مركز أبوظبي للصحة العامة
ABU DHABI PUBLIC HEALTH CENTRE

SCIENTIFIC RESEARCH MONITORING ON COVID-19

28 DECEMBER 2021

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SCIENTIFIC RESEARCH MONITORING ON COVID-19

(Issue 434)

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Abu Dhabi Public Health Center (ADPHC) is gathering the latest scientific research updates and trends on coronavirus disease (COVID-19) in a monthly report. The report provides summaries on breakthrough or updated research on COVID-19 to allow health care professionals and public health professionals get easy and fast access to information.

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Note : All articles presented in this report represent the authors' views and not necessarily represents Abu Dhabi Public Health Center views or directions. Due the nature of daily posting , some minor language errors are expected.
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RESEARCH UPDATES

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Omicron SARS-CoV-2 variant: a new chapter in the COVID-19 pandemic

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Omicron Has Reached the US—Here's What Infectious Disease Experts Know About the Variant

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 27 December 2021

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Figure 1: Total Number of Infected, Recovered, and Death Cases

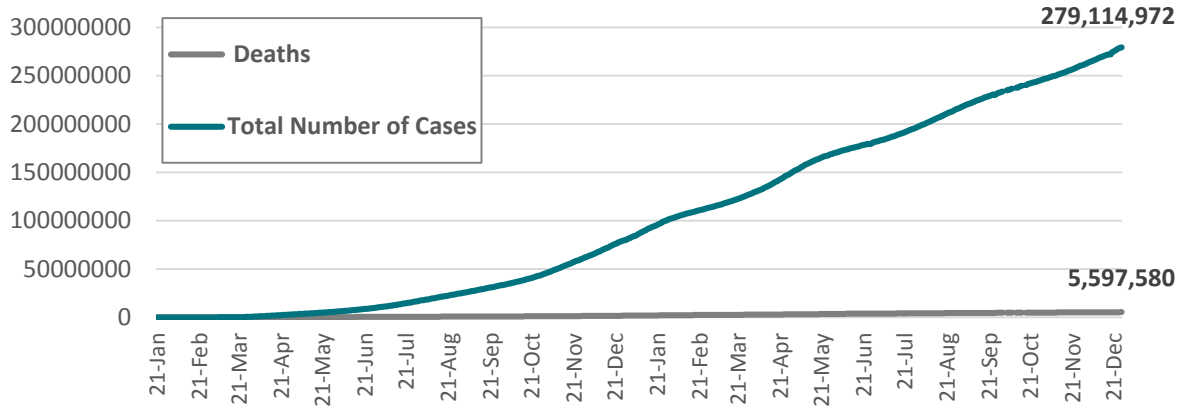

Figure 2: Daily New Infected COVID-19 Cases

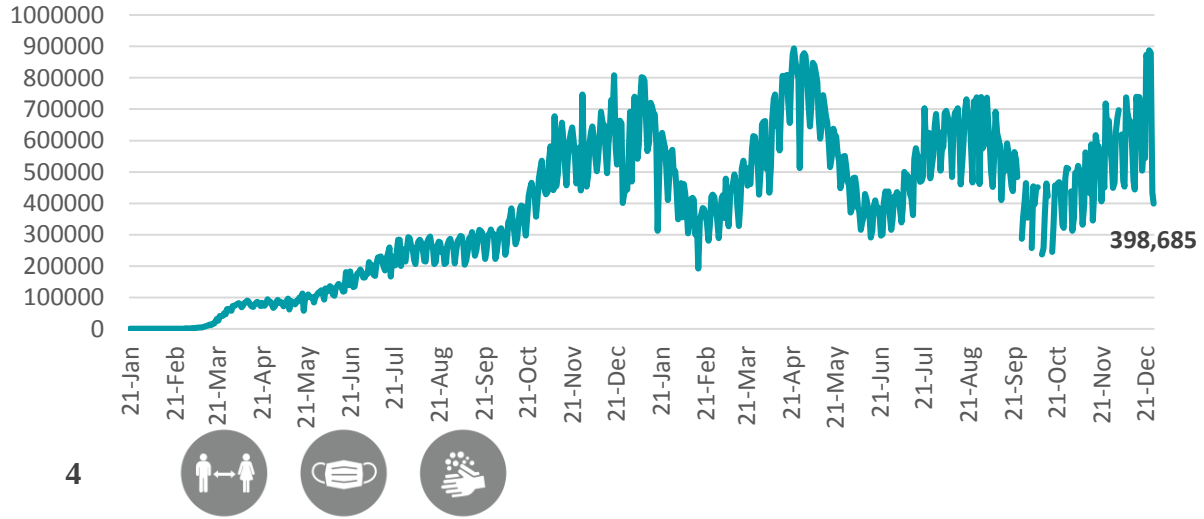

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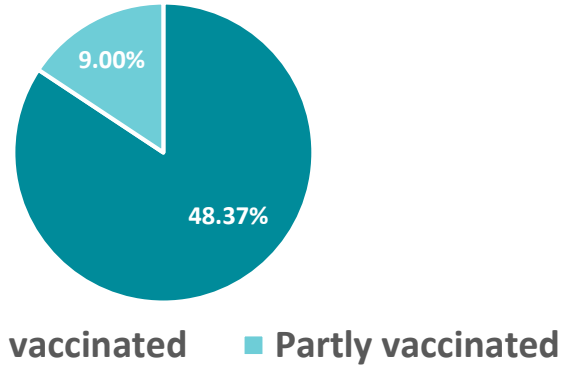
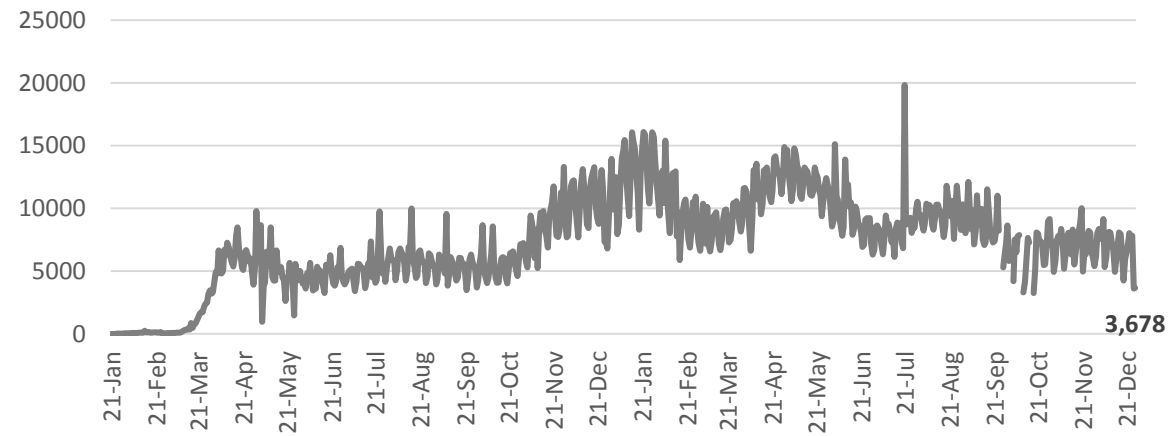
Figure 3: % of people vaccinated fully & partly against COVID-19



