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# Twitter Thread by Dr Emma Hodcroft

**Dr Emma Hodcroft**
@firefoxx66

**Happy Tuesday! The latest focal S:N501 build is now updated with sequences from 11 Jan.**
**There are 101 new sequences in the 501Y.V1 (B.1.1.7 #b117) & 501Y.V2 variants.**

**Additionally, I'll include some updates on S:E484K in this thread.**

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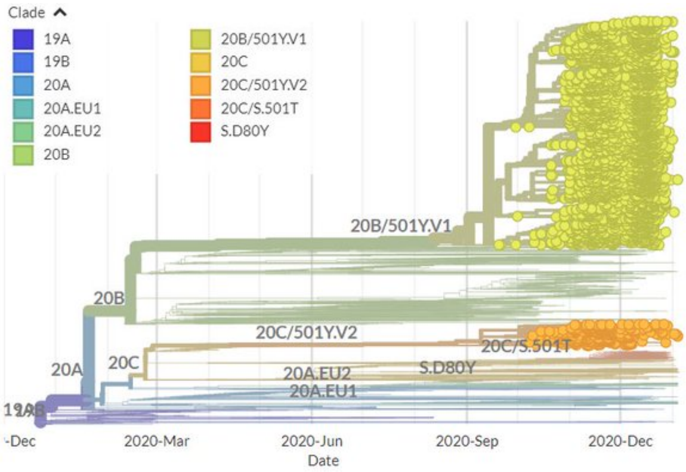
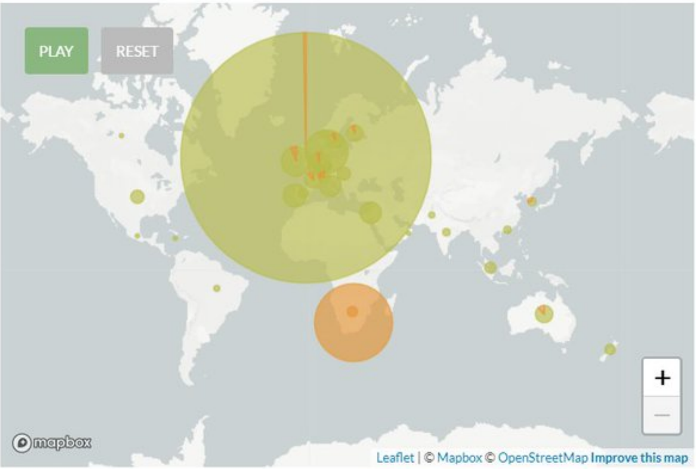
**https://t.co/dXx6nk6Llz**





There are 97 new non-UK sequences in 501Y.V1, including the first sequences in the cluster from Slovakia, Mexico, & Belgium, plus additional sequences from the Netherlands, Denmark, Australia, Spain, Ireland, & Sweden.

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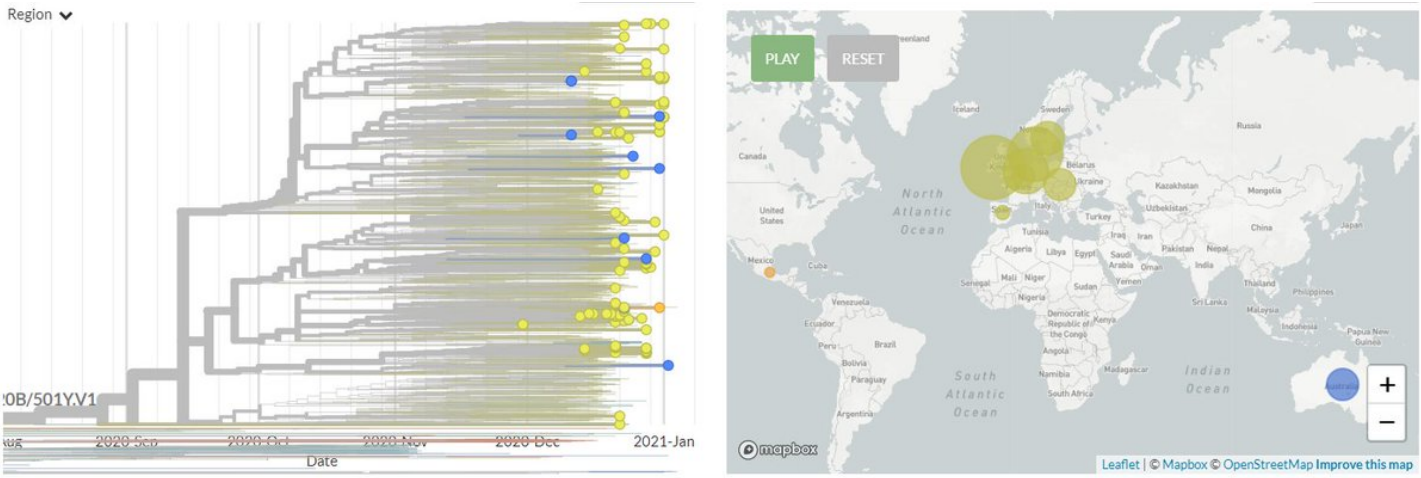

Slovakia has 10 sequences that fall in 501Y.V1 for the first time. These are closely linked, & likely indicate a single introduction and ongoing transmission (remember: vertical distance is not meaningful on the same branch - position of the 2 English samples is arbitrary).

