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Scientific Research Monitoring on COVID-19

9 May 2020

Summary on COVID19



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

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

Scientific Research

- **Transmission:** study showed the presence of SARS-COV2 in the semen of infected and recovered patient. Further studied are needed to prove whether sexual contact is another route of transmission.
- **Public health response:** researchers develop a calculator to be use by health care system provider and regulator to determine the daily maximum capacity of bed for COVID19 management.
- **Clinical feature and transmission:** Cohort in Italian COVID19 infected children found higher degree of non-household transmission compared to other studies in china and in US.

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.

Others

- [Balancing Expediency and Scientific Rigor in SARS-CoV-2 Vaccine Development, J Infect Dis, 2020 May 4](#)
- [Classification of COVID-19 patients from chest CT images using multi-objective differential evolution-based convolutional neural networks. Eur J Clin Microbiol Infect Dis \(2020\)](#)
- [Combined Treatment of Tocilizumab and Chloroquine on Severe COVID-19: A Case Report, QJM, 2020 May 4.](#)
- [A Case of Postoperative Covid-19 Infection After Cardiac Surgery: Lessons Learned, Heart Surg Forum, 2020 Apr 21.](#)
- [COVID-19 Emergency and the Need to Speed Up the Adoption of Electronic Patient-Reported Outcomes in Cancer Clinical Practice. JCO Oncol Pract, 2020 May 1.](#)



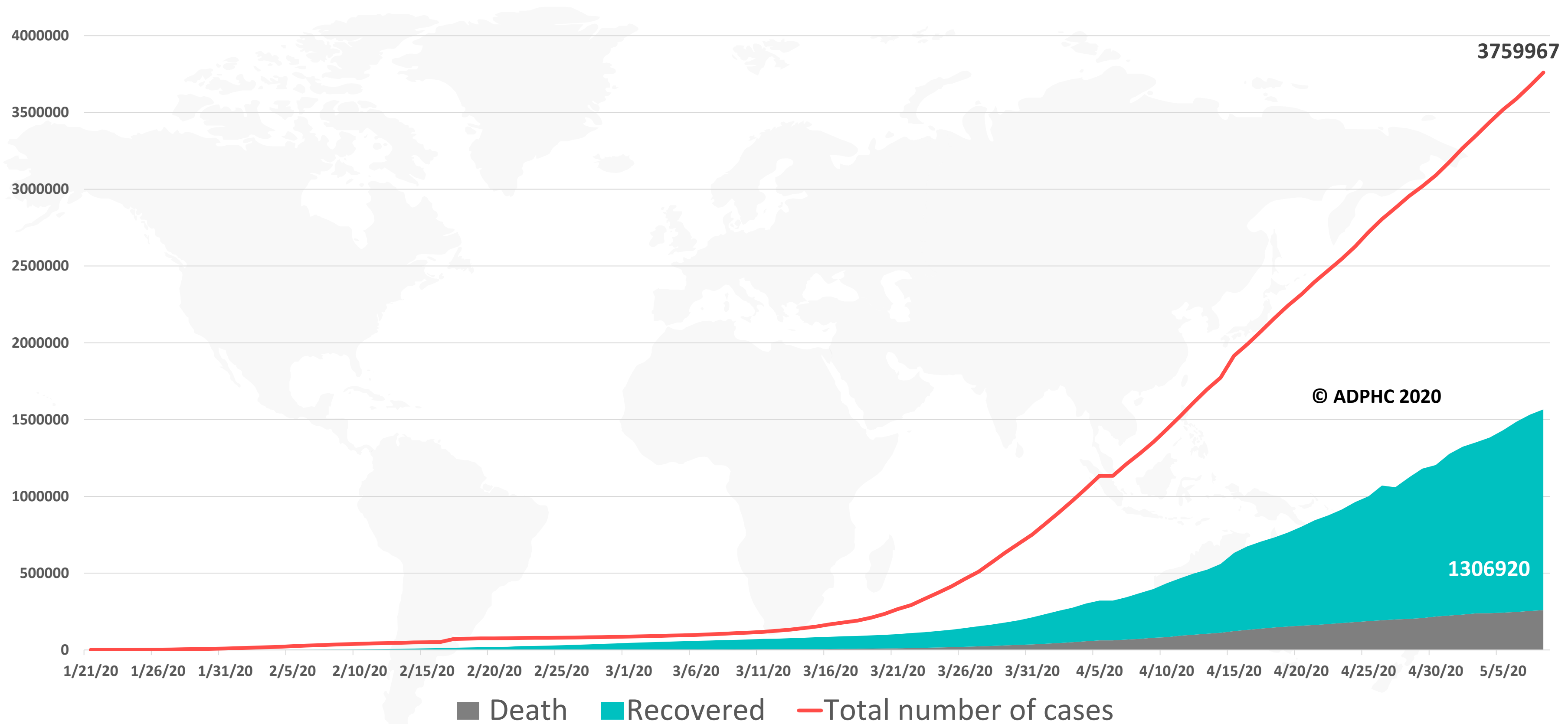
WHO daily report 8 May 2020

- WHO launched a **checklist to support prison administrators and policy-makers** for rapid and effective response to COVID-19.
- WHO is supporting several African countries to coordinate and **reinforce the work of emergency medical teams (EMTs)** deployed to support the efforts to contain the spread of COVID-19 pandemic.
- The WHO Regional Director for Europe, Dr. Hans Henri P. Kluge stated **his concern about the increase in interpersonal violence during COVID-19**, and emphasized that “violence is preventable, not inevitable”.
- At the **third meeting of the International Health Regulations (IHR) (2005) Emergency Committee for COVID-19**, the WHO Director-General reaffirmed that the outbreak of COVID-19 continues to constitute a public health emergency of international concern and issued the Committee’s advice to States Parties as Temporary Recommendations under the IHR..

Epidemiology



Figure 1: Total number of infected, recovered, and death cases (January 21st to May 8, 2020)

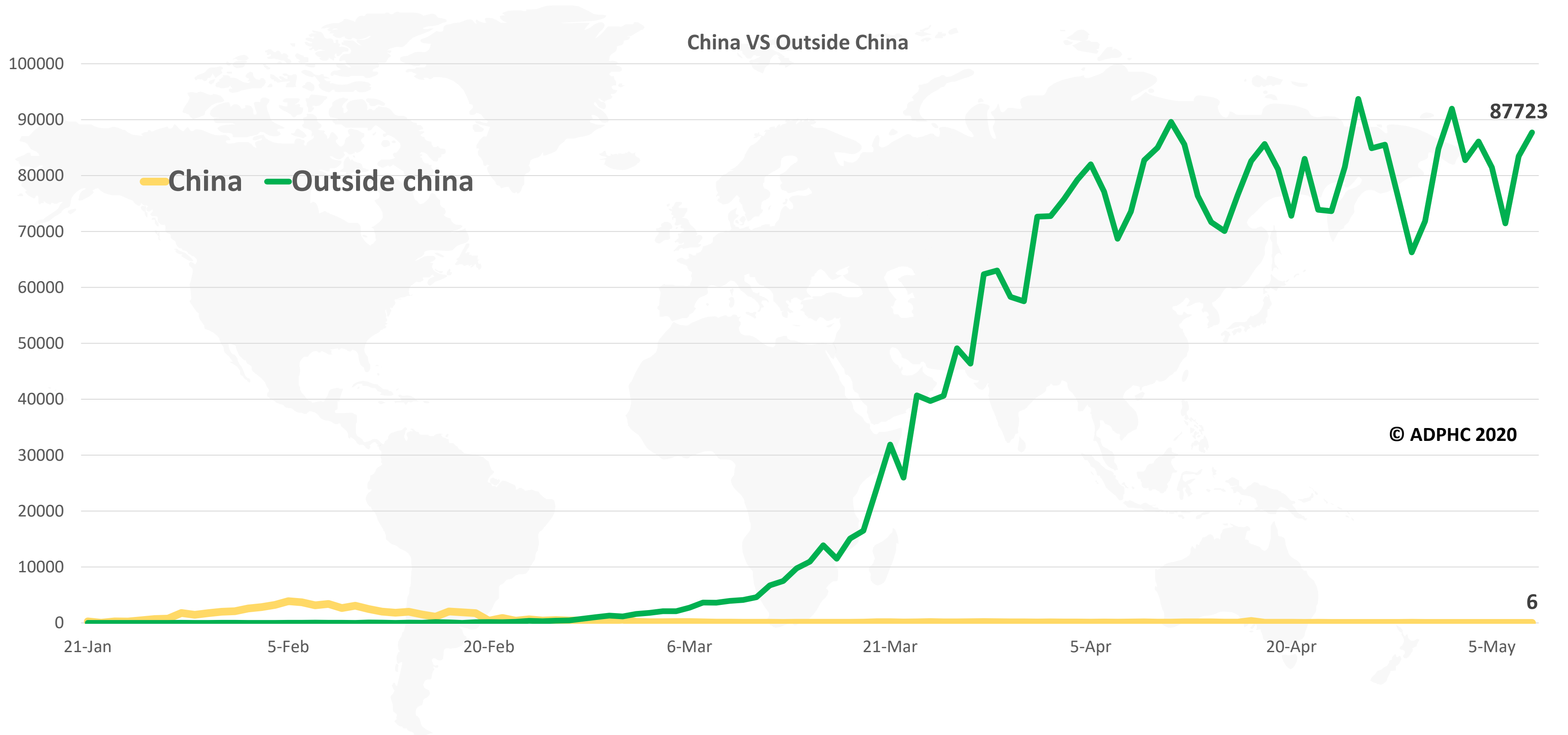


Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: [WHO](#), [John Hopkins University](#)



Figure 2: Daily new infected COVID-19 cases reported between (January 21 to May 8, 2020).