Total:
57.37 %

Figure 4: Global Daily New Deaths Due to COVID-19



Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: WHO, Our world in data

EPIDEMIOLOGY

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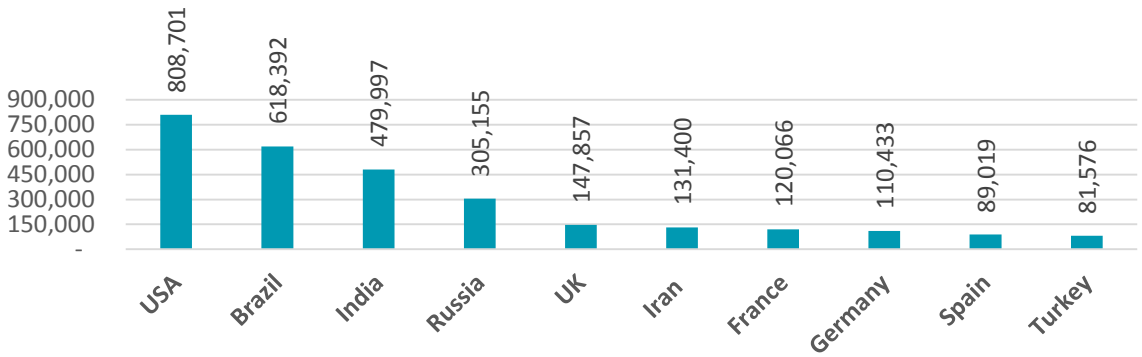
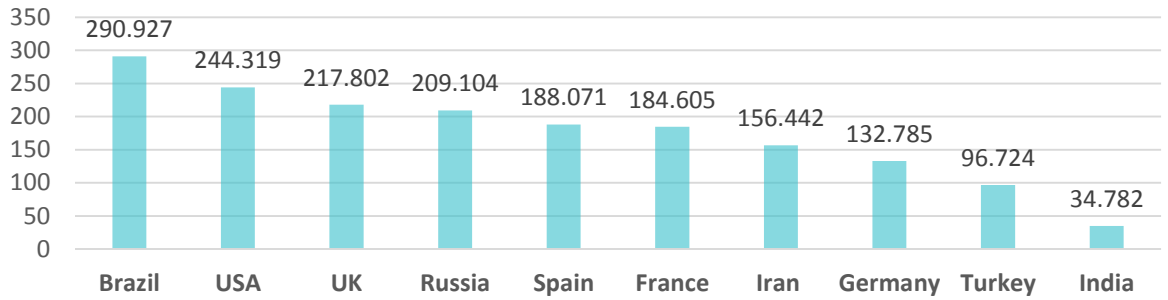
Figure 5: Top 10 Countries in the Total Number of Cases Due to COVID-19

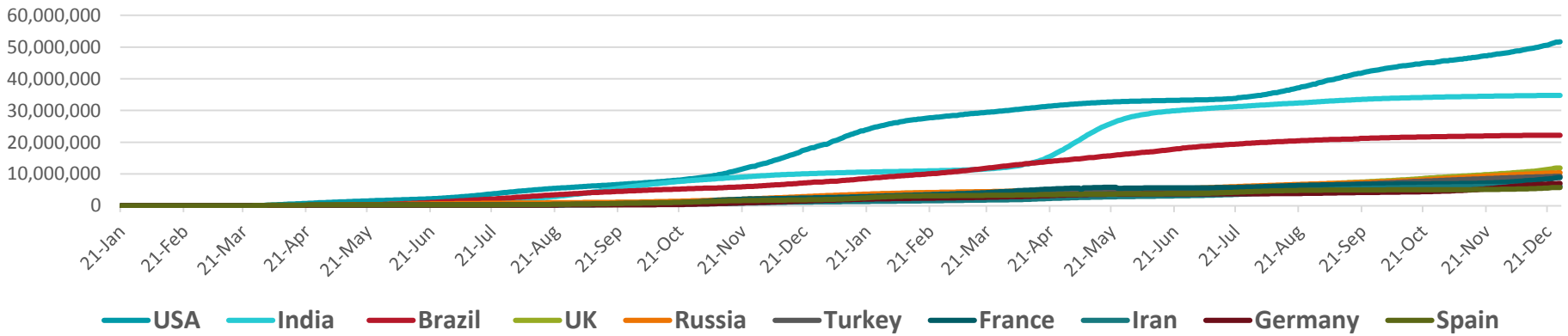
TOTAL DEATHS



DEATHS PER MILLION



TOTAL INFECTED CASES



USA	51,696,204
India	34,793,333
Brazil	22,230,737
UK	11,891,296
Russia	10,415,230
Turkey	9,306,233
France	8,866,364
Germany	7,005,289
Iran	6,184,762
Spain	5,718,008

Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: WHO

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Figure 8: COVID-19 Status in the UAE (Federal Competitiveness and Statistics Authority Dashboard)

Daily Tests
334,275.9 Average Tests
3,379.8 per 100k population
0.2% Positive Rate

Daily Cases
617.6 Average Cases
6.2 per 100k population

Daily Recovered
247.9 Average Recovered
2.5 per 100k population

Daily Deaths
0.6 Average Deaths
0.0 per 100k population
0.1% Case Fatality Rate

Figure 6A: TOTAL Number Of Infected And Recovered Cases Due To Covid-19 Reported By The UAE

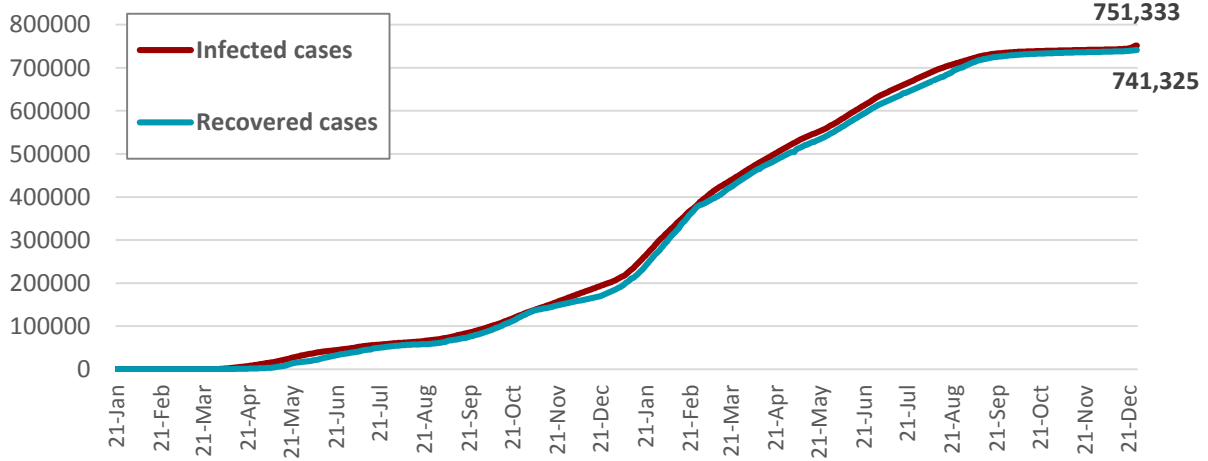
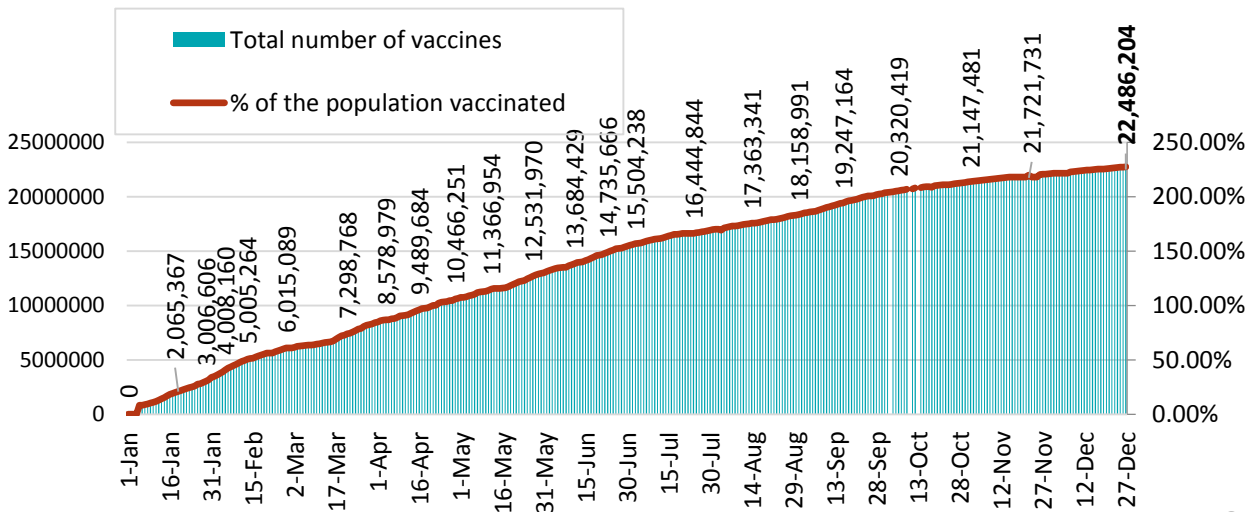


