مركز أبوظبي للصحة العامة
ABU DHABI PUBLIC HEALTH CENTRE

SCIENTIFIC RESEARCH MONITORING ON COVID-19

12 APRIL 2021

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SCIENTIFIC RESEARCH MONITORING ON COVID-19

(Issue 418)

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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 daily 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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Research
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Summary

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.
For further inquiries you may communicate with us as PHR@adphc.gov.ae

RESEARCH UPDATES

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The views and opinions expressed in this report are those of the authors and do not reflect the official policy or position of the Abu Dhabi Public Health Center (ADPHC).

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VACCINE

- Helping Manufacturers Navigate Novel Coronavirus Variants
- SARS-CoV-2 Variants of Concern in the United States—Challenges and Opportunities
- COVID-19 Vaccines vs Variants—Determining How Much Immunity Is Enough

EPIDEMIOLOGY

- SARS-CoV-2 infection and transmission in primary schools in England in June–December, 2020 (sKIDs): an active, prospective surveillance study
- Testing for SARS-CoV-2 infection: a key strategy to keeping schools and universities open

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 04 APR 2021

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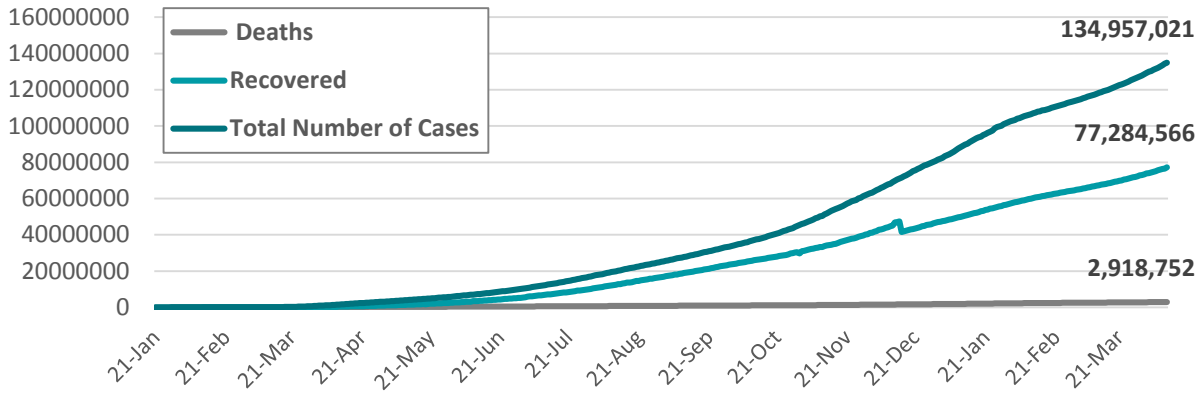
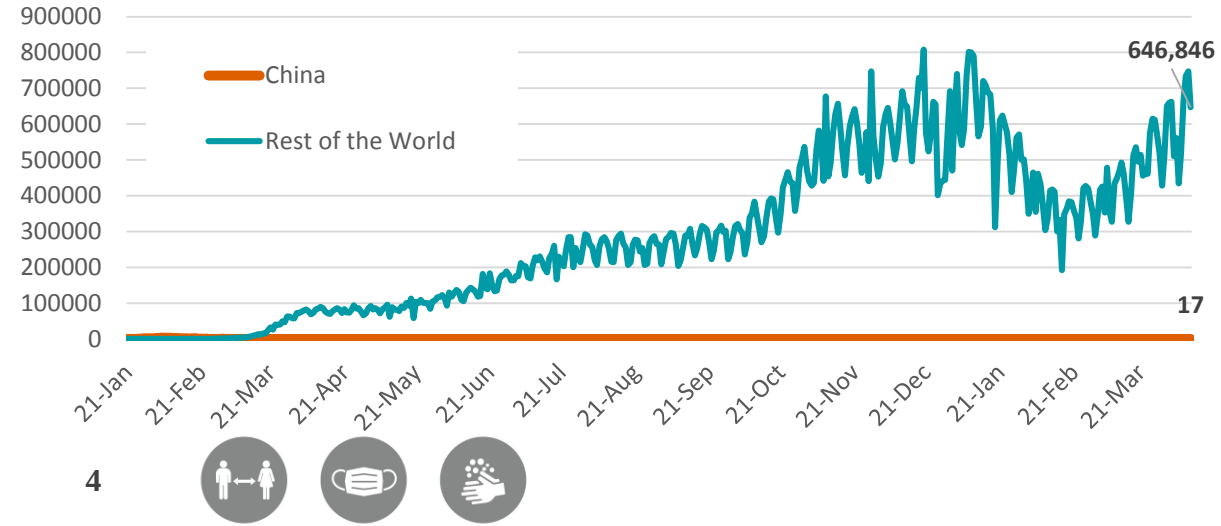
Figure 1: Total Number of Infected, Recovered, and Death Cases



Note: the number of recovered cases in 31th October recorrected from 30 million to 29 million, and in 15th December recorrected from 47 million to 41 million in Johns Hopkins website

Figure 2: Daily New Infected COVID-19 Cases (China and rest of the world)



4

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

Figure 3: Total Number of Death Due to COVID-19 (china and result of the world)

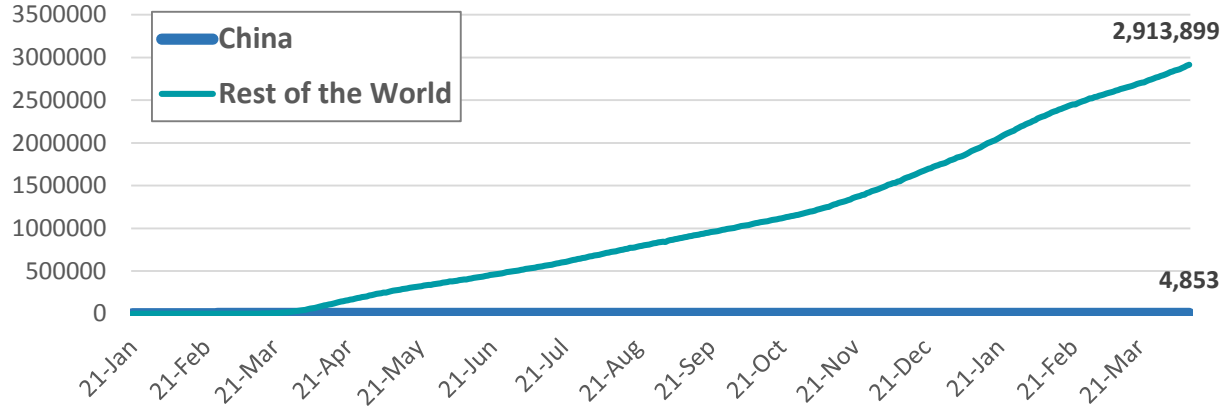
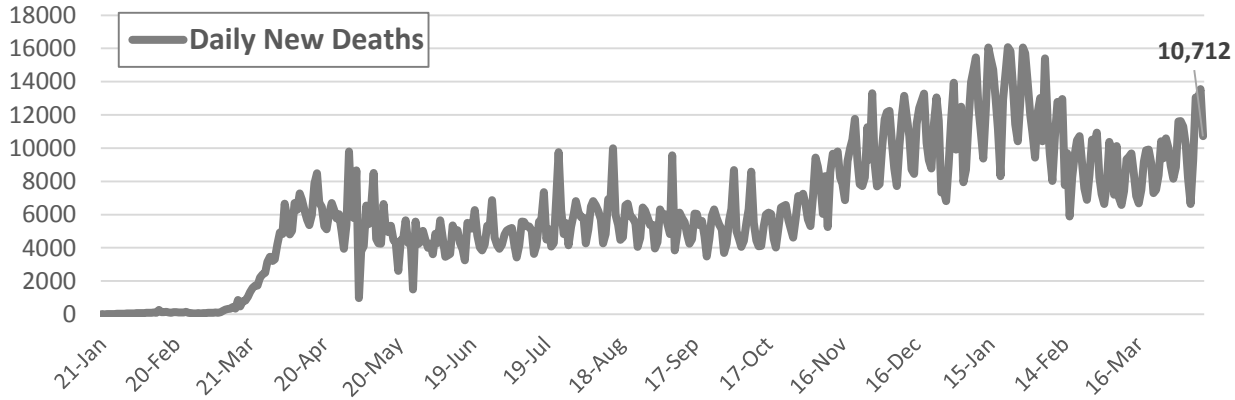


