

COVID-19 Public Health Updates

MarkAlain Dery, DO, MPH, FACOI

Chief Innovation Officer Access Health Louisiana

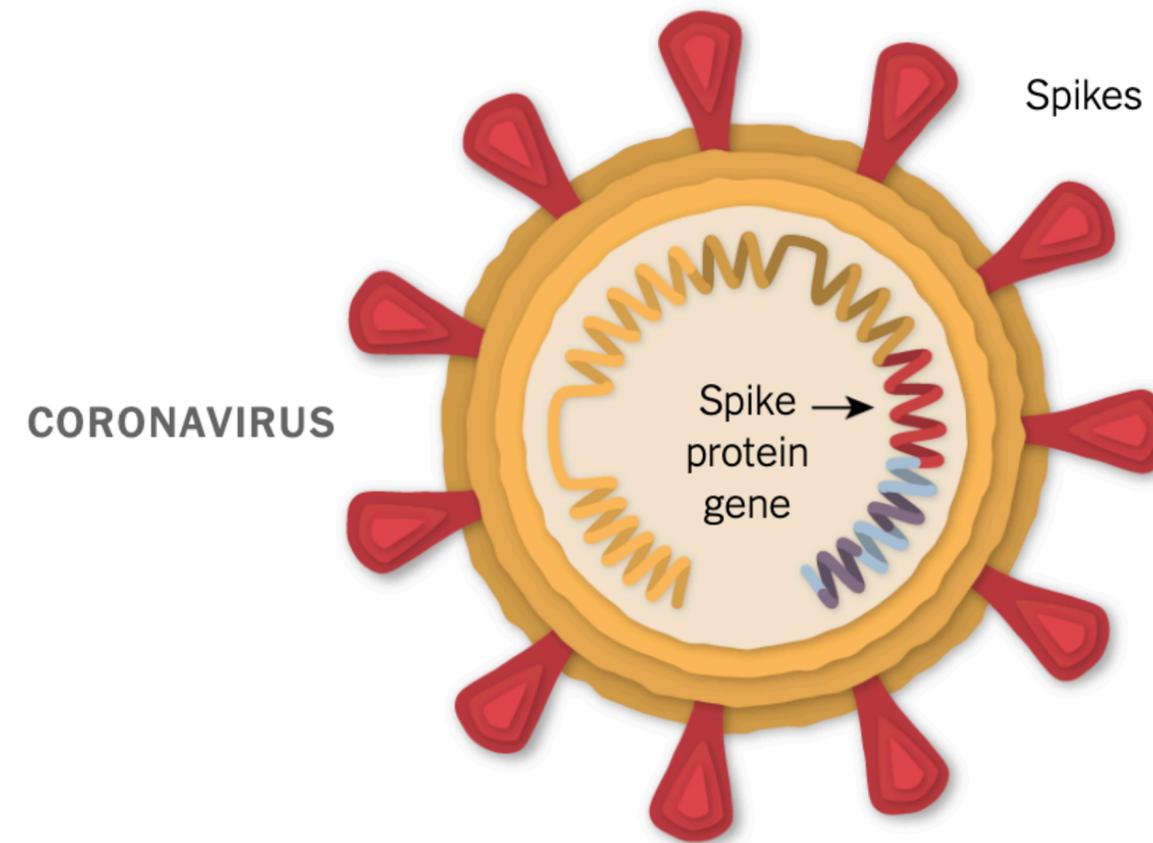
Medical Director of Infectious Diseases Access Health Louisiana

madery@mac.com

504.343.4914

A Piece of the Coronavirus

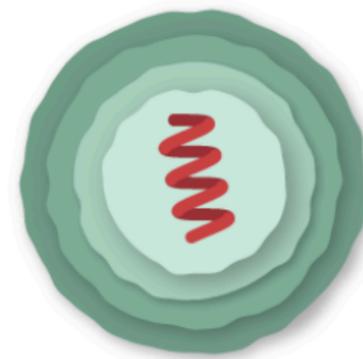
The SARS-CoV-2 virus is studded with proteins that it uses to enter human cells. These so-called spike proteins make a tempting target for potential vaccines and treatments.



Like the Pfizer-BioNTech vaccine, Moderna's vaccine is based on the virus's genetic instructions for building the spike protein.

mRNA Inside an Oily Shell

The vaccine uses messenger RNA, genetic material that our cells read to make proteins. The molecule — called mRNA for short — is fragile and would be chopped to pieces by our natural enzymes if it were injected directly into the body. To protect the vaccine, Moderna wraps the mRNA in oily bubbles made of lipid nanoparticles.