Figure 6 B: TOTAL NUMBER and Percentage of UAE population Vaccinated



Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: FCSA, WHO, John Hopkins, National Emergency Crisis and Disaster Management Authority

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Figure 7A : Global Distribution of COVID-19 Cases

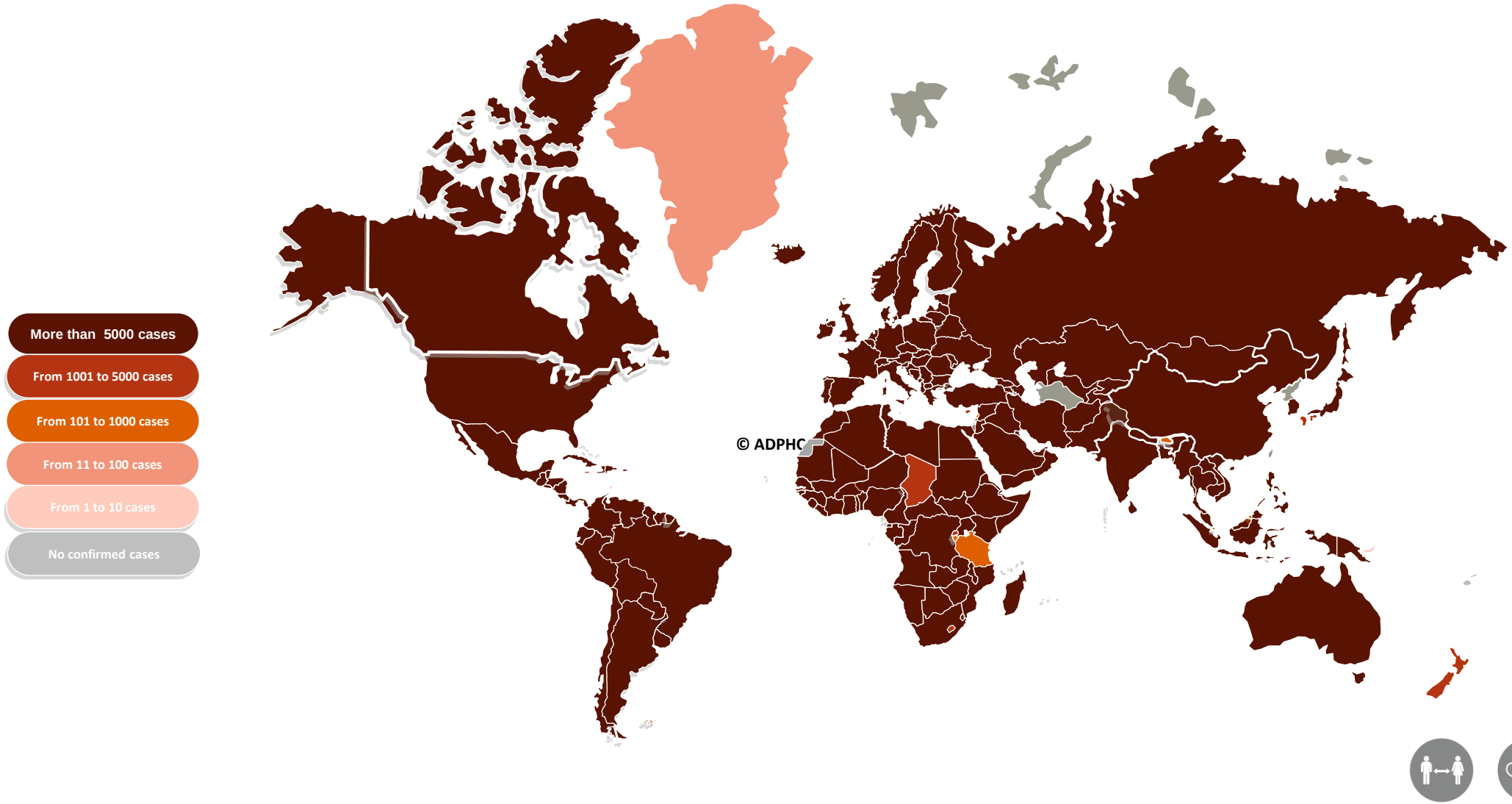

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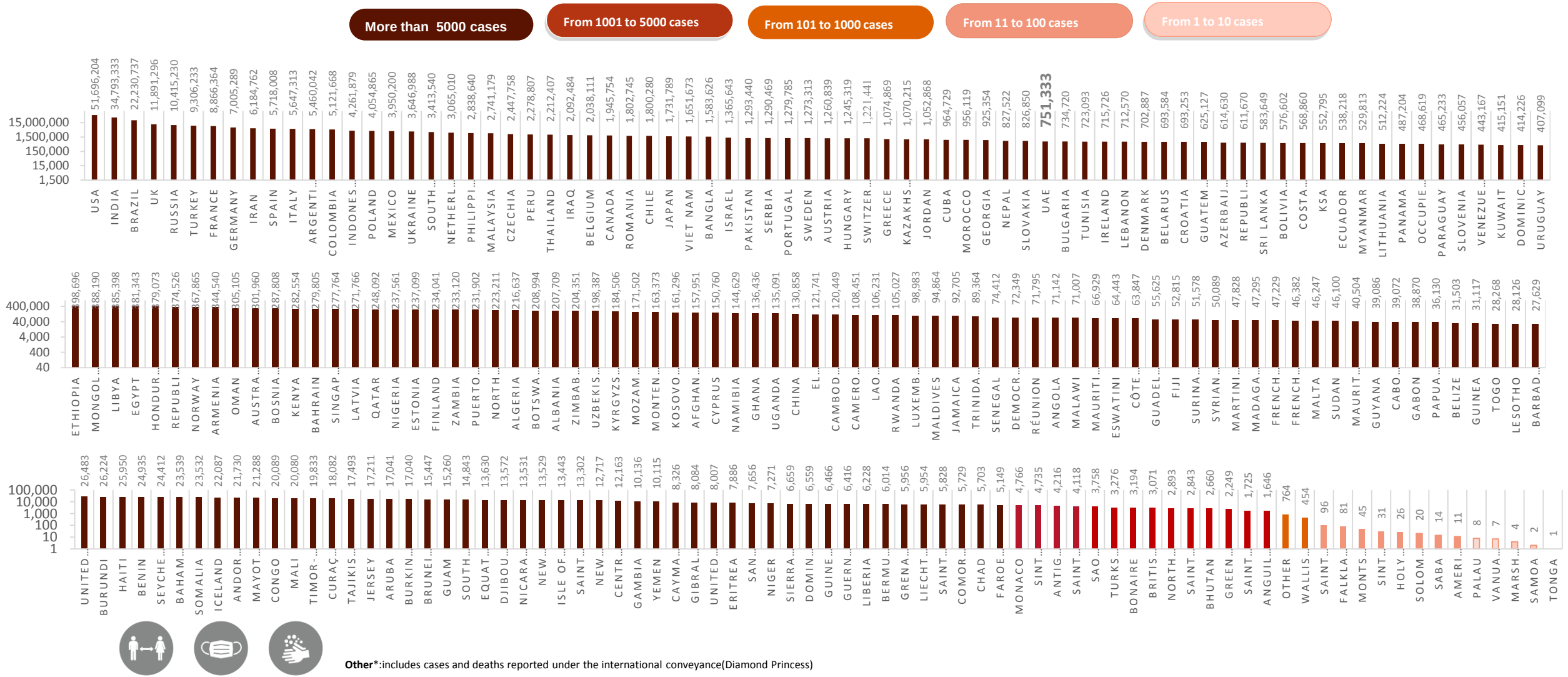
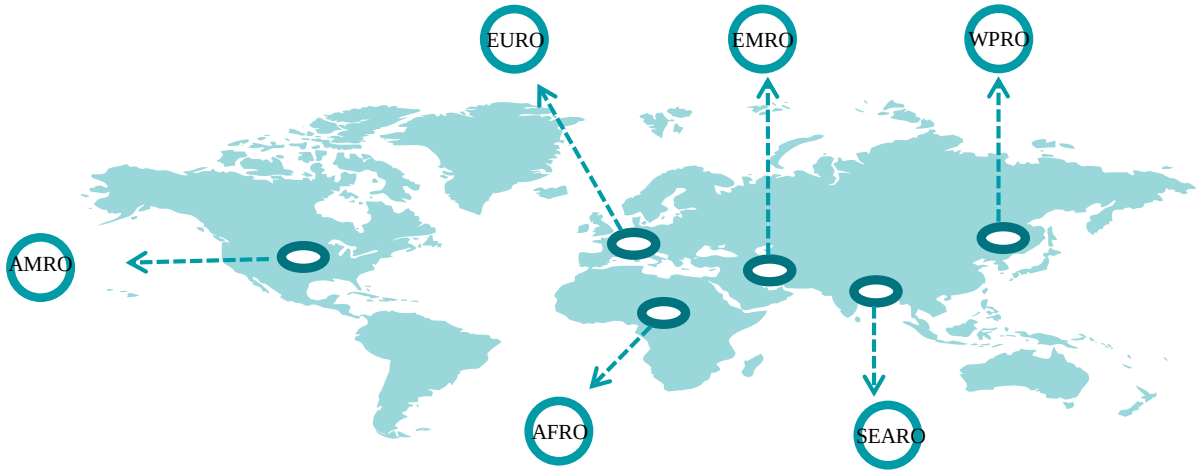
Figure 7B: Bar Chart Illustrates the Global Distribution of COVID19 Cases



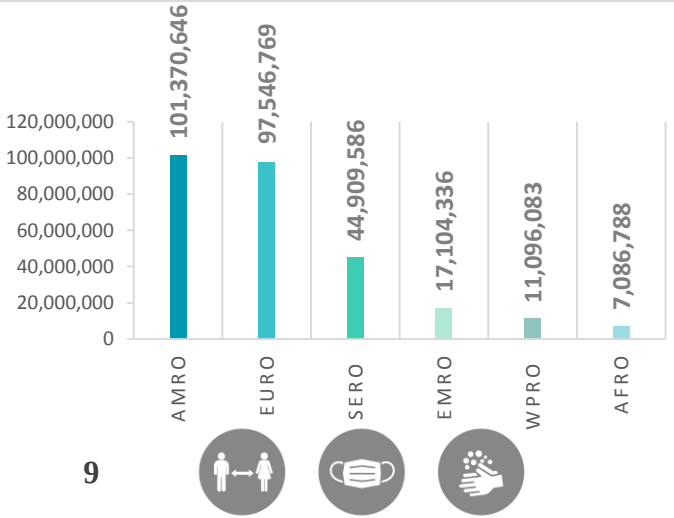
Other*:includes cases and deaths reported under the international conveyance(Diamond Princess)

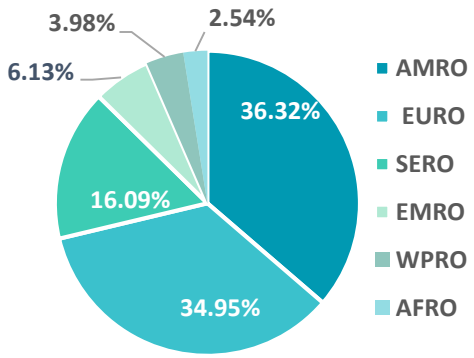
Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: WHO

