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HEALTH CENTRE

SCIENTIFIC RESEARCH MONITORING ON COVID-19

13 OCTOBER 2020

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SCIENTIFIC RESEARCH MONITORING ON COVID-19 (ISSUE 254)

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ABU DHABI PUBLIC HEALTH CENTRE

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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Articles
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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

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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Treatment

Remdesivir for the Treatment of Covid-19 - Final Report

Clinical Features

Clinical Features of COVID-19 Mortality: Development and Validation of a Clinical Prediction Model

EPIDEMIOLOGY

FROM 21 JAN TO 12 OCT PT 2020

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

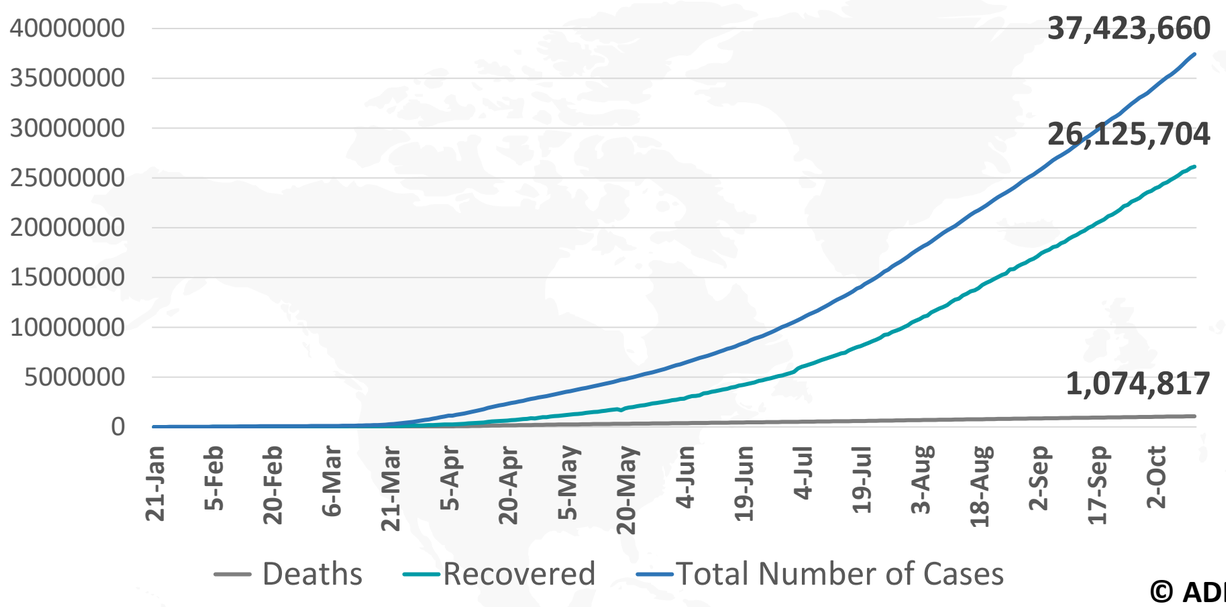


Figure 2: Daily New Infected COVID-19 Cases (China and rest of the world)

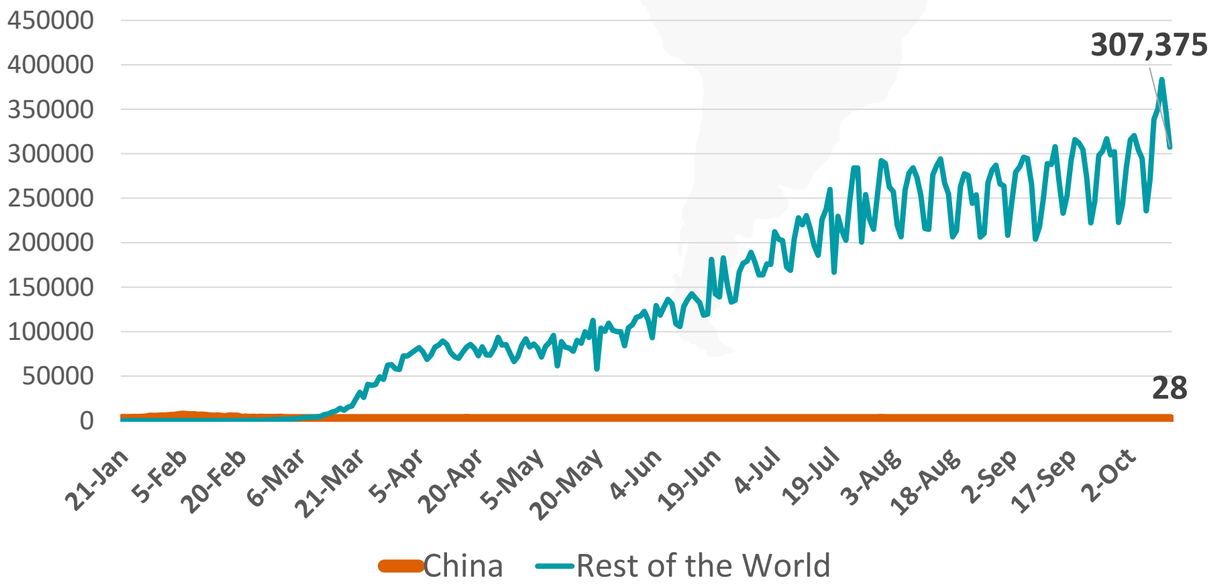


Figure 3: Total Number of Death Due to COVID-19 (china and result of the world)

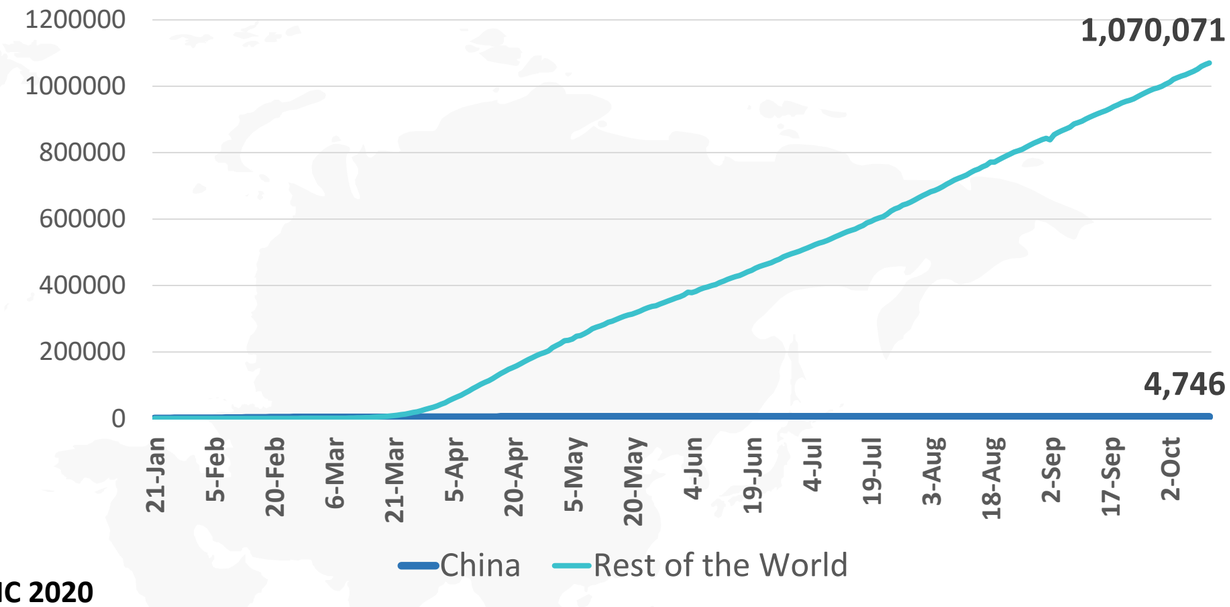
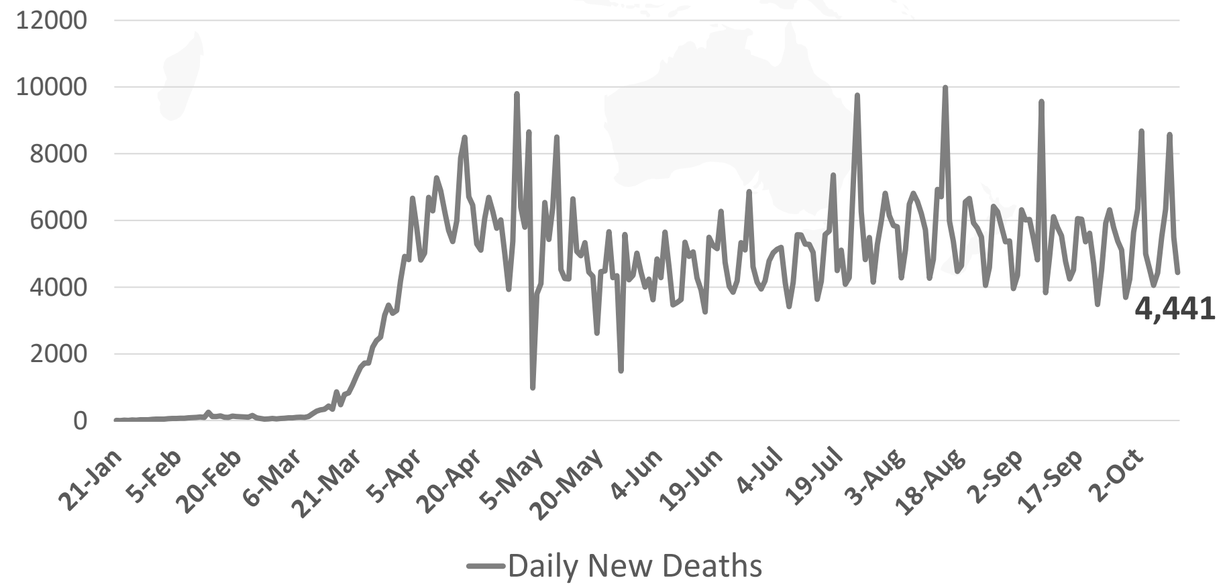