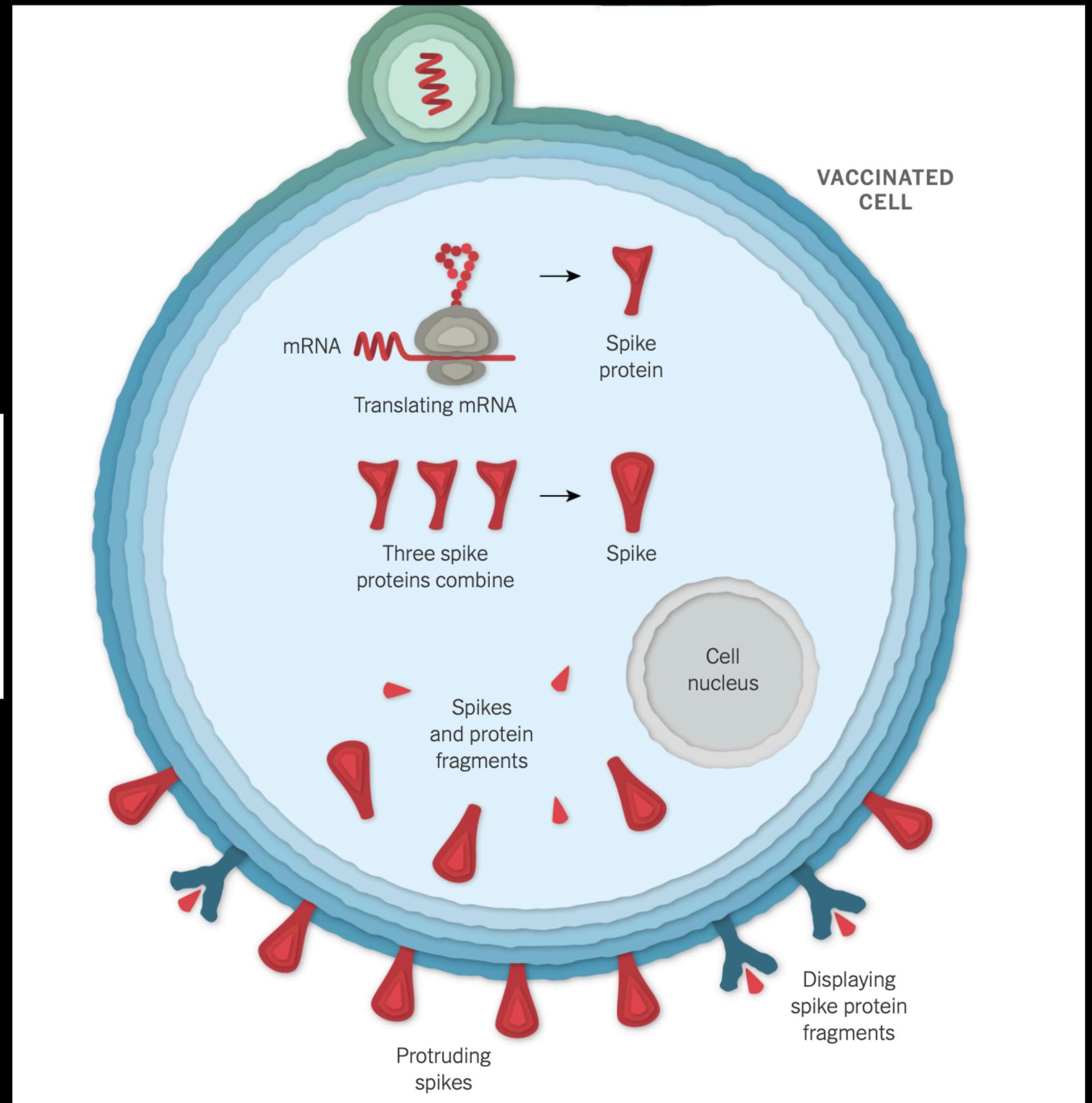


Lipid nanoparticles surrounding mRNA

Because of their fragility, the mRNA molecules will quickly fall apart at room temperature. Moderna's vaccine will need to be refrigerated, and should be stable for up to six months when shipped and stored at -4°F (-20°C).