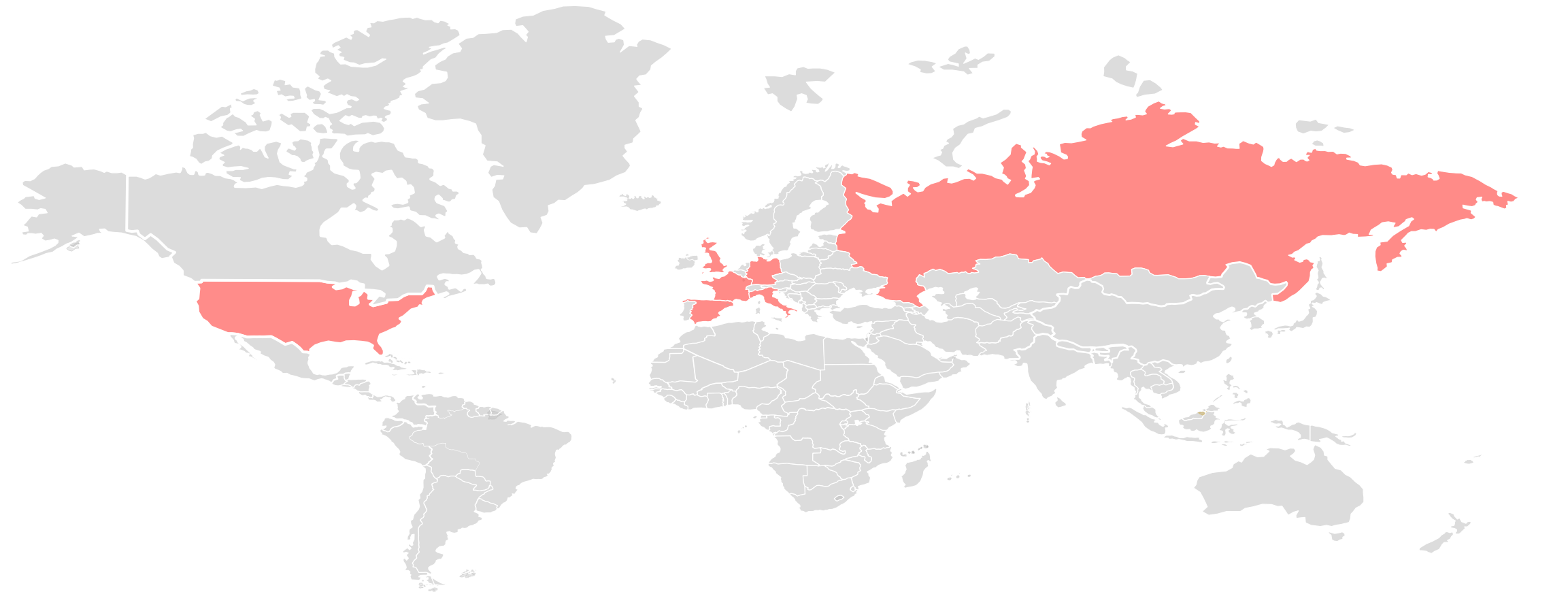
Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: [WHO](https://www.who.int/)

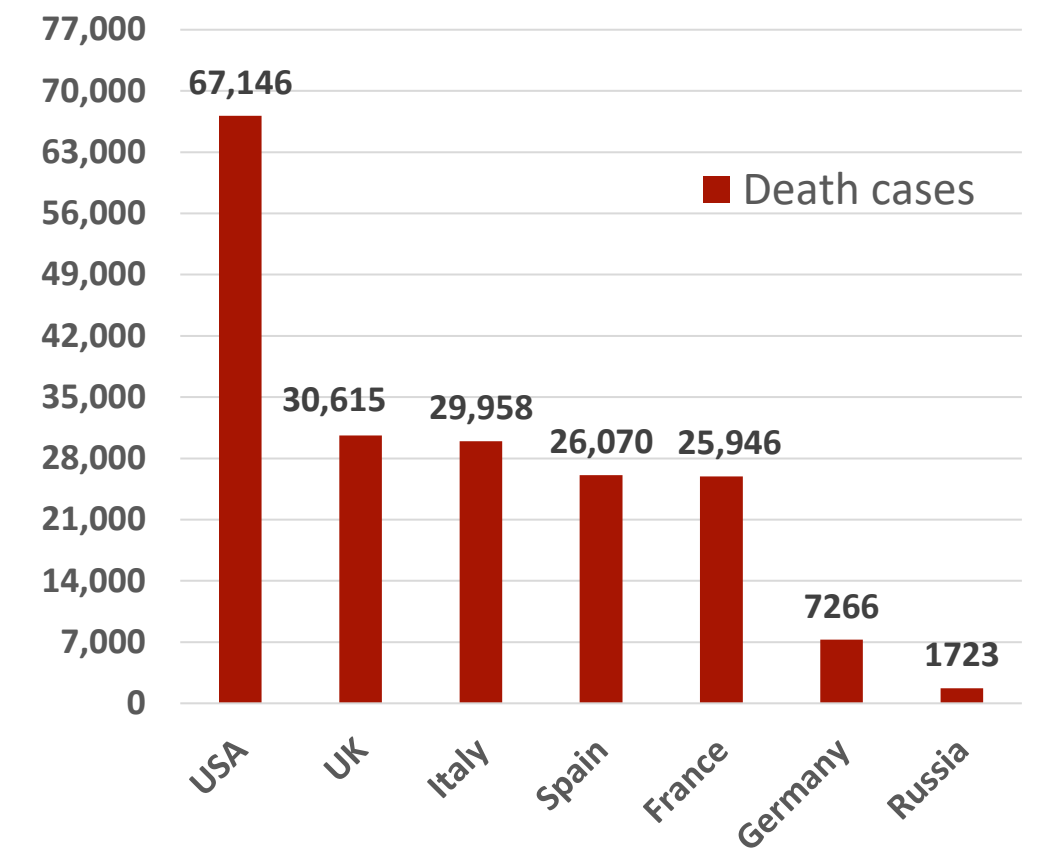
Epidemiology



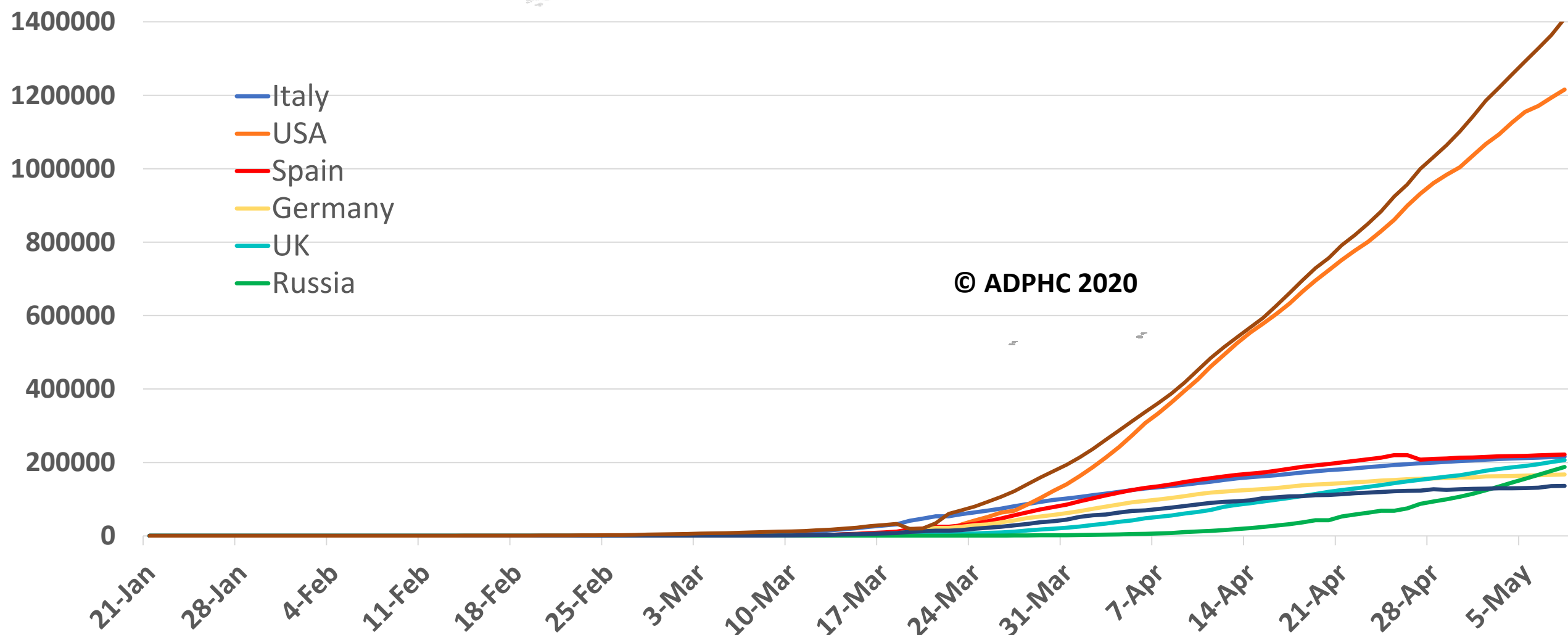
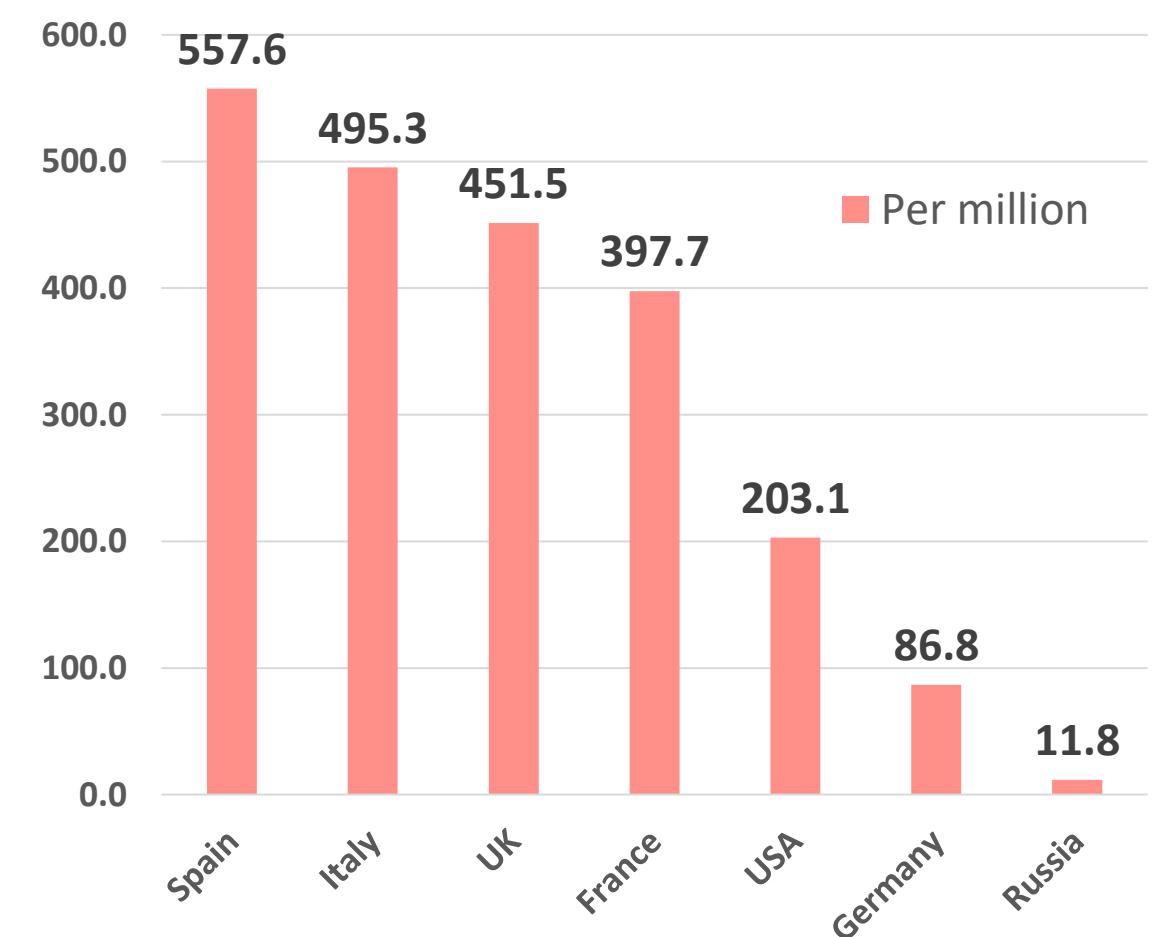
Figure 3 : Top 7 countries in the total number of cases due to COVID-19 (January 21 to May 8, 2020).