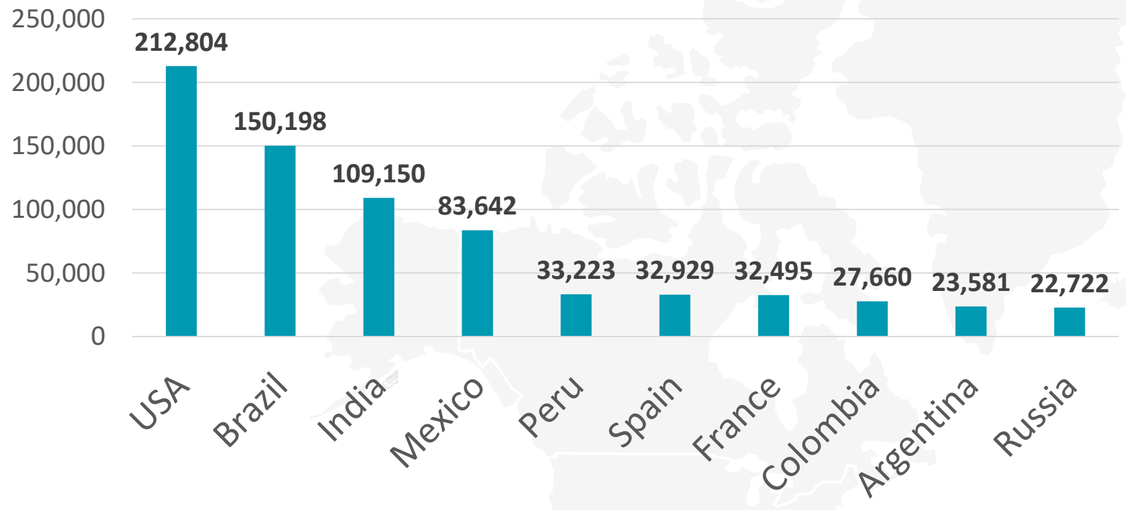
Figure 4: Global Daily New Deaths Due to COVID-19 (china and rest of the world)



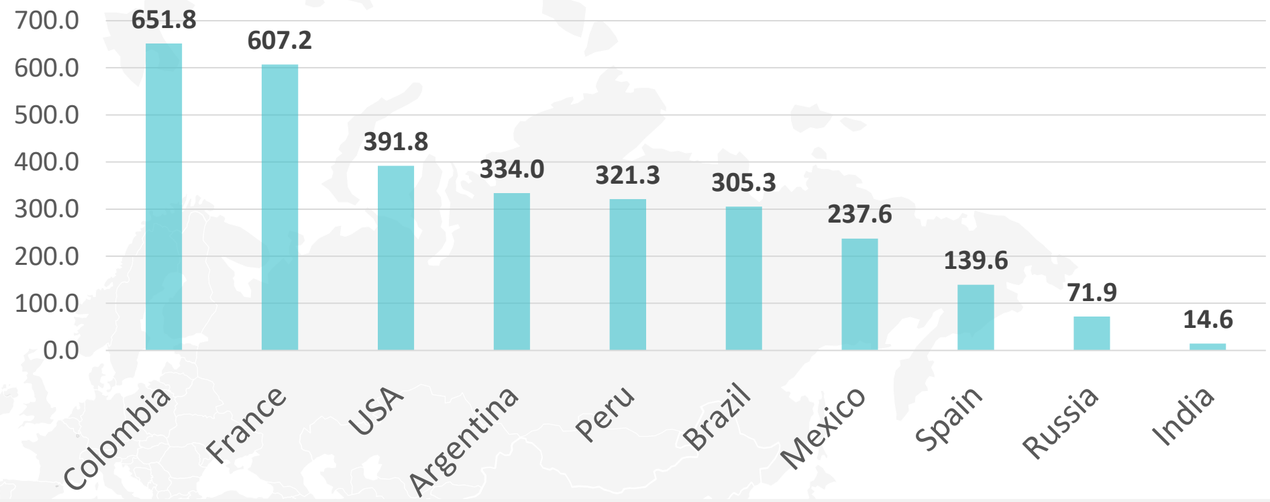
Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: John Hopkins, WHO

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

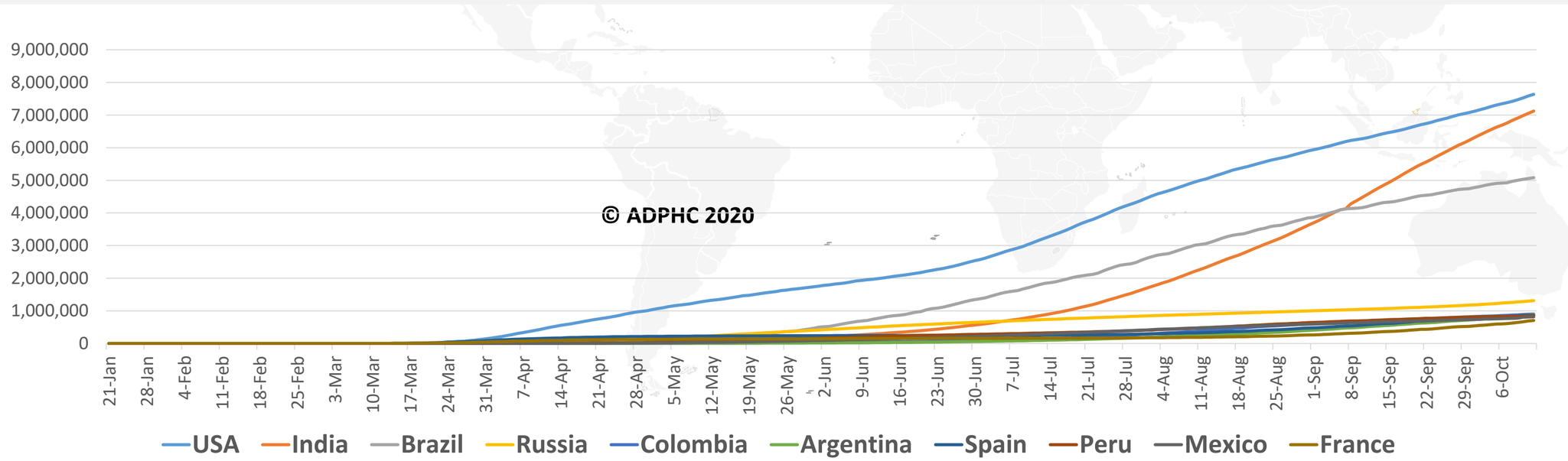
TOTAL DEATHS



DEATHS PER MILLION



TOTAL INFECTED CASES



USA	7,636,803
India	7,120,538
Brazil	5,082,637
Russia	1,312,310
Colombia	902,747
Argentina	883,882
Spain	861,112
Peru	846,088
Mexico	814,328
France	707,469

Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: WHO

EPIDEMIOLOGY

FROM 21 JAN TO 12 OCT PT 2020

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Figure 6: COVID-19 Status in the UAE (Federal Competitiveness and Statistics Authority Dashboard)

