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للصحة العامة
ABU DHABI PUBLIC
HEALTH CENTRE

SCIENTIFIC RESEARCH MONITORING ON COVID-19

24 AUGUST 2020

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SCIENTIFIC RESEARCH MONITORING ON COVID-19 (ISSUE 204)

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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
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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Treatment

Effect of Remdesivir vs Standard Care on Clinical Status at 11Days in Patients With Moderate COVID-19

Public Health Response

Precision Public Health as a Key Tool in the COVID-19 Response

Clinical Features

COVID-19 and Multisystem Inflammatory Syndrome in Children and Adolescents

Vaccine

A SARS-CoV-2 mRNA Vaccine - Preliminary Report

EPIDEMIOLOGY

FROM 21 JAN TO 23 AUG 2020

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

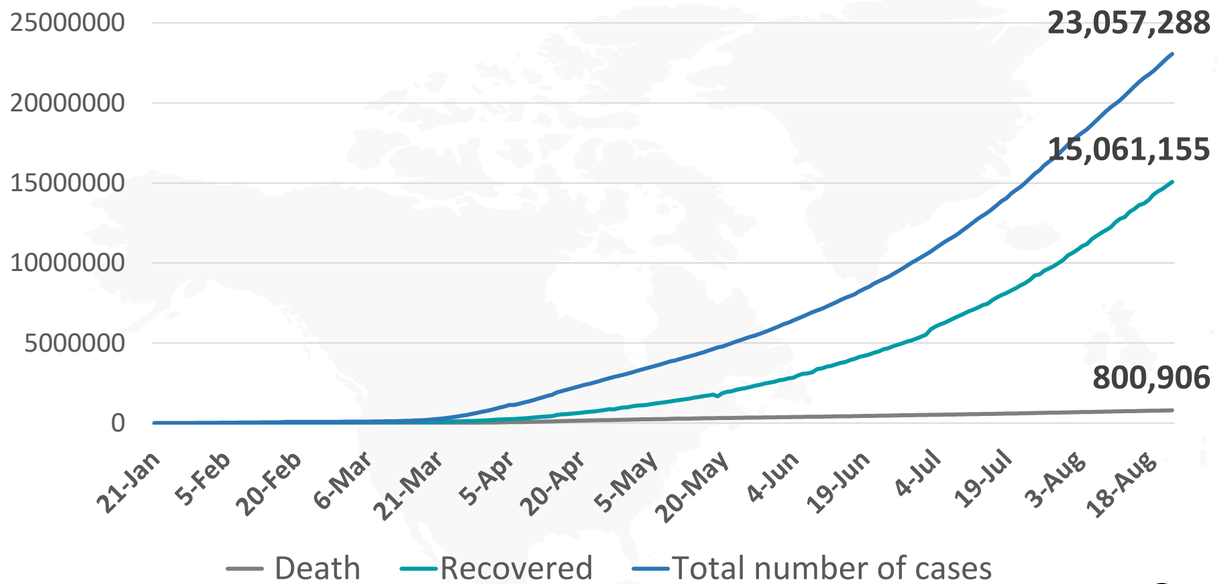


Figure 3: Total Number of Death Due to COVID-19 (china and result of the world)

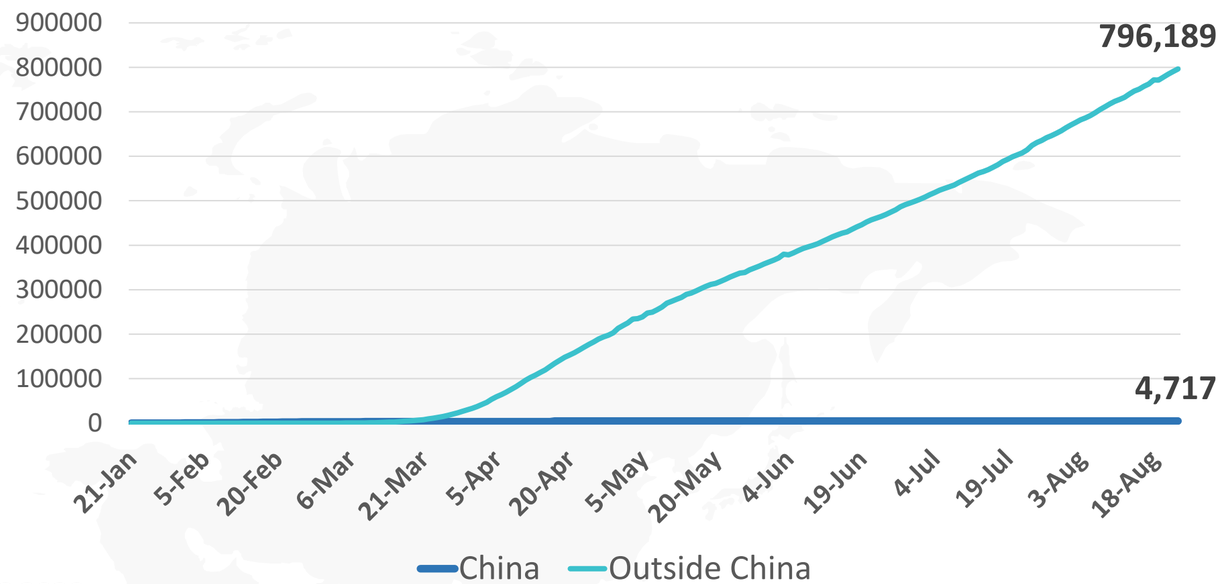


Figure 2: Daily New Infected COVID-19 Cases (China and rest of the world)

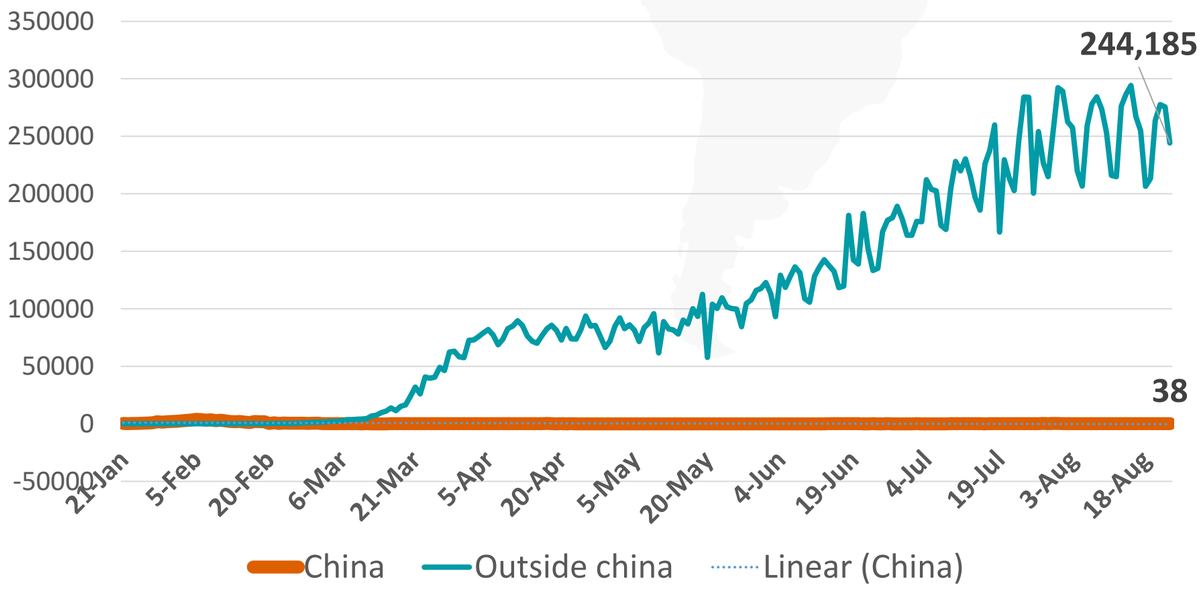
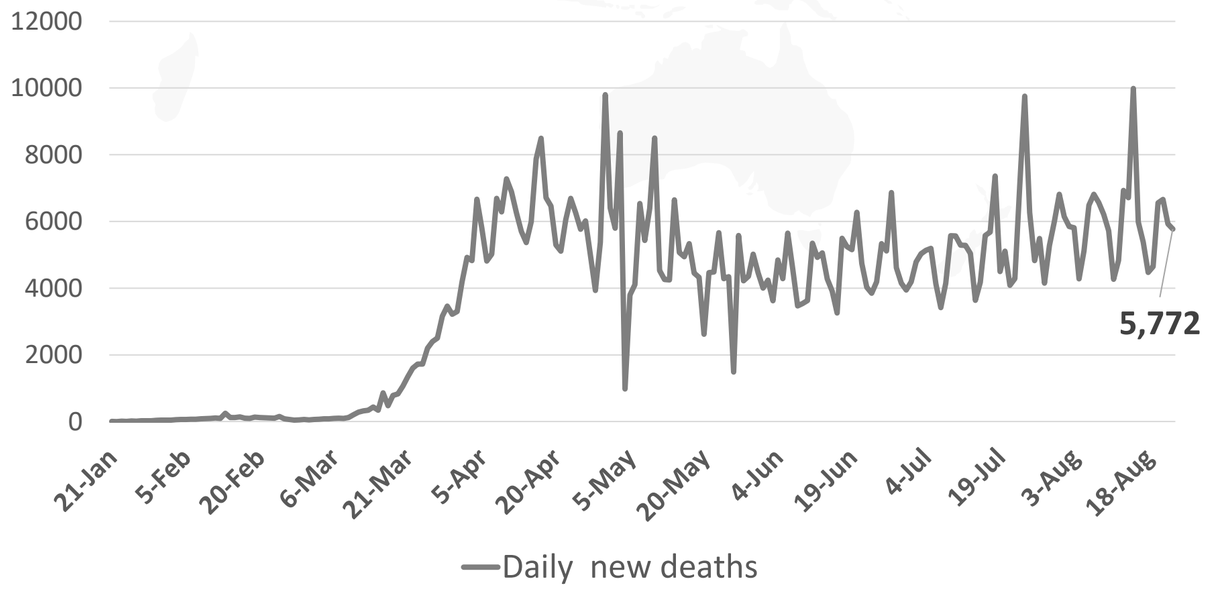


