



# An update on **SARS-CoV-2 virus mutations & variants**

THE LATEST ON THE COVID-19 GLOBAL SITUATION  
& THE EMERGENCE OF NEW MUTATIONS & VARIANTS

# Overview

- [All viruses change over time](#) ..... 7
- [New emerging SARS-CoV-2 variants](#) ..... 8
- [Monitoring of SARS-CoV-2 variants](#) ..... 14
- [Communicating with the public about SARS-CoV-2 variants](#) ..... 16
- [COVID-19 protective measures](#) ..... 17
- [Additional resources](#) ..... 18

# Current global situation

As of 24 January 2021, 10:00AM CEST

- **> 97 million cases**

- 5 countries with highest cumulative number of cases



United States of America



India



Brazil



Russian Federation



The United Kingdom

- **> 2.1 million deaths**

- 5 countries with highest cumulative number of deaths



United States of America



Brazil



India



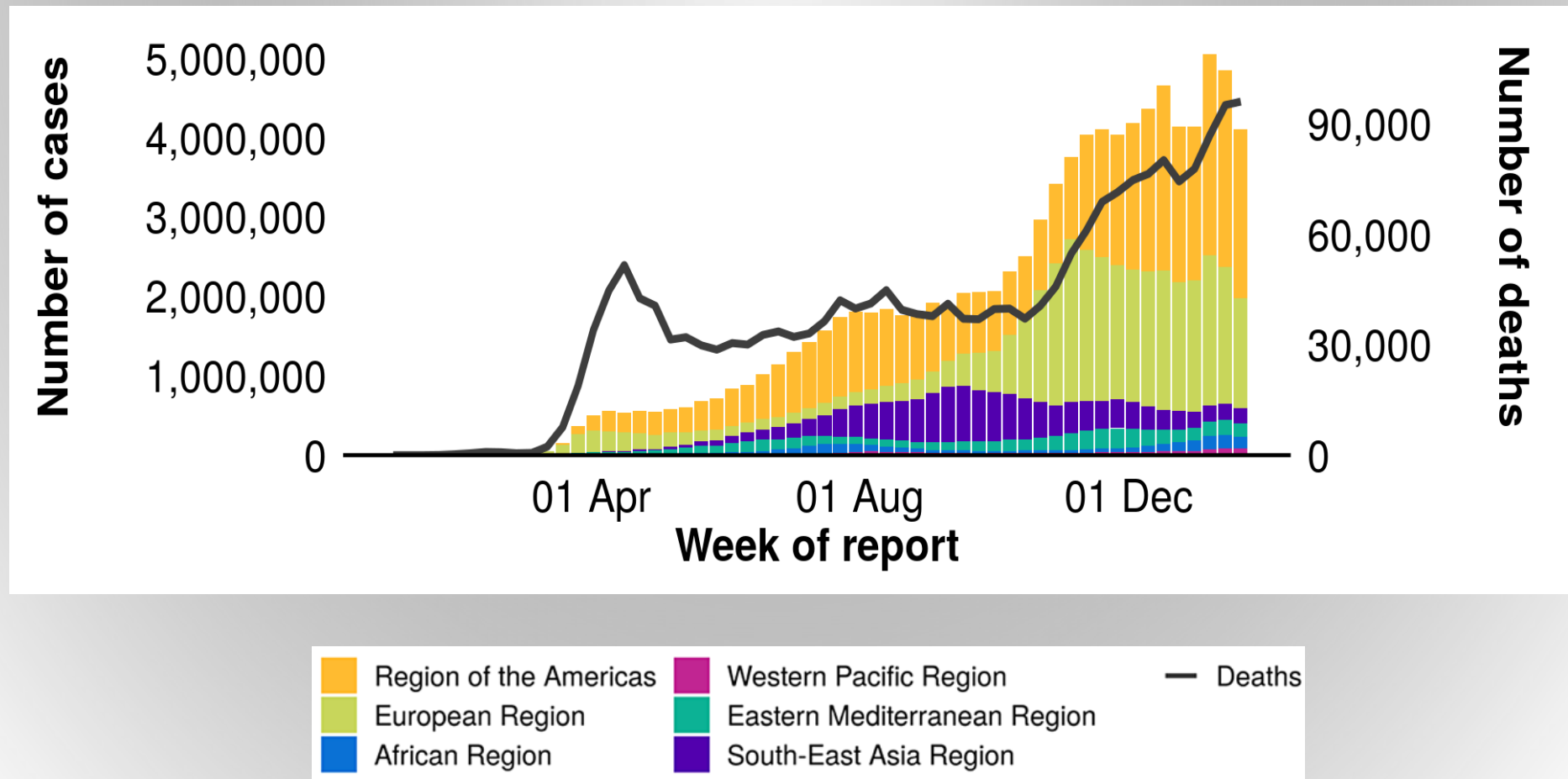
Mexico



The United Kingdom

# Current global situation

Cases reported to WHO as of 24 January 2021, 10:00AM CEST

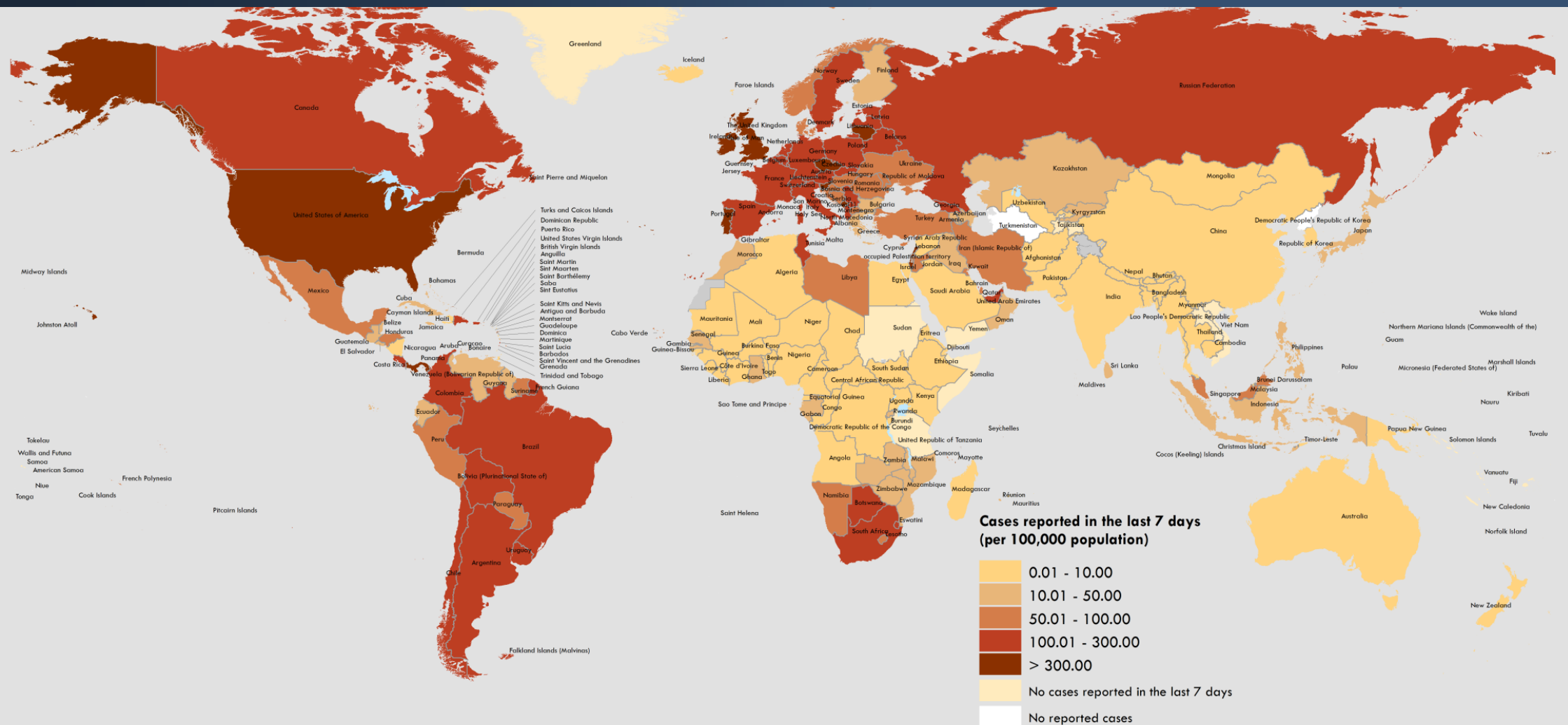


\* Data are incomplete for the current week. Cases depicted by bars; deaths depicted by line

# COVID-19 cases reported in the last 7 days

## Per million population

FROM 18 to 24 JANUARY 2021, 10:00 AM CEST



**Data Source:** World Health Organization,  
United Nations Population Division (population prospect 2020)  
**Map Production:** WHO Health Emergencies Programme