Figure 4: Global Daily New Deaths Due to COVID-19



EPIDEMIOLOGY

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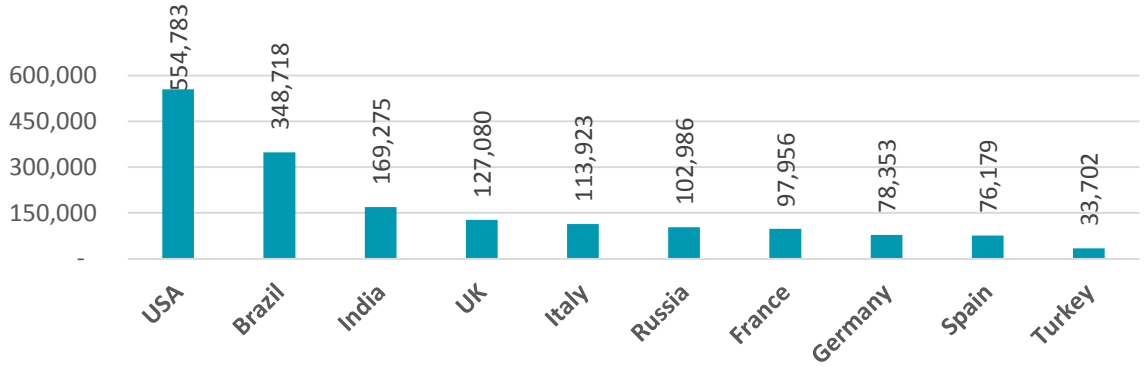
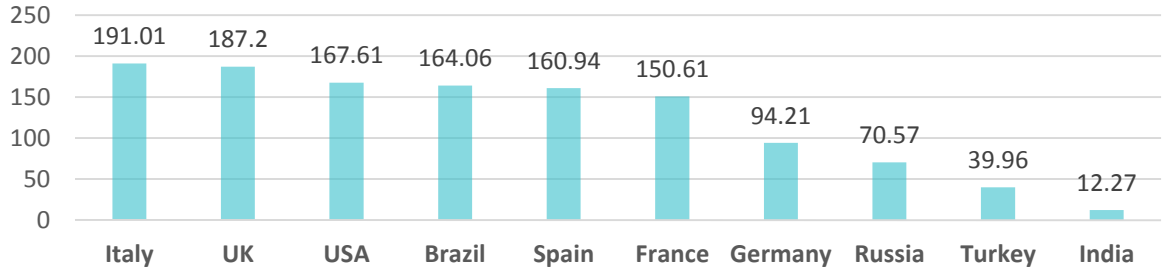
Figure 5: Top 10 Countries in the Total Number of Cases Due to COVID-19

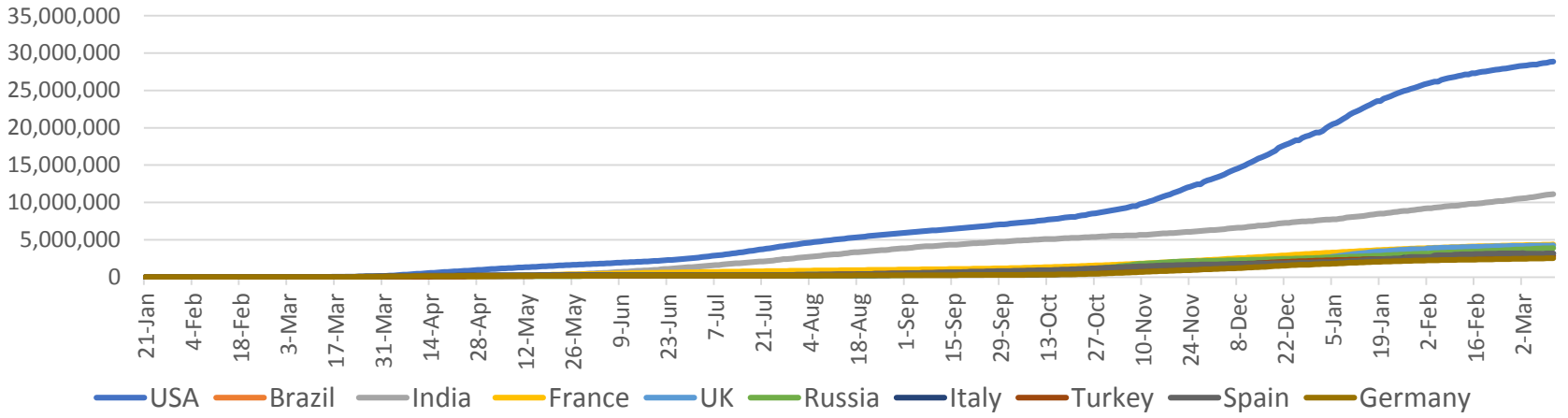
TOTAL DEATHS



DEATHS PER MILLION



TOTAL INFECTED CASES



USA	30,692,226
Brazil	13,373,174
India	13,358,805
France	4,945,238
Russia	4,641,390
UK	4,368,049
Turkey	3,798,333
Italy	3,754,077
Spain	3,336,637
Germany	2,998,268

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
238,638.4 Average Tests
2,412.8 per 100k population
0.8% Positive Rate