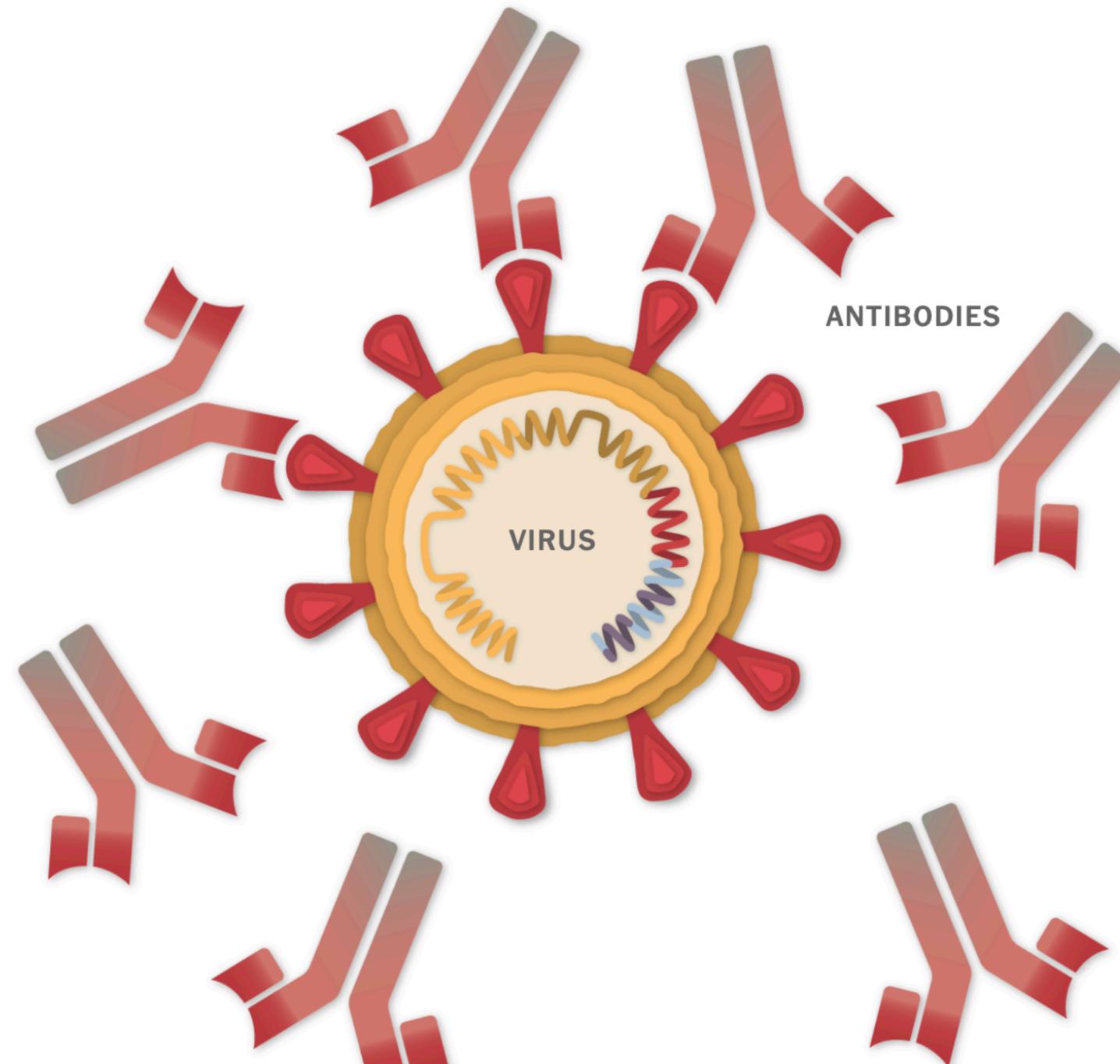
Entering a Cell

After injection, the vaccine particles bump into cells and fuse to them, releasing mRNA. The cell's molecules read its sequence and build spike proteins. The mRNA from the vaccine is eventually destroyed by the cell, leaving no permanent trace.



Stopping the Virus

The antibodies can latch onto coronavirus spikes, mark the virus for destruction and prevent infection by blocking the spikes from attaching to other cells.



Meet the Newest American Hero; Kizzmekia Corbett

- Viral immunologist at the Vaccine Research Center (VRC) at the National Institute of Allergy and Infectious Diseases (NIH)
- Appointed to the VRC in 2014, she is currently the scientific lead of the VRC's Coronavirus Team and helped to develop the mRNA technologies used in the Moderna vaccine.

"To be living in this moment where I have the opportunity to work on something that has imminent global importance...it's just a surreal moment for me".

Kizzmekia Corbett



Born

Kizzmekia Shanta Corbett
January 26, 1986 (age 34)
Hurdle Mills, North Carolina,
United States



What We Know

- Viruses constantly change through mutation, and new variants of a virus are expected to occur over time.
- Sometimes new variants emerge and disappear.
- Other times, new variants emerge and persist.
- Multiple variants of the virus that causes COVID-19 have been documented in the United States and globally during this pandemic.

COVID-19 B.1.1.7; Variant; FAQ's

• Where has this virus been identified?

- At least five U.S. states and 33 countries have identified the new variant, known as B.1.1.7.
- Several nations have also identified an additional variant, first identified in South Africa, that also appears to infect people more easily.

• Is this variant more contagious?

