

SCIENTIFIC RESEARCH MONITORING ON COVID-19

5 OCTOBER 2020

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SCIENTIFIC RESEARCH MONITORING ON COVID-19

(ISSUE 247)

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
Update



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 PHP@adphc.gov.ae

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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Clinical Features

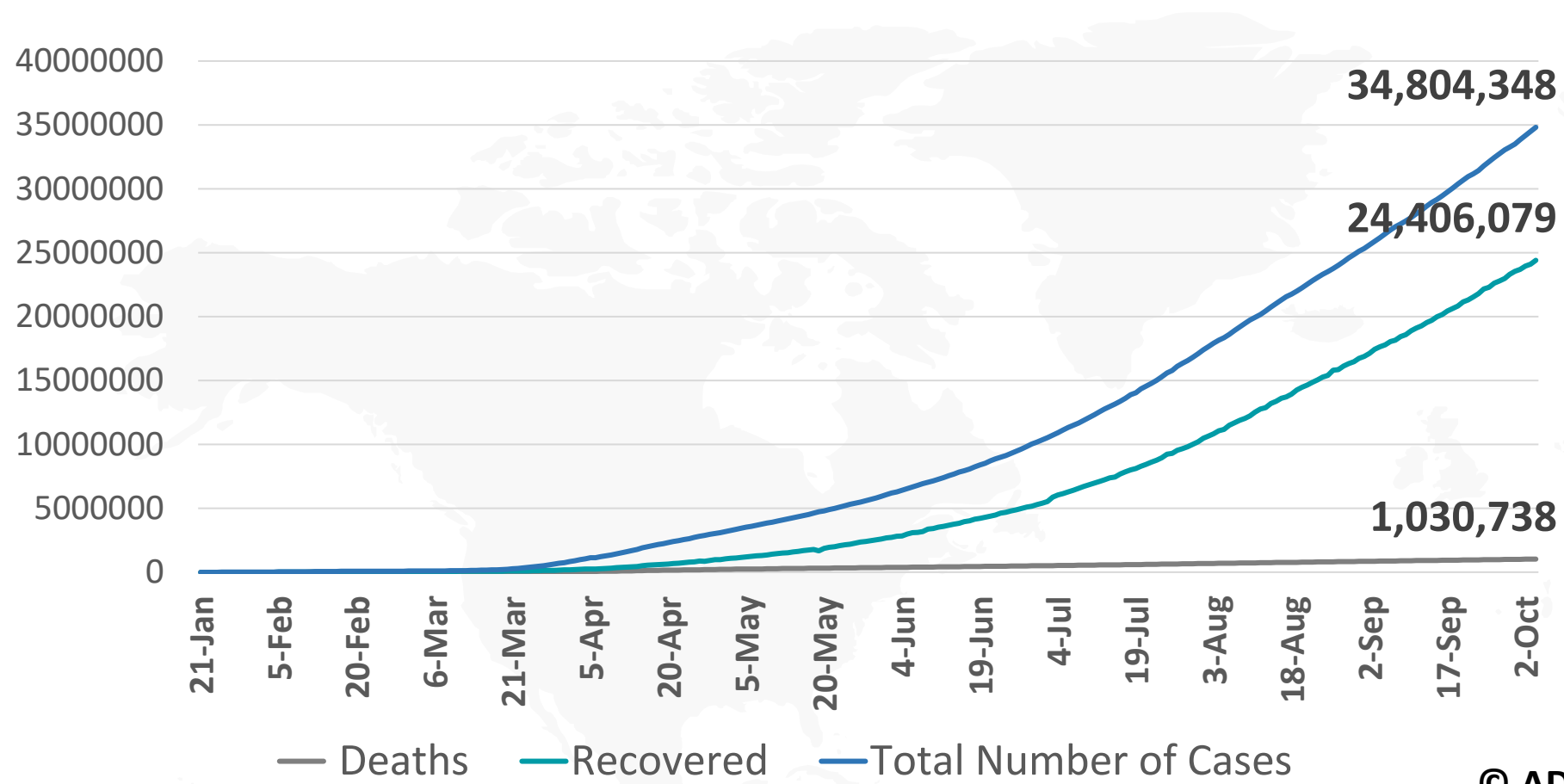
**False-Positive COVID-19
Results: Hidden Problems and
Costs**

Diagnosis

**Deep Learning-Based Triage
and Analysis of Lesion Burden
for COVID-19: A Retrospective
Study with External Validation**



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



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

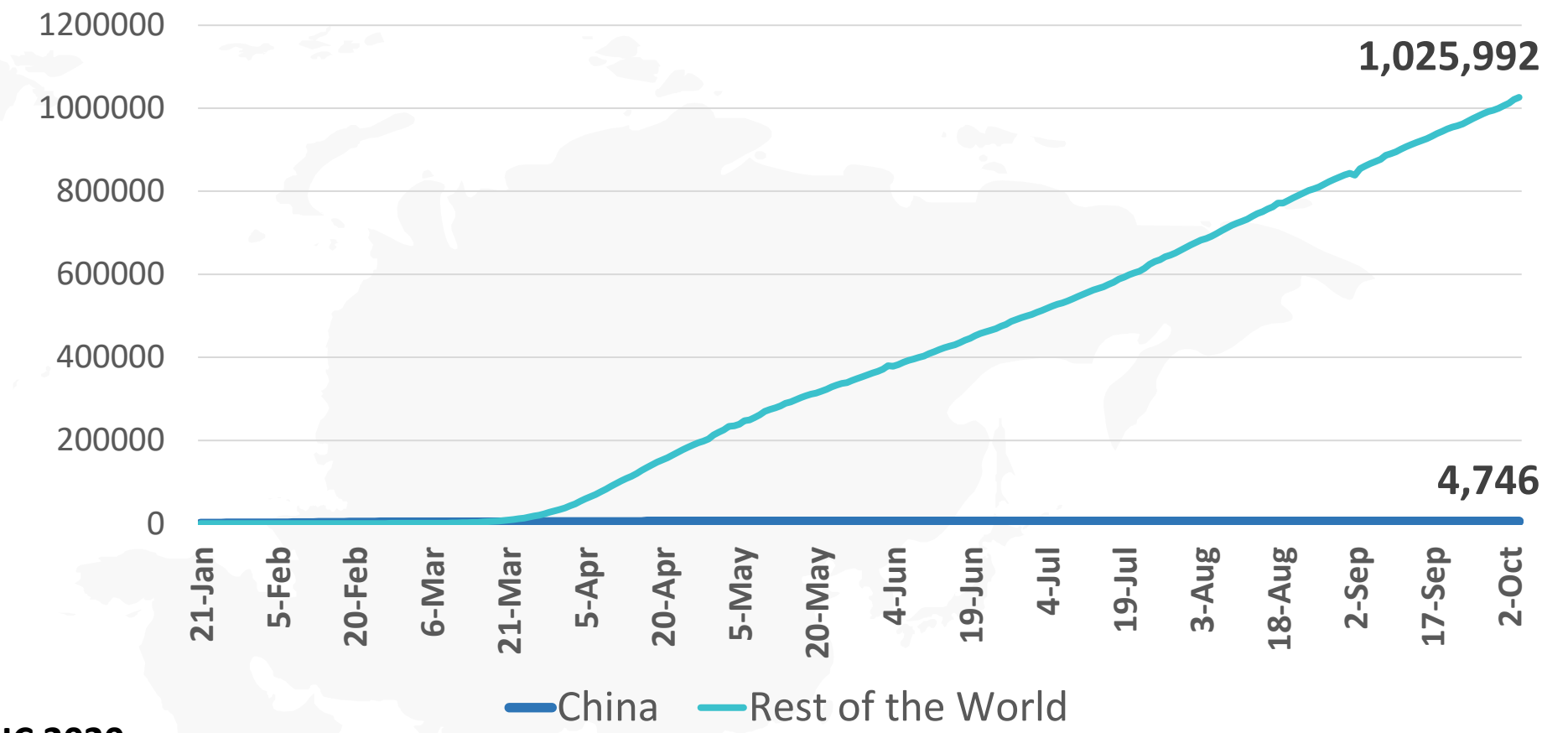


Figure 2: Daily New Infected COVID-19 Cases (China and rest of the world)

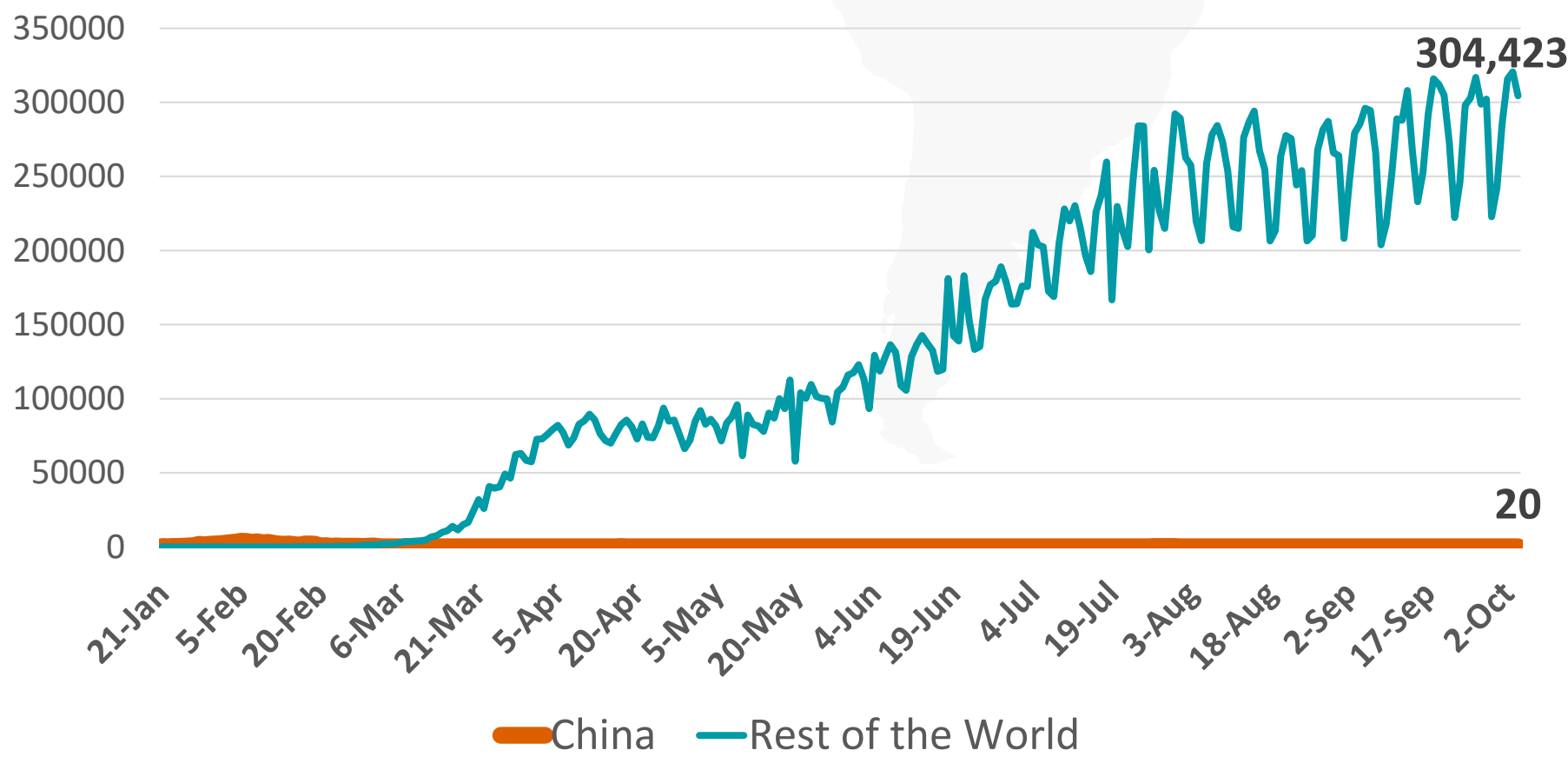


Figure 4: Global Daily New Deaths Due to COVID-19 (china and rest of the world)