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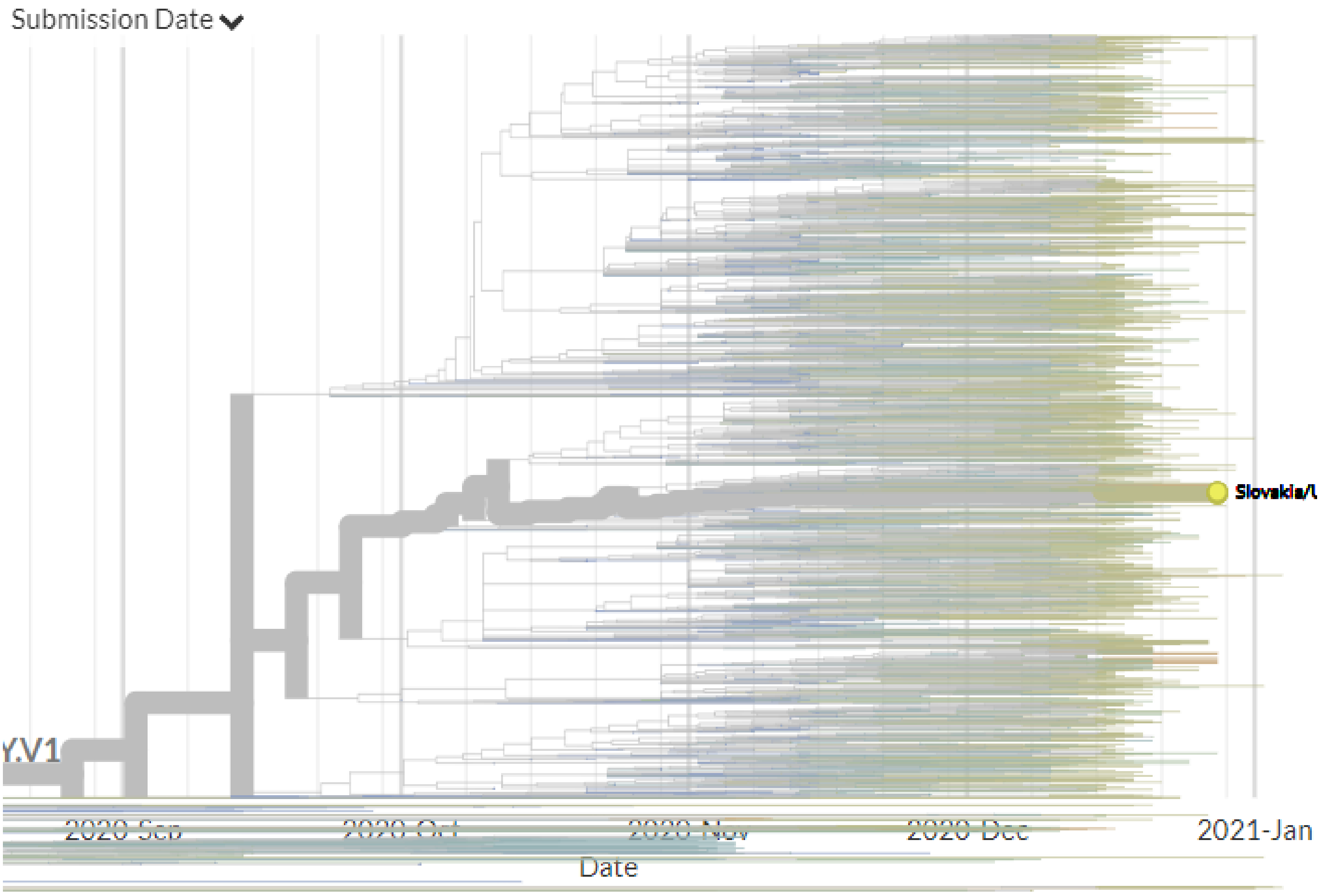

Belgium has 5 sequences in 501Y.V1 for the 1st time, indicating 3 separate intros. 3 seqs cluster together (zoomed, divergence), indicating a single introduction. The connection to Netherlands might indicate transmission, or 2 transmissions from same diversity in the UK.

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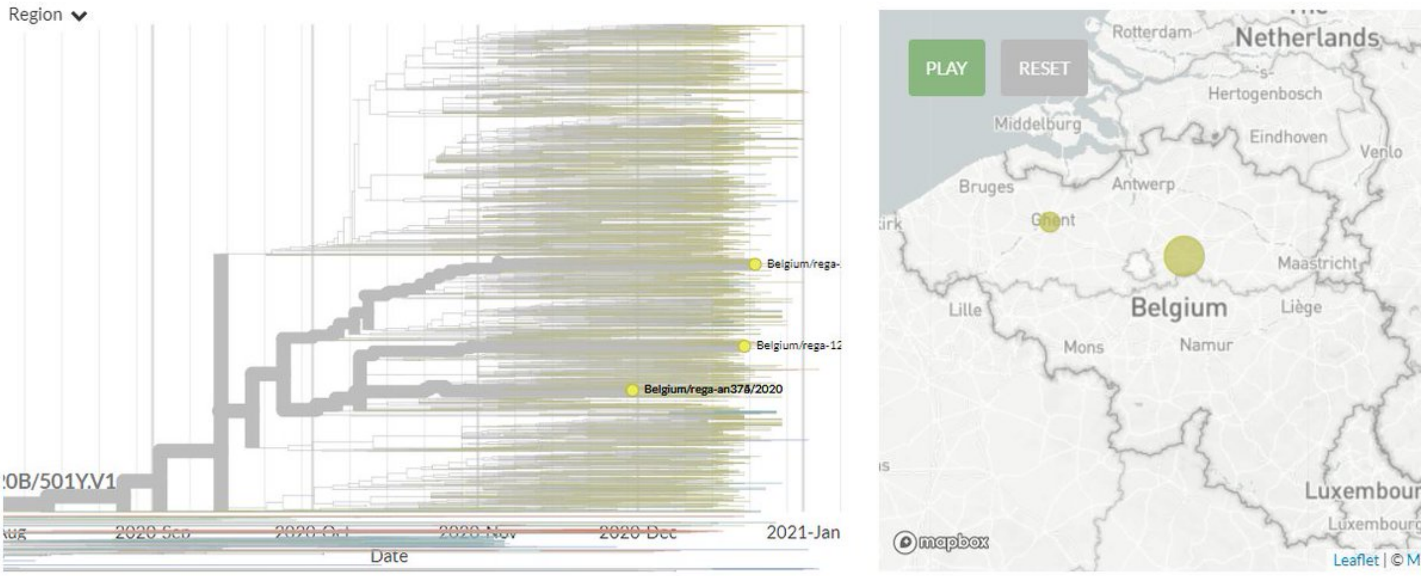

Mexico also has a sequence that falls into 501Y.V1 for the first time.

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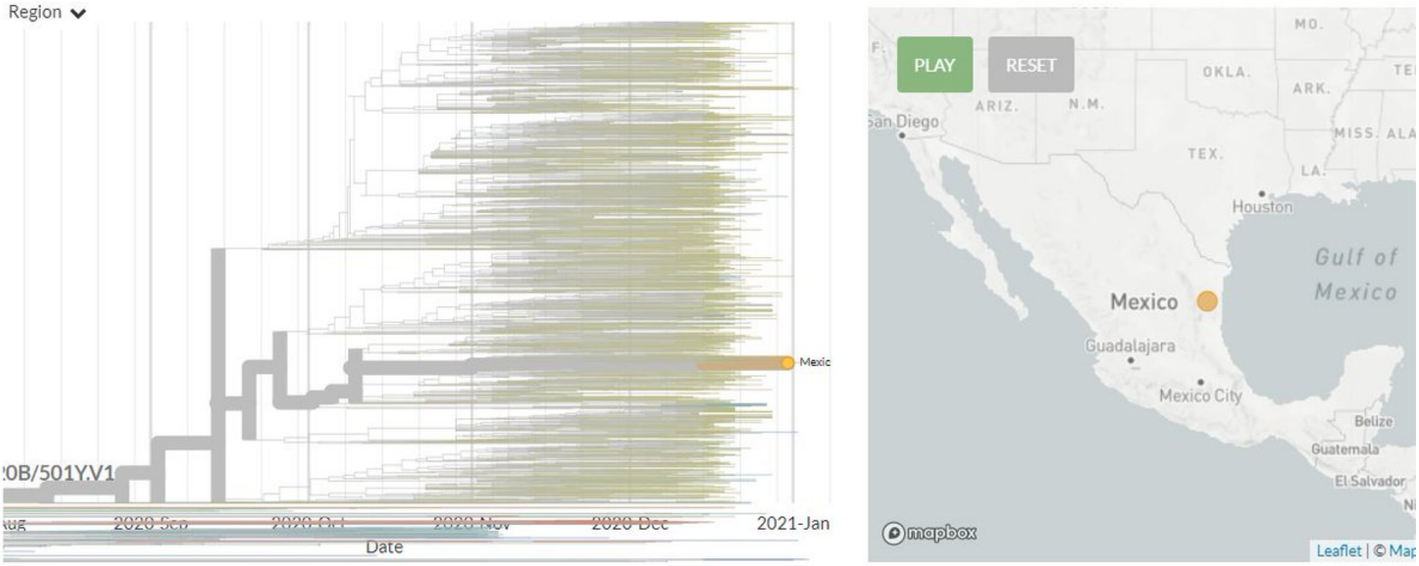

Ireland has 36 new sequences. Many represent separate introductions, but some do cluster with older sequences & may represent local transmission, or introductions from the same UK diversity.