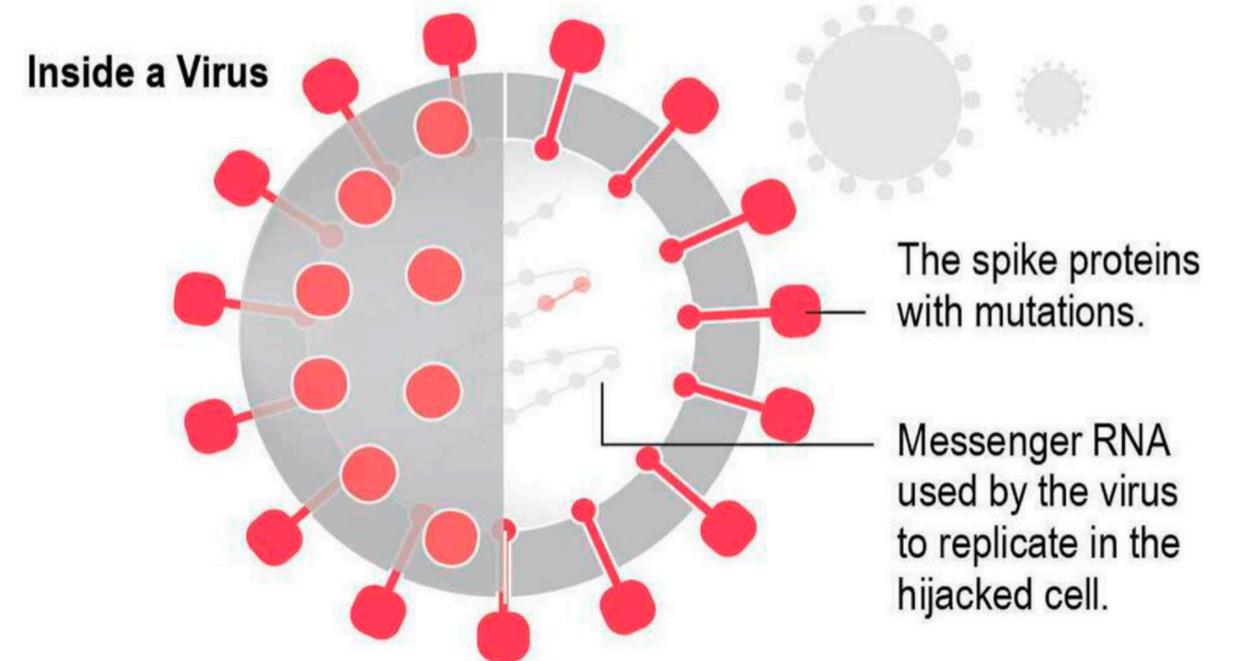
- The strain first identified in the U.K. spreads more easily and quickly than other strains, according to the CDC.
- Scientists in the U.K. estimate that the new variant is 40-70% more infectious based on analysis of affected populations in Britain.

• What makes the new strain more contagious?

- The mutation affects the spike protein which increases its ability to bind to ACE-2 receptors- in other words, it infects cells better which means it can transmit easier.

The new coronavirus variant

The new variant of the virus that causes COVID-19 has several mutations on its spike proteins. These spikes are used by the virus to attach to and infect cells. They also are what vaccines and antibody drugs target.

