مركز أبوظبي للصحة العامة
ABU DHABI PUBLIC HEALTH CENTRE

SCIENTIFIC RESEARCH MONITORING ON COVID-19

14 JUNE 2021

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SCIENTIFIC RESEARCH MONITORING ON COVID-19

(Issue 427)

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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
Titles

Statistics

Articles
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

- Association of Convalescent Plasma Treatment With Clinical Outcomes in Patients With COVID-19

DIAGNOSTIC

- Pre-existing conditions are associated with COVID-19 patients' hospitalization, despite confirmed clearance of SARS-CoV-2 virus
- A method for detection of SARS-CoV-2 RNA in healthy human stool: a validation study

TREATMENT

- Association of Convalescent Plasma Treatment With Clinical Outcomes in Patients With COVID-19
- Dynamics of SARS-CoV-2 neutralising antibody responses and duration of immunity: a longitudinal study

EPIDEMIOLOGY

FROM 21 JAN 2020 TO 13 June 2021

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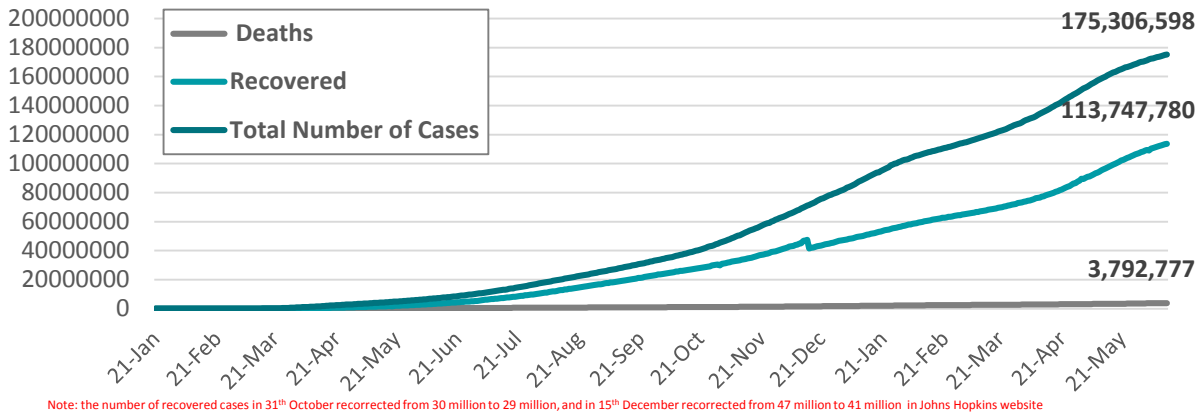
Figure 1: Total Number of Infected, Recovered, and Death Cases



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

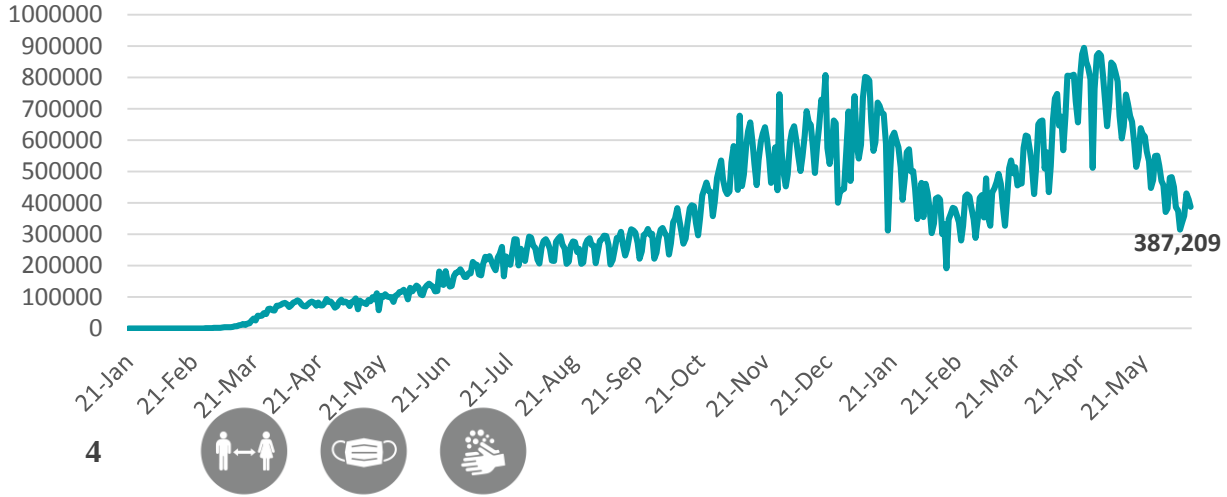


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Figure 3: % of people who received at least one dose of COVID-19 vaccine around the world

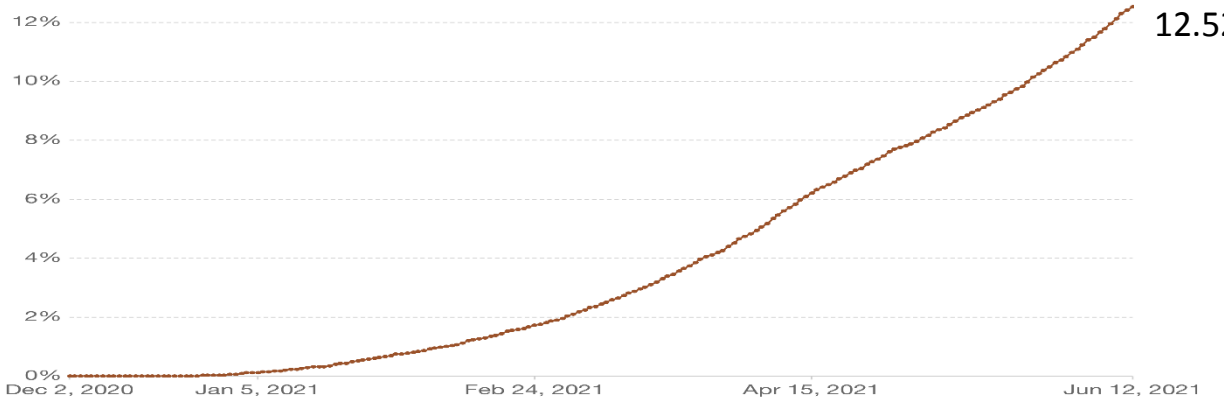
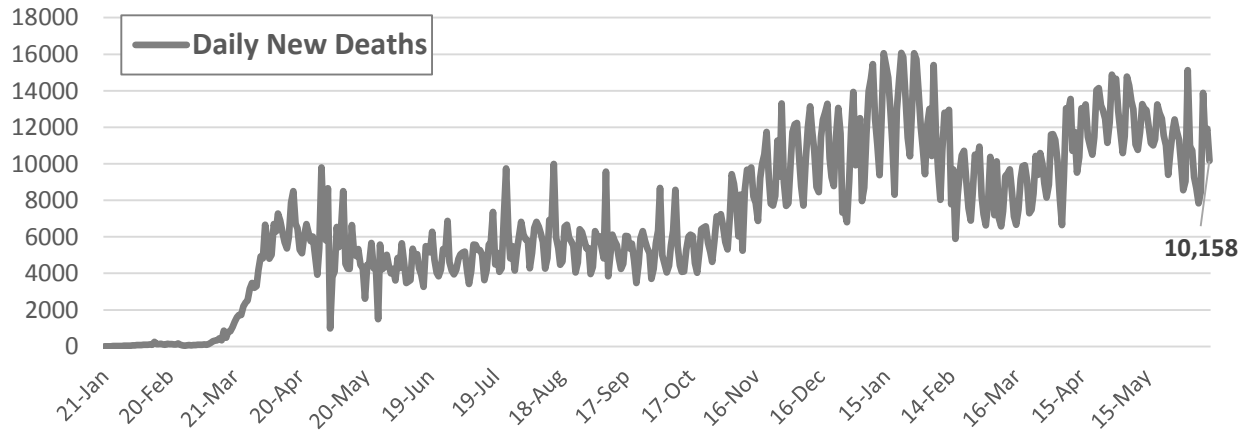


Figure 4: Global Daily New Deaths Due to COVID-19



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

EPIDEMIOLOGY

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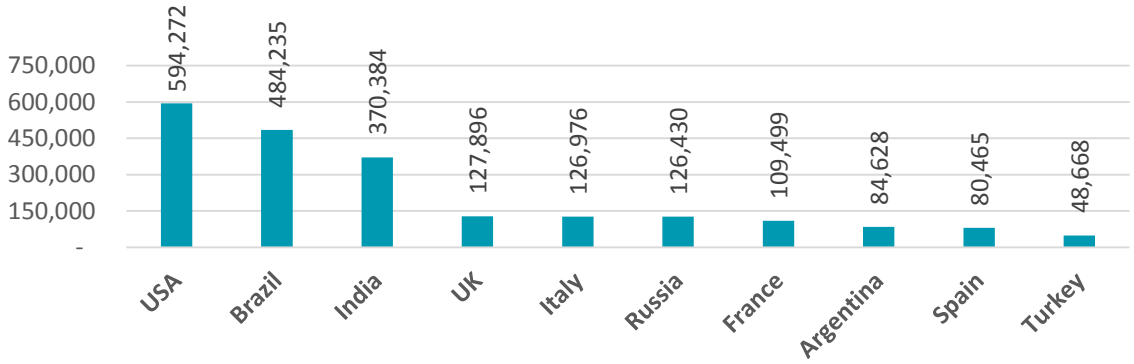
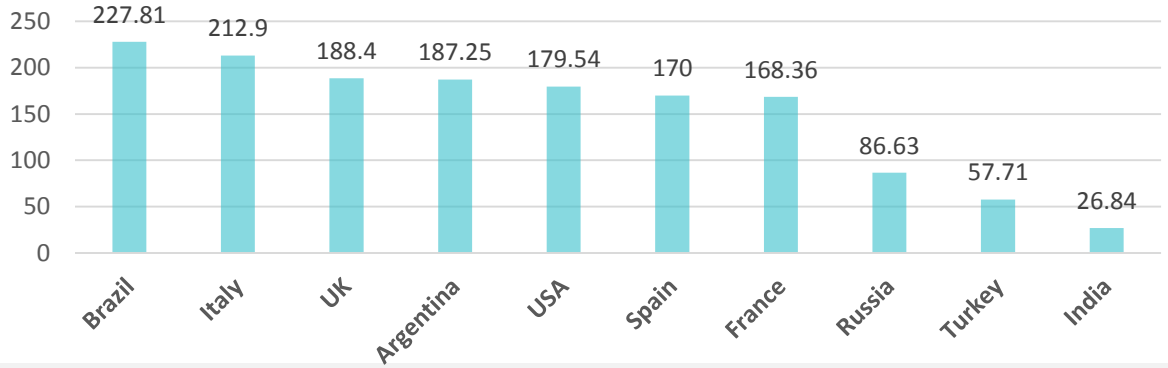
Figure 5: Top 10 Countries in the Total Number of Cases Due to COVID-19