Daily Cases
1,944.4 Average Cases
19.7 per 100k population

Daily Recovered
1,979.4 Average Recovered
20.0 per 100k population

Daily Deaths
3.0 Average Deaths
0.0 per 100k population
0.2% Case Fatality Rate

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

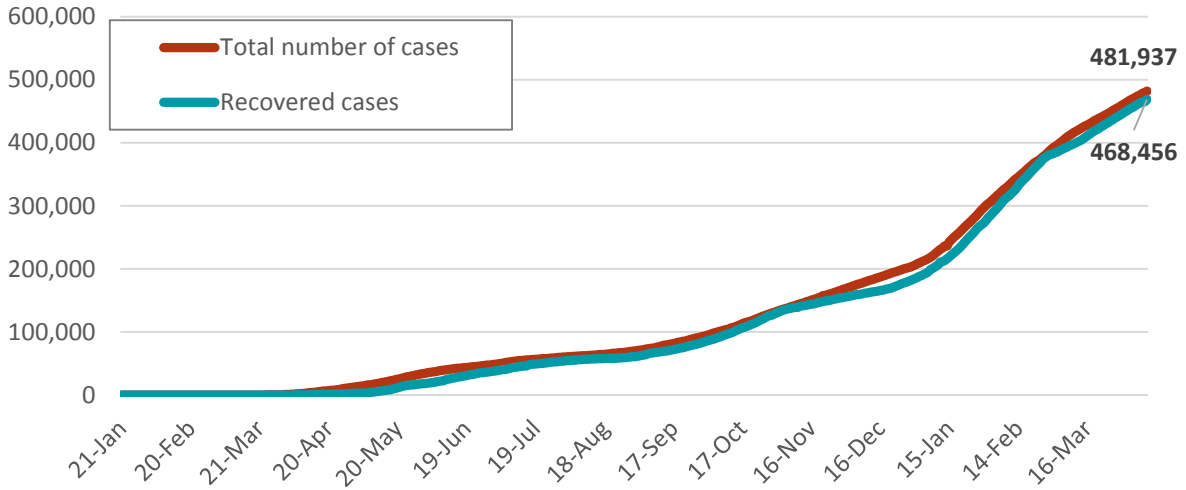
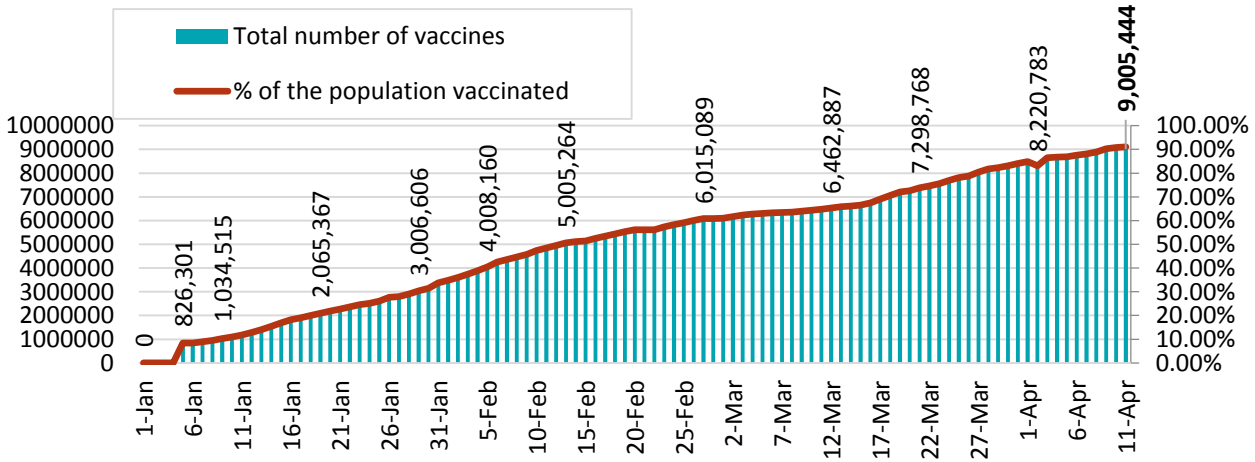


Figure 6 B: TOTAL NUMBER and Percentage of UAE population Vaccinated



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

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 04 APR 2021

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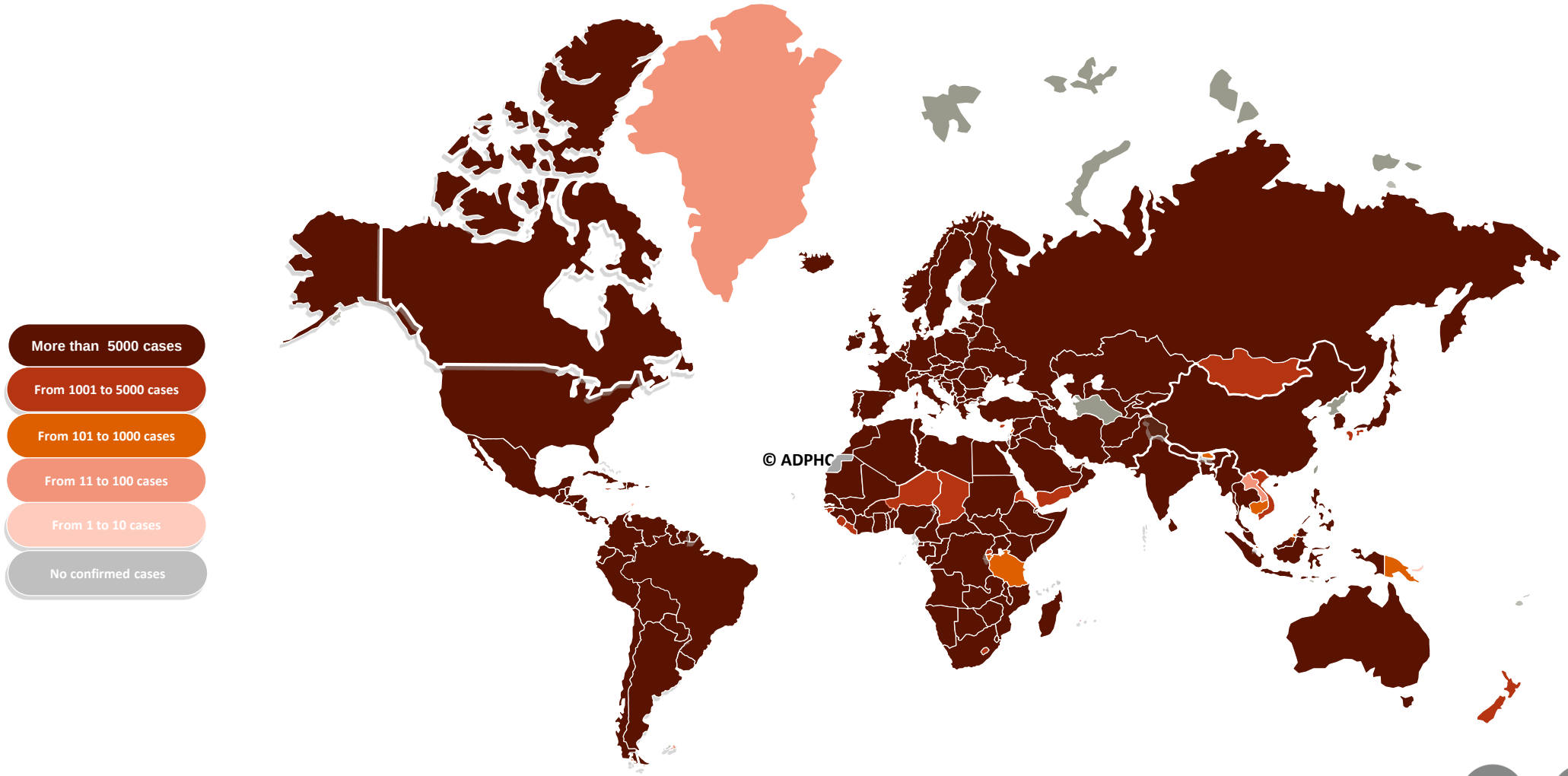
Figure 7A : Global Distribution of COVID-19 Cases