Daily Tests

114,147.4 Average Tests

1,154.1 per 100k population

0.9% Positive Rate

Daily Cases

1,080.0 Average Cases

10.9 per 100k population

Daily Recovered

1,306.4 Average Recovered

13.2 per 100k population

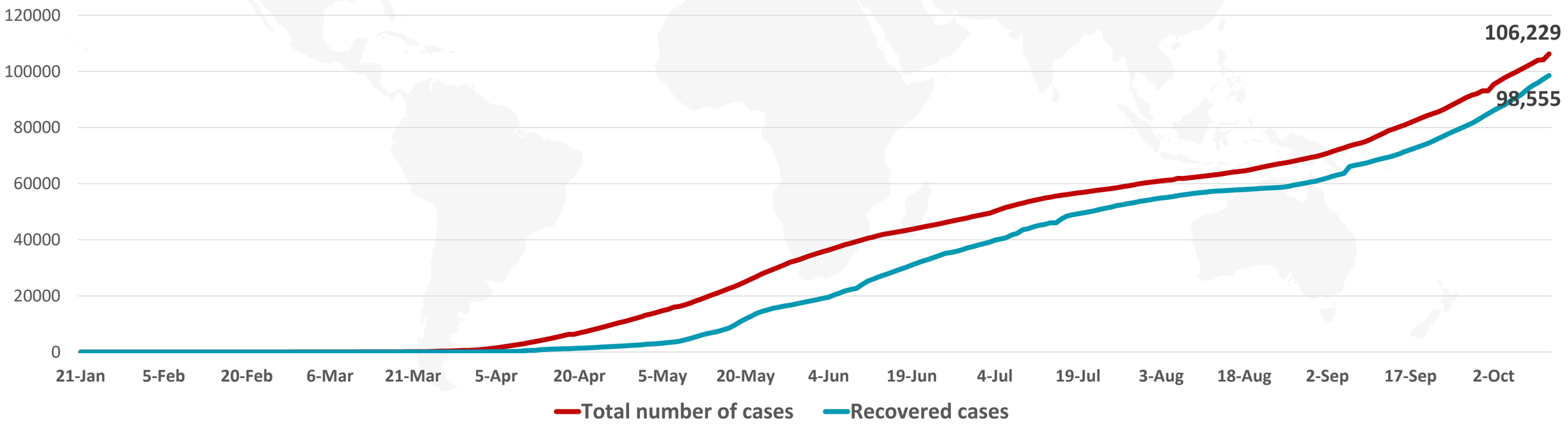
Daily Deaths

2.4 Average Deaths

0.0 per 100k population

0.2% Case Fatality Rate

TOTAL NUMBER OF INFECTED AND RECOVERED CASES DUE TO COVID-19 REPORTED BY THE UAE



Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: FCSA, WHO, John Hopkins

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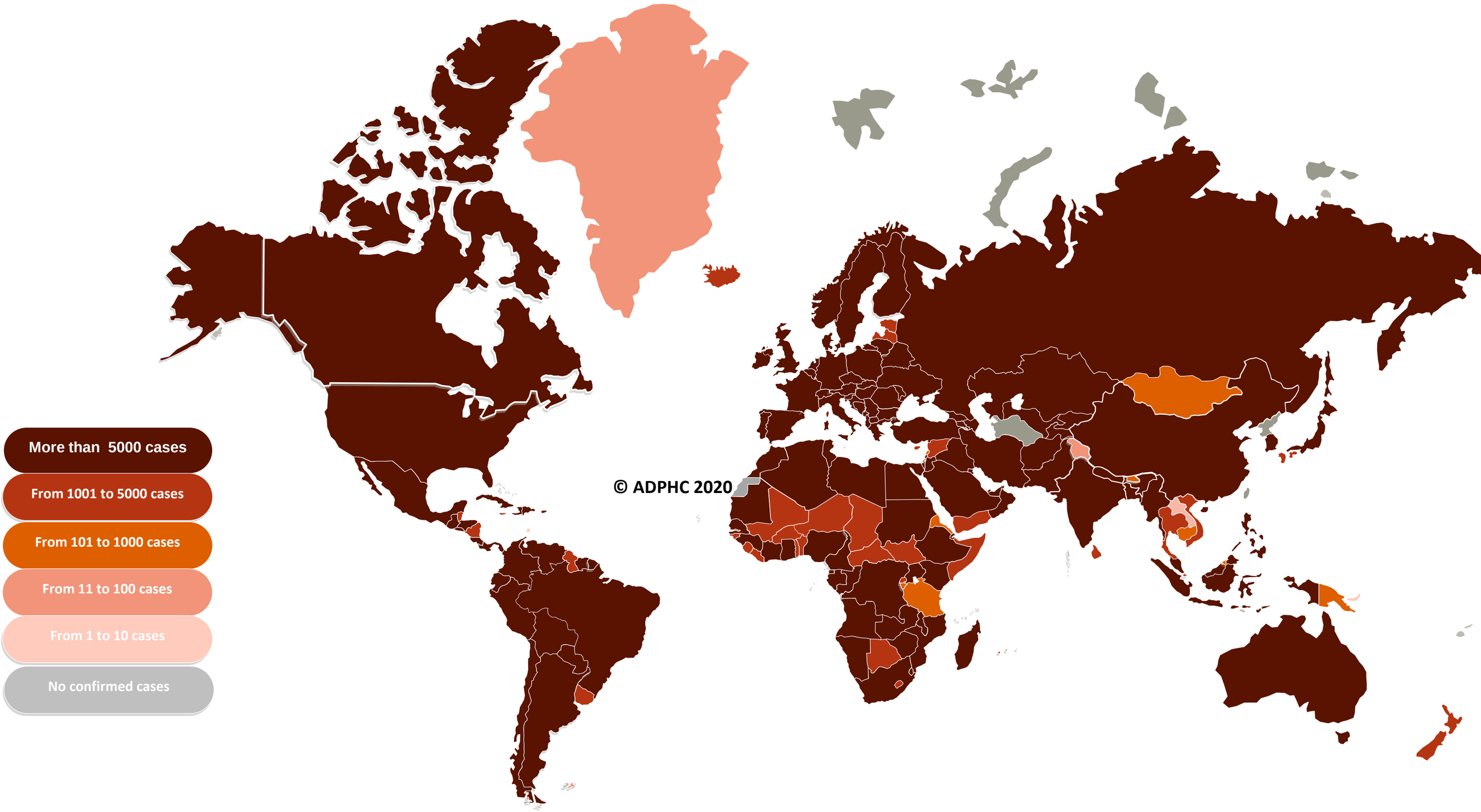
Figure 7A : Global Distribution of COVID-19 Cases



Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: WHO

EPIDEMIOLOGY

Date: 12 OCT 2020

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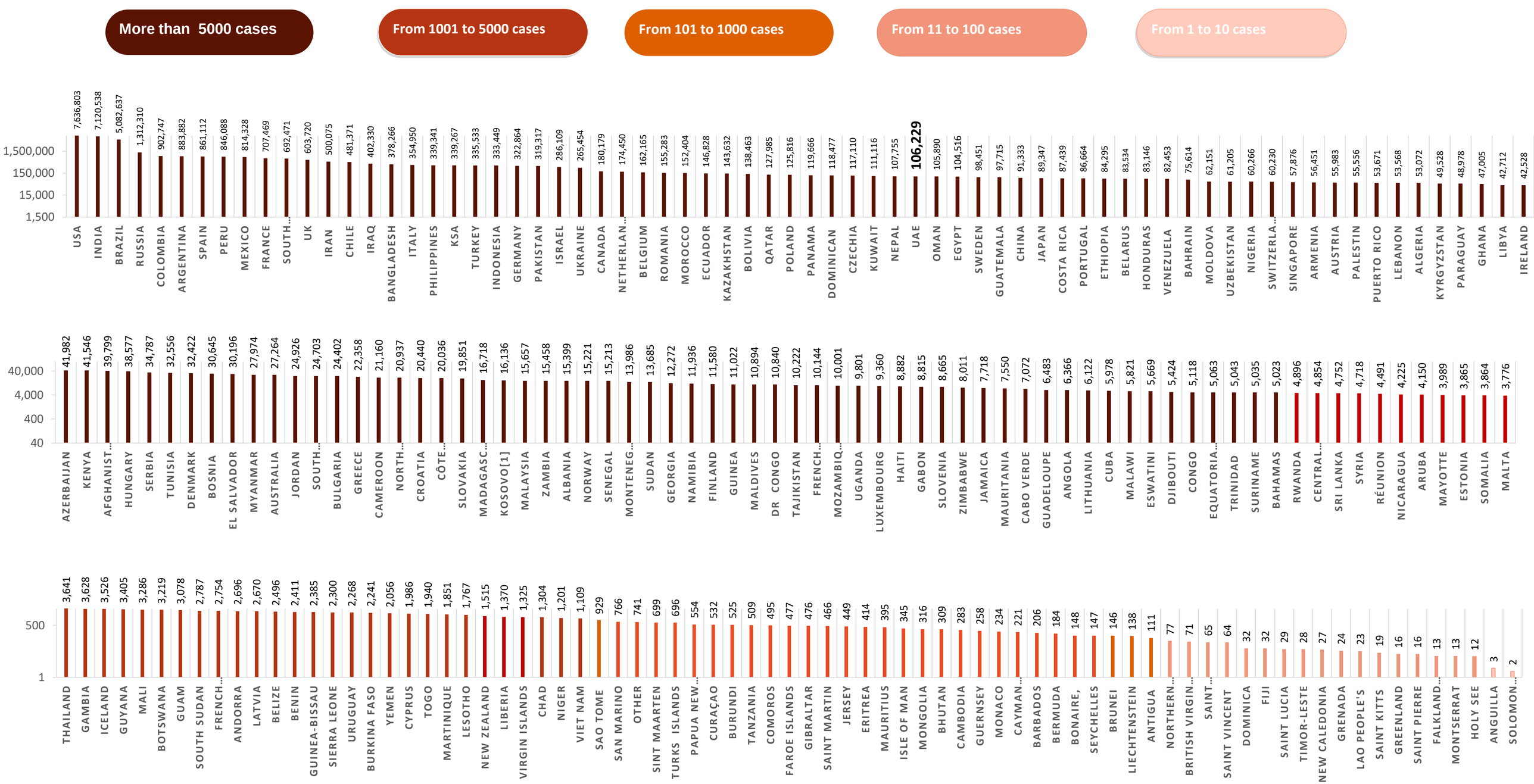
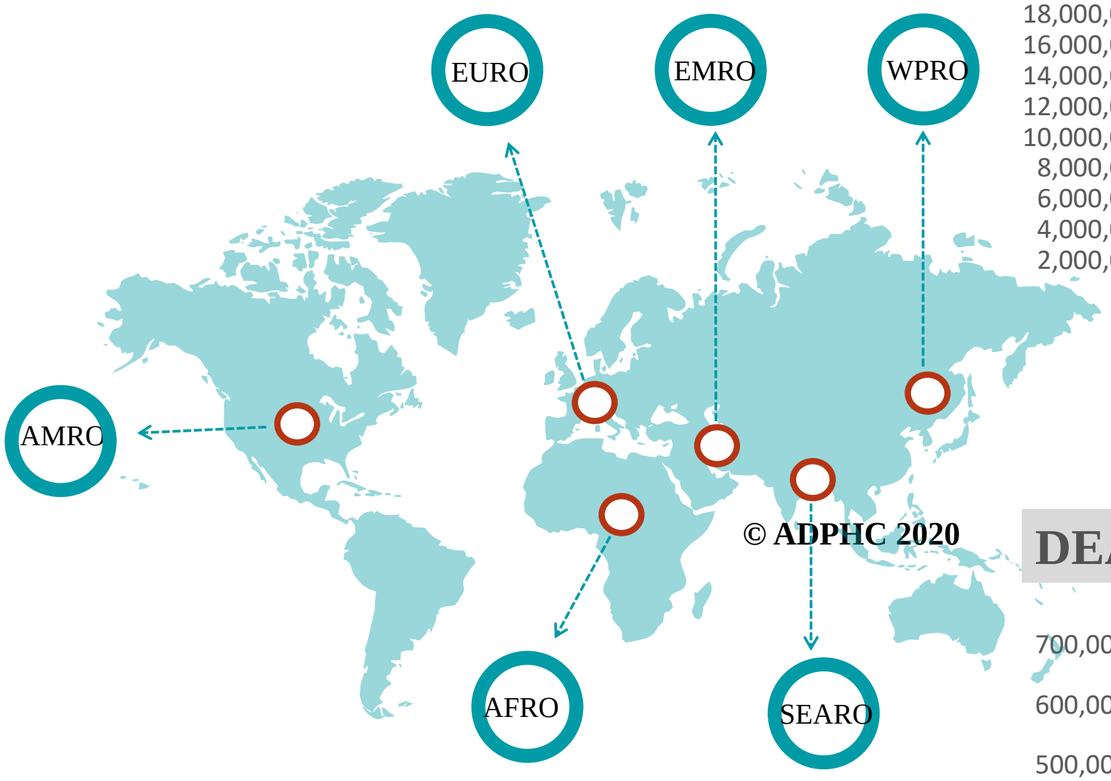
Figure 7B: Bar Chart Illustrates the Global Distribution of COVID19 Cases



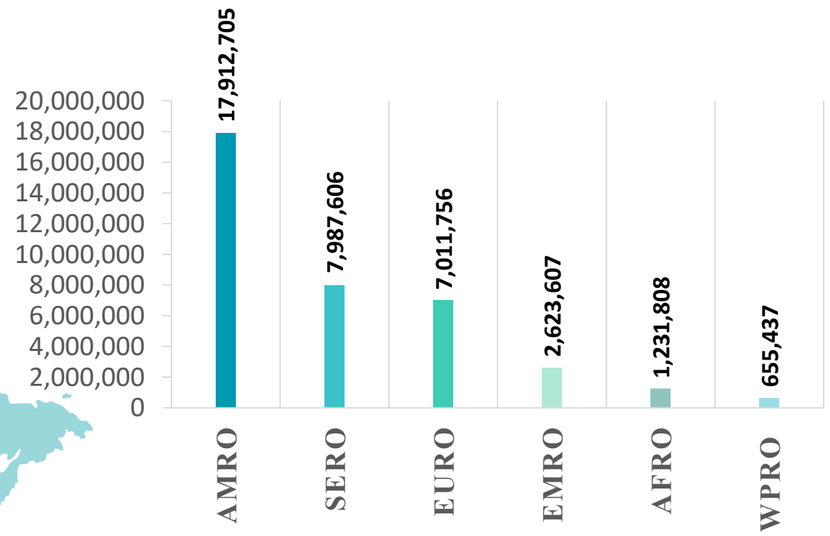
Other*:includes cases and deaths reported under the international conveyance(Diamond Princess)