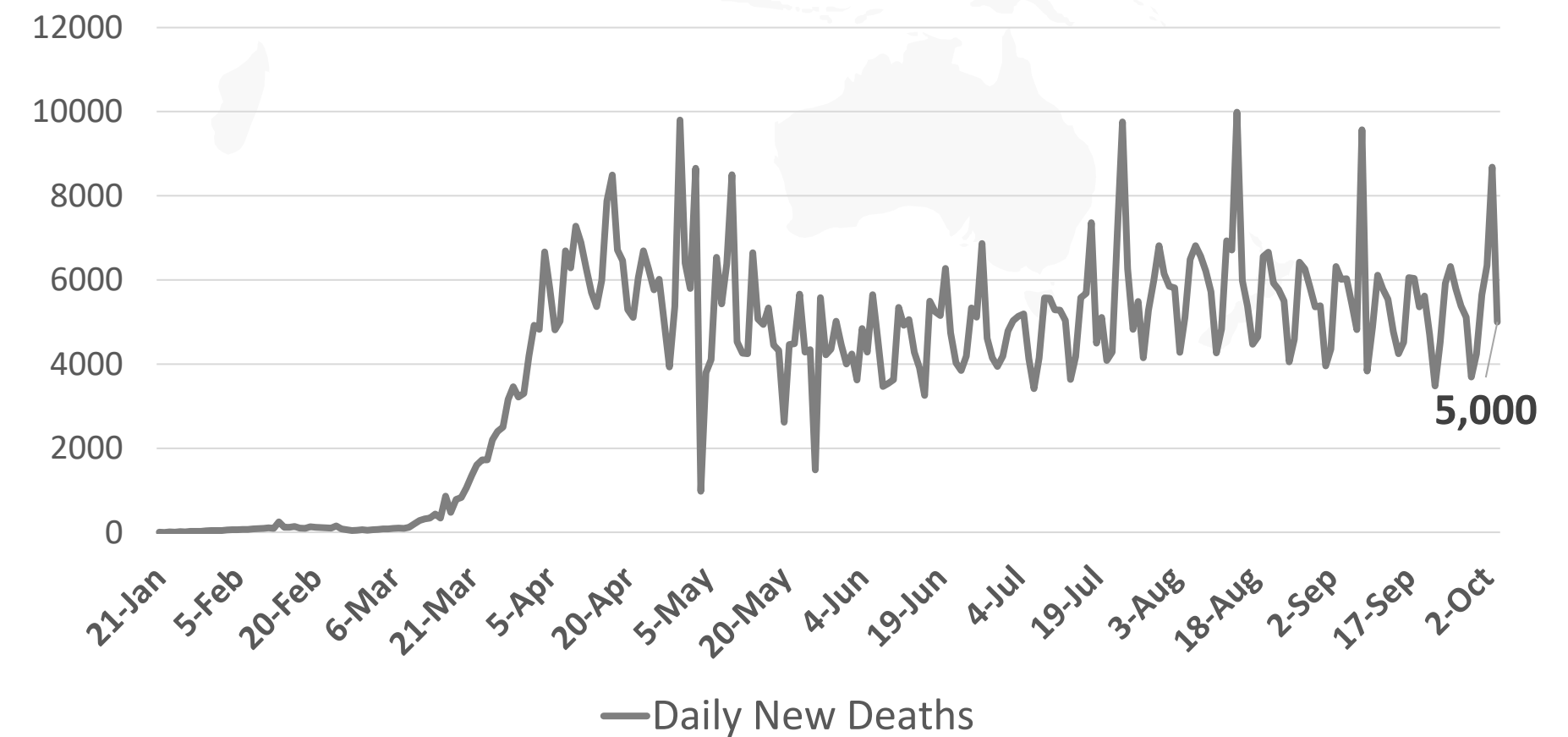
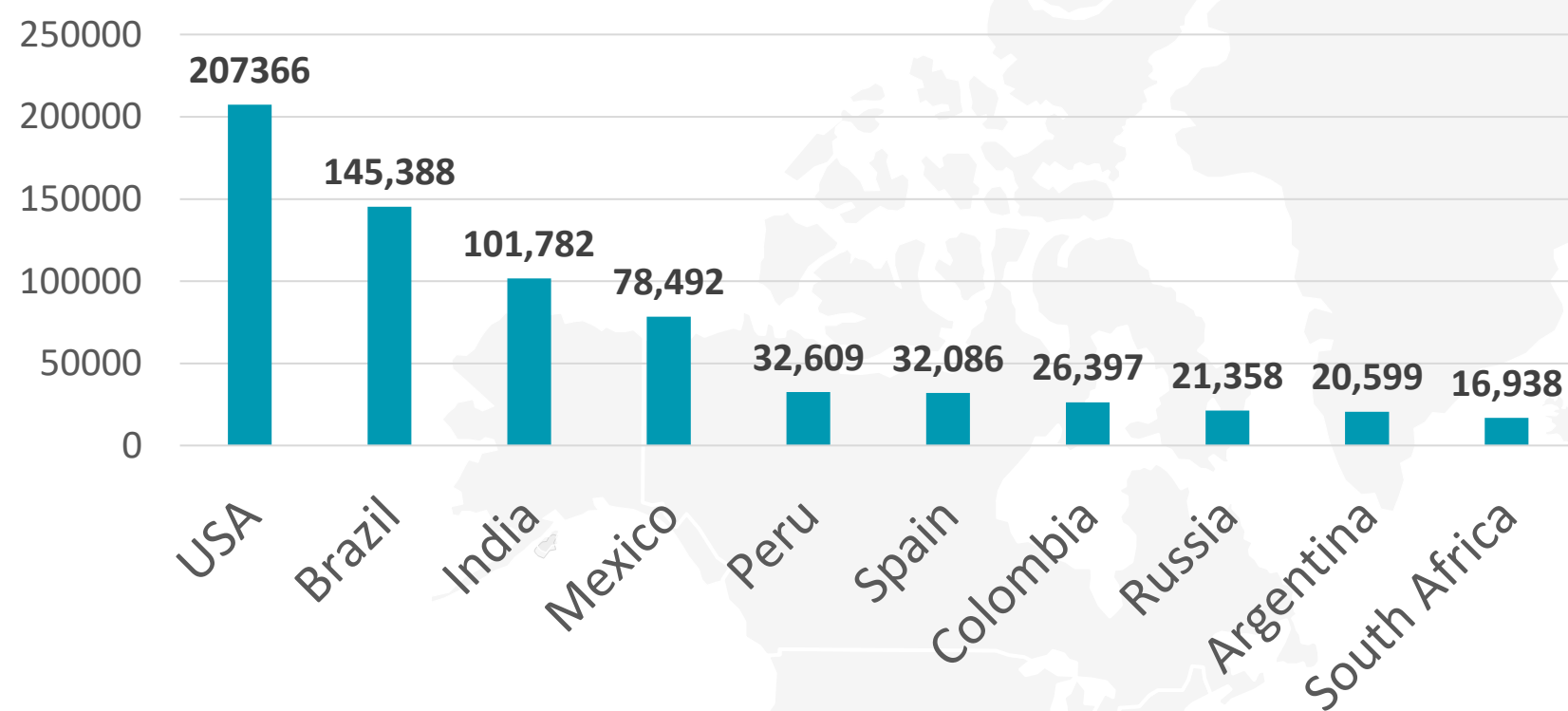
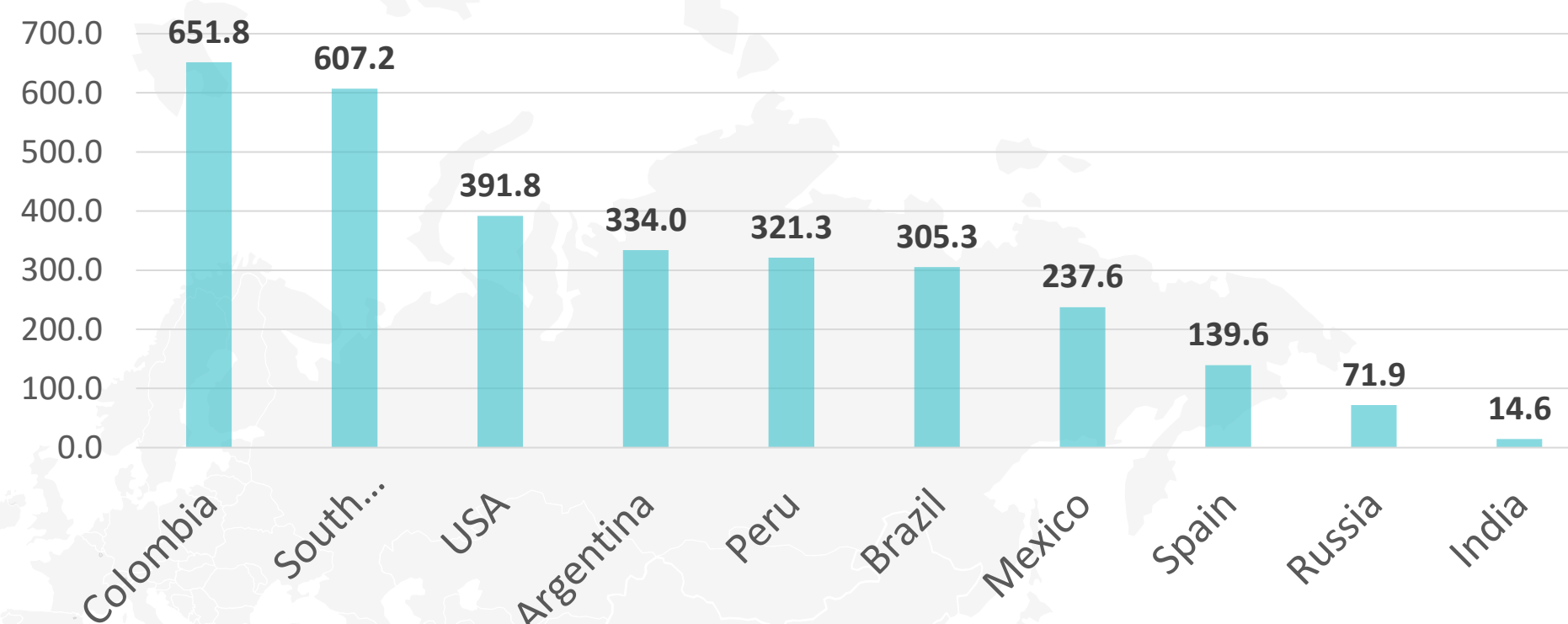


Figure 5: Top 10 Countries in the Total Number of Cases Due to COVID-19

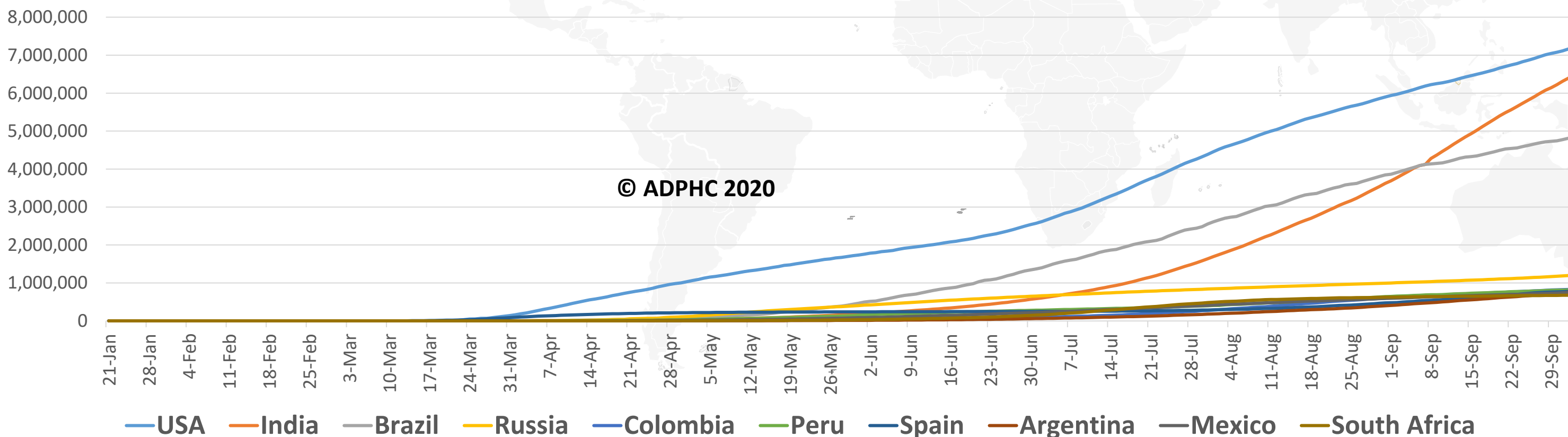
TOTAL DEATHS



DEATHS PER MILLION

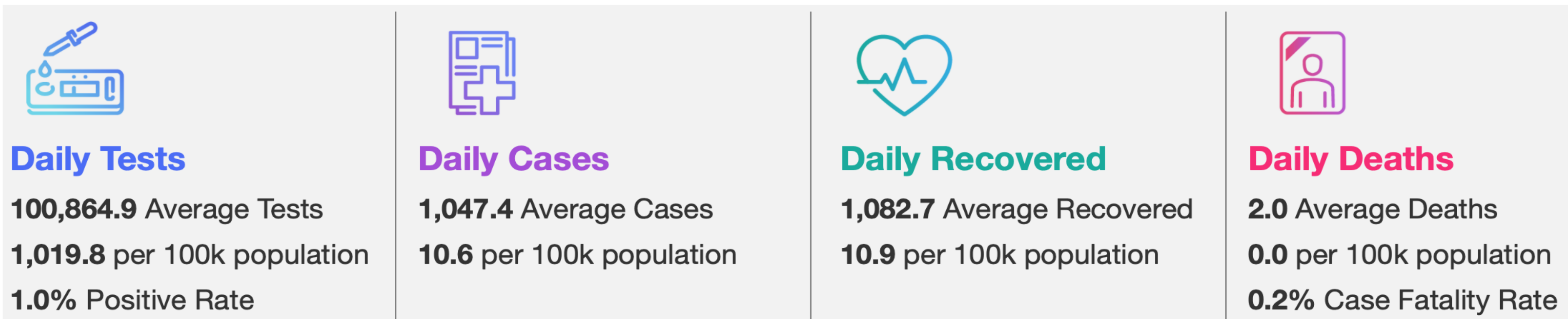


TOTAL INFECTED CASES



USA	7,256,234
India	6,549,373
Brazil	4,880,523
Russia	1,215,001
Colombia	841,531
Peru	821,564
Spain	789,932
Argentina	779,689
Mexico	753,090
South Africa	679,716