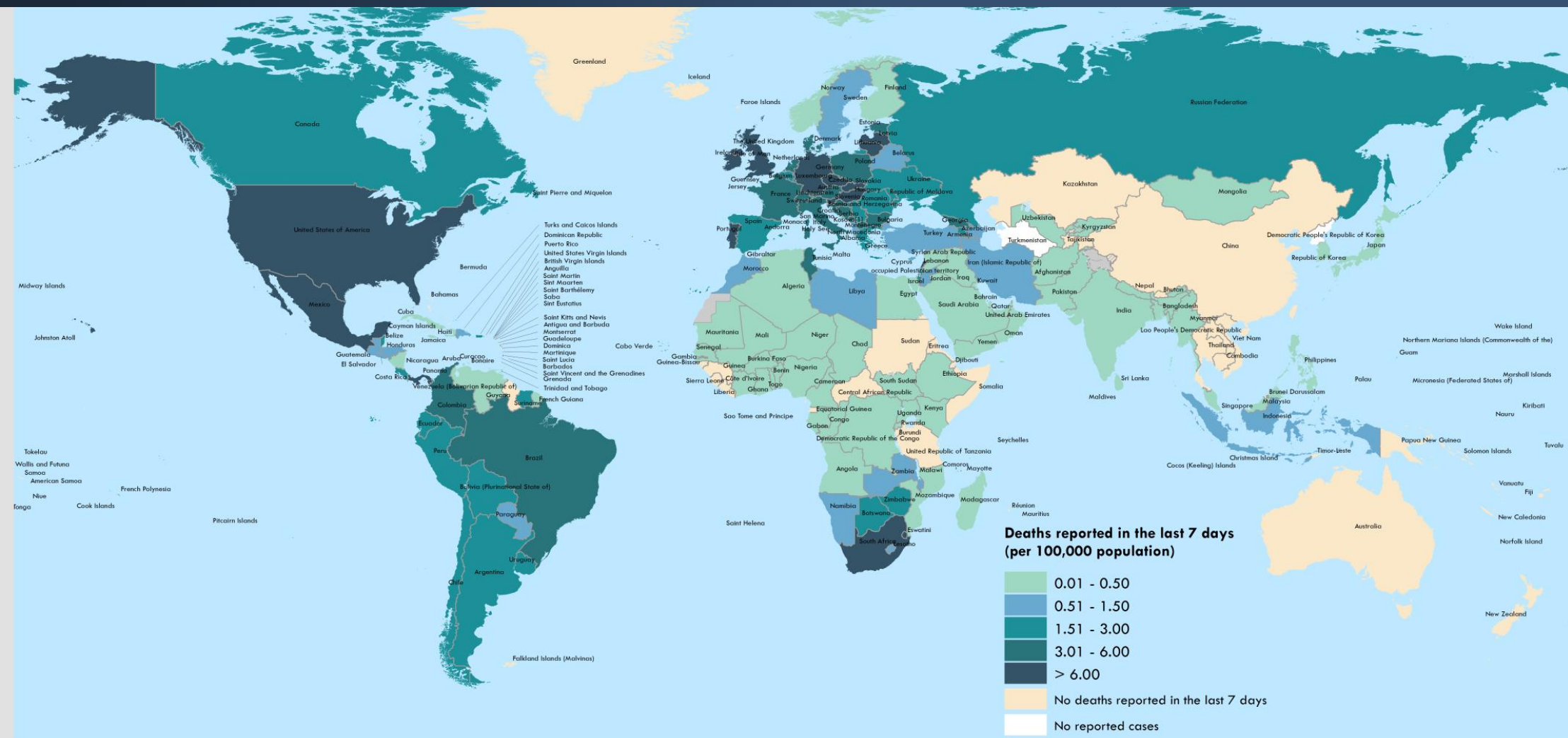
The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. [1] All references to Kosovo in this document should be understood to be in the context of the United Nations Security Council resolution 1244 (1999). Number of cases of Serbia and Kosovo (UNSCR 1244, 1999) have been aggregated for visualization purposes. Data for Bonaire, Sint Eustatius and Saba have been disaggregated and displayed at the subnational level.