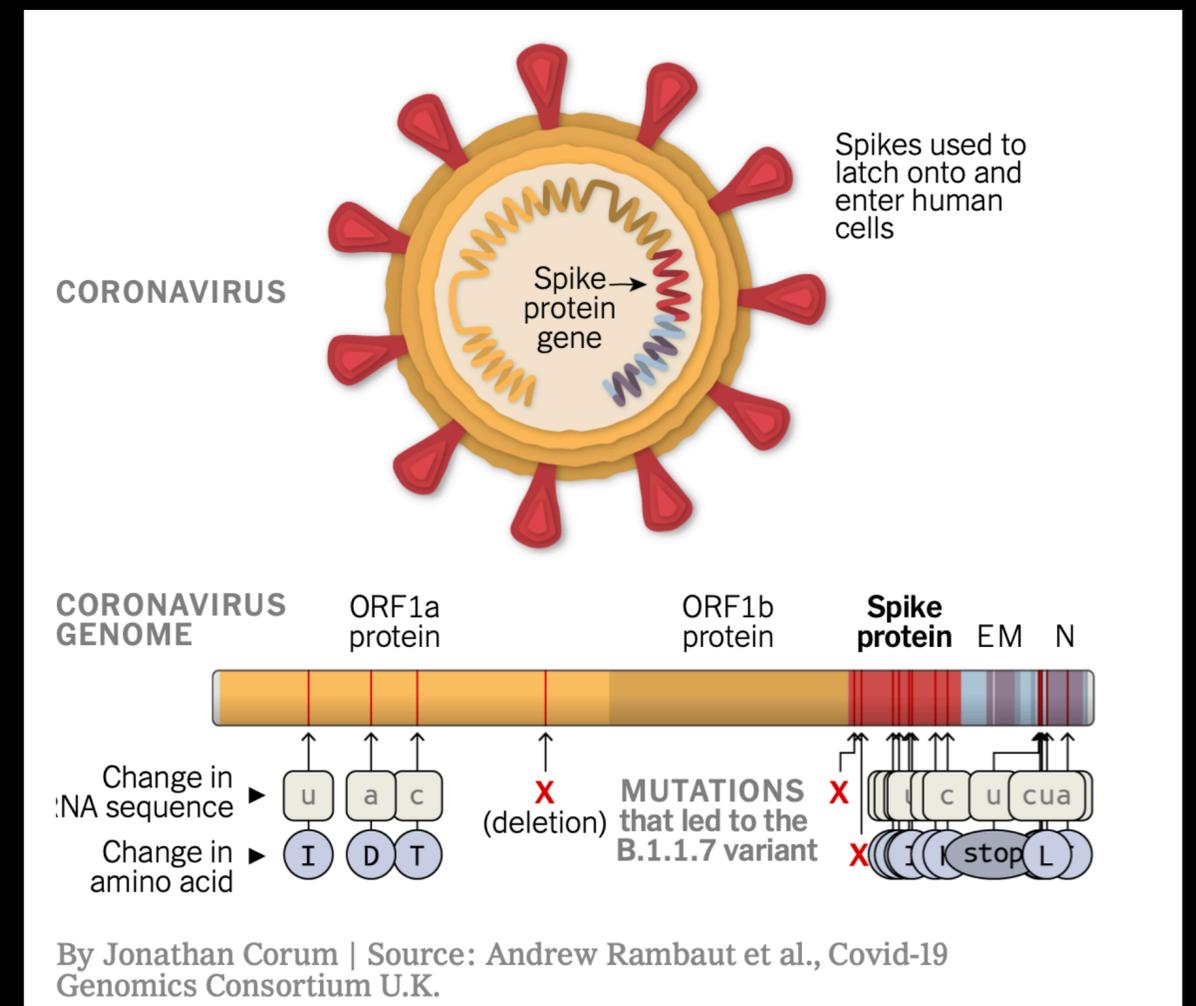


SOURCE: Associated Press reporting

AP

COVID-19 B.1.1.7; Variant; FAQ's

- Is the new strain more lethal?
 - There is no evidence that B.1.1.7 causes more severe illness or increased risk of death, according to the CDC.
- Is the vaccine effective for the new variant?
 - Researchers believe current COVID-19 vaccines will likely protect against B.1.1.7, but data is needed.
 - The virus would "likely need to accumulate multiple mutations in the spike protein to evade immunity induced by vaccines or by natural infection," according to the CDC.
 - From what we know from experience with this mutation and other mutations, it's unlikely to have a large impact on vaccine-induced immunity, or existing immunity from previous strains.



COVID-19 B.1.351; South Africa Variant; FAQ's

• Is there a new variant from South Africa?

- South Africa has also identified a strain similar to B.1.1.7, but it emerged in October independently of B.1.1.7 and is not related to it, according to the CDC.
- Like B.1.1.7, the South Africa variant (B.1.351/501V2) appears to spread more easily and quickly but is not more severe.
- The CDC has not reported cases in the US.
- A third variant also emerged this fall and has been detected in Nigeria, but there is no evidence that it is more severe or more transmissible, according to the CDC.

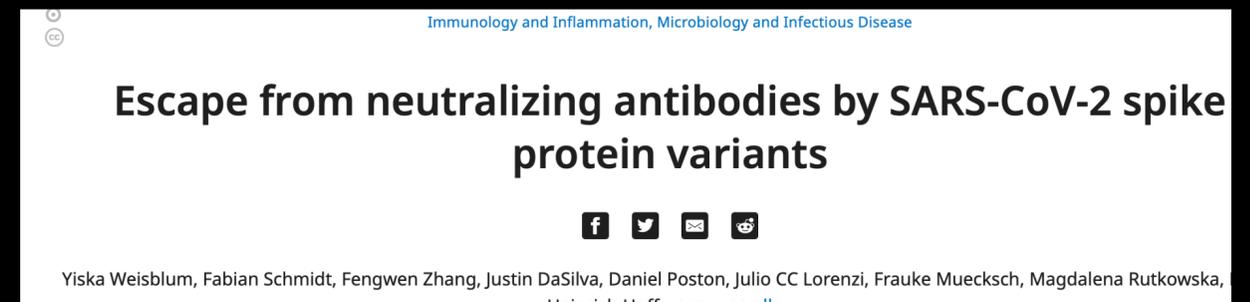
• What are some concerns with the B.1.351 Variant?