Figure 6: Global Distribution of COVID-19 Cases per Region

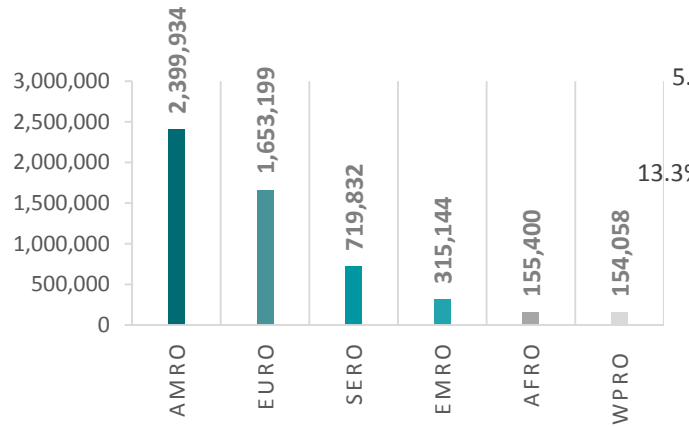


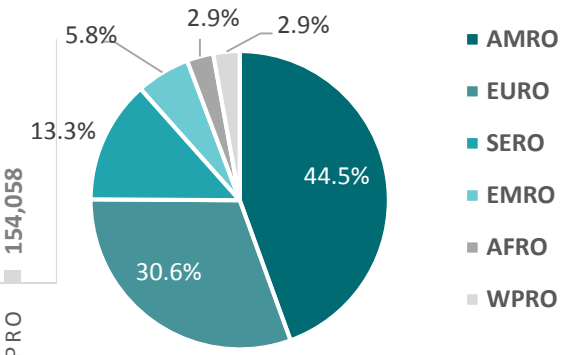
INFECTED





DEATHS

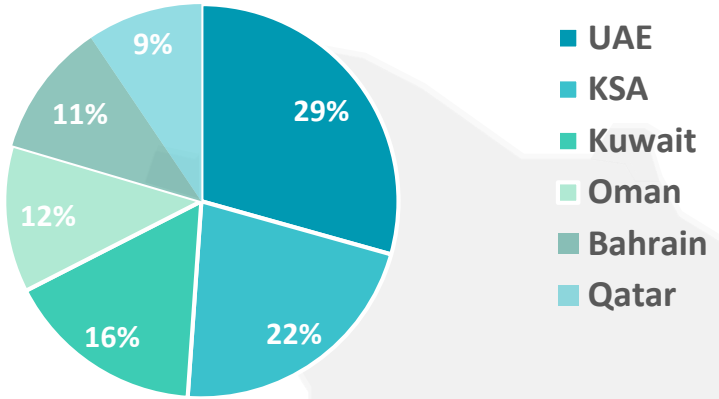


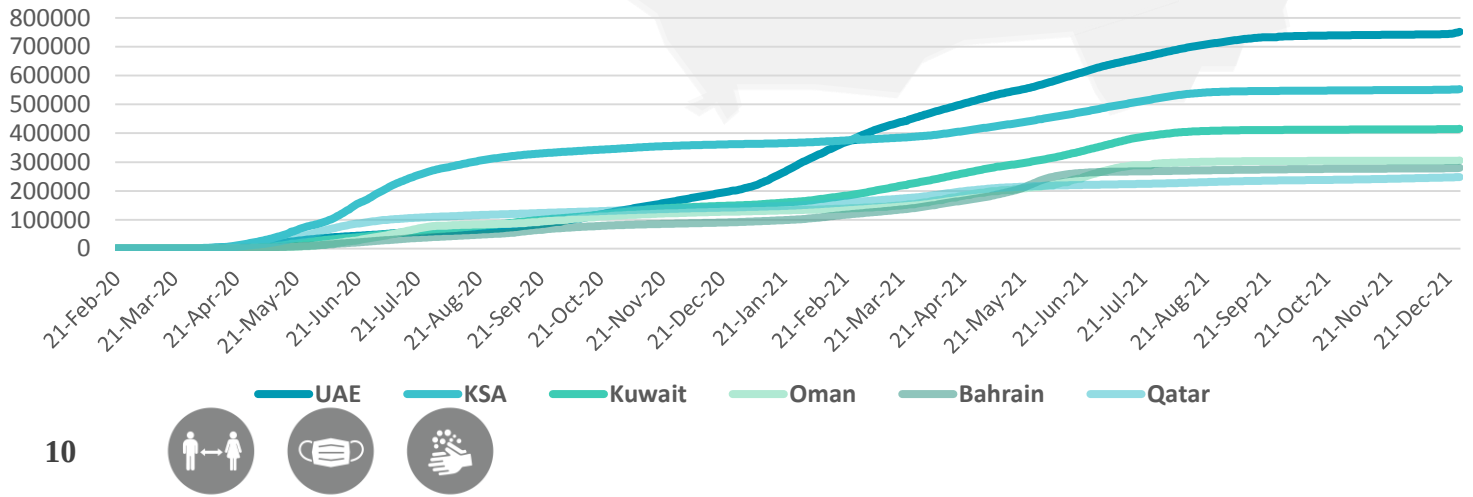


Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: John Hopkins, WHO

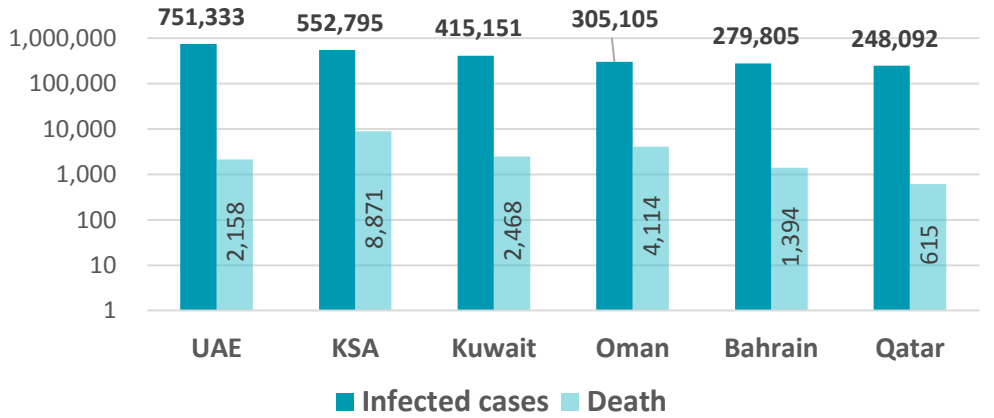
Figure 7: Comparative Analysis of the Distribution of COVID-19 Cases in GCC Countries