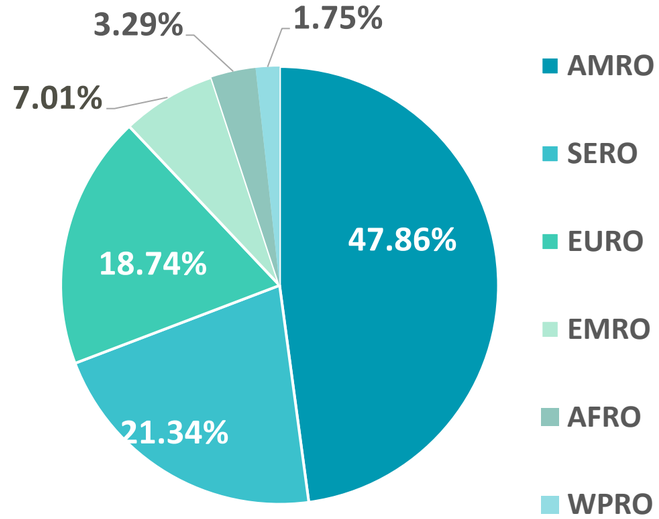
Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: WHO

Figure 8: Global Distribution of COVID-19 Cases per Region

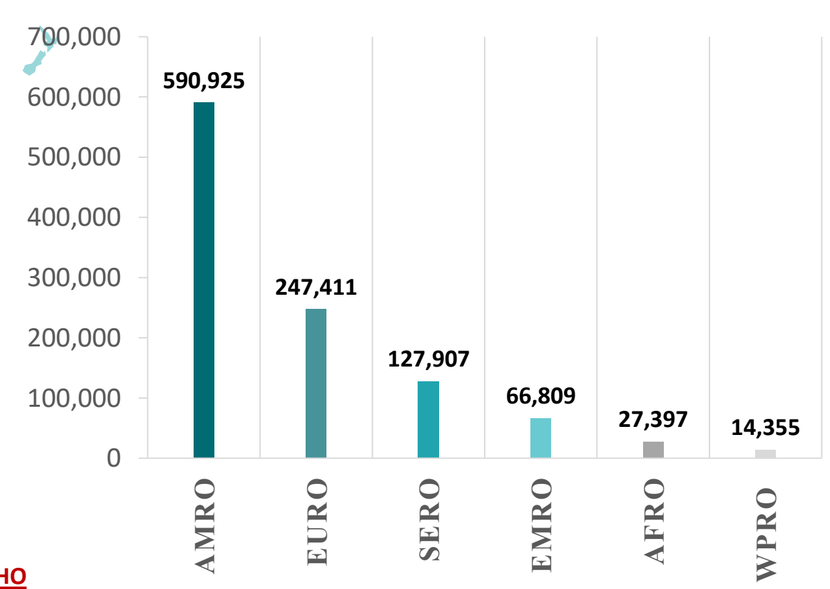


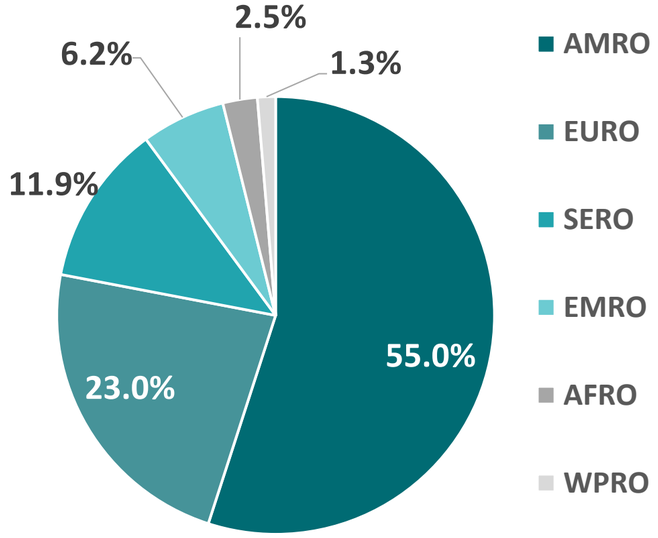
INFECTED





DEATHS

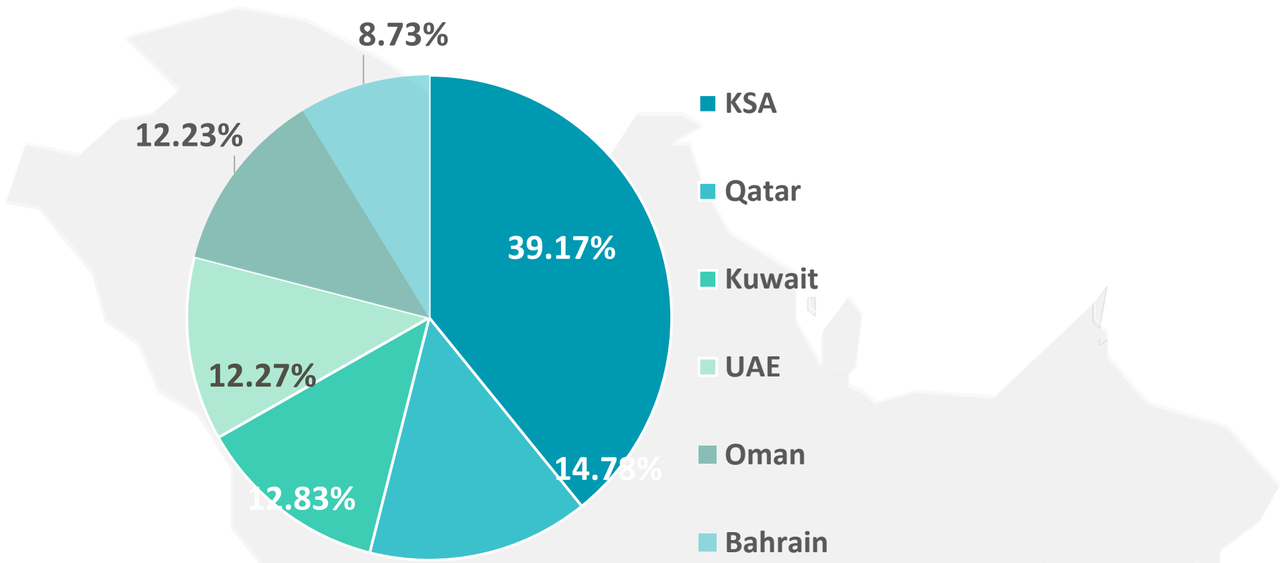


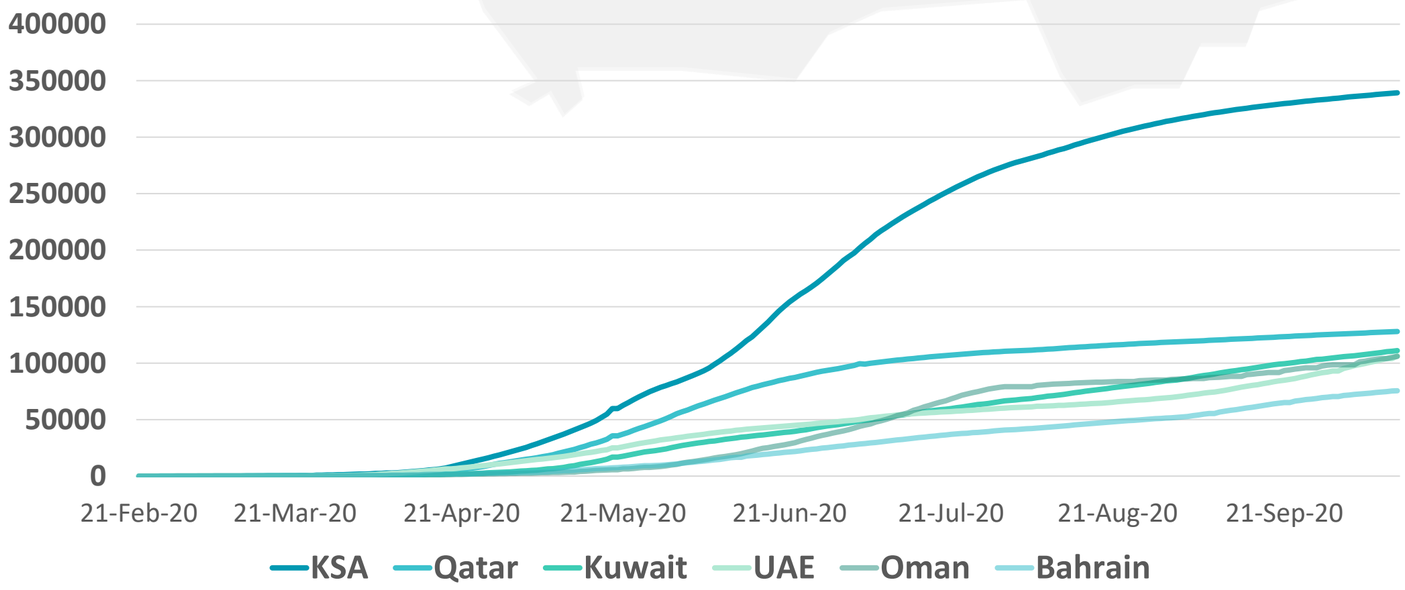


Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: WHO

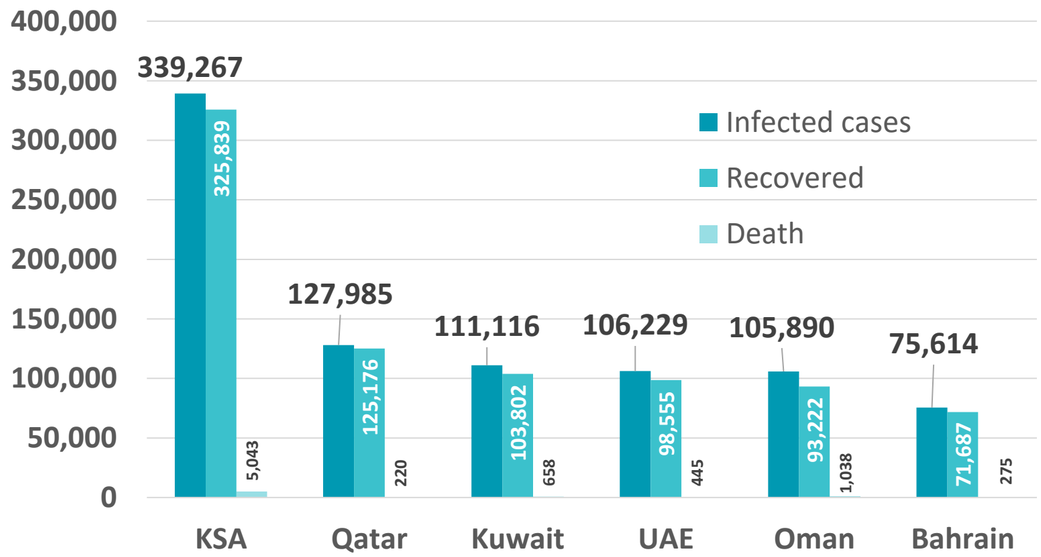
Figure 9: Comparative Analysis of the Distribution of COVID-19 Cases in GCC Countries