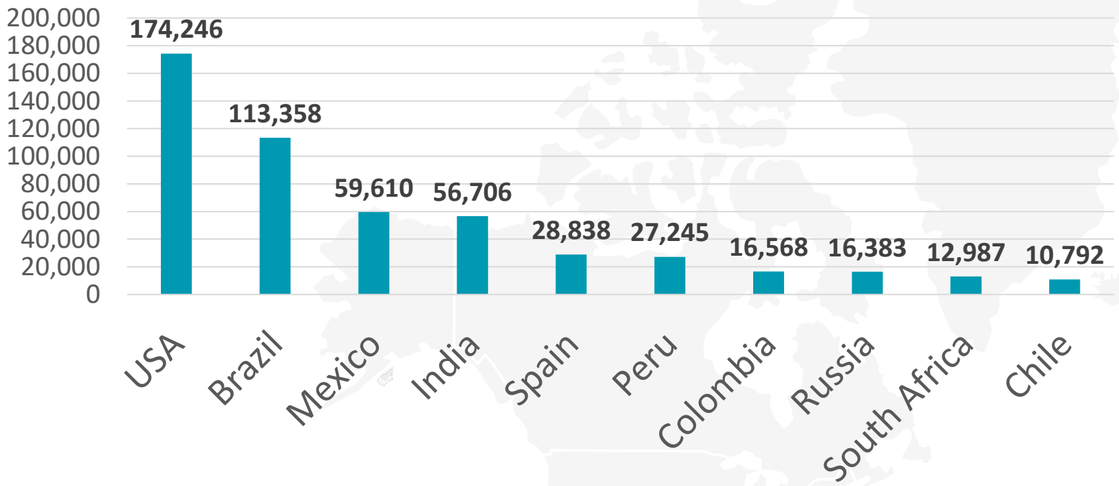
Figure 4: Global Daily New Deaths Due to COVID-19 (china and rest of the world)



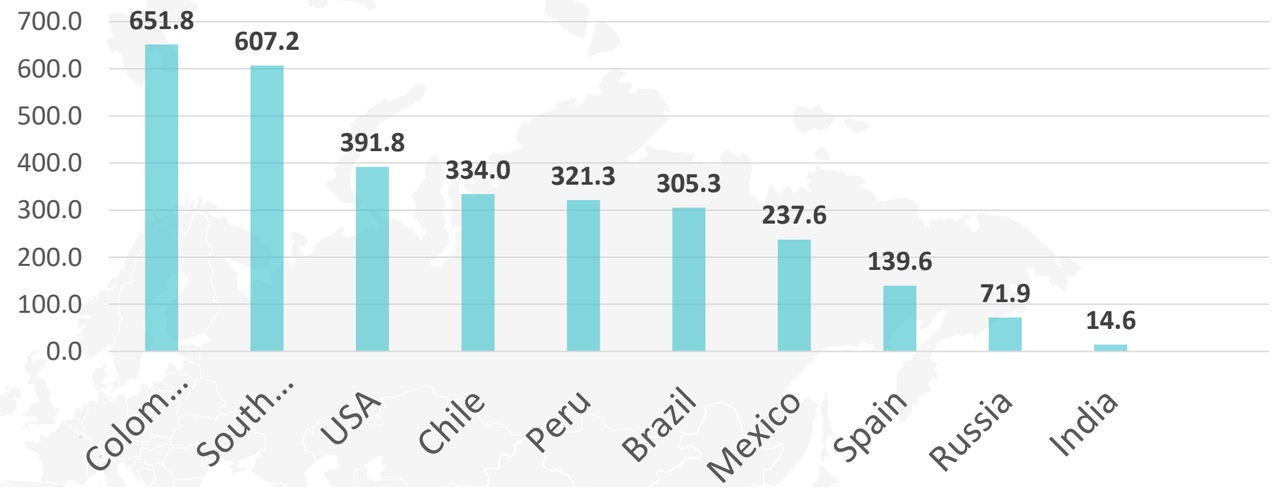
Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: WHO

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

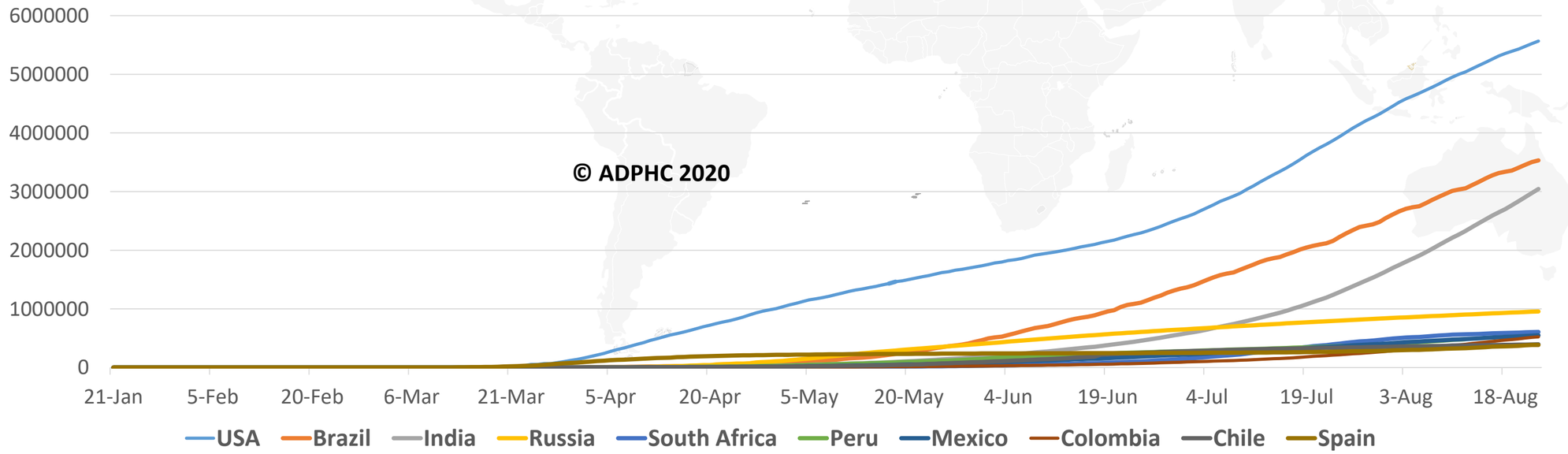
TOTAL DEATHS



DEATHS PER MILLION



TOTAL INFECTED CASES



USA	5,567,217
Brazil	3,532,330
India	3,044,940
Russia	956,749
South Africa	607,045
Peru	576,067
Mexico	549,734
Colombia	522,138
Chile	395,708
Spain	386,054

