

New variants of the coronavirus are causing concern

While news of the Government's success in meeting its target of vaccinating the 15 million people in its first four priority groups by Monday is welcome, the war against the SARS-CoV-2 virus is still very far from over. Conservative MPs are pressing the Prime Minister to reopen the economy by stripping away all restrictions as soon as the next batch of vulnerable people are vaccinated, which is likely to be in April. Boris Johnson is reported to be more cautious than this, and he is right to be. Yet his plan to reopen all schools for face-to-face learning for all children in early March could still be premature.

While all the metrics are going in the right direction, from the R rate to hospitalisations and deaths, the virus is changing all the time. There has been much media talk about the British variant, but as Public Health England noted in its statement last Wednesday (the documents referred to in this article are listed below) over 4,000 SARS-CoV-2 variants have been identified across the globe. Most of these are of no concern. Fortunately, the number that are is very small, but these new Variants of Concern (VOCs) are something that school and college leaders will have to keep an eye on as their emergence could make the difference between the risk of opening up schools being manageable to it being an unacceptable risk to staff and wider society.

Last Saturday Public Health England published *Investigation of SARS-CoV-2 Variants of Concern in England: Technical briefing 6*. This listed the four variants that are of concern. They are:

- VOC 202012/01 (B.1.1.7), first detected in Kent and known as the UK variant, it is predominant in all regions of the UK and is circulating in multiple countries.
- VOC 202102/02 (B.1.1.7 cluster with E484K mutation), first detected in South West England it has been detected in 23 cases.
- VOC 202012/02 (B.1.351), first detected in South Africa, 126 case have been detected in England with evidence of in country transmission. Local testing is underway and links between cases are being investigated.
- VOC 202101/02 (P.1), first detected in Brazil has not been detected in the UK.

Table 1. Total case numbers England per VOC as of 10 February 2021

| Variant | Pangolin lineage | England genomic cases 10 February 2021 | | |
|---------------|----------------------------|--|----------|--------|
| | | confirmed | probable | total |
| VOC 202012/01 | B1.1.7 | 50,148 | 5,774 | 55,922 |
| VOC 202102/02 | B.1.1.7 with E484K cluster | 23 | 0 | 23 |
| VOC 202012/02 | B.1.351 | 126 | 56 | 182 |
| VOC 202101/02 | P1 | 0 | 0 | 0 |

The above table, taken from *Technical Note No. 6*, gives details of the four VOCs as of last Wednesday.

On Thursday 21 January the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) presented a paper to the Scientific Advisory Group for Emergencies (SAGE) which noted that “the variant of concern (VOC) B.1.1.7 appears to have substantially increased transmissibility compared to other variants and has grown quickly to become the dominant variant in much of the UK” and that “initial assessment by PHE of disease severity through a matched case-control study reported no significant difference in the risk of hospitalisation or death in people infected with confirmed B.1.1.7 infection versus infection with other variants.”

However, the NERVTAG paper also noted that “several new analyses are however consistent in reporting increased disease severity in people infected with VOC B.1.1.7 compared to people infected with non-VOC virus variants.” It was too early to say how far these early analyses would confirm this change in understanding of the effects of B.1.1.7 as there were “several limitations” to these early studies, but NERVTAG felt confident to predict that “based on these analyses, there is a realistic possibility that infection with VOC B.1.1.7 is associated with an increased risk of death compared to infection with non-VOC viruses.”

Last Thursday NERVTAG published another paper on B.1.1.7 updating the first. NERVTAG reported that “updated and additional analyses, which together strengthen the earlier finding of increased disease severity in people infected with VOC B.1.1.7 compared to other virus variants.” In other words, NERVTAG’s understanding of the impact of the VOC had evolved and changed. NERVTAG’s updated advice was clear. “Based on these analyses, it is likely that infection with VOC B.1.1.7 is associated with an increased risk of hospitalisation and death compared to infection with non-VOC viruses.” This illustrates how little we often know, especially about new developments, and how new knowledge can dramatically alter the conclusions we draw.

NERVTAG constantly keeps new variant developments under review. On Wednesday 27 January, for example, NERVTAG put a paper up to SAGE on the P.1 variant. Variant P.1 was first identified in Japan amongst travellers from Brazil. The NERVTAG paper noted that “increased transmissibility of the P.1 variant is biologically and epidemiologically plausible but at this time there is insufficient evidence to confirm or refute this. At this time, there is insufficient evidence to assess whether variant P.1 is associated with any change in disease severity.”