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



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

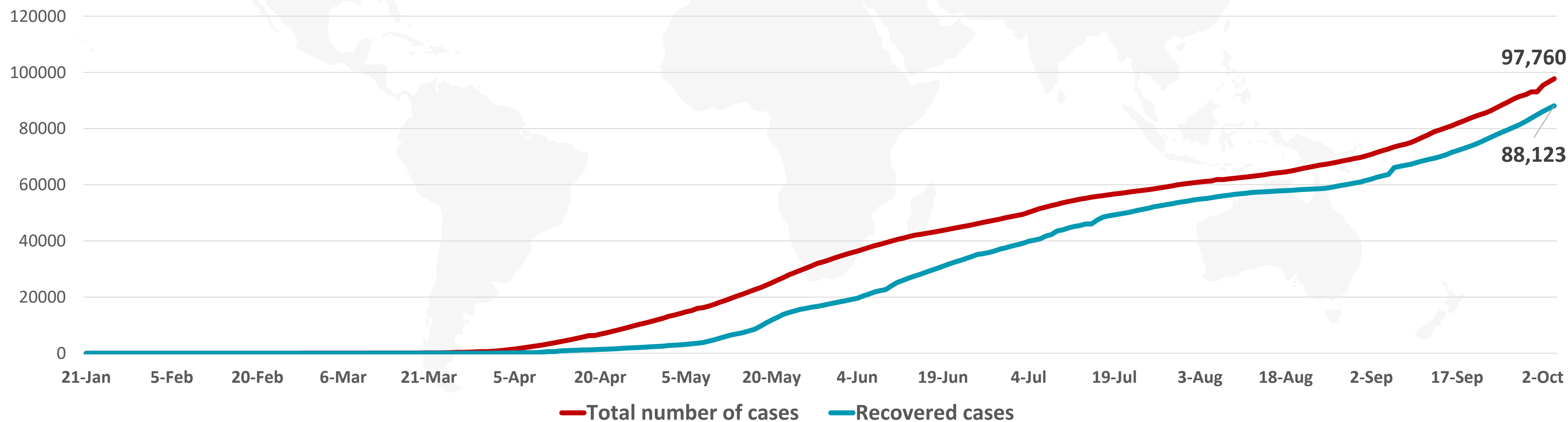


Figure 7A : Global Distribution of COVID-19 Cases

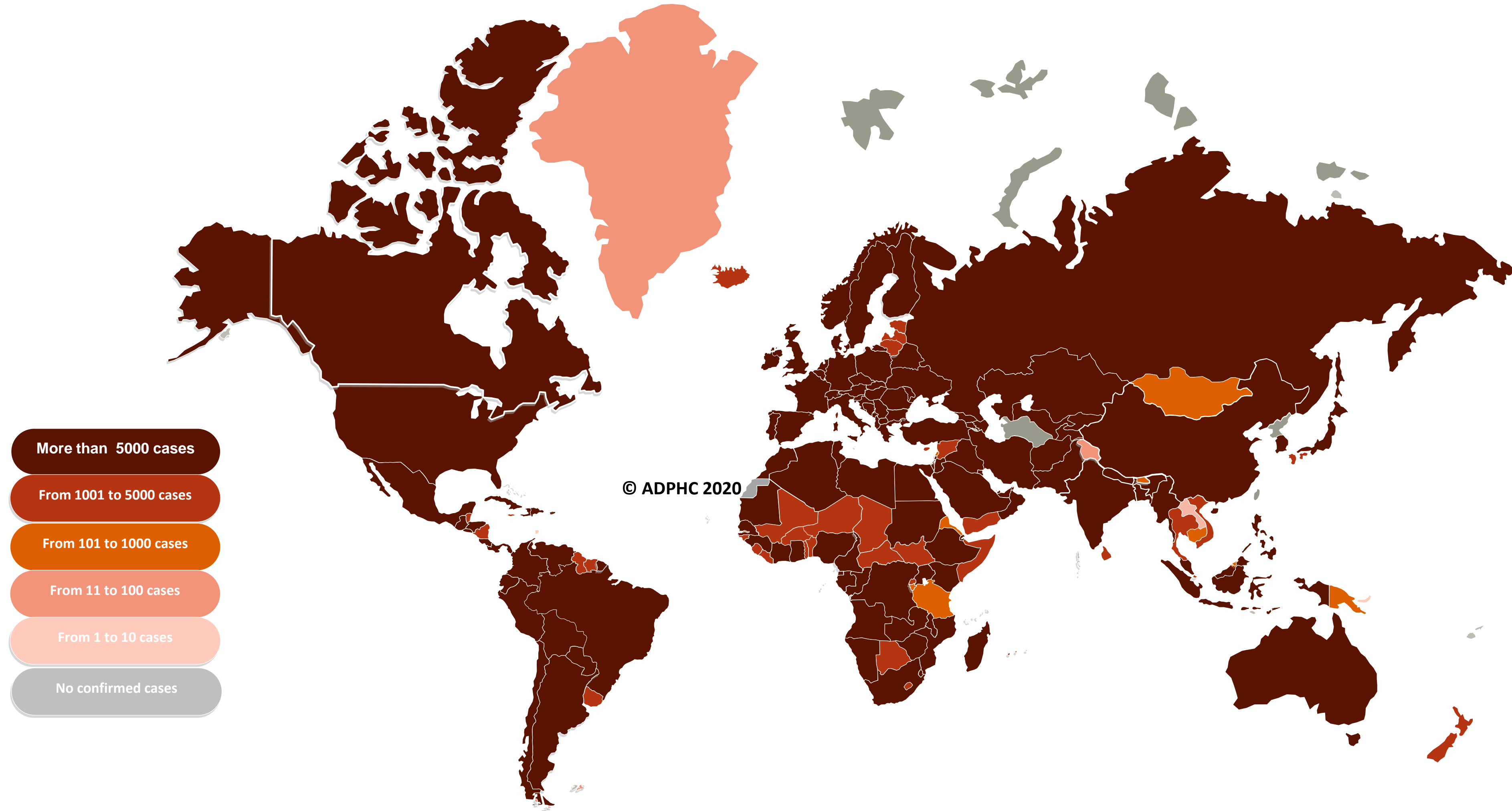
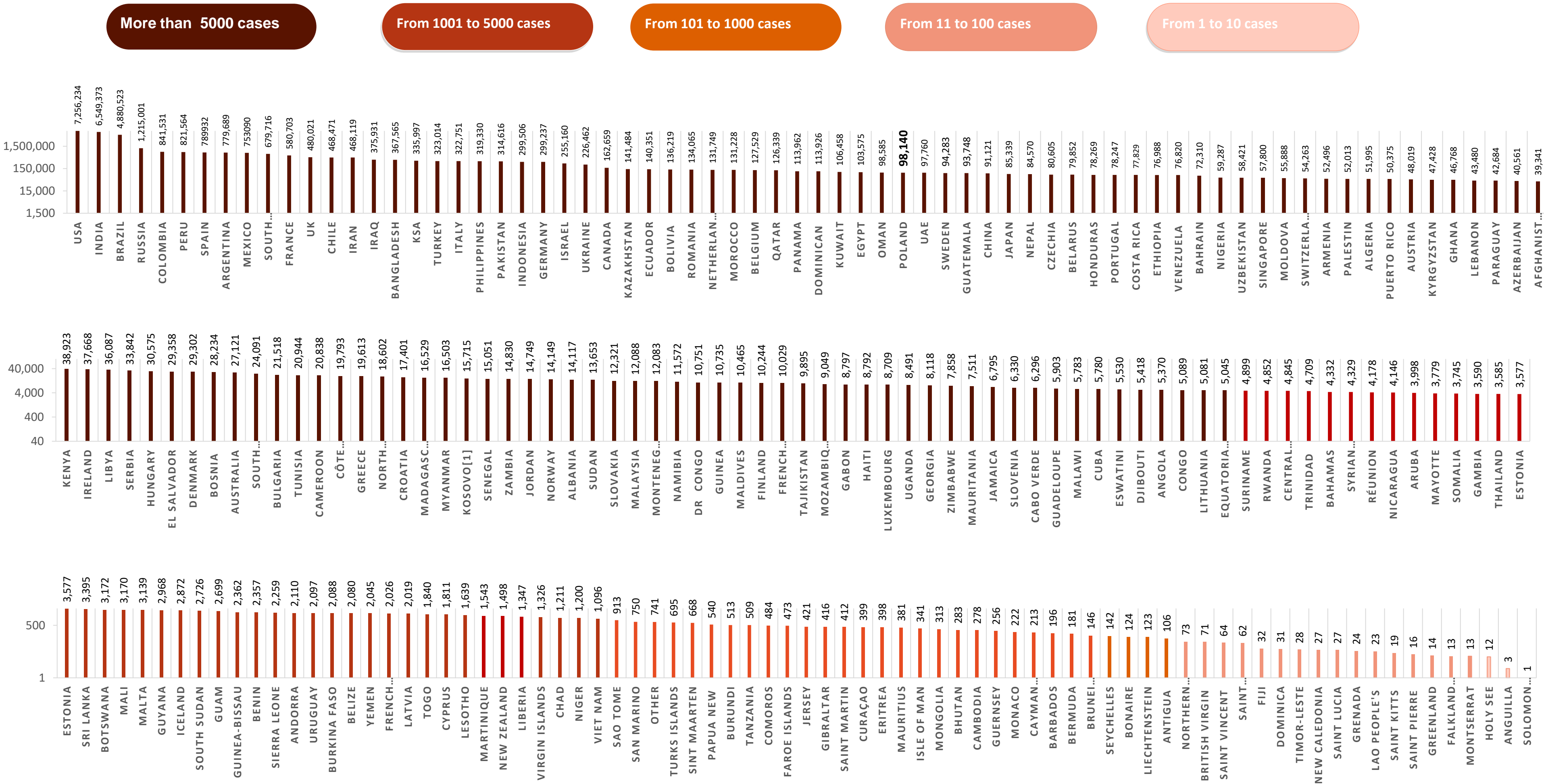


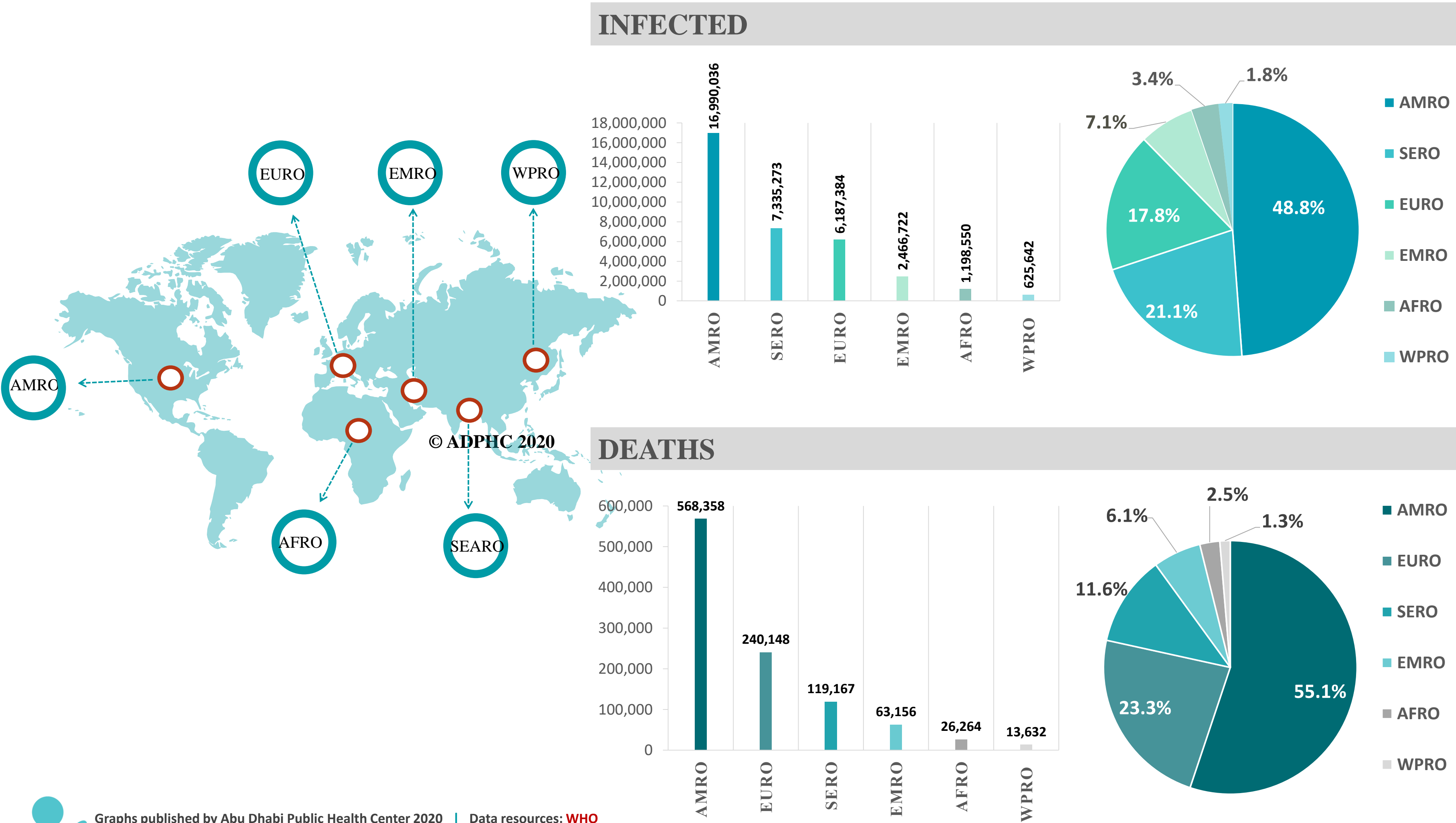
Figure 7B: Bar Chart Illustrates the Global Distribution of COVID19 Cases