TOTAL NUMBER OF INFECTED CASES

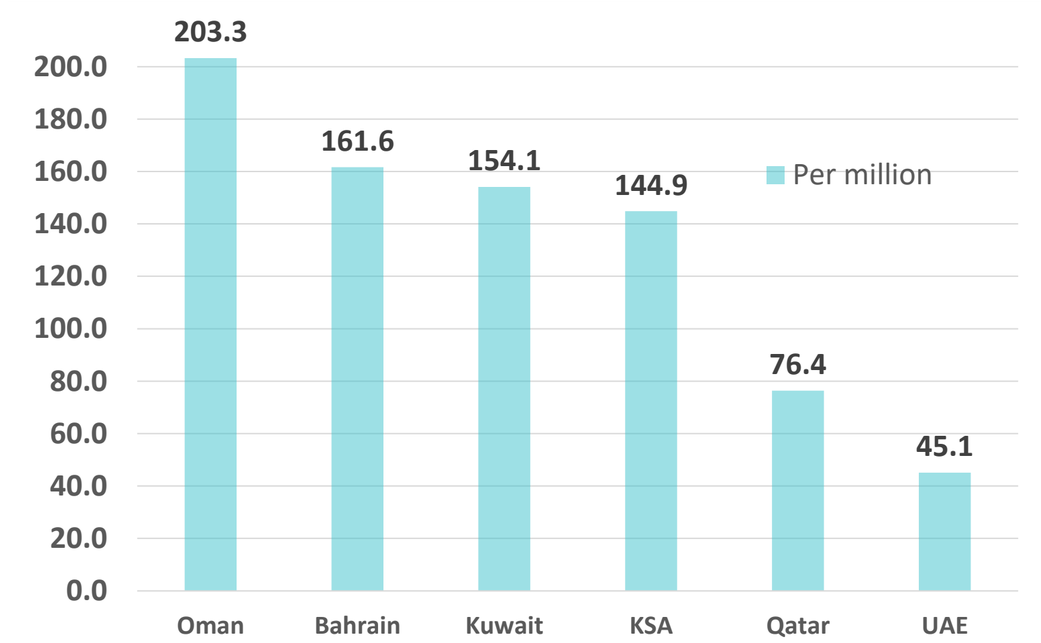




TOTAL NUMBER OF INFECTED, RECOVERED AND DEATHS



DEATHS PER MILLION



Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: John Hopkins, WHO

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

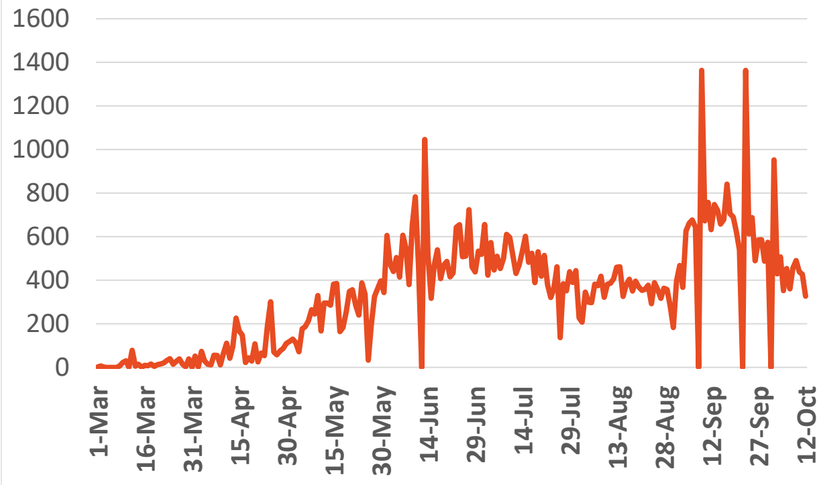
UAE

Source : National Emergency Crisis and Disaster Management Authority

KSA

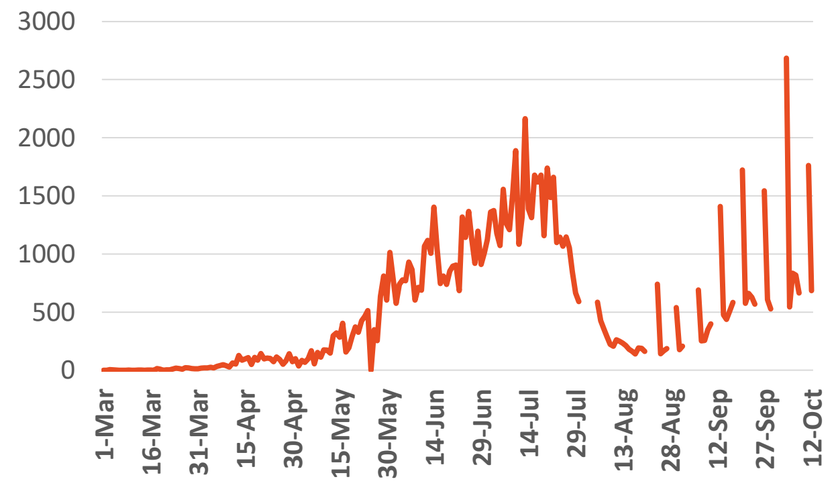
Source : KSA ministry of health

Bahrain



Source :WHO

Oman

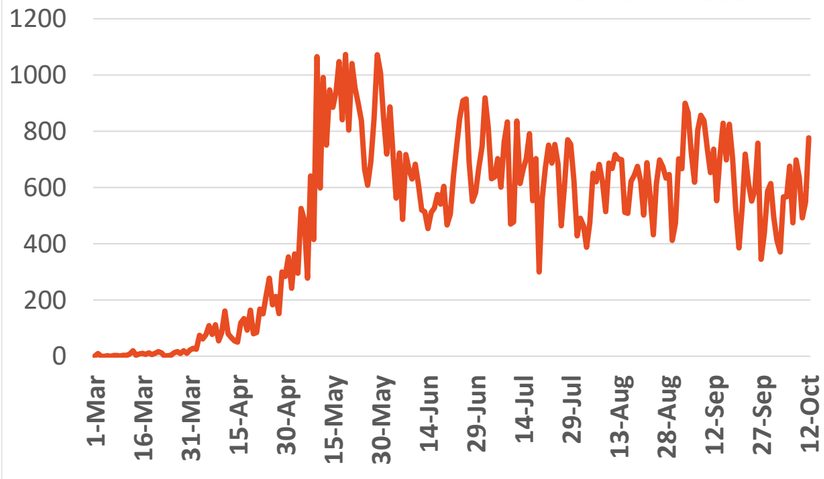


Source :Oman ministry of health

*No announced statistic data from 31 July to 4 August, 21,23,28,30 August 2, 4، 5,11,12,18,19,25 ,26,30 September,1,2,9 & 10 October

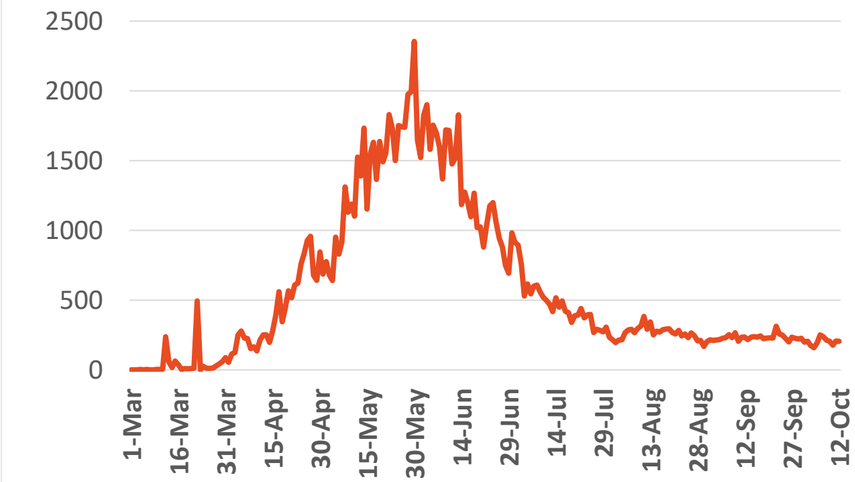
*No announced statistic data on weekends and official holidays.