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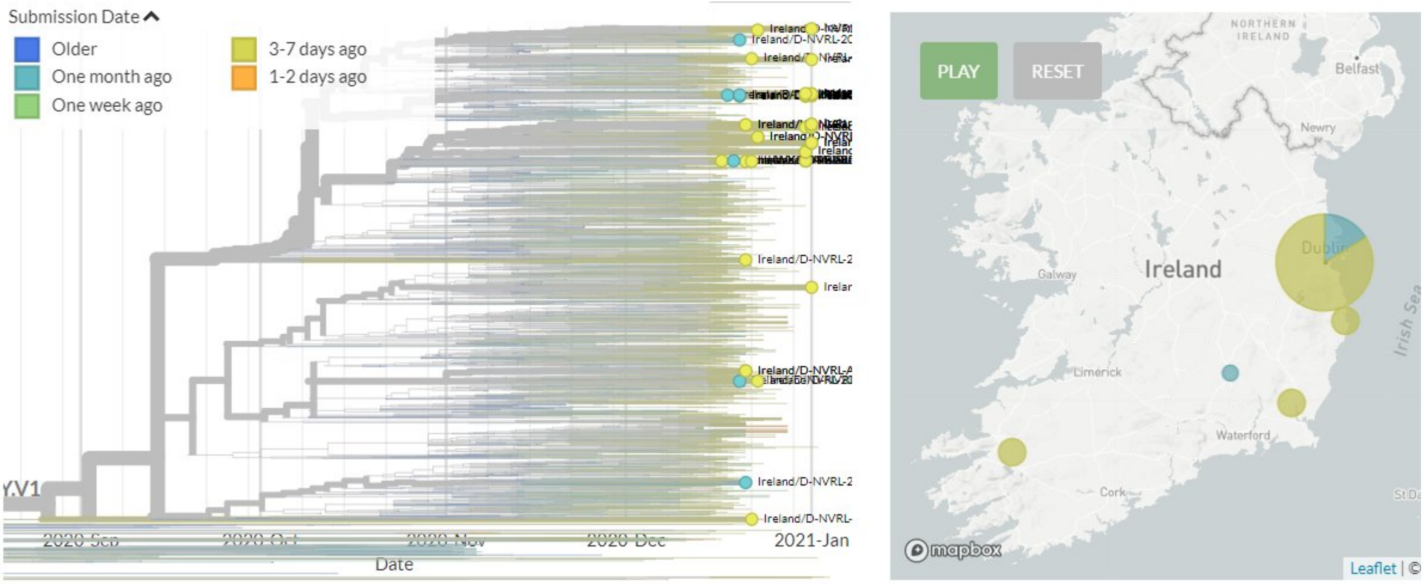

Denmark has 29 new sequences (orange). These represent both new introductions, and further expansion of the large cluster (zoomed view).

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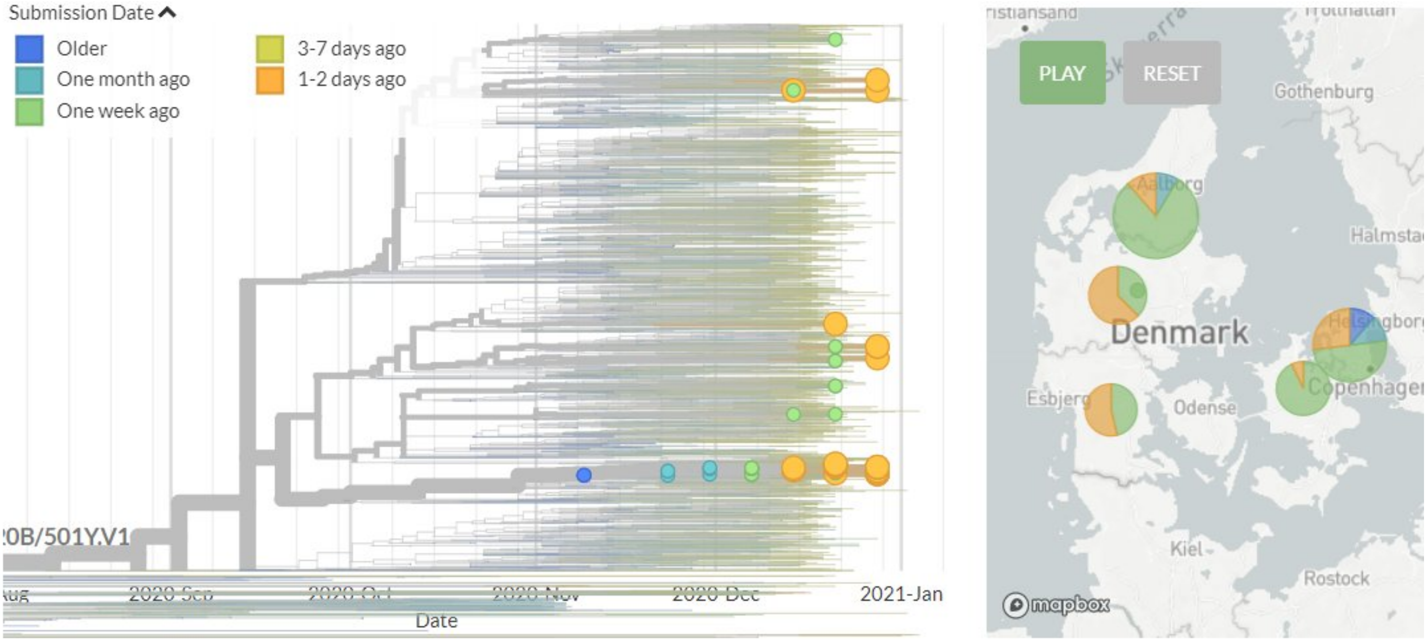

The Netherlands have 6 new sequences. All fall within the section of the tree marked in red.
Zooming in, the new sequences are marked in red: 2 are separate introductions. Zooming in further (divergence view), cluster at the top are identical to an older sequence.