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



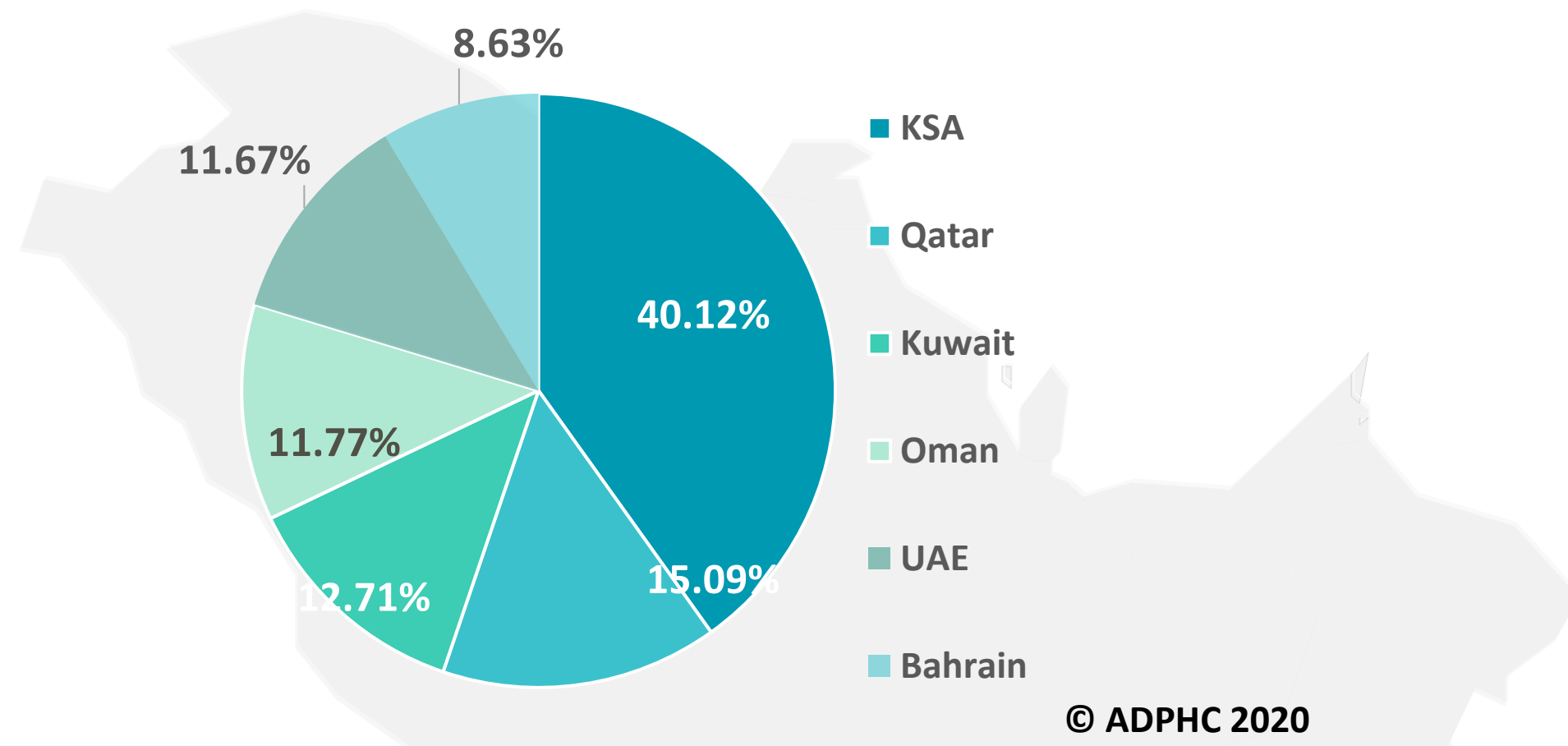
Figure 8: Global Distribution of COVID-19 Cases per Region



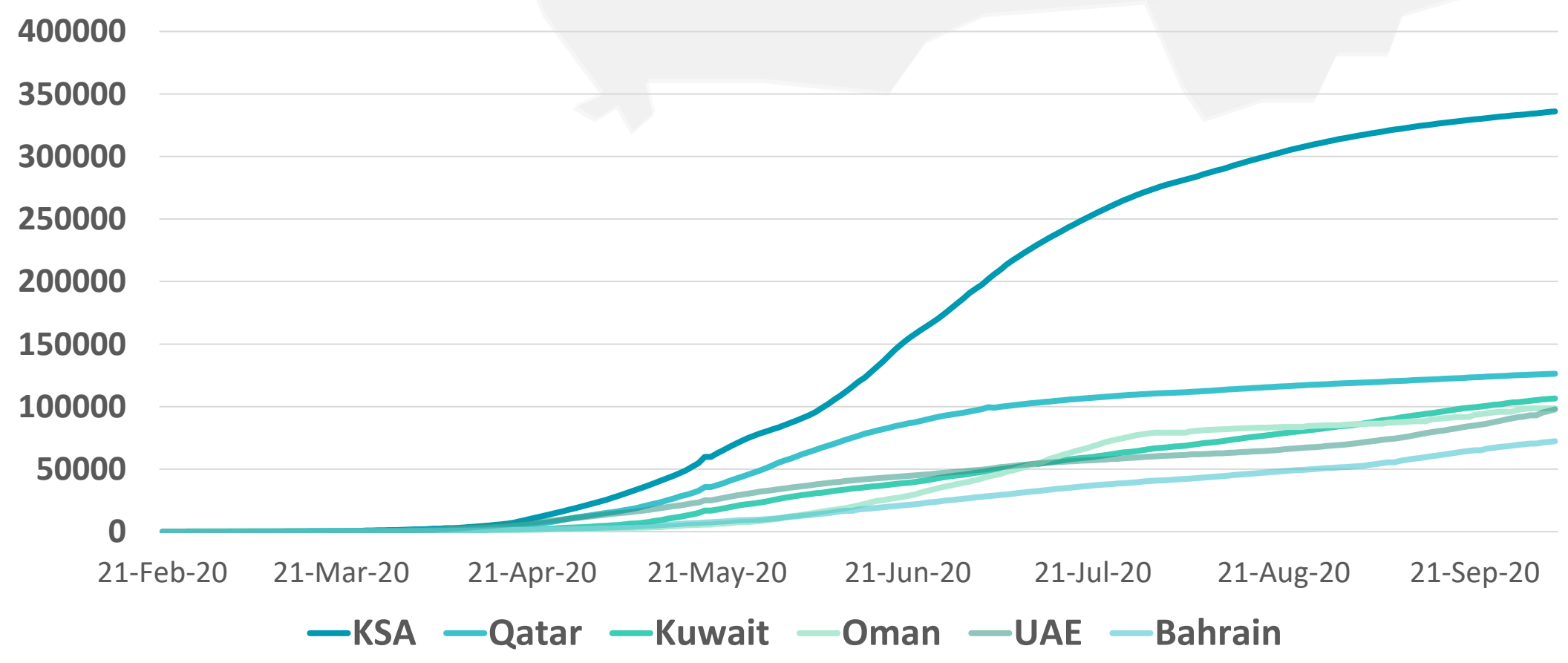
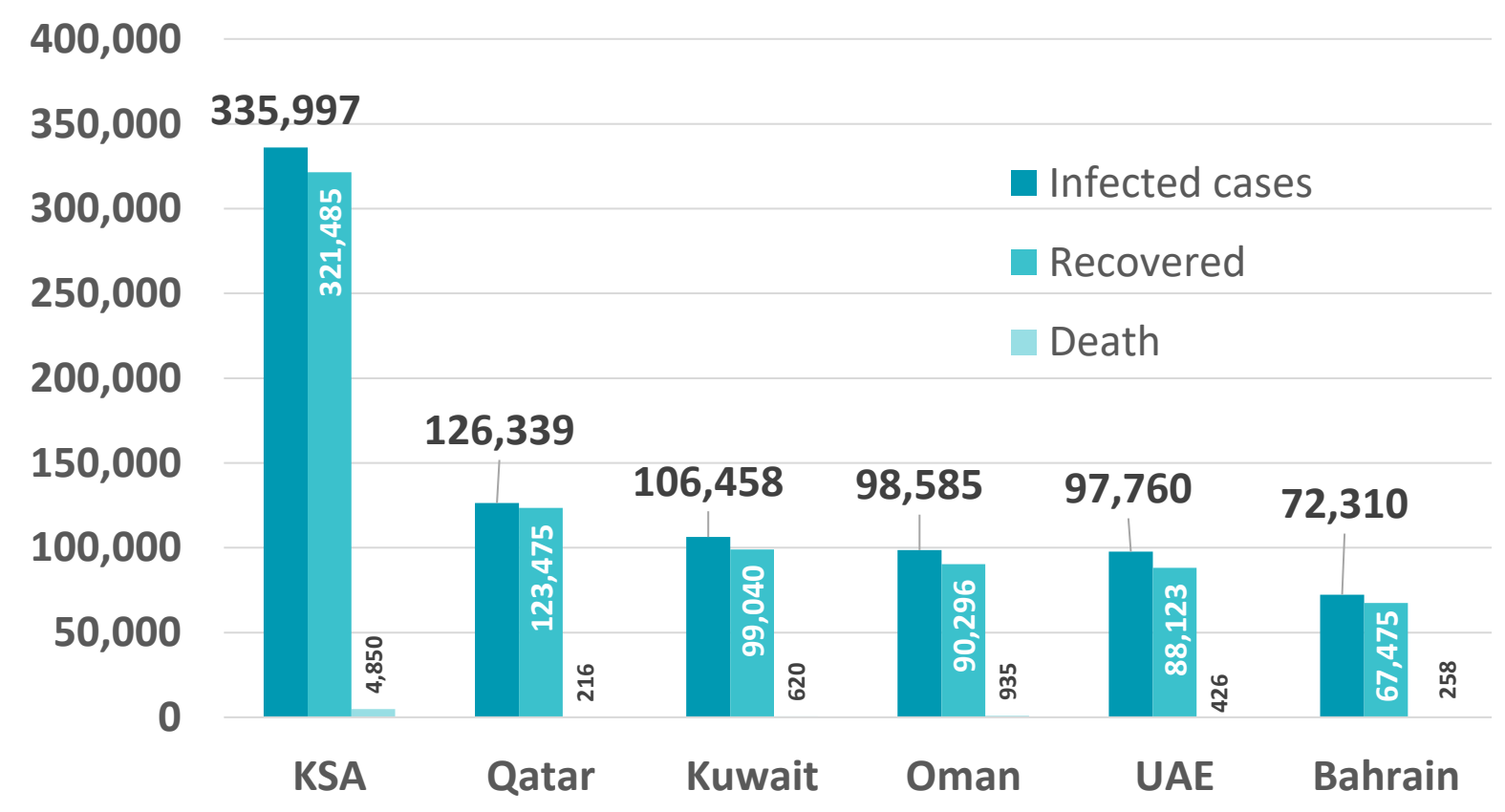
Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: [WHO](#)