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

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 04 APR 2021

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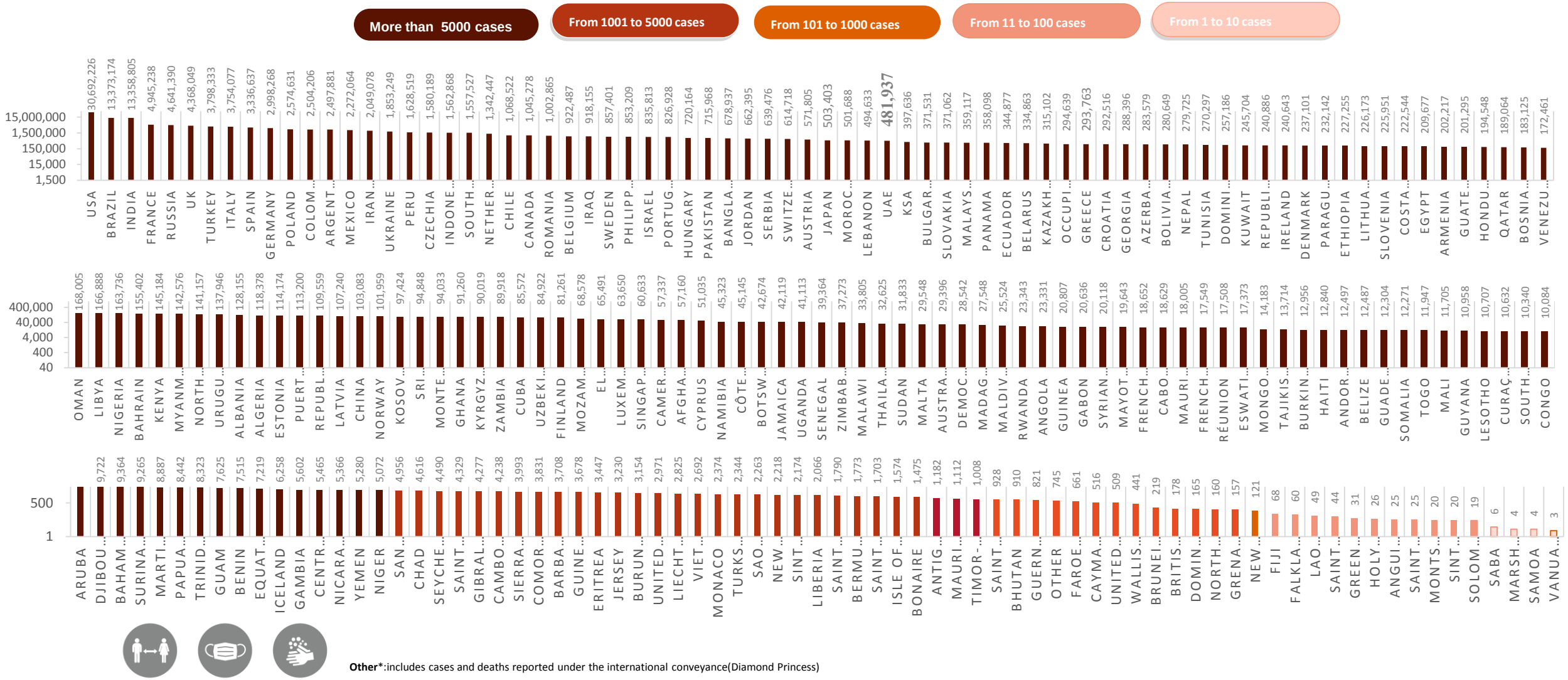
Figure 7B: Bar Chart Illustrates the Global Distribution of COVID19 Cases



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

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

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 04 APR 2021

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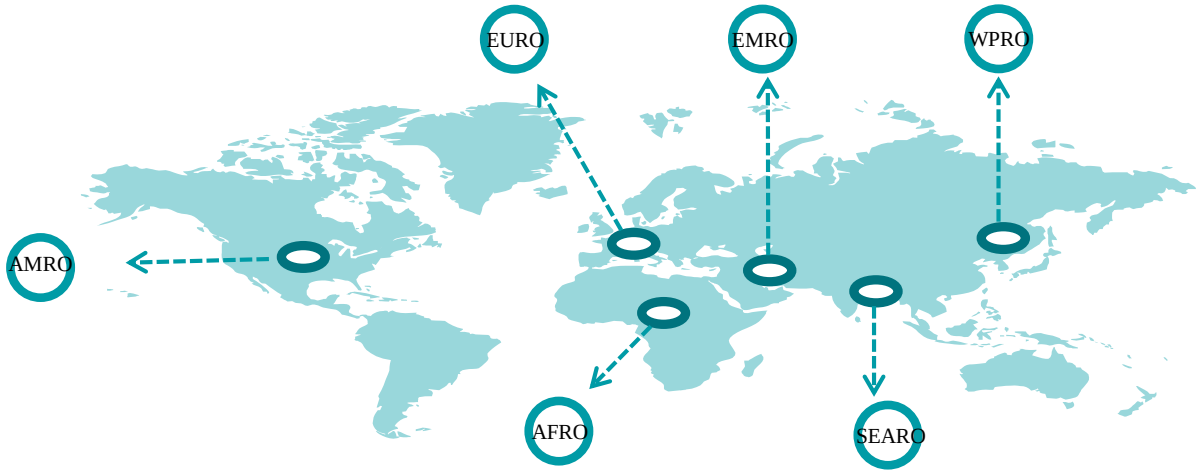
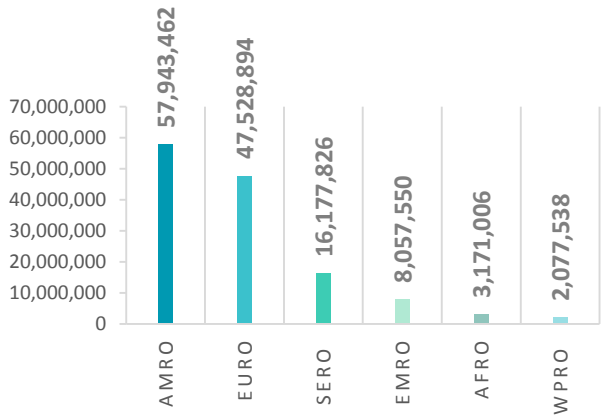
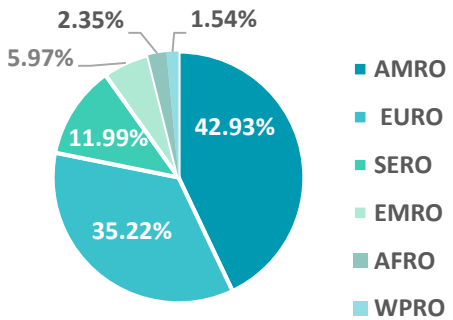
Figure 6: Global Distribution of COVID-19 Cases per Region

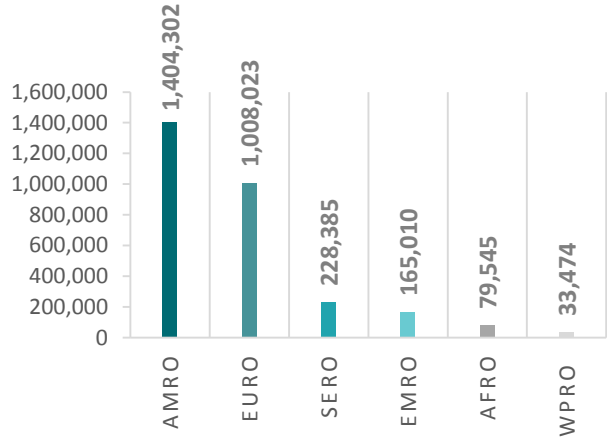


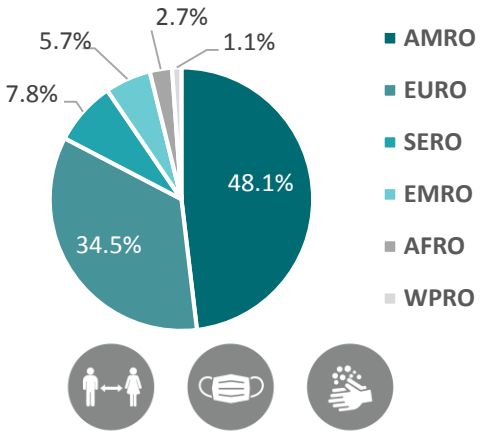
INFECTED





DEATHS





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

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FROM 21 JAN 2020 TO 04 APR 2021

