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Scientific Research Monitoring on COVID-19

11 April 2020

Summary on COVID19

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SARS-COV2 virus

- The virus have been sequenced and found to be similar to MERS-CoV and SARS-CoV. Research revealed that the virus originated in a bat reservoir.
- New designation for the disease and the virus: COVID-19 and SARS-COV2.
- SARS-COV2 stay viable in aerosol for hours and in surface up to 3 days.
- Two strain have been identified for SARS-COV2 (L type (more aggressive) and S type .

Transmission

- Transmission from human to human has been confirmed. Incubation period ranges from 5 days and can reach up to 14 days.
- Suggested human-to-human transmission occurs through droplets, contact and fomites, similar to Severe Acute Respiratory Syndrome (SARS).
- Isolation is the best measure to control transmission.

Clinical features and outcome

- Non-specific and the disease presentation can range from no symptoms (asymptomatic) to severe pneumonia and death.
- Highest risk for severe disease and death include people aged over 60 years and those with underlying conditions
- Pregnant women infected with SARS-COV2 may experience symptoms similar to those of non-pregnant adults. No evidence suggests transmission from mother to newborn if infected late in pregnancy. No evidence of transmission through breast milk.

Therapies and vaccination

- Efforts currently in developing therapies for this virus focus on previously known medications and vaccination for MERS-CoV and SARS-CoV. In addition to other type of medication.
- WHO forum held 11-12 Feb 2020 to mobilize research on COVID19 vaccinations and therapies.

Summary on COVID19 (Cont.)

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COVID19 in figure

- 80% of laboratory confirmed patients have had mild to moderate disease
- 13.8% have severe disease.
- 6.1% are critical
- Children account for 2.4% of all reported cases.(less than 19 years)

Todays' Highlights

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All articles presented in this report represents the authors' views and not necessarily represents Abu Dhabi Public Health Center views or directions.

Scientific Research

- **Treatment**: a new molecular pathway explain how the virus attacks the host and how the HCQ and **Favipiravir** were successful in treating COVID19 patients .
- **Public health response**: modelling study suggests when the number of infections are contained and start to go down, **control measures may be relaxed gradually with close monitoring of new infections especially coming <u>from other countries.</u>**
- **Public health response:** Article gave some tips on how to sustain workforce during pandemic

Due to abundant COVID19 information resources and given the urgent need to keep up with the updates .Below is a cluster of other academic articles for interested reviewer.
Listed articles may represent information that has been previously shared in the report and/or may target specific technical audience.

Others

1. Delayed access or provision of care in Italy resulting from fear of COVID-19
2. A Shift on the Front Line
3. Ensuring Access to Medications in the US During the COVID-19 Pandemic

WHO daily report

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WHO daily report 10 April 2020

- No new country/territory/area reported cases of COVID-19 in the past 24 hours.
- OpenWHO, a web-based learning platform, has launched a new online course Introduction **to Go.Data** – Field data collection, chains of transmission and contact follow-up. The **Go.Data** tool supports outbreak investigation, focusing on field data collection, contact tracing and visualization of chains of transmission.
- As the number of cases continues to climb in Europe, two new WHO tools launched that will **help health planners in the European Region prepare f**or the rapidly increasing number of patients with COVID-19 requiring acute and intensive care in hospitals.
- Dr. Bruce Aylward, Special Adviser to WHO's Director-General, speaking of his **recent mission to Spain** at a press briefing yesterday, highlighted the need for countries to understand that the virus can overwhelm even the most robust health systems, resulting in the need to entirely reconfigure health sectors in response. Summary of main points in his speech:
  - **Speed of the disease:** lockdown measures, which helped the country to slow the spread of the disease and gain time **to reorganize its health system. Contingency planning** in all countries comes to the fore. This involves measures to rapidly reconfigure and repurpose the whole health sector while taking into account worst-case scenarios.
  - **Lockdowns a window of opportunity:** lockdowns are important for slowing the virus, they cannot stop it. Countries should primarily test as much as possible, while also isolating patients with confirmed COVID-19 and tracing and quarantining their contacts. lockdown measures as a window of opportunity to prepare for a gradual and controlled easing of restrictions.
  - **Patients with COVID-19:** After visiting a number of health-care facilities in Spain, Dr Aylward remarked that while COVID-19 hospitalizes many over the age of 60, substantial numbers of people in intensive care units and in need of professional care are younger. He explained that many of those who enter intensive care stay there for approximately 3 weeks and require long periods of rehabilitation following their illness.

Epidemiology

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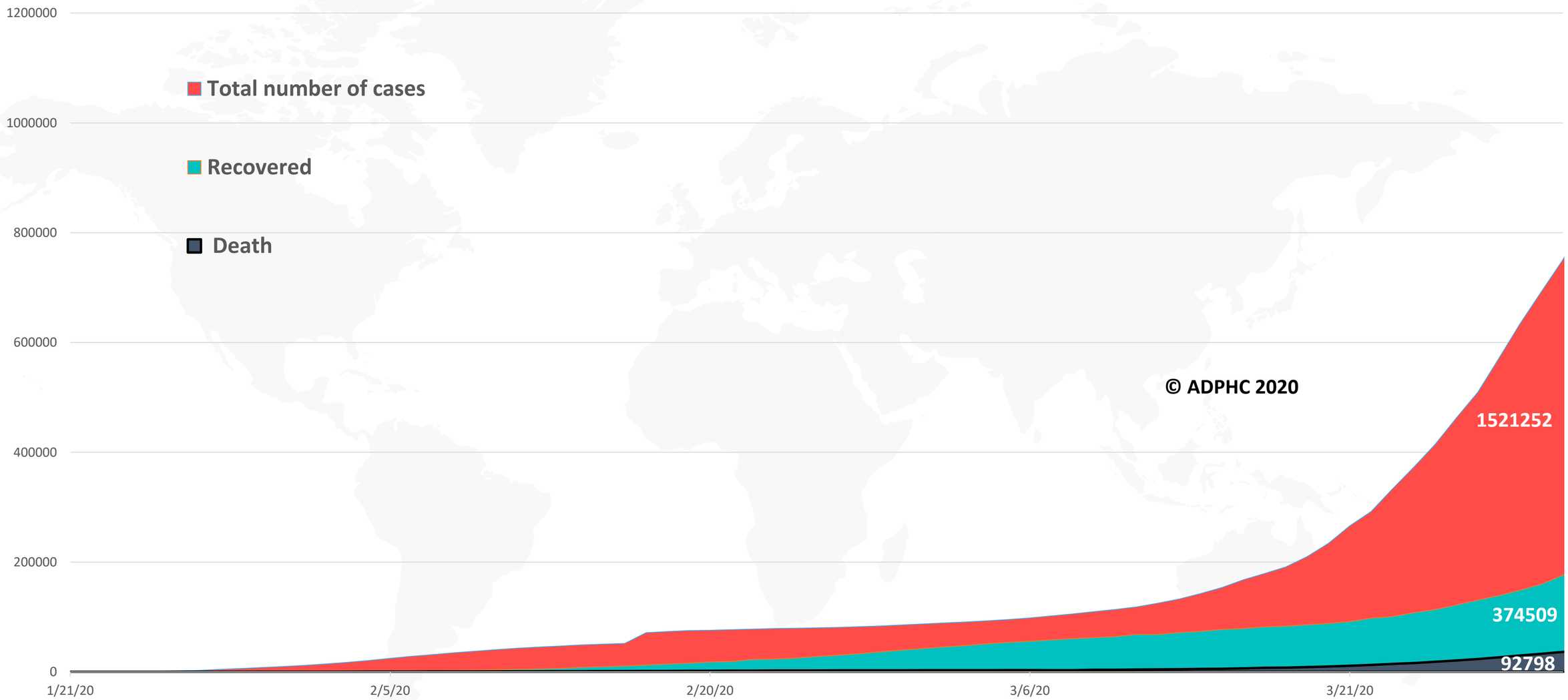
Figure 1: Total number of infected, recovered , and death cases (January 21st to April 10th , 2020)