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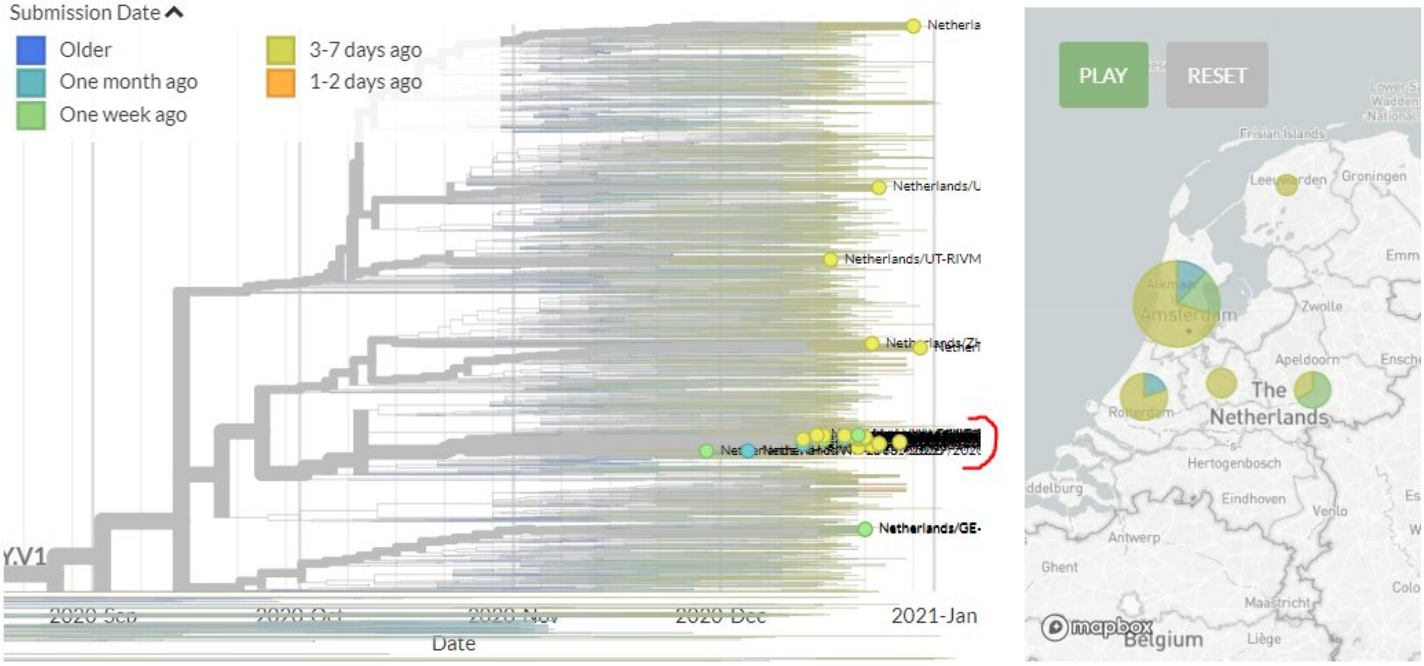

Australia has 6 new sequences, including the first from Northern Territory and Victoria. 1 pair of sequences from Victoria are identical to each other, representing one introduction.

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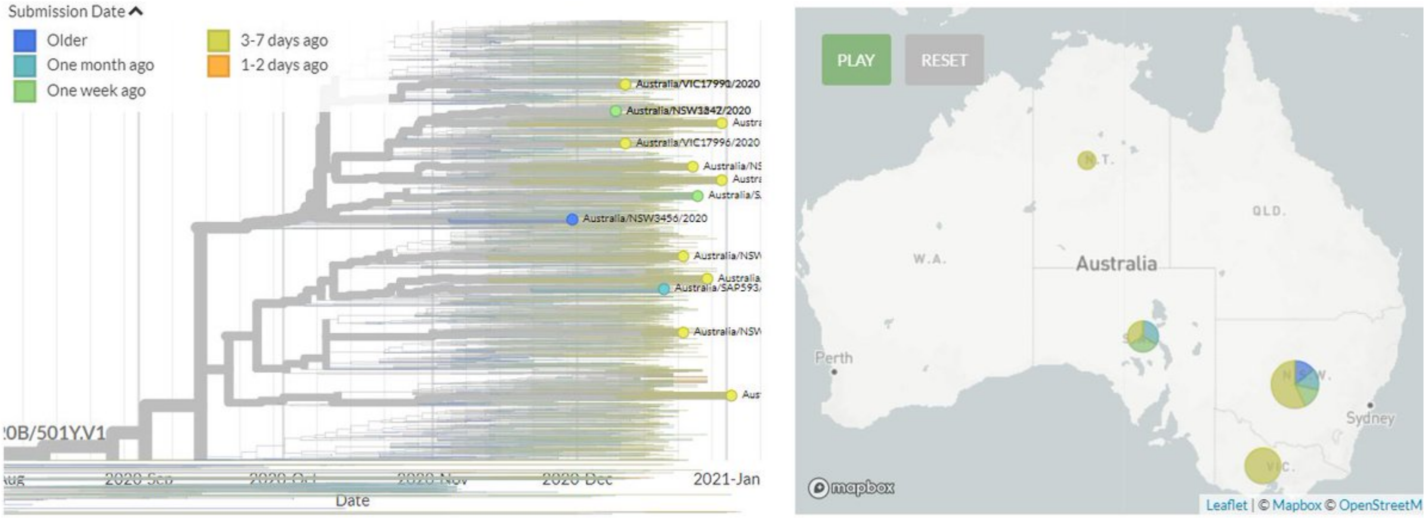

Spain has 2 new sequences (yellow). One represents a separate introduction. The other links to older Spanish sequences, but it's unclear from sequences alone if this is local transmission or transmissions from a common source.

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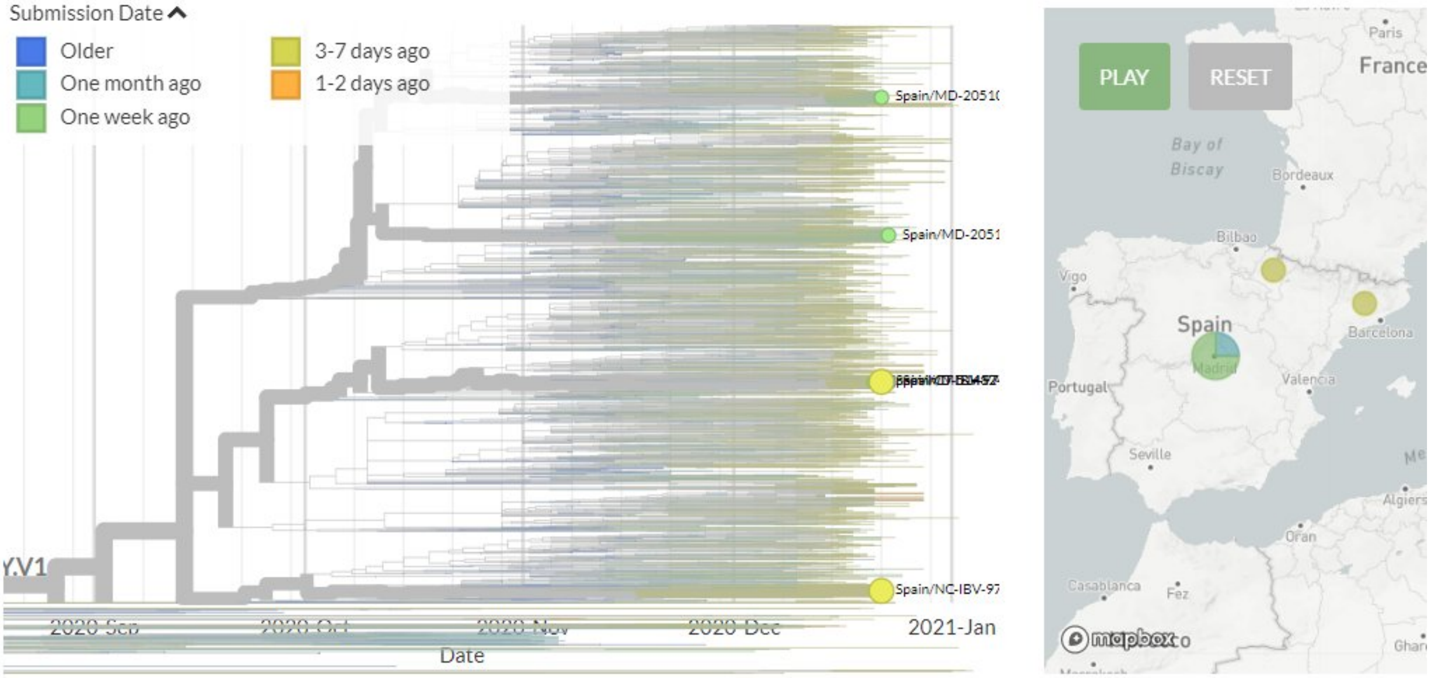