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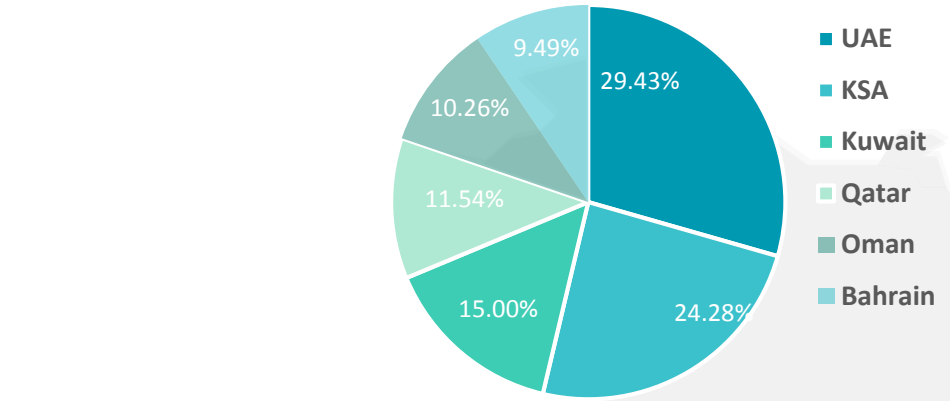
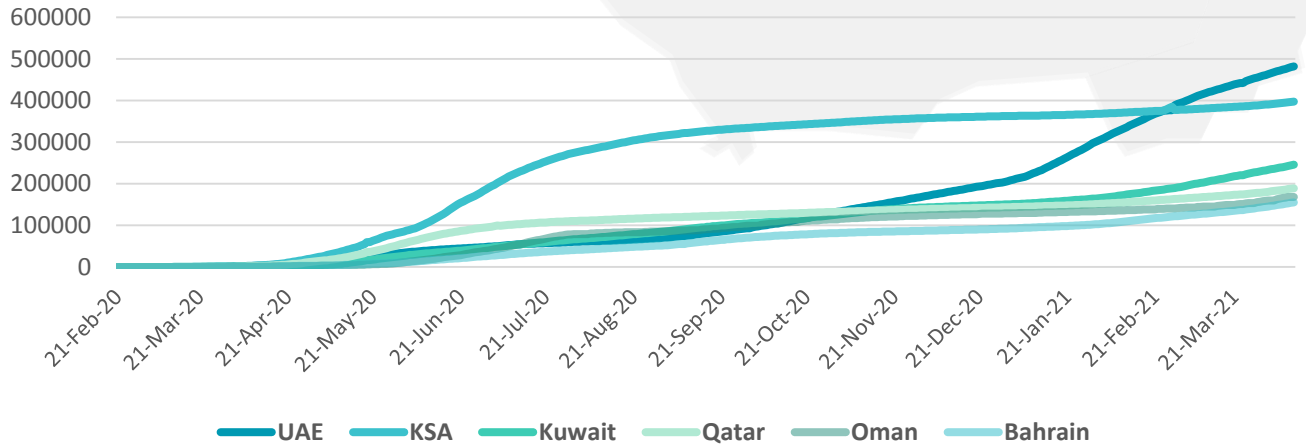
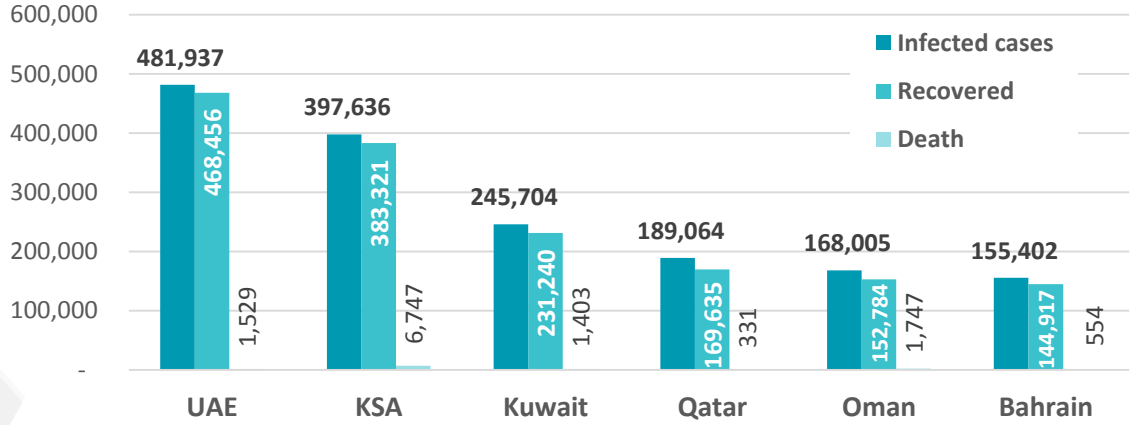
Figure 7: Comparative Analysis of the Distribution of COVID-19 Cases in GCC Countries