TOTAL DEATHS



DEATHS PER MILLION

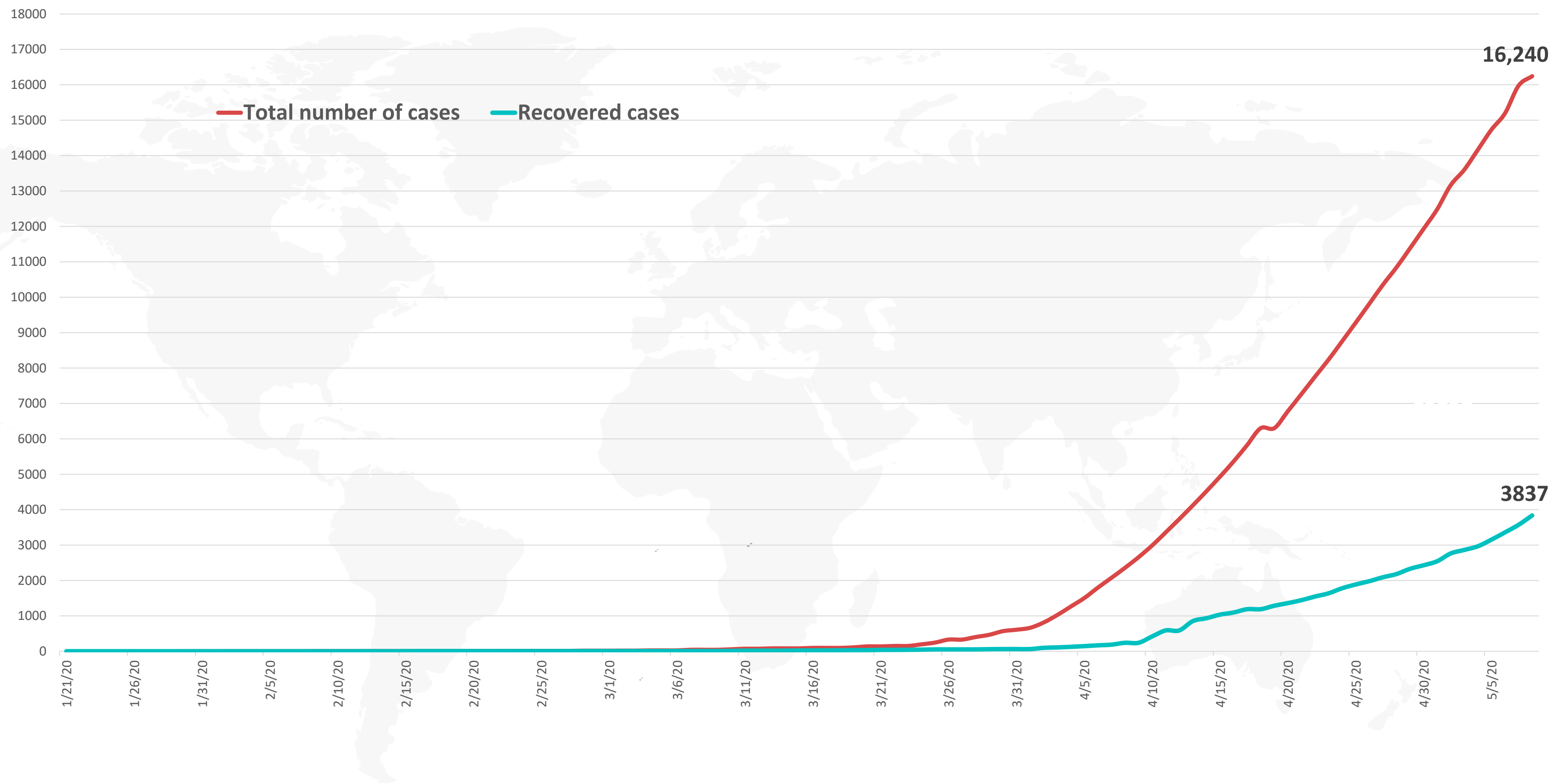


Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: [WHO](https://www.who.int)



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



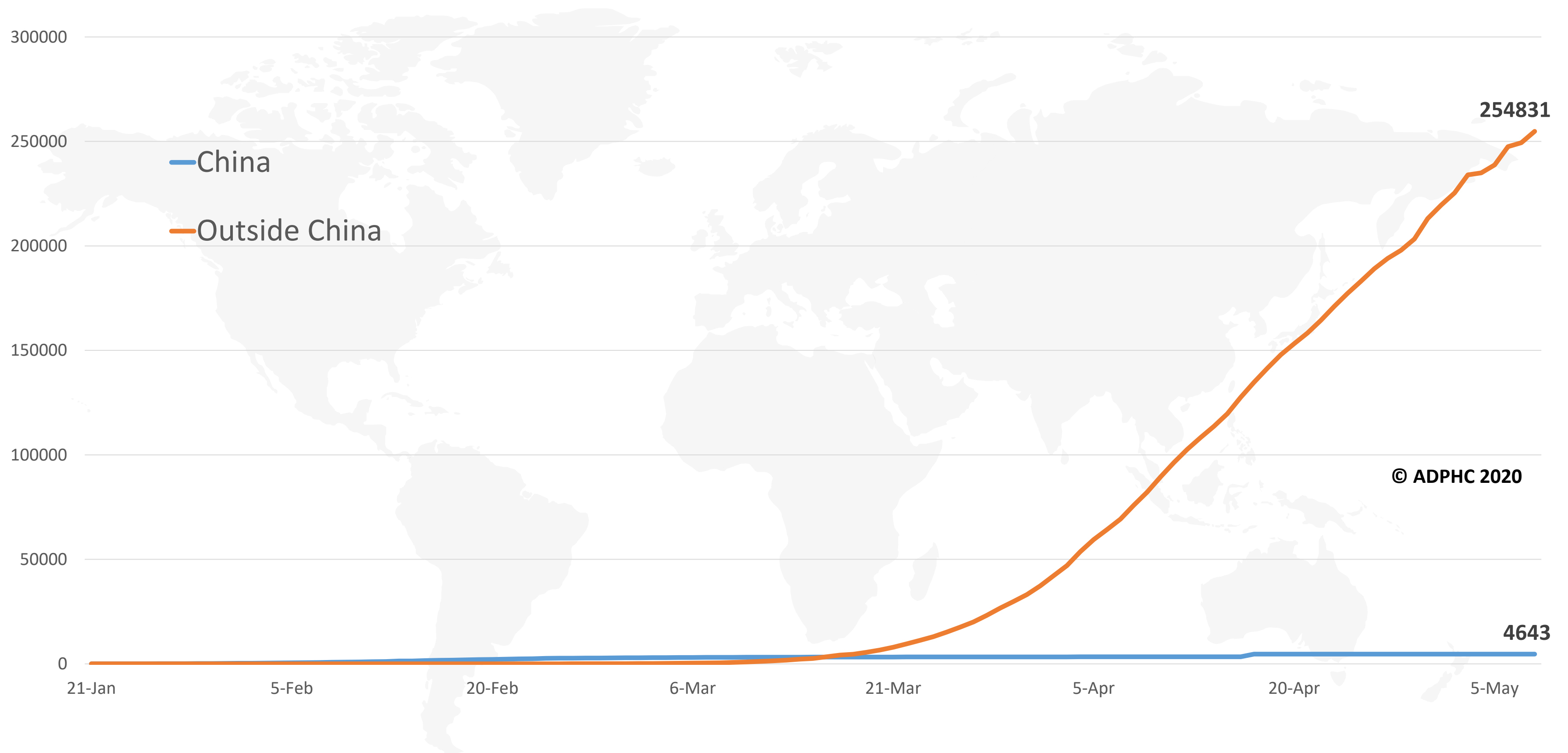
Line graph published by Abu Dhabi Public Health Center 2020.