TOTAL NUMBER OF INFECTED CASES

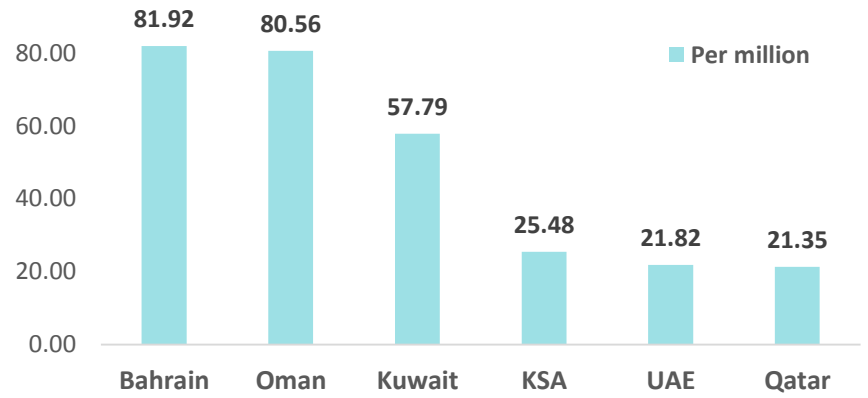




TOTAL NUMBER OF INFECTED, RECOVERED AND DEATHS

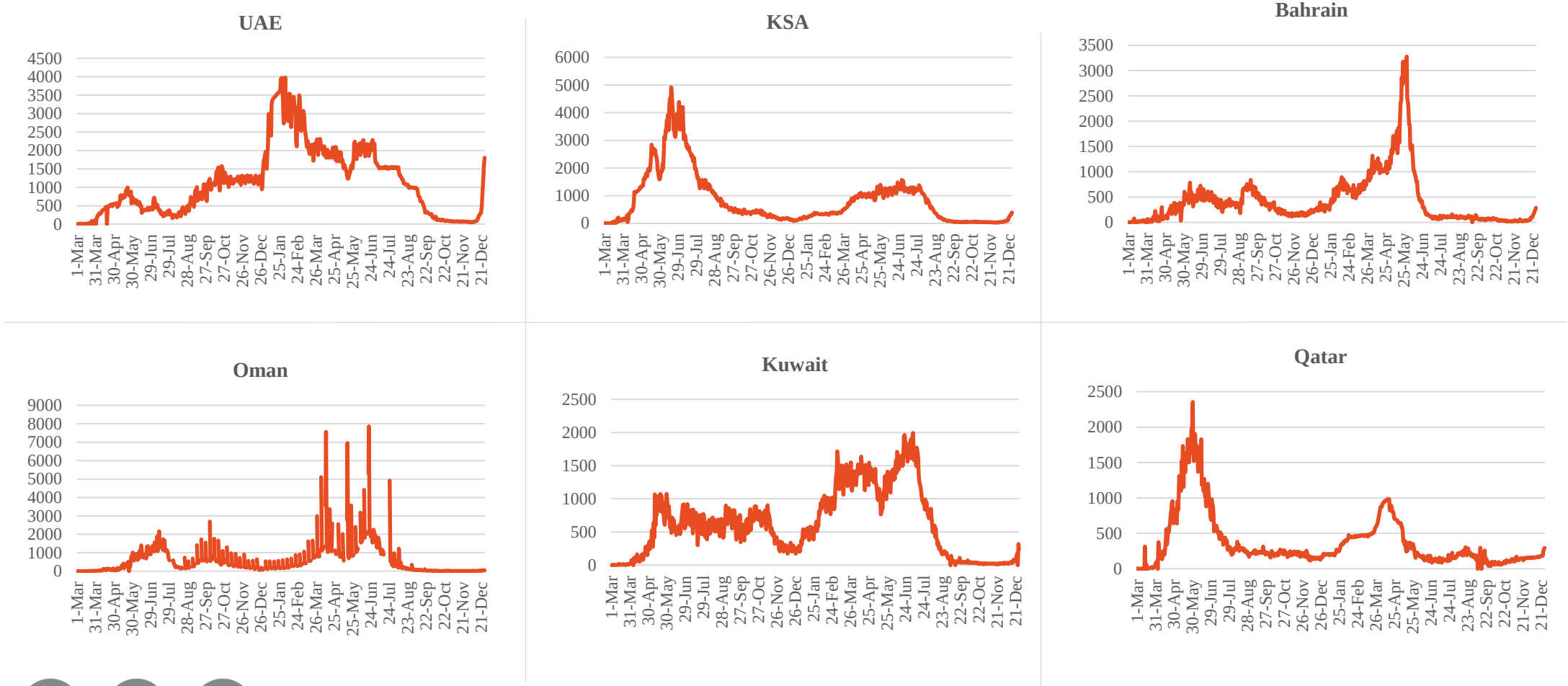


DEATHS PER MILLION



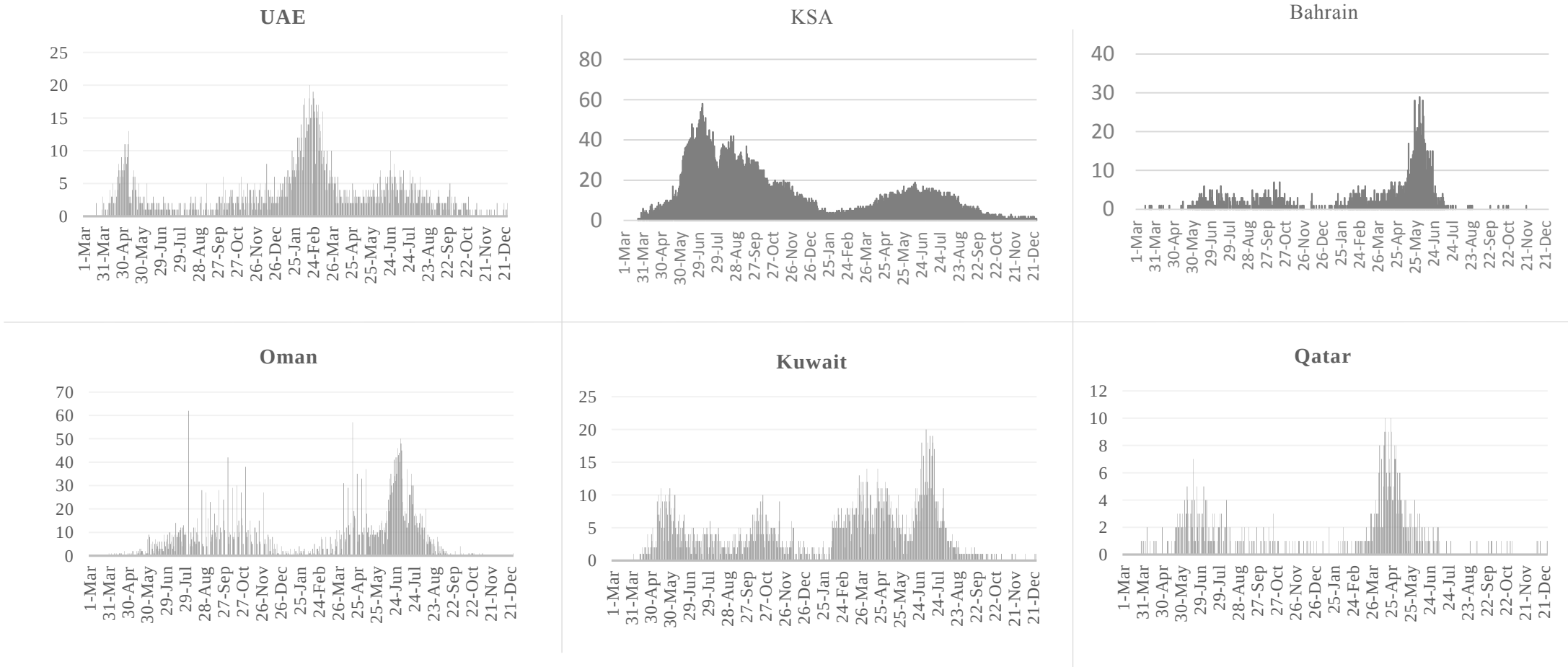
Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: John Hopkins, WHO