TOTAL NUMBER OF INFECTED CASES

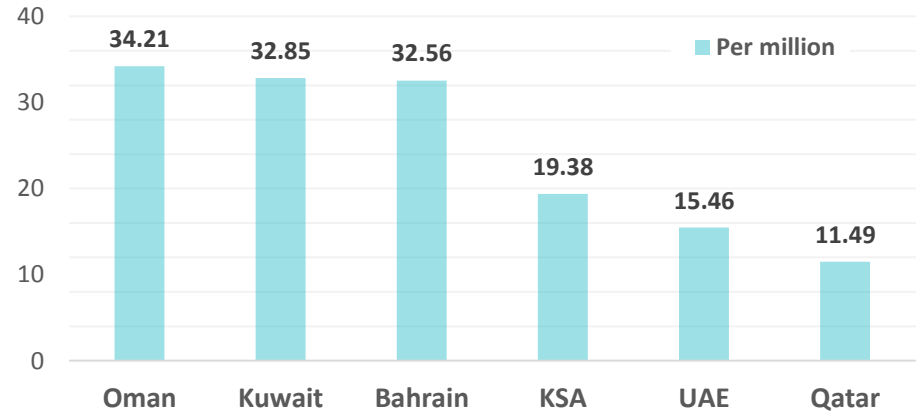




TOTAL NUMBER OF INFECTED, RECOVERED AND DEATHS



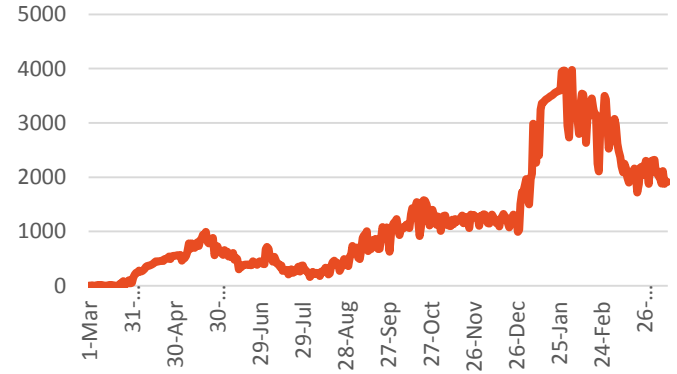
DEATHS PER MILLION



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

UAE

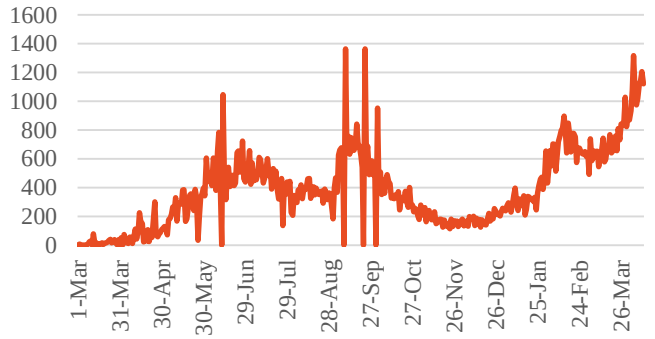


Source : National Emergency Crisis and Disaster Management Authority

KSA

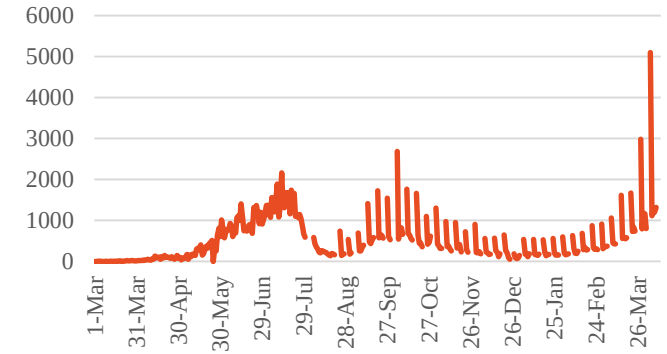
Source : KSA ministry of health

Bahrain



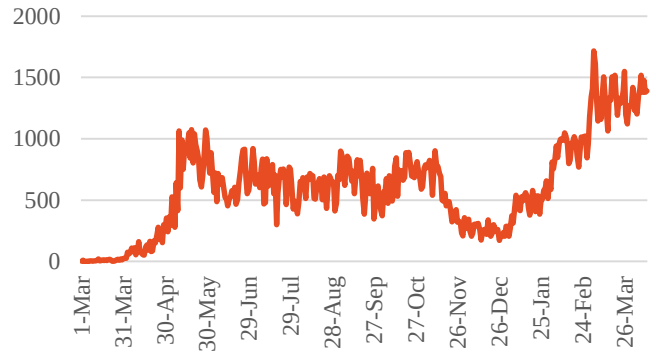
Source :WHO

Oman



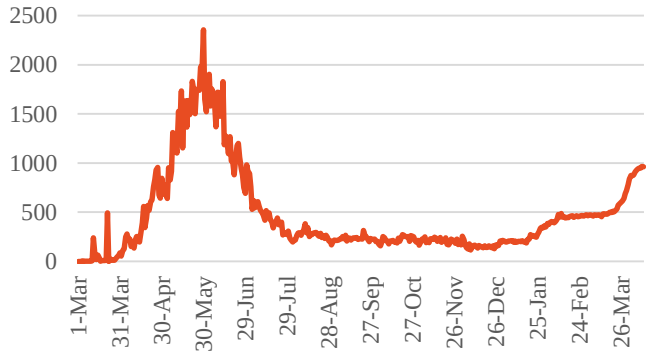
Source :Oman ministry of health

Kuwait



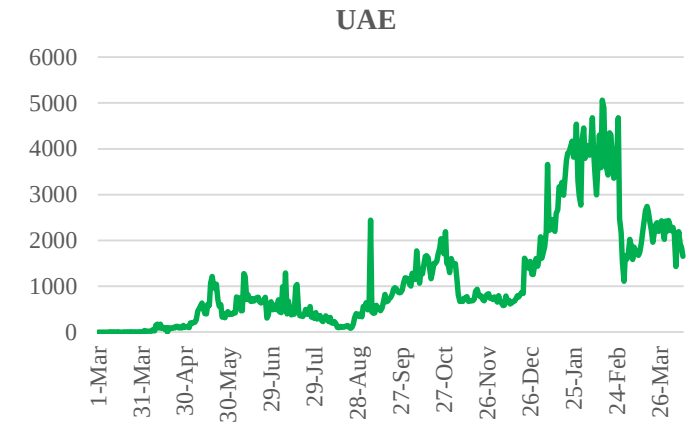
Source : Kuwait ministry of health

Qatar

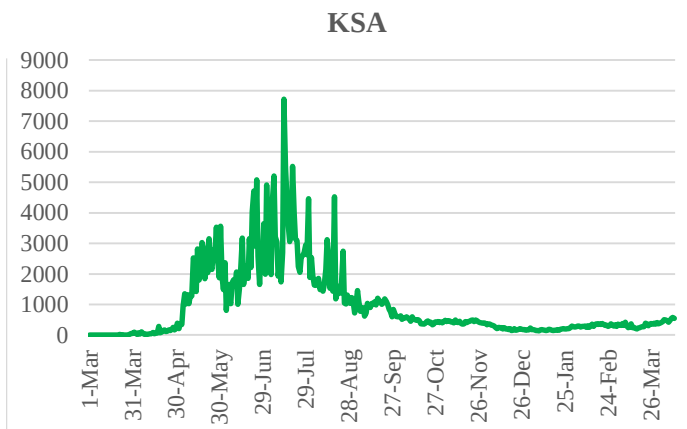


Source : Qatar ministry of health

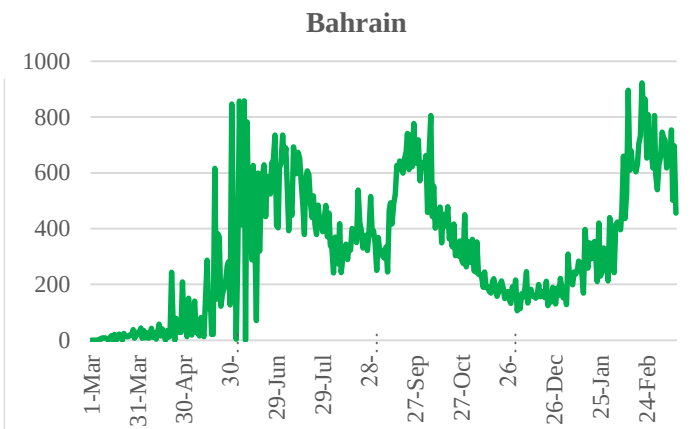
Figure 11: Comparative Analysis of the Distribution of COVID-19 Recovered Cases in GCC Countries



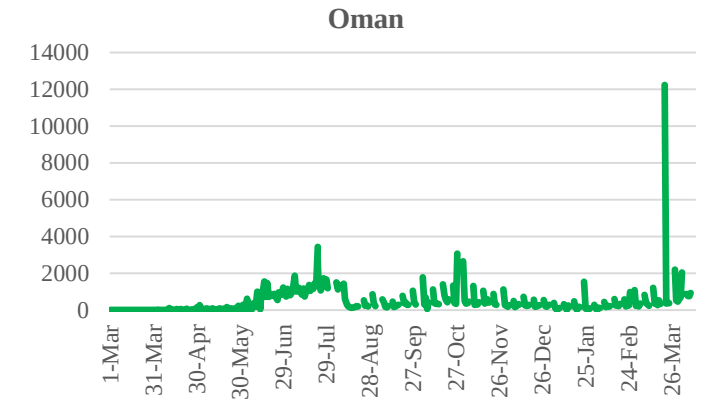
Source : National Emergency Crisis and Disaster Management Authority