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

EPIDEMIOLOGY

FROM 21 JAN TO 23 AUG 2020

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

Daily Tests

71,268.0 Average Tests

720.6 per 100k population

0.5% Positive Rate

Daily Cases

385.0 Average Cases

3.9 per 100k population

Daily Recovered

113.4 Average Recovered

1.1 per 100k population

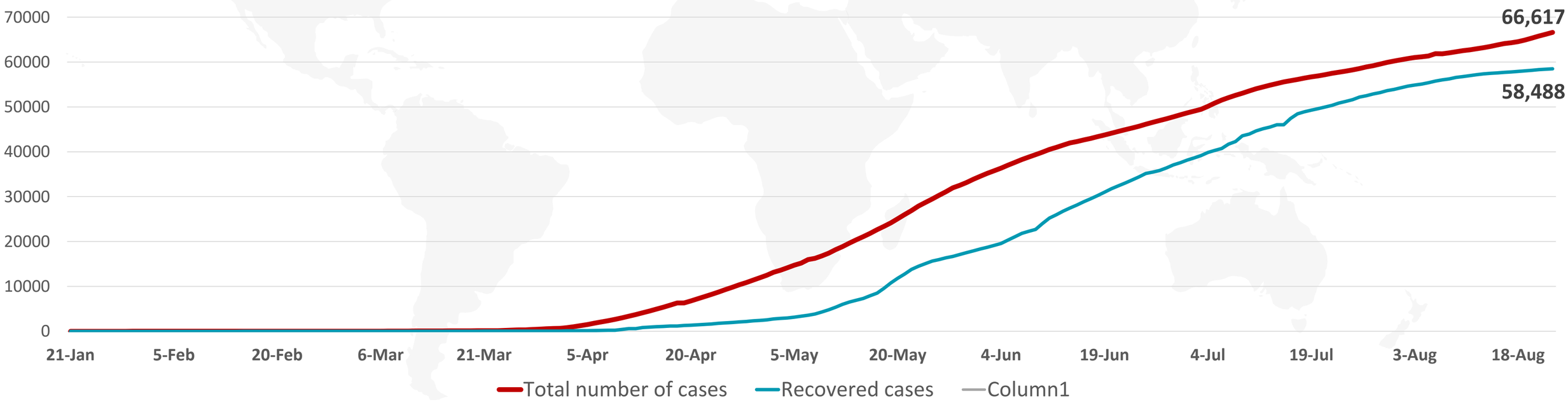
Daily Deaths

1.6 Average Deaths

0.0 per 100k population

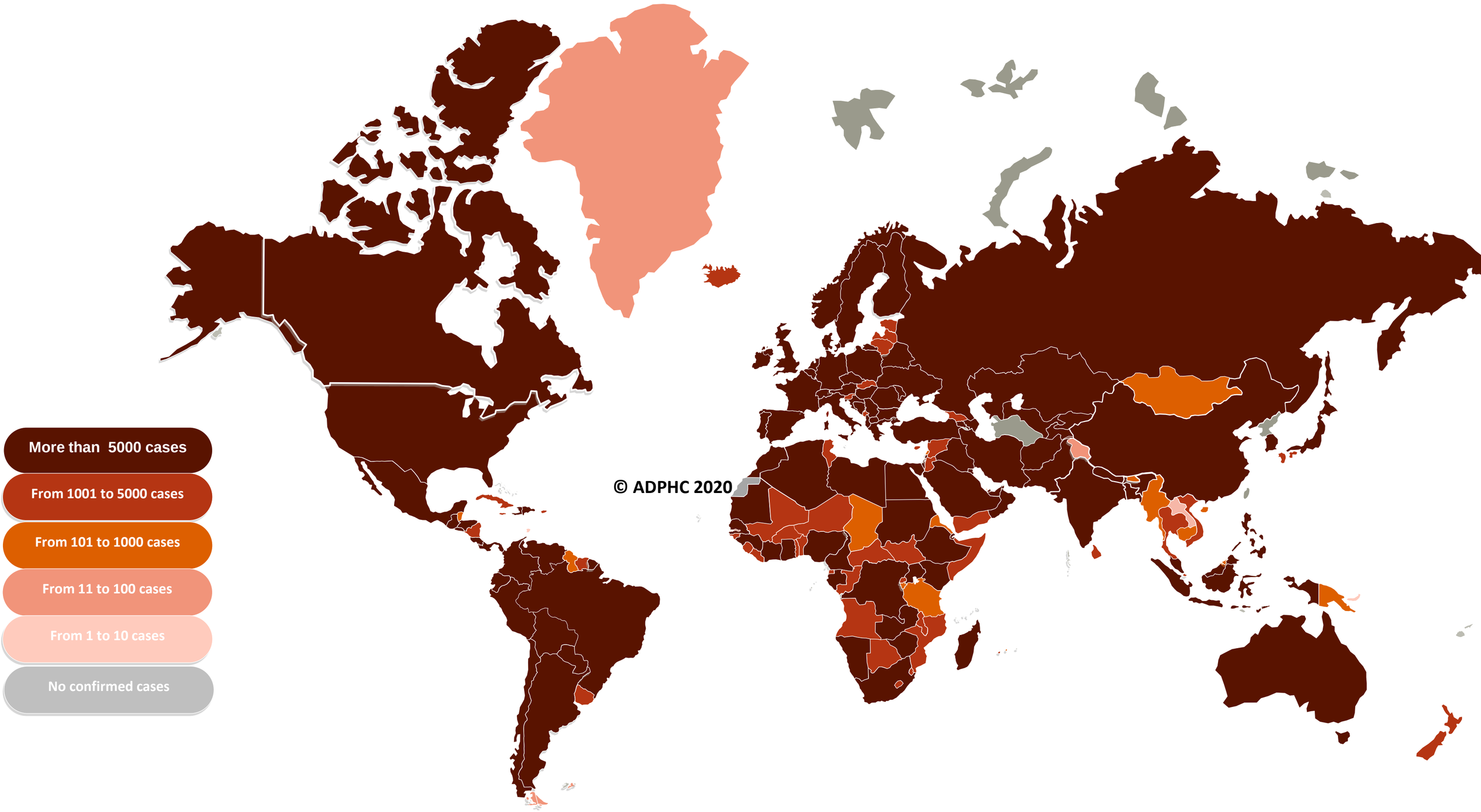
0.4% Case Fatality Rate

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,

Figure 7A : Global Distribution of COVID-19 Cases



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

EPIDEMIOLOGY

Date: 23 AUG 2020

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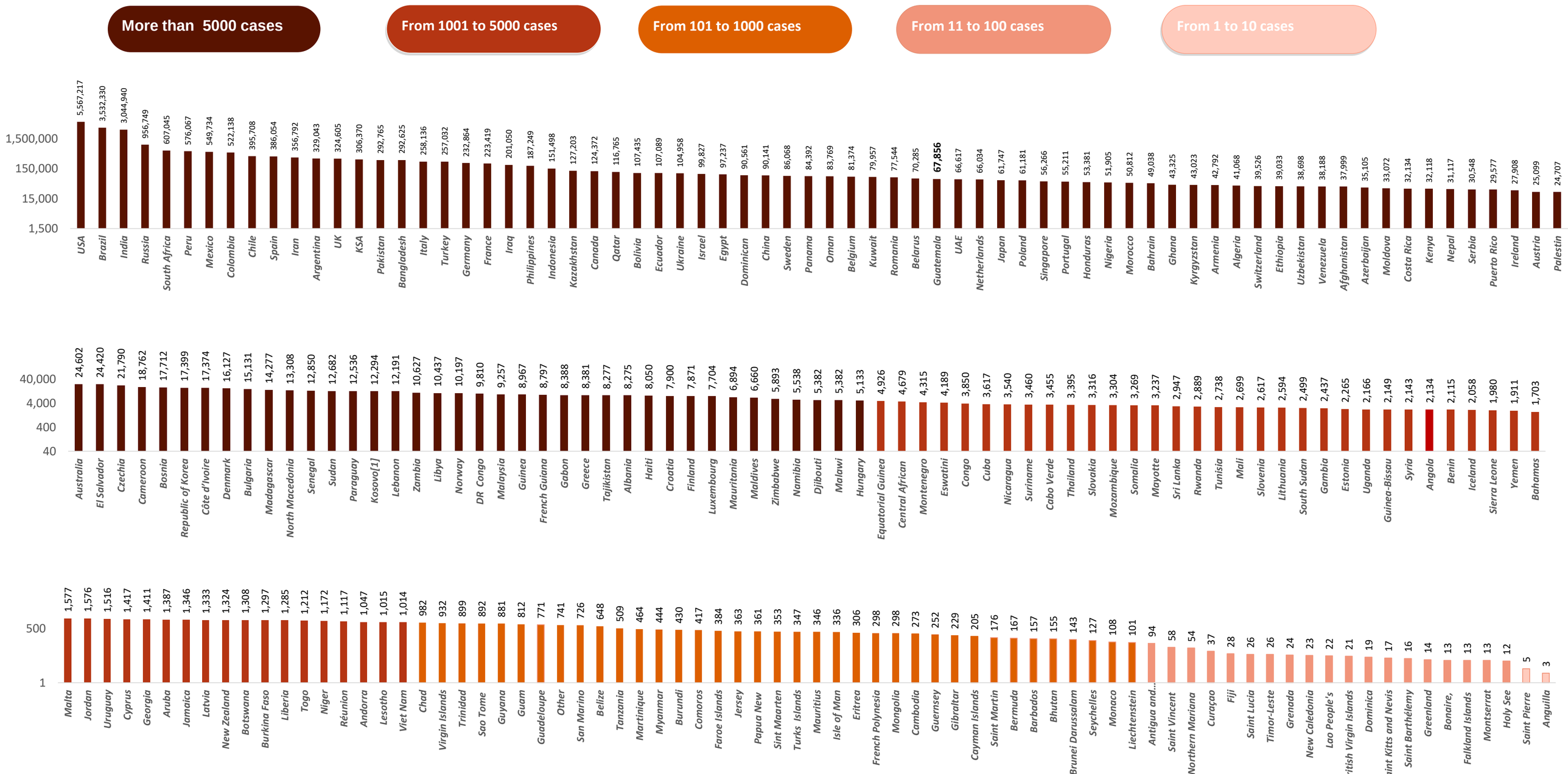
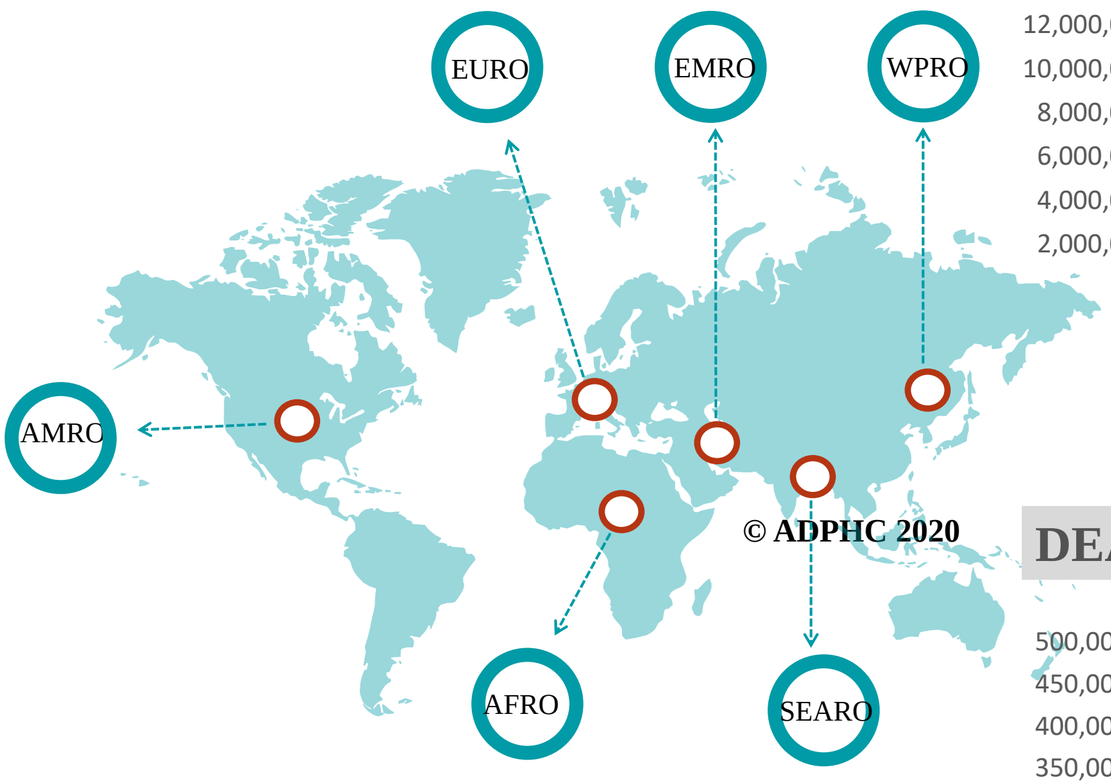
Figure 7B: Bar Chart Illustrates the Global Distribution of COVID19 Cases



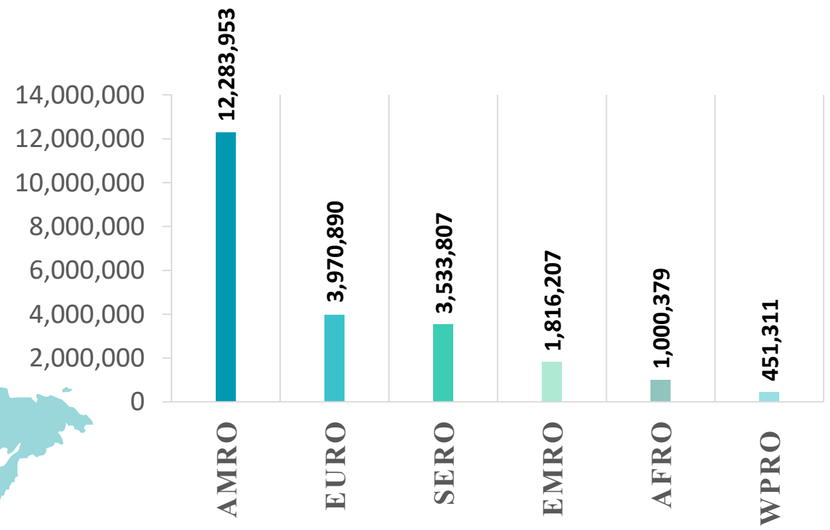
Other*:includes cases and deaths reported under the international conveyance(Diamond Princess)