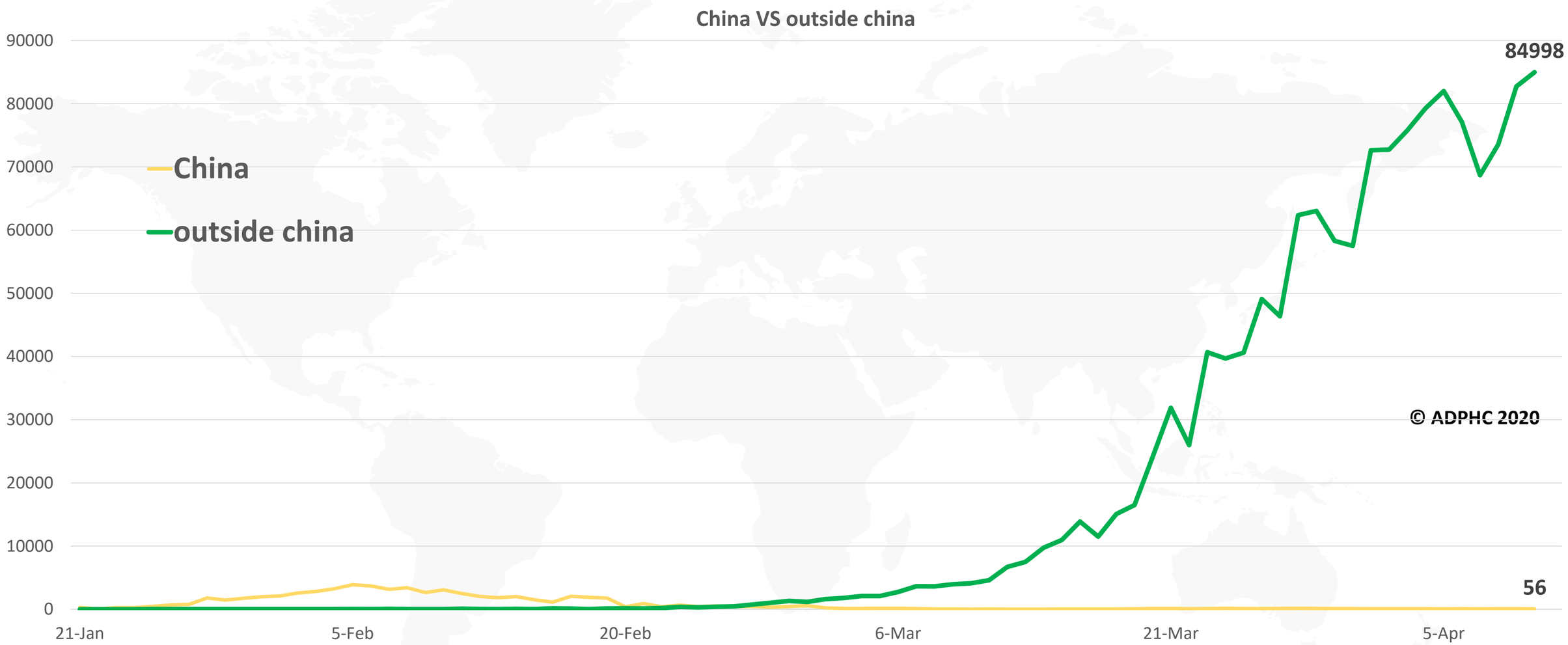


Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: WHO, : John Hopkins University

Epidemiology

Figure 2: Daily new infected COVID-19 cases reported between (January 21 to April 10th, 2020).



Line graph published by Abu Dhabi Public Health Center 2020.
Data resources: WHO

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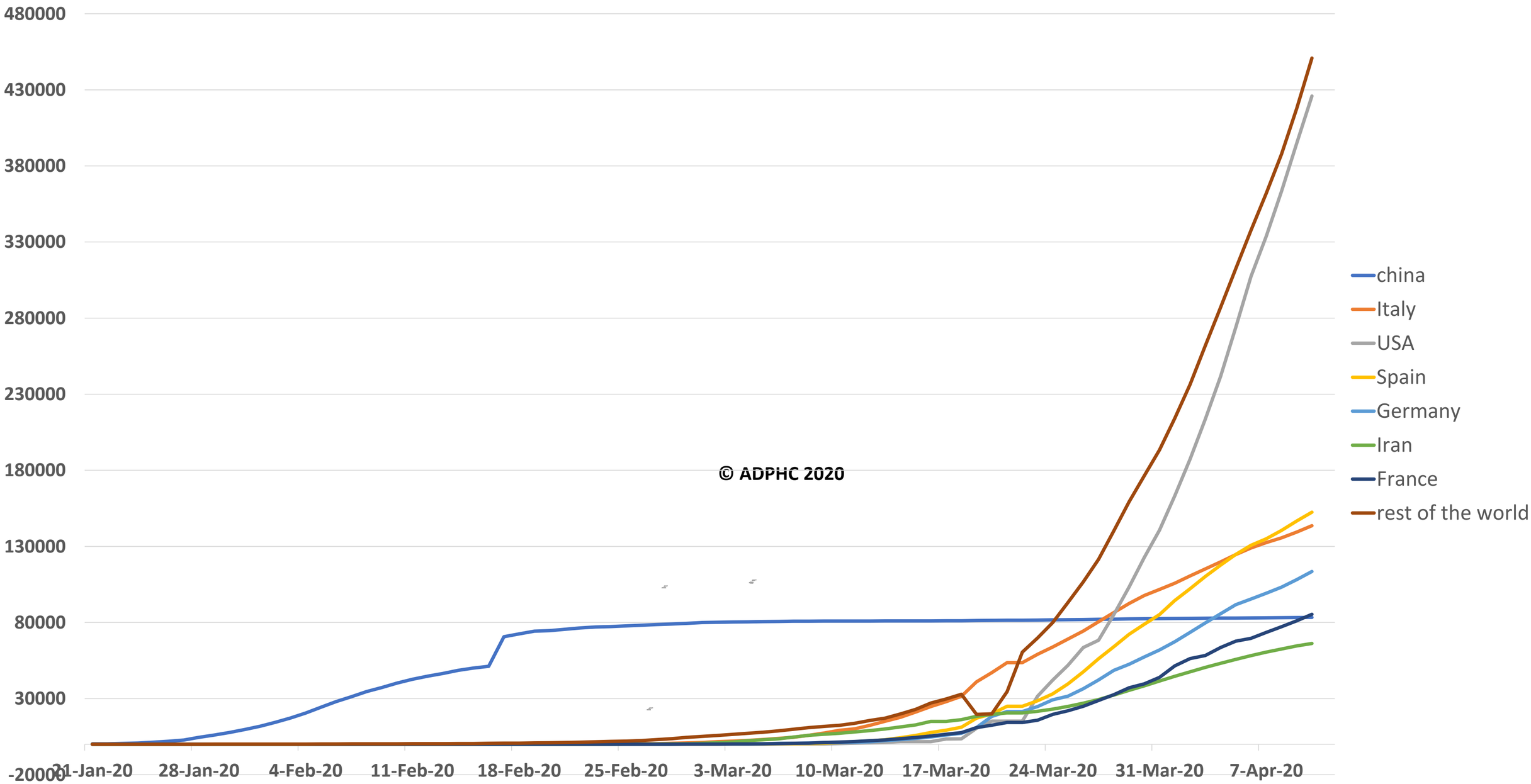
Figure 3 : Top 7 countries in the total number of cases due to COVID-19 (January 21 to April 10th, 2020).