Figure 10: Comparative Analysis of the Distribution of COVID-19 New Cases in GCC Countries



Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: WHO

Figure 12: Comparative Analysis of the Distribution of COVID-19 New Death Cases in GCC Countries



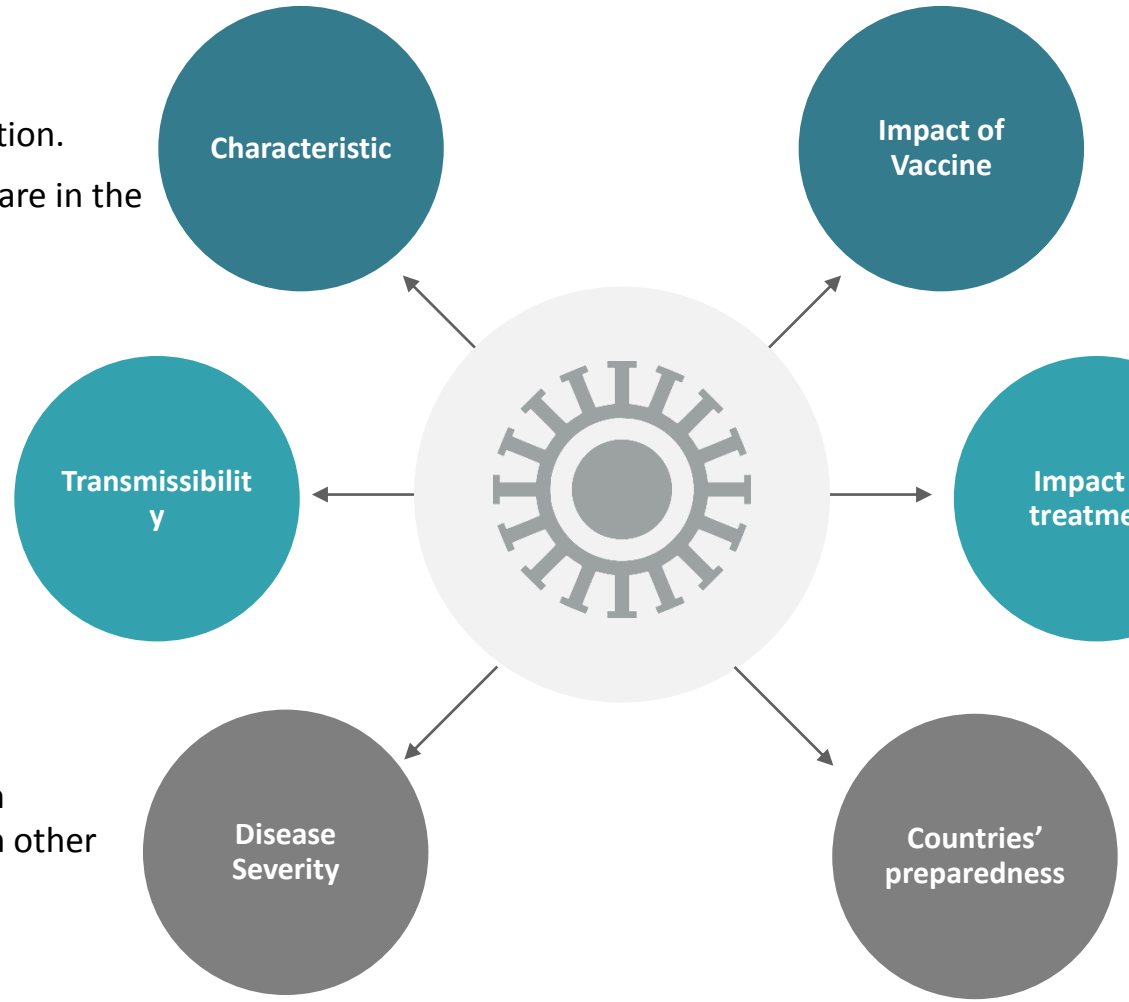
Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: WHO