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 22 to May 8, 2020).



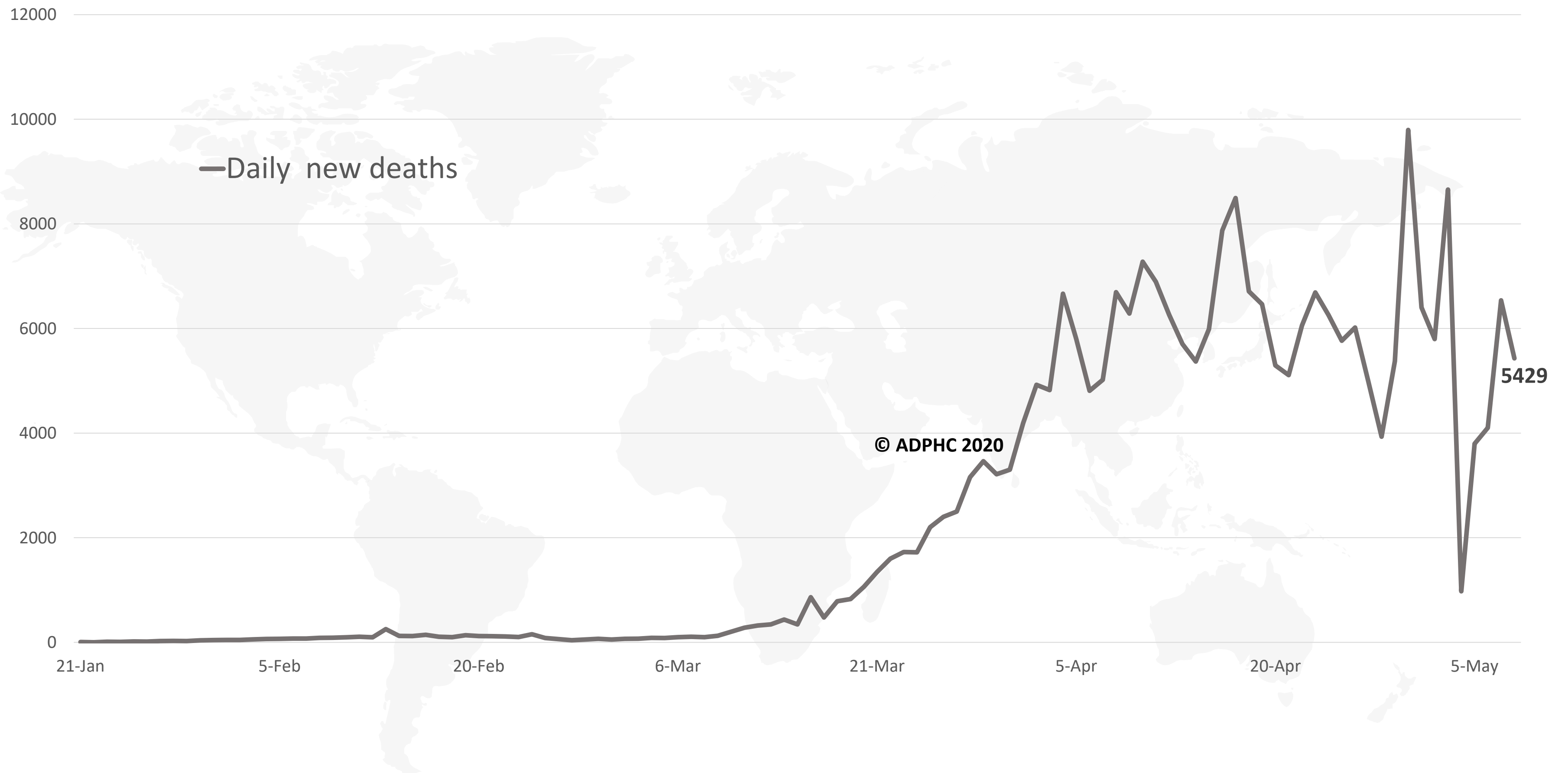
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Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: [WHO](https://www.who.int/)



Figure 6: Global daily new deaths due to COVID-19 (January 22 to May 8, 2020).



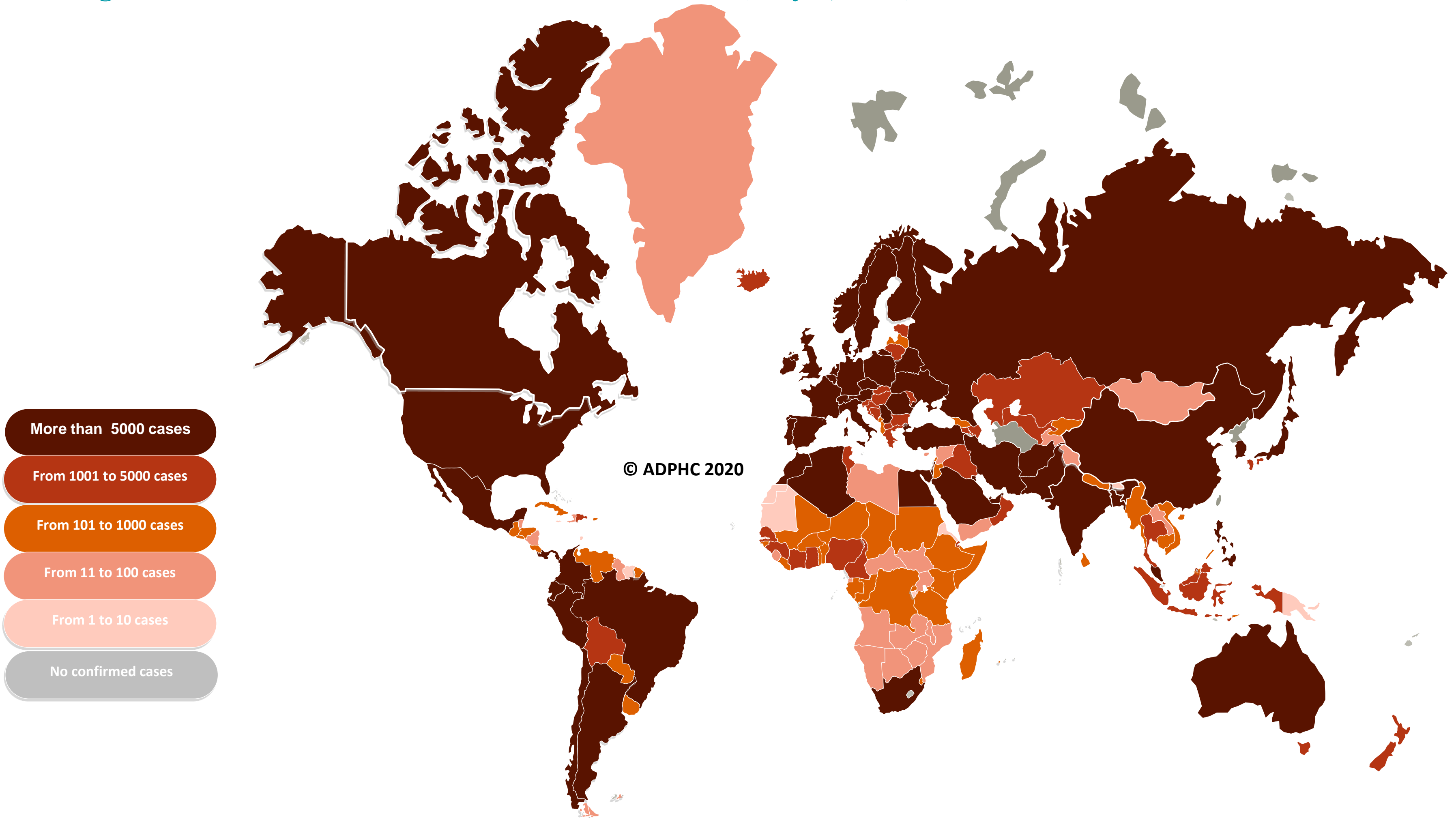
Line graph published by Abu Dhabi Public Health Center 2020.

Data resources: [WHO](https://www.who.int/)

Epidemiology



Figure 7a : Global distribution of COVID-19 cases (May 8, 2020).