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

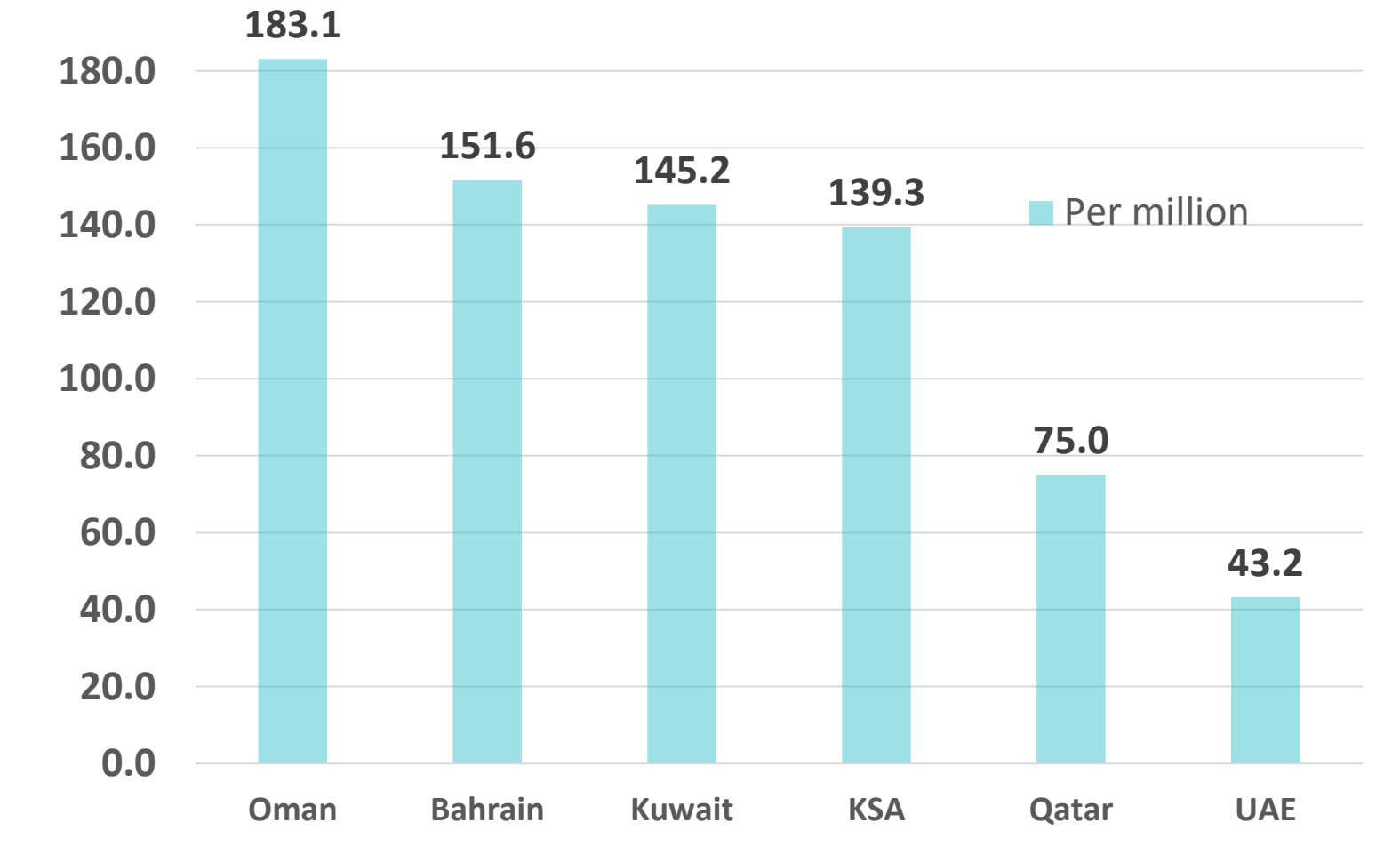
TOTAL NUMBER OF INFECTED CASES



TOTAL NUMBER OF INFECTED, RECOVERED AND DEATHS



DEATHS PER MILLION



Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: [John Hopkins](#), [WHO](#)

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

UAE



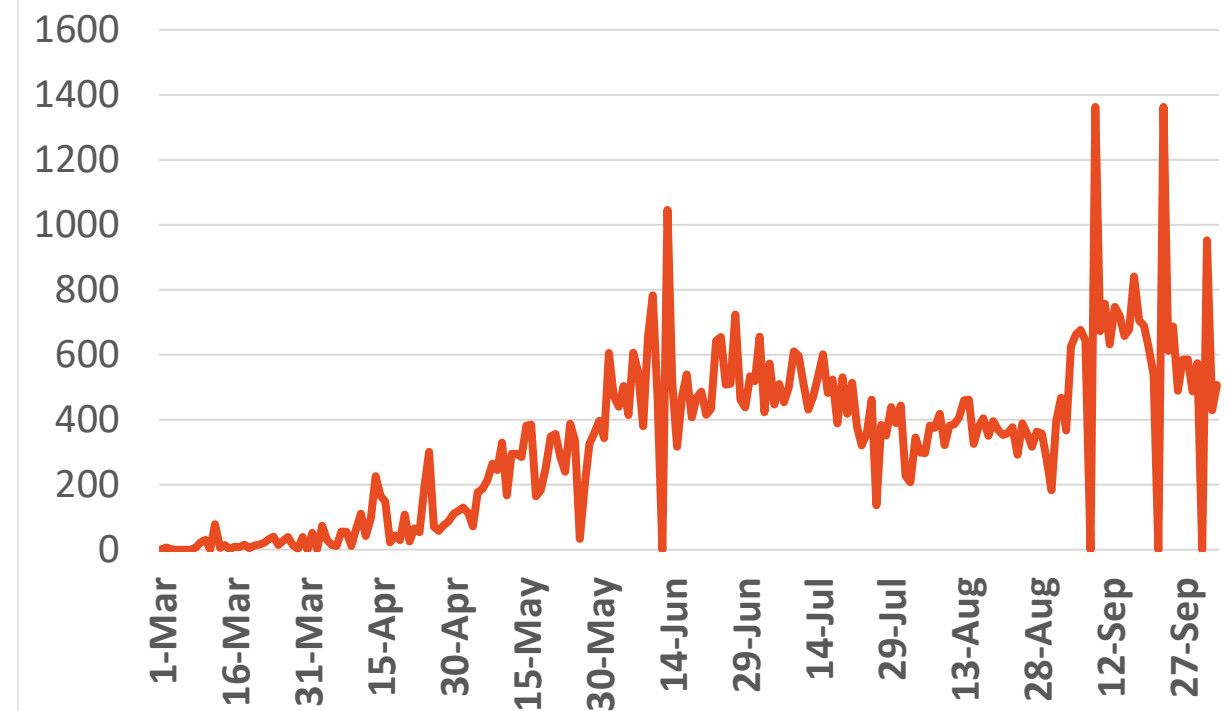
Source : National Emergency Crisis and Disaster Management Authority

KSA



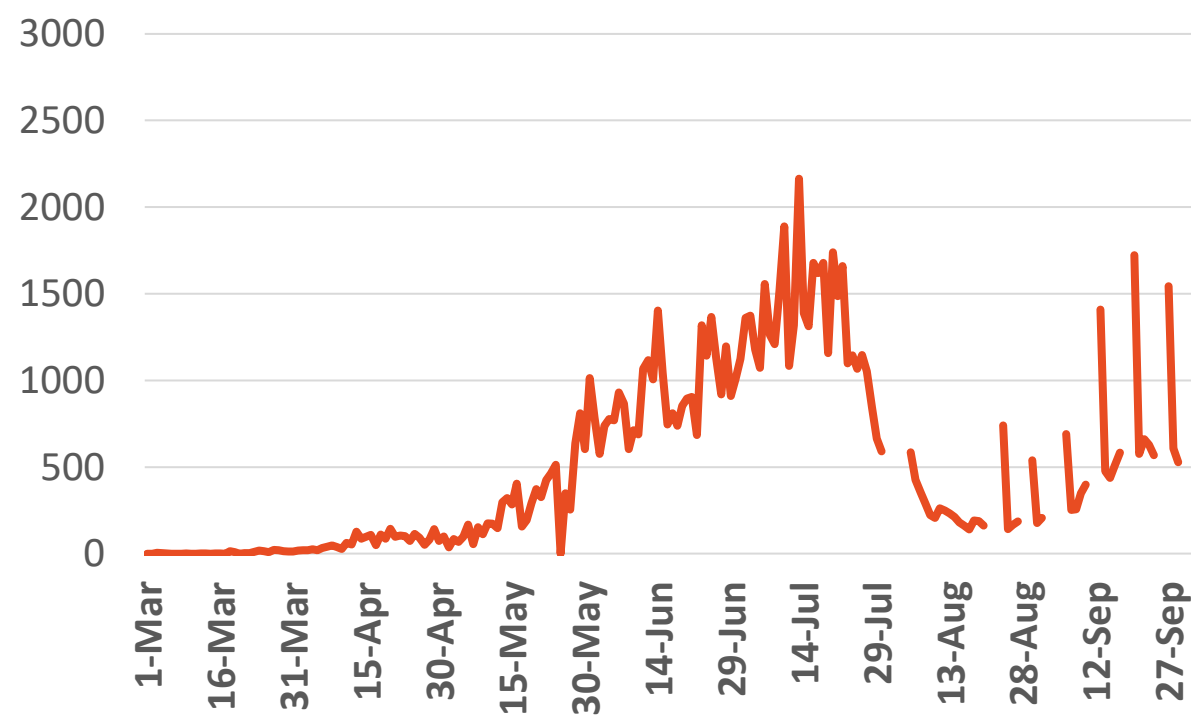
Source : KSA ministry of health

Bahrain



Source :WHO

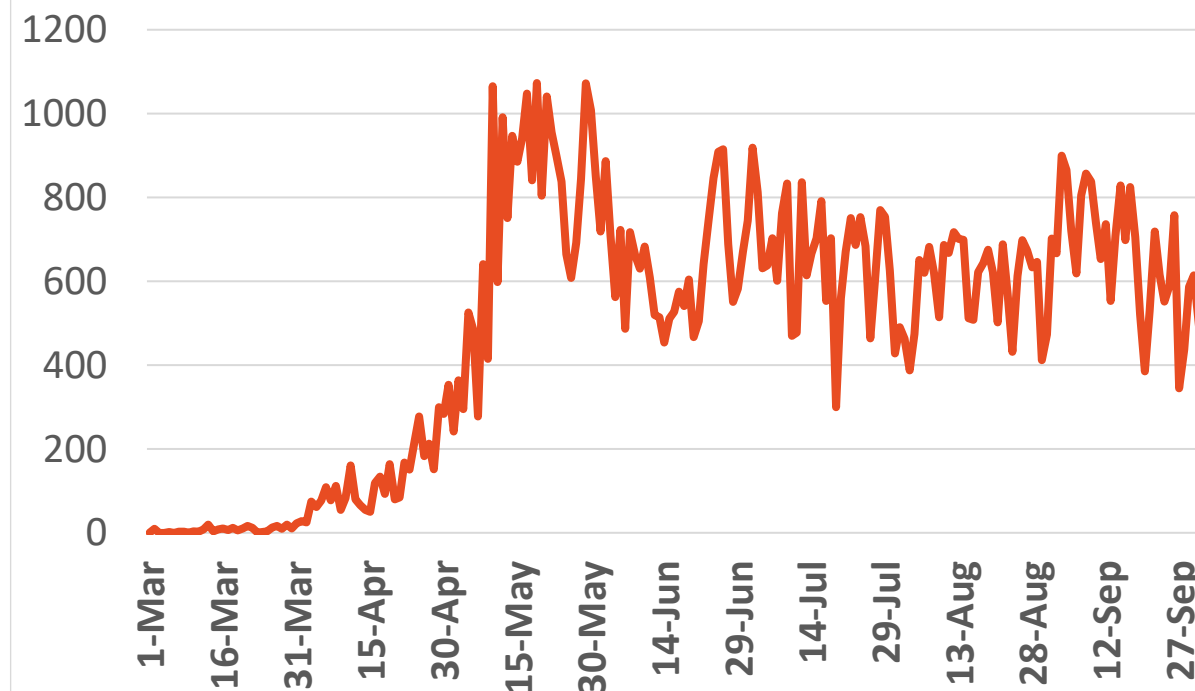
Oman



Source :Oman ministry of health

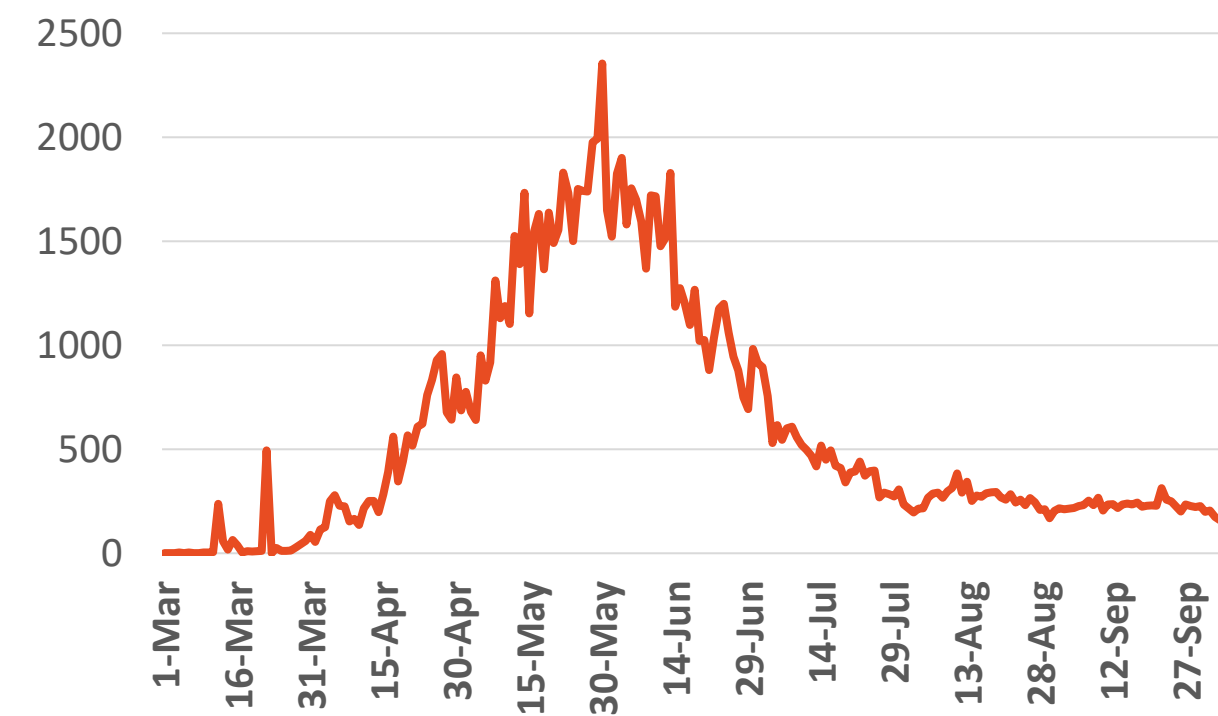
Kuwait

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Source : Kuwait ministry of health