OMICRON VARIANT

- 30 amino acid substitutions.
- 3 small deletions, and one small insertion.
- 15 of the 30 amino acid substitutions are in the receptor binding domain (RBD.

- Likely to have increased transmission compared to the original SARS-CoV-2 virus, but it is difficult to infer if it is more transmissible than Delta.

- No atypical symptoms associated with Omicron variant infection, and as with other variants (fatigue, muscle pain..)
- Many patients are asymptomatic..



- Vaccination is anticipated to continue to offer protection against hospitalization and death

- The expectation is that the Omicron variant will remain susceptible to some monoclonal antibody treatments

- Reassessed the measures.
- Advice to wear mask in the public area,
- Encourage to get the vaccine

Data resources: CDC

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Article 1

Omicron SARS-CoV-2 variant: a new chapter in the COVID-19 pandemic

Published Dec 6, 2021 in The LANCET

- The emergence of the alpha, beta, and delta SARS-CoV-2 variant of concern (VoCs) were associated with new waves of infections. Previous VoCs emerged in a world in which natural immunity from COVID-19 infections was common, however, Omicron emerged at a time when vaccine immunity is increasing
- The increased transmissibility of the delta was associated with higher viral load, longer duration of infectiousness, and high rates of reinfection due to the ability to escape from natural immunity. The first sequenced omicron case was reported from Botswana on Nov 11, 2021.
- The new variant was associated with an S-gene target failure on a specific PCR assay because of a 69–70del deletion when compared to alpha variant
- Omicron has some deletions and more than 30 mutations, several of which (eg, 69–70del, T95I, G142D/143–145del, K417N, T478K, N501Y, N655Y, N679K, and P681H) overlap with those in the alpha, beta, gamma, or delta VoCs.
- Based on the extrapolation from what is known, these deletions and mutations are known to lead to increased transmissibility, higher viral binding affinity, and higher antibody escape, however, it is not yet clear whether it has greater transmissibility than delta, although preliminary indications suggest that it is spreading rapidly
- Immune escape is another concern. Data suggest an increase in cases of reinfection in South Africa.
- There are conflicting reports on whether COVID-19 vaccines have consistently retained high efficacy for each of the four VoCs preceding omicron. Vaccine efficacy in mild infection by Omicron is not clear
- Thus far, most COVID-19 vaccines have remained effective in preventing severe COVID-19, hospitalisation, and death, for all previous variants, because this efficacy might be more dependent on T-cell immune responses than antibodies.

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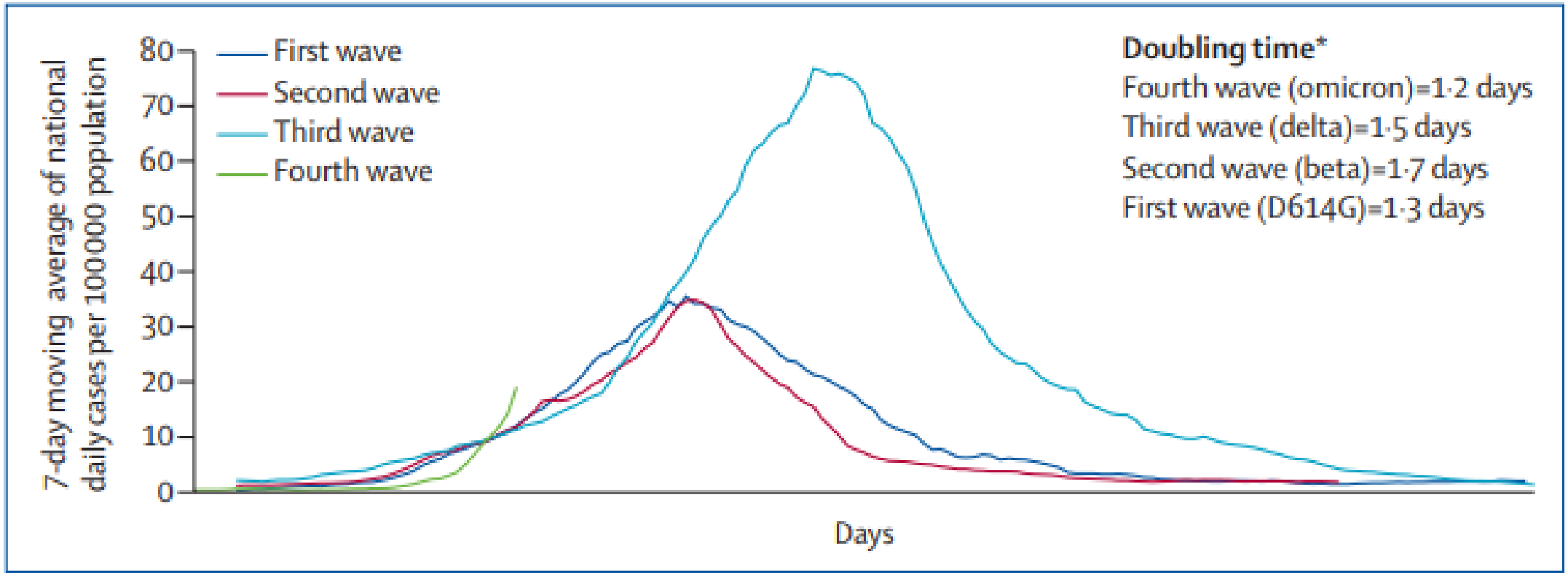
Continued

Figure 1: SARS-CoV-2 cases in first, second, third, and fourth waves, Gauteng Province of South Africa



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Article 2

Emerging SARS-CoV-2 variants: shooting the messenger

Published October 14, 2021 in NEJM

Background

On Nov 24, South Africa alerted the world to the latest SARS-CoV-2 variant, omicron (B.1.1.529). The omicron variant is different from previous variants - 49 mutations in its genomic sequencing (30 of which occur within the spike protein)—a jump from the 13 mutations found within the delta variant (B.1.617.2). More mutations do not mean a variant is more dangerous, but almost immediately omicron generated concern within the global health community regarding its transmissibility and ability to evade both vaccine-induced and natural immunity.