# COVID-19 deaths reported in the last 7 days

## Per million population

FROM 18 to 24 JANUARY 2021, 10:00 AM CEST



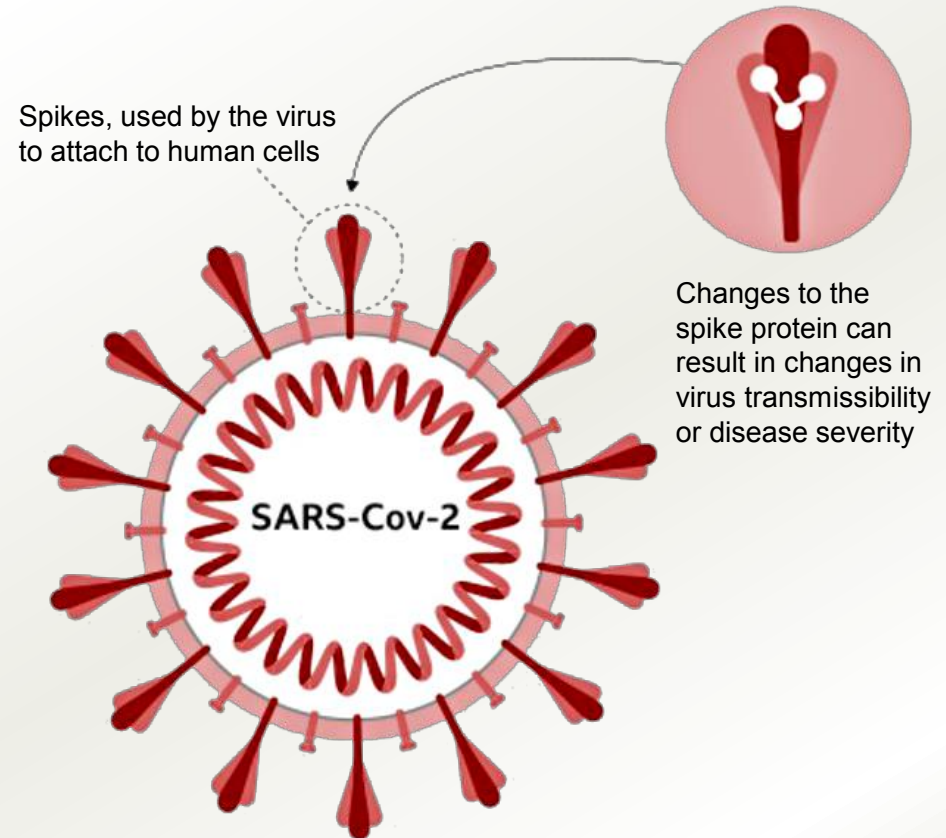
The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. [1] All references to Kosovo in this document should be understood to be in the context of the United Nations Security Council resolution 1244 (1999). Number of cases of Serbia and Kosovo (UNSCR 1244, 1999) have been aggregated for visualization purposes. Data for Bonaire, Sint Eustatius and Saba have been disaggregated and displayed at the subnational level.

Not applicable

0 2,500 5,000 km  
 © World Health Organization 2021, All rights reserved.

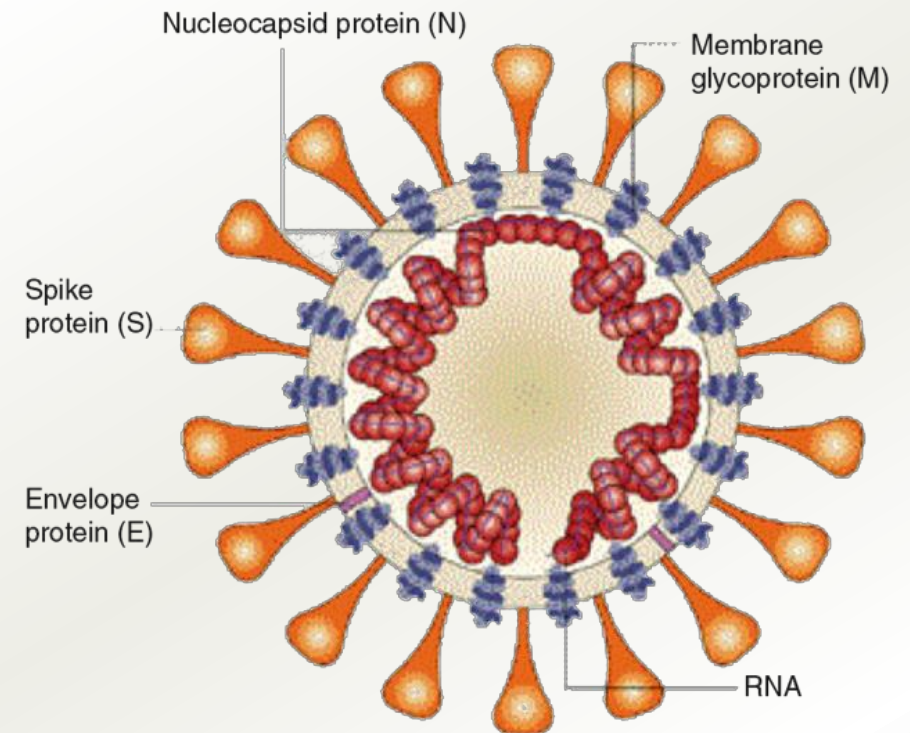
# All viruses change over time

- It is normal for viruses to evolve over time through mutations, as a consequence the emergence of new variants is to be expected
  - **Mutation** refers to the actual change in the virus genetic sequence
  - A changed virus is called a **variant** of the original virus. Variants can differ by one mutation or many
  - Mutations may result in the virus being more transmissible, increase disease severity or influence efficacy of diagnostics, therapeutics or vaccines
  - When these variants increase the risk to human health they are considered to be **variants of concern**
- When there are many infections in a population the likelihood of the virus mutating increases