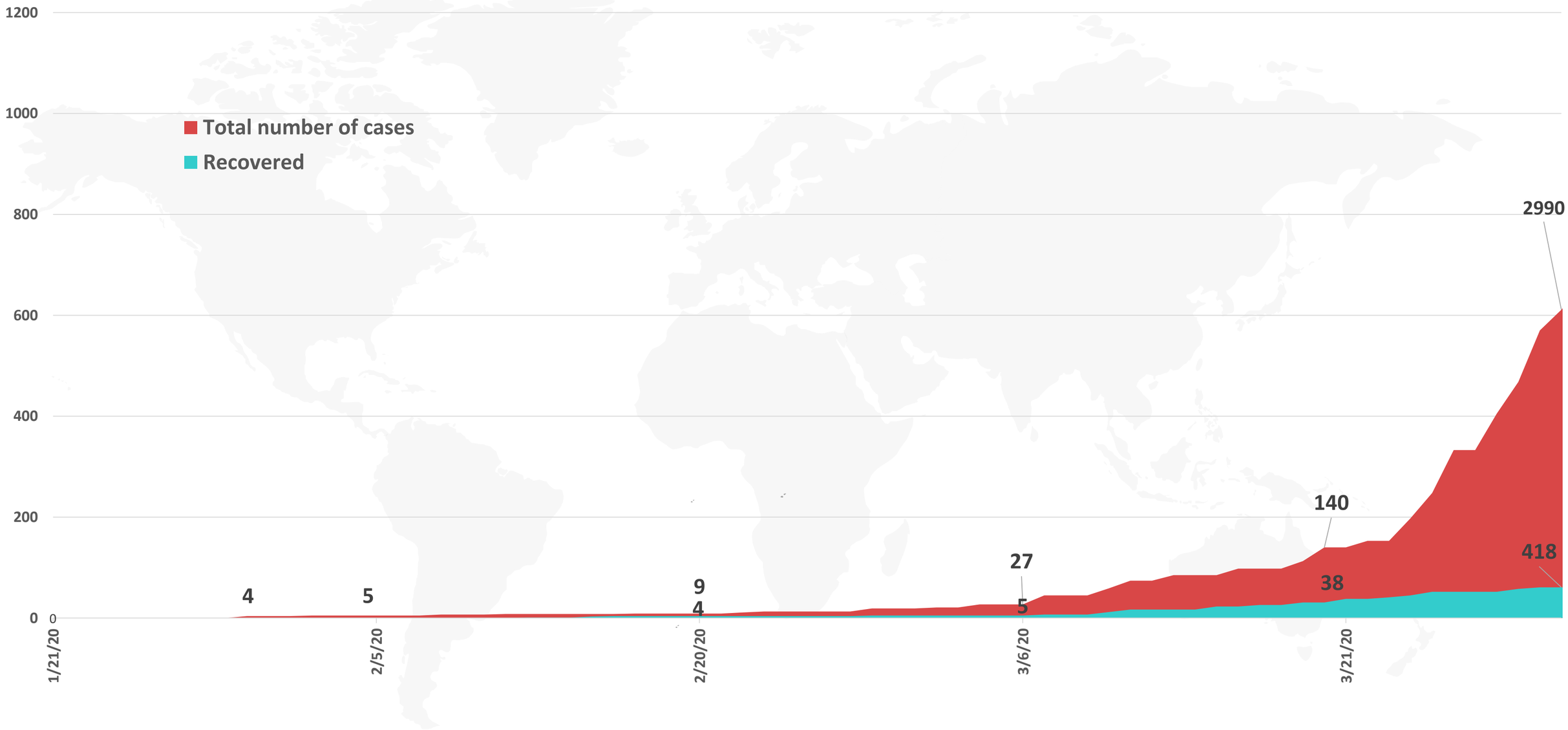


Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: WHO

Epidemiology

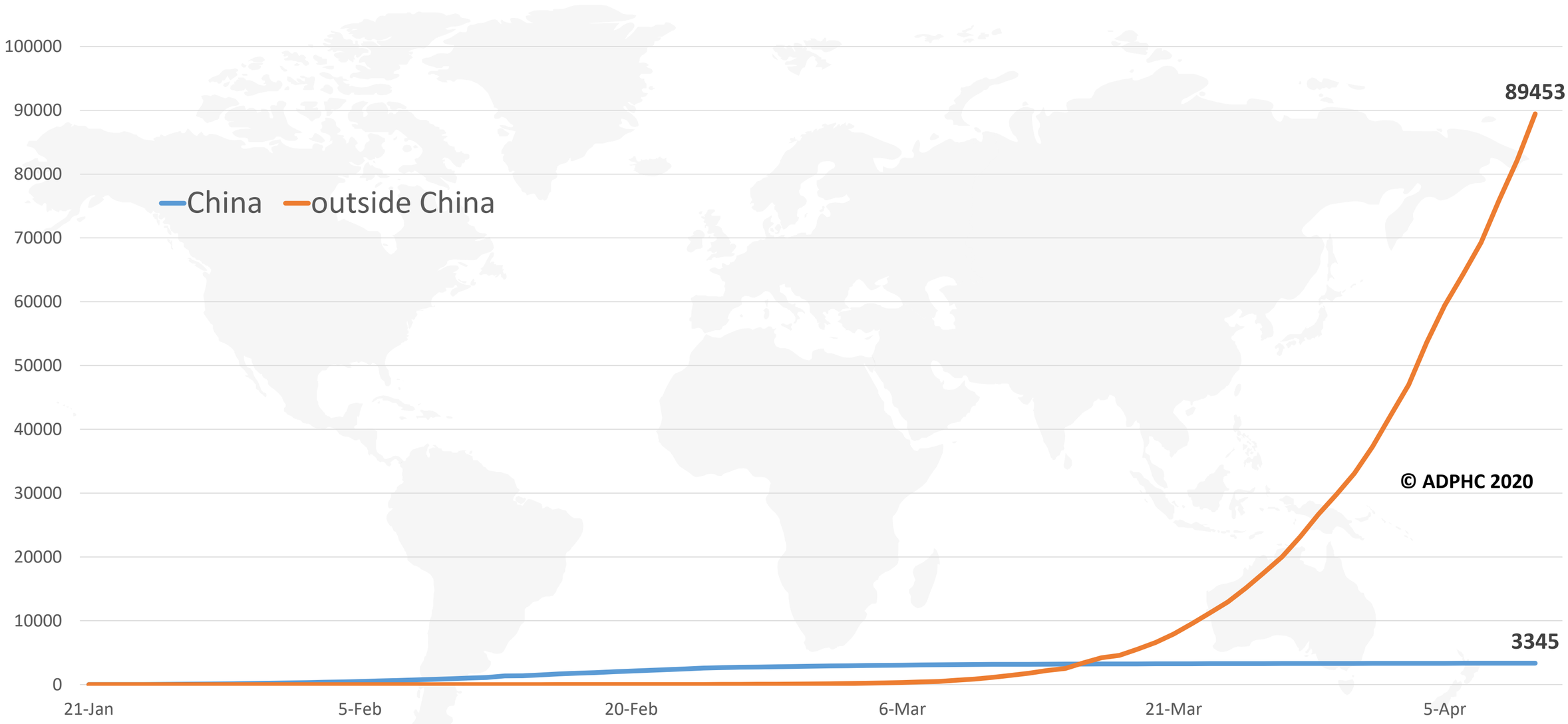
Figure 4: Total number of COVID-19 infected and recovered cases in UAE over time