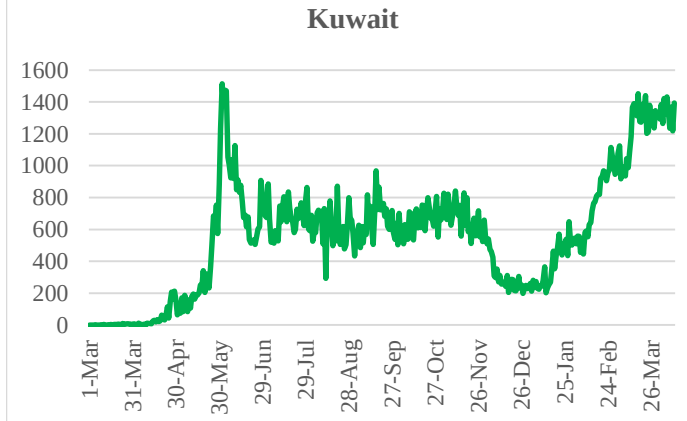
Source : KSA ministry of health



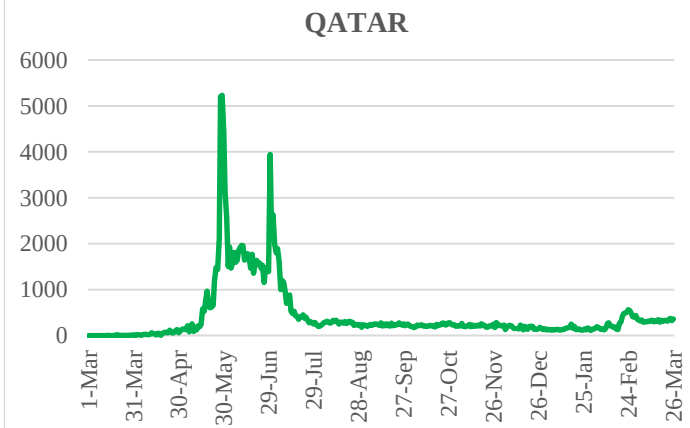
Source : Bahrain ministry of health



Source :Oman ministry of health

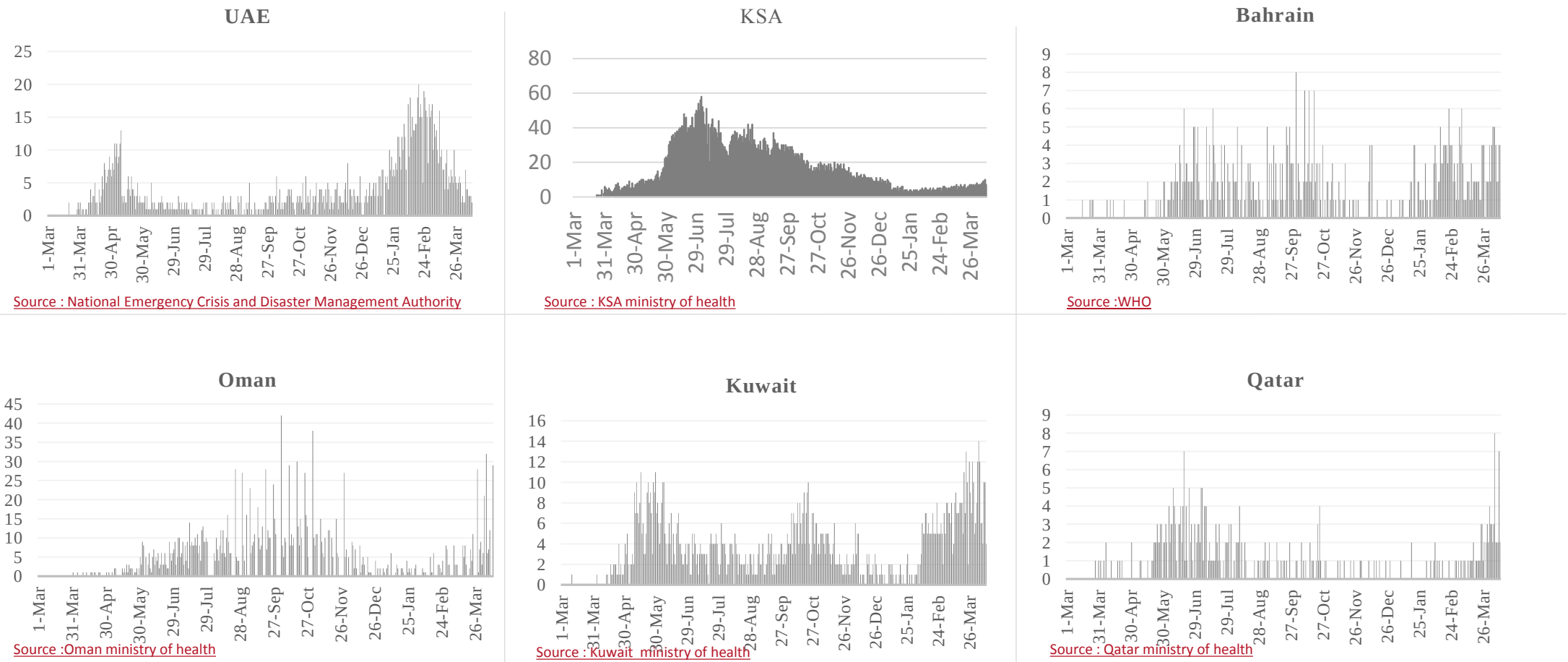


Source : Kuwait ministry of health



Source : Qatar ministry of health

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



Source : National Emergency Crisis and Disaster Management Authority

Source : KSA ministry of health

Source :WHO

Source :Oman ministry of health

Source : Kuwait ministry of health

Source : Qatar ministry of health

EPIDEMIOLOGY - SCHOOL

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Article 1

Published

SARS-CoV-2 infection and transmission in primary schools in England in June–December, 2020 (sKIDs): an active, prospective surveillance study

March 16, 2021 in THE LANCET

- Public Health England initiated a study, COVID-19 Surveillance in School KIDs (sKIDs), in primary schools when they partially reopened from June 1, 2020, after the first national lockdown in England to estimate the incidence of symptomatic and asymptomatic SARS-CoV-2 infection, seroprevalence, and seroconversion in staff and students.
- sKIDs, an active, prospective, surveillance study, included two groups: the weekly swabbing group and the blood sampling group. The swabbing group underwent weekly nasal swabs for at least 4 weeks after partial school reopening June to mid-July, 2020. The blood sampling group additionally underwent blood sampling to measure previous infection at the beginning (June 1–19, 2020) and end (July 3–23, 2020) of the summer half-term, and, after full reopening in September, 2020, and (Nov 23–Dec 18, 2020). We tested for predictors of antibody positivity using logistic regression. We calculated antibody seroconversion rates for participants who were seronegative in the first round and were tested in at least two rounds.

- During the summer half-term, 11 966 participants in 131 schools had 40 501 swabs taken. Weekly SARS-CoV-2 infection rates were 4·1 per 100 000 students and 12·5 per 100 000 staff. At recruitment, in 45 schools, 91 of 816 students and 209 of 1381 staff members were positive for SARS-CoV-2 antibodies, similar to local community seroprevalence. Seropositivity was not associated with school attendance during lockdown. At the end of the summer half-term, 73·9%students and 73·5% staff members were still participating in the surveillance, and five (four students, one staff member) seroconverted. By December, 2020, 55 of 1085 participants who were seronegative at recruitment (in June, 2020) had seroconverted, including 19 of 340 students and 36 of 745 staff members. In England, SARS-CoV-2 infection rates were low in primary schools following their partial and full reopening in June and September, 2020.

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Article 2

Published March 19, 2021 in THE LANCET

Testing for SARS-CoV-2 infection: a key strategy to keeping schools and universities open

- This is the editor comment on the previous study:
- The prospective study was done in primary schools in England, UK. During weekly RT-PCR testing in 131 schools across a 6-week mini term (June to mid-July, 2020) following the country's first lockdown, 40 501 nasopharyngeal swabs were collected from students and staff. teachers were not at higher risk than others in community, and no association was found between being seropositive and attendance at school. Correlation with notified case and outbreak data relatively low rates of SARS-CoV-2 transmission occurred in England primary schools, consistent with Australia and Norway.
- A retrospective cohort study examined different testing strategies for detection of SARS-CoV-2 infection among 6273 dormitory-dwelling students commencing in-person study. The students had baseline SARS-CoV-2 testing before or on arrival to the university.
- Afterwards, a surveillance-based informative testing (SBIT) strategy was implemented for 12 days.
- **This was associated with a relative 36% decline in prevalence of infection early in the semester.**
- Subsequent weekly surveillance testing resulted in a relative 75% decrease in prevalence (to 1·4%). Using modelling, it was concluded that voluntary symptomatic testing alone would have resulted **in 154% more infections than SBIT**. This study and previous modelling shows the value of frequent testing and that outbreaks cannot be controlled with symptomatic testing alone.
- Developing practical and effective ways of living with SARS-CoV-2 and keeping open or re-opening educational institutions remains a priority. Implementation and evaluation of tailored testing, contact tracing, and isolation need to continue.

Helping Manufacturers Navigate Novel Coronavirus Variants

Article 3

Published March 16, 2021 in THE JAMA

News From the Food and Drug Administration

- The FDA is developing guidance for manufacturers of diagnostics, therapeutics, and vaccines to aid their response to emerging severe acute respiratory syndrome coronavirus 2 variants, Acting Commissioner Janet Woodcock, MD, said in a statement.
- Woodcock said FDA officials don't believe they'll have to "start at square one with any of these products—we recognize we are in a pandemic and we need to arm health care providers with the most appropriate tools to fight this pandemic on the frontlines. We do not want to create obstacles to getting these tools to the frontlines."
- The approaches include accelerating the evaluation of new monoclonal antibodies that may be effective against variants. The FDA acknowledged that some authorized monoclonal antibodies and others still under development are less effective against certain variants.