# New emerging SARS-CoV-2 variants

- **New SARS-CoV-2 variants:**
  - Variant that emerged in Denmark in September 2020 related to mink farming
  - Variant detected in the United Kingdom in December 2020
  - Variant detected in South Africa in December 2020
- All these variants involve **genetic mutations of the spike protein**
- The spike protein of SARS-CoV-2 is targeted by most vaccines currently approved or in development; mutations of the spike protein are therefore closely monitored



Nature Reviews | Microbiology



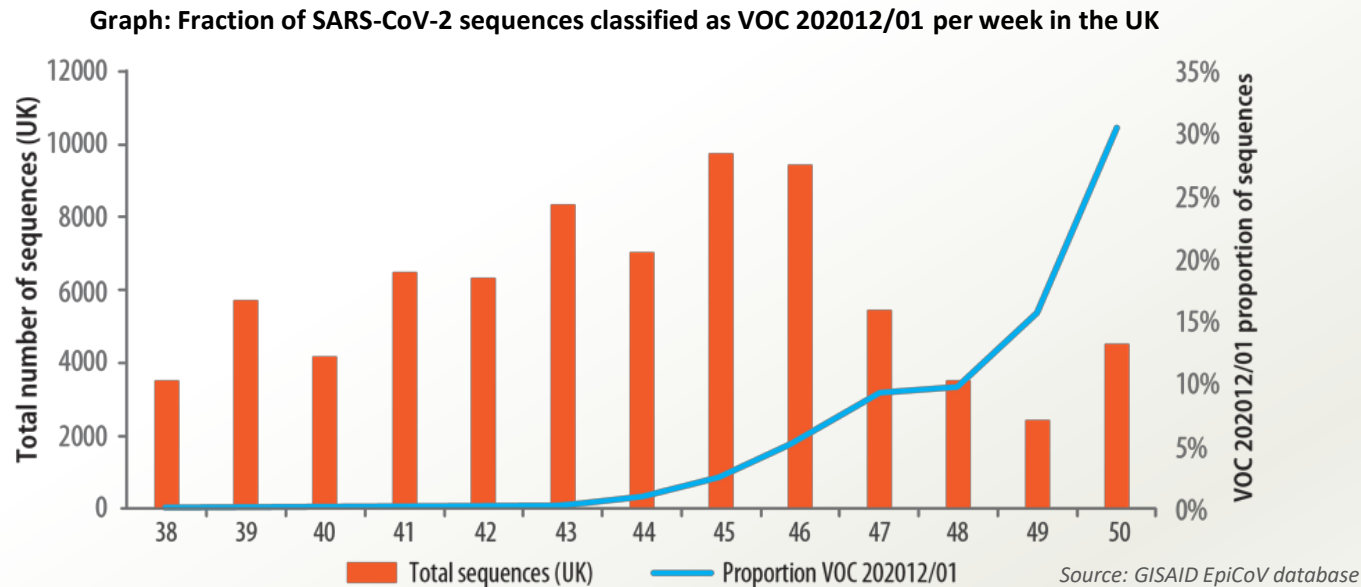
# SAR-CoV-2 variant emerged among mink in Denmark

- A SARS-CoV-2 variant referred to as the 'Cluster 5' variant was linked to infection among farmed mink
- This variant was subsequently transmitted to humans
- In response to the outbreak in mink and to stop the spread of the 'Cluster 5' variant, 17 million mink were culled in Denmark in November 2020
- Danish authorities have identified only 12 human cases of the 'Cluster 5' variant and it does not appear to have spread more widely