Sweden has 2 new sequences, marked in red. Both represent independent introductions. The second one is hard to see, but zooming in shows this more clearly.

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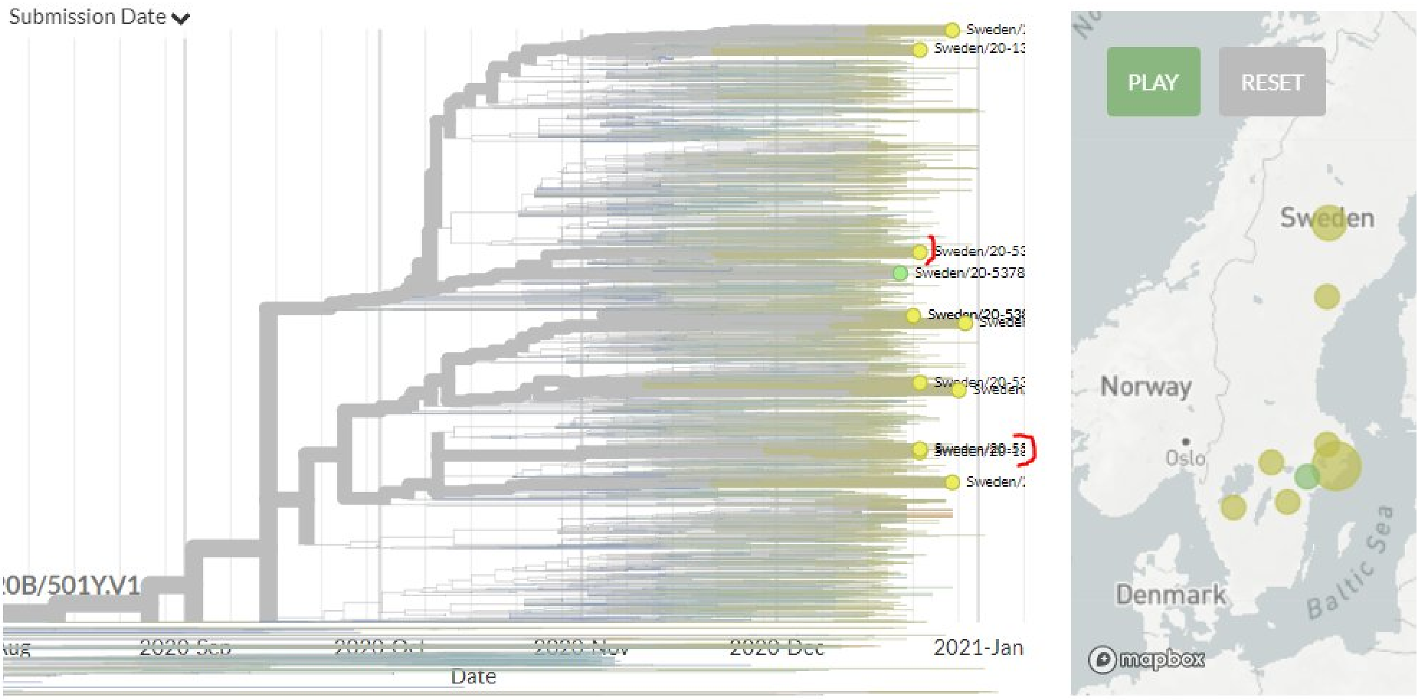

Now turning to 501Y.V2:

There are 4 new non-South African sequences in 501Y.V2, including the first from Ireland (3) and the Netherlands (1).

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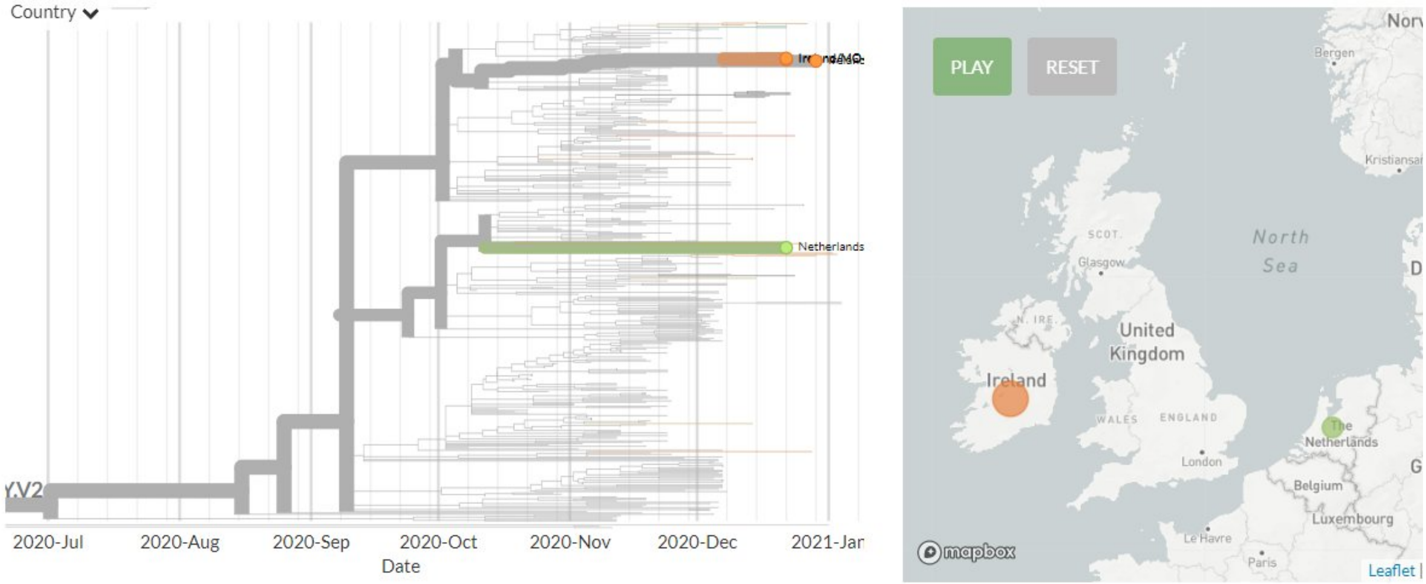

Ireland has 3 sequences in 501Y.V2 for the first time. They cluster together, and may indicate either local transmission, or a common exposure (pictures 1 & 2).