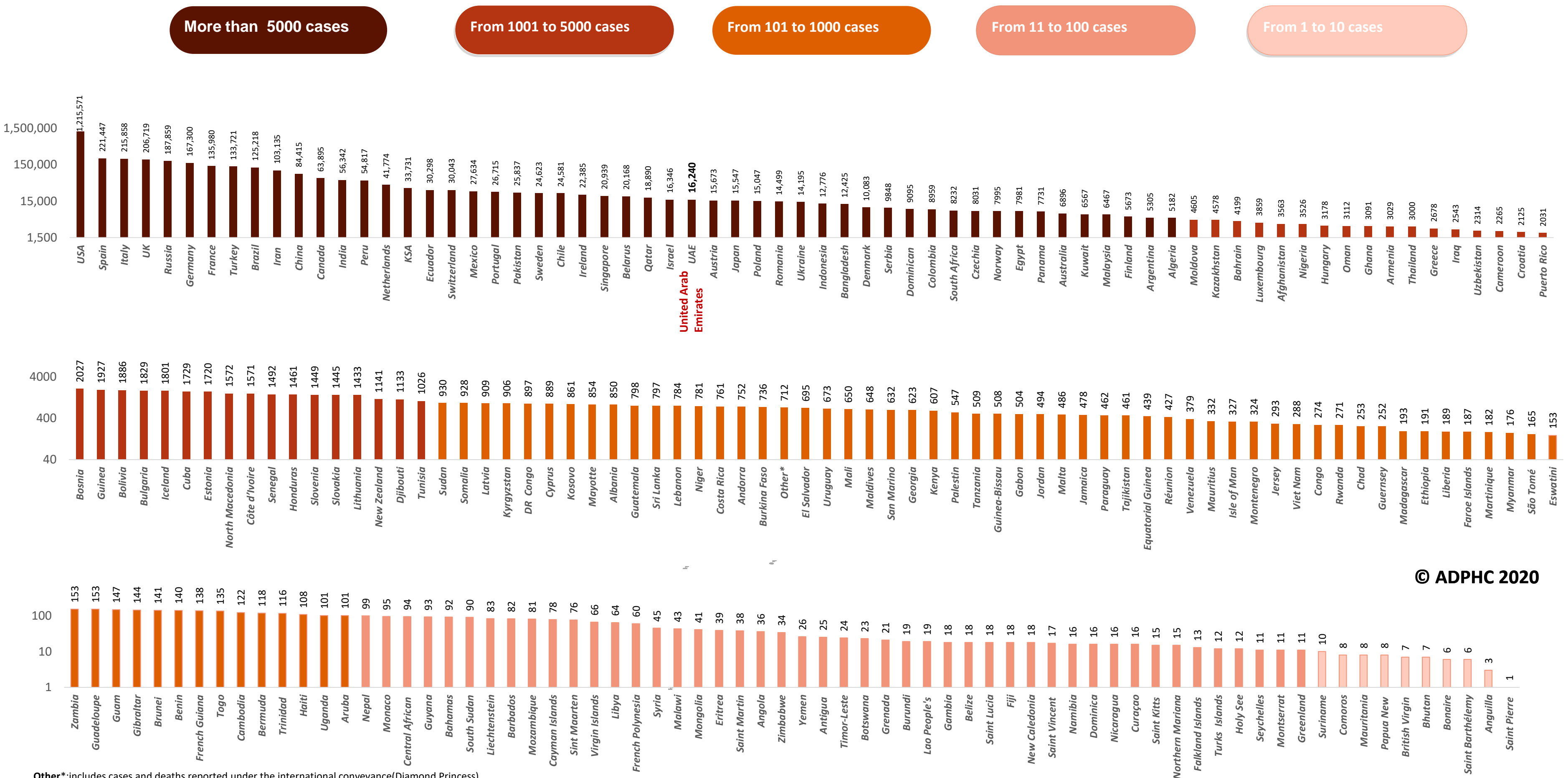


Map chart published by Abu Dhabi Public Health Center 2020.

Epidemiology



Figure 7B: Bar chart illustrate the global distribution of COVID19 cases May 8, 2020)



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

Map chart published by Abu Dhabi Public Health Center 2020.

Data resources: [WHO](https://www.who.int/)

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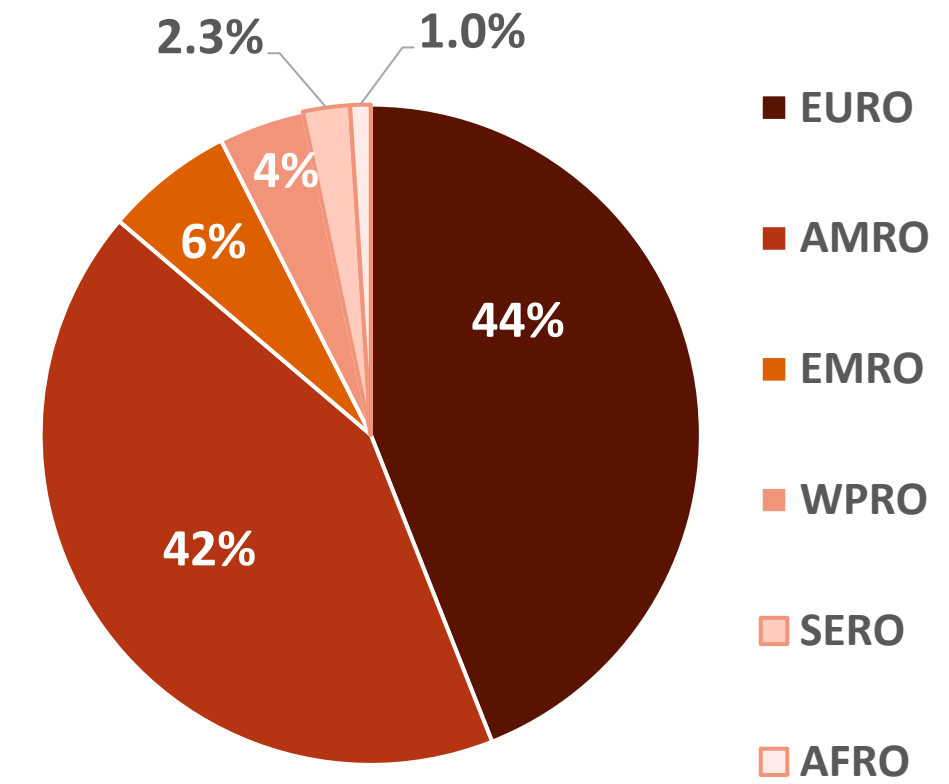
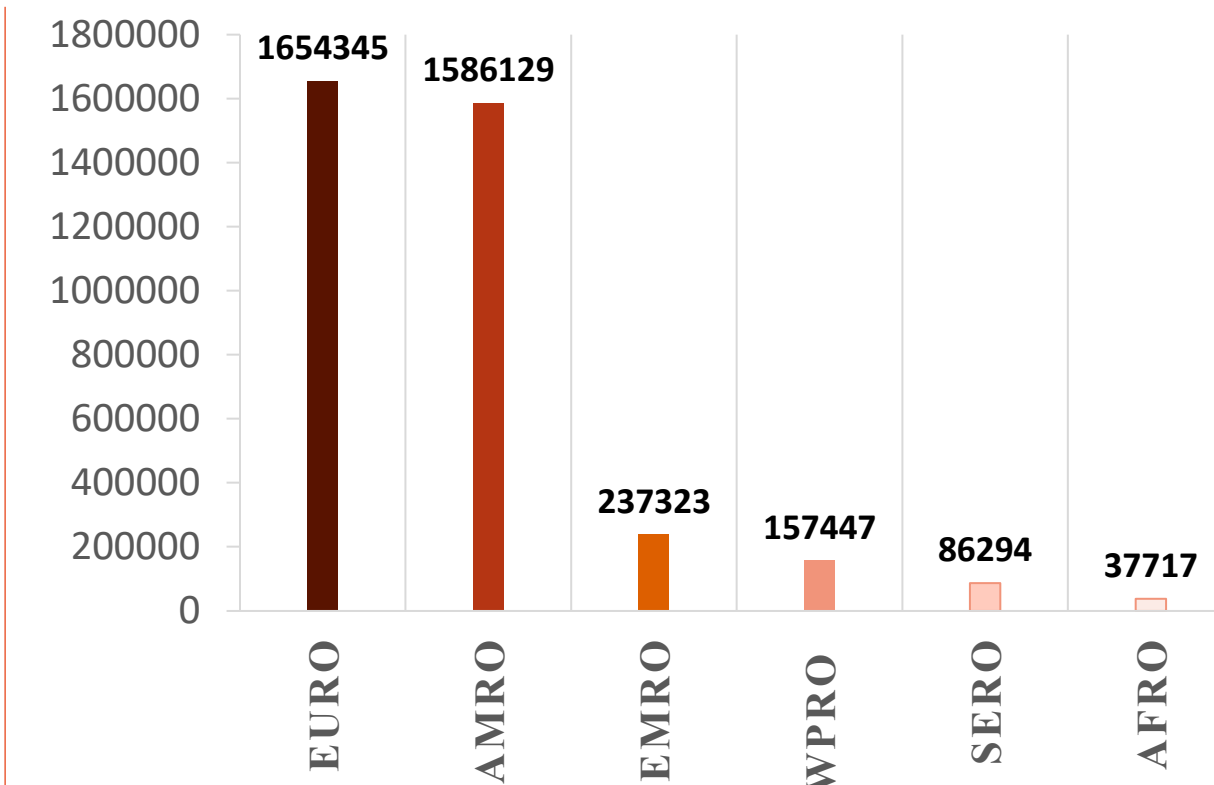
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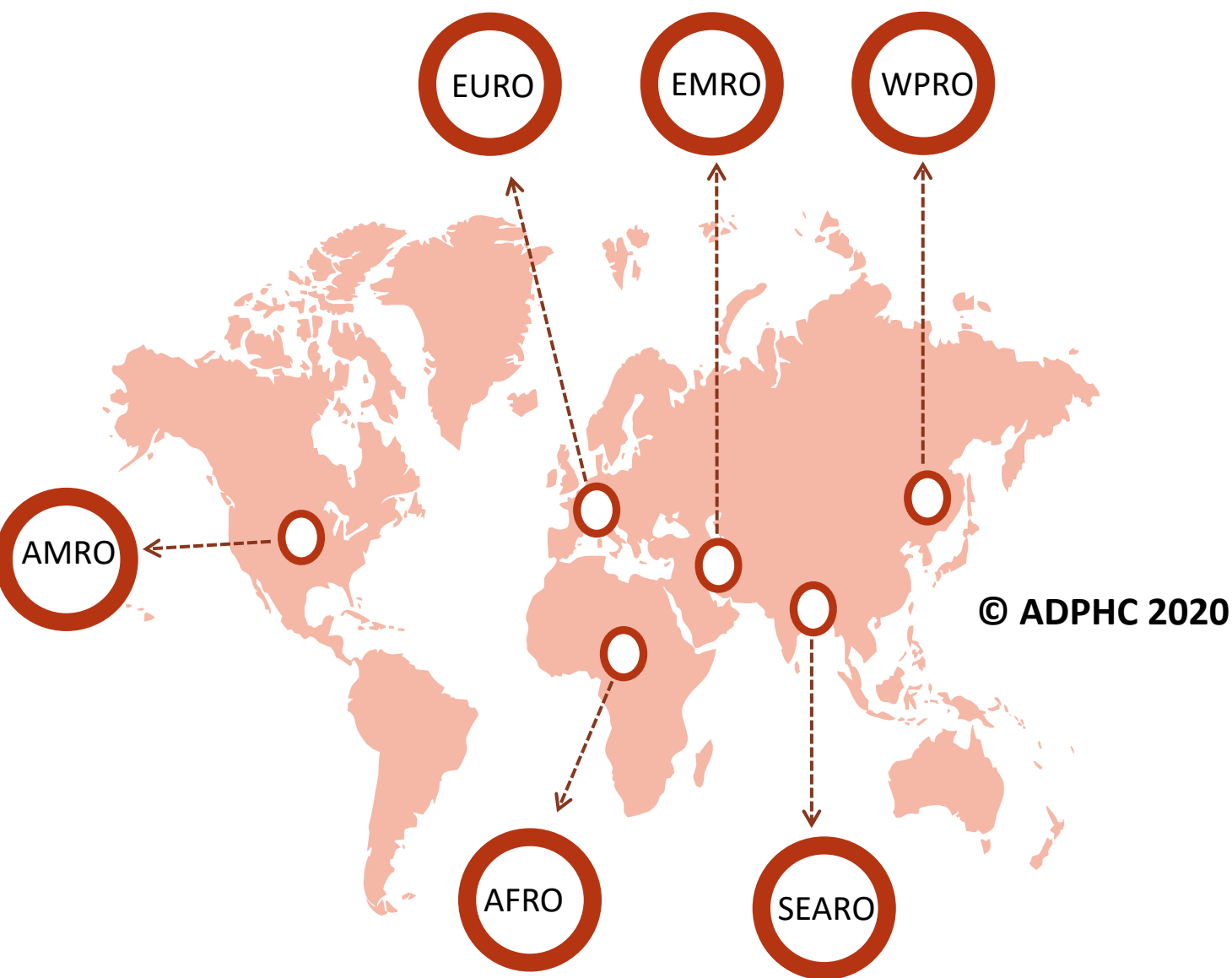
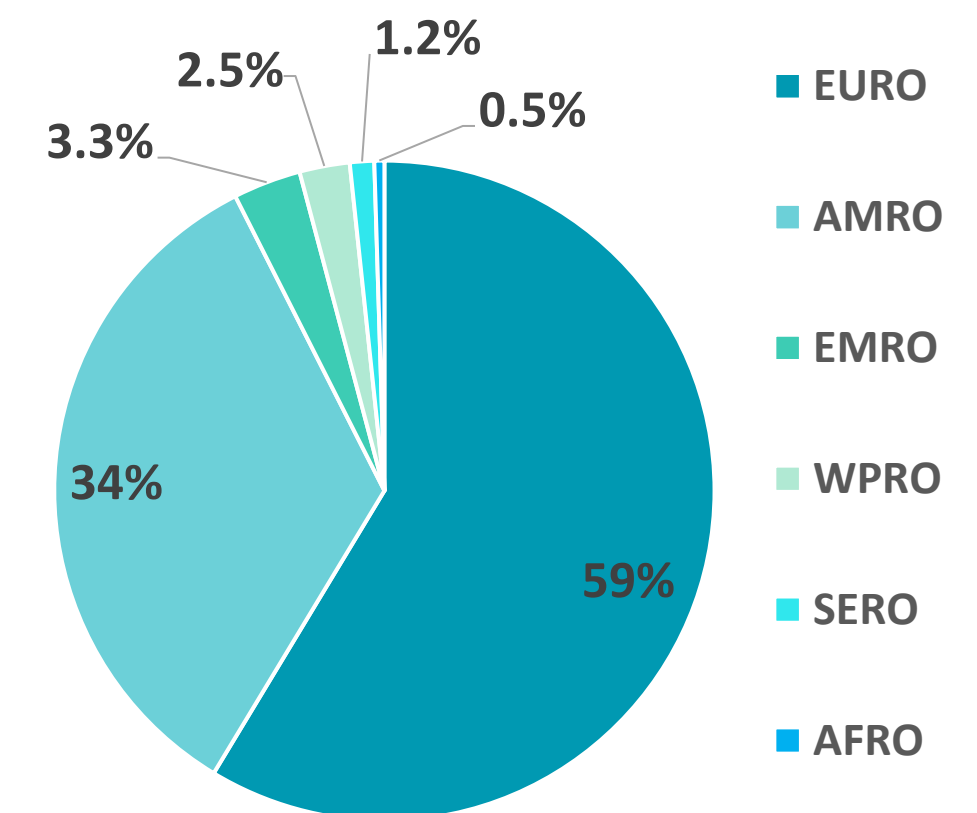
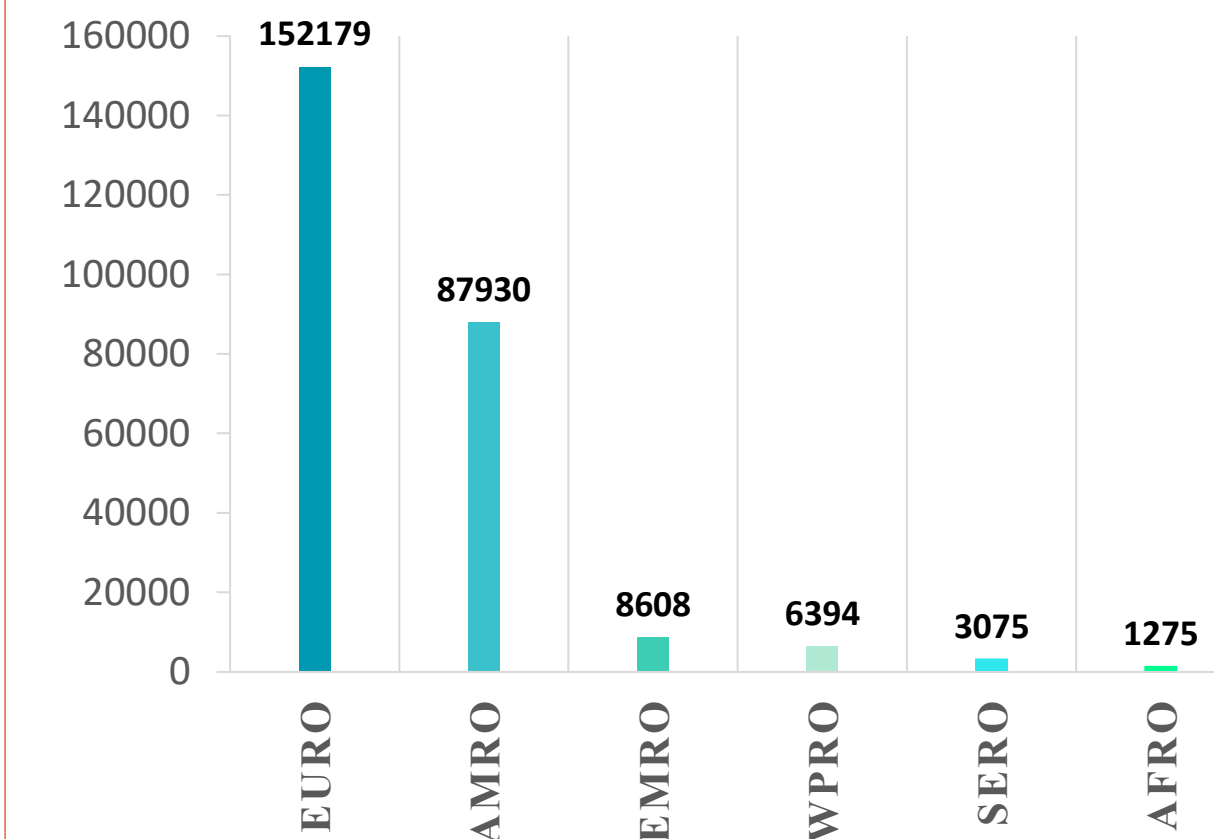
Figure 8: illustrate the Global distribution of COVID19 cases per region (May 8, 2020)