Yet NERVTAG had “reasons to be concerned” about this variant. It wasn’t prevalent in Britain yet, but it was a potential threat. The variant contained three mutations of known biological importance: K417T, E484K, and N501Y. NERVTAG concluded that “increased transmissibility is biologically and epidemiologically plausible, but at this time there is insufficient evidence to confirm or refute this.”

The presence of the E484K spike protein mutation also crops up in the B.1.1.7 VOC. It was first identified by Public Health England (PHE) on 10 January, while

investigating a cluster of five cases linked to members of staff from a hospital in Liverpool. So far, 55 cases of this variant have been found.” The E484K mutation is present on the Variant of Concern first detected in South Africa (VOC-202012/02), as well as a number of other variants sequenced globally. Although there is currently no evidence this mutation alone causes more severe illness or greater transmissibility, it is reported to result in weaker neutralisation by antibodies in laboratory experiments.

Dr Susan Hopkins, COVID-19 Strategic Response Director at PHE, said: “While we expect that the vaccines will still prevent severe illness and deaths, we are taking public health action on clusters of variants with E484K to reduce the risk of spread in our population. We will be implementing the necessary public health action to mitigate the spread of these variants and will continue to monitor them closely. It remains absolutely vital that people continue to stay at home where possible, and follow the guidance on face coverings, social distancing and hand hygiene.” Any final decision to reopen schools to face-to-face learning for all will have to take account of this advice. It runs counter to the pressure from some politicians to reopen the economy as well as schools. The new South African variant, VOC202102/02, has been designated a variant of concern as it has arisen as a result of a mutation on the Variant of Concern VOC202012/01 (the British variant) and retains the characteristics that led to its parent variant being designated a VOC originally with an additional mutation of the critical E484K.

It is to counter this South African variant that the British Government is going to such lengths with its airport isolation plan. The degree to which it succeeds in keeping this variant out, for there are few cases prevalent in the UK at present, will be relevant in the decision on whether to open up schools or the economy next month or later. The outcome of the race between the virus and the vaccines is far from certain, although at present the vaccine manufacturers are confident that all that will be needed for the vaccines to work with the new variants we know of will be no more than tweaks. However, the variants that we don't yet know of may be another matter.

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Editor, *Education Journal*
Wednesday 17 February 2021

The reports that this article is based on that were published over the last few days are listed below.

NERVTAG presentation on B.1.1.7 Variant of Concern (VOC) to SAGE on Thursday 21 January 2021, the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) paper by Peter Horby, Catherine Huntley, Nick Davies, John Edmunds, Neil Ferguson, Graham Medley and Calum Semple produced for the Scientific Advisory Group for Emergencies (SAGE) on Thursday 21 January 2021 and published on Friday 12 February 2021.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/961037/NERVTAG_note_on_B.1.1.7_severity_for_SAGE_77__1_.pdf

Update on Advice to SAGE on VOC B.1.1.7, the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) paper produced for the Scientific Advisory Group for Emergencies (SAGE) on Thursday 11 February 2021 and published on Friday 12 February 2021.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/961042/S1095_NERVTAG_update_note_on_B.1.1.7_severity_2021_0211.pdf

NERVTAG. Brief Note on SARS-CoV-2 VOC P.1, the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) paper produced for the Scientific Advisory Group for Emergencies (SAGE) on Wednesday 27 January 2021 and published on Friday 12 February 2021.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/961117/s1064-nervtag-variant-note-P1-270121.pdf

PHE Statement on Variant of Concern and New Variant Under Investigation, statement by Public Health England (PHE) following the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) naming one additional SARS-CoV-2 Variant Under Investigation and one additional Variant of Concern. Published by Public Health England on Wednesday 10 February 2021.

https://www.gov.uk/government/news/phe-statement-on-variant-of-concern-and-new-variant-under-investigation?utm_medium=email&utm_campaign=govuk-notifications&utm_source=af74f22e-3c24-497b-8623-67f60b332b33&utm

Investigation of SARS-CoV-2 Variants of Concern in England: Technical briefing 6, Public Health England, published on Saturday 13 February 2021.

https://www.gov.uk/government/publications/investigation-of-novel-sars-cov-2-variant-variant-of-concern-20201201?utm_medium=email&utm_campaign=govuk-notifications&utm_source=4b62b597-96f0-49fe-9aa3-909ee4991296&utm_content=immediately