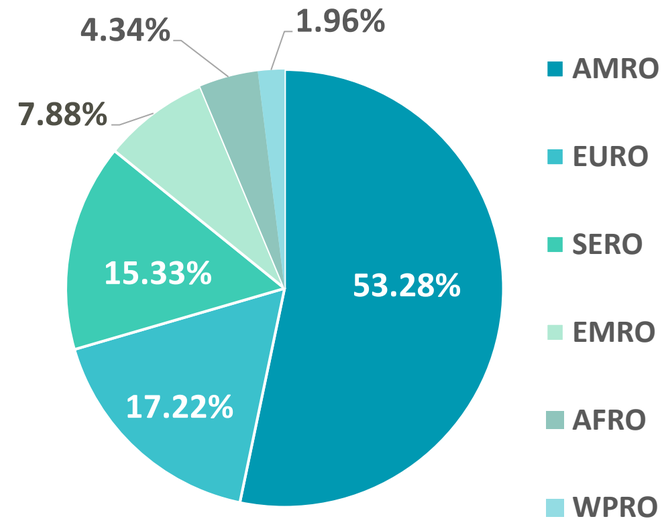
Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: WHO

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

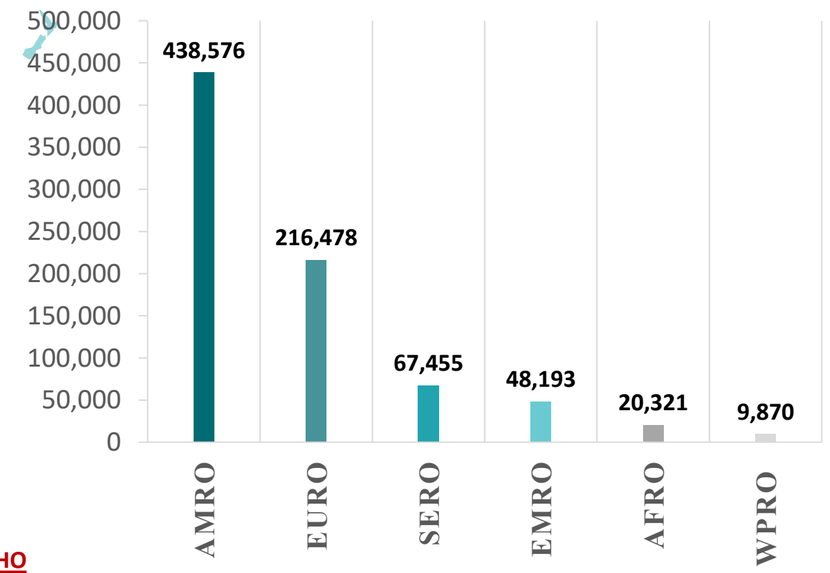


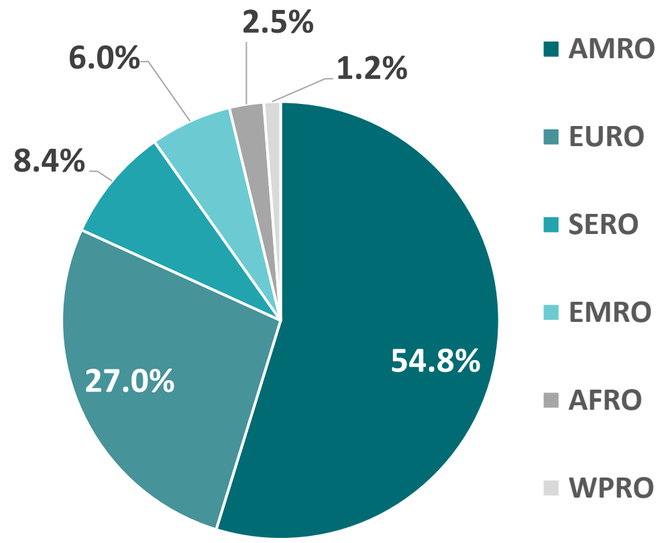
INFECTED





DEATHS

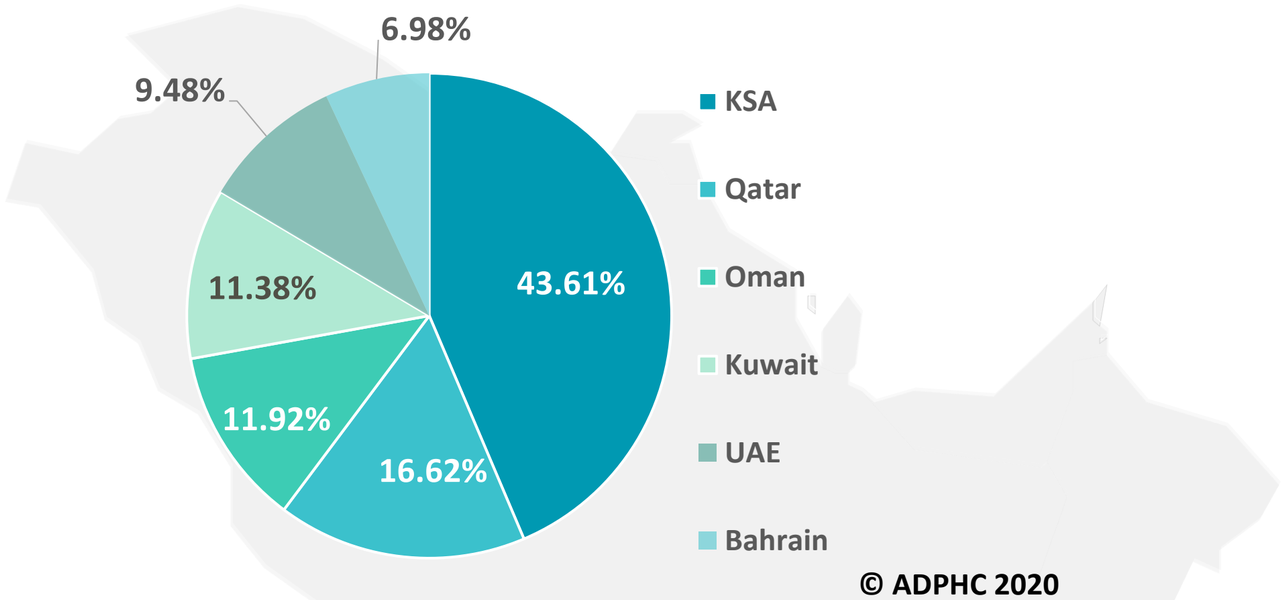


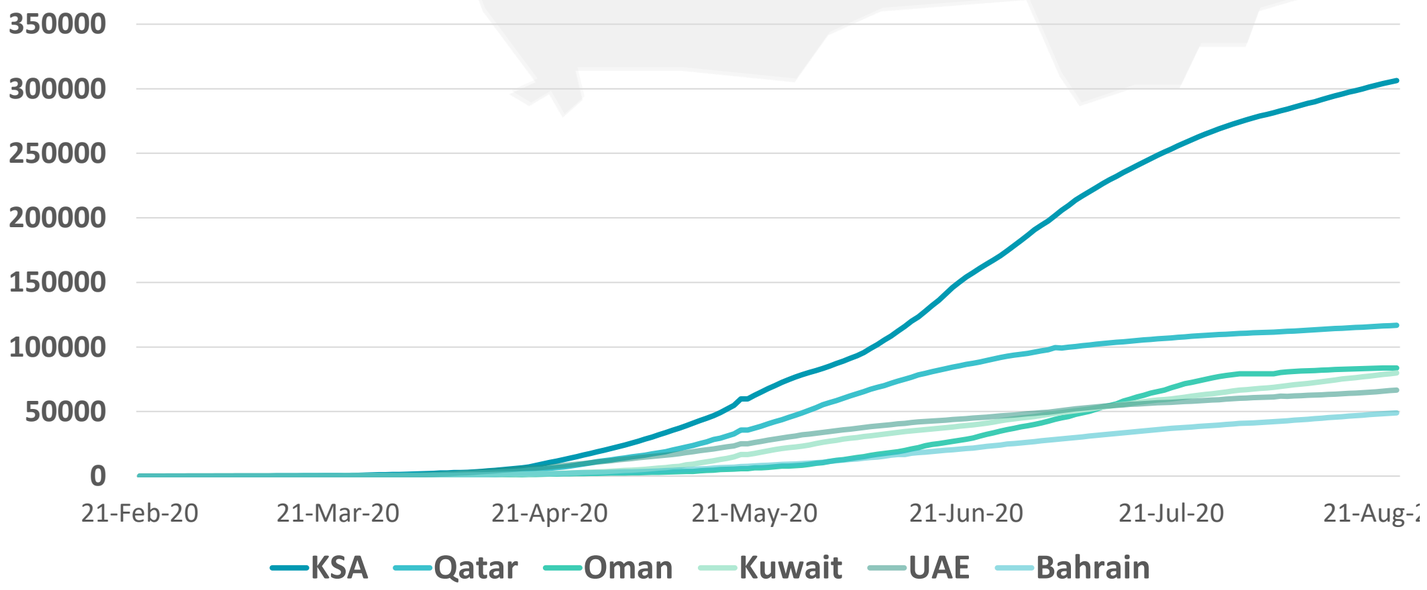


Graphs published by Abu Dhabi Public Health Center 2020 | Data resources: WHO

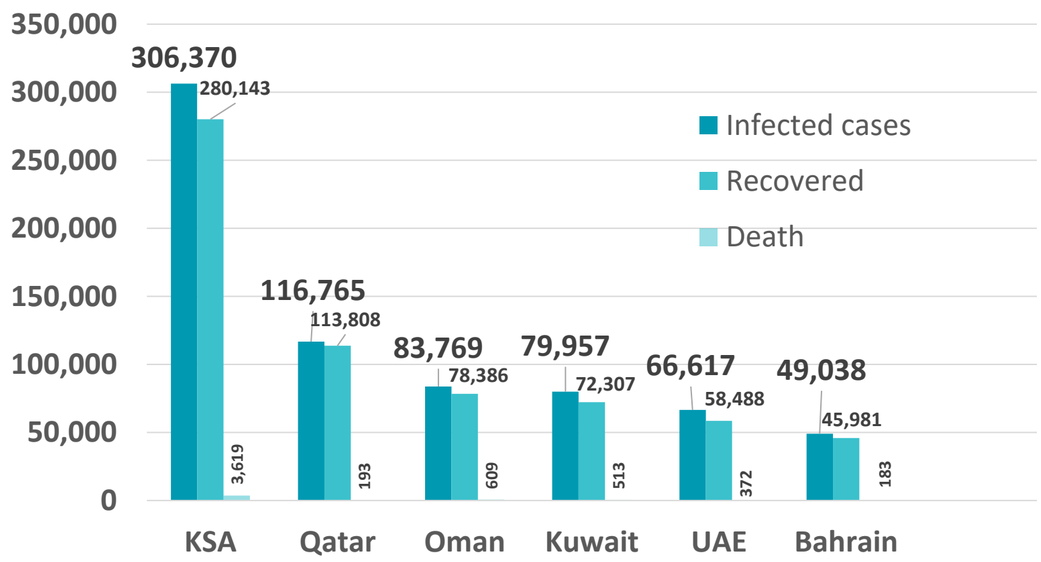
Figure 9: Comparative Analysis of the Distribution of COVID-19 Cases in GCC Countries

