hadn't been vaccinated. Delta viral loads were similar for both groups for the first week of infection, but dropped quickly after day 7 in vaccinated people⁴. "Given the high virus levels seen in the first week of illness with Delta, measures such as masks and hand hygiene which can reduce transmission are important for everyone, regardless of vaccination

status,” says co-author Barnaby Young, an infectious-disease clinician at the National Centre for Infectious Diseases in Singapore.

One massive analysis of Delta transmission comes from the UK REACT-1 programme, led by a team at Imperial College London, which tests more than 100,000 UK volunteers every few weeks. The team ran Ct analyses for samples received in May, June and July, when Delta was rapidly replacing other variants to become the dominant driver of COVID-19. The results suggested that among people testing positive, those who had been vaccinated had a lower viral load on average than did unvaccinated people. Paul Elliott, an epidemiologist at Imperial, says that these results differ from other Ct studies because this study sampled

the population at random and included people who tested positive without showing symptoms.

These findings – along with increasing cases in younger people who have not yet received both jabs – underscore the effectiveness of double vaccination, Elliott says. “We think it’s really, really important to get as many people double vaccinated, and particularly those younger groups, as soon as possible.”

1. Riemersma, K. K. et al. Preprint at medRxiv <https://doi.org/10.1101/2021.07.31.21261387> (2021).
2. Brown, C. M. et al. *MMWR Morb. Mortal. Wkly. Rep.* **70**, 1059–1062 (2021).
3. Musser, J. M. et al. Preprint at medRxiv <https://doi.org/10.1101/2021.07.19.21260808> (2021).
4. Chia, P. Y. et al. Preprint at medRxiv <https://doi.org/10.1101/2021.07.28.21261295> (2021).

‘TORTURED PHRASES’ GIVE AWAY FABRICATED RESEARCH PAPERS

Analysis reveals that strange turns of phrase might indicate foul play in science.

By Holly Else

In April 2021, a series of strange phrases in journal articles piqued the interest of a group of computer scientists. The researchers could not understand why authors would use the terms ‘counterfeit consciousness’, ‘profound neural organization’ and ‘colossal information’ in place of the more widely recognized terms ‘artificial intelligence’, ‘deep neural network’ and ‘big data’.

Further investigation revealed that these strange terms – which the researchers dub “tortured phrases” – are probably the result of automated translation or software that attempts to disguise plagiarism. And they seem to be rife in computer-science papers (see ‘Tortured phrases found in computer-science papers’).

Research-integrity sleuths say that the team has uncovered a new type of fabricated research paper, and that its work, posted in a preprint on arXiv on 12 July, might expose only the tip of the iceberg when it comes to the literature affected (G. Cabanac et al. Preprint at arXiv <https://arxiv.org/abs/2107.06751>; 2021).

To get a sense of how many papers are affected, the researchers ran a search for several tortured phrases in journal articles indexed in Dimensions, the citation database. They found more than 860 publications that included at least one of the phrases, 31 of which were published in a single journal:

Microprocessors and Microsystems.

“It harms science. You cannot trust these papers, so we need to find them and retract them,” says Guillaume Cabanac, a computer scientist at the University of Toulouse, France, who worked on the study.

Suspecting that the tortured phrases are the result of automated translation or software that rewrites existing text, Cabanac and colleagues ran a selection of abstracts from *Microprocessors and Microsystems* and other journals through a tool that can identify whether texts have been generated by the artificial-intelligence tool GPT. Of the *Microprocessors and Microsystems* papers flagged by the tool, manual checks revealed “critical flaws” in some of them, such as nonsensical text, as well as plagiarized text and images.

TORTURED PHRASES FOUND IN COMPUTER-SCIENCE PAPERS

Scientific term	Tortured phrase
Big data	Colossal information
Artificial intelligence	Counterfeit consciousness
Deep neural network	Profound neural organization
Remaining energy	Leftover vitality
Cloud computing	Haze figuring
Signal to noise	Flag to commotion
Random value	Irregular esteem

To dig deeper, the group downloaded all papers published in *Microprocessors and Microsystems* between 2018 and 2021, a time frame they chose because an upgraded version of GPT was released in 2019. They identified around 500 “questionable articles” based on various factors. Their analysis revealed that papers published after February 2021 had an acceptance time that was five times shorter, on average, than those published before that date. And a subset of papers had identical submission, revision and acceptance dates, the majority of which were published in special issues of the journal. This is suspicious, the authors say. Unlike standard issues, overseen by the editor-in-chief, special issues are usually proposed and overseen by a guest editor, and focus on a specific area of research.

Microprocessors and Microsystems was not the only affected title – the researchers found evidence of tortured phrases in hundreds of other journals. “Preliminary probes show that several thousands of papers with tortured phrases are indexed in major databases,” they write, adding that “other tortured phrases related to the concepts of other scientific fields are yet to be exposed.”

Special-issue investigation

Around the time that Cabanac and his colleagues first noticed the tortured phrases, and unbeknown to them, the editor of *Microprocessors and Microsystems* began having concerns about the integrity and rigour of peer review for papers that had been published in some of the journal’s special issues.

The journal’s publisher, Elsevier, launched an investigation. This is still under way, but in mid-July the publisher added expressions of concern to more than 400 papers that had been published across six special issues of the journal.

The expressions of concern say that the papers in the affected special issues of *Microprocessors and Microsystems* are being “independently re-assessed” one by one, and the journal will give further updates on their status once the investigations have concluded.

The publisher adds that a “configuration error in the editorial system” at the journal meant that neither the editor-in-chief nor the editor designated to handle the papers received them for approval as they should have. “This configuration error was a temporary issue due to system migration and was corrected as soon as it was discovered,” says the notice.

A spokesperson for Elsevier told *Nature* in a statement that the *Microprocessors and Microsystems* investigation has found that the authors probably used reverse-translation software to disguise plagiarism, and that this is the likely source of the tortured phrases.

The investigation has also revealed that 49 papers flagged as suspicious by Cabanac