The Netherlands has its first sequence in 501Y.V2 (picture 3).

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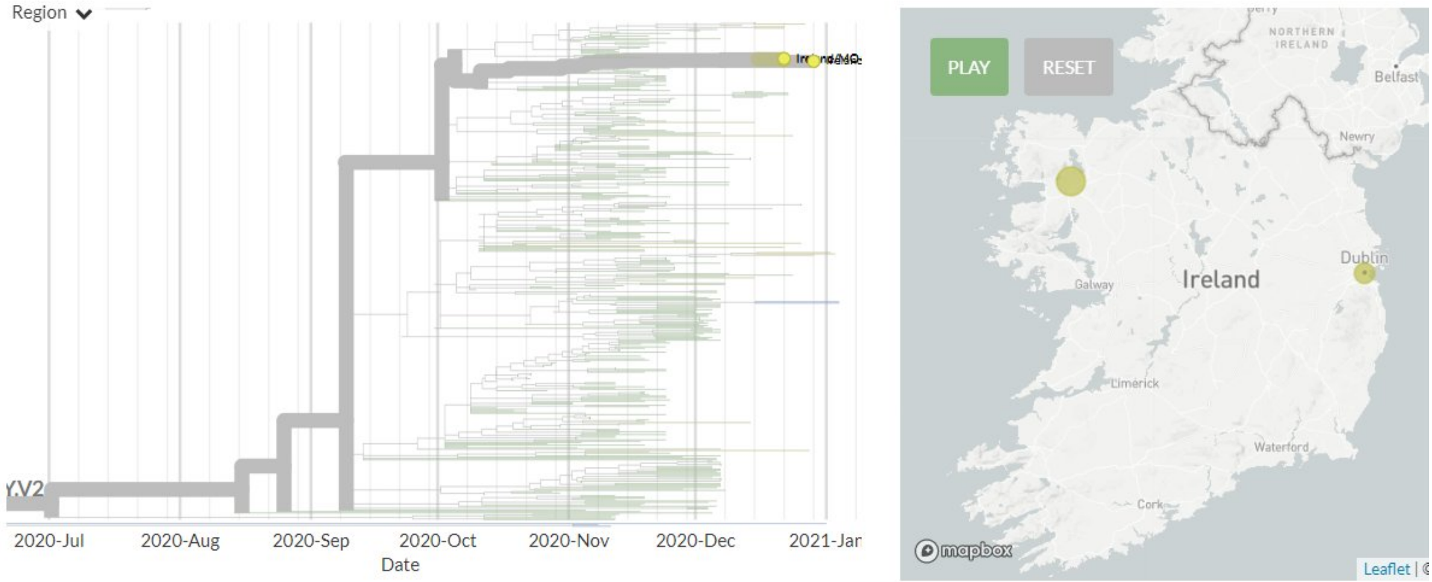

As usual, the updated country graphs are also available. As always, interpret with care: countries are selectively sequencing to track 501Y.V1, so proportions of sequences are not representative for many countries.

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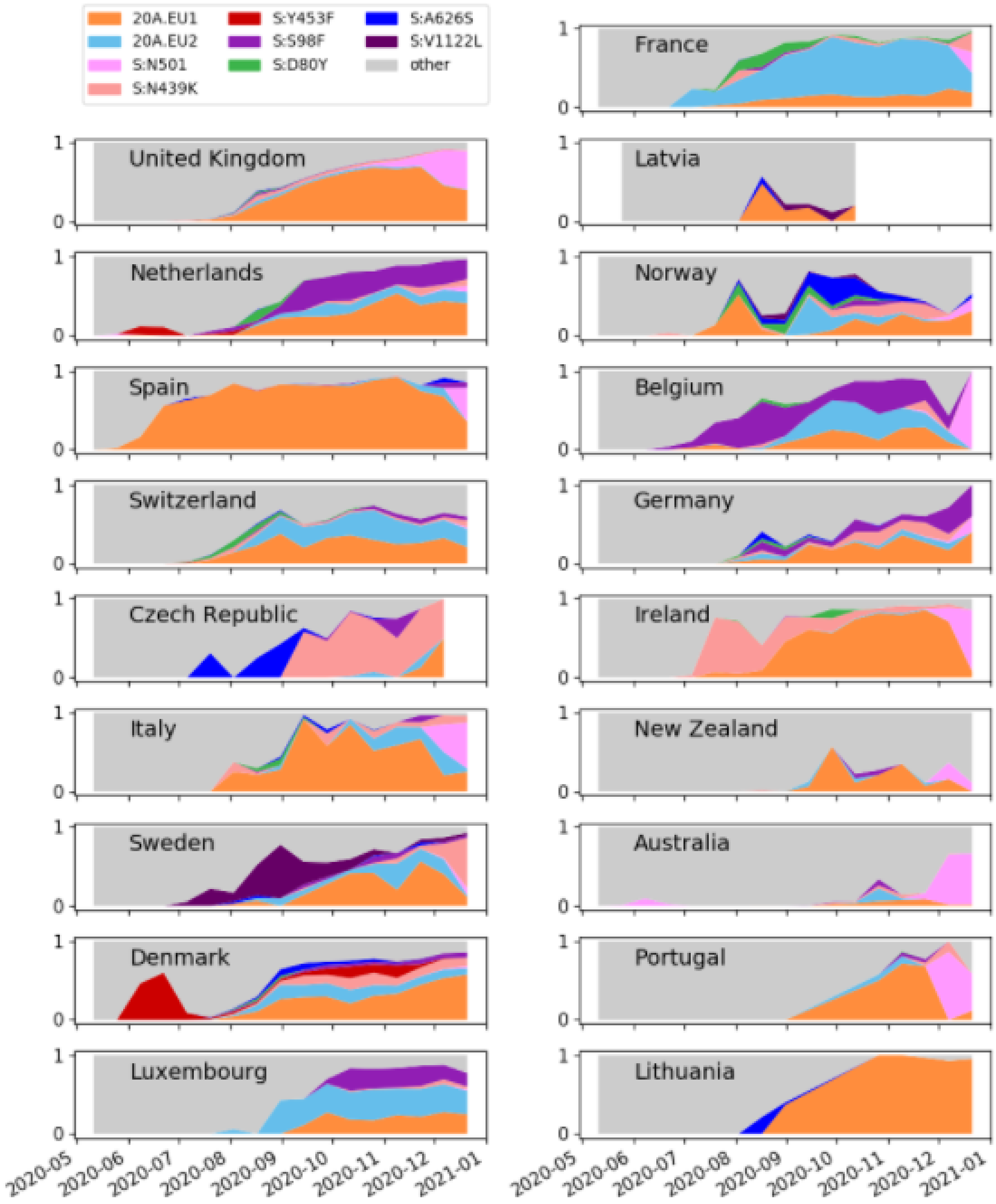
https://t.co/c7wlQOLRiq



Finally, an updated focal S:E484 build is also up.

S:E484K is found predominantly in the 501Y.V2 variant, & in a cluster of sequences primarily in Brazil, though it has appeared numerous times in the past.