Line graph published by Abu Dhabi Public Health Center 2020.
Data resources: WHO, : John Hopkins University

Epidemiology

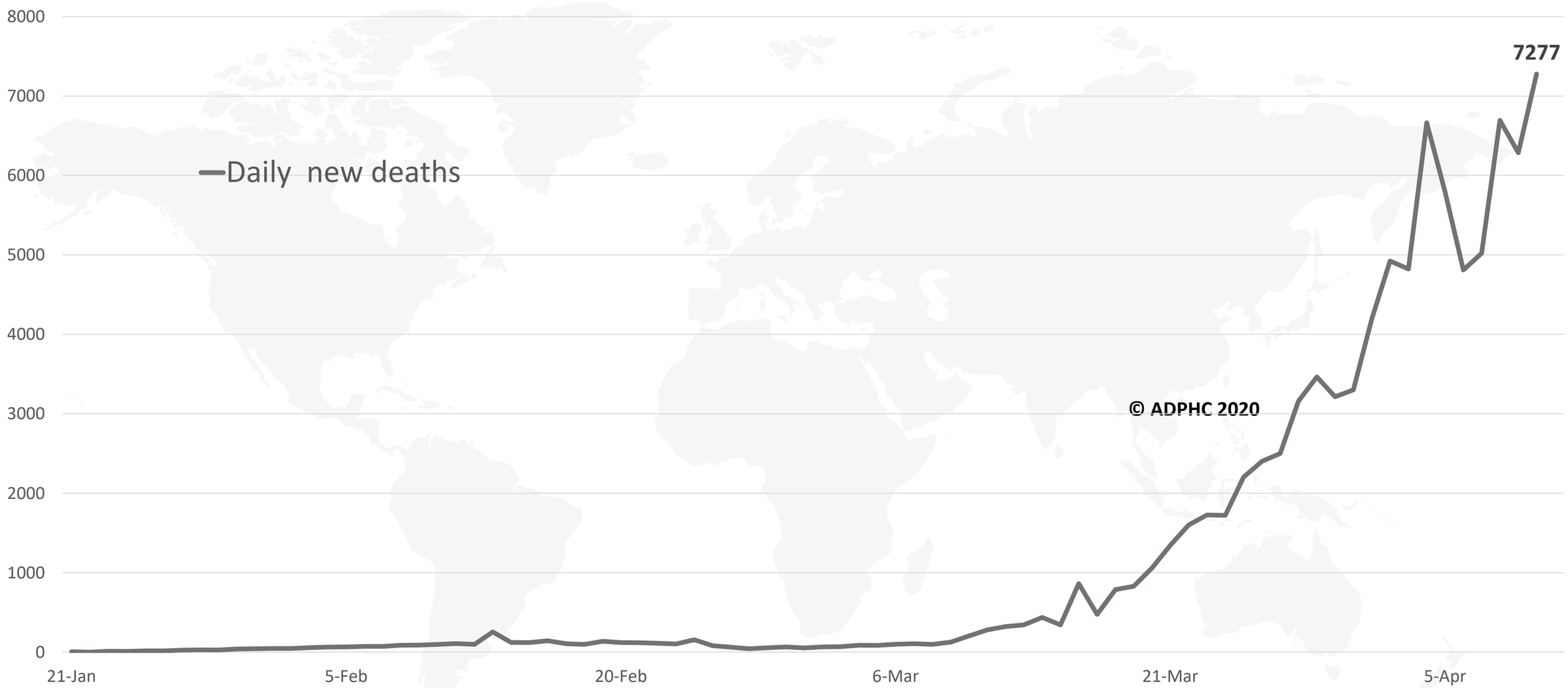
Figure 5: Total number of death due to COVID-19 reported by China and the rest of the world (January 21 to April 10th, 2020).