Qatar



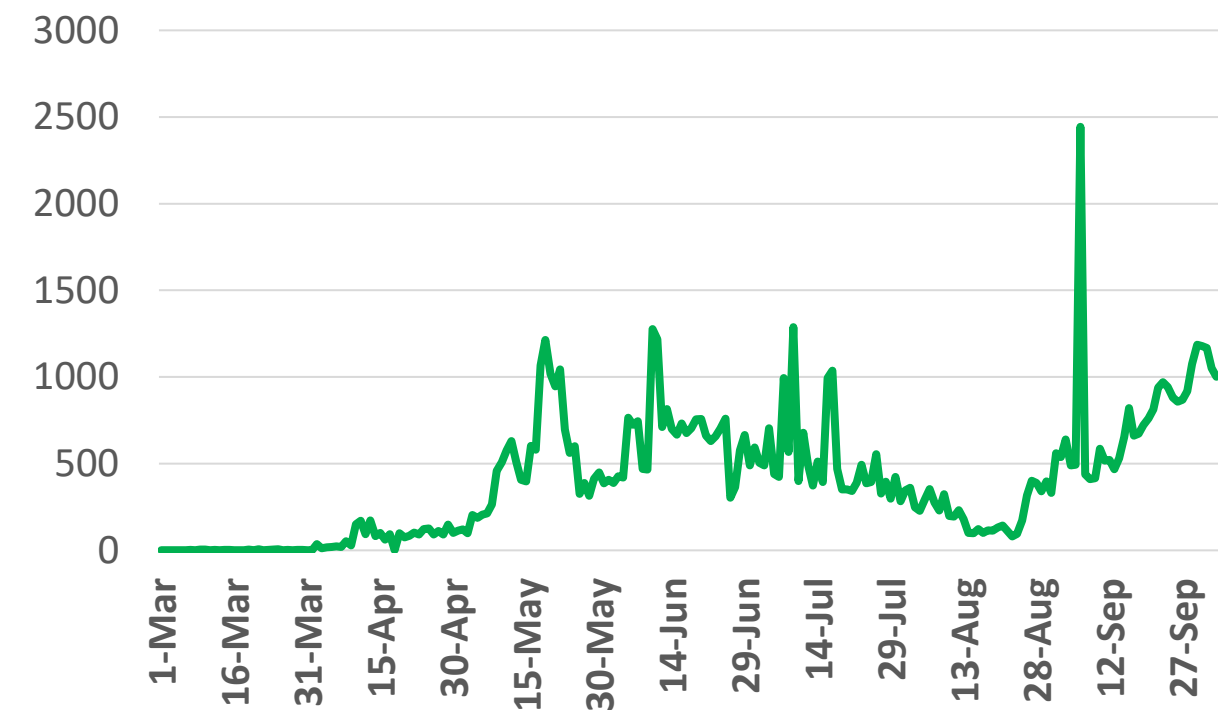
Source : Qatar ministry of health

*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 October
*No announced statistic data on weekends and official holidays.



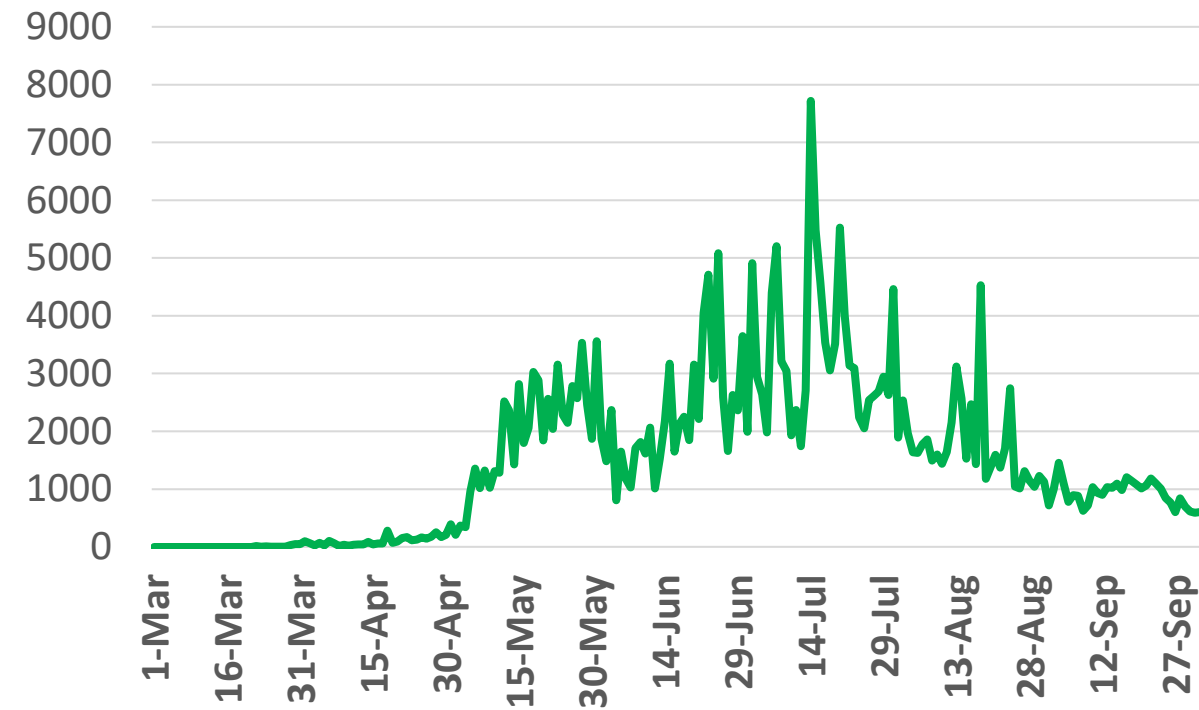
Figure 11: Comparative Analysis of the Distribution of COVID-19 Newly Recovered Cases in GCC Countries

UAE



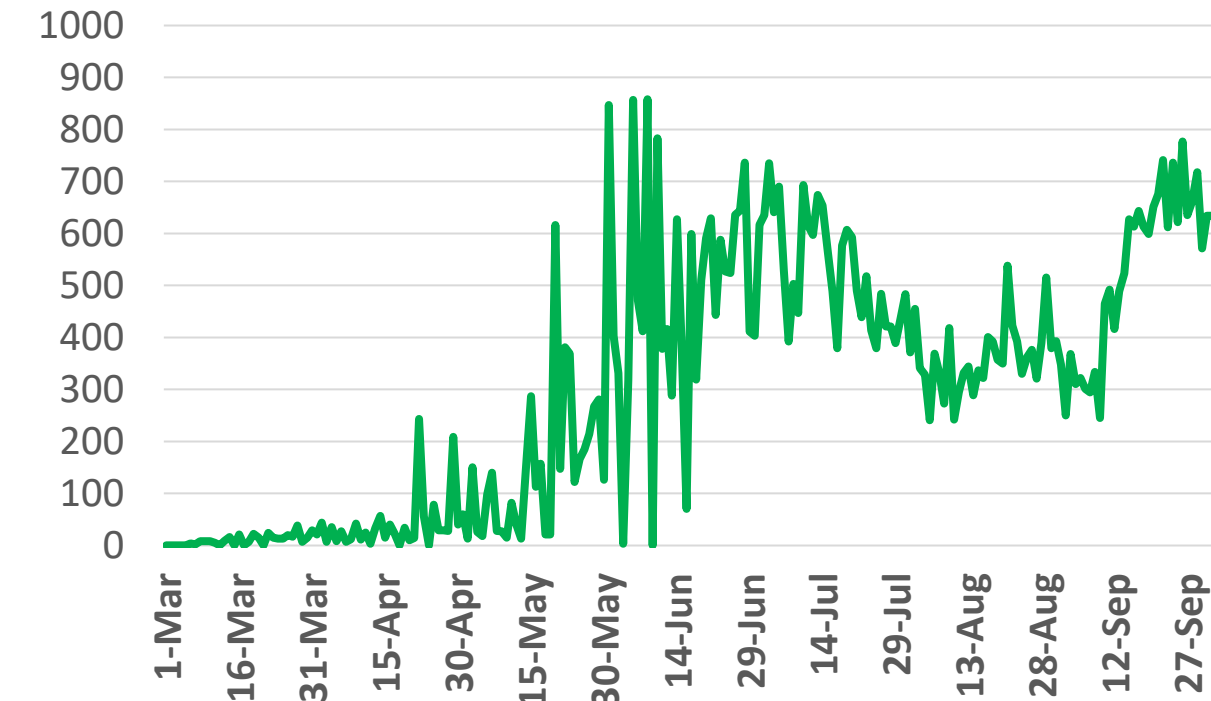
Source : National Emergency Crisis and Disaster Management Authority

KSA



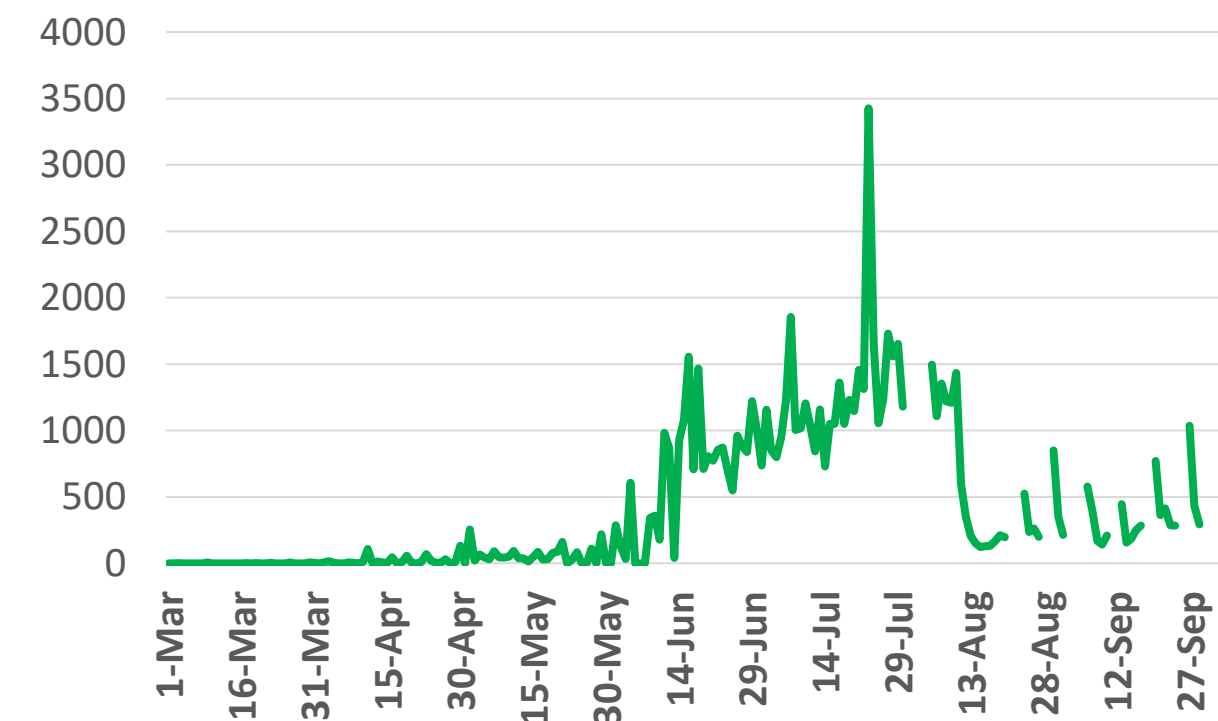
Source : KSA ministry of health

Bahrain



Source : Bahrain ministry of health

Oman



Source : Oman ministry of health

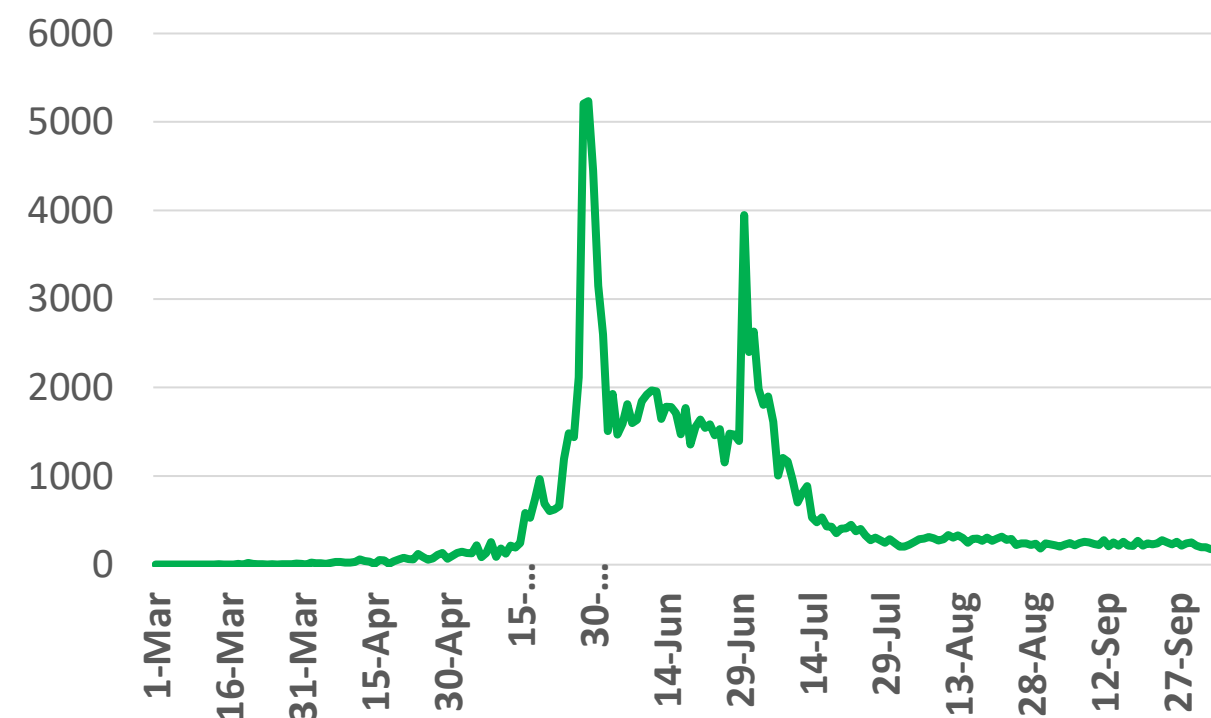
Kuwait

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Source : Kuwait ministry of health