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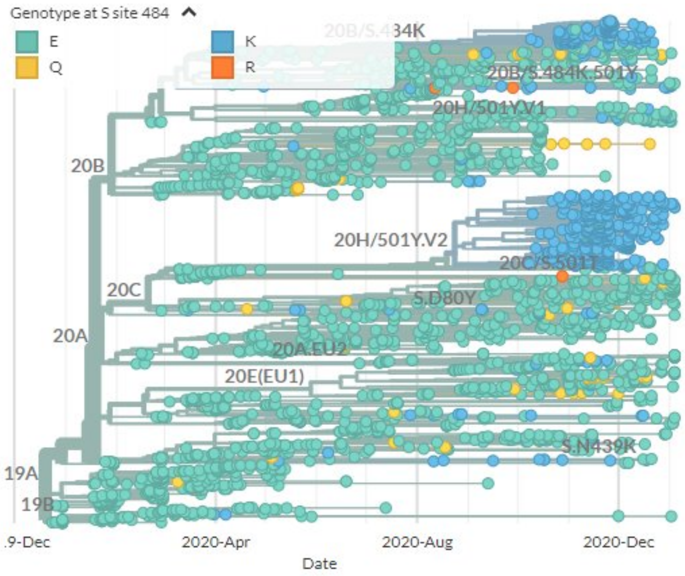
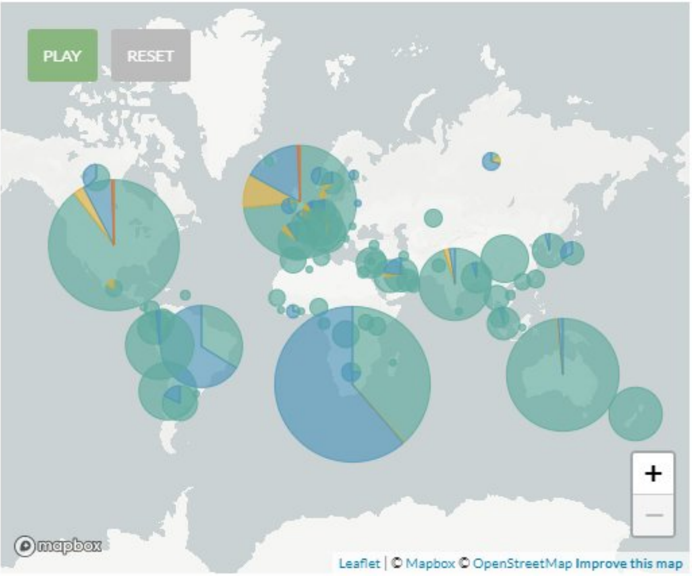
https://t.co/Od95D6DL74





S:E484K has been discussed recently as there are suggestions it may impact how well the immune system can recognise the virus, particularly if you've been infected with SARS-CoV-2 before.

Links to the studies are on https://t.co/SmanZBHpse

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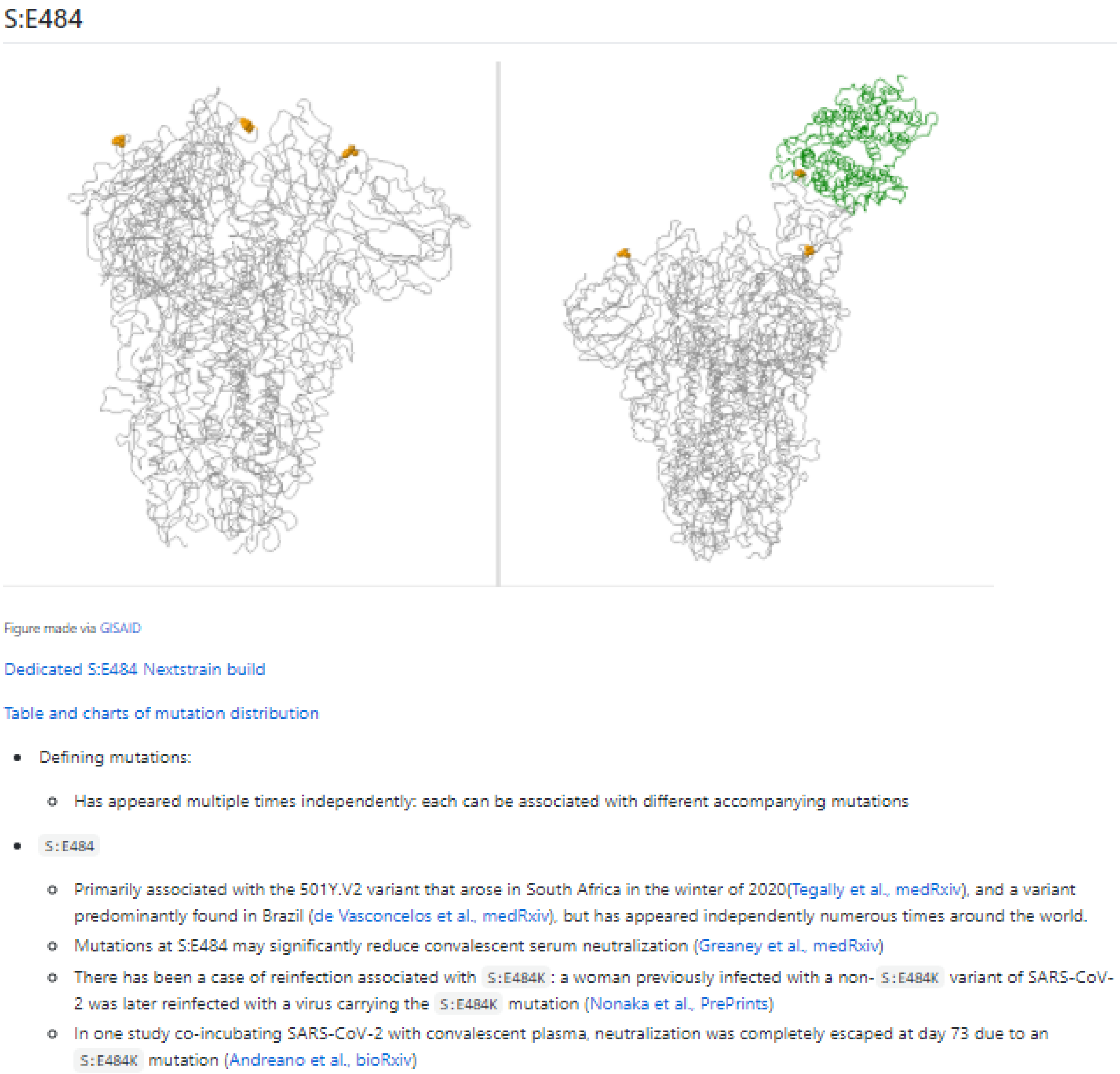

## S:E484

Figure made via GISAID

Dedicated S:E484 Nextstrain build

Table and charts of mutation distribution

- Defining mutations:
    - Has appeared multiple times independently: each can be associated with different accompanying mutations
- `S:E484`
    - Primarily associated with the 501Y.V2 variant that arose in South Africa in the winter of 2020(Tegally et al., medRxiv), and a variant predominantly found in Brazil (de Vasconcelos et al., medRxiv), but has appeared independently numerous times around the world.
    - Mutations at S:E484 may significantly reduce convalescent serum neutralization (Greaney et al., medRxiv)
    - There has been a case of reinfection associated with `S:E484K` : a woman previously infected with a non- `S:E484K` variant of SARS-CoV-2 was later reinfected with a virus carrying the `S:E484K` mutation (Nonaka et al., PrePrints)
    - In one study co-incubating SARS-CoV-2 with convalescent plasma, neutralization was completely escaped at day 73 due to an `S:E484K` mutation (Andreano et al., bioRxiv)

Additionally, over the weekend, travellers from Brazil to Japan were found to be infected with a novel variant with many mutations, including S:E484K & S:N501Y.
Translated report linked below.