Line graph published by Abu Dhabi Public Health Center 2020.
Data resources: WHO

Epidemiology

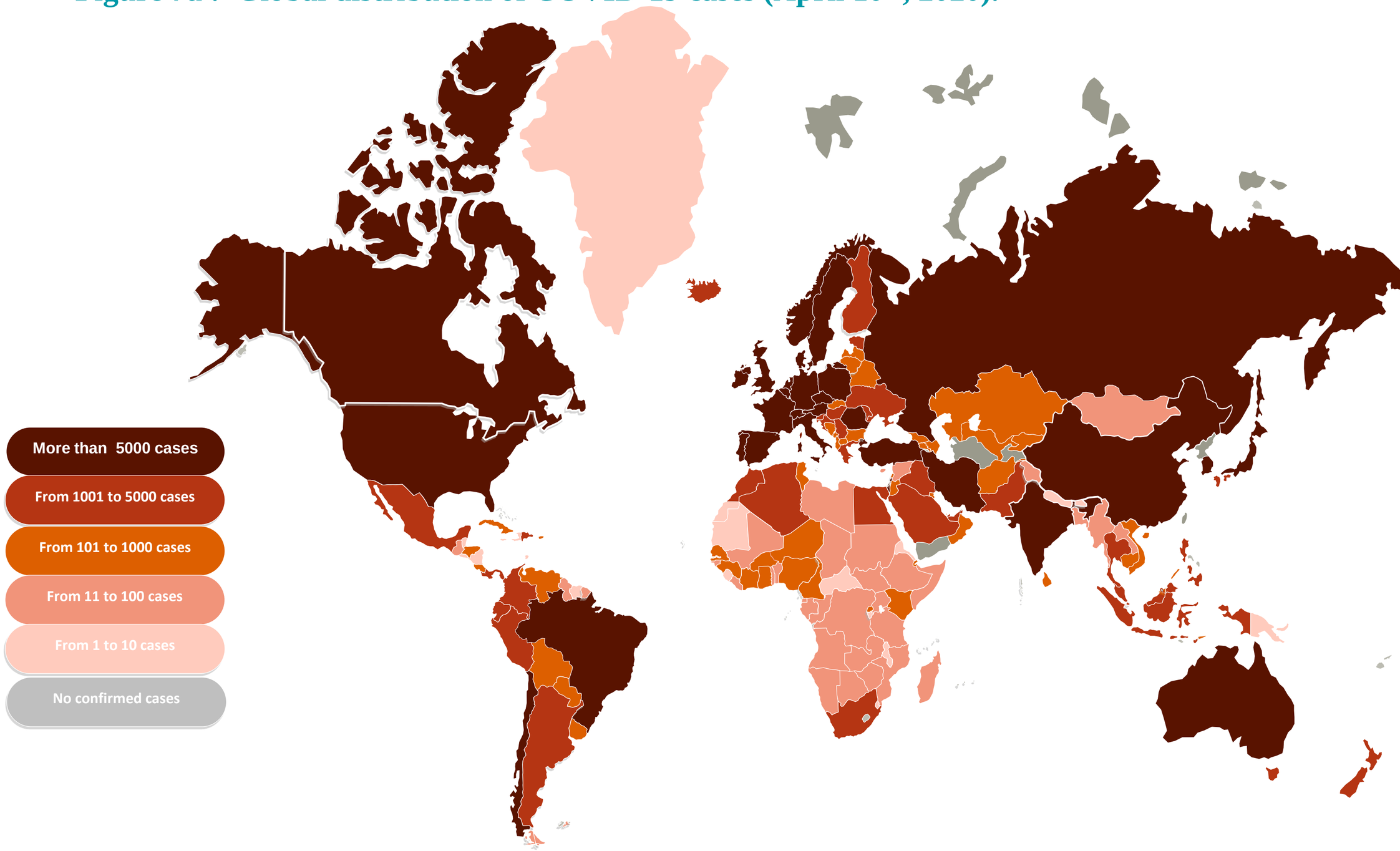
Figure 6: Global daily new deaths due to COVID-19 (January 21 to April 10th, 2020).



Line graph published by Abu Dhabi Public Health Center 2020.
Data resources: WHO

Epidemiology

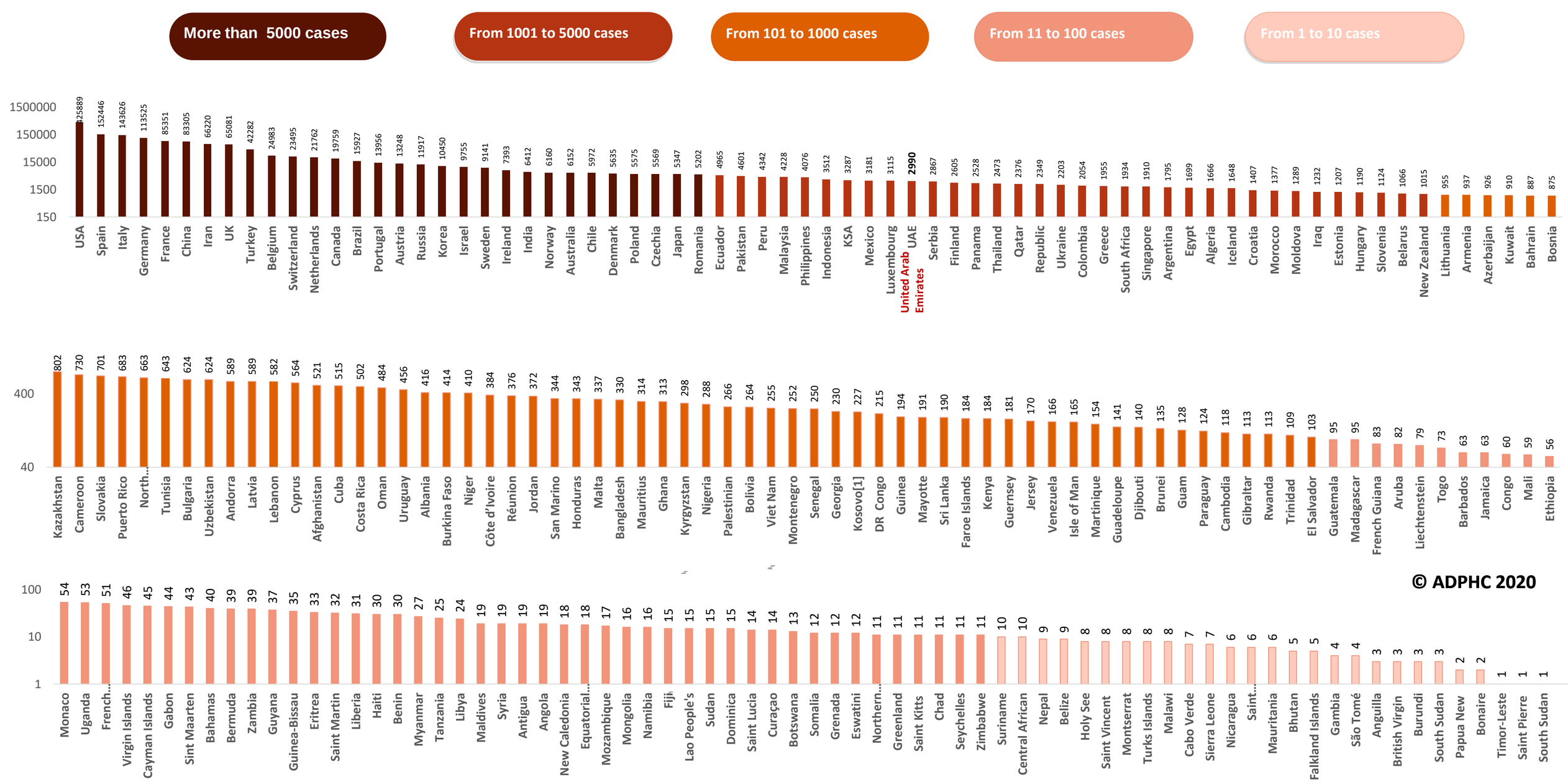
Figure 7a : Global distribution of COVID-19 cases (April 10th, 2020).



Map chart published by Abu Dhabi Public Health Center 2020.

Epidemiology

Figure 7B: Bar chart illustrate the global distribution of COVID19 cases April 10th, 2020)



Map chart published by Abu Dhabi Public Health Center 2020.