- Preliminary studies have demonstrated that people infected with this variant carry a heightened viral load — a higher concentration of the virus in their upper respiratory tract and this may be related to symptom severity.

South Africa records 'grim' Covid milestone as humanitarian crisis unfolds at border with Zimbabwe

COVID-19 B.1.351; South Africa Variant; FAQ's

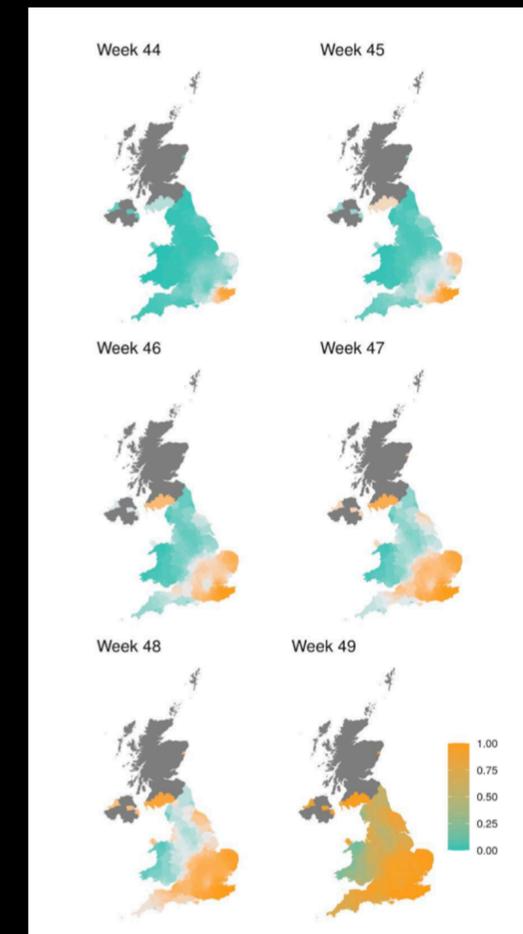
- Where has 501.V2 been identified;
 - The U.K., France, Switzerland, Japan, Austria and Zambia.
- Why is this variant getting so much attention?
 - 501.V2 carries a mutation in the spike protein called E484K, which is not present in the UK strain.
 - The E484K mutation has been shown to reduce antibody recognition.
 - Scientists believe vaccines would work on the UK variant but there is a “big question mark” about 501.V2, as there is still sparse evidence about it.
 - Study demonstrated that mutations with the 501.V2 variant can reduce antibody production by a factor of 10 in those with natural immunity (infection)- what is not known, but is of great concern is how immunity from vaccines will reposed to the variant.