TOTAL NUMBER OF INFECTED CASES

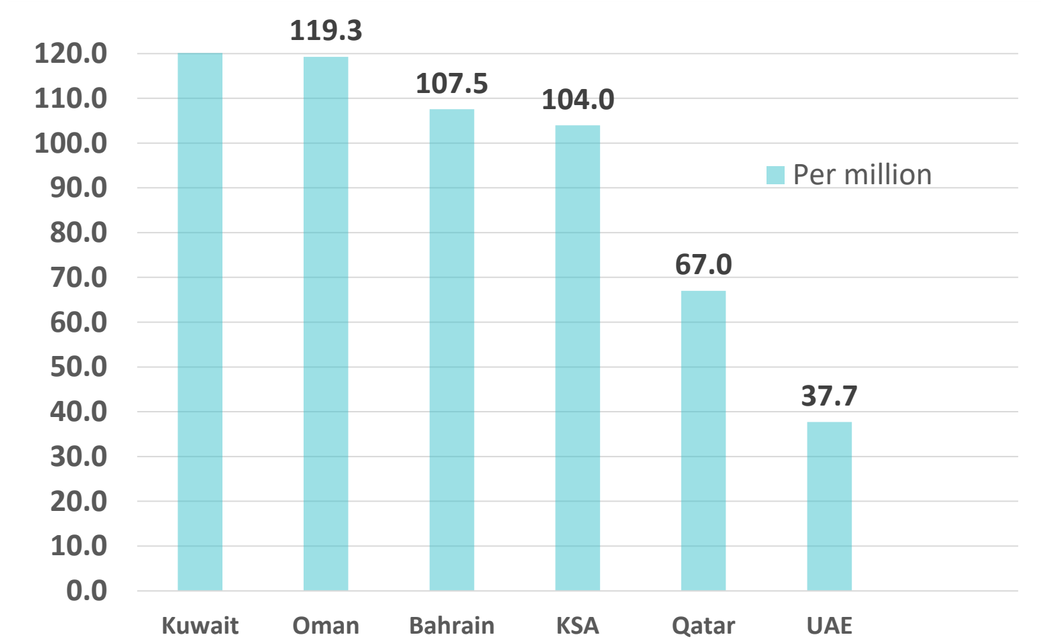




TOTAL NUMBER OF INFECTED, RECOVERED AND DEATHS



DEATHS PER MILLION



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

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

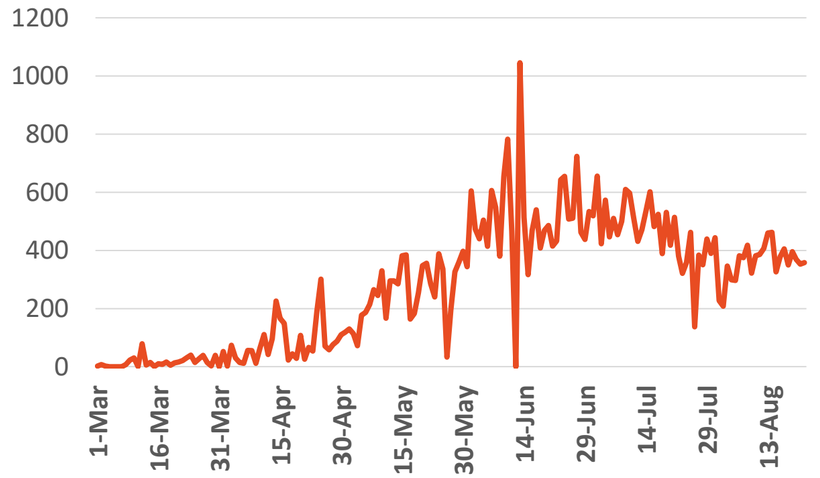
UAE

Source : National Emergency Crisis and Disaster Management Authority

KSA

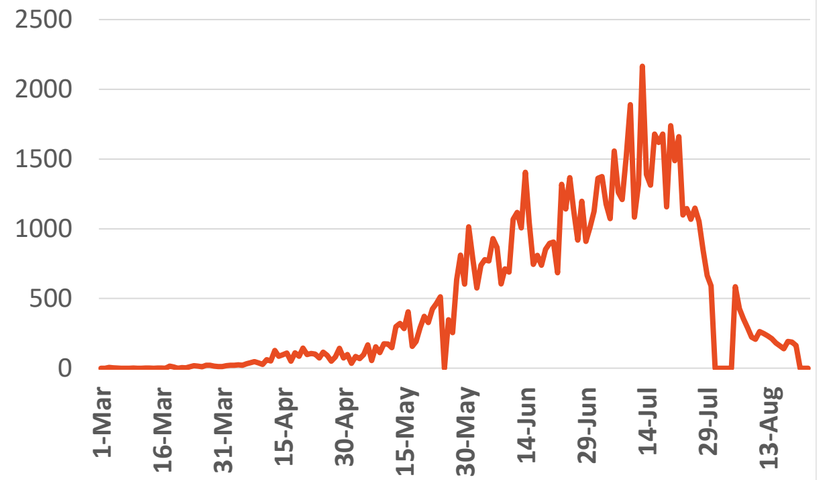
Source : KSA ministry of health

Bahrain



Source :WHO

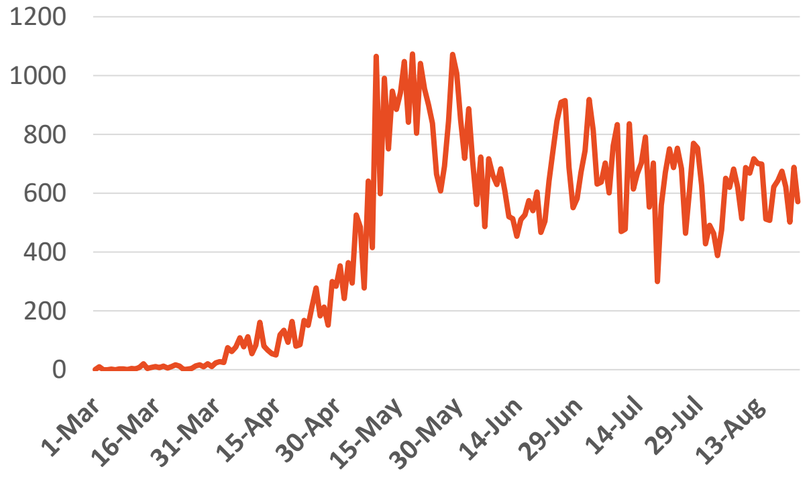
Oman



Source :Oman ministry of health

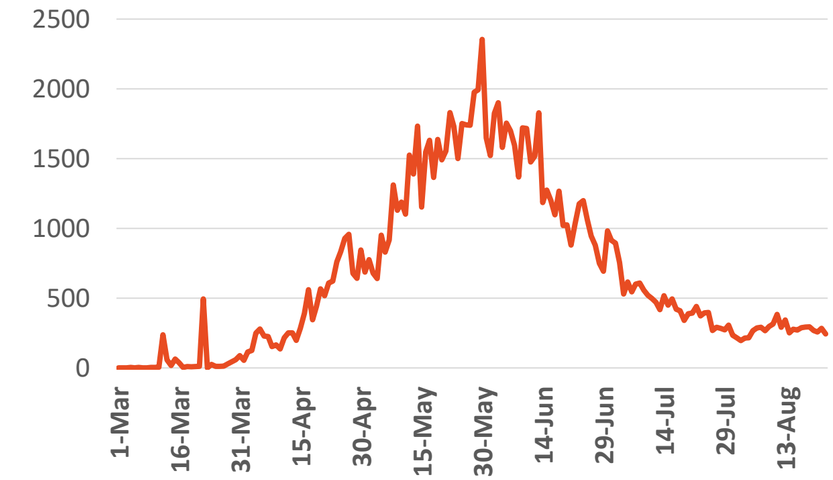
*No announced statistic data from 31 July to 4 August & from 21 to 23 August
*No announced statistic data on weekends and official holidays.