Qatar



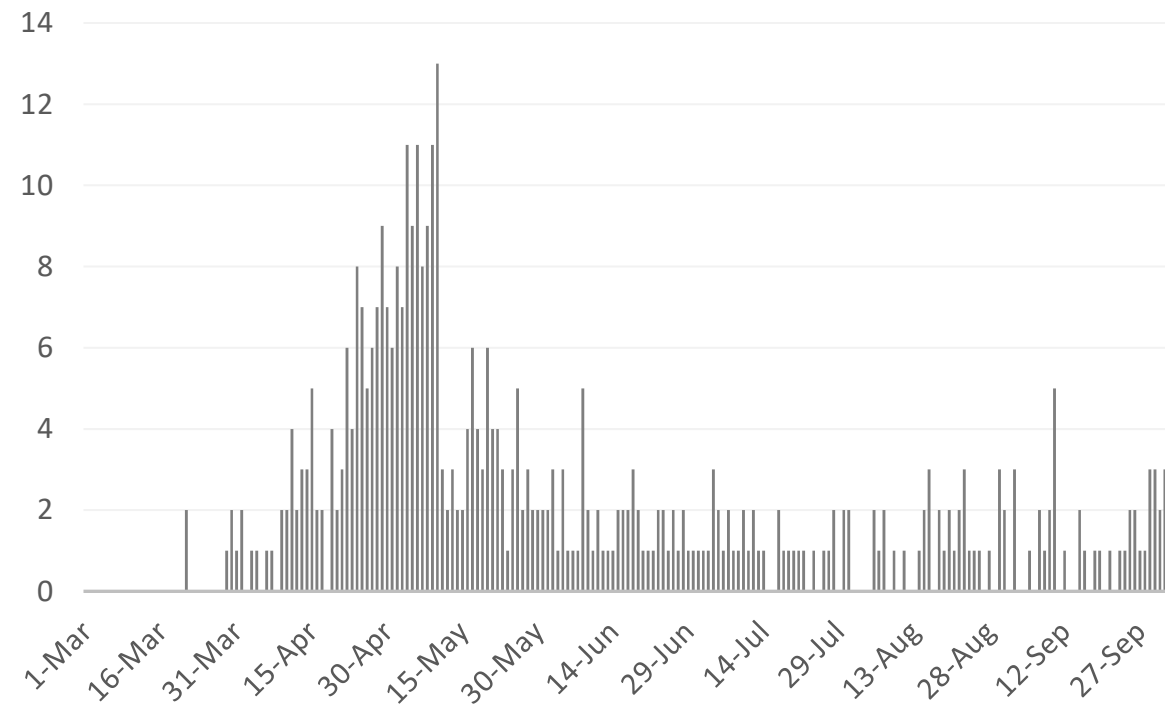
Source : Qatar ministry of health

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*No announced statistic data on weekends and official holidays.



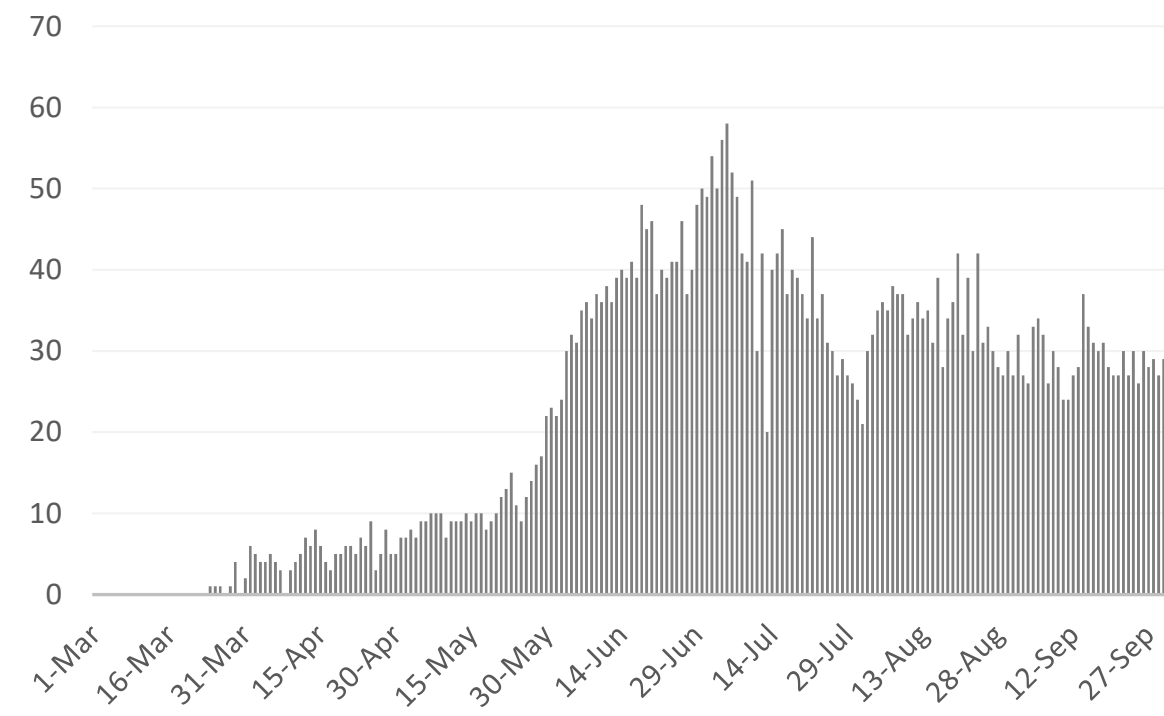
Figure 12: Comparative Analysis of the Distribution of COVID-19 New Death Cases in GCC Countries

UAE



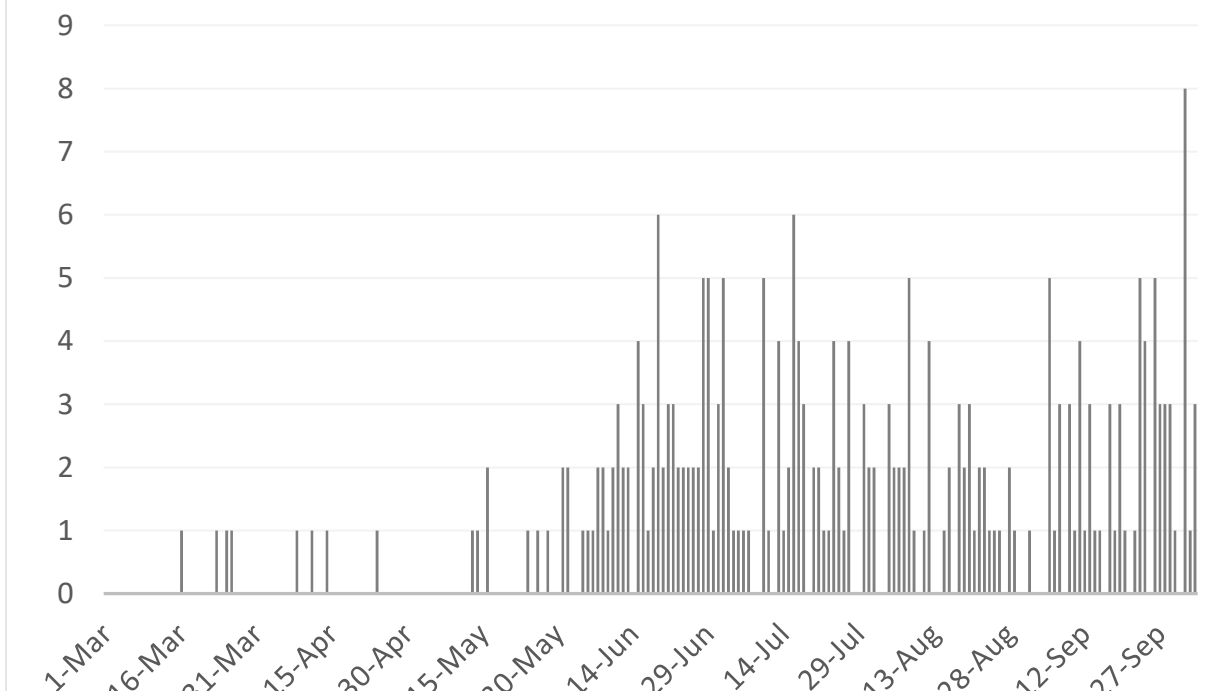
Source : National Emergency Crisis and Disaster Management Authority