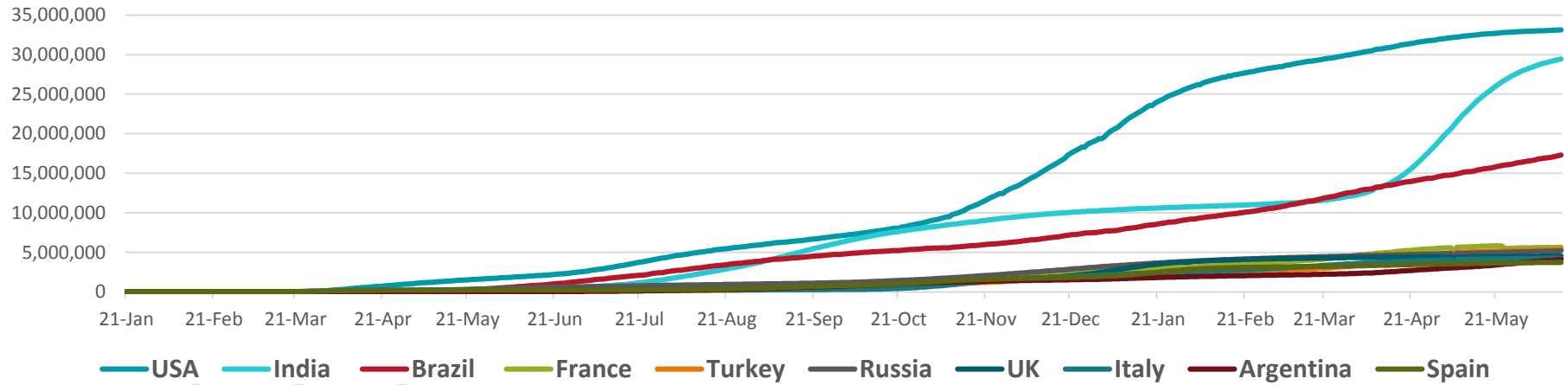
TOTAL DEATHS



DEATHS PER MILLION



TOTAL INFECTED CASES



USA	33,120,623
India	29,439,989
Brazil	17,296,118
France	5,632,993
Turkey	5,325,435
Russia	5,208,687
UK	4,558,498
Italy	4,243,482
Argentina	4,093,090
Spain	3,729,458

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

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

Daily Tests
229,359.7 Average Tests
2,319.0 per 100k population
0.9% Positive Rate

Daily Cases
2,130.7 Average Cases
21.5 per 100k population

Daily Recovered
2,094.0 Average Recovered
21.2 per 100k population

Daily Deaths
3.9 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

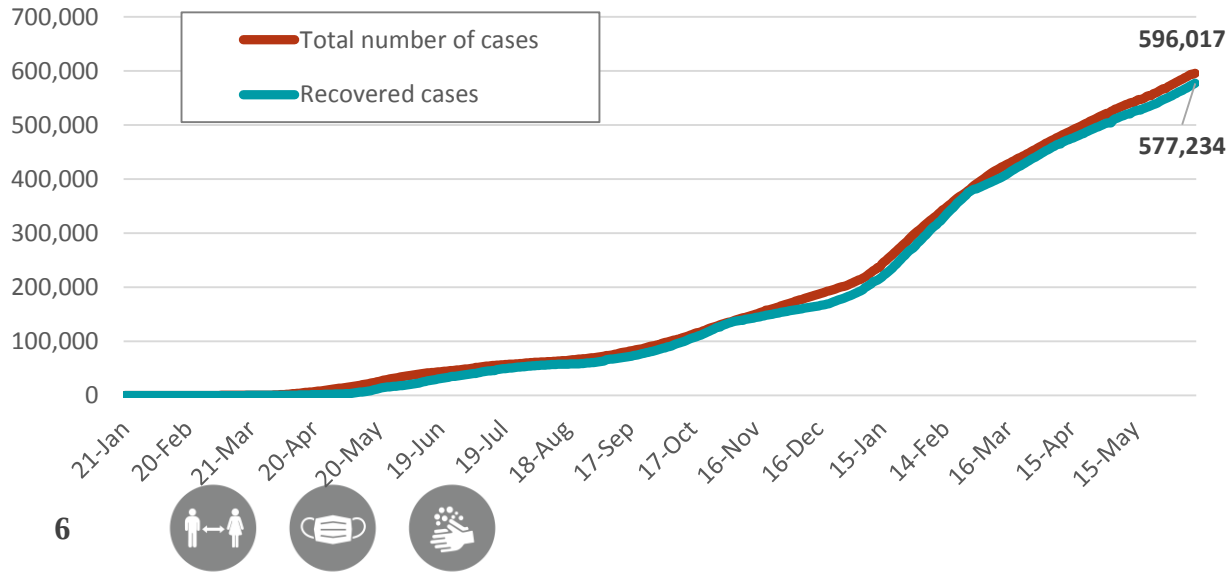
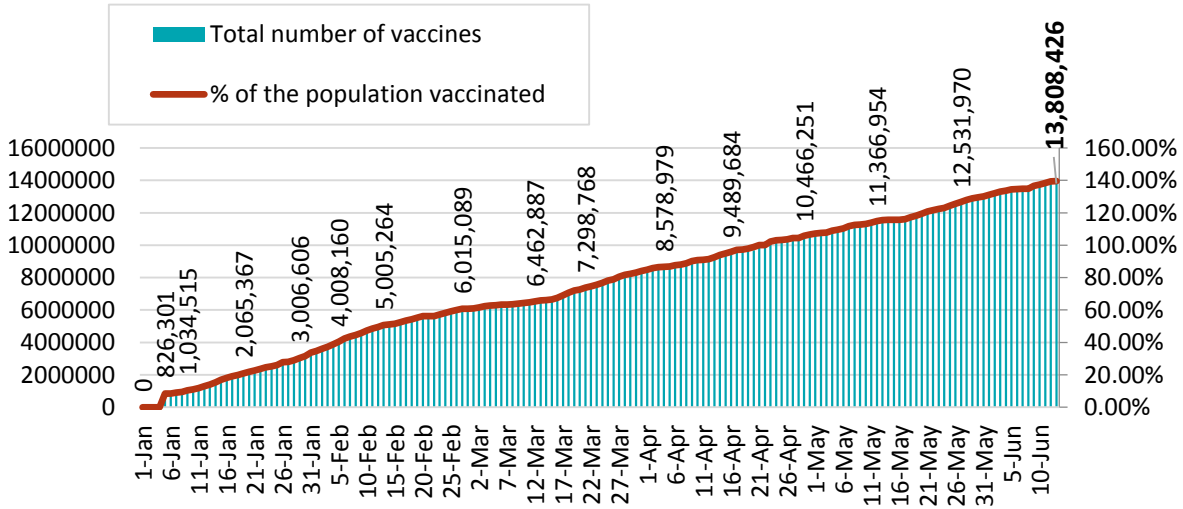


Figure 6 B: TOTAL NUMBER and Percentage of UAE population Vaccinated



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

EPIDEMIOLOGY

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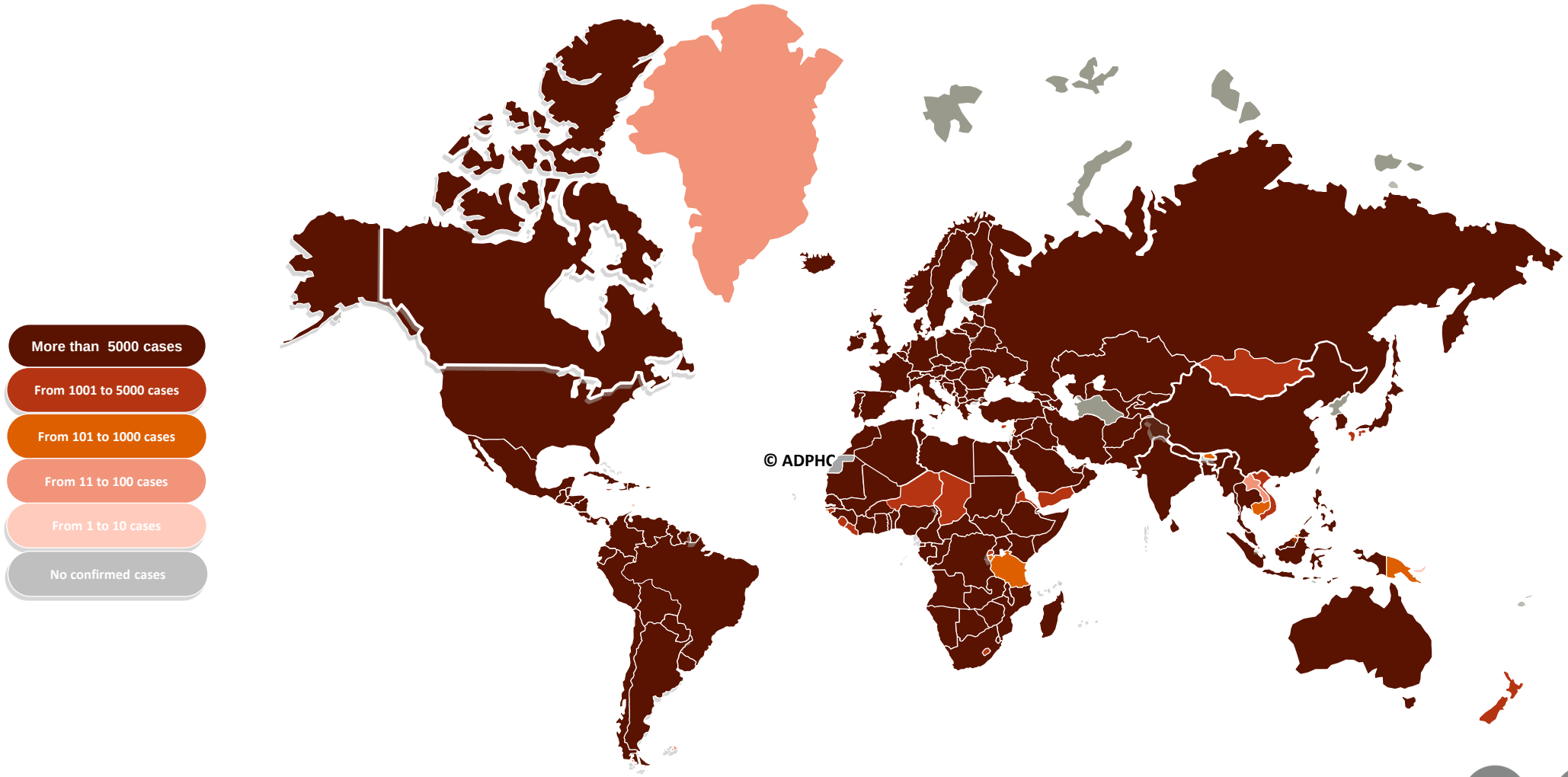
Figure 7A : Global Distribution of COVID-19 Cases