INFECTED



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DEATH



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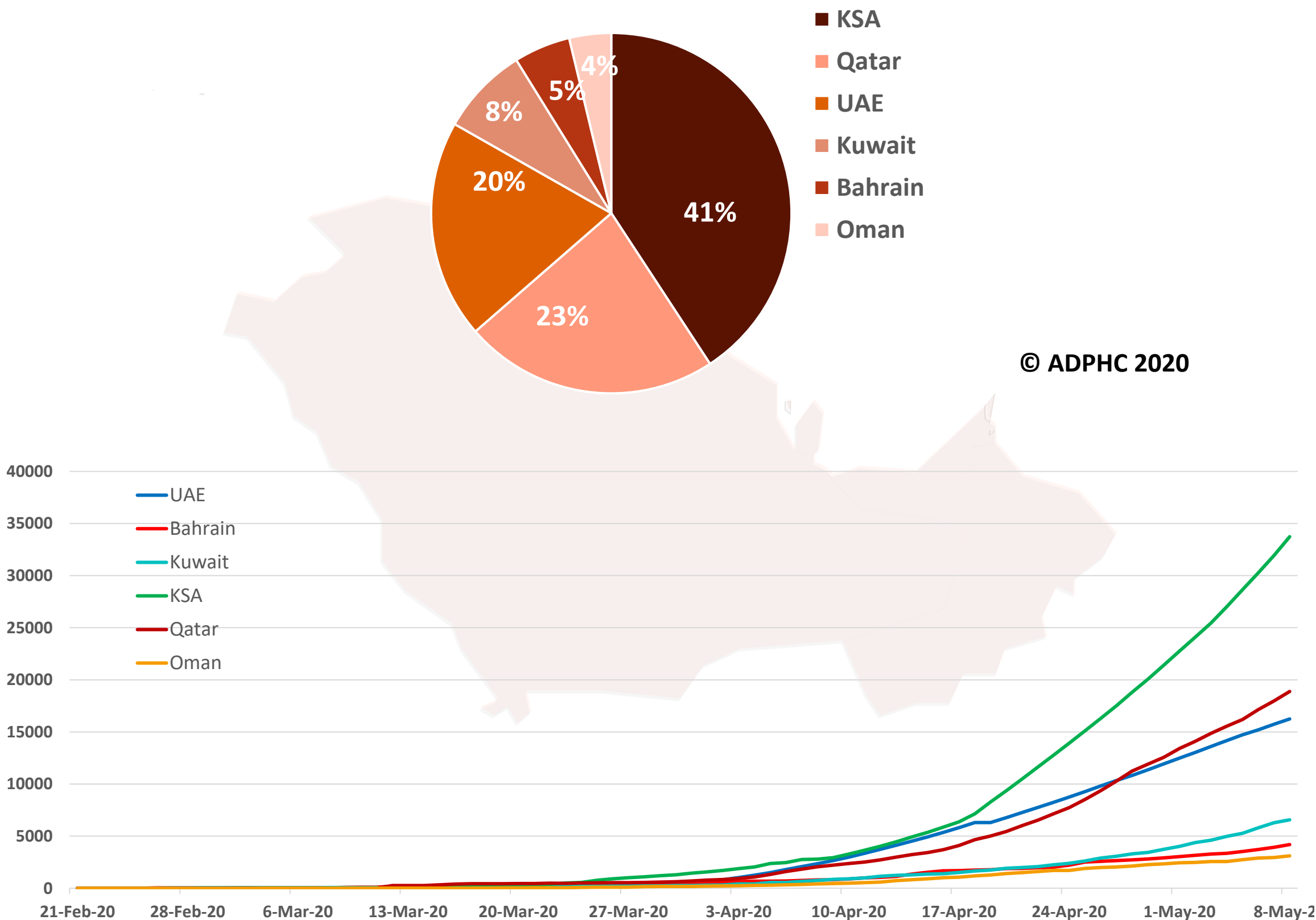
Map chart published by Abu Dhabi Public Health Center 2020.