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https://t.co/G1ITeT3MoV

To help viewers identify these new samples from Japan, I've added a *temporarily* label to the S:E484K build: 20B/S.484K.501Y.

Additionally, I've added a *temporary* label to the Brazilian cluster with S:E484K: 20B/S.484K.

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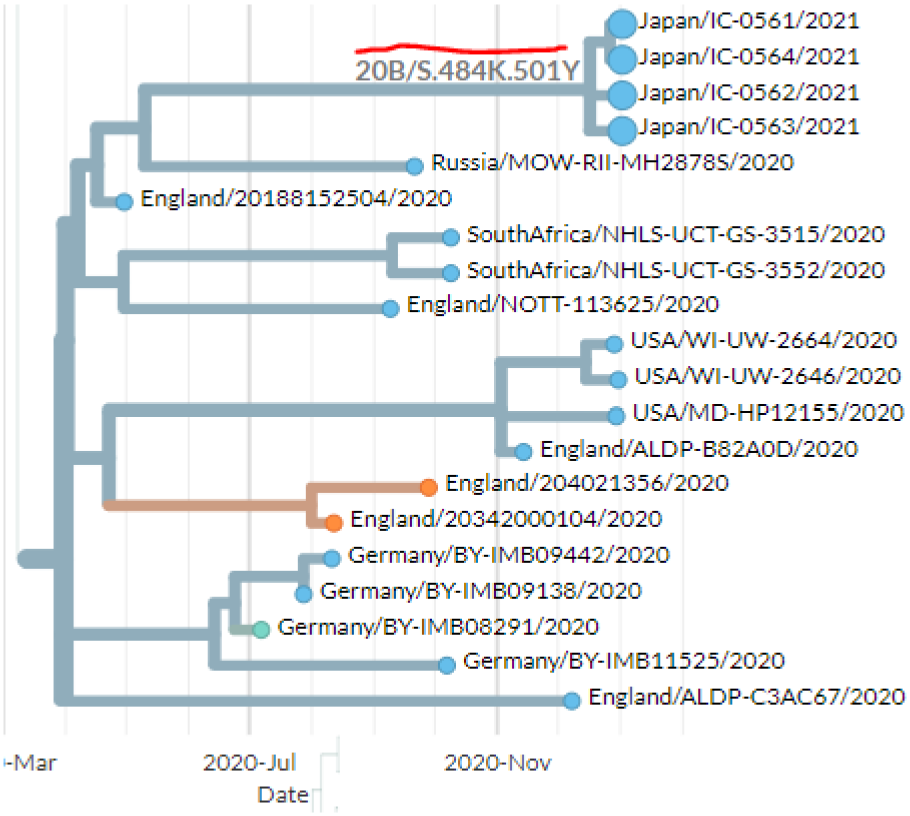

Interestingly, though the recent Japanese sequences carry S:E484K & seem to originate from Brazil, they do *not* branch from the larger 484K cluster in Brazil, but instead sit on a long branch separately within the 20B Clade.

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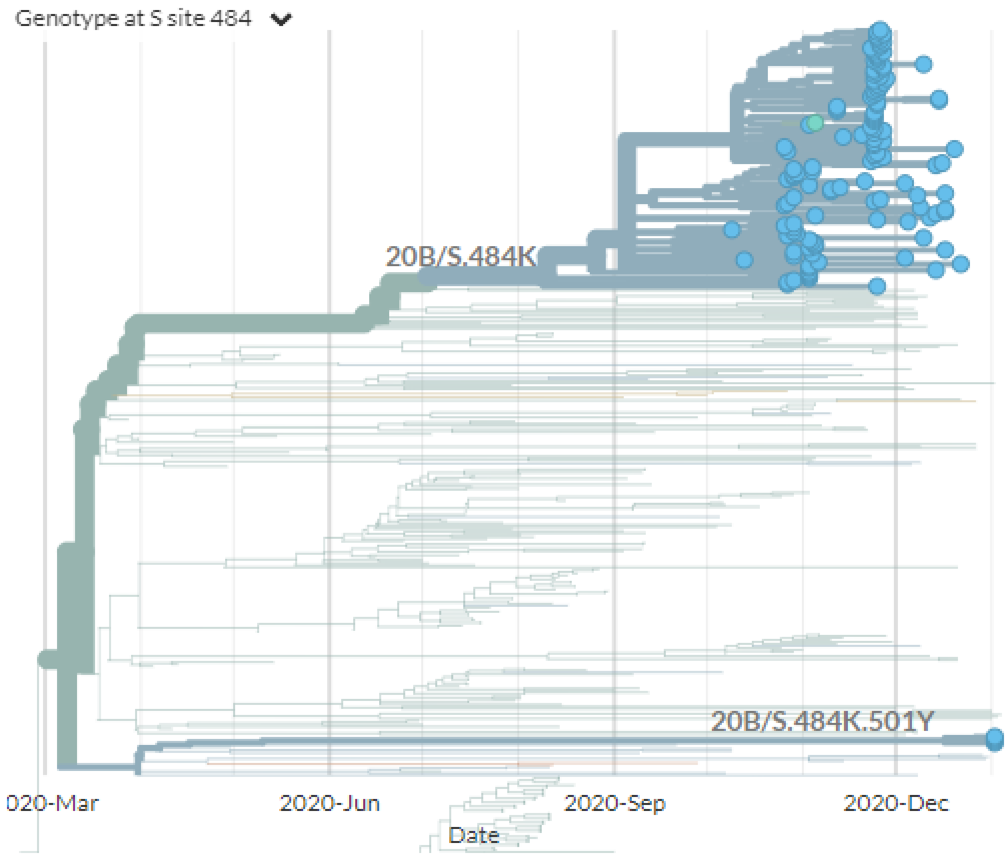

Getting case numbers down saves #LivesAndLivelihoods, and reduces #SARSCoV2's opportunities to explore situations with unique selection pressures, potentially resulting in mutations expanding that we'd rather not see.

Help make my updates more boring: bring cases down!

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PS - For related but slightly-different-angle updates on 501Y.V1 (B.1.1.7) & 501Y.V2 (B.1.351), you should follow @AineToole & keep an eye on her tweets about updated reports!

https://t.co/fZDQqwvJmr

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> Updated SARS-CoV-2 new variant report now available for 2021-01-11 at https://t.co/e3J9becNTz. @arambaut @viralverity @MOUGK pic.twitter.com/x4UabXv5Yt
>
> — \xc1ine O'Toole (@AineToole) January 11, 2021