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

EPIDEMIOLOGY

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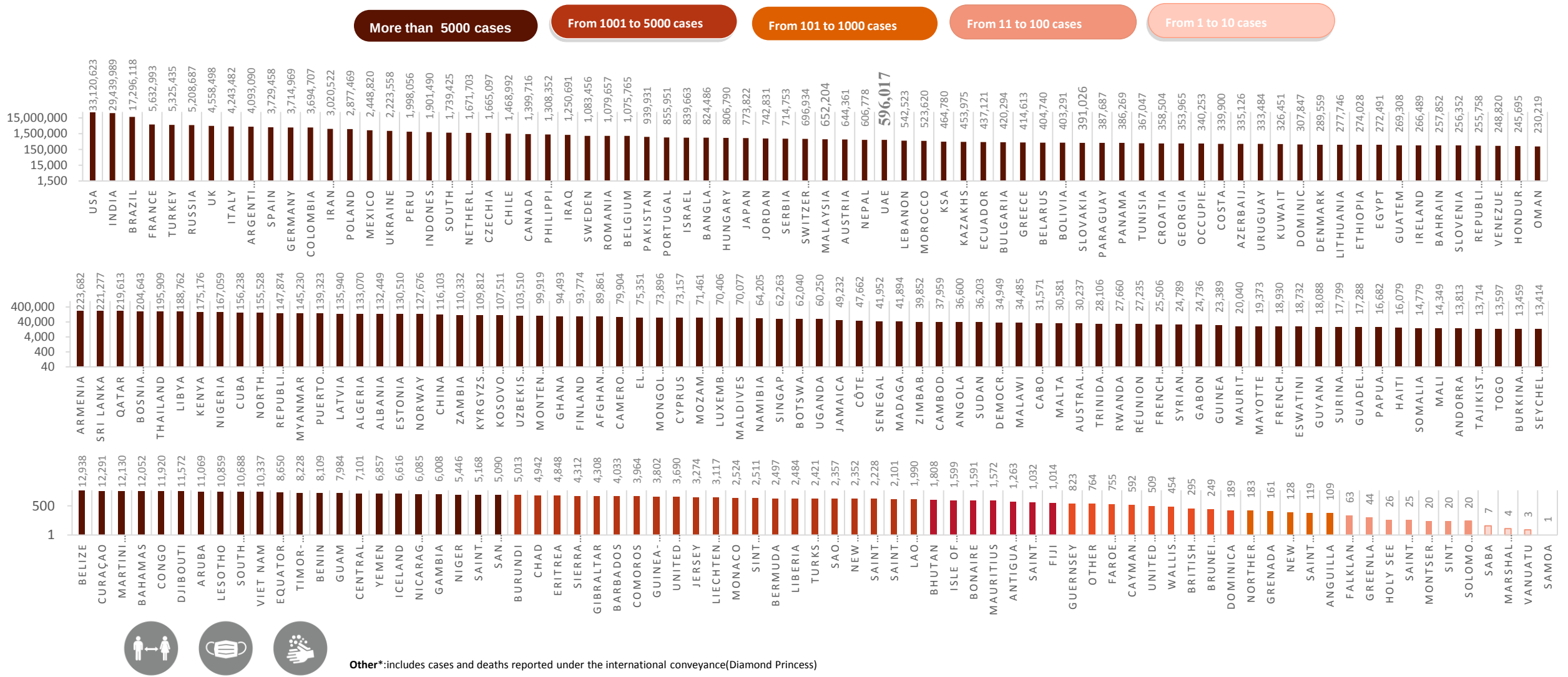
Figure 7B: Bar Chart Illustrates the Global Distribution of COVID19 Cases



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 13 June 2021

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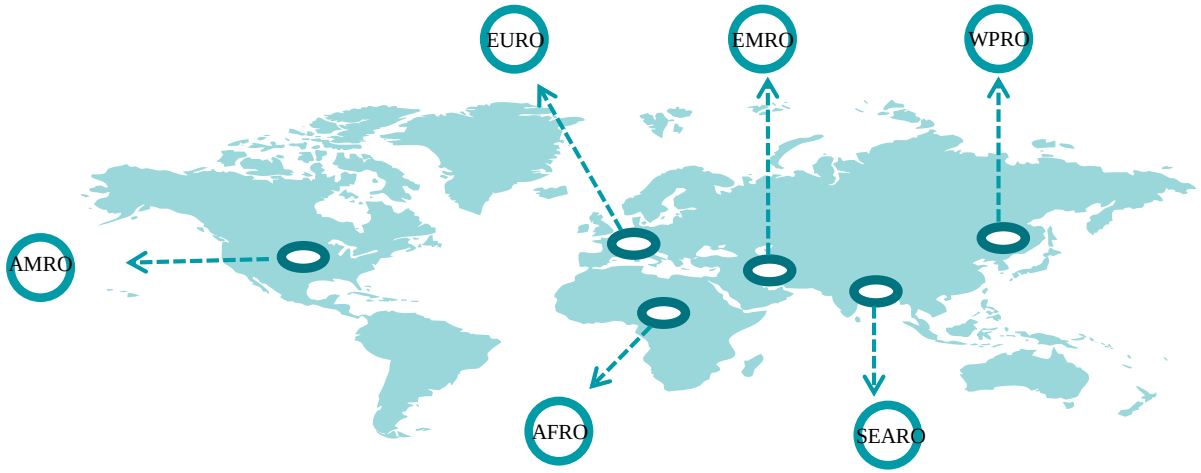
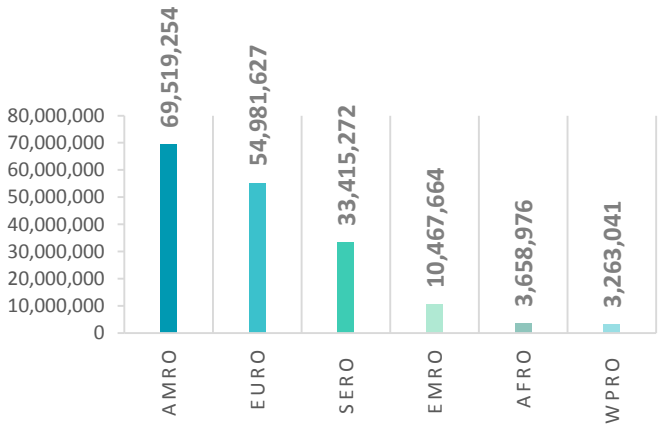
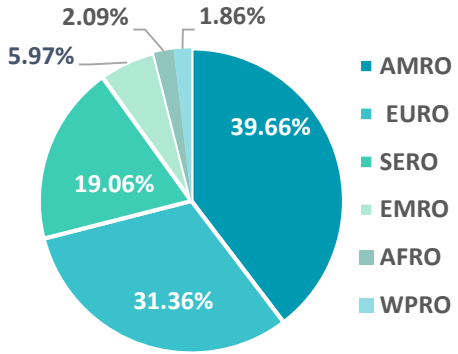
Figure 6: Global Distribution of COVID-19 Cases per Region