<https://science.sciencemag.org/content/371/6525/172>

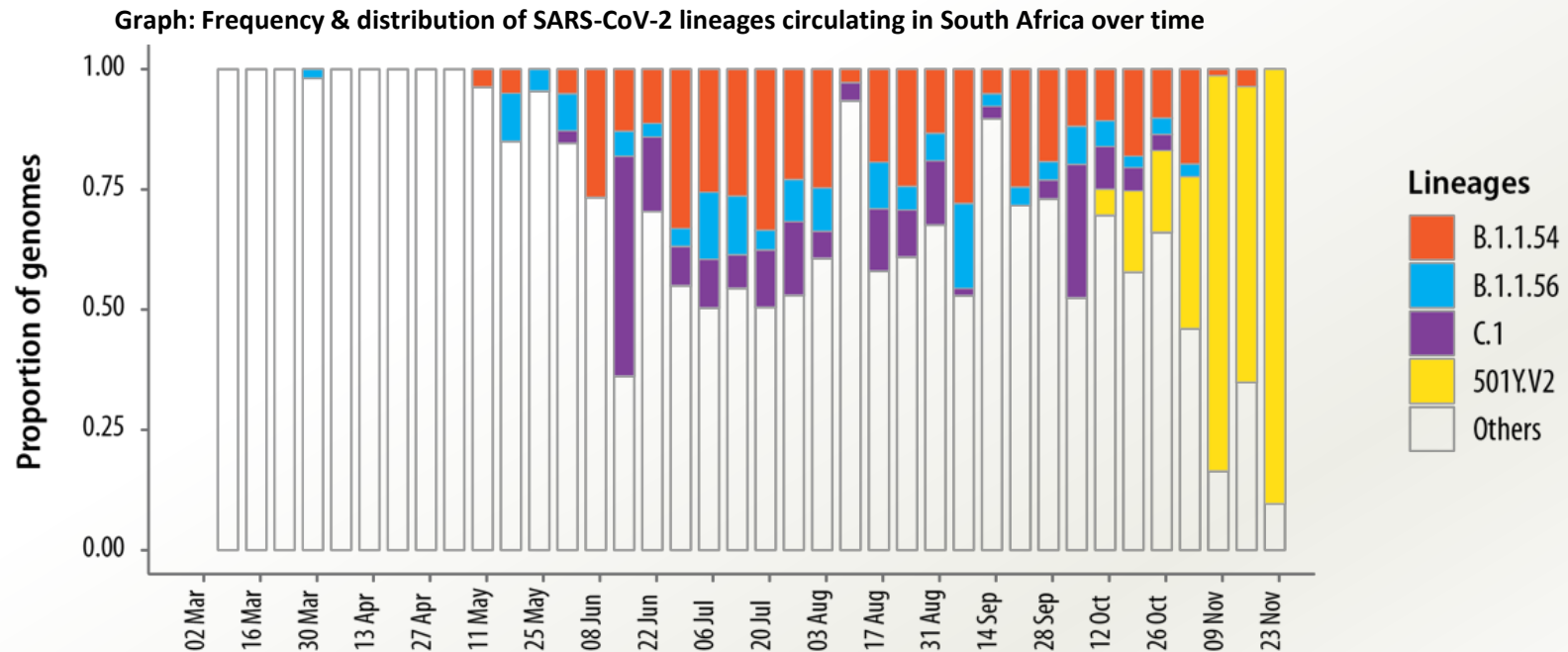
# The variant detected in the United Kingdom



- On 14 December 2020, authorities of the United Kingdom reported a variant referred to as **SARS-CoV-2 VOC 202012/01** (Variant of Concern, year 2020, month 12, variant 01)
- This variant has an unusually large number of mutations involving 17 mutations on the spike protein
- SARS-CoV-2 VOC 202012/01 has become the predominant variant circulating in the UK
- As of the 24<sup>th</sup> January, more than 60 countries have detected SARS-CoV-2 VOC 202012/01 in samples of positive cases

<https://www.gov.uk/government/publications/investigation-of-novel-sars-cov-2-variant-variant-of-concern-20201201>

# Another variant emerges in South Africa



- On 18 December, authorities in South Africa announced the detection of this new variant rapidly spreading in three provinces of South Africa
- South Africa has named this variant **501Y.V2**
- This new SARS-CoV-2 variant has largely replaced other SARS-CoV-2 viruses circulating in South Africa

# Implications of variants detected in the UK & South Africa

Function of SARS-CoV-2	Variant detected in United Kingdom	Variant detected in South Africa
Transmissibility	increased transmissibility <sup>1</sup>	increased transmissibility <sup>2</sup>
Disease severity	preliminary data suggests no changes in disease severity <sup>1</sup> , however more studies are needed <sup>3</sup>	preliminary data suggests no changes in disease severity, however more studies are needed <sup>3</sup>
Vaccines	preliminary data <sup>4</sup> suggests the variant is unlikely to have an impact on the efficacy of approved vaccines	preliminary data <sup>5</sup> suggests vaccines continue to work, however more studies are needed
Diagnostics	may affect the performance of some diagnostic PCR assays*	More studies are needed
Therapeutics	more studies are needed	more studies are needed

<sup>1</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7674007>

<sup>2</sup> <https://www.medrxiv.org/content/10.1101/2020.12.21.20248640v1>

<sup>3</sup> <https://www.ecdc.europa.eu/en/publications-data/covid-19-risk-assessment-spread-new-variants-concern-eueea-first-update>