Rapid Transmission of B1117 Variant- UK

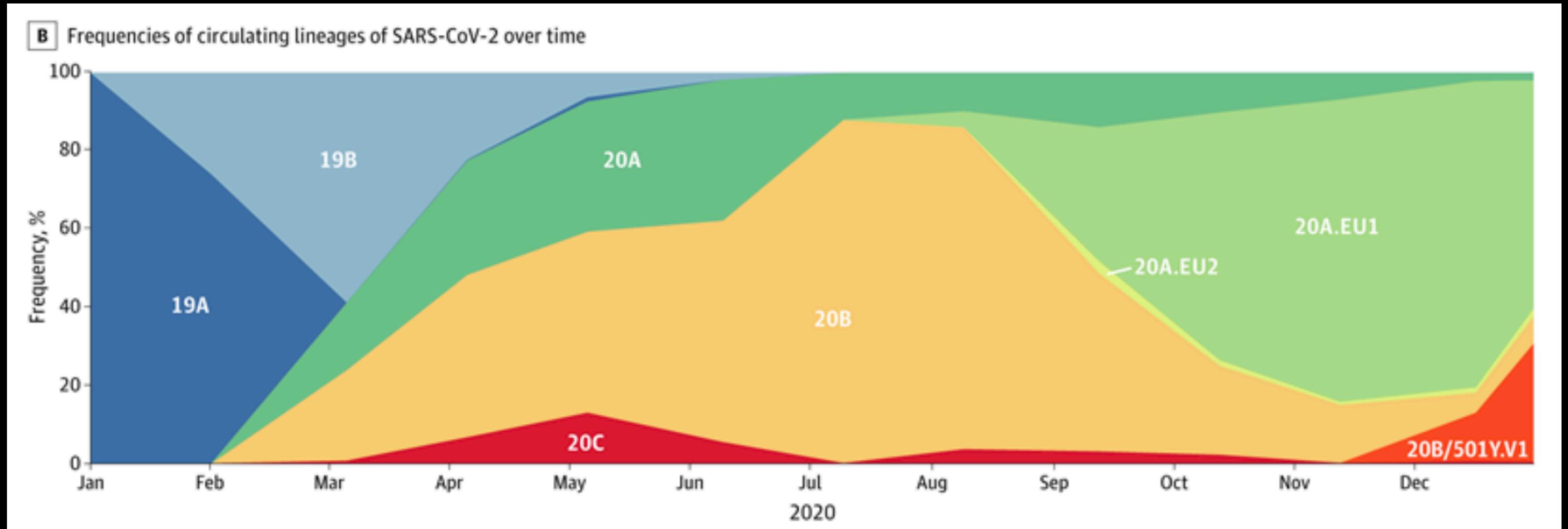
Preprint

- What is the epidemiologic evidence of transmission of B1117 through the UK?
- SARS-CoV-2 lineage B.1.1.7 is now designated Variant of Concern 202012/01 (VOC) by Public Health England and is a genetic variant that includes amino acid substitutions with implications on increased ACE2 binding, and deletions with impact on diagnostic assays.
- **FINDINGS**;
 - Estimated frequency of VOC strains in London, England has increased from approximately 5% in early November 2020 to approximately 80% in mid- December.
 - During the second English lockdown period, the real-time effective reproduction number (R_t) for VOC was 1.4 compared to 0.9 for non-VOC strains.
 - Persons under 20 years accounted for a larger proportion of cases with VOC than non-VOC strains.



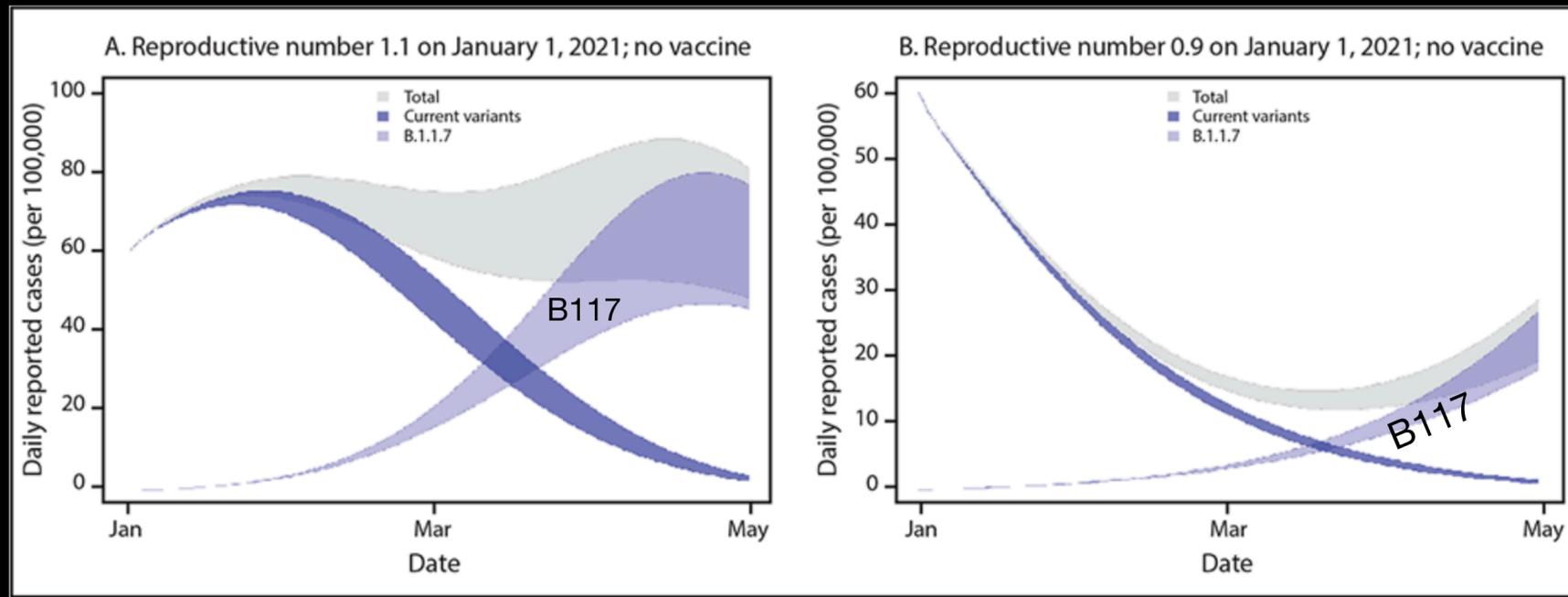
Bottom Line; VOC has rapidly spread across England- represents over 80% of cases. Seeding of this variant in other parts of the world has occurred, & in the absence of vaccine-related population immunity, may lead to rapid acceleration of the pandemic in other countries.