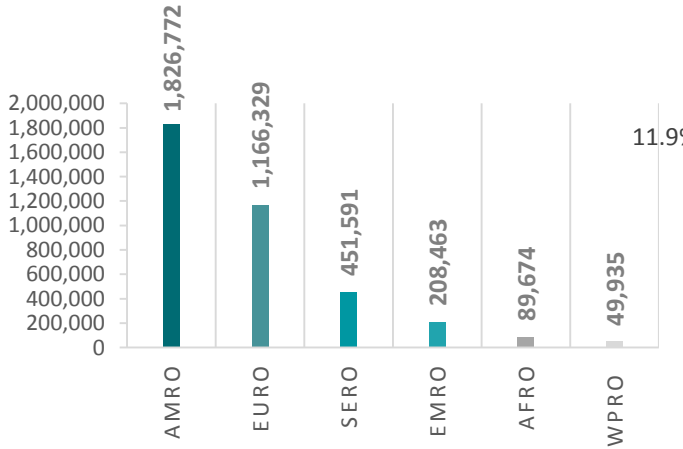


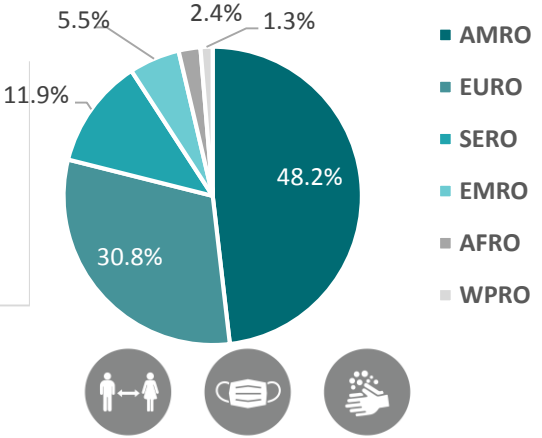
INFECTED





DEATHS





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

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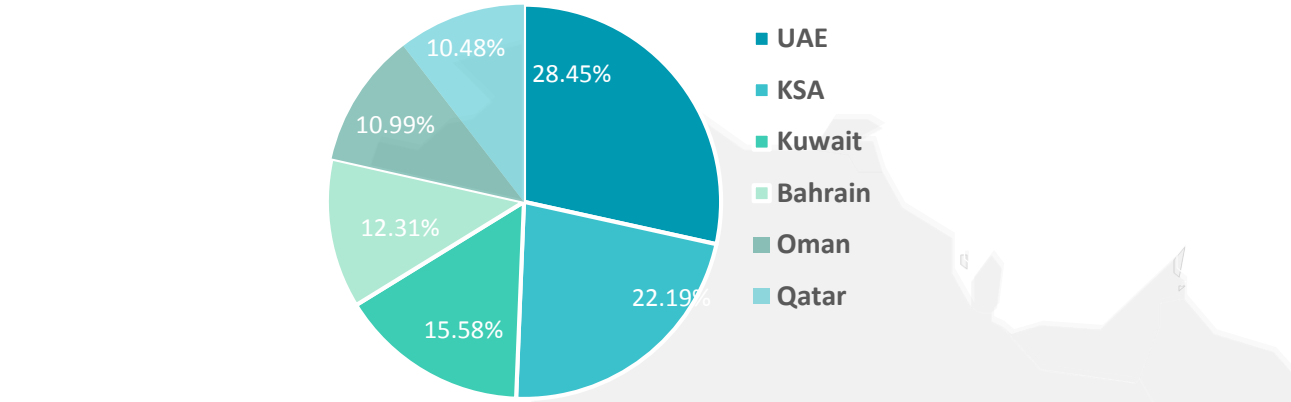
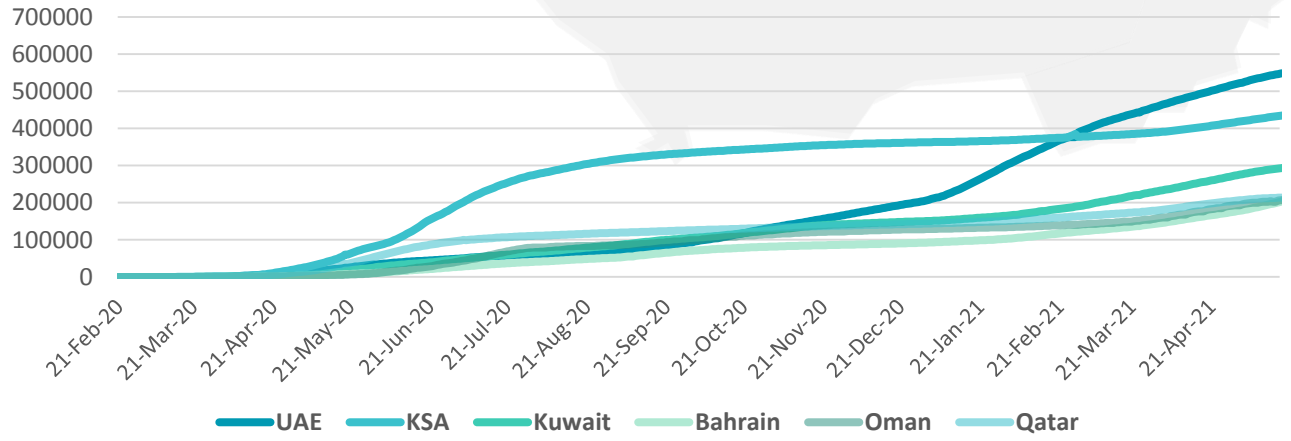
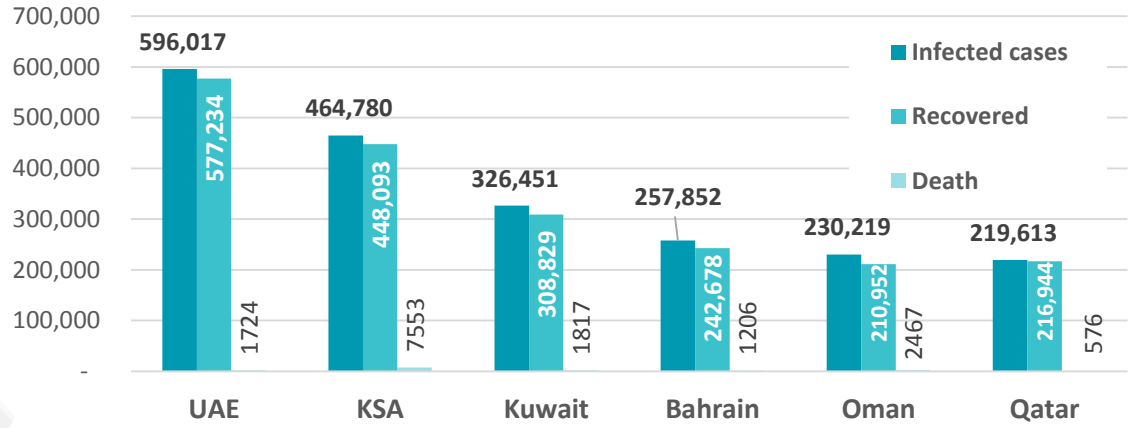
Figure 7: Comparative Analysis of the Distribution of COVID-19 Cases in GCC Countries

TOTAL NUMBER OF INFECTED CASES

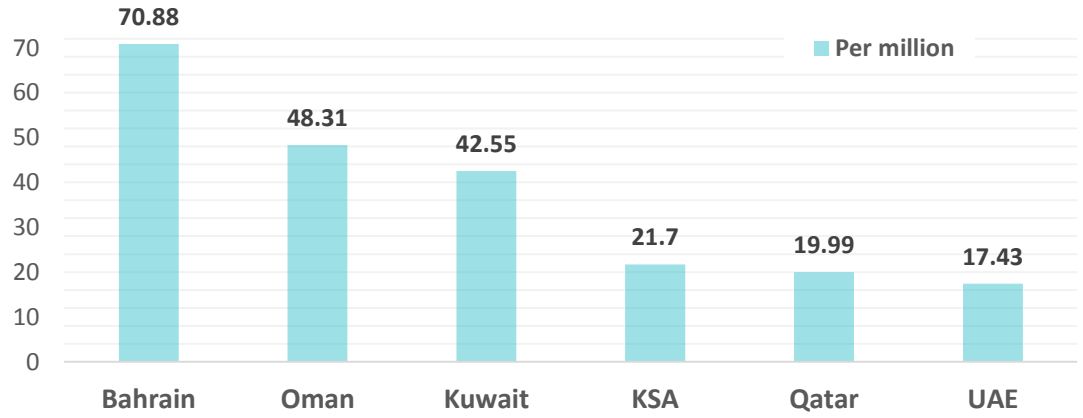




TOTAL NUMBER OF INFECTED, RECOVERED AND DEATHS

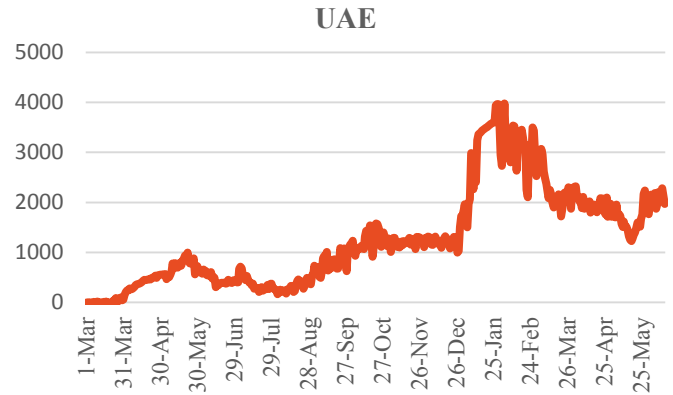


DEATHS PER MILLION

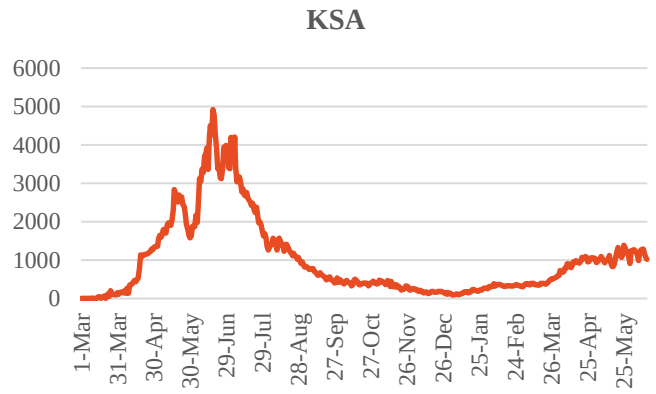


Graphs published by Abu Dhabi Public Health Center 2021 | Data resources: John Hopkins, WHO

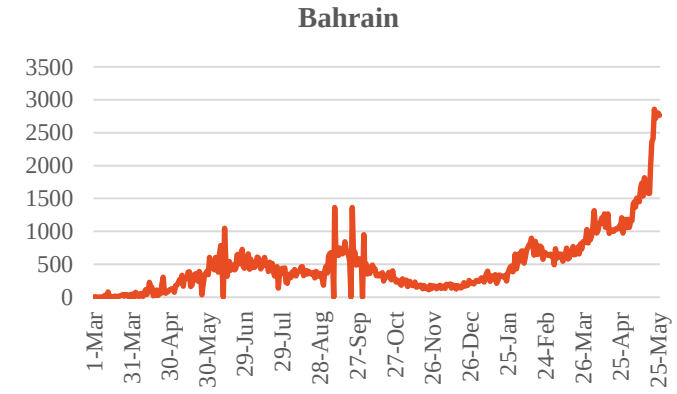
Figure 10: Comparative Analysis of the Distribution of COVID-19 New Cases in GCC Countries



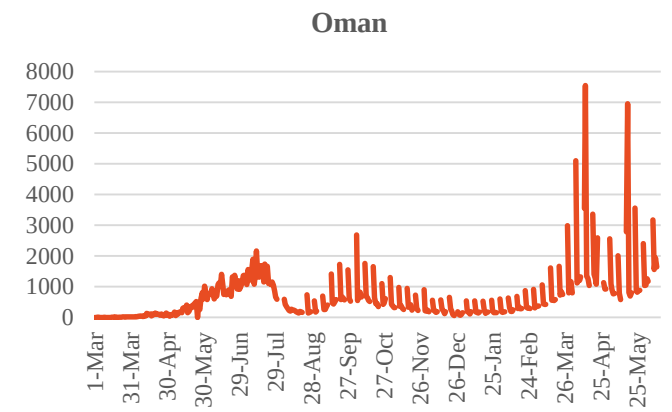
Source : National Emergency Crisis and Disaster Management Authority