Global response

National governments reacted with the reintroduction of non-pharmaceutical measures and ramped up vaccine booster programmes in the hope of delaying the spread of omicron. Controversially, however, for some governments the immediate response was to issue travel bans against South Africa. The UK was the first to adopt such a proposal, and was swiftly followed by the USA, Israel, and others.

Travel bans

Patients with breakthrough infection who had antibody titers obtained within a week before SARS-CoV-2 detection (peri-infection period) were matched with four to five uninfected controls and generalized estimating equations were used to predict the geometric mean titers among cases and controls and the ratio between the titers in the two groups. Correlation between neutralizing antibody titers and N gene cycle threshold (Ct) values with respect to infectivity was also assessed.

- On the contrary, WHO states that such restrictions would have a detrimental impact on the targeted countries as the economies of these countries will be harmed, and this in turn will hurt their ability to combat the pandemic. South Africa, therefore, is being punished for being the first country to raise the alarm.

- The travel bans do not even appear to be effective in their aims. As of Nov 29, omicron cases have been detected in eight EU countries, as well as in Australia, Canada, the UK, and other regions. Most notably, Dutch health authorities identified the variant in samples taken on Nov 19 and Nov 23 (before the formal discovery of the variant).

- WHO official guidance also warns that travel bans might do more longer-term damage than their possible shorter-term benefit: punishing the country that discovers the variant could unintentionally discourage countries from sharing genomic data on new variants in the future. Inhibition of this crucial data sharing could be disastrous. Nations must not be disincentivised from alerting the world to new variants. In fact, the world will benefit from upscaling genomic surveillance.

- Most breakthrough cases were mild or asymptomatic, although 19% had persistent symptoms (>6 weeks). The B.1.1.7 (alpha) variant was found in 85% of samples tested. A total of 74% of case patients had a high viral load (Ct value, <30) at some point during their infection; however, of these patients, only 17 (59%) had a positive result on concurrent Ag-RDT. No secondary infections were documented.

Continued

Global Surveillance

There already exists an uneven distribution of global surveillance of SARS-CoV-2 variants worldwide. Some regions, such as Denmark and Hong Kong, are sequencing at least half of their COVID-19 cases, searching for mutations. Most countries sequence zero cases, suggesting potential for global blind spots for variant emergence. South Africa, which has sequenced only 0·8% of its cases but discovered two variants (beta [B.1.351] and omicron), potentially provides a template for the national surveillance of infectious agents.

Increased global genomic surveillance of variants requires both international collaboration and the sharing of resources and expertise. Although the distribution of vaccines worldwide have not been encouraging, a special session at the World Health Assembly in Geneva between Nov 29 and Dec 1, offers some hope where numerous world leaders met to discuss recommendations for improving global pandemic response. The most notable outcome was the agreement to develop an accord to govern pandemic response, including a commitment to the equitable distribution of diagnostics, drugs, and vaccines.

Conclusion

In addition to resources, countries will need assurances that they can report all findings without fear of reprisal. The genesis of variants, such as omicron, are (in part) the result of the world's unequal response to COVID-19.

The large portions of the global population that remain unvaccinated present the greatest risk for mutations and evolution of SARS-CoV-2. So, while these people remain without a vaccine, the least that can be done is stop penalising the countries that bring the consequences of inaction to light.

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Article 3

Omicron Has Reached the US—Here's What Infectious Disease Experts Know About the Variant

Published December 6, 2021 in JAMA

- JAMA organized a panel of specialists on December 1 to address what is known, and what is unknown about Omicron variant.
- The panel was moderated by Preeti Malani, MD, MSJ, a professor of medicine at the University of Michigan Medical School's Division of Infectious Diseases and the university's chief health officer. Additionally, Adam Lauring, MD, PhD, an associate professor of medicine in the university's Division of Infectious Diseases, and Carlos del Rio, MD, a distinguished professor of medicine in the Division of Infectious Diseases at Emory University School of Medicine, a professor of epidemiology and global health at the Rollins School of Public Health, and a member of JAMA's editorial board, were among those who joined her.
- **DR LAURING:** There are about 35 number of mutations in Omicron's spike protein. The virus's ability to spread is influenced by mutations. Spike is also a crucial target for our monoclonal antibodies and vaccines.
- **DR MALANI:** Omicron variant was initially sequenced in South Africa, and its origins are still unknown.
- **DR DEL RIO:** One theory holds that the evolution took place in a person with HIV and significant immune suppression who was infected for a long time, perhaps exceeding 300 days. Because you can't get rid of the virus, it keeps multiplying and mutating in that environment. This may have resulted in this variation.
- **DR LAURING:** SARSCoV-2, according to reverse zoonosis theory, has spread to other species over time. It will develop in a different way in an animal host than in a human host. It might later resurface in the human population as a completely distinct virus.
- **DR DEL RIO:** The Centers for Disease Control and Prevention (CDC) has now allowed boosters for people over the age of 18. Approximately 20% of Americans who have been vaccinated had their boosters.

Continued

- **DR DEL RIO:** Moreover, the CDC needs to increase testing, surveillance, and sequencing of the genome. Normally, between 5% to 7% of isolates are sequenced nationwide and we need to scale that up quite a bit.
- **DR LAURING:** There's a discussion within our health system about how to transition testing programs to particular platforms that could provide an early warning for Omicron. A signature can be found in certain PCR [polymerase chain reaction] tests that can be used to screen for the Omicron variation.
- **DR LAURING:** The mutations have given us some hints. Many of these monoclonals' targeted epitopes have mutations, and it looks that some of them will lose significant effectiveness as a result of those changes.
- **DR DEL RIO:** In the vast majority of the world, monoclonals are completely unavailable. We need to find new treatments. Oral antivirals that can be scaled out internationally to treat persons infected with SARS-CoV-2 are what we actually need.
- **DR LAURING:** We're still discovering more about Delta and how effective vaccines are. I wouldn't be surprised if the vaccine's ability to protect against infection deteriorates. I'm considerably more enthusiastic about the vaccine's ability to protect against more serious disease.
- **DR DEL RIO:** I think there are a lot of people out there not getting vaccinated not because of a lack of information, but because of excessive misinformation. We have to really tackle misinformation because it's driving a lot of people to not get vaccinated. This pandemic has highlighted what we have all known from HIV and from many other diseases the enormous health disparities that exist globally.
- **DR LAURING:** We've got highly effective vaccines. We've got drugs coming out. Even though there's a lot of big problems to solve, we really have made tremendous improvements.

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ACKNOWLEDGMENT

EDITORS

Dr Shereena Al Mazroui . MBBS, MPH – (**ADPHC**).
Dr Maha Al Safi – MBBS – **(ADPHC).**

TEAM

Hanan Al Mutairi, BSPH - **(ADPHC).**
Shahad Al Shamlan, BSPH - **(ADPHC).**
Ahlam Al Maskari , BSPH- **(ADPHC).**

CONTRIBUTORS

Dr. Mumtaz Meeran, MPH – **(ADPHC).**
Dr. Wasim El Nekidy, PHD in clinical pharmacology – **(CCAD).**
Esrat Zahan Khan - **(ADU).**