- The FDA will also work with test developers to ensure that their products can accurately detect variants. Despite a low risk of known variants affecting molecular test accuracy, the agency may have companies expand monitoring for variants that affect test performance or use test designs that minimize variants' effects. In addition, transparent labeling could help to inform users about a test's detection capabilities.
- FDA officials are also trying to determine the types of data that would be needed to support changes in existing vaccines or the addition of new vaccine components. Although authorized vaccines appear to be effective against circulating variants, the FDA said it is considering how manufacturers could streamline data reporting to demonstrate their products' effectiveness against variants.
- In addition, Woodcock said the FDA is planning how to rapidly respond to any product and supply chain disruptions, "no matter what path the pandemic takes in the next months."

VACCINE

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Article 4

Published February 17, 2021 in THE JAMA

SARS-CoV-2 Variants of Concern in the United States—Challenges and Opportunities

- As of February 3, 2021, 468,000 sequences of SARS-CoV-2 from COVID-19 cases uploaded globally. Among the numerous SARS-CoV-2 variants that have been detected, only a very small proportion are of public health concern because they are more transmissible, cause more severe illness, or can elude the immune response that develops following infection and possibly from vaccination such as, B.1.1.7, B.1.351, and P.1.
- Some data suggest that people infected with SARS-CoV-2 may have reduced protection from reinfection with the B.1.351 (South Africa) variant. This observation and a report of an approximately 6-fold reduction in neutralization of B.1.351 variants from vaccinated individuals with currently employed vaccines might be less effective at preventing infection due to this variant. It should be noted that this study does not assess other types of potential immunity, such as T- and B-cell activity.
- Modeling data have illustrated how a more contagious variant, such as B.1.1.7 (UK), has the potential to exacerbate the trajectory of the US pandemic. A recent report on the variant cases highlighted the risk of domestic and international travel; the CDC recommends delaying travel to reduce the chance of acquiring and spreading SARS-CoV-2 including emerging VOC. By February 3, 2021, genomic sequencing suggests that the nationwide prevalence of the UK variant in the US is now approaching 1%, with prevalence in some states exceeding 2%.
- To ensure a proactive rather than reactive response, the HHS established a SARS-CoV-2 Interagency Group (SIG) to improve coordination among CDC, the NIH, the FDA, the Biomedical Advanced Research and Development Authority (BARDA), the USDA, and the Department of Defense (DoD). The SIG focuses on rapid characterization of the emerging VOC and actively monitors their potential influence on critical SARS-CoV-2 countermeasures including diagnostics, therapeutics, and vaccines.
- To ensure that diagnostic testing continues to reliably identify infections including those caused by VOC, FDA and CDC are working together with industry to evaluate tests already approved for SARS-CoV-2 detection under Emergency Use Authorization. To address risk of reinfection and ensure vaccine effectiveness, multiple stakeholders are conducting in vitro neutralization. In addition to CDC's partnership with state health departments on national strain surveillance of 750 samples per week, CDC is now increasing sequence surveillance to more than 6000 samples per week.

Helping Manufacturers Navigate Novel Coronavirus Variants

Article 5

Published March 16, 2021 in THE JAMA

News From the Food and Drug Administration

- The FDA is developing guidance for manufacturers of diagnostics, therapeutics, and vaccines to aid their response to emerging severe acute respiratory syndrome coronavirus 2 variants, Acting Commissioner Janet Woodcock, MD, said in a statement.
- Woodcock said FDA officials don't believe they'll have to "start at square one with any of these products—we recognize we are in a pandemic and we need to arm health care providers with the most appropriate tools to fight this pandemic on the frontlines. We do not want to create obstacles to getting these tools to the frontlines."
- The approaches include accelerating the evaluation of new monoclonal antibodies that may be effective against variants. The FDA acknowledged that some authorized monoclonal antibodies and others still under development are less effective against certain variants.

- The FDA will also work with test developers to ensure that their products can accurately detect variants. Despite a low risk of known variants affecting molecular test accuracy, the agency may have companies expand monitoring for variants that affect test performance or use test designs that minimize variants' effects. In addition, transparent labeling could help to inform users about a test's detection capabilities.
- FDA officials are also trying to determine the types of data that would be needed to support changes in existing vaccines or the addition of new vaccine components. Although authorized vaccines appear to be effective against circulating variants, the FDA said it is considering how manufacturers could streamline data reporting to demonstrate their products' effectiveness against variants.
- In addition, Woodcock said the FDA is planning how to rapidly respond to any product and supply chain disruptions, "no matter what path the pandemic takes in the next months."

Article 6

Published March 17, 2021 in THE JAMA

COVID-19 Vaccines vs Variants—Determining How Much Immunity Is Enough

This article indicate the emerging "variants of concern"— that appear to be more transmissible or deadlier than the wild-type SARS-CoV-2—contain mutations in the spike protein, spurring vaccine efficacy concerns:
Examples of the Trials:

- The Novavax, Janssen/Johnson & Johnson, and AstraZeneca vaccines: The South Africa trials found lower vaccine efficacy compared with trials in other countries where B.1.351 wasn't dominant
- The Pfizer-BioNTech vaccine against recombinant viruses containing some or all of the spike protein mutations found in the B.1.351variant. Neutralization of B.1.351 was approximately two-third slower than that of USA-WA1/2020, an early SARS-CoV-2 isolate.
- The Moderna COVID-19 vaccine, neutralizing antibody titers induced by a recombinant virus bearing the B.1.351 spike protein were 6-fold lower than those induced by a recombinant virus bearing the original Wuhan-Hu-1 spike protein. They noted, lower vaccine efficacy in the South African clinical trials could be related to geographic or population differences.
- The mRNA vaccines also induce virus-specific helper T cells and cytotoxic T cells that might help protect against infection.

Experiments vs experience:

- COVID-19 cases and hospitalizations started to decline in mid-January in Israel. Larger and earlier decreases occurred among older individuals, who were a top priority for vaccination. According to an article, COVID19–related hospitalizations **declined by 36% and 29% fewer patients were severely ill.**
- In Scotland, researchers estimated that Pfizer-BioNTech's vaccine was up **to 85% effective and Oxford-AstraZeneca's vaccine up to 94% effective in preventing COVID-19– related hospitalizations.**
- A Public Health England (PHE) report on immunization with the Oxford-AstraZeneca or Pfizer-BioNTech vaccine noted that "**early data suggest that any cases that do occur in older vaccinated people are around half as likely to lead to hospitalization and/or death**
- Transmission by infected asymptomatic vaccines could provide an opportunity for more virulent variants to spread.

Continued

Stopping the spread

Experiments vs experience:

- In a study of UK health care workers immunized with the Pfizer-BioN Tech vaccine **found a 70% reduction** in both types of infection 21 days after participants received their first dose and an **85% reduction a week after receiving their** second dose. There is a strong effect to reducing any infection—**asymptomatic and symptomatic.**

- Pfizer and BioNTech announced that non–peer reviewed data from Israel showed their vaccine **was 94% effective against asymptomatic SARS-CoV-2 infection.**

Next steps

- Manufacturers say they're developing strategies to deal with the possibility of a variant that escapes coverage by first generation vaccines.
- Moderna and Novavax, , announced they are working on developing a booster, a combination bivalent vaccine, or both to protect against variants. It expected to begin clinical trials in the second quarter of 2021.
- The FDA updated its non binding guidance for vaccine manufacturers to include information about what the agency would like to see when evaluating vaccines that have been modified to address emerging SARS-CoV-2 variants.

The hard part:

- The need to deploy vaccines or boosters targeting new variants would complicate the already rocky rollout of COVID-19 vaccines.

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