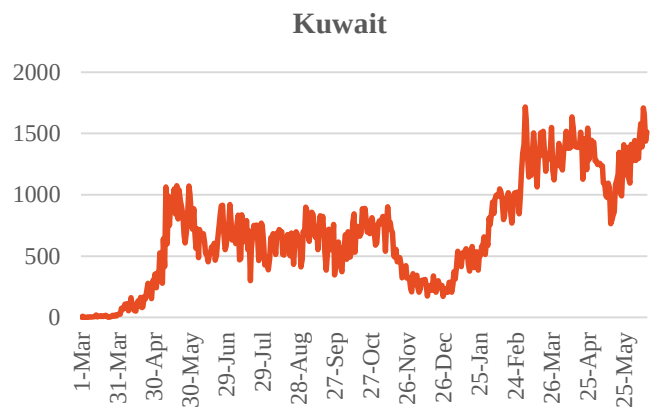
Source : KSA ministry of health



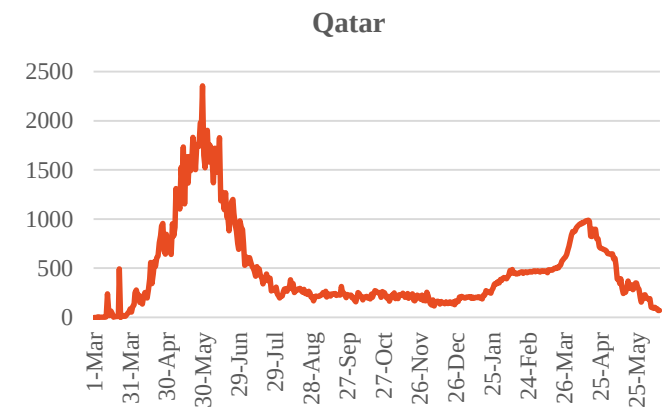
Source :WHO



Source :Oman ministry of health



Source : Kuwait ministry of health



Source : Qatar ministry of health

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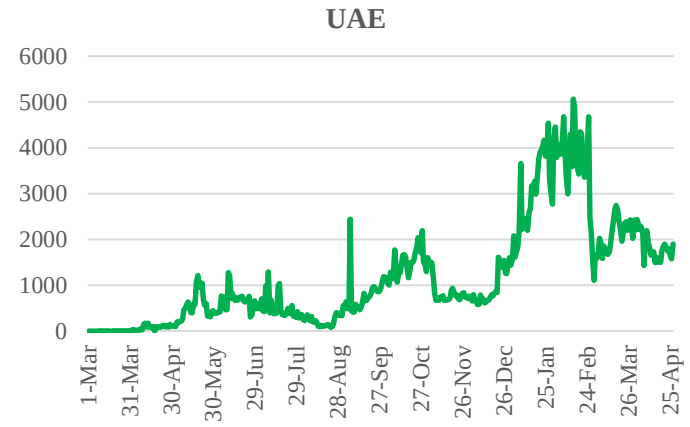
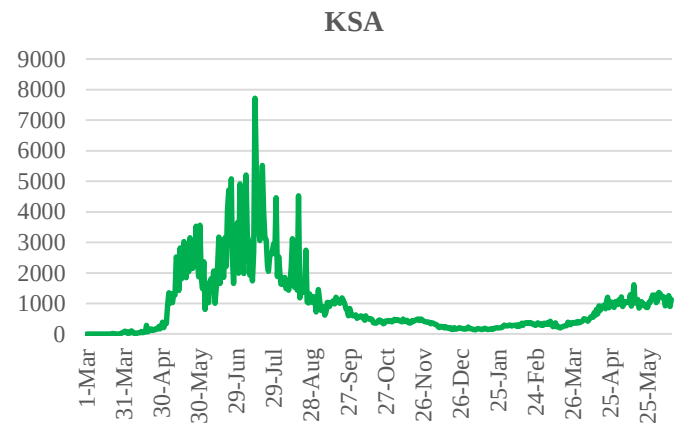
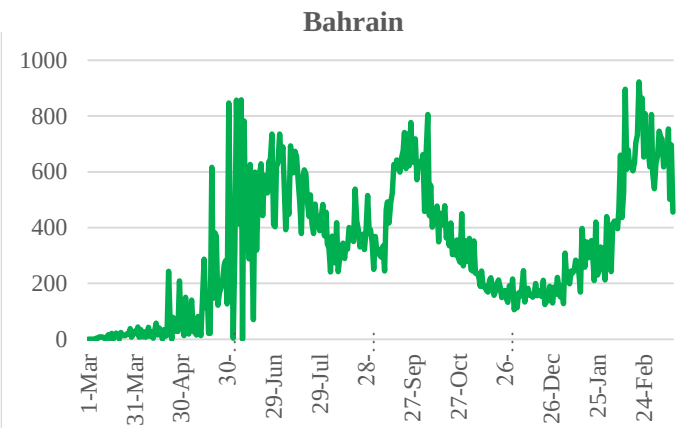
Figure 11: Comparative Analysis of the Distribution of COVID-19 Recovered Cases in GCC Countries



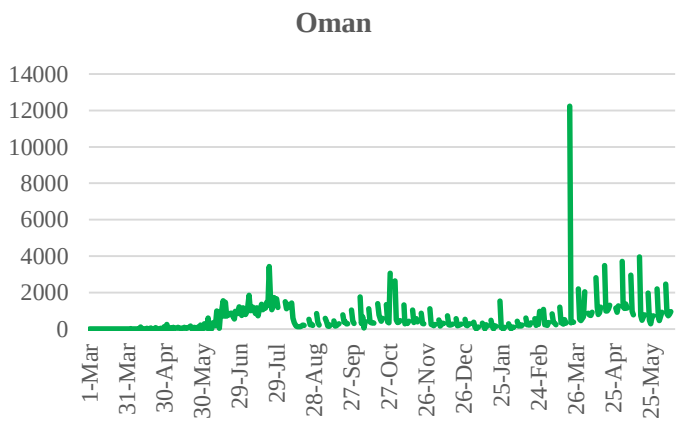
Source : National Emergency Crisis and Disaster Management Authority



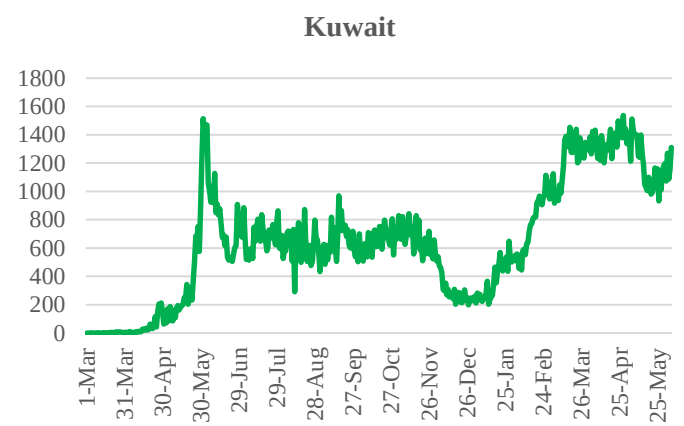
Source : KSA ministry of health



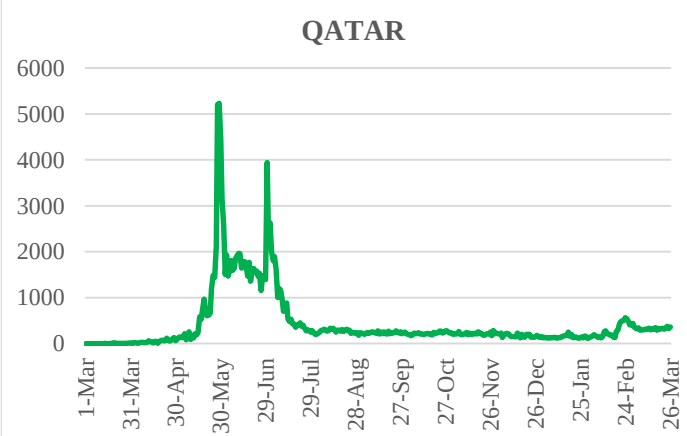
Source : Bahrain ministry of health



Source :Oman ministry of health



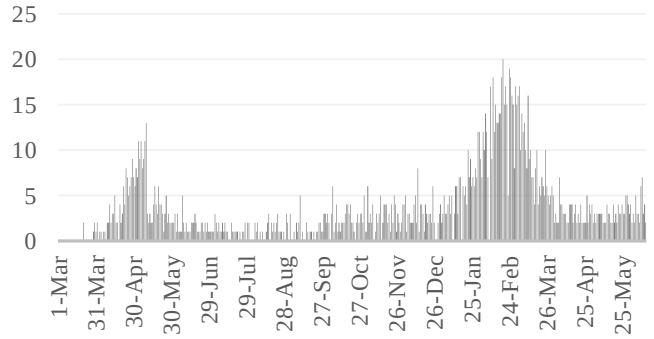
Source : Kuwait ministry of health



Source : Qatar ministry of health

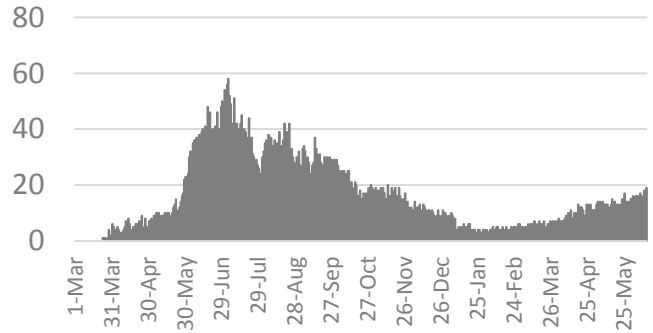
Figure 12: Comparative Analysis of the Distribution of COVID-19 New Death Cases in GCC Countries

UAE



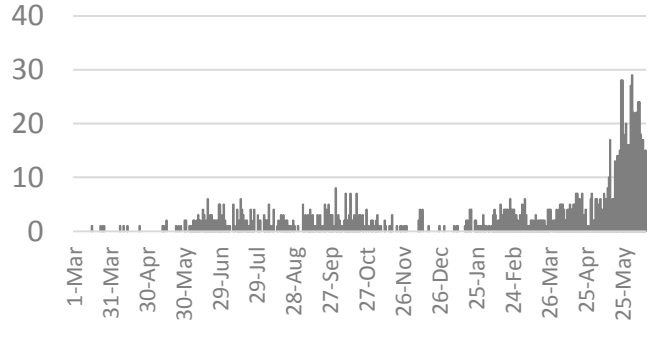
Source : National Emergency Crisis and Disaster Management Authority