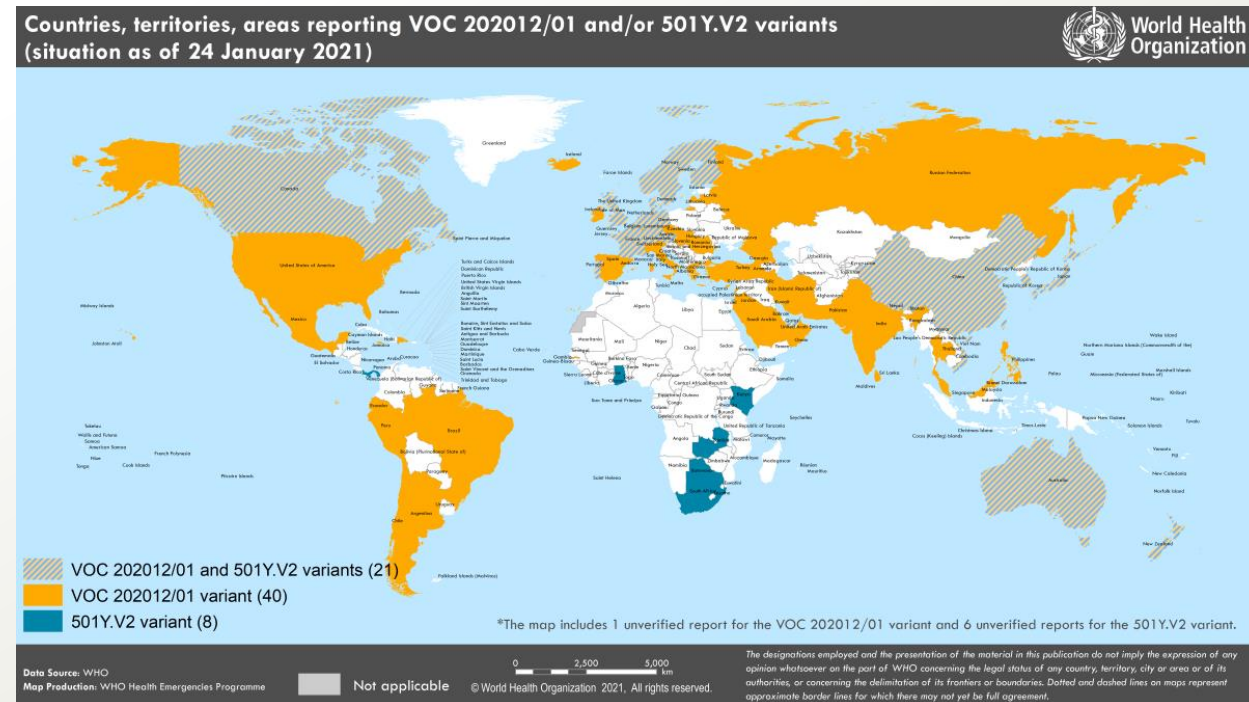
<sup>4</sup> <https://pubmed.ncbi.nlm.nih.gov/33377359>

<sup>5</sup> <https://www.biorxiv.org/content/10.1101/2021.01.07.425740v1.full.pdf>

\* most PCR assays will use multiple targets and therefore the impact of the variant on diagnostics is not anticipated to be significant

# Increased transmissibility of variants detected in the UK & South Africa

- Preliminary analysis shows that both variants of the virus may spread more easily and infect more people<sup>1,2,3</sup>
- An increase in COVID-19 cases can put pressure on the health system and can lead to an increase in hospitalizations and deaths
- However, the mode of transmission of the virus variants has not changed and the same preventive measures continue to be effective and should continue to be implemented<sup>4</sup>



Countries and territories reporting VOC 202012/01 and/or 501Y.V2 variants

1 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7674007/>

2 <https://www.medrxiv.org/content/10.1101/2020.12.21.20248640v1>

3 <https://jamanetwork.com/journals/jama/fullarticle/2775006?alert=article#>

4 <https://www.who.int/publications/i/item/considerations-in-adjusting-public-health-and-social-measures-in-the-context-of-covid-19-interim-guidance>



# Monitoring of SARS-CoV-2 variants

- **Virus mutations or variants are being monitored** from the start of the COVID-19 pandemic through the [Global Initiative on Sharing Avian Influenza Data \(GISAID\)](https://gisaid.org/) sequencing database
- **WHO routinely assesses if variants of SARS-CoV-2 have an impact on**
  - Virus transmissibility
  - Disease severity
  - Efficacy of diagnostics, therapeutics and vaccines
- WHO performs a risk assessment for **variants of concern** to determine if there will be public health implications