Data resources: [WHO](https://www.who.int/)

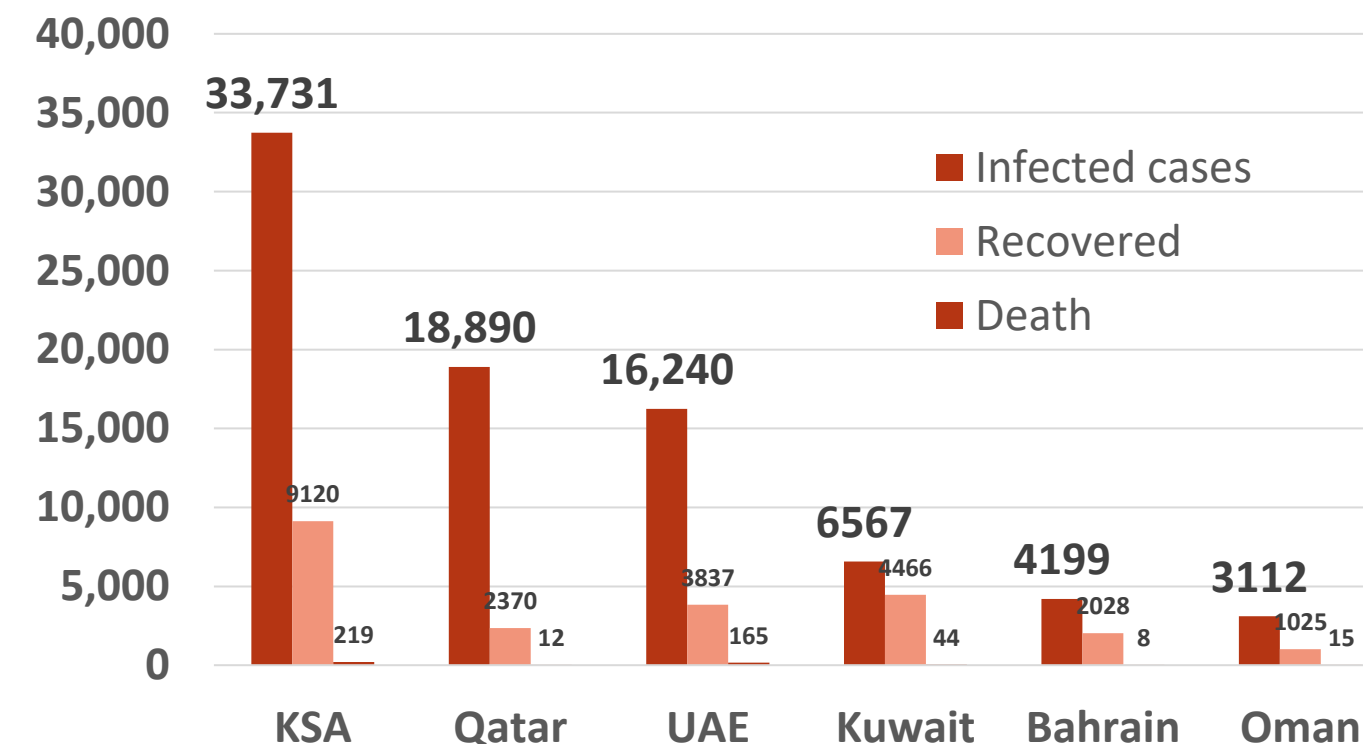


Figure 9: Comparative analysis of the distribution of COVID19 cases in GCC countries (May 8, 2020)

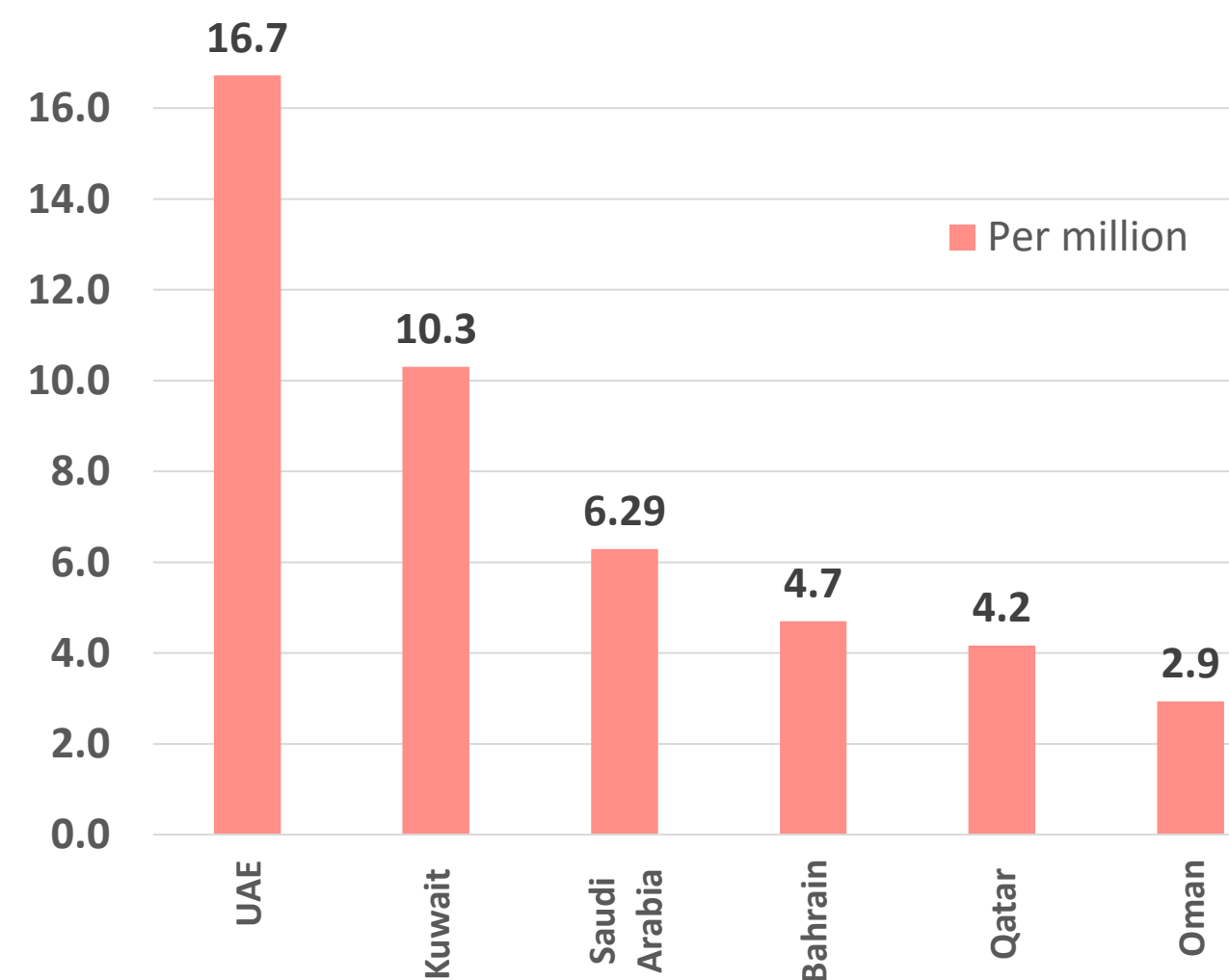
TOTAL NUMBER OF INFECTED CASES



Total number of infected, recovered and Deaths



Death per million



charts published by Abu Dhabi Public Health Center 2020.

Data resources: [WHO](https://www.who.int/)

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Article 1: Clinical Characteristics and Results of Semen Tests Among Men With Coronavirus Disease 2019

Published: May 7, 2020 in the [JAMA](#)

Summary:

- A 50 patient were enrolled in one of the COVI19 hospital in china to study the presence of SARA-COV2 in the semen specimen. 38 patients were able to provide the sample.
- Finding
- Six patients (15.8%) had results positive for SARS-CoV-2, including 4 of 15 patients (26.7%) who were at the acute stage of infection and 2 of 23 patients (8.7%) who were recovering
- The study have certain limitation such as sample size , viral shedding , concentration, lack of follow up which is makes it to early to draw a conclusion.
- If it could be proved that SARS-CoV-2 can be transmitted sexually in future studies, sexual transmission might be a critical part of the prevention of transmission, especially considering the fact that SARS-CoV-2 was detected in the semen of recovering patients.

Table. Clinical Characteristics of Patients With Positive Test Results for Severe Acute Respiratory Syndrome Coronavirus 2 in Semen

Patient ^a	Approximate age, y ^a	Time since onset of symptoms, d	Time since hospitalization, d	Time since clinical recovery, d	Presence of urogenital disease	Other comorbidity
1	20s	6	2	NA ^b	No	Coronary heart disease, hypertension
2	20s	10	6	NA ^b	No	Coronary heart disease
3	30s	11	5	NA ^b	No	No
4	40s	9	8	NA ^b	No	No
5	50s	12	10	2	Yes	No
6	30s	16	13	3	No	Chronic bronchitis

Abbreviation: NA, not applicable.