KSA



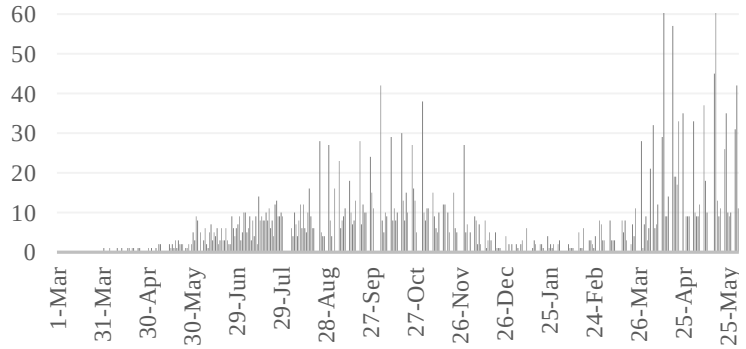
Source : KSA ministry of health

Bahrain



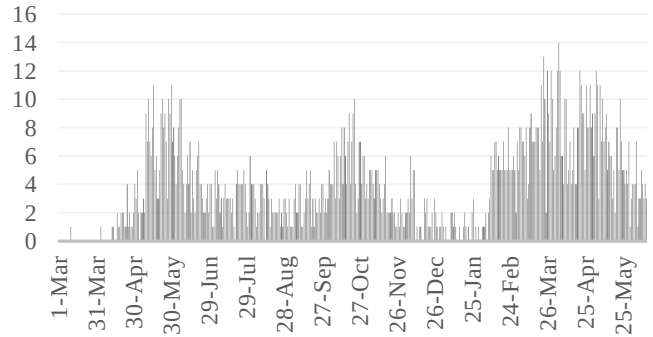
Source :WHO

Oman



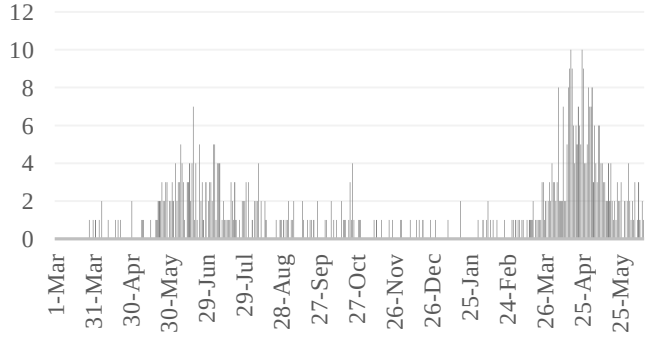
Source :Oman ministry of health

Kuwait



Source : Kuwait ministry of health

Qatar



Source : Qatar ministry of health

VACCINE

Article 1

Published

Symptomatic Acute Myocarditis in Seven Adolescents Following Pfizer-BioNTech COVID- 19 Vaccination

June 1 , 2021 in PEDIATRICS

This report summarizes case histories of 7 healthy male adolescents 14 to 19 years of age who developed acute myocarditis or myopericarditis within 4 days after receiving the second dose of the Pfizer-BioNTech COVID-19 vaccine, none of whom met criteria for MIS-C. All 7 patients were vaccinated in April and May of 2021 and have been reported to Vaccine Adverse Event Reporting System .

As of May 12, 2021, children in the US age 12 years and older are now eligible to receive the Pfizer-BioNTech vaccine. Primary care and ED physicians and healthcare providers should consider myocarditis as an etiology of chest pain in patients with recent COVID-19 mRNA vaccination. Elevated serum troponin, an abnormal ECG, and an abnormal cardiac MRI were seen in all cases. An evaluation for acute COVID-19 infection (via PCR of respiratory tract sample) and past disease (via SARS-CoV-2 nucleocapsid and spike protein antibodies) is recommended for all cases of myocarditis that occur after COVID-19 mRNA vaccination, as well as a comprehensive workup to exclude other infectious and non-infectious causes. The benefits of vaccination significantly exceed possible risks. Individuals and physicians are encouraged to follow the guidance of the CDC Advisory Committee on Immunization Practices21. All cases of myocarditis with or without pericarditis occurring after COVID-19 vaccination should be promptly reported to Vaccine Adverse Event Reporting System.

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Article 2

Pre-existing conditions are associated with COVID-19 patients' hospitalization, despite confirmed clearance of SARS-CoV-2 virus

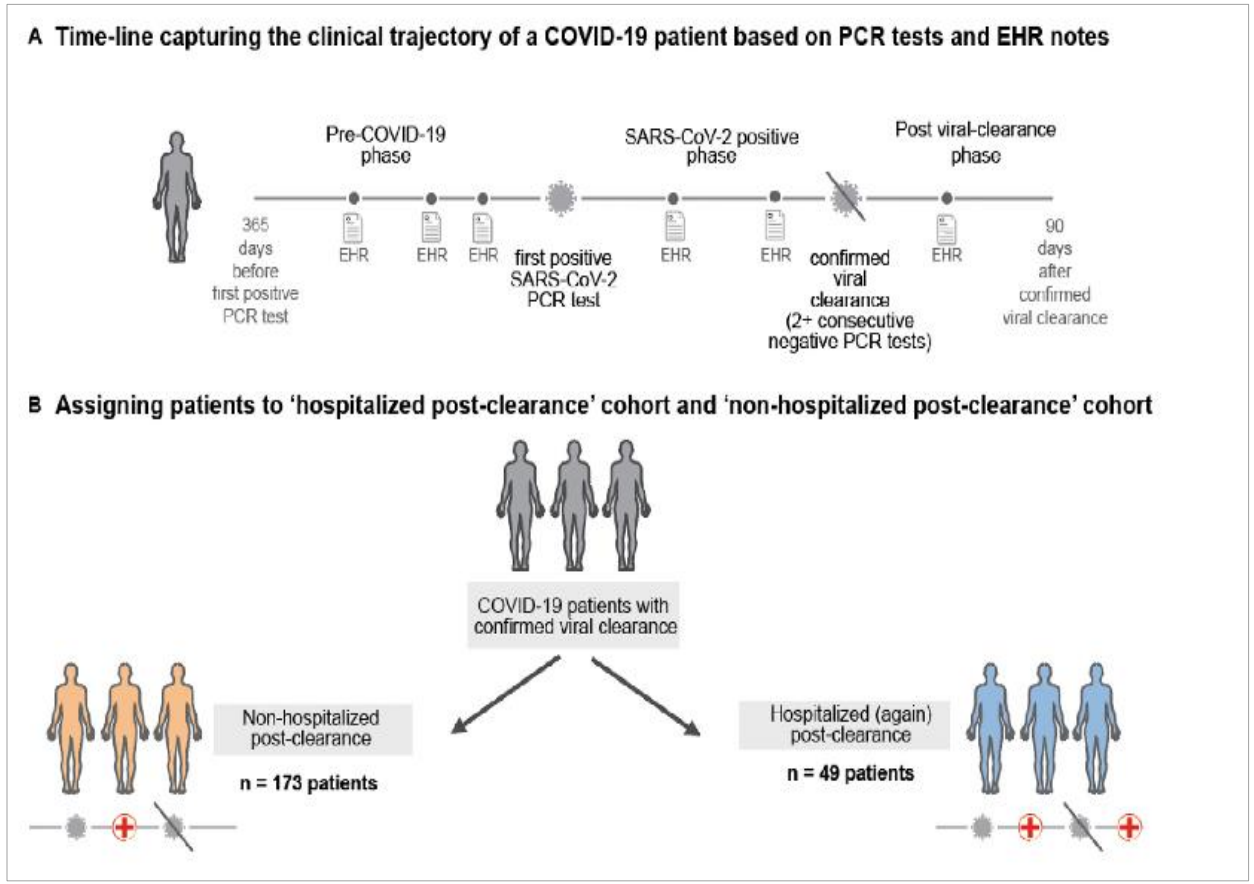
Published March 23, 2021 in THE LANCET

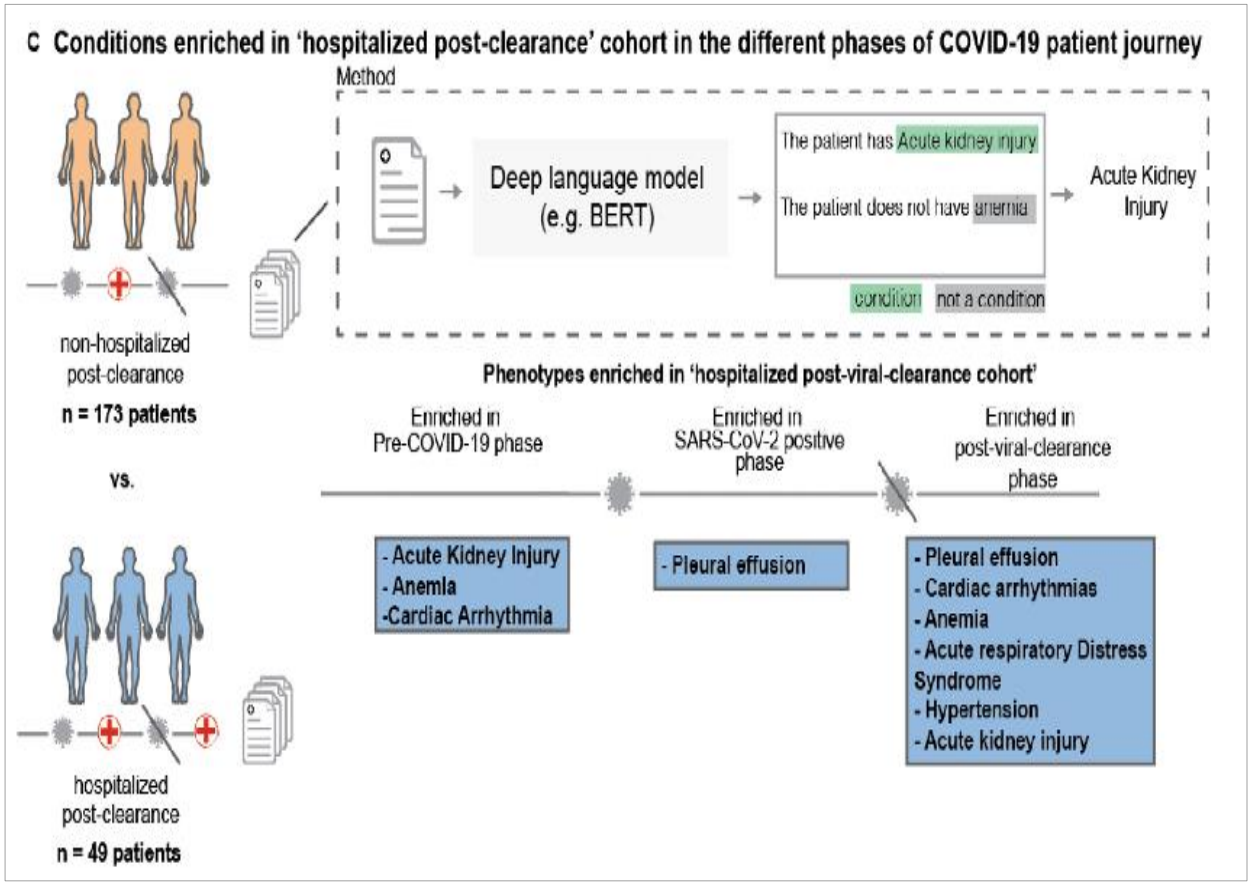
- There are reports of hospitalization of COVID-19 patients despite confirmed viral clearance as well as may patients continue to experience symptoms up to months after their initial infection.
- Subjects with pre-existing disease conditions such as cancer, cerebrovascular disease, type 2 diabetes mellitus, chronic obstructive pulmonary disease (COPD), hypertension, and chronic kidney disease are more susceptible to COVID-19 infection
- In this study, the investigators retrospectively analyzed 222 hospitalized COVID-19 patients to compare 49 patients who were readmitted post-viral clearance. The authors used neural network models for the 'augmented curation' of comorbidities and complications with positive sentiment in the Electronic Hospital Records physician notes to differentiae between the 2 groups.