[https://www.who.int/news/item/15-01-2021-statement-on-the-sixth-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-coronavirus-disease-\(covid-19\)-pandemic](https://www.who.int/news/item/15-01-2021-statement-on-the-sixth-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-coronavirus-disease-(covid-19)-pandemic)

# Global response to the emergence of new variants

- Countries with adequate capacity are sequencing samples in order to understand if and how widely these new variants are circulating
- **WHO SARS-CoV-2 Virus Evolution Working Group** is collaborating with researchers and governments to assess and better understand the results of studies on these variants
- **WHO is working with countries to:**
  - **Strengthen surveillance systems** to evaluate virus variations
  - **Establish genetic sequencing capacity** where possible
  - **Provide access to international sequencing services**, so countries can send samples for sequencing and analysis



# Communicating with the public about SARS-CoV-2 variants

---

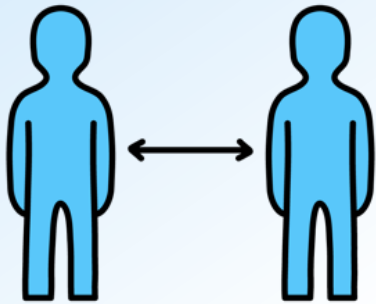
## Key points to communicate

- **Mutations – it is normal** for the virus to evolve over time, and important to track changes to the virus
- **Uncertainty** – as an evolving situation, it is important to maintain transparency. Continue to communicate what is known and not known about new variants; and explain the global/national scientific process to educate the public
- **Empower individuals & reinforce the importance of maintaining preventive measures<sup>1</sup>:**
  - To reduce the transmission of SARS-CoV-2 to protect oneself and others
- **Avoid stigmatization** – use appropriate variant names not associated with locations as this may stigmatize individuals and goods from those locations
- **Communication for specific target groups**
  - For *individuals who have a low perception of risk*, discourage risky behaviours such as social gatherings
  - Remind *vulnerable populations* that they are a high risk population and to stay vigilant

<sup>1</sup> <https://www.who.int/publications/i/item/considerations-in-adjusting-public-health-and-social-measures-in-the-context-of-covid-19-interim-guidance>

# COVID-19 protective measures

Protect yourself & others



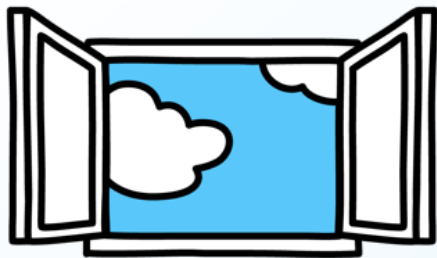
Keep your distance



Wash your hands frequently



Cough & sneeze into your elbow



Ventilate or open windows



Wear a mask



# WHO resources

- **WHO Disease outbreak news**  
<https://www.who.int/csr/don/31-december-2020-sars-cov2-variants/en/>
- **Global initiative on sharing avian influenza data**  
<https://www.gisaid.org/>
- **What we know about COVID-19 and mink**  
[https://www.who.int/docs/default-source/coronaviruse/risk-comms-updates/update42-covid-19-and-mink.pdf?sfvrsn=9767d659\\_11](https://www.who.int/docs/default-source/coronaviruse/risk-comms-updates/update42-covid-19-and-mink.pdf?sfvrsn=9767d659_11)
- **Public health surveillance for COVID-19**  
<https://www.who.int/publications/i/item/who-2019-nCoV-surveillanceguidance-2020.8>
- **SARS-CoV-2 genomic sequencing for public health goals: interim guidance**  
[https://www.who.int/publications/i/item/WHO-2019-nCoV-genomic\\_sequencing-2021.1](https://www.who.int/publications/i/item/WHO-2019-nCoV-genomic_sequencing-2021.1)
- **Genomic sequencing of SARS-CoV-2: a guide to implementation for maximum impact on public health**  
<https://www.who.int/publications/i/item/9789240018440>
- **Q & A on SARS-CoV-2 virus evolution**  
<https://www.who.int/news-room/q-a-detail/sars-cov-2-evolution>
- **Spread of new SARSCoV-2 variants of concern in the EU/EEA**  
<https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-risk-related-to-spread-of-new-SARS-CoV-2-variants-EU-EEA.pdf>
- **WHO weekly epidemiological updates**  
<https://www.who.int/publications/m/item/weekly-epidemiological-update---27-january-2021>





**EPI**•WiN

infodemic  
MANAGEMENT

[www.who.int/epi-win](http://www.who.int/epi-win)