New (UK) Variant; B.1.1.7 is Emerging



Lineage B.1.1.7 (20B/501Y.V1) shown in orange.

New Coronavirus Variant (B.1.1.7) Could Become Dominant Strain in March, CDC warns



New virus variants that spread more easily could lead to a rapid rise in COVID-19 cases

NOW, more than ever, it is important to slow the spread

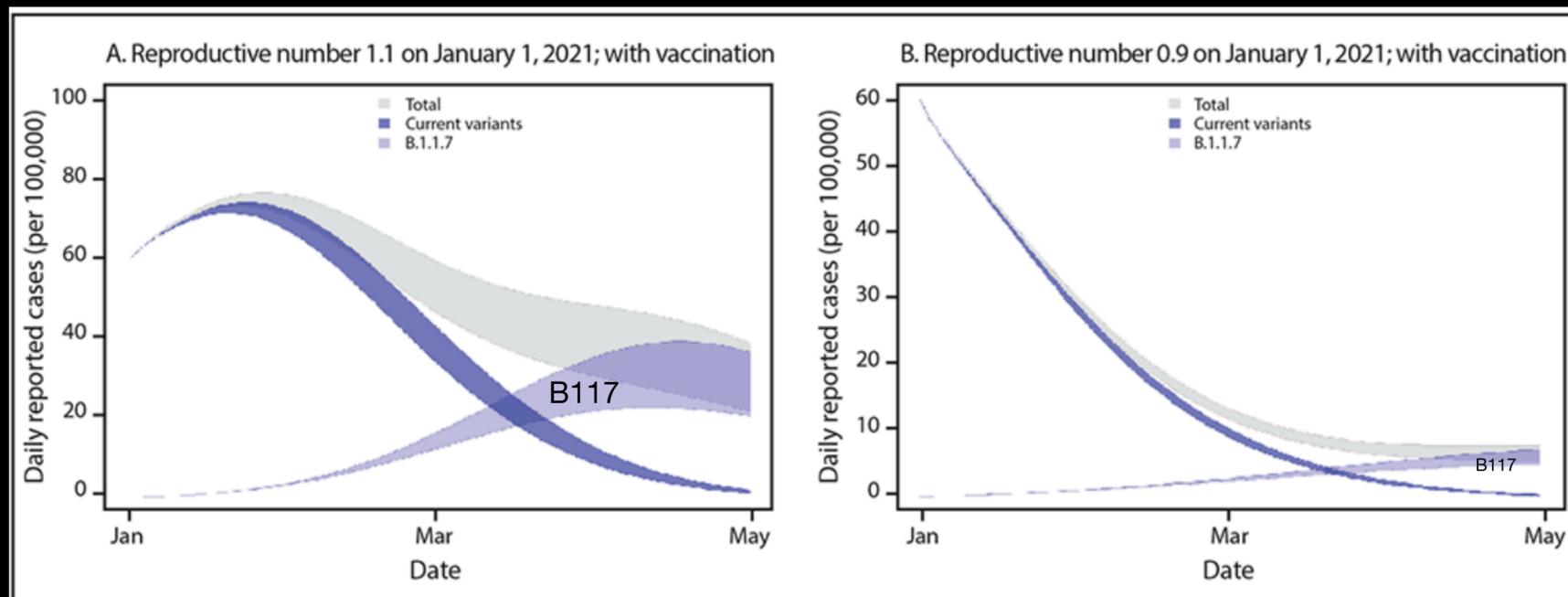
In the U.S.

- ⚠️ New cases are the highest ever and rising
- ⚠️ Some health care systems are at or near capacity
- ⚠️ New variants are emerging that spread more easily

Wear a mask
 Stay at least 6 feet apart
 Avoid crowds
 Get vaccinated when available to you

MORE SPREAD → MORE CASES → MORE DEATHS

CDC.GOV bit.ly/MMWR11521 MMWR



CDC replaced 'hand washing' with 'avoid crowds'

Bottom Line; CDC modeling study; predicts that B117 will be predominate strain in March. They warn that increase in vaccination rates may be warranted.

Side-By-Side Comparison COVID-19 Viral Variants

	UK	South Africa	Brazil
Mutation	B.1.1.7; change in spike protein	B.1.1.7 and E484K; change in spike protein	Change in spike protein
Epidemiology	Become dominant in much of Britain and has spread to more than 50 other countries	Found in at least 20 other countries, including the UK	Brazil
Clinical Effect	Better at infecting cells and spreading.	Better at infecting cells and spreading, studies demonstrate decrease immunity	Better at infecting cells and spreading.
Vaccine Efficacy	Studies indicate that Pfizer is effective.	Studies indicate that Pfizer is effective for B117, unclear as to E484K.	Unknown
Lethality	No difference from previous variant	B117 is no different, unclear about E484K variant	Unknown