- It was reported that anemia 26.5%, p-value: 0.007, cardiac arrhythmias 28.6% p-value: 0.015, and acute kidney injury 14.3%, p-value: 0.030 were significantly enriched in the physician notes of the hospitalized post-clearance cohort.
- The authors concluded that pre-existing conditions that are associated with higher hospitalization rates in COVID-19 patients despite viral clearance.
- This study suggests that these pre-existing conditions may be risk factors for the post-clearance complications of COVID-19 which require hospitalization.

DIAGNOSTIC

Continued





DIAGNOSTIC

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Article 3

Published

A method for detection of SARS-CoV-2 RNA in healthy human stool: a validation study

March 31, 2021 in THE LANCET

- Faecal microbiota transplantation (FMT) is used to treat several conditions and especially Clostridioides difficile infection. SARS-Co-V-2 transmission of infection could occur through fecal microbiota transplantations. However, there is scarce data on methods to detect the virus from faecal samples.

- The authors of this study sought to develop and validate a test specifically for detection of SARS-CoV-2 in human stool. The investigators evaluated the performance characteristics of a reverse transcriptase real-time PCR (RT-rtPCR) test for detection of SARS-CoV-2 in human stool. Analytical sensitivity was also evaluated.
- Short-term stability (7-day) of viral RNA in stool samples was assessed with four different stool storage buffers and kept at –80°C, 4°C, and ambient temperature (approximately 21°C). 30 contrived SARS-CoV-2 samples were tested.

- The lower limit of detection of the assay was found to be 3000 viral RNA copies per g of original stool sample, with 100% detection across 20 replicates assessed at this concentration. Analytical sensitivity was diminished by approximately two times after a single freeze-thaw cycle at –80°C.
- The maximum changes in mean threshold cycle values observed at –80°C storage in Cary-Blair medium (from 29·4 at baseline to 30·8 at day 7; p<0·0001), at 4°C storage in DNA/RNA Shield (from 28·5 to 29·8; p=0·0019), and at ambient temperature in STAR buffer (from 30·4 to 32·4; p=0·0083). All samples were tested by a second laboratory and were correctly identified.
- The authors concluded that this method is sensitive to detect the SARS-CoV-2 RNA in human stool and could be used in faecal microbiota transplantation donor screening, sewage monitoring.

TREATMENT

مركز أبوظبي للصحة العامة
ABU DHABI PUBLIC HEALTH CENTRE

Article 4

Published

Association of Convalescent Plasma Treatment With Clinical Outcomes in Patients With COVID-19

February 26, 2021 in THE JAMA

- The study is a systematic review and meta-analysis that assess the clinical outcomes of providing treatment to COVID-19 patients using convalescent plasma treatment "*plasma from persons who have recovered from SARS-CoV-2 infection*".
- The systematic review included peer-reviewed and preprint publications or press releases of randomized clinical trials (RCTs) that compared treatment with convalescent plasma vs placebo or standard of care for confirmed or suspected COVID-19 patients.
- This systematic review and meta-analysis analyzed 4 peer-reviewed RCTs with 1060 patients, & 6 other publicly available RCTs with 10 722 patients. Inverse variance–weighted meta-analyses were conducted to summarize the treatment effects.

Results

- Primary analysis "only peer-reviewed RCTs, N=4": the mortality in convalescent plasma group was 11.6% vs 12.7% in control. Summary RR for all-cause mortality with convalescent plasma was 0.93 (95% CI, 0.63 to 1.38; P = .60), & the absolute risk difference was −1.21% (95% CI, −5.29% to 2.88%) (**Fig. 2.A**).
- Analysis of all RCTs "N=10": the summary RR for all-cause mortality with convalescent plasma was 1.02 (95% CI, 0.92 to 1.12]; P = .68). No significant between-trial heterogeneity. In the meta-analysis for all-cause mortality, the RECOVERY trial "*not peer-reviewed trial*" accounted for 90.2% of the weight and 88.3% of the patients (**Fig. 2.A**).
- In both meta-analysis of only peer-reviewed RCTs and analysis of all RCTs: **no significant associations** between treatment with convalescent plasma and reductions in length of hospital stay or mechanical ventilation use (**Fig. 2.B,C**).

Conclusion and Clinical Implication:

- **Convalescent Plasma Treatment was not significantly associated with a decrease in all-cause mortality or with any benefit for other clinical outcomes when compared with placebo or standard of care in the treatment of COVID-19.**
- Certainty of evidence of convalescent plasma treatment was low to moderate in all outcomes.
- Treatment with convalescent plasma compared with control was not associated with improved survival or other positive clinical outcomes among COVID-19 patients.

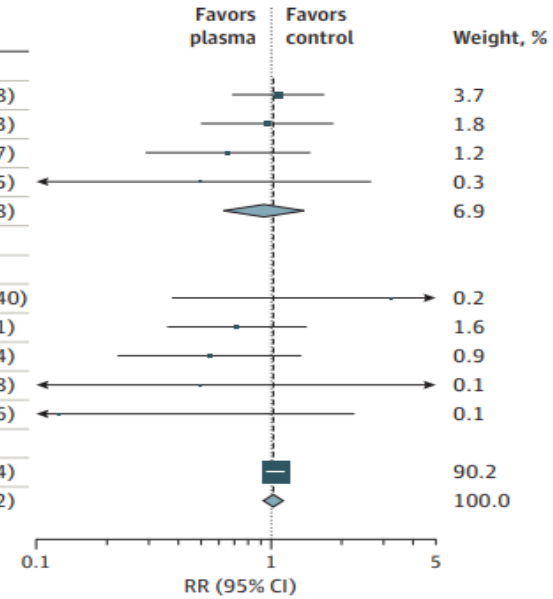
TREATMENT

Continued

Figure 2. Association of Convalescent Plasma With All-Cause Mortality, Length of Hospital Stay, and Mechanical Ventilation Use in Peer-Reviewed Trials and Non–Peer-Reviewed Trials (Preprints and the RECOVERY Trial)

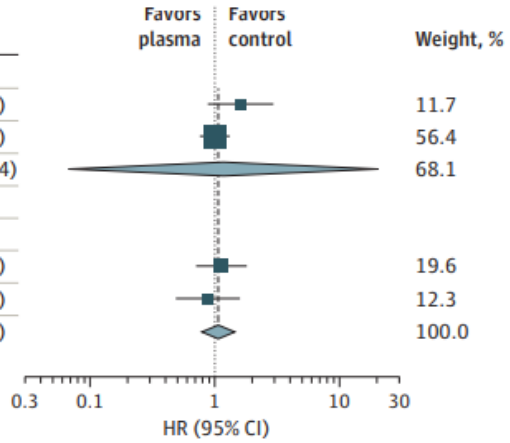
A All-cause mortality

Trial	Events, No./total: Plasma	Control	RR (95% CI)	Weight, %
Studies published in peer-reviewed journals				
PLACID[17]	34/235	31/229	1.07 (0.68-1.68)	3.7
PlasmAr[18]	25/228	12/105	0.96 (0.50-1.83)	1.8
ChiCTR2000029757[19]	8/52	12/51	0.65 (0.29-1.47)	1.2
NCT04479163[16]	2/80	4/80	0.50 (0.09-2.65)	0.3
Summary for peer-reviewed studies			0.93 (0.63-1.38)	6.9
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $P = .65$				
Studies published as preprints				
ILBS-COVID-02[21]	3/14	1/15	3.21 (0.38-27.40)	0.2
PICP19[24]	10/40	14/40	0.71 (0.36-1.41)	1.6
ConCOVID[22]	6/43	11/43	0.55 (0.22-1.34)	0.9
NCT04356534[20]	1/20	2/20	0.50 (0.05-5.08)	0.1
ConPlas-19[23]	0/38	4/43	0.13 (0.01-2.26)	0.1
Study published as press release				
RECOVERY[8]	NA/NA	NA/NA	1.04 (0.95-1.14)	90.2
Summary for all studies			1.02 (0.92-1.12)	100.0
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $P = .48$				
Test for overall effect: $P = .68$				



B Length of hospital stay

Trial	Events, No./total: Plasma	Control	HR (95% CI)	Weight, %
Studies published in peer-reviewed journals				
ChiCTR2000029757[19]	NA/52	NA/51	1.61 (0.88-2.95)	11.7
PlasmAr[18]	NA/228	NA/105	1.00 (0.76-1.32)	56.4
Summary for peer-reviewed studies			1.17 (0.07-20.34)	68.1
Heterogeneity: $I^2 = 49\%$, $\tau^2 = 0.0559$, $P = .16$				
Studies published as preprints				
ConPlas-19[23]	NA/38	NA/43	1.13 (0.71-1.80)	19.6
ConCOVID[22]	NA/43	NA/43	0.88 (0.49-1.59)	12.3
Summary for all studies[a]			1.07 (0.79-1.45)	100.0
Heterogeneity: $I^2 = 0\%$, $\tau^2 = 0$, $P = .48$				
Test for overall effect: $P = .55$				