Data resources: WHO

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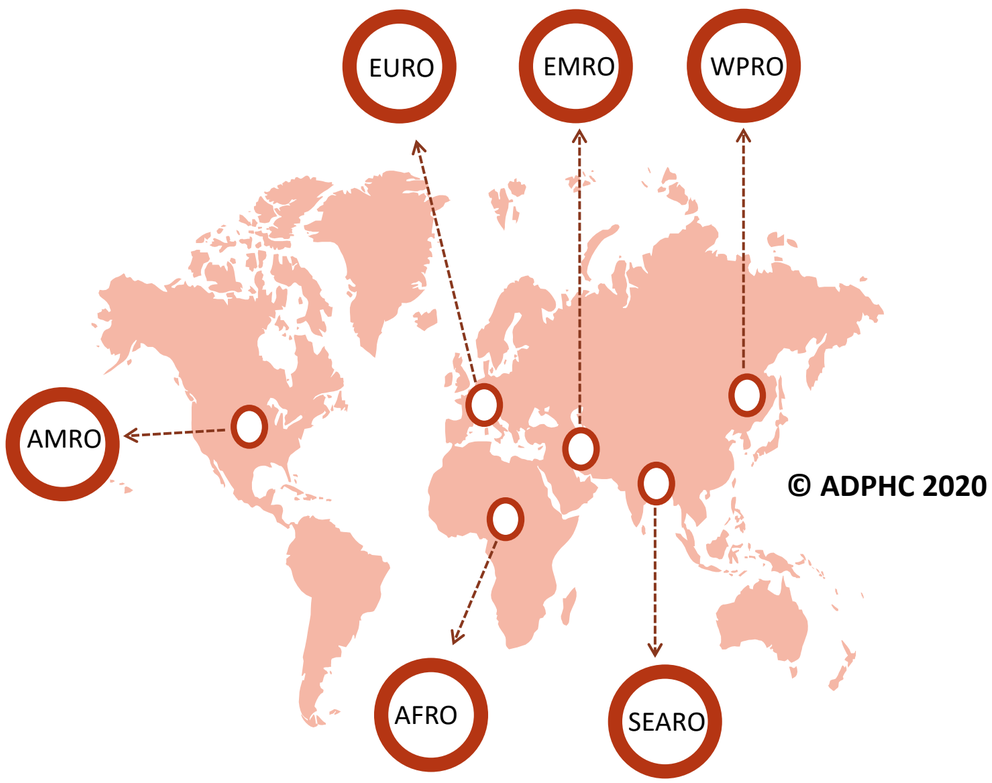
Figure 8: illustrate the Global distribution of COVID19 cases per region (April 10th, 2020)



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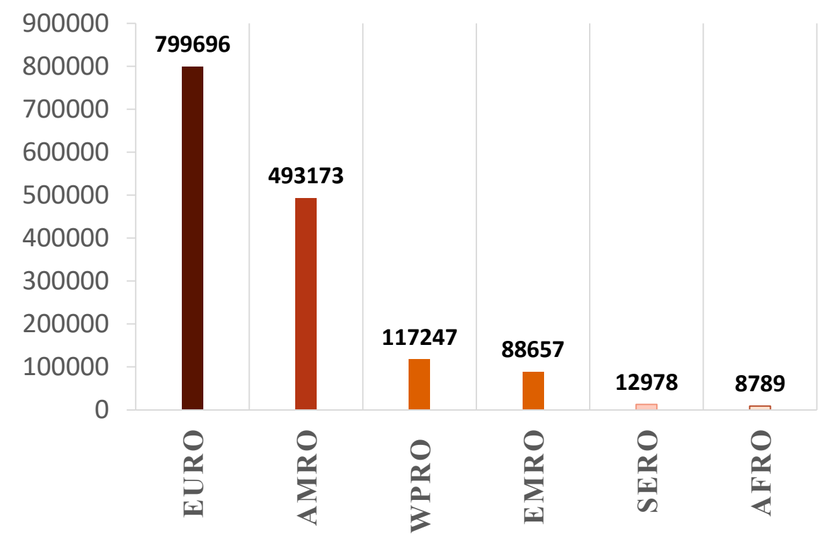
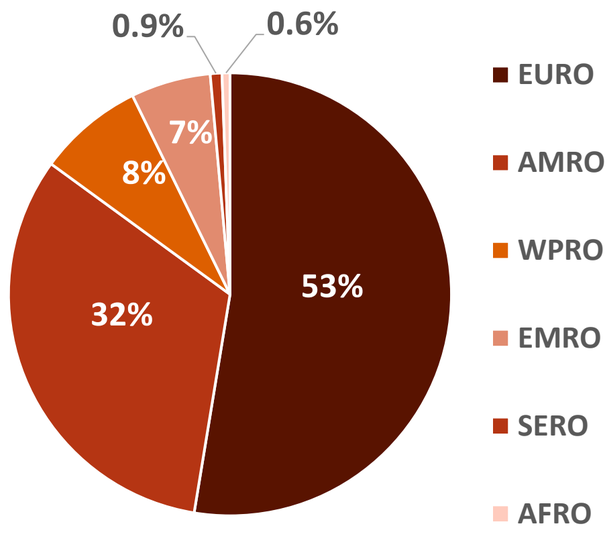
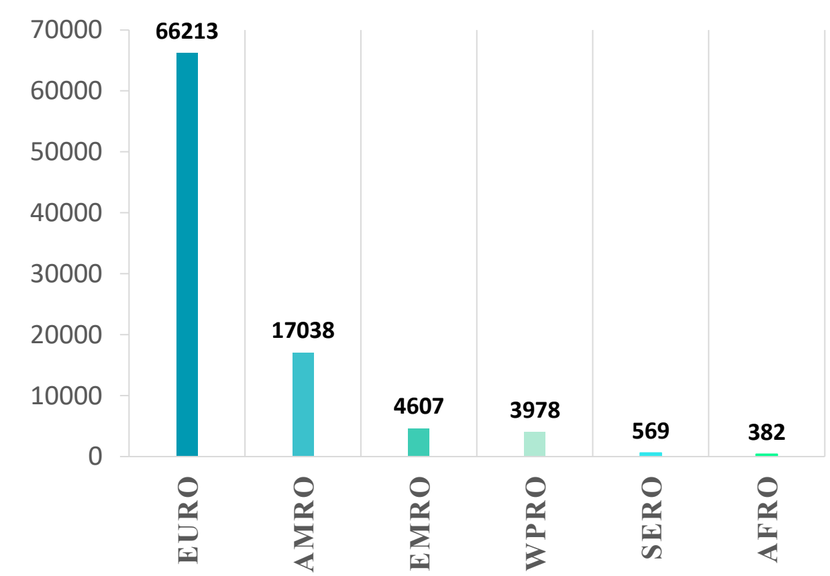
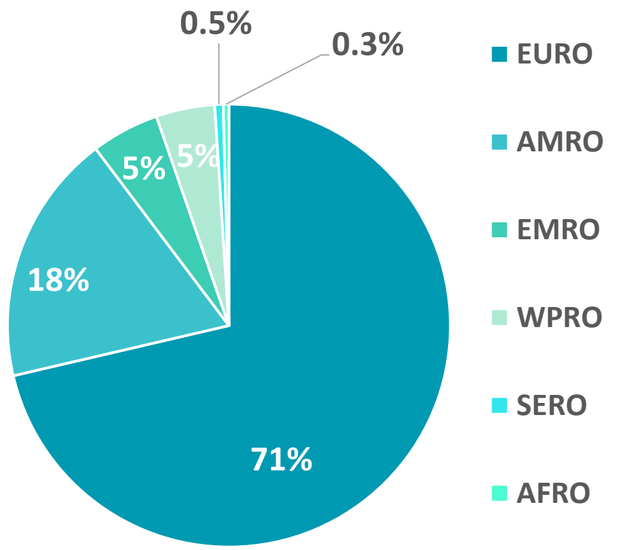
INFECTED