Kuwait



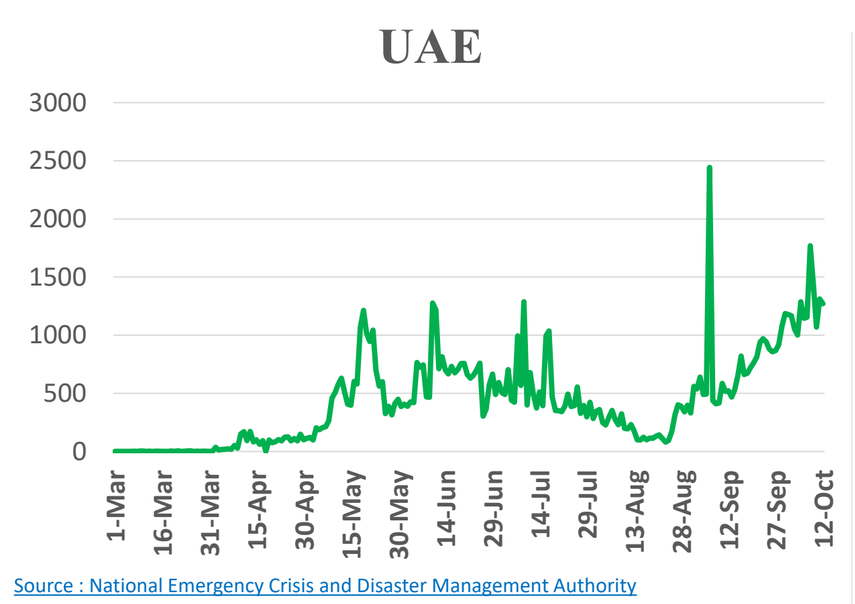
Source : Kuwait ministry of health

Qatar

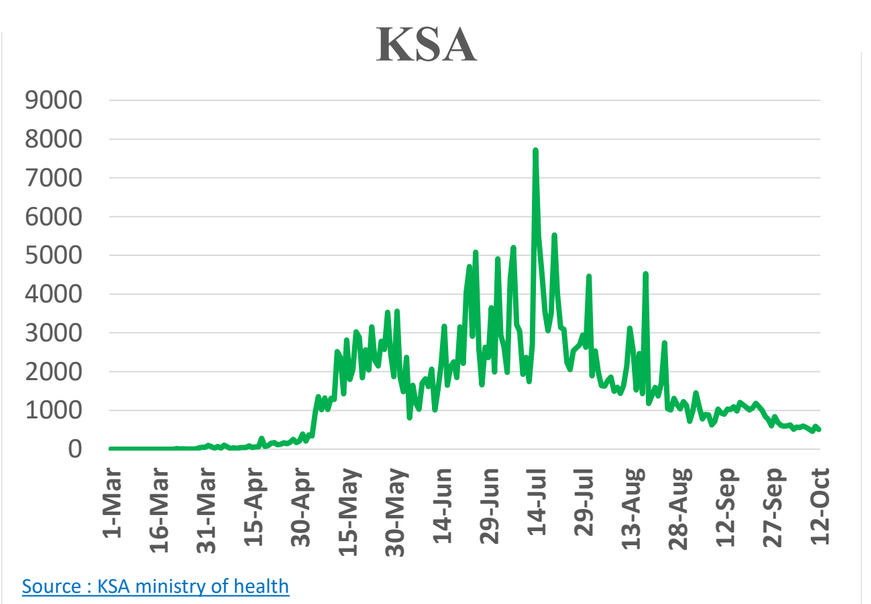


Source : Qatar ministry of health

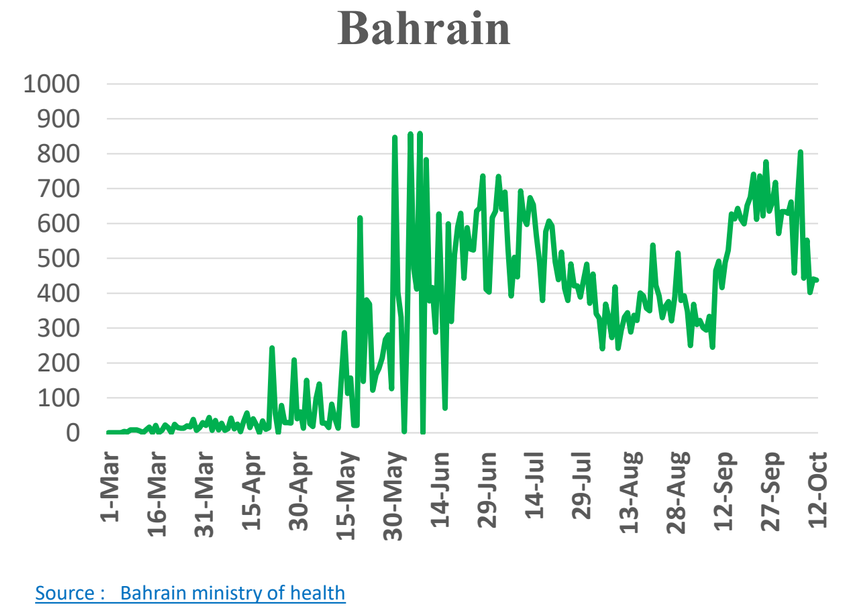
Figure 11: Comparative Analysis of the Distribution of COVID-19 Newly Recovered Cases in GCC Countries



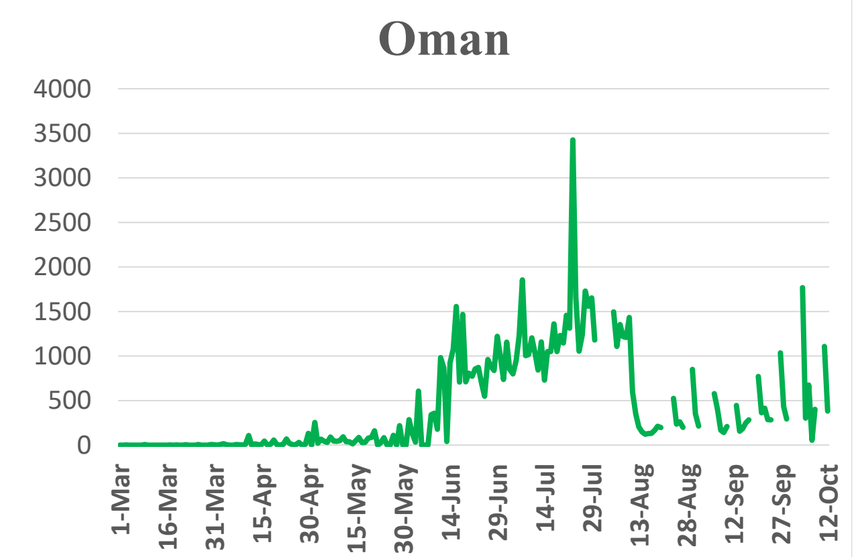
Source : National Emergency Crisis and Disaster Management Authority



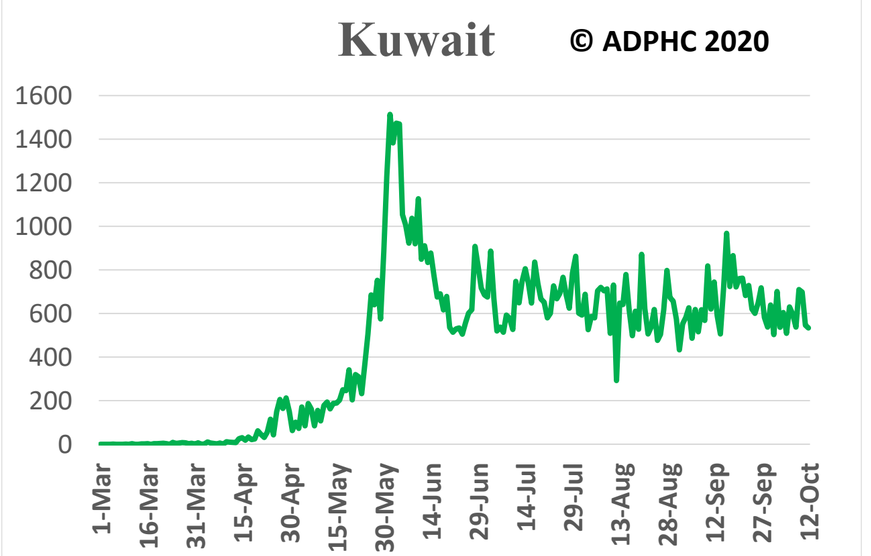
Source : KSA ministry of health



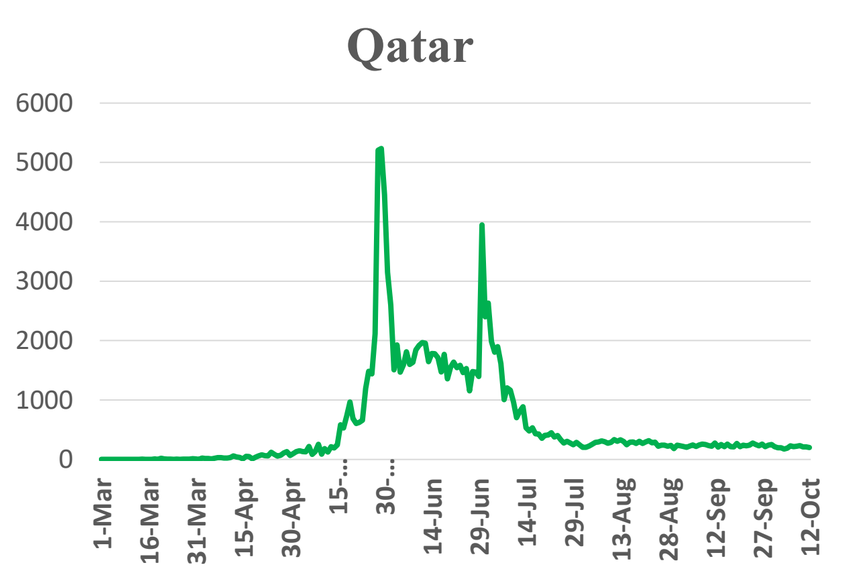
Source : Bahrain ministry of health



Source :Oman ministry of health



Source : Kuwait ministry of health



Source : Qatar ministry of health

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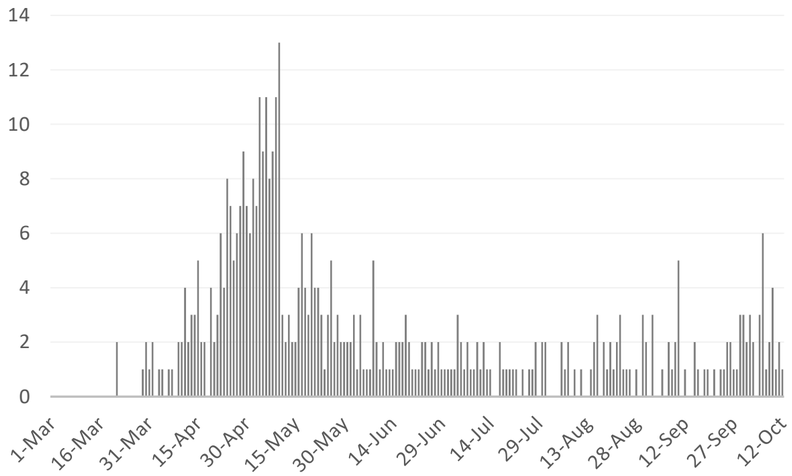
*No announced statistic data on weekends and official holidays.