Kuwait



Source : Kuwait ministry of health

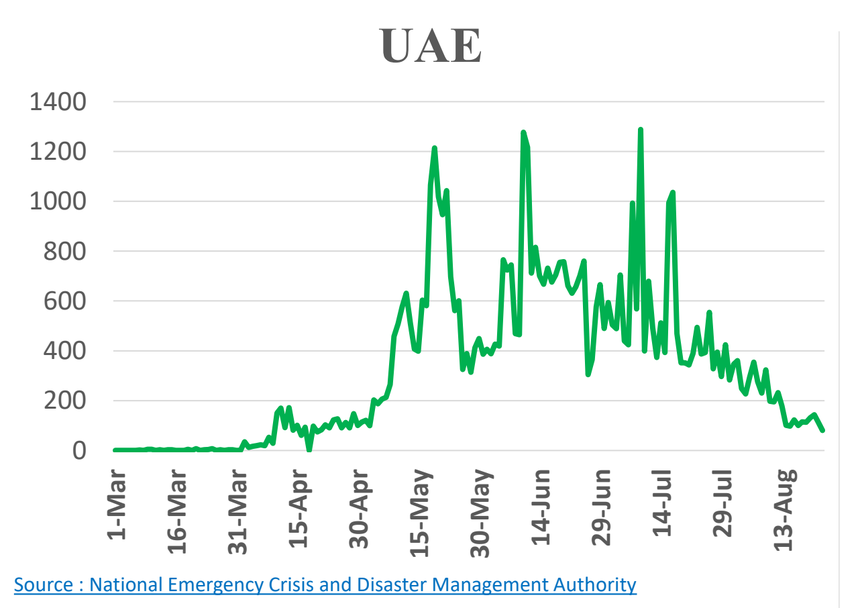
Qatar



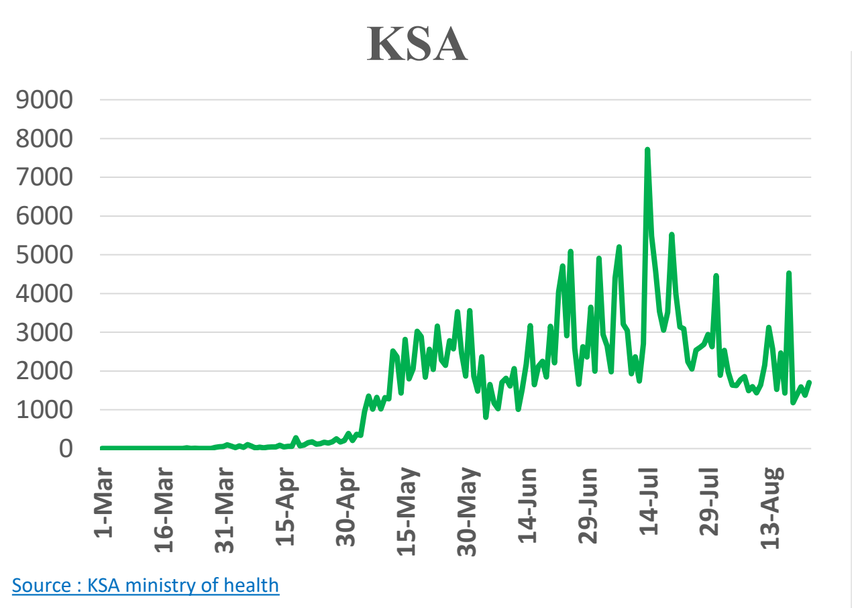
Source : Qatar ministry of health

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

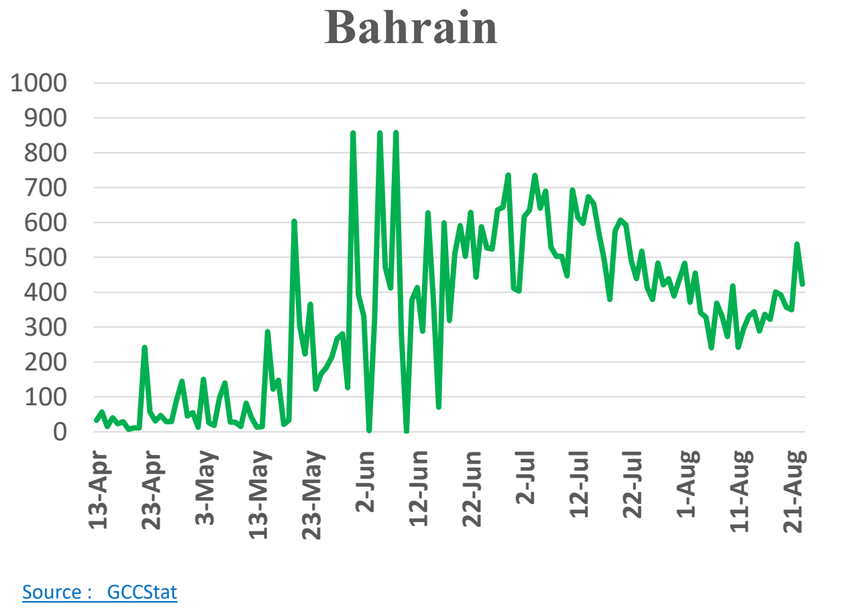
Figure 11: Comparative Analysis of the Distribution of COVID-19 Newly Recovered Cases in GCC Countries



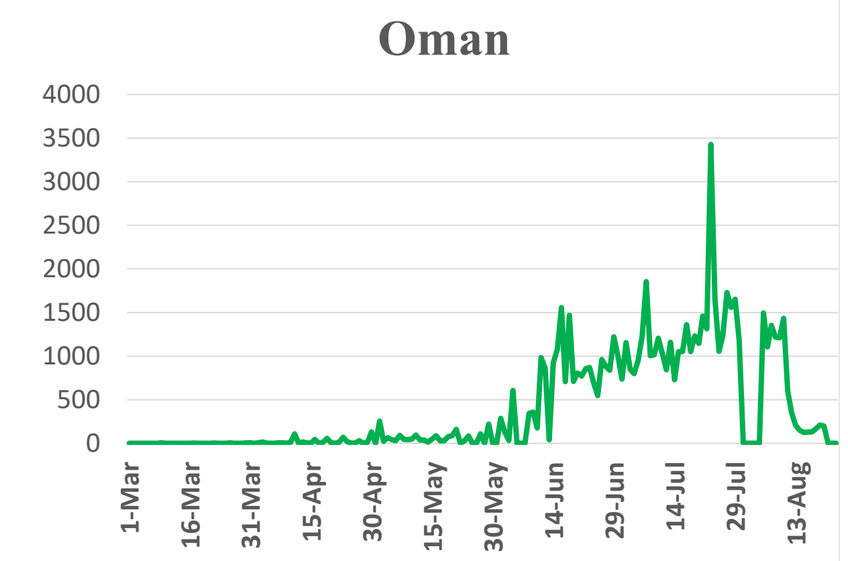
Source : National Emergency Crisis and Disaster Management Authority



Source : KSA ministry of health



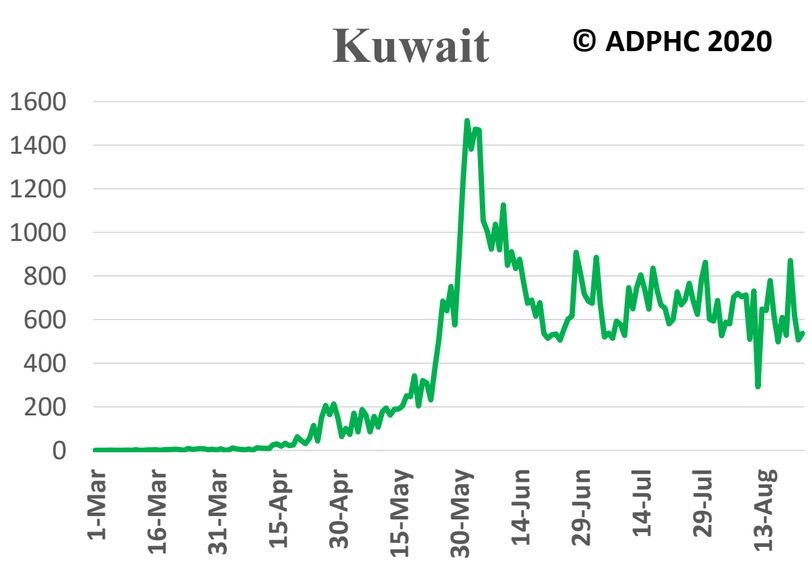
Source : GCCStat



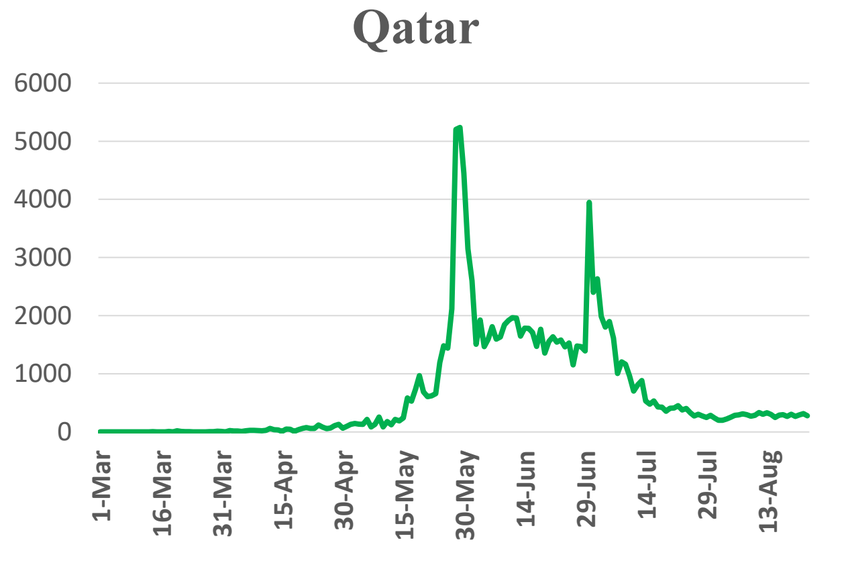
Source :Oman ministry of health

*No announced statistic data from 31 July to 4 August & from 21 to 23 August

*No announced statistic data on weekends and official holidays.