^b Patient was still in the acute stage of infection.

^a For the purpose of anonymity, patients are identified by number and their ages are given as approximates.



Public Health Response

Article 2: Estimating the Maximum Capacity of COVID-19 Cases Manageable per Day Given a Health Care System's Constrained Resources

Published: 2020 Apr 16. in PMC , Annals of internal medicine

Summary:

As some health care systems approach collapse, a pressing need exists for tools modeling the capacity of acute and critical care systems during the COVID-19 pandemic. A team in Ontario health department in Canada generated an online tool to estimate the maximum number of COVID-19 cases that could be managed per day within the catchment area served by a health care system, given acute and critical care resource availability.

The tool first calculates the maximum daily turnover of acute care beds, critical care beds, and mechanical ventilators available for patients with COVID-19 by taking the maximally available number of each of those resources for these patients and dividing it by the expected duration of their use for patients with COVID-19.

The tool then calculates the population-weighted age-stratified probabilities of COVID-19 cases requiring acute care hospitalization and critical care and those who might be mechanically ventilated..

Finally, the maximum number of new COVID-19 cases per day that a health care system could manage is calculated by dividing the daily turnover of maximally available acute care beds, critical care beds, or mechanical ventilators by the probability of each resource being used among COVID-19 cases. The tool outputs maximum numbers of manageable cases per day separately for acute care beds, critical care beds, and mechanical ventilators and created a chart per our input. (figure 1)

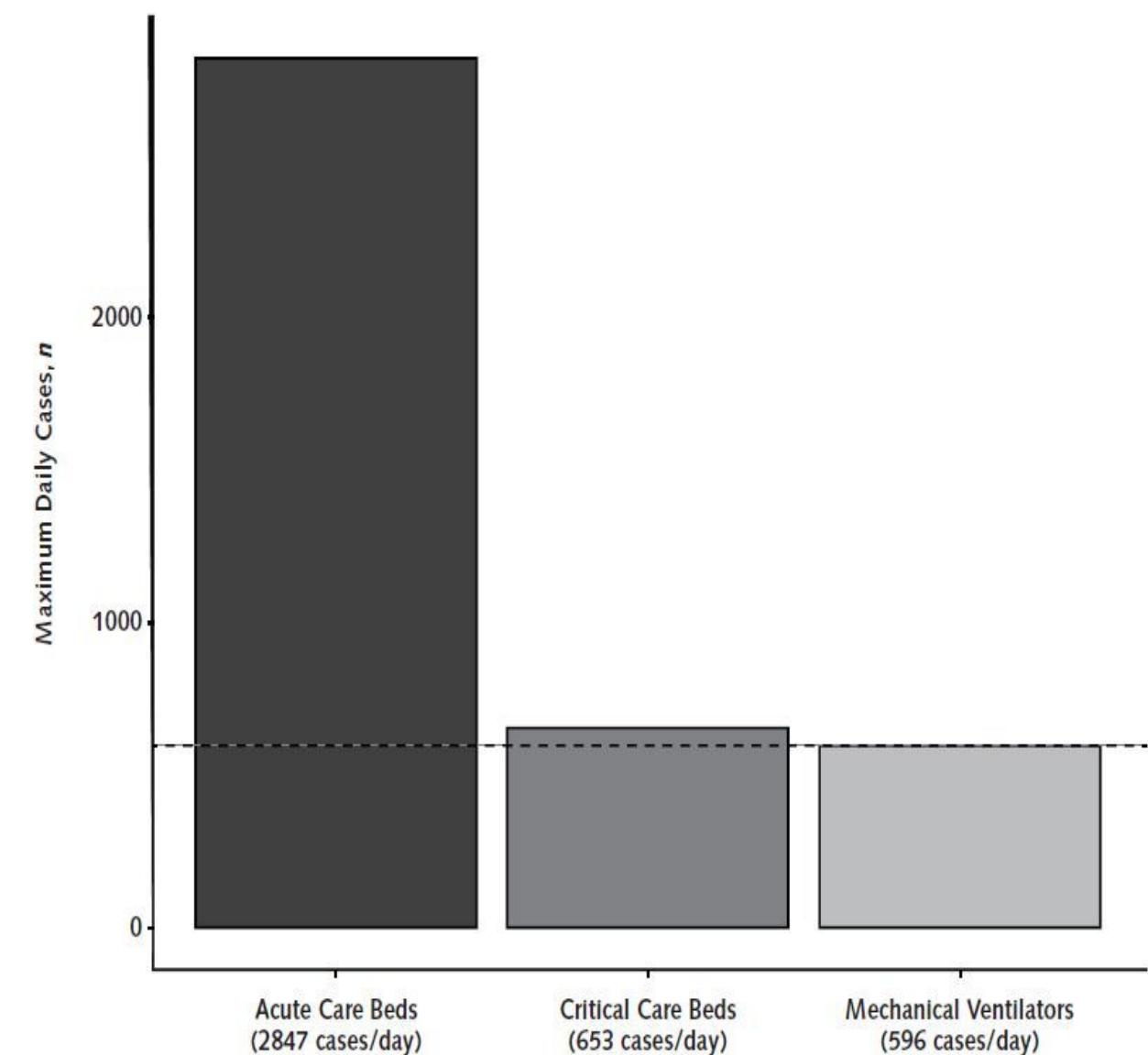


Public Health Response

Article 2: Cont.,

Findings:

By using an online tool, health care systems can estimate the maximum number of COVID-19 cases per day that could be managed on the basis of age-based case distribution and severity and the number of maximally available acute and critical care resources. Unlike forecasting instruments, this tool determines a sustainable threshold for resource use during the pandemic rather than forecasting when resources might become depleted on the basis of assumptions about reporting, epidemic growth, and reproduction numbers. The online tool is available on <https://caic-rt.shinyapps.io/CAIC-RT> and although the application of Canadian, Chinese, Italian, and U.S. data were used as a default parameters, which may not be generalizable to all health care systems, the tool allows its inputs and parameters to be tailored to use in any region of the world and applied to either a large health care system (such as a national or state-level system) or to an individual hospital. Although the default parameters for age-based case distribution and severity reflect data from the United States and acute and critical care resource availability inputs reflect provincial data from province of Ontario in Canada, users can modify these parameters to match their local data.



The CAIC-RT default output.

The default output of CAIC-RT is the maximum number of COVID-19 cases per day manageable by the health care system in Ontario, Canada, on the basis of resource constraints. The tool outputs steady-state estimates of the maximum number of cases based on existing acute care bed, critical care bed, and mechanical ventilator capacities so that health care systems can determine its capacity.



Clinical Feature and transmission

Article 3: Children with Covid-19 in Pediatric Emergency Departments in Italy

Published: May 1, 2020 in the [NEJM](#)

Summary:

A cohort study consisted of 100 Italian children younger than 18 years of age with confirmed Covid-19 was carried out between 3-27 March. The result was compared with three previous cohorts (1 in USA and 2 in China). By March 25, Italy had the second highest number of Covid-19 infections worldwide. Children younger than 18 years of age who had Covid-19 composed only 1% of the total number of patients; 11% of these children were hospitalized, and none died.

The median age was 3.3 years . **Exposure in 55 % was from unknown source or from a source outside the child's family.** Around 12% of the children appeared ill to pediatric emergency. 38% of the patients were admitted to the hospital because of symptoms, irrespective of the severity of disease. **21% asymptomatic,**

Outcome : 58% had mild disease, 19% had moderate disease, 1% had severe disease, and 1% were in critical condition. Severe and critical cases were diagnosed in patients with coexisting conditions (not mentioned).

- In comparison, transmission through apparent exposure to a **family cluster was lower than that in other cohorts,** possibly because of the late lockdown in Italy.

Clinical Feature and transmission



Article 3 : Cont.,

Table 1. Epidemiologic Characteristics, Clinical Features, and Outcomes in the Italian CONFIDENCE Cohort as Compared with Other Cohorts.*

Characteristics	CONFIDENCE Study (N=100)	Lu et al. ³ (N=171)	Dong et al. ⁴ (N=731)	CDC MMWR ⁵ (N=2572)†
Median age (range) — yr	3.3 (0–17.5)	6.7 (1 day–15 yr)	7 (NA)	11 (0–17)
Age distribution — no. (%)				
<1 yr	40 (40.0)	31 (18.1)	86 (11.8)	398 (15.5)
1 to <6 yr	15 (15.0)	40 (23.4)	137 (18.7)	NA
6–10 yr	21 (21.0)	58 (33.9)	171 (23.4)	NA
>10 yr	24 (24.0)	42 (24.6)	337 (46.1)	NA
Sex — no./total no. (%)				
Female	43/100 (43.0)	67/171 (39.2)	311/731 (42.5)	1082/2490 (43.4)
Male	57/100 (57.0)	104/171 (60.8)	420/731 (57.5)	1408/2490 (56.5)
Coexisting conditions — no./total no. (%)	27/100 (27.0)	NA	NA	80/345 (23.2)
Exposure to SARS-CoV-2 — no./total no. (%)				
Family cluster	45/100 (45.0)	131/171 (76.6)‡	NA	168/184 (91.3)
Other exposure	48/100 (48.0)	2/171 (1.2)	NA	16/184 (8.7)
Unknown exposure	7/100 (7.0)	15/171 (8.8)	NA	0
Outcome — no./total no. (%)				
Admitted	67/100 (67.0)	NA	NA	147/2572 (5.7)
Admitted for signs and symptoms	38/100 (38.0)	NA	NA	NA
Admitted and awaiting swab results	4/100 (4.0)	NA	NA	NA
Admitted for isolation	25/100 (25.0)	NA	NA	NA
Survived — no./total no. (%)	100/100 (100.0)	170/171 (99.4)	730/731 (99.9)	2569/2572 (99.9)
Died — no./total no. (%)	0	1/171 (0.6)	1/731 (0.1)	3/2572 (0.1)