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## Covid-19: Omicron may be more transmissible than other variants and partly resistant to existing vaccines, scientists fear

Ingrid Torjesen

Omicron, the SARS-CoV-2 variant responsible for a cluster of cases in South Africa and that is now spreading around the world, is the most heavily mutated variant to emerge so far and carries mutations similar to changes seen in previous variants of concern associated with enhanced transmissibility and partial resistance to vaccine induced immunity.

Daily case numbers in South Africa had been fairly low but then rose rapidly from 273 on 16 November to more than 1200 by 25 November, more than 80% of which were in the northern province of Gauteng, where the first cases were seen.

Europe's first case of the variant was confirmed in Belgium on 26 November in a person who tested positive for covid-19 on 22 November. By 29 November cases had been reported in the Netherlands, France, Germany, Portugal, and Italy. The UK had recorded nine cases by the morning of 29 November, six of them in Scotland.

Elsewhere in the world cases have been reported in Botswana, Hong Kong, Canada, and Australia, which has had extremely tight border controls through the pandemic.

Some countries, including Japan and Israel, were quick to close their borders to all foreign travellers, while others, such as the UK and EU countries, enforced quarantine for travellers from South Africa and neighbouring countries after the World Health Organization designated omicron an official variant of concern on 26 November.

To slow the spread of the variant the UK government has announced that masks are again to become compulsory on public transport and in shops and schools, all contacts of people with a case of omicron will be required to isolate for 10 days, and all travellers entering the country will have to take a PCR test two days later and to self-isolate until they receive a negative result. On 29 November the government was expected to announce that the vaccine booster programme would be expanded to people under 40, after a recommendation from the Joint Committee on Vaccination and Immunisation.

Chaand Nagpaul, chair of council at the BMA, said that mandatory mask wearing should be extended to all public indoor and closed settings, including for staff in the hospitality industry, such as restaurants, and beauty salons. "This addition to government measures will have minimal economic and social impact, but evidence tells us that it will help to further reduce the spread of the virus," he said. "We only have a small window of opportunity to get this right to ensure that we don't lose control of this new variant, which has the potential to have a devastating

impact on the health service. The government must act now, or we risk seeing even more unnecessary deaths."

### Novel mutations

Lawrence Young, a virologist and professor of molecular oncology at Warwick Medical School, said, "This new variant of the covid-19 virus is very worrying. This variant carries some changes we've seen previously in other variants but never altogether in one virus. It also has novel mutations that we've not seen before."

In total, the variant's genome has around 50 mutations, including more than 30 in the spike protein, the part that interacts with human cells before cell entry and that has been the primary target for current vaccines.

David Matthews, professor of virology at the University of Bristol, said that there have been several variants of concern that have turned out not to be as worrying as first thought but that it was important to be cautious at this stage. "There is also the risk that the variant might be better at spreading than the delta variant, and then you speed up the rate at which people are fed into the NHS or any healthcare system, particularly the unvaccinated, which makes it harder and harder for any healthcare system to cope," he said.

Sharon Peacock, director of the COG-UK Genomics UK Consortium and professor of public health and microbiology at the University of Cambridge, said that the effects of the detected mutations on the omicron variant's functionality were unknown. "Studies are being rapidly conducted in South Africa to look at antibody neutralisation of this variant, as well as interactions with T cells, but these studies are going to take several weeks to complete," she said.

Even if current vaccines proved to be less effective against omicron, they were likely to still provide some protection, said Wendy Barclay, leader of the G2P-UK National Virology Consortium and research chair in virology at Imperial College London, and she urged the general public to take up all vaccine shots offered. "If we have a variant that is antigenically distant and isn't neutralised at a certain level of antibody, there is something we can do: we can boost the overall antibody levels, because sometimes quantity can compensate for the lack of match," she said. "I would strongly urge people to take the opportunity to give their immune systems the best quantitative chance that they have by getting booster doses and the full course of vaccination."

Scientists praised South African authorities for their quick action in identifying the variant and putting the world on alert.

Investigation of a similar rise in cases last winter in Kent had also led to the quick identification of the alpha variant.

In contrast, lack of sequencing capability in India meant it took many weeks before the delta variant was found to be behind a rise in cases there. “By that point, delta had already seeded itself in many parts of the world,” said Jeffrey Barrett, director of the Covid-19 Genomics Initiative at the Wellcome Sanger Institute, at a Science Media Centre briefing.

One of the omicron variant’s mutations leads to “S gene target failure” (or “S gene dropout”), meaning that one of several areas of the gene that are targeted by PCR testing gives a false negative. This can be used as a “surrogate marker,” allowing genome sequencing to be targeted, Peacock said, particularly where circulating strains are predominantly S gene positive, as is the case with the delta variant.