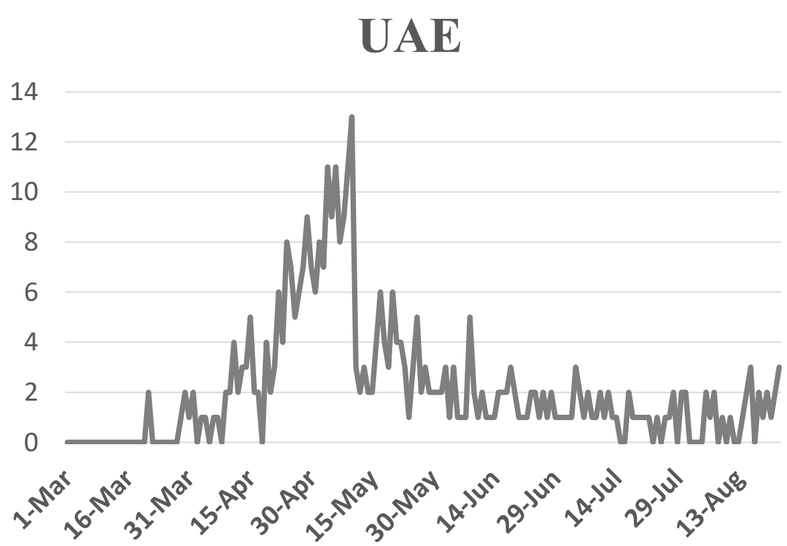
Source : Kuwait ministry of health



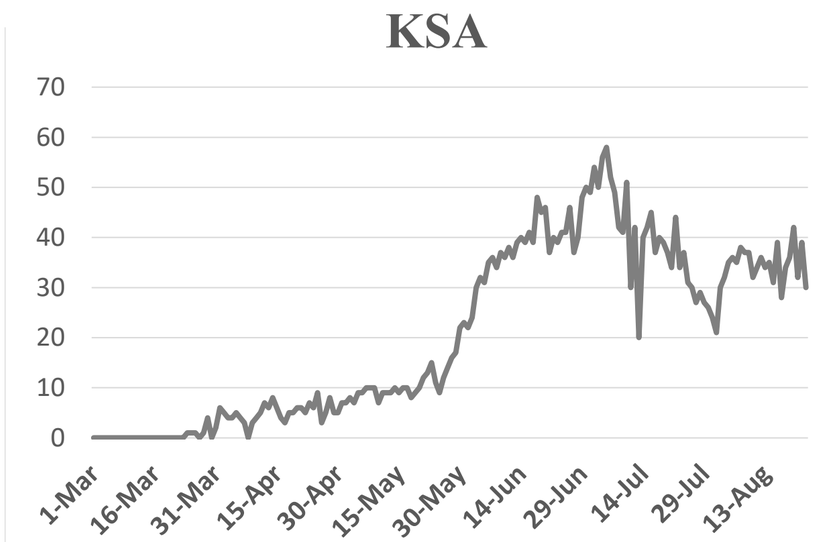
Source : Qatar ministry of health

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

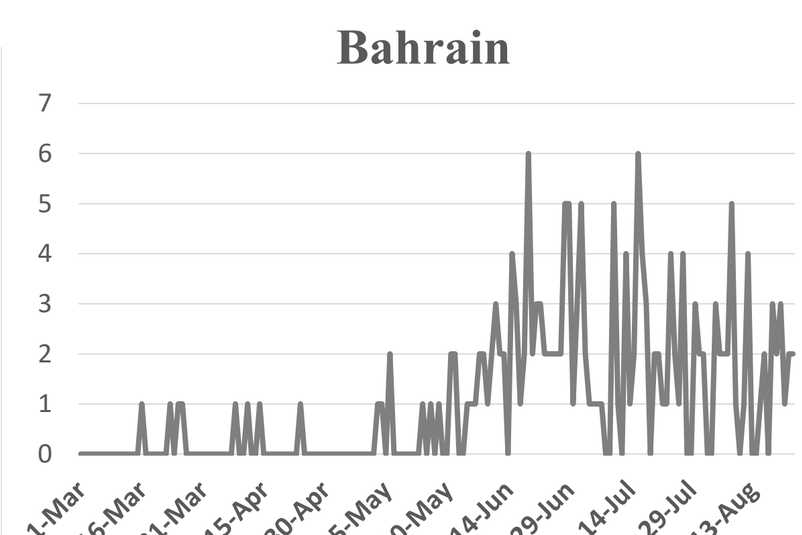
Figure 12: Comparative Analysis of the Distribution of COVID-19 New Death Cases in GCC Countries



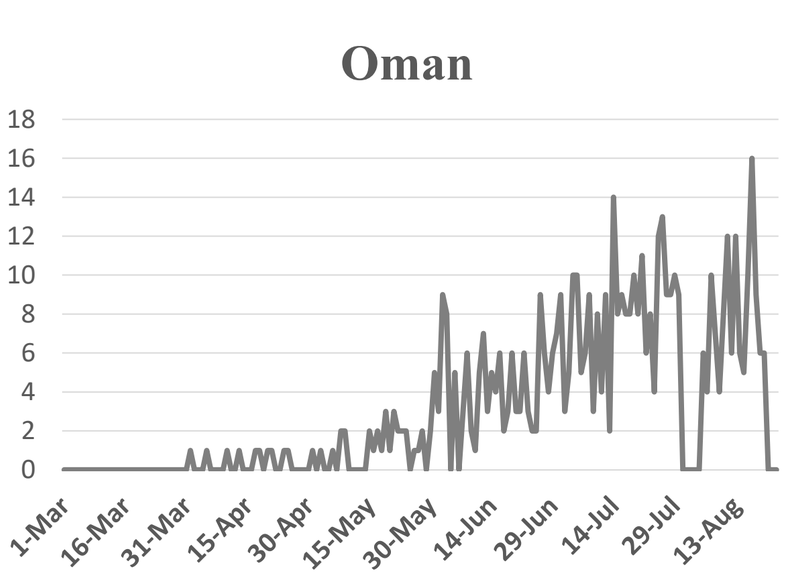
Source : National Emergency Crisis and Disaster Management Authority



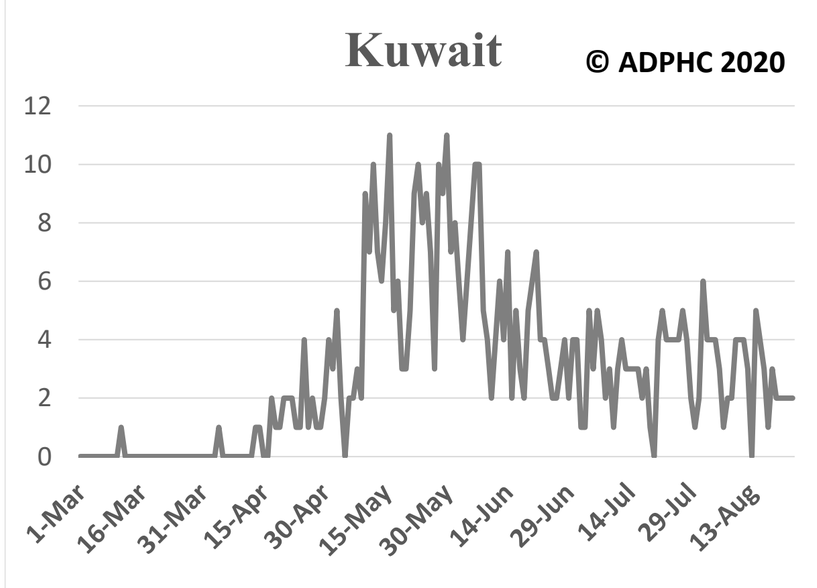
Source : KSA ministry of health



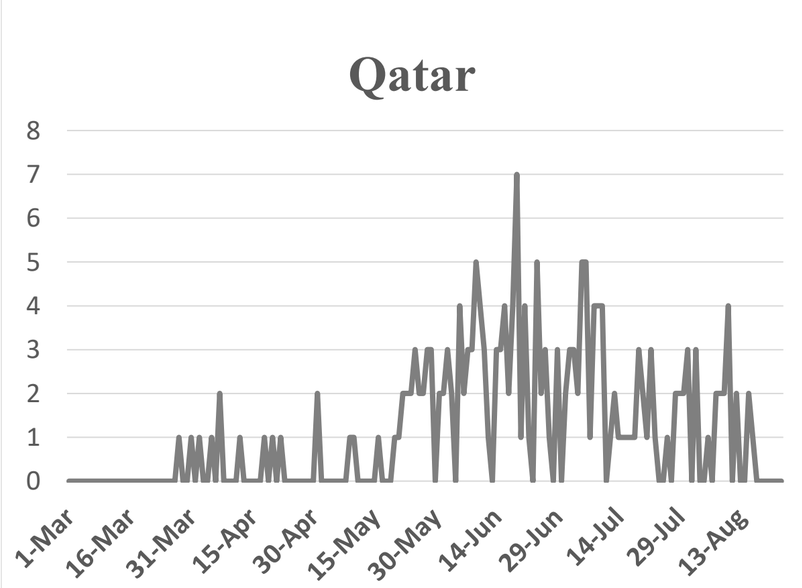
Source :WHO



Source :Oman ministry of health



Source : Kuwait ministry of health



Source : Qatar ministry of health

*No announced statistic data from 31 July to 4 August & from 21 to 23 August

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

CLINICAL FEATURE

Article 1

Published

Characteristics and Outcomes of COVID-19 Patients During Initial Peak and Resurgence in the Houston Metropolitan Area

13 August 13, 2020 JAMA

This study reports the characteristics of patients during the first and second surge of COVID-19 hospitalization in Houston, USA.

Methodology

- The study was conducted at Houston Methodist, an 8-hospital health care system in Houston, Texas, USA.
- From electronic health records, patients with positive RT-PCR nasopharyngeal swab test results for SARS-CoV2 were identified.
- Age, sex, race/ethnicity, comorbidity, medication, intensive care unit (ICU) admission, and mortality information was extracted.
- Daily total, ICU, and non-ICU (medical/surgical units) hospital census was tracked across the reporting period.
- Patients were categorized into surge 1 for admissions between March 13 and May 15, 2020, and surge 2 between May 16 and July 7, 2020.
- Surge 2 started 2 weeks after a phased statewide reopening.

Conclusion

- As of July 7, 2020, 2904 unique COVID-19 patients; had been hospitalized, representing 774 patients during surge 1 and 2130 patients during surge 2.
- Patients in surge 2 were younger (mean age, 57.3 vs 59.9 years; difference, 2.62 years).
- The proportion identifying as Hispanic was higher (43.3% vs 25.7%; difference, 17.64%)
- The median zip code–based income was lower ($60 765 vs $65 805; difference, $5040).
- Surge 2 patients had a significantly lower burden of overall and specific comorbidities such as diabetes, hypertension, and obesity.
- A smaller proportion of surge 2 patients; were admitted to the ICU (20.1% vs 38.1%; difference, 18.07%).
- Length of hospital stay for surge 2 patients was less (4.8 vs 7.1 days; difference, 2.31 days).

CLINICAL FEATURE

Continued

- Among dead or discharged patients (n = 2252 [77.5%]; n = 774 in surge 1 and n = 1478 in surge 2), surge 2 in-hospital mortality was significantly lower compared with that for surge 1 (5.1% vs 12.1%; difference, −7.07%).
- In-hospital mortality among discharged and deceased ICU-treated patients during surge 2 was not significantly lower than that during surge 1 (49/214 [22.9%] vs 81/295 [27.5%]; difference, −4.56%).
- The mean daily proportion of individuals with positive RT-PCR results during surge 1 was 13%, whereas it was 25% during surge 2.
- A greater proportion of surge 2 patients received remdesivir and enoxaparin.

Public Health Message

- An increase in COVID-19 hospitalizations in Houston was temporally related to phased reopening.
- Surge 2 data indicated a demographic shift of the pandemic toward a younger, predominantly Hispanic, and lower socioeconomic patient population with an overall lower comorbidity burden, ICU admission rate, and in-hospital mortality.
- The demographic and socioeconomic shift may reflect the return to work and relaxation of COVID-19 transmission mitigation practices.
- In-hospital mortality among ICU-treated surge 2 patients was 4.6% lower than that in surge 1. The overall better outcomes during surge 2 may be explained by a combination of lower comorbidity burden, lesser disease severity, and better medical management.

Article 2

Precision Public Health as a Key Tool in the COVID-19 Response

Published 14 August 2020 PLOS One

In this viewpoint, authors discusses the role of 'Precision Public Health' for handling of COVID-19 pandemic.

What is Precision Public Health?

- Precision public health is an emerging discipline that uses extensive population-specific data to provide the right intervention to the right population at the right time.
- Precision public health uses data from traditional and emerging sources to target interventions for populations by person, place, and time, in part with a focus on reducing health disparities.
- It is similar to how precision medicine uses genomic and other personalized patient data to provide the right treatment to the right patient at the right time.