C Mechanical ventilation use

Trial	Events, No./total: Plasma	Control	RR (95% CI)	Weight, %
Studies published in peer-reviewed journals				
PLACID[17]	19/235	19/229	0.97 (0.53-1.79)	37.8
PlasmAr[18]	19/228	10/105	0.87 (0.42-1.82)	29.6
NCT04479163[16]	3/80	10/80	0.30 (0.09-1.05)	12.4
Summary for peer-reviewed studies			0.76 (0.20-2.87)	79.9
Heterogeneity: $I^2 = 29\%$, $\tau^2 = 0.1194$, $P = .25$				
Studies published as preprints				
ILBS-COVID-02[21]	3/14	1/15	3.21 (0.38-27.40)	4.6
NCT04356534[20]	4/20	6/20	0.67 (0.22-2.01)	15.5
Summary for all studies[a]			0.81 (0.42-1.58)	100.0
Heterogeneity: $I^2 = 11\%$, $\tau^2 = 0.0559$, $P = .34$				
Test for overall effect: $P = .44$				

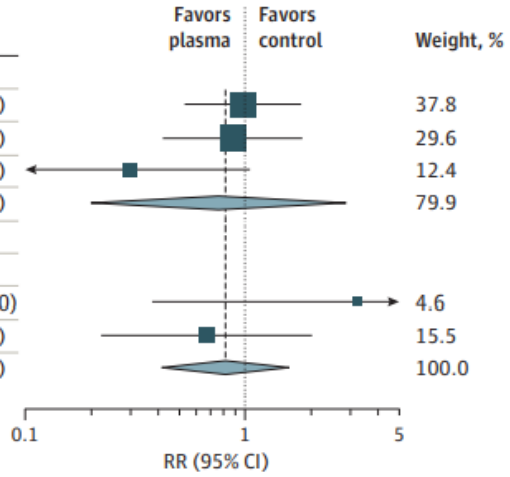


Fig.2: Three of the trials did not have study acronyms (only trial registration numbers) and ILBS-COVID-02 and PLACID did not have expansions in the original publications. Hartung-Knapp adjustment was used for the random-effects model and the Paule-Mandel estimator was used for τ2 . The weight percentages correspond to the secondary analysis for all studies. ConCOVID indicates Convalescent Plasma as Therapy for Covid-19 Severe SARS-CoV-2 Disease; ConPlas-19, Convalescent Plasma Therapy vs SOC for the Treatment of COVID-19 in Hospitalized Patients; HR, hazard ratio; NA, not available; PICP19, Passive Immunization With Convalescent Plasma in Severe COVID-19 Disease; PlasmAr, Convalescent Plasma and Placebo for the Treatment of COVID-19 Severe Pneumonia; RECOVERY, Randomized Evaluation of COVID-19 Therapy; RR, risk ratio. a Includes only the studies shown that were published in peer-reviewed journals or as preprints.

TREATMENT

مركز أبوظبي للصحة العامة
ABU DHABI PUBLIC HEALTH CENTRE

Article 5

Published March 23, 2021 in THE LANCET

Dynamics of SARS-CoV-2 neutralising antibody responses and duration of immunity: a longitudinal study

- This is a 180-days Longitudinal study, which examined the peak levels and dynamics of neutralising antibody waning and Immunoglobins G "IgG" avidity maturation over time of confirmed COVID-19 infection, and correlate the findings with clinical parameters, Cytokins, and T-cell responses.
- The study followed-up 164 patients, who had adequate blood samples collected for analysis, with a total of 546 serum samples collected during hospital treatment and post-discharge; (64 samples at 14 days, 39 samples at 21 days, 127 samples at 28 days, 30 samples at 60 days, 158 samples at 90 days, and 128 samples at 180 days post-symptom onset).

Results

➢ Identified distinctive patterns of neutralising antibody dynamics **(fig.1A)**- based on slope of the regression line and the significance threshold of 30% inhibition:

I. Negative; during study time, did not develop neutralising antibodies at the 30% inhibition level (19 [12%]).
II. Rapid waning; had varying levels of neutralising antibodies early on (≈20 days post-symptom onset), then seroconverted in less than 180 days (44 [27%]).
III. Slow waning; neutralising antibody positive at 180 days post-symptom onset (46 [28%]).
IV. Persistent; have varying peak neutralising antibody levels but had minimal neutralising antibody decay (52 [32%]); patients in the persistent group had poorer clinical outcomes.
V. Delayed response; an unexpected increase of neutralising antibodies during late convalescence (≥90 days post-symptom onset) (three [2%]).

➢ IgG maturation "increase in avidity" **(fig. 1C)**:

- levels of receptor binding domain (RBD)-binding IgG antibody avidity correlated with the levels and waning rates of neutralising antibody in all patient groups.
- For negative, rapid waning, and slow waning groups, "I,II,III groups" there was a corresponding biphasic kinetics for avidity change, with more rapid rise in the first phase (from days 15–30 post-symptom onset) than the second phase (from days 31–180 post-symptom onset).
- The persistent group, avidity reached a high level very early (15–30 days) and had less obvious biphasic change.

TREATMENT

Continued

Continuation of results:

- Tests on T cells that were reactive to peptides of S, M, NP, ORF3a, and ORF7/8 proteins:
  - All patients in each group maintained substantial specific T-cells at 180 days post-symptom onset with multi-specific T-cell response (mainly: T-cells reactive to NP, M, and S).
  - No clear difference in T-cell immunity between the groups.
- In the multivariable model: only disease severity was independently associated with persistent antibody levels, [adjusted odds ratio of 5·20 (95% CI 1·83–16·7)] for moderate disease severity and [30·3 (10·0–107·9) for severe disease severity].
- The persistence of neutralising antibodies was associated with disease severity and sustained level of pro-inflammatory cytokines, chemokines, and growth factor.

Conclusion and Clinical Implication:

- Among COVID-19 patients, the dynamic of neutralising antibody **differ** greatly between individual, in peak antibody level, rate of waning and longevity of neutralising antibodies.
- There is an **association** between persistent neutralising antibodies and severe COVID-19 clinical symptoms and higher levels of pro-inflammatory cytokines and chemokines.
- In a subset of tested patients, SARS-CoV-2 specific T cells were detected regardless of waning patterns of neutralising antibodies.

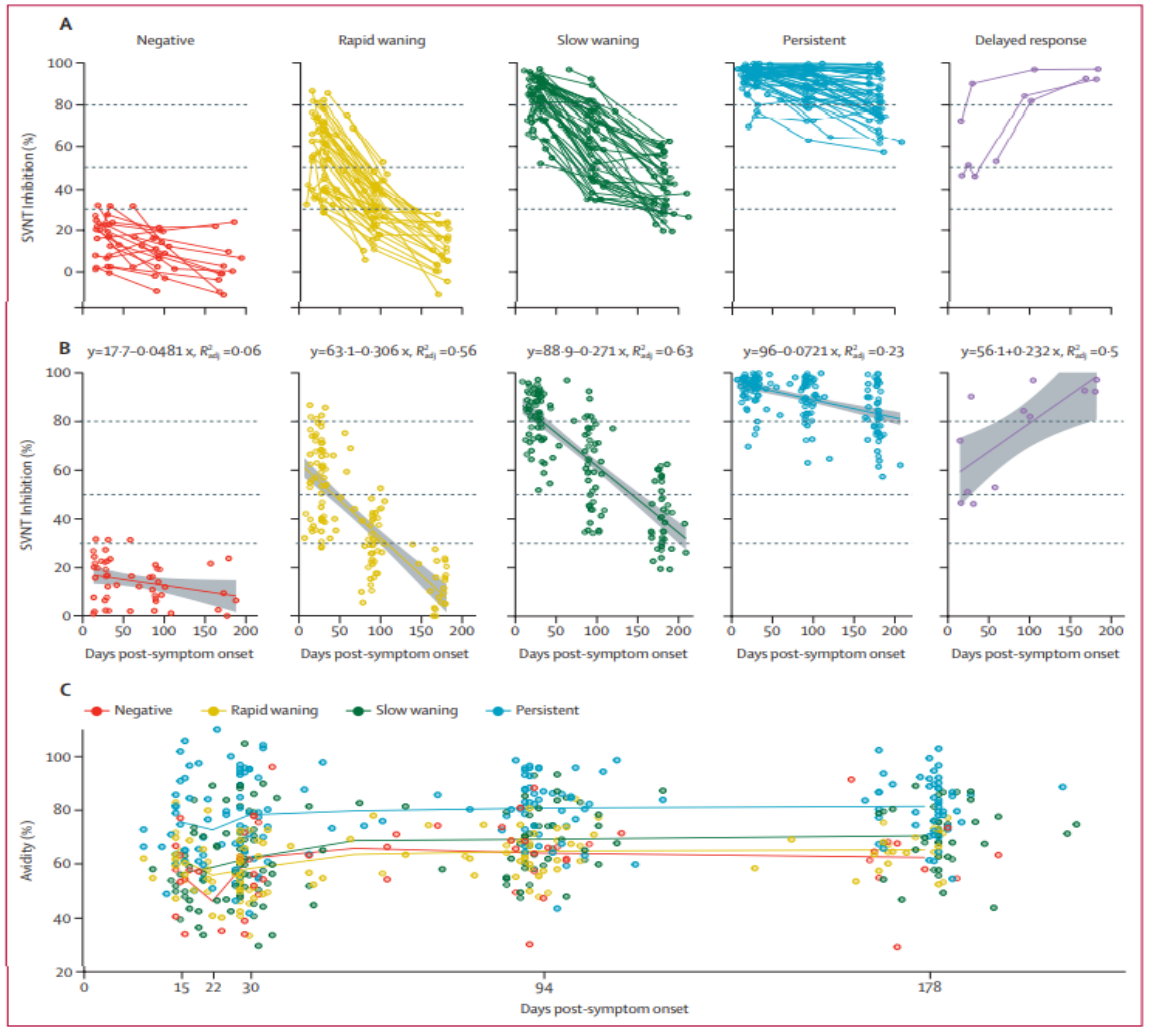


Figure 1: **Longitudinal dynamics of neutralising antibodies**
(A) Neutralising antibody level, measured by percentage inhibition of sVNT readings. (B) Linear regression model of each grouping for neutralising antibody level. Dashed lines represents 30%, 50%, and 80% of sVNT percentage inhibition. (C) Group mean of IgG avidity percentage is connected at days 14, 21, 30, 90 and 180. Since each patient blood sample was taken at a different timepoint in practice, we marked the mean days post-symptom onset of the samples within the same group but the definition of the time groups remains 14, 21, 30, 90, and 180 days post-symptom onset. Each point represents a single patient. sVNT=surrogate virus neutralisation test.

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