DEATH





Map chart published by Abu Dhabi Public Health Center 2020.
Data resources: WHO

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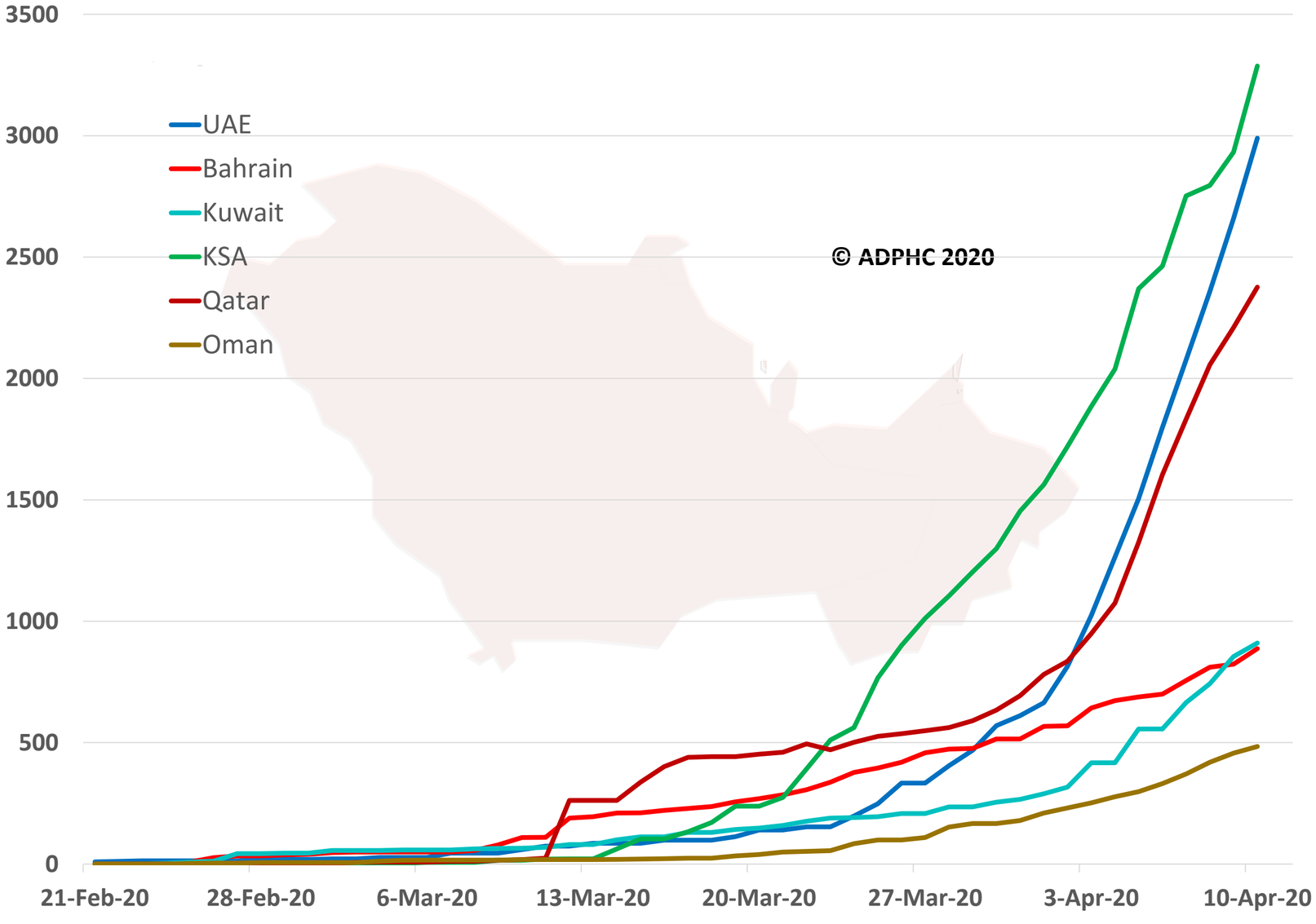
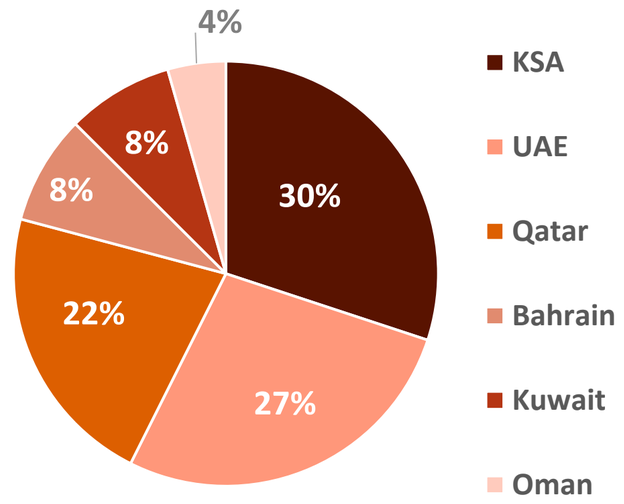
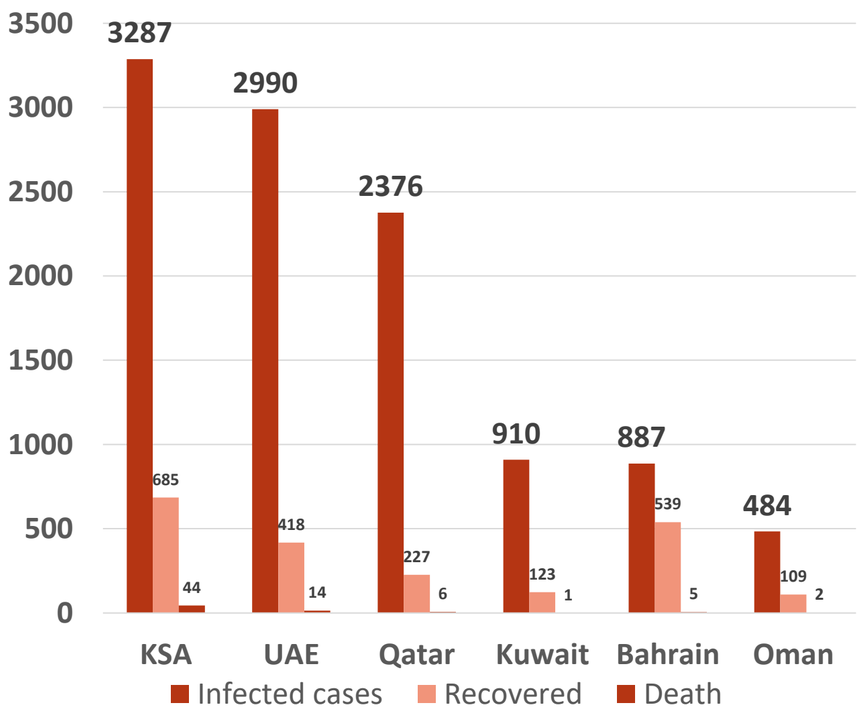
Figure 9: Comparative analysis of the distribution of COVID19 cases in GCC countries (April 10th, 2020)

TOTAL NUMBER OF INFECTED CASES





Total number of infected, recovered and Deaths



Map chart published by Abu Dhabi Public Health Center 2020.