Precision Public Health in COVID-19

- Pathogen genomics has become the leading prototype of precision public health, with numerous applications in tracking and control of infectious disease outbreaks, most notably for foodborne diseases.
- Granular data from public health surveillance are essential to target public health interventions.
- Geographic information and other technologies can be integrated to identify hot spots to allow targeting of interventions.
- An example of using pathogenic genomics for the COVID-19 response is the application of a combination of whole-genome sequence analyses and epidemiological data in the Netherlands to provide reliable assessments of SARS-CoV-2 community transmission patterns.
- Measures such as number of daily cases per 100,000 (low <1, moderate 1-10, high 10-25, and critical >25) and percent positive rate on PCR testing (low <3%, moderate 3%-6%, high 6%-10%, and critical >10%) could be used to determine phases of reopening of communities.
- Increasingly focusing prevention efforts on communities at the highest risk of morbidity and mortality will have greater benefits than focusing those efforts on lower-risk communities. If a population has a higher proportion of people at increased risk of severe disease, messages could be provided to educate on when to seek medical attention.

PUBLIC HEALTH RESPONSE

Continued

- Although traditional public health data are useful; the use of emerging digital data should also be explored. Some data is derived from non-traditional data sources and data included under the rubric of “big data” and associated predictive analytics, including cell phone mobility data, information from wearable fitness trackers, and geographic information.
- Information on areas of high disease transmission could be used to target prevention strategies (stay-at-home orders, public education regarding physical distancing, and the wearing of face coverings). Other emerging data sources (fitness trackers and monitoring of sewage for SARS-CoV-2 virus) could also be used to predict the presence of infection.
- Although some of these emerging data sources require careful consideration of ethical, legal, and social implications; they hold promise in informing the pandemic response by serving potentially as an early alert system.
- Evidence of community nonadherence to mitigation measures from cell phones, increasing levels of SARS-CoV-2 in sewage, and changes in resting heart rate on fitness trackers might have predicted impending outbreaks in some states before the increases were recognized by public health surveillance efforts.
- Early identification would have allowed for prompt implementation of interventions, at a time when they would have been more effective.
- Early indications of disease spread could also be used to ensure that adequate testing sites and contact tracing capacity are available to allow for rapid implementation of isolation of cases and quarantine of contacts.
- Understanding how to best integrate these data sources to inform public health might be an important strategy in response to COVID-19.
- The pandemic provides an opportunity for the further evolution of the field of precision public health, as new tools and technologies begin to complement traditional medical and public health approaches to prevention and control.

CLINICAL FEATURE

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Article 3

Published 13 August 2020 JAMA

COVID-19 and Multisystem Inflammatory Syndrome in Children and Adolescents

This review critically appraises and summarizes the literature available on Multisystem Inflammatory Syndrome in Children and adolescents (MIS-C1) in terms of epidemiology, causes, clinical features, current treatment protocols, and possible underlying pathophysiology for COVID-19-induced inflammatory processes.

Case Definition and Clinical Spectrum

- Clinical features of reported COVID-19 associated MIS-C in pediatrics, are similar to those of other inflammatory diseases including Kawasaki disease, Kawasaki disease shock syndrome, and toxic shock syndrome.
- Health organizations (WHO, US CDC2, RCPCH3) have defined diagnostic criteria for COVID-19 associated MIS-C, see Table 1 for more information on the criteria.
- A broader UK definition describes MIS-C as a spectrum ranging from persistent fever and inflammation to characteristic features of Kawasaki disease in children, and to severely ill children with shock and multiple organ failure.

COVID-19 Causes, Pathophysiology and link with MIS-C

- Risk factors of developing severe disease from SARS-CoV-2 infection in children include age, viral load, and chronic comorbidities.
- Babies younger than 1 year are at higher risk of severe COVID-19, while after the first year of age the disease appears to be asymptomatic or mild.
- Most COVID-19 associated MIS-C cases were reported 4-6 weeks after the peak of COVID-19 infections (**Figure 1**).
- Only a third of MIS-C cases reported positive RT-PCR test for SARS-CoV-2, while the high proportion of MIS-C cases reported positive antibody test indicating past infection.
- As the highest proportion of cases was linked to positive antibody test, the delay in MIS-C presentation relative to the pandemic is suggested that the inflammatory syndrome coincides with the development of immune response to SARS-CoV-2.
- SARS-CoV-21 act as immune trigger causing immune mediated injury to heart and coronary arteries similar to Kawasaki disease and can result in coronary aneurysms.

[1] as identified by WHO and US Centers for Disease and Prevention or PIMS-TS (Pediatric Inflammatory Multisystem Syndrome Temporally associated with SARS-Cov-2) according to Royal College of Pediatrics and Child Health, UK
[2] US Centers for Disease and Prevention
[3] Royal College of Pediatrics and Child Health

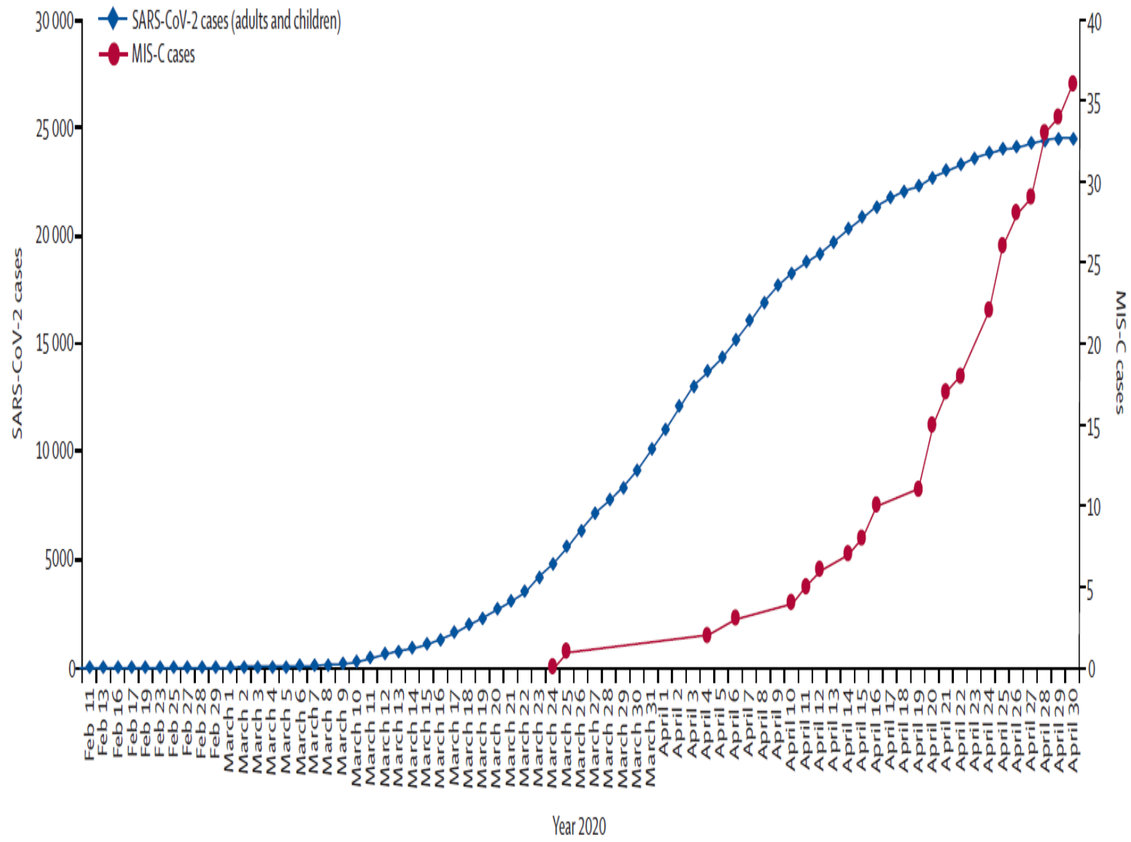
PUBLIC HEALTH RESPONSE

Continued

Management of MIS-C

- Suspected/diagnosed MIS-CMDT approach consisting of pediatric infectious disease unit, cardiology, immunology, and intensive care unit teams consider therapy with antivirals (if PCR +ve for SARS-CoV-2) or immunotherapy or both close monitoring and supportive care especially for vital signs, hydration, electrolytes and metabolic status.
- The heart is a major target of injury in MIS-C. Follow-up with a cardiologist is recommended for all MIS-C cases, as there are unknowns about long-term cardiovascular morbidity.
- A hallmark of COVID-19 is striking coagulopathy, so patients with severe COVID-19 cases are currently recommended to start anticoagulant therapy (mainly heparin or LMWH2).

Figure 1: Time course of MIS-C in PCR-positive COVID-19 cases
Only incudes PCR-positive cases in London, UK. Data taken from Public Health England



[1] **Multidisciplinary Team** [2]**Low Molecular-Weight Heparin**

VACCINE

Article 4 A SARS-CoV-2 mRNA Vaccine - Preliminary Report

Published 20 August 2020 JAMA

- This paper reported two letters to the editor on Moderna vaccine developers who published their phase 1 and 2 Trial results in NEJM on 14 of July.

- The main concern was that although positive antibody response to mRNA vaccine is an optimistic step towards controlling COVID-19, this vaccine and other DNA and RNA vaccines may contiously stimulate cellular production of the target antigens for an unknown period. A mechanism is required to be able to stop the antigen production after a period of time to avoid the possibility of desensitization.

- The other concern was the lack of information on IgA. IgA is a crucial first-line defense in mucosal tissues, and we wonder whether there was an increase in SARS-CoV-2–specific IgA.

- Moderna vaccine developers response:
  - Regarding the duration of immunity a phase 1 and 2 trials are designed to follow participants for one year after the second vaccination and to obtain samples to characterize humoral and cellular immunologic responses. A phase 3 trial is designed to follow participants for two years to allow assessment of the durability of protective immunity during that interval.
  - The second comment was that trial of mRNA vaccine induced an impressive IgG antibody response; however, vaccine developer did not report on IgA, which is a major first-line defense in mucosal tissues. The lack of IgA may cause an unprotected spread of SARS-CoV-2 from nasal mucosal tissue.
  - The vaccine developer replied that the role of monomeric IgA induced by parenteral vaccines (non-oral route, usually Intramuscular or intravenous as a mood of delivering medicine) is unknown and monomeric IgA is unlikely to reach the mucosal compartment in substantial quantities. In the preclinical studies of the vaccine, they used parenteral vaccine on animals show protective immunity, and they detected positive IgA and IgG in airway fluid.

* Usually oral vaccines like polio do induce IgA most , compared to other routes of vaccine deliveries.

THANK YOU

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