KSA



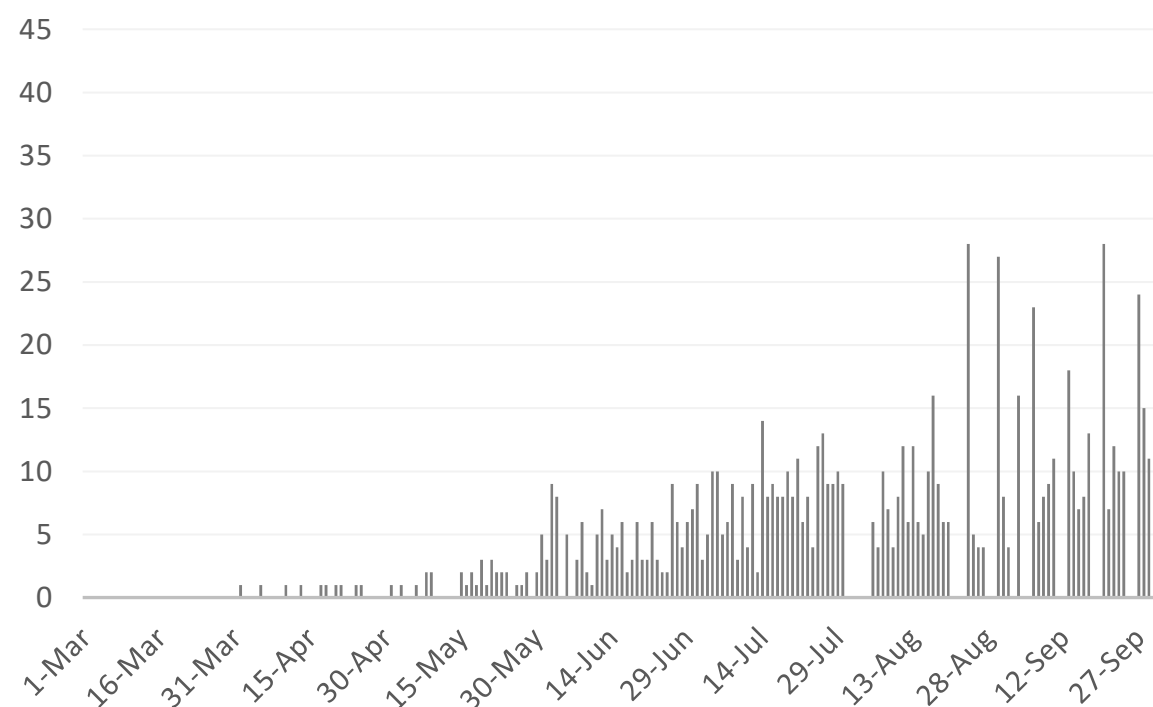
Source : KSA ministry of health

Bahrain



Source :WHO

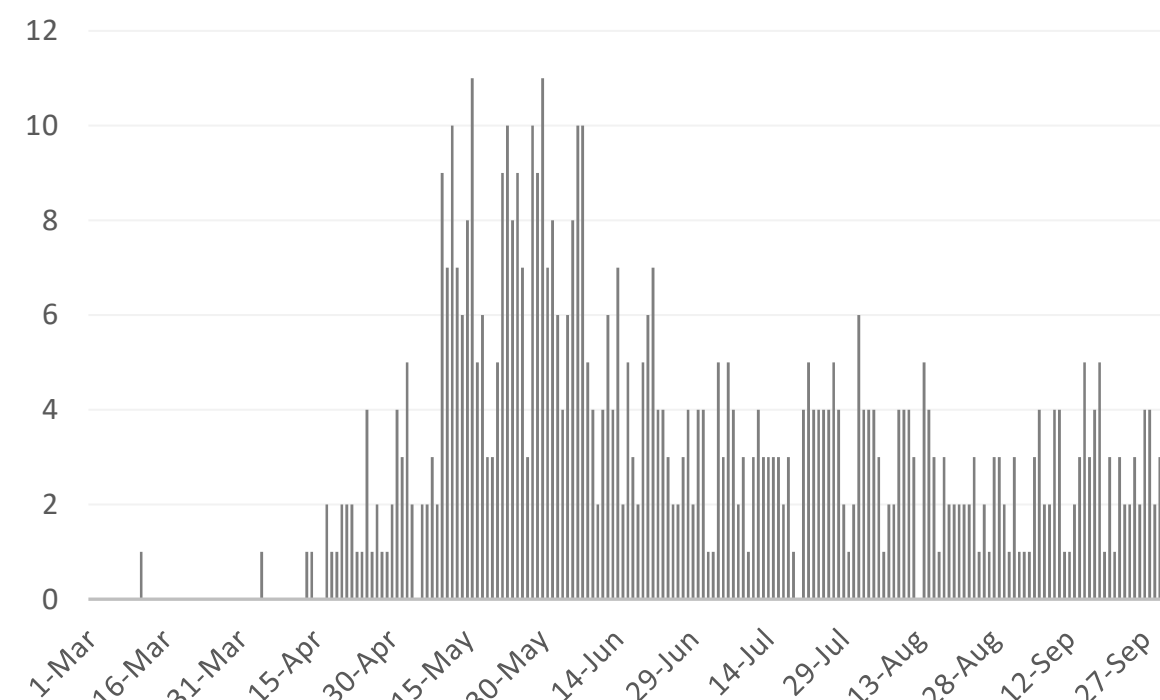
Oman



Source :Oman ministry of health

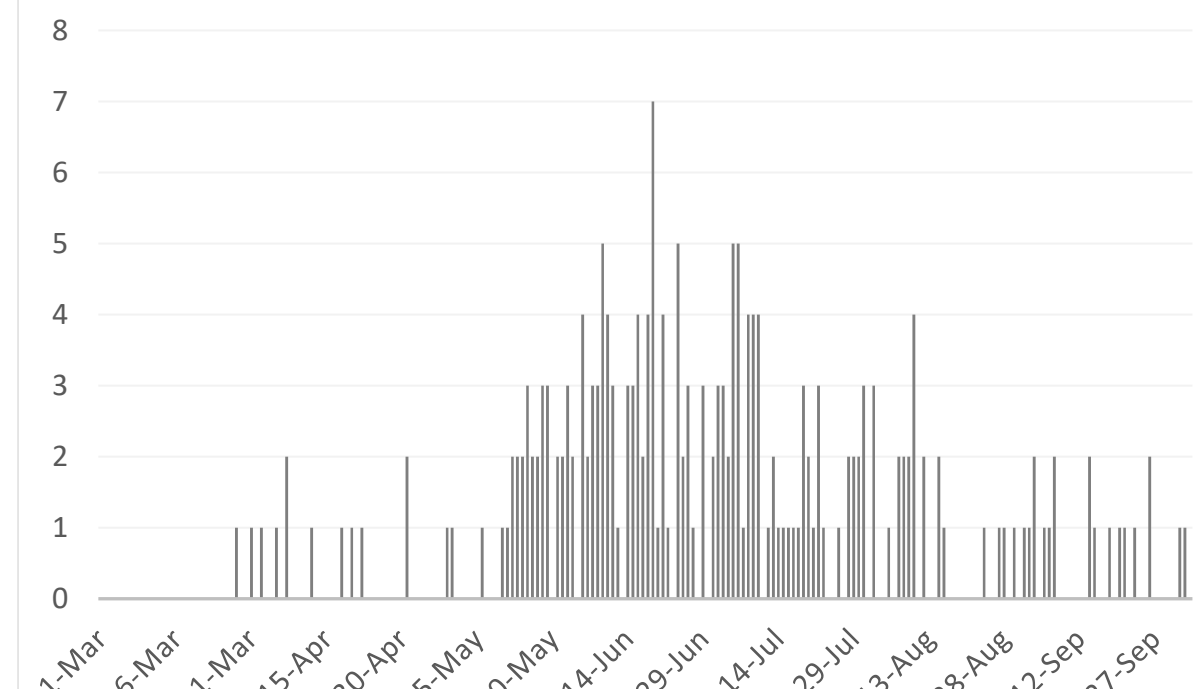
Kuwait

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Source : Kuwait ministry of health

Qatar



Source : Qatar ministry of health

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*No announced statistic data on weekends and official holidays.



Article 1

False-Positive COVID-19 Results: Hidden Problems and Costs

Published

September 29, 2020 [THE LANCET Respiratory Medicine](#)

- RT-PCR tests to detect severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) RNA are the operational gold standard for detecting COVID-19 disease in clinical practice.
- Although false-negative tests have until now had priority due to the devastating consequences of undetected cases and the propagation of the epidemic especially by asymptomatic or mildly symptomatic patients, the consequences of a false-positive result are not benign from various perspectives, in particular among health-care workers.

Potential Consequences of False-Positive COVID-19 Swab Test Results

A. Individual Perspective

- Health-related
 - Screening swab tests before elective procedures or surgeries: unnecessary treatment cancellation or postponement
 - Screening swab tests during urgent hospital admissions: potential exposure to infection following a wrong pathway in hospital settings as an in-patient
- Financial
 - Financial losses related to self-isolation, income losses, and cancelled travel, among other factors
- Psychological
 - Psychological damage due to misdiagnosis or fear of infecting others, isolation, or stigmatization





Continued

Continued: Potential Consequences of False-Positive COVID-19 Swab Test Results

B. Global Perspective

- Financial
 - Misspent funding (often originating from taxpayers) and human resources for test and trace, **unnecessary testing**, funding replacements in the workplace, various business losses
- Epidemiological and diagnostic performance
 - Overestimating COVID-19 incidence and the extent of asymptomatic infection
 - Misleading diagnostic performance, potentially leading to mistaken purchasing or investment decisions
- Societal
 - Misdirection of policies regarding lockdowns and school closures
 - Increased depression and domestic violence (e.g. due to lockdown, isolation, and loss of earnings after a positive test).
- Several **measures** might help to **minimize false-positive swab test** results and mitigate possible consequences.
 - Firstly, stricter standards should be imposed in laboratory testing.
 - Secondly, pretest probability assessments should be considered, and clear evidence-based guidelines on the interpretation of test results developed.
 - Thirdly, policies regarding the testing and prevention of virus transmission in health-care workers might need adjustments, with an immediate second test implemented for any health-care worker testing positive.
 - Finally, research is urgently required into the clinical and epidemiological significance of prolonged virus shedding and the role of people recovering from COVID-19 in disease transmission.





Article 2

Published

Deep Learning-Based Triage and Analysis of Lesion Burden for COVID-19: A Retrospective Study with External Validation

01 October, 2020 [THE LANCET Digital Health](#)

- Chest CT has been used to supplement the RT-PCR testing of patients with suspected COVID-19. In China, there has been a heavy reliance on CT imaging in hospitals and fever clinics during the COVID-19 pandemic.
- A retrospective diagnostic study was conducted in China to develop a fully automated deep learning algorithm to flag suspected COVID-19 cases and expedite chest CT-based triage in fever clinics and to analyze lesion burdens
- A large sample of chest CT scans was obtained from:
 - RT PCR-confirmed COVID-19 cases to develop the deep learning algorithm and
 - Consecutive cases were collected from regions of varying COVID-19 prevalence in China to assess the accuracy and efficiency of Artificial Intelligence triage, using radiological reports as the reference standard.

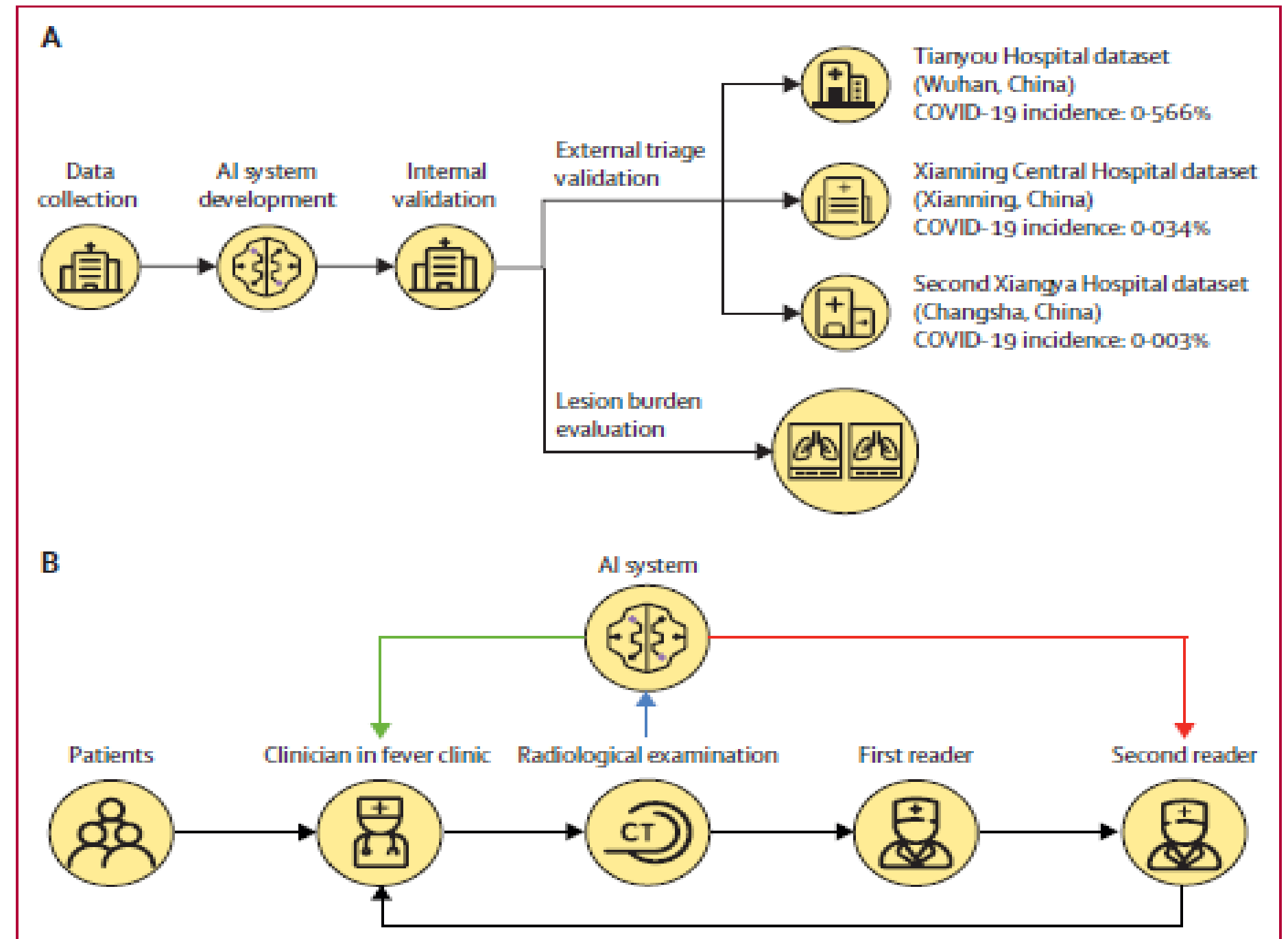


Figure 1: Development and validation of a deep learning algorithm to provide rapid triage in fever clinics and to automatically analyse lung opacities on the basis of chest CT scans
 (A) Overview of the development and validation of the algorithm. (B) Evaluation of triage efficiency; black lines show the standard workflow in Chinese fever clinics; after a patient's CT examination is completed, a first reader drafts a radiology report in a first-in-first-out order and then a second radiologist revises and approves the first reader's report before sending it to a fever clinician; after receiving the radiological report the fever clinician decides whether the patient qualifies as a suspected case and should receive RT-PCR testing; we proposed that through directly notifying either the second radiologist (ie, scan-to-second-reader triage; red line) or the fever clinician (scan-to-fever-clinician triage; green line) of suspected cases triaged by AI, the workflow in fever clinics could be expedited. AI=artificial intelligence.



Continued

- In the external validation set, using radiological reports as the reference standard, AI-aided triage achieved an area under the curve of 0.953 (95% CI 0.949–0.959), with a sensitivity of 0.923 (95% CI 0.914–0.932), specificity of 0.851 (0.842–0.860), a positive predictive value of 0.790 (0.777–0.803), and a negative predictive value of 0.948 (0.941–0.954).
- AI took a median of 0.55 min (IQR: 0.43–0.63) to flag a positive case, whereas radiologists took a median of 16.21 min (11.67–25.71) to draft a report and 23.06 min (15.67–39.20) to release a report.
- With regard to the identification of increases in lesion burden, AI achieved a sensitivity of 0.962 (95% CI 0.947–1.000) and a specificity of 0.875 (95 %CI 0.833–0.923).
- The agreement between AI and the radiologist panel was high (Cohen’s kappa coefficient 0.839, 95% CI 0.718–0.940).
- The robust and satisfactory performance of this deep learning algorithm indicates its potential clinical use for screening patients with suspected COVID-19 in fever clinics and monitoring disease progression among patients with confirmed COVID-19. Shortening the time to diagnosis would enable earlier isolation and treatment of affected patients, which is crucial to curb the pandemic.



THANK YOU

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