EPIDEMIOLOGY

FROM 1 MAR TO 12 OCT 2020

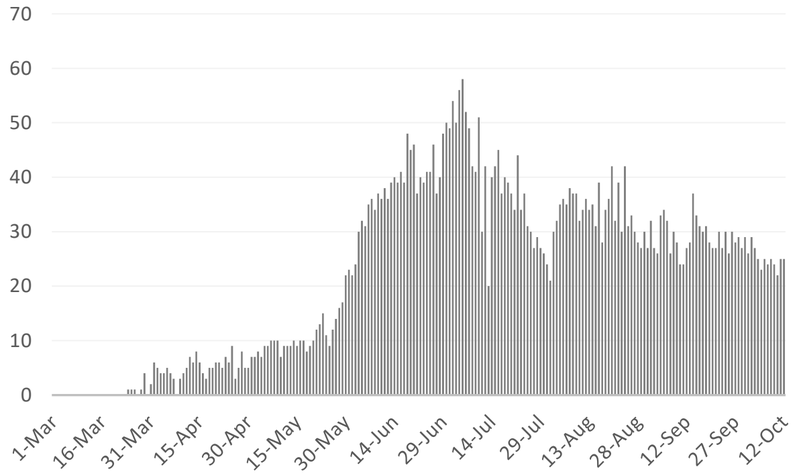
Figure 12: Comparative Analysis of the Distribution of COVID-19 New Death Cases in GCC Countries

UAE



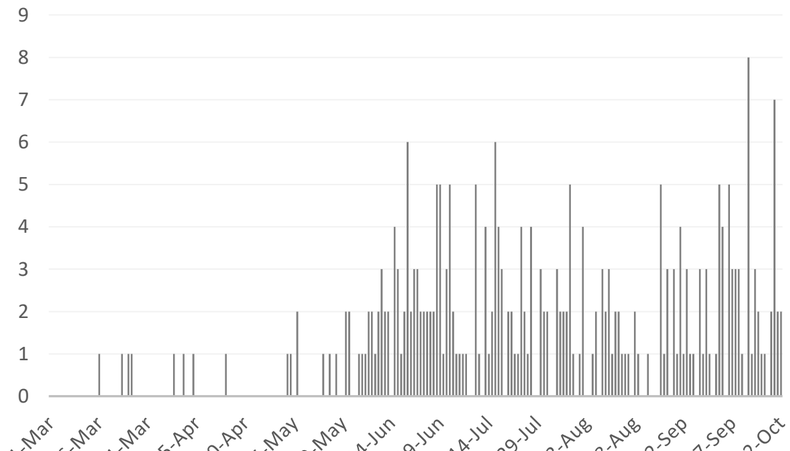
Source : National Emergency Crisis and Disaster Management Authority

KSA



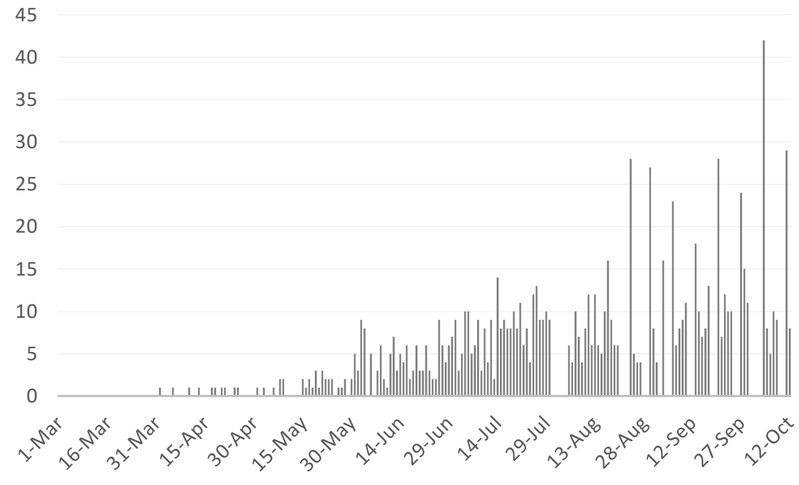
Source : KSA ministry of health

Bahrain



Source :WHO

Oman



Source :Oman ministry of health

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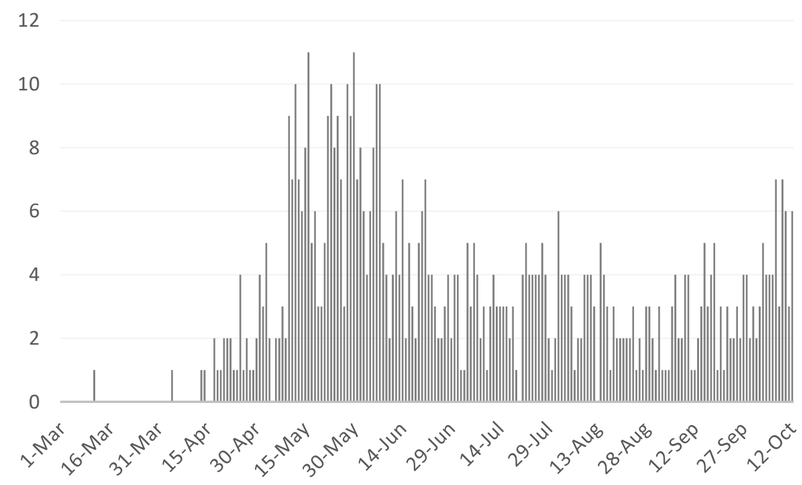
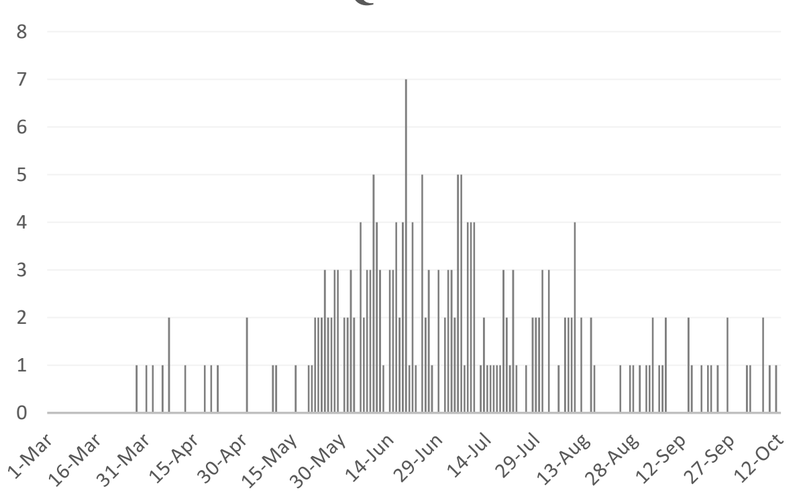
Kuwait



Source : Kuwait ministry of health

Qatar



Source : Qatar ministry of health

TREATMENT

Article 1

Published October 08, 2020, THE NEJM

Remdesivir for the Treatment of Covid-19 – Final Report

- Remdesivir inhibits the viral RNA-dependent, RNA polymerase with in vitro inhibitory activity against SARS-CoV-1 and the Middle East respiratory syndrome (MERS-CoV), was identified early as a promising therapeutic candidate for Covid-19 because of its ability to inhibit SARS-CoV-2 in vitro

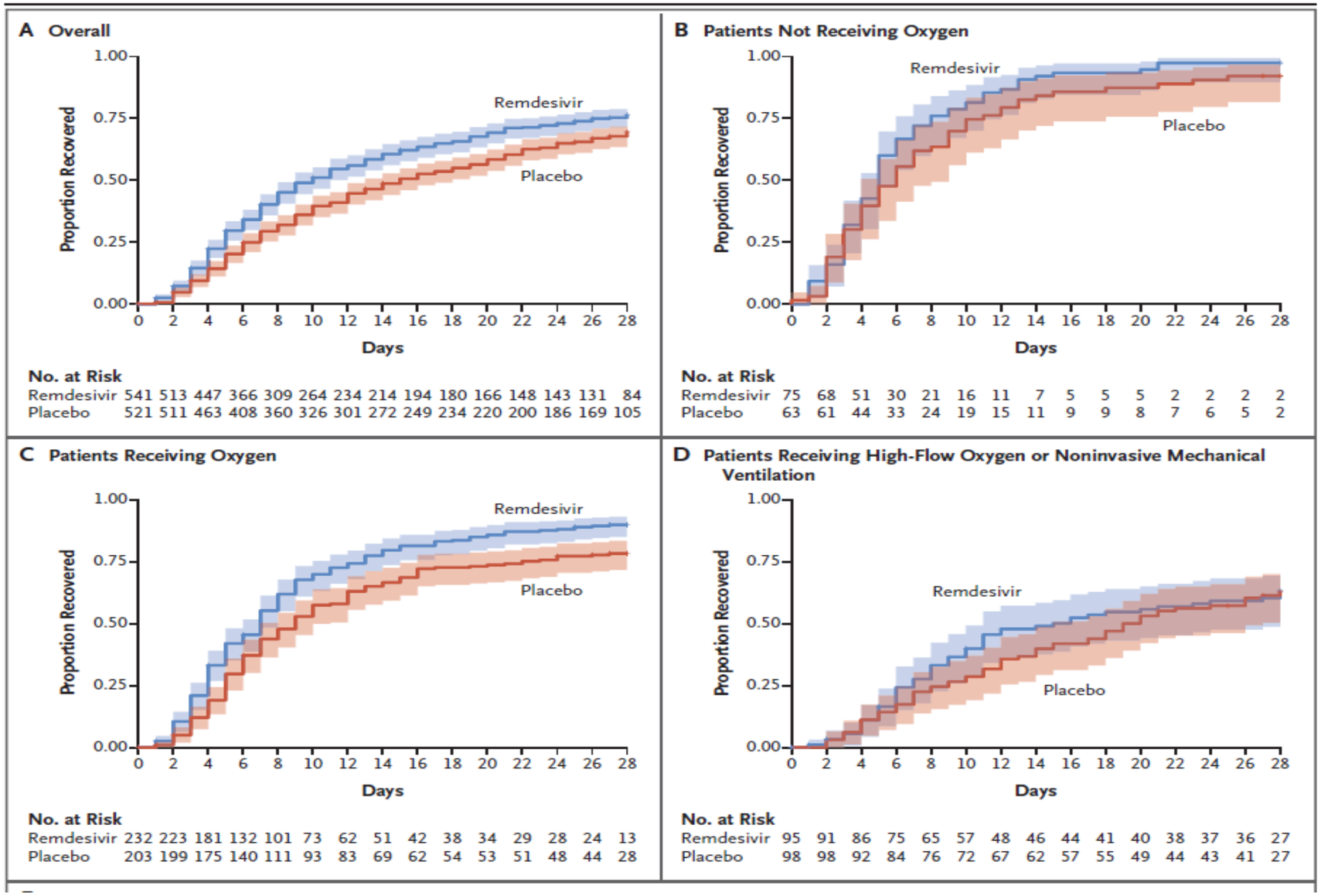
- The investigators of this study conducted a double-blind, randomized, placebo-controlled trial of intravenous remdesivir in adults who were hospitalized with Covid-19 and had evidence of lower respiratory tract infection. Patients received either remdesivir (200 mg loading dose on day 1, followed by 100 mg daily for up to 9 additional days) or placebo for up to 10 days.

- Of the 1062 randomized patients, 541 received remdesivir, and 521 received placebo. The median recovery time in the remedisivir arm was 10 days ([CI], 9 to 11), as compared with 15 days (CI, 13 to 18) with placebo P<0.001. In an analysis that used a proportional odds model with an eight-category ordinal scale, the patients who received remdesivir showed clinical improvement at day 15 (odds ratio, 1.5; 95% CI, 1.2 to 1.9, after adjustment for actual disease severity) as compared to placebo. The Kaplan–Meier estimates of non-significant mortality of 6.7% with remdesivir and 11.9% with placebo by day 15 and 11.4% with remdesivir and 15.2% with placebo by day 29 (hazard ratio, 0.73; 95% CI, 0.52 to 1.03). Serious. adverse events were reported in 131 of the 532 patients who received remdesivir (24.6%) and in 163 of the 516 patients who received placebo (31.6%).