Data resources: WHO

Treatment

Article 1 : COVID-19: Attacks the 1-Beta Chain of Hemoglobin and Captures the Porphyrin to Inhibit Human Heme-Metabolism
Published: : April 8, 2020 by Chemrxiv

Summary:
The article explain how the virus attack the body blood cell and the role of certain drugs in preventing this attack.
The virus proteins attack the hemoglobin Hgb in the blood cell.
The Hgb = globin+ heme (porphyrin + iron ion).
The virus Proteins attack the **heme** on 1-beta chain of hemoglobin to dissociate the **iron** to form **the porphyrin**. The attack will cause less and less hemoglobin that can carry oxygen and carbon dioxide. Body will accumulate **too many harmful iron ions**, which will cause inflammation in the body and **increase CRP and albumin**. This attack can be prevented by **chloroquine** and effectively relieve the symptoms of respiratory distress. Chloroquine **causes loss of Hgb enzyme and insufficient amino acids** for the virus to grow. **Favipiravir** could inhibit the virus envelope protein and the protein binding to porphyrin, prevent the virus from entering host cells, and catching free porphyrins.
We know also that the virus enters human body through spike protein binding human ACE2 receptor causing human infection. **But we found that this binding is weak.** Functions of viral proteins are still unclear.
Conclusion: both **chloroquine** and **favipiravir** can help to relieve some symptoms. More biological studies are needed to understand the role of virus proteins to be able to find treatment.

Public Health Response:

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Article 2: First-wave COVID-19 transmissibility and severity in China outside Hubei after control measures, and second-wave scenario planning: a modelling impact assessment

Published: April 08 2020, The Lancet.

Article summarized by Subject Matter Expert

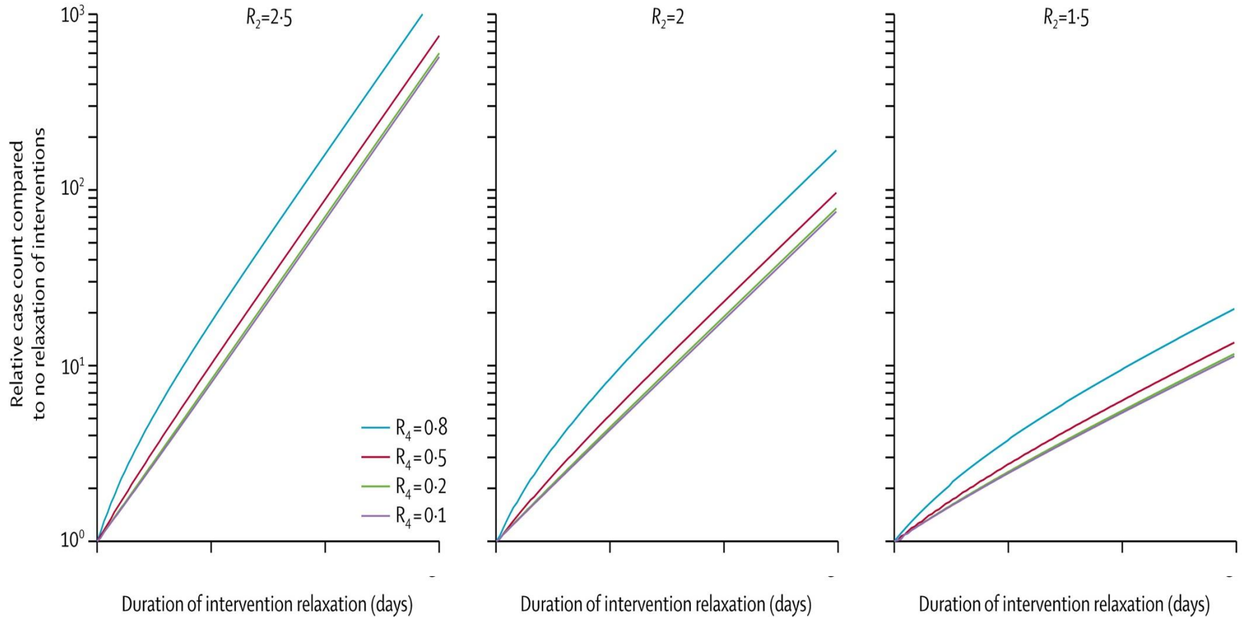
Summary:

What the study look at?

- Transmission and severity of COVID-19 during the first wave in areas outside Hubei, China.
- Modelling of potential adverse results of early relaxation of control measures.

What the study found?

- After applying the control measures, such as, social distancing, lockdowns, contact tracing etc., the transmission of COVID-19 decreased substantially.
- This decrease in infection transmission was for both imported (coming out of the city) and local (within the city) transmission.
- The case fatality rate for COVID-19 in this study was below one, which is a good news.
- In case of early relaxation of control measures and no herd immunity, it is predicted that transmission will increase again, and there will be a second wave of infections.



Public Health Message

- Follow the advice from Health Authorities about staying home, social distancing, lockdowns etc.
- When the number of infections are contained and start to go down, **control measures may be relaxed gradually with close monitoring of new infections especially coming <u>from other countries.</u>**

Public Health Response

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Article 3 : Ensuring and Sustaining a Pandemic Workforce
Published: April 8, 2020 by NEMJ
Summary:

The article gave examples of the current efforts to sustain health care work force during the pandemic in the US, in addition the authors provide some suggestions to enhance it:
Here we add the main new or interesting points:

- The authors are calling to Expand the scope of health care professional practice as required to strengthen the support
- Centers for Medicare and Medicaid Services CMS has taken further steps in the US and issued guidance allowing hospitals to provide benefits to support staff, such **as multiple daily meals, laundry service for personal clothing, or childcare services.**
- Expanding health care manpower:
- Suggestion that Government and private efforts focusing on obtaining and producing ventilators, hospitals will require personnel who can operate these machines; So developing **strategies to deploy respiratory therapists to the hospitals most in need and to develop programs to quickly train** workers are needed.
- Medical students in their third and fourth years who are no longer in clinical rotations can help expand the workforce by **performing various medical tasks to free up clinicians for Covid-19 care. They can, for example, triage and assess patients, collect and analyze data needed for institutional decision making, and perform administrative task**
- Organizations can recruit **health care professionals who have either retired or temporarily left the workforce and encouraging them to return to work.**
- New York City recently saw 1000 retired physicians and nurses volunteer to rejoin whose practices have closed because of COVID-19. **Such health professionals can be trained to conduct screenings**, **take vital signs, provide telephone follow-up of quarantined people with Covid-19**
- Mental health:
- Health care organizations and health departments can also **partner with community health workers**, **peer-support workers**, **occupational and physical therapists**, and **home health workers** to identify and attend to **social needs**, including helping patients with **COVID-19 adhere to their medical treatment**.