- The findings of this study showed that remdesivir was superior to placebo in shortening the time to recovery in hospitalized adults with Covid-19 and had evidence of lower respiratory tract infection, however, did not show mortality benefits.

TREATMENT

Continued



CLINICAL FEATURE

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Article 2

Published

Clinical Features of COVID-19 Mortality: Development and Validation of a Clinical Prediction Model

October 01, 2020, THE LANCET

Background

- Predicting mortality among patients with Covid-19 is very difficult, which limits the prognosis and management of the disease.
- The aim of this study was to identify the clinical features most predictive of Covid-19 mortality and develop an accurate prediction model.

Methodology

- Using machine learning techniques, authors conducted a prediction model development and validation study at the Mount Sinai Health System in New York City, NY, USA.
- Between March 9 and April 6, 2020, patient data was randomly assigned (80:20) to the development dataset or test dataset 1 (retrospective).
- Patient data for those with encounters on April 6, 2020, were used in test dataset 2 (prospective).
- Prediction models based on clinical features and patient characteristics were assessed using the area under the receiver operating characteristic curve (AUC) score.

Results

- The development dataset included 3841 patients with 313 deaths, test dataset 1 had 961 patients with 78 deaths, and test dataset 2 comprised of 249 patients of whom 25 died.
- 17 distinct clinical features with less than 20% missing values were identified among the patients in the development dataset that improved prediction performance (17F model).
- Three features were identified from the development dataset (3F model): **1) Patient age, 2) Minimum oxygen saturation recorded during the encounter, 3) Type of encounter (inpatient vs outpatient and telehealth visits).**
- Validation of the 17F and 3F models on test dataset 1 (retrospective data) and test dataset 2 (prospective data) both yielded good performance (AUC score of >0.9).
- Calibration curves of the 17F model's and 3F model's performances on the two test datasets also showed that the models did reasonably well at predicting patient mortality.
- An accurate and cheap Covid-19 mortality prediction model based on three features might have utility in clinical settings to guide the management and prognostication of patients affected by this disease.

CLINICAL FEATURE

Continued

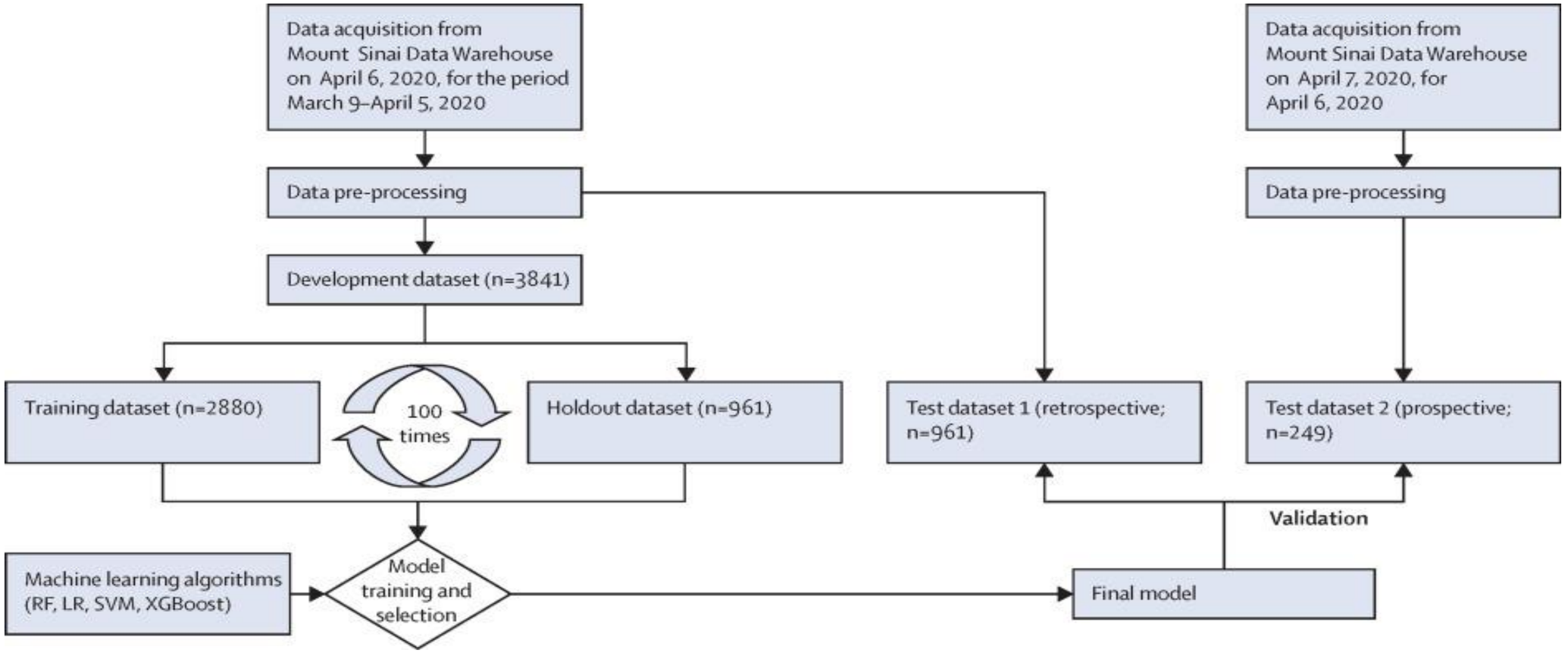


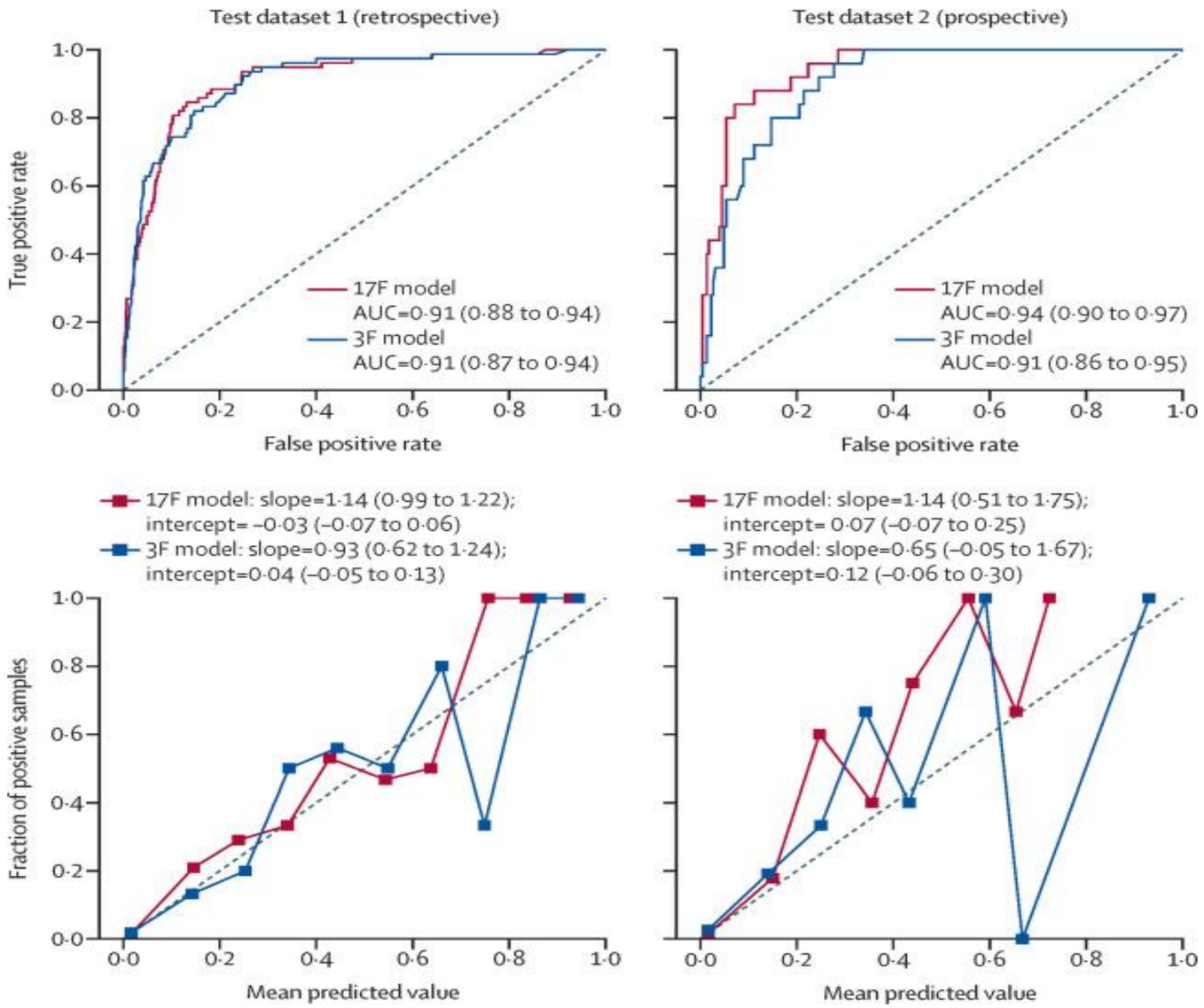
Figure. Workflow for data management and COVID-19 mortality prediction model development

Data were obtained from the Mount Sinai Data Warehouse. After pre-processing, data for patients with COVID-19 (n=4802) were randomly divided in an 80:20 ratio into a prediction model development dataset (n=3841) and an independent retrospective validation dataset (test dataset 1; n=961). For prediction model training and selection, the development dataset was further randomly split into a 75% training dataset (n=2880) and a 25% holdout dataset (n=961). Four classification algorithms were assessed. The final predictive model was validated on test dataset 1 and another independent prospective validation dataset (test dataset 2; n=249). LR=logistic regression. RF=random forest. SVM=support vector machine. XGBoost=eXtreme Gradient Boosting.

CLINICAL FEATURES

Continued

Figure. Performance of the mortality prediction models on two validation datasets
Evaluation results for test datasets 1 (A) and 2 (B) are shown here in terms of the ROC curves obtained, as well as their AUC scores, with 95% CIs in parentheses. Calibration curves of the 3F and 17F models on test datasets 1 (C) and 2 (D), with the slopes and intercepts of all the curves, along with their 95% CIs in parentheses. AUC=area under the ROC curve. ROC=receiver operating characteristic.



The authors of this study have provided a code (if someone has data then they can use this code to do the similar study) that could only be used with python and other machine learning soft wares. https://github.com/SBCNY/Clinical-predictors-of-COVID-19-mortality

THANK YOU

ADPHCAE ADPHC_AE ADPHC_AE ADPHC.AE ADPHC-AE 056 2312171